# ACADEMIC BULLETIN

## 2021-2022

COCHIN UNIVERSITY OF SCIENCE AND TECHNOLOGY
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# PREFACE

This edition of the Academic Bulletin aims at giving a brief overview of the course structure as well as regulations for the various graduate and post- graduate programmes offered in the University. We believe that this bulletin will enable the students to choose electives according to their interest in the topic. The details of the faculty in each Department along with their specializations are given in the text. Information in this bulletin is organised faculty wise and Department wise- within each faculty. Clarifications regarding any detail which is not included in the bulletin can be obtained from the concerned Head of the Department. It may be noted that the rules and regulations are subject to changes, depending on subsequent decisions taken by the academic bodies.

The Academic Bulletin Committee is thankful to all the Directors of Schools/ Heads of Departments and the University authorities for extending all sort of Co-operation in bringing out this bulletin. We would also like to place on record our appreciation to the staff of Academic Section for their administrative help and support.

Sri. Baby Chakrapani

Dr. S Sabu

Dr.SujaHaridas

Dr. S.M. Sunoj (Convenor)

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| 32 | Dr. Glory Joseph | : | Professor, Civil Engineering Division, School of Engineering |

## REGULATION FOR POST GRADUATE PROGRAMMES UNDER CHOICE BASED CREDIT SYSTEM (CBCS) OFFERED BY THE UNIVERSITY DEPARTMENTS/SCHOOLS/CENTRES
## (To be effective from 2021 admissions)

1. **SCOPE**

1.1 These Regulations shall apply to all M. Sc., MA, MBA and MCA, programmes conducted by the Departments/Schools of the Cochin University of Science and Technology with effect from 2021 admissions.

1.2 The provisions herein supersede all other Regulations with respect to such PG programmes unless otherwise provided.

2. **DEFINITIONS**

2.1 ***Academic Committee*** means the committee constituted by the Vice-Chancellor under this regulation to monitor the conduct of the programmes.

2.2 ***Core course*** means a course that the student admitted to a particular programme must successfully complete in order to receive the Degree and which cannot be substituted by any other course.

2.3 ***Elective course*** means a course, which can be substituted by equivalent courses from the same or other Departments/Schools.

2.4 ***Audited course*** means a course which can be opted by a student but which will not accrue any credit.

2.5 ***Department/School*** means Departments/Schools instituted in the University as per Statutes and Act.

2.6 **All PG programmes following this regulation will be of Second Level.**

3. **ELIGIBILITY FOR ADMISSION**

As per the eligibility criteria prescribed by the University from time to time.

4. **ADMISSIONS**

As per the Regulations prescribed by the University from time to time.After completing the admissions, each student shall be assigned a Unique Registration Number, in a format suggested by the university, by the concerned department which will be valid throughout his/her programme of study in the University.

## 5. COURSE REGISTRATION

5.1 Every Department/School shall have faculty members as student advisors. Each student will be assigned to an Advisor/Mentor, within one week from the commencement of the course, by the department council. He/She will advise the student about the academic programme and counsel the student on the choice of courses for the coming semester depending on the student's academic background and objective. The student will then register for the courses he plans to take for the semester before the classes begin and within the time prescribed by the University. The student should have completed the prescribed prerequisites if any for a course before registration. The Advisor/Mentor can be a contract/adjunct faculty. The student has to be closely monitored and motivated by the Advisor. The Advisor/Mentor should have up-to-date knowledge on the performance of the students as he/she go through the programme and must keep frequent contact with the students. In addition, one faculty coordinator will be assigned to an incoming batch of students to each Programme by the Department council. The faculty-coordinator will synchronize the activities of the batch.

The Department offering any course shall prescribe the maximum number of students that can be admitted taking into consideration the facilities available. Core courses of any programmes are to be compulsorily offered by the respective Department that offers the programme.

In any Department, preference shall be given to those students for whom the course is a core-course.

A student can drop an elective/audit course(s) within ***10*** working days after the commencement of the classes.

5.2 University shall make available to all students through CUSAT website a Bulletin in listing all the courses offered in every semester specifying the credits, prerequisites, list of topics, the course intends to cover, the instructor who is giving the courses, the time and place of the classes for the courses. Each course shall have a code consisting of first two digits indicating the year of revision of syllabus/curriculum, following three characters/digits denoting the department and the next four digits of which the first digit will be 2 indicating the level of the course, second indicating the Semester and third and fourth digits the serial number of the course. However in such Departments having more than one Masters Programme of the same level, of the three characters/digits denoting the Department, the third one will represent the course of study.

## 6. COURSE STRUCTURE

6.1 The CBCS system will be fully internal in all sense. There shall be three kinds of courses: Core, Elective and Audit courses. Normally all core courses shall have two / three / four credits except in cases where only project/dissertation including seminars are involved in which case the minimum credit shall be sixteen. Elective courses, if any offered through Massive Open Online Course (MOOC) can have two/three/four credits. Any such online courses should be pre- approved by the Department Council before the beginning of a semester to ensure quality and suitability. In the case of online courses attended by the student, a proof of satisfactory completion and marks/grade issued by the authority who conducted the course must be submitted to the Head of the Department. Head/mentor/advisor may conduct a viva on the subject of the online course if found necessary.

6.2 The minimum number of the Credit in a semester shall not be less than 16. For Departments under Science faculty conducting Integrated Programmes, the minimum total credits required for the last four semesters of integrated programmes should be 80 and it should be the same as total credits required for two year M.Sc. Programmes.

6.3 The Department Council shall make recommendations on the content of core and elective courses including the detailed syllabus pertaining to each programme offered by the Department to the University to be approved by the concerned Board of Studies, Faculty and Academic Council. The Department Council shall have the freedom to design and introduce new electives and audited courses, to modify/redesign existing electives and to replace any existing electives with new or modified/redesigned electives to facilitate better exposure and training for the students. Prior approval from the Board of Studies and Academic Council is not required for such modifications in the electives, but shall be done only with the approval of the Academic Committee. Such changes shall be placed in the Board of Studies, Faculty and Academic Council in the next meeting for ratification.

6.4 The general structure of the programme shall be as given below

A minimum 75 % attendance is compulsory. Heads of Department can give five percent condonation with the approval of Department Council. The Vice- Chancellor shall have the power to condone shortage of attendance upto 10% on medical grounds on the recommendations of the Head of Department. However, such condonation for shortage of attendance shall be given only once during the entire programme of study.

| | MA/ M.Sc other than from the Faculty of Science | M.Sc from the Faculty of Science | MBA (Full Time) | MBA (Part Time)* | MCA |
|---|---|---|---|---|---|
| Programme duration | 4 Sem | 4 Sem | 4 Sem | 6 Sem | 4 Sem |
| Accumulated minimum credit required for successful completion of the programme | 72 | 80 | 102 | 102 | 72 |

Note: *MBA (Part Time) Programme is stretched to 6 semesters with the same content as the full-time programme with 4 semesters.

Each semester shall have a minimum of 16 weeks duration and one credit shall be given for one-hour lecture or 2 hours of practical work per week. No regular student shall register for more than 24 credits per semester and less than 16 credits per semester. In the case of MBA (PT) programme, the minimum and maximum credits per semester will be 12 and 19 respectively

6.5 A student shall compulsorily register and complete atleast one Online course/ Interdisciplinary Elective (IE) course/ Industry based course (one of the Electives) from other Departments/Schools/Industry before registering for the final semester of the Programme. However, MBA (PT) programme may be exempted from this clause. For the 'Industry based course' one faculty member from the department will be responsible along with the industry partner in designing course and evaluating the student and awarding the grade.

Each department shall encourage the students to register for MOOC/ SWAYAM/ NPTEL Courses during the second or third semester. The credit for the online courses shall be 2. The Students in consultation with the course adviser or the Department council have to register for the course.

6.6 At the end of the second semester, students should be encouraged to go for an internship or carry out a mini project in the area of their interest. For the internship/mini project, a candidate can have an internal guide and external guide (Institution /Industry).

## 7. EVALUATION

7.1 The entire system of evaluation is internal. The evaluation scheme for each semester contains two parts, a continuous assessment and a semester end examination. The continuous assessment shall consist of minimum of two tests and assignments/seminars/quizzes etc. which shall be notified to the students at the beginning of the semester. The marks obtained in the continuous assessment shall be displayed on the notice board and grievances if any may be addressed to the Head of the Department. The Department Council shall finalise the marks of the continuous assessment of each course after addressing such grievances.

The semester end examination will be of 3 hours duration and shall cover the entire syllabus of the course. Equal weightage shall be given for the continuous assessment and the semester end components.

All practical examinations will be internally evaluated as per the procedures laid down by the Department Councils concerned

The question paper for the semester end examination shall be set by the concerned teacher in advance, which shall be scrutinized by the respective department council or by a committee consisting of the HOD and faculty members offering courses in that semester to ensure that questions are within the scope of the syllabus and that the entire syllabus of the course is fairly covered in the question paper. Modifications can be suggested by the council if necessary and such suggestions shall be incorporated in the final version of the question paper.

There shall be only a single evaluation for the semester end examination. Immediately after the examination is over, the Head of the Department shall make arrangements to complete the evaluation and finalize the results within 10 working days from the date of the last examination. The marks and grade in all the courses obtained by the students have to be displayed in the notice board and the answer scripts can be shown to the students for scrutiny if requested.

7.3 For each course there shall be a separate minimum of 50% marks for both the semester end examination and the continuous assessment part. A student who fails to obtain 50% marks in the continuous assessment part of a course will have tore-register and repeat the course at a suitable later time when the course is offered again (if the failed course is a core course) or re-register for the same or a different course (if the failed course is an elective).

7.4 The Department shall publish the marks obtained by the students, in the continuous assessment and semester end examination. If the student has any grievance, he/she can approach the concerned teacher and submit his/her grievance with supporting documents/arguments. The teacher and the HOD will examine the case and decide on his/her grievance. If the student is not convinced with the decision, he/she can approach the appellate authority, which is the department council, in writing and the council shall examine the same and take a final decision which has to be intimated to the student in writing. **The decision of the appellate authority shall be final**. Finalized continuous assessment marks should be uploaded in the University Examination web portal at least 5 working days before the commencement of the end semester examinations.

7.5 The final marks and grades obtained by the students shall be published in the notice board. Those who fail in the end-semester examination of any core or elective course shall approach the concerned teacher if necessary, for a re-examination. Within ten days of the display of the results in the notice board, the department shall conduct an additional semester end examination for these candidates. This re-examination is only to provide the student a chance to pass the examination by completing the course successfully. If he/she completes the course successfully making use of this additional chance, he/she will be awarded only a 'D' grade enabling the candidate to be declared successful in that course. If he/she cannot make it up, he/she may repeat the semester end examination of that course in the next available chance. If the student re- registers and repeats the course, he/she may be awarded the actual grade he/she obtains. The maximum duration for completing any PG degree programme will be 4 years except for MCA/MBA (PT) for which it will be 6 years from the date of commencement of first semester. The marks of the end-semester examinations should be uploaded in the University Examination web portal.

7.6 The result of the examinations will be finalized and published by the department council, which will act as the passing board and the minutes shall be sent to the controller of examinations for issue of semester grade transcript.

## 8. SEMESTER GRADE-TRANSCRIPT

8.1 The University under its seal shall issue a semester Grade transcript to the students on completion of each semester. The semester Grade transcript shall contain the following:

a. Title of the course taken as core, elective and audit. (An audit course shall be listed only if the student has secured a pass).

b. Title of the online course.

c. Title of the Major project if any.

d. The credits associated with and the grades awarded for each course.

e. The number of credits (core and elective separately) earned by the student and the Grade

Point Average.

f. The total credits (core and elective) earned till that semester.

8.2 The following grading system shall be adopted for all the programmes. The following grades will be awarded based on the overall performance in each subject.

| **Range of Marks** | **Grades** | **Weightage** |
|---|---|---|
| 90 and above | S-Outstanding | 10 |
| 80 to 89 | A-Excellent | 9 |
| 70 to 79 | B-Very good | 8 |
| 60 to 69 | C-Good | 7 |
| 50 to 59 | D-Satisfactory | 6 |
| Below 50% | F-Failed | 0 |

Overall performance at the end of the semester will be indicated by Grade Point Average (GPA) calculated as follows.

$$GPA = \frac{G1C1+G2C2+G3C3+ \ldots\ldots\ldots\ldots\ldots\ldots GnCn}{C1+C2+C3+\ldots\ldots\ldots\ldots\ldots\ldots\ldots Cn}$$

'G' refers to the grade weightage and 'C' refers to the credit value of corresponding course undergone by the student. At the end of the final semester Cumulative Grade Point Average (CGPA) will be calculated based on the above formula, considering the Credits and Grades earned during the entire programme of study.

Classification for the Degree/Diploma will be given as follows based on the CGPA:

| | |
|---|---|
| First Class with distinction | 8 and above |
| First Class | 6.5 and above |
| Second Class | 6 and above |

8.3 The Semester Grade transcript issued at the end of the final semester shall contain the details of all the courses taken which shall include the titles of the courses, the credits associated with each course, the CGPA and the class.

8.4 **The CGPA to percentage conversion may be done via the formula %marks = CGPA-0.5)*10.**

## 9. MONITORING AND MANAGEMENT OF PROGRAMMES

9.1 Every post graduate programme conducted in the Departments shall be Monitored by the Department Council subject to these regulations. Such monitoring shall include design of programmes, prescribing the mode of conduct of the programmes and monitoring the evaluation process of students.

## 10.ACADEMIC COMMITTEE

10.1 There shall be an Academic Committee constituted by the Vice-Chancellor to monitor and co-ordinate the working of the CBCS System. The committee can approve the elective courses suggested by the respective departments, and ensure that the syllabi of such elective courses are passed by respective Board of Studies and Academic Council.

The Committee shall consist of:

a The Pro-Vice-Chancellor - Chairman

b The Registrar - Secretary

c The Controller of Examinations

d One Teacher from each Department

10.3 A Senior Professor nominated by the Vice-Chancellor from among the members of the Committee shall be the Vice-Chairman of the Committee.

10.4 The term of the office of the committee shall be two years, but the committee once constituted shall continue in office until a reconstituted committee assumes office.

## 11 TRANSITORY PROVISION

Notwithstanding anything contained in these regulations, the Vice-Chancellor shall, for a period of one year from the date of coming into force of these regulations, have the power to provide by order that these regulations shall be applied to any programme with such modifications as may be necessary.

## 12. REPEAL

The Regulations now in force, in so far as they are applicable to programmes offered in the University Departments and to the extent they are inconsistent with the existing regulations, and the regulations relating to the CBCS System in their application to any programme offered in a University Department, the latter shall prevail.

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# REGULATION FOR POST GRADUATE PROGRAMMES IN ENGINEERING/TECHNOLOGY UNDER CHOICE BASED CREDIT SYSTEM (CBCS) OFFERED BY THE UNIVERSITY DEPARTMENTS/SCHOOLS

## 1. SCOPE

1.1 These Regulations shall apply to all M.Techprogrammes conducted by the Departments/Schools of the Cochin University of Science and Technology.

1.2 The provisions herein supersede all other Regulations with respect to such programmes unless otherwise provided.

## 2. DEFINITIONS

Department/School means Departments/Schools instituted in the University as per Statutes and Act. Core course means a course that the student admitted to a particular programme must

successfully complete in order to receive the Degree and which cannot be substituted by any other course. Core course is offered by the Department where the student takes admission.
Elective course means a course, which can be substituted by equivalent courses from the same or other Departments/Schools.
Audited course means a course which can be opted by a student but which will not accrue any credit.

## 3. ELIGIBILITY AND ADMISSION PROCEDURE

As per the rules prescribed by the University from time to time.

## 4. ADMISSIONS

As per the Regulations prescribed by the University from time to time.

Each student admitted to a program shall be assigned a Unique Registration Number by the department concerned in a format prescribed by the university, which will be valid throughout his/her programme of study in the University.

## 5. COURSE STRUCTURE

5.1 The course content of M.Tech.Programmes shall consist of theory courses, practical courses, seminar, industrial training (optional) and project work.

5.2 The Department Council shall make recommendations on the content of core and elective courses including the detailed syllabus pertaining to each programme offered by the Department to the University to be approved by the concerned Board of Studies, Faculty and Academic Council

5.3 The curriculum for the first two semesters shall generally consist of theory courses, practical courses and seminar. There shall be three kinds of courses: Core, Electives and Audit courses. All core courses shall have three or four credits except in cases where only project/dissertation including seminars are involved in which case the minimum credit shall be sixteen. In all the programmes of study the elective courses (including inter departmental electives) shall have only three credits. Elective courses, if any offered through Massive Open On line Course (MOOC) can have two credits. Practical course / seminar will have one or two credits.

5.4 In the case of online courses attended by the student, a certificate of satisfactory completion and marks/ grade if any issued by the authority who conducted the course must be submitted to the Head of the Department. The Department can conduct a viva on the subject of the online course if necessary. On the completion of this, department council can award the respective weightage/grade to the student.

5.5 The number of credits for the project work in third and fourth semesters shall be in the range of 15 – 18 each.

## 6. COURSE REGISTRATION

6.1 Every Department/School shall have Faculty Members as Student Advisors. Each student will be assigned to an Advisor/Mentor, by the Department council within one week from the commencement of the classes, who will counsel the student on the choice of elective courses depending on the student's academic background and objective. The student will then register for the courses he plans to take for the semester within the time prescribed by the University. The student should have completed the prescribed prerequisites if any for a course before registration.

6.2 The Department offering a course shall prescribe the maximum number of students that can be admitted taking into consideration the facilities available.

6.3 The student can drop any elective/audit course(s) within 15 working days after the commencement of the classes.

6.4 University shall publish a Bulletin listing all the courses offered in every semester specifying the credits, prerequisites, list of topics the course intends to cover, the instructor who is giving the courses, the time and place of the classes for the courses. Each course shall have a code consisting of first two digits indicating the year of revision of syllabus/curriculum, following three digits denoting the program code, the next two digits indicating the semester and last two digits denote the serial number of the course.

6.5 A student shall register and complete at least one Interdisciplinary / industry based/online course as one of the Electives before registering for the final semester of the Programme.

6.6 Each Department/School will announce at least one interdisciplinary course (Elective) to be offered by them, in the "E" slot of the Common Time-table.This interdisciplinary course (Elective) shall not have any prerequisite.

6.7 No regular student shall register for more than 24 credits per semester and less than 16 credits per semester

## 7. EVALUATION

7.1 A student would be considered to have progressed satisfactorily at the end of a semester if he/she has a minimum of 75 % attendance. The evaluation is completely internal.

7.2 The entire system of evaluation is internal. The evaluation scheme for each semester contains two parts, a continuous assessment and a semester end examination. The student shall be evaluated continuously throughout the semester and marks shall be awarded on the basis of tests / assignments as detailed below:

7.3 There shall be two class tests, assignment and an end semester examination. The first class test carries 20 marks and will be based on the portions of the syllabi covered till then. The second class test also carries 20 marks and will be based on the portions covered till then after the first class test. A maximum of 10 marks will be awarded for the assignments

7.4 The end semester examination will be for 50 marks and shall contain questions from the entire syllabus of the course. The duration of the end semester examination shall be three hours.

7.5 All practical examinations will also be internally evaluated as per the procedures laid down by the Department Councils concerned.

7.6 Marks obtained in the continuous assessment shall be displayed on the notice board and grievances if any may be addressed to the teacher concerned/Head of the Department with supporting documents. The teacher and the HOD will examine the case and decide on his/her grievance. If the student is not convinced with the decision, he/she can approach the appellate authority, which is the department council, in writing and the council shall examine the same and take a final decision which has to be intimated to the student in writing. The decision of the appellate authority shall be final.

7.7 There shall be only a single evaluation for the semester end examination. Immediately after the end semester examination is over, the Head of the Department shall make arrangements to complete the evaluation and finalize the results within 10 working days.

7.8 The pass minimum in a subject is 50 %, with a separate minimum of 45% for end semester examination

7.9 The final marks and grade in all the courses obtained by the students in that semester will be displayed in the notice board. Those who could not obtain 50% marks (Grade D) in total for a course will be declared as failed in that course.

Those who fail in any course shall approach the teacher concerned if necessary, for a reexamination of the semester end examination. Within ten days of the display of the results in the notice board, the department shall conduct an additional semester end examination for these candidates. This reexamination is only to provide the student a chance to pass the examination by completing the course successfully. If he/she completes the course successfully making use of this additional chance, he/she will be awarded only a D grade enabling the candidate to be declared successful in that course.

If he/she cannot make it up, he/she may repeat the semester end examination of that course along with the subsequent batches, or re-register and repeats the course. In this case he/she will be awarded whatever grade he/she has secured.

## 8. PROJECT WORK

8.1 Project evaluation shall be done at the end of III and IV semesters in the case of full time programmes and at the end of V and VI semesters in the case of part time programmes.

8.2 The evaluation at the end of III Semester (Full time)/ V Semester (Part time) shall be conducted by an examination committee consisting of the head of the department /school / division, a senior teacher nominated by the head and the project guide.

8.3 At the end of IV or VI semester, the students will have to submit a dissertation on his / her project work to the Head of the Department/School within the last date prescribed for the purpose

8.4 The dissertation will be evaluated by an examination committee consisting of the head of the department /school /division, another faculty member and the project guide. The candidate shall make an open presentation of his/her dissertation which will be followed by a viva-voce examination.

For the purpose of assessment, the performance of a student in the project dissertation may be divided into the following sub components:

At the end of III semester (Full time) / V Semester (Part time)

| | | |
|---|---|---|
| Assessment by the project guide | | |
| (Based on periodic assessment of the work of the candidate) | - | 50% |
| Assessment by the examination committee | - | 50% |

At the end of IV semester (Full time) / VI Semester (Part time)

| | | |
|---|---|---|
| Assessment by the project guide | | |
| (Based on periodic assessment of the work of the candidate) | - | 50% |
| Assessment by the examination committee | - | 50% |

## 9. DECLARATION OF RESULTS

**9.1** The result of the examinations will be finalised and published by the department council, which will act as the passing board and the minutes shall be sent to the controller of examinations for issue of grade card. The University shall issue mark lists/grade card at the end of each semester.

### 9.2 GRADE CARD

9.2.1 The University under its seal shall issue a Grade Card to the students on completion of each semester. The Grade card shall contain the following:

a. Title of the course taken as core, elective and audit. (An audit course shall be listed only if the student has secured a pass)
b. The grades awarded for each course along with the course credit.
c. The number of credits (core and elective separately) earned by the student and the Grade point Average.
d. The total credits (core and elective) earned till that semester.

9.2.2 The following grades will be awarded based on the overall performance in each subject.

| **Range of marks** | **Grades** | **Weightage** |
|---|---|---|
| 90 and above | S-Outstanding | 10 |
| 80 to 89 | A-Excellent | 9 |
| 70 to 79 | B-Very good | 8 |
| 60 to 69 | C-Good | 7 |
| 50 to 59 | D-Satisfactory | 6 |
| Below 50% | F-Failed | 0 |

Overall performance at the end of the semester will be indicated by Grade Point Average (GPA) calculated as follows.

$$GPA = \frac{(G1C1+G2C2+G3C3+\ldots\ldots..GnCn)}{(C1+C2+C3+\ldots\ldots\ldots\ldots\ldots\ldots Cn)}$$

Where 'G' refers to the grade weightage and 'C' refers to the credit value of corresponding course undergone by the student. At the end of the final semester Cumulative Grade Point Average (CGPA) will be calculated based on the above formula, considering the Credits and Grades earned during the entire programme of study.

Classification for the Degree/Diploma will be given as follows based on the CGPA:

| | |
|---|---|
| First Class with distinction | 8 and above |
| First Class | 6.5 and above |
| Second Class | 6 and above |

9.3 The Grade Card issued at the end of the final semester shall contain the details of all the courses taken which shall include the titles of the courses, the credits associated with each course, the CGPA and the class.

9.4 A student shall acquire a minimum of 36 credits in the first two semesters before he/she registers for third semester. A student shall complete the M.Tech programme in 8 (eight) consecutive semesters in the case of full time programme and 10 (ten) consecutive semesters in the case of part time programme by acquiring the minimum total credit requirement of 72.

9.5 A student who wishes to take up professional employment after completing the second semester shall obtain permission from the Head of the Department/School. The student will be permitted to carry out the project work in the institution / organisation where they are employed on production of a certificate from the Head of that institution/organisation to the effect that the student is permitted to carry out the project at the institution/organisation. Such candidates shall carry out the project work under the joint supervision of a project guide from the Department/School and an external guide from the Institution/Organization concerned. The

Department / School Council shall verify the academic/ research credentials of the proposed external guide before granting permission. In the case of students who propose to carry out their project work in National Laboratories on full time basis, the provision regarding having a project guide from the Department/School concerned may be exempted by the Department / School Council, if the situation warrants.

9.6 This clause will be applicable to the sponsored candidates also if they wish to carry out their project work in their parent organisation.

## 10 MONITORING AND MANAGEMENT OF PROGRAMMES

Every post graduate programme conducted in the Departments shall be monitored by the Department Council subject to these regulations. Such monitoring shall include design of programmes, prescribing the mode of conduct of the programmes and monitoring the evaluation process of students.

## 11 TRANSITORY PROVISION

Notwithstanding anything contained in these regulations, the Vice-Chancellor shall, for a period of one year from the date of coming into force of these regulations, have the power to provide by order that these regulations shall be applied to any programme with such modifications as may be necessary.

# REGULATIONS FOR THE 5 YEAR INTEGRATED MASTERS DEGREE IN SCIENCE BY THE UNIVERSITY DEPARTMET OF PHYSICS, DEPARTMENT OF APPLIED CHEMISTRY,DEPARTMENT OF BIOTECHNOLOGY&DEPARTMENT OF MATHEMATICS

## CENTRE FOR INTEGRATED STUDIES

### Integrated M.Sc. Program

### Introduction

In the process of the fulfilment of the set objects of the Cochin University of Science and Technology, a Centre for Integrated Studies (CIS) has to be established in the year 2018-19 to offer 5 year Integrated Master's Degree courses in Science subjects for imparting specialized education to the students on completion of their +2 level of education.

### Courses offered by the Centre

The Centre offers 5-Year Integrated Master'sDegree courses in Science (Physics, Chemistry, Mathematics and Statistics) subjects.

### Overview of the Course

The five year Integrated M.Sc. (I.M.Sc.) courses of the Cochin University of Science and Technology are non-professional courses. They are not merely integrated programmes that combine pre-graduate and post-graduate studies, but are also trans-disciplinary, cutting across several disciplines.

The curriculum is common to all disciplines for the first four semesters. Students with biology background at the +2 stage and who had left mathematics after the $10^{th}$ class are expected to put in the required efforts to learn mathematics. Similarly, students who left biology at the +2 stage are expected to learn Biology. Students of Science subjects require significant amount of Mathematics and Computation throughout the 5-Year programme. The University offers bridge courses in the first semester to facilitate this process. The students spend first two years of their programmes at the CIS. The students are transferred to their parent Departments at the end of the fourth semester.

## Admission

The present intake for the Integrated M.Sc. Programme in Science is 60 (15 x 4). At the end of 2nd year, the student will move to their respective Departments based on the choice of their subject of preferences and SGPA obtained during first four semesters. 15 numbers of students will move to each Department. Reservation norms will be followed while making the allotment. At the end of the 3rd year, the students will be integrated with the M.Sc. courses conducted by the Departments (lateral entry) of Mathematics (15), Statistics (15), Chemistry (15), Physics (15). There can be a variation of +/- 3 from the number 15.

## Eligibility and Entrance Examination

1. Admission will be given to students possessing KVPY Scholarship. They need not have to appear for the Entrance Test. But they also have to submit the requisite application and should pay the application Fee.
2. All other eligible applicants will be called for the written test to be held at various Centres.
3. Candidates with a minimum of 75% marks at +2 level of education (Intermediate, CBSE/ICSE/HSC/ and all State Boards or Equivalent with science subjects [Biology, Chemistry, Mathematics, Physics] are eligible to apply. The programmes are open to all students (Physics, Chemistry, Mathematics and Biology) as their optional subjects with a minimum of 75% at +2 level.

The admission to M.Sc. (5-Year Integrated) in Sciences (Mathematics, Statistics, Physics, Chemistry) will be through a common entrance examination. The entrance examination consists of a written test for 450 marks. The written test paper contains 50 objective questions each in Mathematics, Physics and Chemistry at +2 level. Written test for these programmes is of three hours duration. It will consist of multiple choice (of four options) questions to be answered as Computer based Online Test. The level of questions shall be consistent with +2 level of education. Each right answer shall be given 3 marks. There is negative marking; each wrong answer will be given -1 mark. The question paper will have three sections. A (Chemistry), B (Mathematics), C (Physics). Specific instructions will be given in question papers.

## Selection List

Students possessing KVPY Scholarship will be directly admitted if 3 above holds. The admission will be through common counselling process. Initially, there will be not be any classification of students between the four subjects. After 2 years, the students have to opt their subject of choice. Allotment to their choice after two years will be depending on their performance (SGPA) in the first four semesters. Reservation norms will be followed while making the allotment. But attempts will be made to keep a balance in the number of students admitted to the 3rd year of the programme among the various Departments.

The following criteria shall be followed, one after the other, to resolve the ties, when more than one candidate secures the same total marks in the entrance examination:

a) *First criterion*: Total marks obtained by the candidates for Chemistry and Physics taken together in the entrance examination.

b) *Second criterion*: Marks obtained for Chemistry. If the tie has not broken still, the marks obtained for Physics will be counted.

If the tie has not broken still normal procedure of the University will be followed.

**Reservation**

All relevant reservation rules (Kerala State) will be followed for admission. Similarly, concession in fees for the course also will be based the Government of Kerala Rules. The seat matrix based on reservation has already been given to IRAA Unit.

**Courses in Sciences**

The subjects for I.M.Sc.Courses in Science (Mathematics, Statistics, Physics, Chemistry) are common in the first 4 semesters. The students with Biology background at +2 stage, who left Mathematics after $10^{th}$ are expected to put in necessary effort to learn Mathematics needed for other courses. Similarly, the students who studied Mathematics at +2 stage and left Biology after $10^{th}$ are expected to learn necessary Biology. To provide necessary help in this direction, the University runs bridge courses in the first semester. The students who join the programme are required to attend the relevant bridge courses. They are also encouraged to approach and seek help of the Faculty members concerned and their Mentors.

**Extra Course/Credits**

A student can take courses over and above those stipulated for a semester and can accumulate extra credits in a given semester. In addition to regular courses, the following extra courses are offered in either odd or even semester, based on availability of Faculty resources: Introduction to Foreign Languages (French, German). These courses cannot be taken in lieu of regular subject credit course/s; only one Extra Course is allowed per semester.

**Audit Course**

There is a provision for auditing of not more than one course in each semester. Students who desire to audit courses over and above the number of courses prescribed have to choose from amongst the courses offered by different Departments in that semester and inform the CIS in writing. Courses thus audited should also be indicated in the Registration forms along with other courses opted for that semester. Only one Audit Course is allowed per semester.

**Possibility of Tutorials**

On the basis of the request of a sizable number of students for additional guidance in coping up with the subjects; the Heads/Directors of the participating Departments/Schools will be requested to provide tutorial support for small groups subject to availability of human resources.

**Enrichment Programme**

Cochin University of Science and Technology Career Guidance Bureau organizes Spoken English/UGC NET Classes/ CSIR-UGC/JRF/NET Classes (Paper-1) for the benefit of students.

**Minimum Credit Requirement for Admission into a Department/Discipline**

To graduate to a chosen discipline after completion of six semester (four in case of science courses), the candidates should fulfil the minimum requirements prescribed by respective Departments. For example, the candidates desiring to graduate to Chemistry need to complete a minimum of 36 credits, i.e., opting for a minimum of twelve courses from amongst the courses offered by that Department during the first six semesters. To specialize in other disciplines, a minimum of 36 credits i.e., any twelve /nine courses offered/recognized by that Department need to be completed.

**Attendance**

A student needs to attend at least 75% of the classes held in each course in order to be eligible to write the end-semester examination. If the student has been absent for medical reasons, the shortfall of attendance would be condoned up to 5% subject to submission of the relevant Medical Certificate to the Co-ordinator, CIS. If, due to unusual circumstances, the student's attendance falls far short of the required percentage, he/she may bring it to the notice of his/her course instructor/teacher/Co-ordinator/Assistant Co-ordinator well in advance. He/she can then explore the possibility of dropping the semester and registration during the next semester as per University rules. Students, who are not

found eligible to take semester examination due to shortfall of attendance, may make up the loss by appearing in the Summer Semester (Offered during May-June of every year). It may be noted it is the responsibility of student to monitor his/her attendance and inform the instructor about his/her absence. 75% attendance is the norm for writing end-semester examinations.

**Internal Assessment** CUSAT has a scheme of rigorous continuous internal assessment. The student can get the best out of this system if he/she is well informed about how it works right from the beginning. Schedule and nature of tests/assignments/quizzes that are due may be followed. The specific nature of the assignments/tests is discussed by the faculty in the class and can vary from course to course. In case of any doubt, the student may get in touch with the faculty concerned. The student will be given a minimum of three assessments per semester in each course form which the best two grades/marks will be considered for the purpose of calculating the result of continuous internal assessment. This will make part of one's final grade in the course.

**End-semester Examination**

A final examination at the end of the semester in each course will follow the internal assessments during the semester. The end semester examination is conducted in a totally internal manner. The setting of question papers and evaluation are done by the concerned course teacher. The final result in each course is calculated on the basis of continuous assessment and performance in the end-semester examination.

**Scheme of Examination**

The performance of each student enrolled in a course will be assessed at the end of each semester. Evaluation of all P.G. and integrated PG courses is done under the Grading System. There will be 6 letter grades; S,A,B,C,D and F on a 10-point scale which carries 10,9,8,7,6,0 grade points respectively. The final result in each course will be determined on the basis of continuous assessment and performance in the end semester examination which will be in the ratio of 50:50 in Theorycourses and 50:50 in laboratory courses (practicals).

**Computation of SGPA/CGPA**

Evaluation of Integrated PG course is under the Grading System. There will be 6 letter grades: S,A,B,C,D and F on a 10-point scale which carries 10,9,8,7,6,0 grade points respectively.

The following is the procedure to compute the Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA).

i. The SGPA is the ration of sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student.
   i.e., SGPA (Si) =$\sum$ (Ci x Gi)/ $\sum$Ci
   Where Ci is the number of credits of the $i^{th}$ course and Gi is the grade point scored by the students in the $i^{th}$ course.

ii. The CGPA is also calculated in the same manner taking into account all the courses done by a student over all the semester of a programme.
   i.e. CGPA=$\sum$ (Ci x Si)/ $\sum$Ci
   Where Si is the SGPA of the $i^{th}$ semester and Ci is the total number of credits in that semester.

**Supplementary Examinations**

Students should obtain a minimum of 'D' grade in each course in order to pass in the Integrated PG courses. Students who obtain less than 'D' Grade in any course, may be permitted to take the supplementary examination in the course/s concerned within a week after the commencement of the teaching of the next semester or in accordance with the schedule notified. Appearance at such examinations shall be allowed only one. Those students who get less the 'D' grade in the supplementary examination also, shall have to repeat the course concerned or take an equivalent

available course with the approval of the Head/Director of the Department/School concerned and the Co-ordinator of the CIS. Such approval should be obtained at the beginning of the semester concerned. Those students who are not satisfied with the grades obtained (C or D), in a course in a semester can opt for improving the grade by appearing in the exam during the supplementary exams conducted after each semester. Such students can opt for improvement for only one course after the first semester, two course after the second semester (if the facility is not exercised after the first semester), three courses after the third semester (if the facility is not exercised after the first and second semesters) and so on.

**Special Supplementary Examinations**

The 5-year Integrated PG students who after completion of the prescribed duration of the course are left with backlogs are eligible to appear for special supplementary exams subject to a maximum of two courses where number of courses in a semester are four and a maximum of three courses where the number of courses in a semester are more than four. Appearance in such exams shall be allowed only once.

**Improvement Examinations**

Students securing 'C' or 'D' grade in the course of a semester may be allowed to improve their marks in one course in a semester. Appearance at such an examination in the course will be allowed only once. No further chance will be given under any circumstances. The improvement examinations will be conducted along with the supplementary examinations within a week of the commencement of the teaching of the next semester or as per the schedule prescribed. For the purpose of determining the division, the better of the two performances in the examinations will be taken into consideration. The facility for improvement shall be open to all those who want to improve their grade irrespective of the GPA obtained by them in the examination concerned. However, one should clear all courses of a particular semester in which he/she intends to take an improvement examinations.

**Summer Semester**

Those students who have failed in certain courses, or who were unable to write the end semester exams or who did not have sufficient attendance for writing the exams can register themselves for the summer semester offered during May-June and make up their losses.

**Readmission**

Students who are not found eligible to take semester examinations and also those who are not promoted to the next semester of the course may be considered for readmission to the semester concerned of the immediately following academic year. Such students should seek readmission before the commencement of classes for the semester concerned or within a week of the commencement of the semester concerned, if they are appearing in the supplementary examinations. Such students are given an option either to undergo instruction for all the courses of the semester concerned or instruction in only such courses in which they have failed on the condition that the option once exercised will be binding on the student concerned.

**Backlogs**

No student of I.M.Sc. (5-year Integrated) courses shall be allowed to move to the next semester, if he/she has a backlog of more than 50% of the courses of that semester subject to a maximum of 5 backlogs at any given point of time including the backlogs of previous semester/s, if any.

**Re-evaluation**

Request from the students for re-evaluation should reach Head of the Department/Co-ordinator of the Centre within 15 days of the announcement of the results. On the basis of representation submitted by students every School/Department/Centre will constitute a Grievance Committee consisting of 3 or 4 teachers to examine the complaints received from the student regarding their assessment.

**Lateral Entry**

In the Fourth Year, students of the I.M.Sc.will be integrated with the students admitted for the regular M.Sc. courses conducted by the Departments.

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## REGULATIONS FOR M.VOC. IN TECHNOLOGY AND MANAGEMENT CONSULTING PROGRAM (OFFERED UNDER THE FACULTY OF SOCIAL SCIENCES).

**(*From* 2018 admission onwards)**

The **Master of Vocation (M. Voc)** program has been launched UGC to promote vocational education at higher level to produce industry ready, employable graduates under the National Skill Qualification Framework (NSQF) with multiple entry/exit options during the programme. The contents of the vocational courses are to be designed by providing a judicious mix of skill component relating to a profession (60%) and appropriate content of General education (40%) to ensure that the students are getting equipped in terms of knowledge and skills to be employable at each exit point of the programme.

**M.Voc. in Technology and Management** is a Masters level vocational programme designed to be offered under the DDU KAUSHAL Kendra, CUSAT and designed according to the UGC guide lines based on NSQF with multiple entry/exit options, leading to various job roles at each level of exit. Course contents shall be aligned with the norms of the concerned Sector Skill Councils for enabling the students to obtain skill certifications from SSC concerned at various exit points.

### I. Duration and natural of the Course

M.Voc. in Technology and Management Consulting is a Masters level vocational program which spans over a period of four semesters (two years) with multiple entry and exit options. Multiple entry and exit options imply that students who successfully complete the first two semesters will be eligible for Post-graduate Diploma in Technology and Management Consulting if they wish to discontinue the program after the first year of this programme. Surch students with P.G. Diploma will be eligible for lateral entry to the third semester of M.Voc. Programme later if they wish to do so. In such cases of students must surrender their PG Diploma for obtaining the M.Voc. Degree certificate and such lateral entry shall be permitted only within five years of their original admission to the M.Voc. course. Students who successfully complete all four semesters will be eligible for Master of Vocation (M.Voc.) Degree in Technology and Management Consulting.

### II. Central and Faculty

M.Voc. in Technology and Management Consulting shall be offered at DDU KAUSHAL KENDRA and the degree shall be awarded under the Faculty of Social Sciences.

### III. Eligibility for Admission

**3.1** Eligibility for academic year 2018-19 Admission

Graduates with 60% marks (or equivalent CGPA) in Engineering or Graduates with 60% marks (or equivalent CGPA) in Business Management/ Business Administration/ Commerce/ Economics or B.Voc. graduates with 60% marks (or equivalent CGPA) in Technology/ Management related disciplines with Mathematics/ Statistics/ Accountancy as one of the subjects.

**3.2** Eligibility for academic year 2019-20 onwards

Graduates with 50% marks (or equivalent CGPA) in Engineering or Graduates with 60% marks (or equivalent CGPA) in Business Management/ Business Administration/ Commerce/ Economics or B.Voc. graduates with 60% marks (or equivalent CGPA) in Technology/ Management related disciplines with Mathematics/ Statistics/ Accountancy as one of the subjects.

## IV. Selection and intake of the programme

**4.1** Selection for academic year **2018- 19** admission will be based on the candidates score in CUSAT CAT Exam and interview. Weightage for test and interview shall be in the ratio of 80:20. Seats are reserved for SC/ ST and Other Backward Communities as per Government of Kerala rules in this regard.

**4.2** Selection for academic year **2019- 20** onwards will be exclusively based on the candidates score in CUSAT CAT Exam. Seats are reserved for SC/ ST and Other Backward Communities as per Government of Kerala rules in this regard.

**4.3** Intake of the programme shall be as per the decision of the university from time to time, taking into consideration the facilities available in the centre offering the programme.

## V. Programme structure

**5.1** The number of credits (total) in I, II, III, and IV semesters shall be 24, 36, 24 and 24 respectively. The total number of credits required for a pass in the programme shall be 108, in which minimum credit required for the core courses and electives shall be 96 and 12 respectively.

**5.2** Since the Programme is vocational in character, the curriculum is designed in such a way that 60 per cent of the subjects are in the vocational domains (Technology and Management Consulting) and 40 per cent in the general domains such as communication skills, professional skills, and IT skills, entrepreneurship and functional management.

**5.3** Students shall have the freedom to opt for four electives during semester III of which at least one shall be an Inter disciplinary Elective (IE) course from other Departments/ Schools

**5.4** Students will have to undergo an internship training of minimum 40 working days at the end of semester II. Semester IV is fully devoted to a Major Project work of not less than 90 working days and the same will be on Technology or Management Consulting in a consulting organisation or any other business firm (where the student is required to work on a specific consulting assignment). Each student shall be assigned to a faculty guide for the internship and major project. A written report must be submitted at the end of the internship/ major project in a format prescribed by the Centre.

## VI. Method of Teaching and Training.

The teaching and training for the M.Voc.Programme shall focus on developing skills and enhancing employability of the students so as to make them industry- ready graduates. Hence the teaching and training pedagogy of the programme will be mostly through "Activity oriented Class Room (AOC)", and the same will comprise of case studies, games, simulation techniques, presentations, Industry internships, training lab, both individual and group projects, interaction with industry experts, etc. Live Consulting projects and internship training in organisations shall also from part of the training for the programme.

## VII. Mode of Evaluation and Eligibility for Pass.

**7.1** Mode of Evaluation will be 100 per cent internal for all papers out of which 50% marks are for continuous assessment throughout the semester and 50% marks are for End-semester examination. In the case of following subjects namely Professional Skills Development (Semester 1) and case Development skills for Consultants (Semester II) the entire 100 marks will be awarded through continuous assessment by the teachers through case analysis, group discussion, team building tasks, leadership role, problem solving exercises, personal improvement, report writing, presentations etc. Evaluation for Business Analytics in semester II will be in practical mode.

**7.2** For the internship in semester II, 50% marks are for continuous assessment as well as the written report and remaining 50% mark will be awarded through a give voce examination conducted by internal examiners. For the main project in Semester IV, the maximum marks shall be 300, of which 100 marks each will be allotted on the basis of (I) continuous evaluation of the project work (ii) the project report submitted (III) Viva-voce examination carried out by board of examiners.

**7.3** Marks obtained by the students in the continuous assessment shall be displayed on the Centre notice board and grievances if any may be addressed to the Head of the Centre/ Department. The Centre / Department council shall finalise the marks of the continuous assessment of each course after addressing such grievances.

**7.4** A minimum of 75% attendance is compulsory for each student to appear for End- Semester examination and also to progress to the subsequent semester. But the Vice- Chancellor shall have the power to condone the shortage of attendance up to 10% on medical grounds on the recommendations of the HOD. However, such condonation for shortage of attendance shall be given to a particular student only once during the entire programme of study.

**7.5** Internal marks will be awarded on the basis of class tests, assignments, viva-voce, practical assignments, term- papers, mini- projects etc. as decided by the teacher concerned, considering the relevance of each component with respect to the paper he/ she handles. However, the student shall be evaluated continuously throughout the semester and; marks shall be awarded as per the following guidelines

a) A minimum of 50 per cent weightage shall be given for internal tests /lab exams/ practical assignments
b) A maximum of 20 per cent weightage shall be given for written assignments
c) A maximum of 20 per cent weightage shall be given for class room presentations, Viva- voce and mini projects
d) A maximum of 20 per cent weightage shall be given for other items such as attendance or Activities that the teacher of the concerned course believes as relevant for the course and assigned to the students.

The total internal Marks awarded will be 50.

However, Department/ Centre council can change the guidelines for the distribution of internal marks given above, as and when required.

**7.6** The question paper for the End-Semester examination shall be set by the concerned teacher in advance which shall be scrutinized by the respective Central/ Department council or by a committee consisting of the HOD and faculty members offering courses in that semester to ensure that questions are within the scope of the syllabus and that the entire syllabus of the course is fairly covered in the question papers. Modification can be suggested by the council if necessary and such suggestions shall be incorporated in the final version of the question paper.

There shall be only a single evaluation for the End- Semester examination. Immediately after the examination is over, the Head of the Department/ Centre shall make arrangements to complete the evaluation and finalise the results within 10 working days after the last examination. In case of Semester IIand Semester IV where internship/ major project is included, the results shall be finalised within five working days after the Viva voce examination.The marks and grade in all courses obtained by the students will be displayed in the notice board and the answer scripts can be shown to the students for scrutiny on written request by the student addressed to the Director of the Centre. (Viva-voce marks are exempted from this clause as it awarded by a board of examiners).

**7.7** For each course there shall separate passing minimum of 45% marks for the End-Semester examination and the student has to secure an aggregate of 50% when End-Semester examination and internal marks are taken together for every course in all the semesters for passing the programme. In case of the course Professional Skills Development in Semester II, students acquirea minimum of 50% marks in Continuous Assessment.

Students have toacquire minimum of 50% marks for the Viva Voce examination of the Internship in Semester II and 50% marks in each one of the three components of Main Project in Semester IV (The three components will be (I) continuous evaluation of the project work (ii) the project report submitted and (III) Viva-voce examination.)

**7.8** The department shall publish the marks obtained by the students, in the continuous assessment and End-Semester examination. If the student has any grievance, he/ she can approach the concerned teacher and submit his/her grievance with supporting documents/ arguments. The teacher and the HOD will examine the case and decide on his/her grievance. If the student is not convinced with the decision, he/she can approach the appellate authority, which is the department council, in writing and the council shall examine the same and take a final decision which has to be intimated to the student in writing. The decision of the appellate authority shall be final.

**7.9** The final marks and grades obtained by the students shall be published in the notice board.Those who could not obtain at least Grade D in totalfor a course will be declared as failed in that course. Those who fail in any core or elective course shall submit an application to the HOD within five working days if necessary for a re-examination of the End-Semester examination. Within ten days of the display of the results in the notice board, the department shall conduct an additional End Semester examination for these candidates. This examination is only to provide the student a chance to complete the course successfully. If he/ she complete the course successfully making use of this additional chance, he/she will be awarded only Grade D irrespective of the marks scored. If he/she cannot secure the minimum, he/she may repeat the End-Semester examination of that course in the next available chance/s. In this case, he/she will be awarded whatever grade he/ she has secure.

**7.10** For Semester 1V, the result of the examination will be finalized on published within 30 days from the last date of examinations by the centre/ department council, which will act as the passing board and the minutes shall be sent to the controller of Examinations of the university for the issue of grade cards. In case of Semester II and Semester IV where internship/ major project is included, the results shall be finalized and published within 15 working days after the Viva- Voce examination.

**7.11** A student shall complete his/her M. Voc programme within four years from the date of admission by acquiring the total credit requirements as specified for the award of the degree. In case of candidates who take lateral entry to Semester 111 of the course shall complete his/ her M.Voc. Programme within three years from the date of admission to Semester 111.

**7.12** For PG Diploma in Technology and Management Consulting, a student shall complete the passing requirements within three years of securing admission to the course.

## VIII. Grading and Classification

The following grading system is adopted for all the courses. The following grades will be awarded based on the overall performance in each course.

| Range of marks | Grades | Weightage |
|---|---|---|
| 90% and above | S-Outstanding | 10 |
| (80-89) | A-Excellent | 9 |
| (70-79) | B-Very Good | 8 |
| (60-69) | C-Good | 7 |
| (50-59) | D-Satisfactory | 6 |
| Below 50% | F-Failed | 0 |

Decimal percentages shall be rounded to the next higher number if it is greater than or equal to 0.5. Overall performance at the end of the semester will be indicated by Grade Point average (GPA) calculated as follows:

$$GPA = \frac{(G1IC1+G2C2+G3C3+.....+GnCn)}{(C1+C2+C3+.....+Cn)}$$

Where 'G' refers to the grade weightage and 'C' refers to the credit value of corresponding course undergone by the student. At the end of the final semester, Cumulative Grade Point Average (CGPA) will be calculated based on the above formula.

Classification for the Degree diploma will be as follows:

| Classification | CGPA |
|---|---|
| First Class with Distinction | 8 and above |
| First Class | 6.5 and above |
| Second Class | 6 and above |

## IX. Revision of Regulations and Curriculum.

The University may from time to time, revise, amend or change the Regulations, Schemes of Examinations and Syllabus. The date of effect of such changes will be as decided by the university.

## X. Structure of the Question Paper of End-Semester Examinations.

The End-Semester question paper shall have three parts (except for practical examinations), namely Part -A, Part-B and Part C. The maximum marks for End-Semester Examinations will be 50. In part A, there will be 10 compulsory questions which will be of the type *'Fill in the blanks/one word answer'.* Each question in Part A carries one Mark.

Part- B will consist of six questions out of which students must answer four questions. Each question will carry five marks in this part.

In part-C, student will answer two questions of 10 marks each from a group of three questions. One case study would be preferred among the three questions in this section.

In case of practical exams this pattern need to be followed. The number of questions can be varied according to the nature of the subject and the same will be decided by the examiners concerned based on the norms set by the Centre/Department council.

# REGULATIONS FOR B VOC IN BUSINESS PROCESS AND DATA ANALYTICS PROGRAMME OFFERED IN DDU KAUSHAL KENDRA UNDER THE FACULTY OF SOCIAL SCIENCES.

**(From the academic year 2018-19)**

## I. Introduction

The **Bachelor of Vocation (B.Voc.)** programme has been launched by the UGC to promote Vocational education at higher education institutions to produce industry ready, employable graduates under the National Skill Qualification Framework (NSQF) with multiple entry/exit options during the programme. The contents of the vocational courses are to be designed by providing a judicious mix of skill component relating to a profession (60%) and appropriate content of General education (40%) to ensure that the students are getting equipped in terms of knowledge and skills to be employable at each exit point of the programme.

**B.Voc. in Business Process and Data Analytics** is a vocational graduate programme designed to be offered under the DDU KAUSHAL Kendra, CUSAT and designed according to the UGC guide lines based on NSQF with multiple entry/exit options, leading to various job roles at each level of exit. Course contents shall be aligned with the norms of the concerned Sector Skill Councils (SSC) for enabling the students to obtain skill certifications from SSC concerned at various exit points.

## II. Duration and Nature of the Course

B Voc in Business Process and Data Analytics is a Bachelor level vocational programme which spans over a period of six semesters (three years) with multiple entry and exit options. Multiple entry and exit options imply that the students have exit options at the end of each year of the course and are eligible for varying certifications as shown below and such candidates who exit the course can rejoin to the course on a later stage and can complete the course.

1. Students who successfully complete the first two semesters and take exit option will be eligible for **Diploma in Business Process and Data Analytics**
2. Students those who successfully complete the first four semesters and take exit option will be eligible for **Advanced Diploma in Business Process and Data Analytics** and
3. Students who successfully complete all six semesters will be eligible for Bachelor of Vocation (B. Voc.) **Degree in Business Process and Data Analytics.**

Such students with Diploma/Advanced Diploma will be eligible for lateral entry to the third/fifth semester of B Voc Programme later if they wish to do so. Students with Diploma in Business Process and Data Analytics will be eligible for lateral entry to third semester and those with Advanced Diploma in Business Process and Data Analytics will be eligible for lateral entry to the fifth semester of this course. In such cases the students must surrender their Diploma/Advanced Diploma for obtaining the Advance Diploma/B Voc Degree certificate as they are not eligible for multiple certifications and such lateral entry shall be permitted only within five years of their original admission to the B Voc programme.

## III. Centre and Faculty

B Voc in Business Process and Data Analytics shall be offered at DDU KAUSHAL KENDRA and the degree shall be awarded under the Faculty of Social Sciences.

## IV. Eligibility for Admission

### For 2018 Admission

"Students with a total of 75% marks (or equivalent CGPA) in Plus Two or any equivalent examination conducted by recognised boards with Mathematics/Statistics as one of the subjects. Relaxation in percentage of marks shall be given to the candidates belonging to reservation communities as per rules".

**For 2019 admission onwards**

"Students with a total of 65% marks (or equivalent CGPA) in Plus Two or any equivalent examination conducted by recognised boards with Mathematics/Statistics as one of the subjects. Relaxation in percentage of marks shall be given to the candidates belonging to reservation communities as per rules".

While calculating the percentage of mark for plus two, the marks of mathematics/statistics shall necessarily be included in case the student has studied additional subjects.

## V. Selection and Intake of the Programme

**5.1** Selection of candidates will be based on the following criteria:

**For 2018 Admission**

The eligible students shall be admitted to the course from a rank list prepared by the university based on the marks secured by candidate in an Aptitude Test (CAT) conducted by the university and the marks scored for the qualifying examination. 50% weightage shall be given for the marks scored in CAT and 50% weightage shall be given to the aggregate marks scored by the candidate for the qualifying examination plus the marks scored for the Mathematics or Statistics (If both subjects are studied, only marks for the mathematics will be considered).

**For 2019 admission onwards**

The eligible students shall be admitted to the course from a rank list prepared by the university based on the marks secured by candidate in an Aptitude Test (CAT) conducted by the university.

**5.2** Intake of the programme shall be as per the decision of the university from time to time, taking into consideration the facilities available in the centre offering the programme. Seats are reserved for SC/ST and Other Backward Communities as per Government of Kerala rules in this regard.

## VI. Programme structure

**6.1** Since the Programme is vocational in character, the curriculum is designed in such a way that 60 per cent of the subjects are in the vocational domains (Business Process and Data Analytics) and 40 per cent in the general domains such as English language, communication skills, professional skills, IT skills, entrepreneurship and Functional Management. The curriculum has been designed to meet the requirements laid out in the UGC Guidelines for curriculum design for B Voc programmes under the National Skill Qualification Framework (NSQF). The total credit requirements for the course is 180 out of which skill components will carry 108 and general education components will carry 72 credits. The credit distribution will be in the following pattern:

| | **NSQF Level** | **Skill Component Credits** | **General Education Credits** |
|---|---|---|---|
| Year I Diploma | 5 | 36 | 24 |
| Year II Advanced Diploma | 6 | 36 | 24 |
| Year III B Voc | 7 | 36 | 24 |
| Total | | 108 | 72 |

**6.2** The number of credits (total) in L I L IV V and VI semesters shall be 30, 30, 30, 30, 34 and 26 respectively. The total number of Credits required for a pass in the programme shall be 180, in which minimum credit required for the core courses and electives are 172 and 8 respectively.

**6.3** Students shall have the freedom to opt for one elective each in semester IV and semester V of the programme.

**6.4** Students will have to undertake an organisational study of minimum 15 working days as part of their Project-I at the end of semester II. Project II at the end of Semester IV will be of 15 working days on Business Process Mapping. Semester VI is fully devoted for Project III – (Main Project) of not less than 80 working days and the same will be on a data analytics project in any organisation. Each student shall be assigned to a faculty guide for all the projects. A written report must be submitted at the end of the Project-I, II and III in a format prescribed by the Centre.

**6.5** Students are required to attend single/multiple Training Programme/s with the total duration of which shall amount to 5 days each in Semester I and Semester III and 10 days in Semester VI. These training programmes shall be in the general domain to improve the personal effectiveness, professional skills and career planning of the students. The ten days workshop programme proposed in fourth semester will help students to build personal branding and to prepare career planning along with building awareness about current trends and developments in Industry and Economy. Students shall be encouraged to participate in training programmes organized by state/national level institutes/Centres or Departments of Universities including DDUKK/Professional bodies such as AIMA or ISTD, etc. to satisfy the requirements for acquiring credits for the aforementioned training programmes in various semesters.

In order to attend such training programmes, students have to obtain prior permission from the Centre by submitting the details of the institution offering the training programme and the proposed course. The credits for the participation in such training programme shall be awarded only based on the evaluation of the report submitted by the student with the participation Certificates.

## VII. Method of Teaching and Training

The teaching and training for the B Voc programme shall focus on developing skills and enhancing employability of the students so as to make them industry-ready graduates. Hence the teaching and training pedagogy of the programme will be mostly through "Activity Oriented Class room (AOC)", and the same will comprise of case studies, games, simulation techniques, presentations, Industry internships, training labs, both individual and group projects, interaction with industry experts, etc. Live analytics projects and internship training in organisations shall also form part of the training for the programme.

## VIII. Mode of Evaluation and Eligibility for Pass

**8.1** Mode of Evaluation will be 100 per cent internal for all papers out of which 50% marks are for continuous assessment throughout the semester and 50% marks are for End semester examination. In the case of the following subject namely Managerial Skills Development and Design Thinking (Semester III), the entire 100 marks will be awarded through continuous assessment by the teachers through case analysis, group discussion, team building tasks, leadership role, problem solving exercises, personal improvement, report writing, presentations etc.

For Project I and Project II, 50 % marks will be awarded through continuous assessment and 50% marks will be awarded based on the evaluation of the report submitted by the student. In case of the Project III (Main Project) 100 marks each will be awarded for Continuous

Assessment, Project Report and Viva Voce. Viva-Voce examination at the end of the sixth semester shall be carried out by a board with at least three examiners.

Evaluation for programming-based subjects in various semesters shall be in practical mode.

**8.2** A minimum of 75% attendance is compulsory for each student to appear for End- Semester examination and also to progress to the subsequent semester. But the Vice- Chancellor shall have the power to condone the shortage of attendance up to 10% on medical grounds on the recommendations of the HOD. However, such condonation for shortage of attendance shall be given to a particular student only once during the entire programme of study.

**8.3** Internal marks will be awarded on the basis of class tests, assignments, viva-voce, practical assignments, term-papers, mini-projects etc. as decided by the teacher concerned, considering the relevance of each component with respect to the paper he/she handles. However, the student shall be evaluated continuously throughout the semester and marks shall be awarded as per the following guidelines:

a) A minimum of 50 per cent weightage shall be given for internal tests/lab exams/practical assignments

b) A maximum of 20 per cent weightage shall be given for written assignments

c) A maximum of 20 per cent weightage shall be given for class room presentations, Viva -voce and mini projects

d) A maximum of 20 per cent weightage shall be given for other items such as attendance or activities that the teacher of the concerned course believes as relevant for the course and assigned to the students.

The total Internal Marks awarded will be 50.

However, Department/Centre Council can change the guidelines for the distribution of internal marks given above, as and when required.

**8.4** The question paper for the End-Semester examination shall be set by the concerned teacher in advance which shall be scrutinized by the respective Centre/Department Council or by a committee consisting of the HOD and faculty members offering courses in that semester to ensure that questions are within the scope of the syllabus and that the entire syllabus of the course is fairly covered in the question papers. Modifications can be suggested by the council if necessary and such suggestions shall be incorporated in the final version of the question paper.

There shall be only a single evaluation for the End-Semester examination. Immediately after the examination is over, the Head of the Department/Centre shall make arrangements to complete the evaluation and finalise the results within 10 working days after the last examination. In case of Semester II, Semester IV and Semester VI where Projects are included, the results shall be finalised within seven working days after the submission of the report/ conduct of Viva-Voce examination, which ever applicable as the case may be. The marks and grade in all courses obtained by the students will be displayed in the notice board and the answer scripts can be shown to the students for scrutiny on written request by the student addressed to the Director of the Centre. (Viva voce marks are exempted from this clause as it is awarded by a board of examiners).

**8.5** For each course there shall be a separate passing minimum of 45% marks for the End Semester examination and the student has to secure an aggregate of 50% when End Semester examination and Internal Marks are taken together for every course in an the semesters for passing the programme. In case of the course Managerial Skills Development and Design Thinking in Semester III, students should acquire a minimum of 50% marks in Continuous Assessment. In case of Projects, candidate has to acquire aggregate 50% marks in each projects- Project I, II and III, for the successful completion.

**8.6** The department shall publish the marks obtained by the students, in the continuous assessment and End-Semester examination. If the student has any grievance, he/she can approach the concerned teacher and submit his/her grievance with supporting documents/arguments. The teacher and the HOD will examine the case and decide on his her grievance. If the student is not convinced with the decision, he/she can approach the appellate authority, which is the department council, in writing and the council shall examine the same and take a final decision which has to be intimated to the student. The decision of the appellate authority shall be final.

**8.7** The final marks and grades obtained by the students shall be published in the notice board. Those who could not obtain at least Grade D in total for a course will be declared as failed in that course.

**8.8** For Semester I, III, and V, the results of the examinations shall be finalized and published within 30 working days from the date of last end semester by the centre/department council, which will act as the passing board and the minutes shall be sent to the Controller of Examinations of the University for the Issue of grade cards. In case of Semester II, Semester IV and Semester VI where Project I, II and III are included respectively, the results shall be finalized and published within ten working days after the submission of the report/ conduct of Viva-Voce examination, which ever applicable as the case may be.

**8.9** A student shall complete his/her B Voc programme within six years from the date of admission by acquiring the total credit requirements as specified for the award of the degree. In case of candidates who take lateral entry to Semester III or V of the course shall complete his/her B Voc programme within five years or four years respectively from the date of admission.

**8.10** For Diploma in Business Process and Data Analytics, a student shall complete thepassing requirements within three years of securing admission to the course. And thesame will be four years in the case of Advanced Diploma.

**8.11** For Advanced Diploma in Business Process and Data Analytics, a student shallcomplete the passing requirements within five years of securing admission to the course

## IX. Grading and Classification

The following grading system is adopted for all the courses. The following grades will be awarded based on the overall performance in each course.

| **Range of marks** | **Grades** | **Weightage** |
|---|---|---|
| 90% and above | S-Outstanding | 10 |
| (80-89) | A-Excellent | 9 |
| (70-79) | B-Very Good | 8 |
| (60-69) | C-Good | 7 |
| (50-59) | D-Satisfactory | 6 |
| Below 50% | F-Failed | 0 |

Decimal percentages shall be rounded to the next higher number if it is greater than or equal to 0.5.

Overall performance at the end of the semester will be indicated by Grade Point average (GPA) calculated as follows:

$$GPA = \frac{G1C1+G2C2+G3C3+\ldots\ldots\ldots\ldots\ldots +GnCn}{C1+C2+C3+\ldots\ldots\ldots\ldots\ldots\ldots\ldots+Cn}$$

Where 'G' refers to the grade weightage and C' refers to the credit value of corresponding course undergone by the student.
At the end of the final semester, Cumulative Grade Point Average (CGPA) will be calculated based on the above formula.

Classification for the Degree diploma will be as follows:

| **Classification** | **CGPA** |
|---|---|
| First Class with Distinction | 8 and above |
| First Class | 6.5 and above |
| Second Class | 6 and above |

## X. Revision of Regulations and Curriculum

The University may from time to time, revise, amend or change the Regulations, Schemes of Examinations and Syllabus. The date of effect of such changes will be as decided by the university.

## XI. Structure of the Question Paper of End-Semester Examinations

The End-Semester question paper shall have three parts (except for practical examinations) namely Part-A, Part-B and Part C. The maximum marks for End-Semester Examinations will be 50.
In Part A, there will be 10 compulsory questions which will be of the type Fill in the blanks/one-word answer. Each question in Part A carries one mark.
Parn-B will consist of six questions out of which students must answer four questions. Each question will carry five marks in this part.
In Part-C, student will answer two questions of 10 marks each from a group of three questions. One case study would be preferred among the three questions in this section. In case of practical exams, this pattern need not be followed. The number of questions can be varied according to the nature of the subject and the same will be decided by the examiners concerned based on the norms set by the Centre/Department council.

# REGULATIONS FOR M.VOC. IN MOBILE PHONE APPLICATION DEVELOPMENT COURSE OFFERED UNDER THE FACULTY OF TECHNOLOGY

**(From 2018 admission onwards)**

The **Master of Vocation (M.Voc.**) programme has been launched by the UGC to promote vocational education at higher levels to produce industry ready, employable graduates under the National Skill Qualification Framework (NSQF) with multiple entry/exit options during the programme. The contents of the vocational courses are to be designed by providing a judicious mix of skill component relating to a profession (60%) and appropriate content ofGeneral education (40%) to ensure that the students are getting equipped in terms of knowledge and skills to be employable at each exit point of the programme.

**M.Voc. in Mobile Phone Application Development** is a Masters level vocational programme designed to be offered under the DDU KAUSHAL Kendra, CUSAT and designed according to the UGC guide lines based on NSQF with multiple entry/exit options, leading to various job roles at each level of exit. Course contents shall be aligned with the norms of the concerned Sector Skill Councils for enabling the students to obtain skill certifications from SSC concerned at various exit points.

## I. Duration and Nature of the Course

M.Voc. in Mobile Phone Application Development Course is a Masters level vocational course and will span over a period of four semesters (two years) with multiple entry and exit options. That is, the course is designed in such a way that students who successfully complete the first two semesters can discontinue the programme if they wish and can get a Post- graduate Diploma in Mobile Phone Application Development. Those who continue the course further and finish four semesters successfully will be eligible for M.Voc. Degree (Master of Vocation). Students who discontinue after second semester with P.G. Diploma can come back and opt for lateral entry to the third semester later if they wish to do so and can finish their M.Voc. Degree. In such cases they have to surrender their PG Diploma for obtaining the M.Voc. Degree certificate and such lateral entry shall be permitted only within five years of their original admission to M.Voc. Course.

## II. Centre and Faculty

M.Voc. in Mobile Phone Application Development shall be offered under DDU KAUSHAL KENDRA and the degree shall be awarded under the Faculty of Technology.

## III. Eligibility for Admission

### 3.1 Eligibility for academic year 2018-19 Admission

Engineering graduates with 60% marks (or equivalent CGPA) in the branches of Information Technology/Computer Science/Electronics & Communication or Graduates with 60% marks (or equivalent CGPA) in Computer Science/Computer Applications/ Information Technology / Electronics/Software Development or Graduates with B.Voc. degree in relevant disciplines with 60% marks (or equivalent CGPA).

### 3.2 Eligibility for academic year 2019-20 onwards

Engineering graduates with 50% marks (or equivalent CGPA) in the branches of Information Technology/Computer Science/Electronics & Communication or Graduates with 60% marks (or equivalent CGPA) in Computer Science/ Computer Applications/ Information Technology/ Electronics / Software Development or Graduates with B.Voc. degree in relevant disciplines with 60% marks (or equivalent CGPA).

## IV. Selection and Intake of the course

**4.1** Selection for academic year 2018-19 admission will be based on the candidates score in CUSAT CAT exam and interview. 80% weightage for Test score and 20% weightage for interview shall be given for selection. Ranking will be based on the aggregate score of Test and Interview. Seats are reserved for SC/ST and other backward communities as per Kerala Government rules.

**4.2** Selection for academic year 2019-20 admission onwards will be exclusively based on the candidates score in CUSAT CAT exam. Seats are reserved for SC/ST and other backward communities as per Kerala Government rules.

**4.3** Intake of the course shall be as per the decision of the university from time to time taking into consideration the facilities available in the centre offering the programme.

## V. Course structure

**5.1** The number of credits (total) in I, II, III and IV semesters shall be 24, 36, 24 and 24 respectively. The total number of credits required for a pass in the course shall be 108, in which minimum credit required for the core courses and electives shall be 96 and 12 respectively.

**5.2** Since the Course is vocational in character, the curriculum is designed in such a way that 60 per cent of the subjects are in the vocational domain (Mobile Phone application Development) and 40 per cent in the General domain such as Communication skills, Professional Skills, Management and Entrepreneurship.

**5.3** Students shall have the freedom to opt for two electives during II and IV semester of which at least one should be Interdisciplinary Elective (IE) course from other Departments/Schools.

**5.4** Students will have to undergo for an internship training of minimum 40 working days at the end of second semester. Semester IV is fully devoted to a Major project work of not less than 90 working days and the same will be on mobile phone application development in an IT firm. Each student shall be assigned to a guide for the same and a report has to be submitted in a format prescribed by the Centre.

## VI. Method of Teaching and Training

The teaching and training of the M.Voc. Course should focus on developing skills and enhancing employability of the students to make them industry ready graduates. Hence the teaching and training pedagogy of the course will be mostly through "Activity Oriented Class room (AOC)", on the job training through live projects and the same will comprise of Case studies, games, simulation techniques, presentations, Industry internships, training labs, both individual and group projects, interaction with industry experts, etc.

## VII. Mode of Evaluation and Eligibility for pass

**7.1** Mode of Evaluation will be 100 per cent internal for all papers out of which 50 % marks are for continuous assessment throughout the semester and 50 % marks are for End-semester examination. In case of the paper Professional Skills Development in second semester the entire 100 marks will be awarded through continuous assessment by the teachers through case analysis, Group discussion, Team Task, Leadership role, Problem solving exercises, Personal Improvement, All practical examinations will also be internally evaluated with both etc. continuous assessment and End-semester examinations as mentioned above.

**7.2** For the Internship in second semester, 50% marks are for continuous assessment and the report submitted and remaining 50% marks will be awarded through a viva voce examination conducted by internal examiners. For the Main Project in fourth semester, the maximum marks shall be 300, of which 100 marks each will be allotted to (i) the continuous evaluation of the project work carried out by the student, (ii) the project report submitted (iii) Viva-voce examination carried out by a board of examiners.

**7.3** Marks obtained by the students in the continuous assessment shall be displayed on the notice board and grievances if any may be addressed to the Head of the Centre/department. The department council shall finalise the marks of the continuous assessment of each course after addressing such grievances.

**7.4** A minimum of 75% attendance is compulsory for each student to appear for End-semester examination and also to progress to the next subsequent semester. Butthe Vice-Chancellor shall have the power to condone the shortage of attendance up to 10% on medical grounds on the recommendations of the HOD. However such condonation for shortage of attendance shall be givenonly once during the entire programme of study.

**7.5** Sessionalmarks will be awarded on the basis of class tests, assignments, viva-voce, practical assignments, term-paper, mini-project etc. as decided by the teacher concerned according to the relevance of the same with respect to the paper he/she handles. However, the student shall be evaluated continuously throughout the semester and marks shall be awarded as detailed below:

**a)** A minimum of 50 per cent weightage shall be given for internal tests/lab exams/practical assignments

**b)** A maximum of 20 per cent weightage shall be given for written assignments

**c)** A maximum of 20 per cent weightage shall be given for class room presentations,
Viva -voce and mini projects

**d)** A maximum of 20 per cent weightage shall be given for other items such as attendance or activities that the teacher of the concerned subject believes as relevant for the course and assigned to the students.

Department/Centre Council can change the criteria proposed above for the distribution of internal marks, as and when it required.

**7.6** The question paper for the End-semester examination shall set by the concerned teacher in advance, which shall be scrutinized by the respective department council or by a committee consisting of the HOD and faculty members offering courses in that semester to ensure that questions are within the scope of the syllabus and that the entire syllabus of the course is fairly covered in the question paper. Modifications can be suggested by the council if necessary and such suggestions shall be incorporated in the final version of the question paper. There shall be only a single evaluation for the semester end examination. Immediately after the examination is over, the Head of the Department/Centre shall make arrangements to complete the evaluation and finalise the results within 10 working days after the last examination. In case of second semester and fourth semester where internships are there, the results shall be finalized within five working days after the Viva-Voce examination. The marks and grade in all the courses obtained by the students have to be displayed in the notice board and the answer scripts can be shown to the students for scrutiny (Viva-voce marks are exempted from this clause as it is awarded by a board of examiners) if requested.

**7.7** For each course there shall be a separate minimum of 45% marks for the End- semester examination and the student has to secure aggregate 50% marks for every paper in all the semesters for passing the programme, In case of the paper Professional Skills Development in second semester, students should acquire a minimum of 45% marks in Continuous Assessment.Students have to acquire a minimum of 50% marks for the Viva Voce examination of the Internship in second semester and 50% marks each for all the three components of the main project in fourth semester (three components: (i) the continuous evaluation of the project work (ii) the project report submitted (iii) Viva-voce examination.)

**7.8** The department shall publish the marks obtained by the students, in the continuous assessment and End-semester examination. If the student has any grievance, he/she can approach the concerned teacher and submit his/her grievance with supporting documents/arguments. The teacher and the HOD will examine the case and decide on his/her grievance. If the student is not convinced with the decision, he/she can approach the appellate authority, which is the department council, in writing and the council shall examine the same and take a final decision which has to be intimated to the student in writing. The decision of the appellate authority shall be final.

**7.9** The final marks and grades obtained by the students shall be published in the notice board. Those who could not obtain at least Grade D in total for a course will be declared as failed in that course. Those who fail in any core or elective course shall submit an application to the HOD within five working days if necessary for a re-examination of the semester end examination. Within ten daysof the display of the results in the notice board, the department shall conduct an additional semester end examination for these

candidates. This re-examination is only to provide the student a chance to complete the course successfully. If he/she completes the course successfully making use of this additional chance, he/she will be awarded only a D grade enabling the candidate to be declared successful in that course. If he/she cannot make it up, he/she may repeat the semester end examination of that course in the next available chance/s. In this case, he/she may be awarded whatever grade he/she has secured.

**7.10** The result of the examinations will be finalized and published within 30 daysfrom the last date of examinations by the department council, which will act as thepassing board and the minutes shall be sent to the controller of examinations forthe issues of grade card. In case of second semester and fourth semester whereinternships are there, the results shall be finalized and published within 15working days after the Viva-Voce examination.

**7.11** A student shall complete his/her M.Voc. Program within four years from thedate of admission by acquiring the total credit requirements as specified for theaward of the degree. In case of candidates who take lateral entry during the thirdsemester of the course shall complete his/her M.Voc. Program within three yearsfrom the date of admission to the third semester.

## VIII. Grading and Classification

The following grading system is adopted for all the courses. The following grades will be awarded based on the overall performance in each subject.

| **Range of marks** | **Grades** | **Weightage** |
|---|---|---|
| 90% and above | S-Outstanding | 10 |
| (80-89) | A-Excellent | 9 |
| (70-79) | B-Very Good | 8 |
| (60-69) | C-Good | 7 |
| (50-59) | D-Satisfactory | 6 |
| Below 50% | F-Failed | 0 |

Decimal percentages shall be rounded to the next higher number if it is greater than or equal to 0.5.

Overall performance at the end of the semester will be indicated by Grade

Point average (GPA) calculated as follows:

$$GPA = \frac{G1C1+G2C2+G3C3+\ldots\ldots\ldots\ldots\ldots+GnCn}{C1+C2+C3+\ldots\ldots\ldots\ldots\ldots\ldots\ldots+Cn}$$

Where G' refers to the grade weightage and C' refers to the credit value of corresponding course undergone by the student.

At the end of the final semester, Cumulative Grade Point Average (CGPA) will be calculated based on the above formula.

Classification for the Degree diploma will be as follows:

| Classification | CGPA |
|---|---|
| First Class with Distinction | 8 and above |
| First Class | 6.5 and above |
| Second Class | 6 and above |

**IX.**

**Revision of Regulations and Curriculum**

The University may from time to time, revise, amend or change the Regulations, Schemes or Examinations and Syllabus. The date of effect of such changes will be as decided by the university.

**X. Structure of the Question Paper**

The End-Semester question paper shall have three parts (except for computer lab/practical exams), namely Part-A, Part-B and Part C.

In Part A, there will be 10 compulsory questions which will be of the type Fill in the blanks/one-word answer/multiple choice'. Each question in Part A carries one mark.

Part-B will consist of six questions out of which students must answer four questions. Each question will carry five marks in this part.

In Part-C, student will answer two questions of 10 marks each from a group of three questions. One case study would be preferred among the three questions in this section.

In Part-C, student will answer two questions of 10 marks each from a group of three questions. One case study would be preferred among the three questions in this section.

In case of Software Lab/ Practical oriented papers, this pattern need not be followed. The number of questions or programmes be varied according to the nature of lab/practical and the same will be decided by the examiners concerned based on the norms set by the department council.

## REGULATIONS FOR EXECUTIVE POST GRADUATE DIPLOMA IN ANDROID APPLICATION DEVELOPMENT COURSE (OFFERED UNDER THE FACULTY OF TECHNOLOGY)

**I. Nature and Duration of the Course**

**Executive P.G Diploma in Android Application Development** Course is a Post Graduate level Diploma course and will span over a period of two semesters (one year). The course is designed to add value to the knowledge and skills of the professionals with experience in software development (Teaching/Research/Industry).

Candidates who successfully complete two semesters will get an Executive Post Graduate Diploma in Android Application Development.

The course is proposed to be offered as an evening programme on regular basis under DDUKK, CUSAT.

**II. Centre and Faculty**

Executive P.G Diploma in Android Application Development shall be offered under DDU KAUSHAL KENDRA as a regular evening programme from 6.00 prn to 9.00 pm and the Diploma shall be awarded under the Faculty of Technology.

**III. Eligibility for Admission**

Any graduate with a minimum of two years of experience in software development (Teaching/Research/Industry) shall be eligible for admission to the course.

## IV. Selection and Intake of the course

**4.1** Intake of the course per batch shall be decided by the university from time to time, howeverthe maximum intake shall be limited to 50 per batch.

**4.2** Admissions to the course shall be done directly by the DDUKK obtaining permission from university for every batch.

**4.3** If the numbers of applicants are more than the intake decided for the batch, the admission will be based on an entrance test conducted by DDUKK. Seats shall be reserved for SC/ST and other backward communities as per Kerala Government rules and lapsed seats from" the reservation category shall be filled with open candidates without further notification.

## V. Course structure

**5.1** The course is of one year duration and split into two semesters. The number of credits (total) in semesters I and II shall be 15 and 21respectively. The total number of credits **for** the **course** shall be 36.

**5.2** Students**shall** have the freedom to opt for one elective during semester II. **Students will** have to undertake a Major Project work during semester II in **Android** application development, which can commence along with the semester and carried out parallel to the regular classes. However, the last four weeks of the semester will be exclusively for the project and internship, if required, as part of the same. Each student shall be assigned to a guide for the same and a report has to be submitted in a format prescribed by the Centre.

## VI. Method of Teaching and Training

The teaching and training of the Executive P.G Diploma course orient towards developing skills and enhancing employability of the candidates to make them more proficient and equipped for their current job as well as for higher jobs in IT industry. Hence the teaching and training pedagogy of the course will be mostly through lab oriented classroom sessions and the same will comprise of practical, simulation techniques, presentations, both individual and group projects, interaction with industry experts, etc.

## VII. Mode of Evaluation and eligibility for pass

**7.**1 Mode of Evaluation will be 100 per cent internal for all except the **Viva-voce examination in semester II,** out of which 50 % marks are for continuous assessment throughout the semester and 50 % marks are for End-semester examination.

**7.2** The total marks for the Project in second semester shall be 200 in which 50 marks each will be awarded for 1) continuous assessment, 2) App development and implementation, 3) Project report and 4) Viva voce examination.

**7.3** A student would be considered to have progressed satisfactorily at the end of a semester if he/she has a minimum of 75% attendance aggregate for the semester.

**7.4** Sessional marks will be awarded on the basis of class tests, assignments, viva-voce, practical assignments, term-papers, mini-projects etc. as decided by the teacher concerned according to the relevance of the same with respect to the paper he/she handles. However, the student shall be evaluated continuously throughout the semester and marks shall be awarded accordingly.

**7.5** A candidate shall obtain a minimum of 45% in end semester examination and aggregate 50% marks for every paper in all the semesters to be eligible for the Diploma. Student has to acquire at least 50% marks for the Main project evaluation in semester II.

**7.6** A student shall complete his/her Executive P.G Diploma program within two years from the date of admission by acquiring the total credit requirements as specified for the award of the degree.

## VIII. Grading and Classification

| Range of marks | Grades | Weightage |
|---|---|---|
| 90% and above | S-Outstanding | 10 |
| (80-89) | A-Excellent | 9 |
| (70-79) | B-Very Good | 8 |
| (60-69) | C-Good | 7 |
| (50-59) | D-Satisfactory | 6 |
| Below 50% | F-Failed | 0 |

The following grading system is adopted for all the courses. The following grades will be awarded based on the overall performance in each subject.

Decimal percentages shall be rounded to the next higher number if it is greater than or equal to 0.5.

Overall performance at the end of the semester will be indicated by Grade Point average (GPA) calculated as follows:

$$GPA = \frac{Gl'Cl+G2C2+G3C3+.....+GnCn/}{Cl+C2+C3+.....+Cn}$$

Where 'G' refers to the grade .weightage and 'C' refers to the credit value of corresponding course undergone by the student.

At the end of the final semester, Cumulative Grade Point Average (CGPA) will be calculated based on the above formula
Classification for the Degree diploma will be as follows:

| Classification | CGPA |
|---|---|
| First class with Distinction | 8 and above |
| First class | 6.5 and above |
| Second class | 6 and above |

## IX. Revision of Regulations and Curriculum

The University may from time to time, revise, amend or change the Regulations, Schemes of Examinations and Syllabus. The date of effect of such changes will be as decided by the university.

## X. Structure of the Question Paper

Considering the vocational nature of the course, evaluation of the students shall be based on practice-oriented Lab exams. The number of questions or programmes be varied according to the nature of lab and the same will be decided by the examiners concerned based on the norms set by the department/center council.

# REGULATION FOR THE M.Sc. (FIVE YEAR INTEGRATED) DEGREE IN PHOTONICS OFFERED BY INTERNATIONAL SCHOOL OF PHOTONICS

## 1. SCOPE

**1.1** These Regulations shall apply to the M.Sc.(Five Year Integrated) Degree in Photonics conducted by International School of Photonics of the Cochin University of Science and Technology.

**1.2** The provisions herein supersede all other Regulations unless otherwise provided.

## 2. DEFINITIONS

**2.1** Academic Committee means the committee constituted by the Vice-Chancellor under this regulation to monitor the running of the programme.

**2.2** Core course means a course that the student admitted to a particular programme must successfully complete to receive the Degree and which cannot be substituted by any other course.

**2.3** Elective course means a course, which can be substituted by equivalent courses from the same or other Departments/ Schools.

**2.4** Audited course will not accrue any credit.

**2.5** Department/School means Departments/ Schools instituted in the the University as per Statutes and Act.

**2.6** Levels of courses in these Regulations will generally means:

| | | |
|---|---|---|
| First Level | **:** | Undergraduate programme (Semester 1 to Semester V1) |
| Second Level | **:** | Post graduate programme (Semester VII to Semester X) |
| Third Level | **:** | M.Tech. programmes |

**2.7** Choice Based Credit Semester (CB CS) System shall be followed.

## 3. ELIGIBILITY FOR ADMISSION

As per the Regulations prescribed by the University from time to time.

## 4. ADMISSIONS

As per the Regulations prescribed by the University from time to time.
After closing the admissions, each student will be assigned a unique registration number by the department which will be valid throughout his course in the University.

## 5. COURSE REGISTRATION

**5.1** The School shall have Faculty Members as Student Advisors. Each student at the time of seeking admission will be assigned to an Advisor by the Department Council. She/ he will advise the student about the academic programme and counsel on, the choice of courses depending on the student's academic background and objective. The student will then register for the courses he plans to take for the semester before the classes begin.

The Department shall prescribe the maximum number of students that can be admitted taking into consideration the facilities available. Preference shall be given to those students for whom the course is core- course if the demand for registration is beyond the maximum prescribed. The student has to complete the prescribed prerequisites for the course before registration and register before the last date prescribed by the university. The student can drop/re-register any elective/audit courses (s) within 15 working days after the commencement of the classes.

**5.2** The University shall make available to all students a Bulletin listing all the courses offered in every semester specifying the credits, List of topics the course intends to cover, the instructor who is giving the courses, the time and place of the classes for the courses and examination schedule. Each course shall have a code consisting of three characters denoting the Department and four digits of which first digit indicating the level of thecourse, second indicating the Semester and third and fourth digits the serial number of the course. However in such Departments having more than 1 Masters Programme of same level, the first 2 characters denote Department and the third, the course of study

## 6. E STRUCTURE

**6.1** The CBCS system will be fully internal in all sense. There shall we three kinds of courses: Core, Electives and Audit courses. Core courses should generally be offered by the Department/. School concerned. Normally no course shall have more than four credits expect in case where only project/dissertation including seminars are involved in which cases the minimum credit shall be sixteen.

**6.2** In the case of integrated MSc Photonics course, the minimum credit required to be awarded the BSc (photonics) degree is 115 and for MSc (photonics) degree is 187.

**6.3** The Department Council shall make recommendations on the core and elective courses including the detailed syllabus for each programme offered by the Departments to the University and approved by the Board of Studies, Faculty and Academic Council. The Department Council shall have the freedom to design and introduce new electives and or audited courses, to modify/ redesign existing electives and to replace any existing electives with new or modified/ redesigned electives to facilitate better expose and training for the students. Prior approval from the Board of Studies and Academic Council is not required for such modifications in the electives, but shall be done only with the approval of the Academic Committee. Such changes shall be brought to the notice of the concerned bodies in the next meeting for ratification.

**6.4** The general structure of the programme shall be as given below: A minimum 75% attendance is compulsory. But Vice- Chancellor shall have the power to condone shortage of attendance up to 10 percent on medical grounds on the recommendations of the Head of Department. However such condonation for shortage of attendance shall be given only twice during the entire course.

| | **Int. MSc Photonics** |
|---|---|
| Programme duration | 10 sem |
| Accumulated minimum credit required for successful completion of the | 187 |
| Minimum Attendance required | 75% |

**Note:** Each semester shall have a minimum of 90 working days and one credit shall be given for one hour lecture or 3 hours of practical work per week. No regular student shall register for more than 24 credits per semester and less than 16 credits per semester. The minimum credit required to continue to level 2 (Sem 7 to Sem 10) from level 1 (Sem 1 to Sem 6) shall be 90.

The students should have a minimum of 75% attendance to appear for the internal examinations as well.

**6.5** A student shall compulsorily register and complete at least one Interdisciplinary Elective (IE) course (one of the Electives) from other Departments/Schools before registering for the final semester of the Programme. For Int.MSc Photonics course, Interdisciplinary Elective (IE) need to be completed in level 2 only.

**6.6** Each Department/School must announce at least one interdisciplinary course (Electives) to be offered by them, in the "E" slot of the Common Time-table.

**6.7** This interdisciplinary course (Elective) shall not have any prerequisite.

## 7. EVALUATION

**7.1** The entire system of evaluation is internal. The evaluation scheme for each semester contains two parts, a continuous assessment and an end semester examination. The continuous assessment shall consist of minimum of two tests of twenty marks each and ten marks for assignments/seminars/quizzes etc. which has to be intimated to the students at the beginning of the semester. Marks obtained in the continuous assessment shall be displayed on the notice board and grievances received if any through the Head of the Department. The Department Council shall finalise the marks of the continuous assessment of each course.

The semester end examination shall cover the entire syllabus of the course. Equal weightage shall be given for the continuous assessment and the semester end components. All practical examinations will be internally evaluated as per the procedures laid down by the Department Councils concerned.

**7.2** Two distinct sets of question papers for the semester end examination are to be set by the concerned teacher in advance, which shall be scrutinized by the department council to ensure that questions are within the scope of the syllabus and also the entire syllabus of the course is fairly covered in the question paper. Modifications can be suggested by the council if necessary and the incorporation of such suggestions should reflect in the final question paper. Out of the two question papers prepared, one shall be selected by the director for conducting the end semester examination.

There shall be only a single internal evaluation for the end semester examination. Immediately after the examination is over, the Head of the Department shall arrange an internal valuation camp pertaining to all the end semester examinations conducted in the Department and the results shall be finalized within 10 working days after the examination is over. The marks and grade in all the subjects obtained by the students has to be displayed in the notice board and the answer scripts can be given back to the students for scrutiny if necessary.

**7.3** **For each course there shall be a separate minimum of 45% marks for the semester end examinations,**

**7.4** The Department shall publish the marks obtained by the students, in the continuous assessment and semester end examination If the student has any grievance, he/she can approach the concerned teacher and submit his/her grievance with supporting documents/arguments within five working days of publication of the results. The teacher and the HOD will examine the case and decide on his/her grievance. If the student is not convinced with the decision, he/she can approach the appealing authority- the department council- in writing and the council shall examine the same and take a final decision which has to be intimated to the student in writing. The decision of the appealing committee shall be final.

**7.5** The final marks and grades obtained by the students shall be published in the notice board. Those who could to obtain 50% marks (Grade D) in total for a course will be declared as failed in that course. Those who fail in any core or elective course shall approach the concerned teacher if necessary for a re- examination of the semester end examination. Within one week of the display of the results in the notice board, the concerned teacher shall conduct an additional semester end examination for these candidates. This re- examination is only to enable the student to pass the examination so by completing the course successfully. If he/she completes the course successfully making use of this additional chance, he/she will be awarded only a D grade for that course. If he/she cannot make it up, he may repeat the semester end examination of that course in the next available chance. The maximum duration for completing the MSc degree programme will in any case be 9 years from the date of commencement of first semester A student will have additional two years to complete the first level and additional two years for completing the second level. Total additional years that can be availed is 4)

**7.6** The result of the examinations will be declared by the department council within 30 days of the last examination of the semester and the minutes shall be sent to the controller of examinations to issue the mark list of that examination.

## 8 GRADE CARD

**8.1** The University under its seal shall issue a Grade Card to the students on completion of each semester. The Grade card shall contain the following:

a Title of the course taken as core, elective and audit. (An audit course shall be listed only if the student has secured a pass)

b The credits associated with and the grades awarded for each course.

c The number of credits (core and elective separately) earned by the student and the Grade point Average.

d The total credits (core and elective) earned till that semester.

**8.2** The following grading system be adopted for all the courses.

The following grades will be awarded based on the overall performance in each subject.

| **Range of marks** | **Grades** | **Weightage** |
|---|---|---|
| 90 and above | S-Outstanding | 10 |
| 80 to 89 | A-Excellent | 9 |
| 70 to 79 | B-Very good | 8 |
| 60 to 69 | C-Good | 7 |
| 50 to 59 | D-Satisfactory | 6 |
| Below 50% | F-Failed | 0 |

Overall performance at the end of the semester will be indicated by Grade Point Average (GPA) calculated as follows,

$$GPA = \frac{G1C1+G2C2+G3C3+ \ldots\ldots\ldots\ldots\ldots\ldots GnCn}{C1+C2+C3+ \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots Cn}$$

Where 'G' refers to the grade weightage and 'C' refers to the credit value of corresponding course undergone by the student. At the end of the final semester Cumulative Grade Point

Average (CGPA) will be calculated based on the above formula, considering the Credits and Grades earned during the entire course of study.

Classification for the Degree/Diploma will be given as follows:

| | | |
|---|---|---|
| First Class with distinction | **:** | 8 and above |
| First Class | **:** | 7 and above |
| Second Class | **:** | 6 and above |

**8.3** The Grade Card issued at the end of the final semester shall contain the details of all the courses taken which shall include the titles of the courses, the credits associated with each course, the CGPA and the class. The rank shall be awarded based on CGPA corrected to the 2 Decimal.

## 9. MONITORING AND MANAGEMENT OF COURSES

**9.1** Every post graduate programme conducted in the Departments shall be monitored by the Department Council subject to these regulations. The Department Council shall design courses, prescribe the mode of conducting the courses and monitor the evaluation of students.

## 10. ACADEMIC COMMITTEE

**10.1 The Committee shall consist of:**

| | | | |
|---|---|---|---|
| **a.** | The Pro-Vice-Chancellor | **:** | Chairman |
| **b.** | The Registrar | **:** | Secretary |
| **c.** | The Controller of Examinations | | |
| **d.** | One Teacher from each Department | | |

**10.2** A Senior Professor nominated by the Vice-Chancellor from among the members of the Committee shall be the Vice-Chairman of the Committee.

**10.3** The term of the office of the committee shall be two years, but the committee once constituted shall continue in office until a reconstituted committee assumes office.

## 11 TRANSITORY PROVISION

Notwithstanding anything contained in these regulations the Vice-Chancellor shall for a period of one year from the date of coming into force of these regulations, have the power to provide by order that these regulations shall be applied to any programme with such modifications as may be necessary.

## 12 REPEAL

The Regulations now in force, in so far as they are applicable to programmes offered in the University Departments and to the extent they are inconsistent with the existing regulations, and the regulations relating to the Credit and Semester System in their application to any course offered in a University Department, the latter shall prevail

## PH.D REGULATIONS – 2020

**(Appendix to U.O.No.Ac.B2/Ph.D Regulations/2020 dated 10.11.2020)**

**Preamble**



**Preamble**

These regulations, named as **Cochin University of Science and Technology Ph.D Regulations 2020,** are framed in accordance with the University Grants Commission (Minimum Standards and Procedure for the Award of M.Phil/Ph.D.degrees) Regulations 2016, which are in supervision of the 2009 Regulations, notified in the Gazette of India [No.278, Part III- Section 4] Extra Ordinary on July 5th, 2016 vide No.F.1-2/2009(EC/PS)V(I)Vol.II – in exercise of the powers conferred by Clauses (f) and (g) of sub-section (1) of Section 26 of the University Grants Commission Act, 1956 (3 of 1956).

Cochin University of Science and Technology is conducting research programmes in various subjects and inter-disciplinary areas in its Schools/Departments/Centres and other Recognized Institutions leading to the award of Degree of Doctor of Philosophy, under the Faculties listed in the Statutes. The Standards and Procedures for registration, research and award of Ph.D Degree of the University shall be as per this Regulation.

1. **Short title, Application and Commencement:**

1.1 These Regulations shall be called Cochin University of Science and Technology Ph.D Regulations – 2020.

1.2 These Regulations shall apply to every **Academic Unit of Research** (School/Department/Centre of the University) and Recognized Institutions, where research programme leading to Ph.D of Cochin University of Science and Technology is being conducted.

1.3 These Regulations shall come into force from the date decided and notified by the University and shall govern all Ph.D Registrations from the date it comes into force.

2. **Recognised Institutions:**

The University may decide to accord recognition, in specified Faculties, on the recommendation of the Academic Council, to a Research/Educational Institution under the control of Central/State Government as per the provisions of the Cochin University of Science and Technology (CUSAT) Act 1986 and the relevant statutes and ordinances in this regard, provided the University is satisfied that the institution will be able to provide the required facilities to candidates to persue their studies in the Institution for the Degree of Doctor of Philosophy (Ph.D) of the University in the Faculties concerned and to fulfill such other conditions that the Syndicate may stipulate from time to time.

3. **Research Supervisor:**

3.1 Any Full-Time regular faculty member of the University/Scientist of Equivalent Grade of the Recognized Research Institution with a Ph.D degree and at least two research publications in referred journals may be recognized as a Research Supervisor. Provided that in areas/disciplines where there is no or only a limited number of referred journals, the University may relax the above condition for recognition of a person as Research Supervisor with reasons recorded in writing. All Teachers/Scientists who are Research Supervisors under the immediate previous regulations shall continue to serve as Research Supervisors under these regulations also.

3.2 A person who has joined in an academic unit of research in the University under Inspire faculty scheme/tenure track/faculty recharge scheme, etc. for a period not less than five years can also be recognized as Research Supervisor, fulfilling the other conditions of research publications.

3.3 The allocation of Research Supervisor for a selected Research Scholar shall be decided by the Department/School/Centre Research Committee concerned depending on the number of scholars per Research Supervisor, the available specialization among the Supervisors and research interests of the scholars as indicated by theme at the time of selection interview. Joint-Supervisor can be allowed in inter-disciplinary areas from other departments of the same institute or from other recognized institutions.

3.4 The number of research scholars that a Professor, Associate Professor and Assistant Professor shall supervise at any given time is 8, 6 and 4 respectively. The maximum number mandated above also includes the number of Ph.D Scholars supervised/ co-supervised by the Supervisor in any other Universities/Institutes. Those who are presently guiding a number more than what is mentioned above are allowed to retain theme till their completion of research. A declaration to the above effect shall be submitted by the supervisor on accepting new doctoral student(s). Persons mentioned under item 3.2 above, will be treated as equivalent to Assistant Professor in this case.

3.5 A Research Supervisor can take one foreign student sponsored under a scholarship scheme by the Government for undergoing Ph.DProgramme in India over and above the allotted number.

3.6 A Research Supervisor should have at any point of time at least one Research Scholar under reserved category under his guidance. Here, preference shall be given to SC/ST candidates; if SC/ST candidate is not available, seats may be filled from other reservation category.

3.7 A Research Supervisor may be recognized under more than one faculty if the person is eligible for the same. The total number of scholars in all faculties under a Supervisor shall also be limited to the number as per rules.

3.8 A Research Supervisor on retirement may be allowed to continue to guide the scholars already registered under their supervision at the time of retirement. They will not be allowed to register fresh candidates for supervision.

3.9 If a Research Supervisor leaves the present job and takes up another assignment in an Institution which is not a recognized Research Centre of the University, the Supervisor may be allowed continue to guide the scholars already registered under their supervision. They will not be allowed to register fresh candidates for supervision.

4. **Joint Supervisor**

4.1 If the Research Committee feels, for valid academic reasons, that the service of an additional supervisor is desirable it may recommend a Joint-Supervisor provided both the supervisors are willing. For reckoning the maximum number of students who may register under a Research Supervisor, the students under joint guidance shall be treated as 0.5 for each Supervisor.

4.2 In the case of interdisciplinary/multidisciplinary subjects, there shall be two Research Supervisors, one in scholar's own PG based subject according to which the candidate is registered in a Research Centre and another in the area of subject in which he combines the core subject. In this case, for reckoning the maximum number of students who may register under a Research Supervisor, the students under joint guidance shall be treated as 0.5 for each Supervisor.

4.3 Scientists/Researchers working in partnering institutions having MoU on specific projects with a department of the University may be permitted to be a Joint Supervisor for the students working in that project, irrespective of the geographical jurisdiction.

5. **Research Committee (RC)**

5.1 Every Department/School/Centre of research in the University shall have a Research Committee (RC) with the Head of the Department/Division/School/Centre as Chairman, and all the recognized Research Supervisors of the University serving in the Department/School/Centre as members. The Vice-Chancellor may, on the recommendation of the Dean of the Faculty concerned, nominate additional members from other relevant Department/School/Centre/Recognized Institutions to the Research Committee. In Departments where interdisciplinary/multidisciplinary research is pursued, the Committee shall consist of the Research Supervisor(s) from other subject(s) who has (have) consented to supervise the candidate(s).

5.2 Every Recognized Institution shall similarly have a Research Committee with the Head of the Recognized Institution or a Research Supervisor working in the Institution nominated by the Chairman as Convener, all the recognized Research Supervisors working in the Recognized Institution, the Deans of the Faculties concerned and the Heads of the Department/Division/School/Centre of the University concerned or their nominees as members.

5.3 The Research Committee in the University Department/Division/School/ Centres / Recognized Institutions shall decide upon the number of research students who can be admitted during the next academic year with the areas of specialization.

5.4 The Research Committee shall meet at least twice in a year to review the progress of research work of the registered research students in the Department/Division/ School/ Centres /Recognized Institution and record the minutes of the meeting in a Register kept for the purpose. The Chairman shall submit the minutes of the meetings to the University.

**6. Doctoral Committee (DC)**

6.1 There shall be a Doctoral Committee (DC) to monitor the progress of each student registered for research in the University Department/School/Centre/Recognized Institution. The Doctoral Committee shall provide necessary guidance to the research student shall take efforts to ensure that good progress is made by him/her.

6.2 In the case of a University Department/School/Centre, the Head concerned in consultation with the Research Supervisor shall constitute the Doctoral Committee with the Research Supervisor as Convener, Joint Supervisor (if any) and an approved Research Supervisor from the Department in the same area as members. The Head of the Department/Division/Centre shall be the Chairman of the Doctoral Committee.

6.3 In the case of a Recognized Institution, the Head of the Recognized Institution in consultation with the Research Supervisor shall constitute the Doctoral Committee with the Research Supervisor as Convener, the Joint Supervisor, if any, and an approved Research Supervisor from the same or allied area in the University as members. Head of the Institution (or his nominee) will be the Chairman of the Doctoral Committee.

6.4 The Doctoral Committee shall be constituted and conduct its first meeting within a month of admission of the candidate. The meetings of the DC should be convened regularly atleast once in every semester for the entire duration of research of the candidate.

6.5 The Doctoral Committee shall be in existence during the full period of registration of a candidate and shall be reconstituted on the recommendations of the Supervisor with such changes in membership as may become necessary from time to time in accordance with relevant Clauses.

6.6 All research students shall submit progress reports to the respective Research Supervisors every six months which shall be discussed in the Doctoral Committees to assess the progress of the work.

6.7 The Doctoral Committee shall make recommendations on matters such as (a) the conversion of registration from Full-Time to Part-Time or vice-versa, (b) granting leave of the candidate for short term assignments, training, etc, (c) presentation of synopsis and (d) cancellation of registration in case of unsatisfactory progress, unethical practices in research committed by the student, or misconduct of the student.

6.8 The Doctoral Committee shall be responsible for the preparation of the confidential panel of adjudicators for evaluation of the thesis with the recommendation of the Dean of the Faculty concerned to the Controller of Examination for further necessary action.

7. **Notification for Ph.DProgramme.**

7.1 The Notification for Ph.D admissions shall be issued once a year through notification in atleast two national newspapers, of which one shall be in the regional language. The details shall also be available in the University website.

7.2 All Academic Unit of Research of the University and Recognized Research Institutions that are allowed to conduct Ph.Dprogrammes shall decide on an annual basis through their Research Committee (RC) the number of Ph.D Scholars to be admitted as per the norms regarding the Scholar-Supervisor ratio and the facilities available.

7.3 A candidate who wishes to pursue a programme of study and research leading to the degree of Doctor of Philosophy (Ph.D) will be required to seek registration to the programme under these regulations as Full-Time or Part-Time research student in an Academic Unit of study or in an institution recognized for this purpose by the University, under an appropriate Faculty. In the case of recognized institutions, Part-Time registration shall be granted only for the permanent employees of the respective institutions.

7.4 Application for admission shall be submitted to the Head of the Academic Unit of Research concerned in the prescribed form on payment of the required fees. Candidates intending to do research in Recognized Institutions shall submit their applications through the Head of Institution to the Head of concerned Academic Unit of Research.

8. **Eligibility for Admission**

8.1 Candidates for admission to the Ph.Dprogramme shall have a Master's degree or a professional degree declared equivalent to the Master's degree by the corresponding statutory regulatory body, with at least **55%** marks in aggregate (or an equivalent grade) or an equivalent degree from a foreign educational institution accredited by an Assessment and Accreditation Agency which is approved, recognized or authorized by an authority, established or incorporated under a law in its home country or any other statutory authority in that country for the purpose of assessing, accrediting or assuring quality and standards of educational institutions.

8.2 A relaxation of 5% of marks in the qualifying examination, or an equivalent relaxation of grade, may be allowed for those belonging to SC/ST/OBC (non-creamy-layer)/Differently abled and other special categories of candidates as per the decision of the University from time to time. This relaxation to the categories mentioned above are permissible based on the qualifying marks without including the grace mark procedures.

9. **Admission procedure: Departmental Admission Test (DAT)**

9.1 The admission shall be based on the criteria notified by the University, keeping in view of the guidelines/norms in this regard issued by the UGC and other statutory bodies concerned and any other rules framed by the University from time to time.

9.2 Candidates are submitted through a Departmental Admission Test (DAT) which will be conducted only once in a year before the end of August. DAT for Ph.DProgramme (including admission to Recognized Institutions) shall be conducted by concerned Department of University.

9.3 The Departmental Admission Test (DAT) shall have two parts – Written test and Interview. In the case of candidates undertaking interdisciplinary/multidisciplinary research, the written test can be on a subject offered by the academic unit where the candidate is seeking registration.

9.4 The syllabus of the Entrance Test shall consist of subject/subjects specific to the Academic Unit of Research concerned.

10. **Exemption from DAT**

10.1 The following candidates are exempted from the written examination part of the DAT and they shall be ranked separately as per the norms laid down in relevant clauses for the same of these regulations.

10.1.1 Candidates who have been awarded Fellowships by agencies such a UGC/CSIR/AICTE/etc. or similar agencies of the Government of India or the Government of Kerala for pursuing doctoral research leading to Ph.D degree.

10.1.2 Candidates who are working in funded research projects in the department/academic unit of research with assured fellowship for at least two years and have qualified NET/GATE/ or other similar examinations conducted by national agencies.

10.1.3 Foreign students who have been sponsored under a Scholarship scheme by the Government of India for undergoing Ph.Dprogramme in India.

10.1.4 Students from India or abroad coming from Ph.D based on specific agreements or MoUs of the University.

10.1.5 Candidates who have provisionally qualified for INSPIRE fellowship. (If they don't get the final selection, registration will be cancelled).

10.1.6 Regular and permanent teachers from University Departments, Government & Aided Colleges within the State with a minimum continuous service of 5 years as permanent Teachers.

10.1.7 Scientists working in R&D Institutions/Industry with a minimum continuous service of 5 years as permanent employees.

10.1.8 Candidates working/residing outside India (NRI status) shall not be eligible for registration for Ph.D, except for as per Clause 10.1.4.

10.1.9 Foreign students shall not be allowed to do Part-Time research.

10.2 All candidates who have passed the written part of DAT with a minimum of 50% marks as well as those exempted from DAT shall be required to present themselves for an interview with the Research Committee (RC) or with a sub-committee constituted for the same. In the case of admission for interdisciplinary research the Committee or sub-committee shall consist of the Research Supervisor(s) from other subject(s) who has (have) consented to co-supervise the candidate.

10.3 Only DAT qualified candidates are considered for University Research Fellowship which will be awarded based on a separate rank list prepared for the same.

10.4 Candidates applying for registration as Part-Time Research Scholars shall be considered for registration only in cases where the Research Committee (RC) is convinced that effective supervision can be ensured. The RC shall also check on the regularity and progress of the Ph.D work being carried out by the Scholar.

11. **Preparation of Rank list**

11.1 The rank list will be prepared for with the following weightage of marks.

**DAT qualified candidates**

| | | | |
|---|---|---|---|
| (a) | Written Test | : | 50% |
| (b) | Master's Degree | : | 25% |
| (c) | NET/GATE/similar exams | : | 5% |
| (d) | Interview | : | 20% |

**DAT exempted candidates**

| | | | |
|---|---|---|---|
| (a) | Master's Degree | : | 50% |
| (b) | Interview | : | 50% |

11.2 The admission lists and the waiting list of all eligible candidates shall be displayed on the notice boards of the respective academic unit of research/Recognized Institutions and also put in the University Website. The rank list shall be valid till 31st December of the year.

## 12. Admission and Registration

12.1 A candidate who has been ranked and recommended for provisional admission shall take the admission within fifteen days from the date of issue of memo after paying the required fees and fulfilling such other requirements as per the admission rules.

12.2 The Head of the academic unit of research/Recognized Institution shall be empowered to give an extension of time for a further period upto three months to the candidate, if so requested by the candidate and recommended by the Research Supervisor (within the validity period of the rank list).

12.3 The Head of Department/Recognized Institution shall forward to the University a consolidated list of all those who are admitted to the Ph.Dprogramme within ten days after the validity of the rank list.

12.4 The University shall allot registration numbers to students admitted for the Doctoral Programme with effect from the date on which he/she paid the prescribed fees and was admitted to the respective Department/School/Centre/Recognized Institution concerned.

12.5 The time schedule for the admission and registration process will be as decided by the University form time to time and shall be published in its website.

12.6 Candidates who are exempted from DAT under the Clause 10.1.1 to 10.1.4 (with assured fellowship) may be admitted at any time during the academic year on submission of applications in the prescribed format with the consent from a recognized research supervisor and the recommendations of the Research Committee.

12.7 The University shall maintain the list of all Ph.D registered students on its website with the details such as the name of registered candidate, topic of research, name of Supervisor/Co-supervisor, and date of registration. All Academic Units of Research shall provide these details on year-wise basis to the Registrar before 31st December.

## 13. Course Work

13.1 After having been admitted, each Ph.D student (Both Full-Time and Part-Time) shall be required to undertake course work on a Full-Time basis for a minimum period of one semester with a minimum total of 18 credits. The course work should be completed

within TWO years of joining for research, by all research scholars, failing which they will be deemed to have discontinued the Ph.Dprogramme (Part-Time Research Scholars will have to take leave from their regular job and attend the course work for a semester on Full-Time basis). The course work shall be done along with the ongoing semester in the Department.

13.2 The course work shall be treated as pre-PhD preparation. The structure of the course work shall be as follows:

| Course Number | Credits | Marks | | Total marks |
|---|---|---|---|---|
| | | Continuous Evaluation | End Semester Examination | |
| I | 4 | 50 | 50 | 100 |
| II | 4 | 50 | 50 | 100 |
| III | 4 | 50 | 50 | 100 |
| IV | 2 | 50 | 50 | 100 |
| V | 4 | - | 100 | 100 |

The details of course shall be follows:

Course I **4** Credits: Shall be covering the Board area of Research of the candidate. Syllabus and Title for this course shall be prepared by DC and approved by RC.

Course II **4** Credits: Shall be covering the Specific topic of Research of the candidate. Syllabus and Title for this course shall be prepared by DC and approved by RC.

Course III **4** Credits: Shall focus on **Research Methodology** which covers areas such as quantitative methods, computer applications, research ethics, training, field work, etc. This course shall be designed for each faculty/department and shall be approved by the Faculty/RC concerned and may be conducted simultaneously in one or more academic unit of research.

Course IV **2** Credits: This course on Research and Publication Ethics (RPE) is to create awareness about publication ethics and publication misconducts. The course structure and syllabus is as prescribed by UGC, and is mandatory in Ph.D course work.

Course V **4** Credits: Shall be devoted to the preparation of a comprehensive report of review of literature relevant to the candidate's research and preparation, submission and defence of the Research Proposal.

13.3 Ph.D students with M.Phil degree, awarded complying with the UGC Regulations for awarding M.Phil/Ph.D in the same field of study, may be exempted from registering for Course I and Course III of the course work, if the Research Committee is satisfied that similar courses have been undergone by the students in the M.Phil. Programme.

13.4 Candidate may undergo course work in any academic unit of research with the approval of the concerned DC and RC.

13.5 Continuous evaluation shall be done by the teachers offering the courses. An end-semester examination (except course V) shall be carried out by a Board of Examiners approved by Research Committee. For course V, at the end of the semester, the student

shall submit a report on the scope, relevance and purpose of the research work, its identified objectives, review of literature, research methodologies to be followed and expected outcome of the thesis work. The evaluation of Course V shall be done by the Research Committee or a subcommittee nominated by the Research Committee at the end of the semester, through an open seminar.

13.6 Based on the marks obtained in the examinations, the students may be awarded grades as detailed below:

| **Range of Marks** | **Grades** | **Weightage** |
|---|---|---|
| 90% and above | S – Outstanding | 10 |
| (80-89) | A – Excellent | 9 |
| (70-79) | B – Very Good | 8 |
| (60-69) | C – Good | 7 |
| (50-59) | D – Satisfactory | 6 |
| Below 50% | F – Failed | 0 |

Overall performance of the candidate will be indicated by Grade Point Average (GPA) calculated as follows:

$$GPA = \frac{G1xC1+G2xC2+G3xC3+G4xC4+G5xC5}{C1+C2+C3+C4+C5}$$

Where 'G' refers to the grade weightage and 'C' refers to the credit value of the corresponding course undergone by the student.

13.7 Students who are not able to acquire a minimum grade in each course shall be given one more chance to complete the course work successfully in the next semester when the course is offered. If he/she cannot acquire the required 18 credits within a period 24 months from the date of his/her Ph.D registration, his/her registration will be cancelled.

13.8 The research committee will scrutinize the grades awarded to the candidate in each course, and finalize the results. On successful completion of the course work by acquiring minimum of 18 credits, the candidate shall be given a certificate for eligibility for continuing doctoral research (both the Grade Cards and Certificate or Eligibility will be issued by the Chairman of Research Committee).

14. **Attendance**

14.1 A student registered as Full-Time research student will be required to have atleast 80% attendance in every semester failing which his/her name shall be removed from the rolls of the University subject to the existing provisions.

14.2 Every research student shall submit an attendance certificate and a report of the progress of research countersigned by the Supervisor and HOD/Head of the Institution pertaining to the previous semester before the payment of the next semester fees.

14.3 The Research Committee shall be empowered to condone the shortage of attendance upto 10% on an application made by the student, duly recommended by the Research Supervisor and endorsed by the Doctoral Committee.

14.4 A Research student will be eligible to attend conferences/seminars/symposia/specialized training programmes connected with his/her area of research or participate in research cruises or visit other places for collecting data, and all such days (including University holidays) when they were away from the Department/School/Centre or Recognized Institution, including days of travel, shall count for attendance or for periods of being in residence at the University, if they have been duly authorized to do so by the Research Supervisor with intimation to the Head of the academic unit.

14.5 A candidate registered for Full-Time research shall be eligible to avail of leave for thirty days in one calendar year and maternity leave as per University rules, leave without fellowship for three months on medical grounds or for any other genuine reasons duly recommended by the Research Supervisor.

14.6 A Part-Time Research Scholar shall have a minimum attendance of 60 days each in a calendar year or on a pro-rata basis for part of the year. The days of minimum attendance shall also include days of eligibility of attendance as per relevant clauses.

14.7 Notwithstanding anything contained in these regulations a candidate who comes under the National/State or such other fellowship or scheme/project etc,.shall be governed by the respective rules governing the award of such fellowship/scheme/project, regarding attendance, leave etc.

15. **Change of Research Supervisor**

15.1 The Research Committee (DRC) shall have the power to consider the request of candidate to change his/her Supervisor or to have a Joint Supervisor provided that the request supported by his/her Supervisor and the prospective Joint Supervisor, and the request is recommended by the Doctoral Committee. If the Research Committee gives assent to the request, the matter shall be reported to the University.

15.2 However, such request for change of Supervisor or Joint Supervisor shall be made atleast one year prior to the candidate's giving notice for submission of the thesis for adjudication by examiners, provided that, this limitation shall not be applicable in the case where in the present supervisor is unable to continue supervision due to reasons of health, shifting of place of work/residence to a distant place etc.

16. **Change of Academic Unit of Research**

The Research Committee shall have the power to consider and to give assent to the request of the candidate for change of Academic Unit of Research, provided the request is recommended by the Research Supervisor and the Doctoral Committee and is accompanied by a 'No Objection Certificate' from the Head of the present and newly proposed recognized Academic Unit of Research. Such instances of request for change in the Academic Unit of Research shall be submitted to the University, which shall obtain the comments of the Dean of the Faculty concerned on the matter and inform the candidate of its decision.

**17. Change of Area of Research**

17.1 A Candidate who has registered for research shall be eligible to apply for the change of the topic or the area of research on payment of the prescribed fee and the Research Committee shall be competent to give assent to the request, which has been duly supported by the Research Supervisor, the Doctoral Committee and the University shall be informed accordingly. The Doctoral Committee shall examine if the change in topic or area is allowable with the course work already completed or if additional course work needs to be prescribed, considering that the topic or area of research has changed. Their explicit comments on the matter of adequacy of course work done shall accompany the

topic or area change request/decision. If additional course work is required considering the change in topic or area the course work done earlier may be cancelled in full or part and the necessary additional course work completed within one year of the change being provisionally allowed. However, such an application for change of topic/the area of research shall be permitted only once during the period of registration, and further that the application for the same shall be made at least one year prior to the notice for submission of thesis.

17.2 A research student shall be eligible to request for approval of the title of his/her thesis and the Doctoral Committee shall be competent to give assent to the request. In case there is a change in the title of research, the request shall be made at least one month prior to the submission of the synopsis.

**18. Conversion of Registration from Full-Time to Part-Time**

18.1 A Candidate who has registered for the Ph.D. Programme shall be eligible to apply for conversion of research work from full-time to part-time and vice versa. The request shall be duly recommended by the research supervisor and endorsed by the Doctoral Committee. The Research Committee shall be empowered to grant the conversion which shall be reported to the University for confirmation.

18.2 Conversion from part-time to full-time or vice versa will not be allowed more than three times during the period of registration

**19. Progress of Research and Publications**

19.1 All research students should give an open presentation on an annual basis in the Department (with due notification) on his/her progress of research, which will be duly certified by the Research Committee.

19.2 A research student shall have at least TWO research papers published/accepted in SCI/SSCI/SCOPUS indexed or UGC recognized journals (peer reviewed/refereed journals with ISSN numbers for humanities) and TWO paper presentations in conferences/seminars before the submission of synopsis. They should produce evidence for the same in the form of reprints/acceptance letters from the Journal and presentation certificates in conference/seminars. Out of the two journal papers required, one may be substituted by a patent application with number allocated by the concerned authorities.

19.3 While publishing any paper at the recognized institution under the Ph.D. program with CUSAT, the research scholar should additionally mention the affiliation with CUSAT, along with their parent institute address. The Doctoral Committee shall submit a certificate to this effect at the time of submission of thesis.

**20. Submission of the Thesis for Ph.D. Degree**

20.1 Every candidate of the degree of Doctor of Philosophy shall be required to submit a thesis embodying the results of his/her research finding to the University for Adjudication by examiners.

20.2 A candidate who is registered for the Ph.D. Degree and has completed the course requirements shall be eligible to submit his/her thesis for adjudication, on completion of a minimum period of two years of registration for Full-Time research scholars and three years for Part-Time research scholars.

20.3 The thesis shall be written in English, except the case of these from the Faculty of Humanities where the language of the thesis shall be in the language of study and should conform to the format and standard prescribed by the University from time to time.

20.4 A Candidate proposing to submit the thesis shall submit a synopsis of the same at least one month in advance to the University, and such intimation shall be accompanied by a certificate from the Head of Academic Unit of Research that he/she has presented the salient features of the proposed thesis in a pre-synopsis seminar in the Academic Unit of Research with notice to all RC members and the Research Scholars. If the presentation is not found satisfactory and major changes are recommended by the RC members, the candidate shall have to repeat the presentation. Recommendations for any changes if made during the pre-synopsis seminar have to be examined by the DC for incorporation at that stage and appropriate decision taken. After successful presentation, the Scholar shall submit the synopsis as given below:

a) 5 copies of the Synopsis of the thesis not exceeding ten pages, highlighting the literature review, problem selected, objectives, methods used in the research, observations, findings, a brief discussion and conclusion. It shall also have a list of references cited in the synopsis.

b) Copy of the Grade cards in respect of the Ph.D. course work.

c) Copy of at least two published research paper/letter of acceptance with a copy of the manuscript along with a certificate from the Doctoral Committee to the effect that the paper is published in a refereed journals as specified in para 20.2, and certificate of at least two conference paper presentations during the period of Ph.D. registration. The above published papers and conference papers should be related to the work presented in the thesis.

d) Attendance certificate from the Head of Academic Unit of Research.

e) A certificate from the Head of Academic Unit of Research stating that the candidate has presented his/her pre-submission synopsis seminar.

f) A certificate from the Research Supervisor to the effect that all the relevant corrections and modifications suggested by the audience during the pre-synopsis Seminar and recommended by the Doctoral Committee of the candidate has been incorporated.

g) Recommendation of the Doctoral Committee to the effect that work of the candidate is adequate and complete for the award of the Ph.D. degree.

h) Evidence of having paid the required fees prescribed by the University.

20.5 The candidate shall submit the thesis within THREE months from the date of submission of synopsis. The delay in submitting the thesis beyond THREE months, but within SIX months may be condoned by the Research Committee on the recommendation of the Doctoral Committee. The Vice-Chancellor may condone delay for a further period of six months in exceptional cases, provided further that the candidate shall submit the thesis only during the period of his/her registration.

20.6 The candidate shall submit FIVE copies of the thesis prepared in the language proposed to be used in the thesis, and conforming to the specification if any prescribed by the University along with a CD containing soft copy of the thesis in PDF format.

20.7 The thesis shall be accompanied by the following:

a. A declaration signed by the candidate to the effect that the thesis is the outcome of the original work done by the candidate and that the work did not form part of any dissertation submitted for the award of any degree, diploma, associate ship, or any other title or recognition from any University/Institution.

b. A Certificate by the Research Supervisor (s) to the effect that to the best of his/her/their knowledge the thesis is a bonafide record of research carried out by the candidate under his/her/their supervision and that the work has not been submitted for the award of any other degree/diploma of the same Institution where the work was carried out, or to any other Institution.

c. The University Library shall make available a facility for plagiarism checking and shall on the request of a supervisor assist in running the plagiarism check and issue the plagiarism report. The supervisors should assure that the plagiarism level shows less than 15 percent values for the overall thesis. Similarity with self-declared published work of the Scholar will be permitted. While submitting for the thesis for evaluation, the supervisor should issue a certificate vouching that the plagiarism level is below 15%.

d. An appendix containing list of research articles published by him/her jointly with the supervising guide and others in the same area of study as evidence of the research work done by the candidate.

**21. Procedure for Adjudication of the Thesis**

21.1 The Panel of experts prepared by the Doctoral Committee shall be forwarded to the University duly verified by the concerned Dean of Faculty. In the case of recognized institutions, panel of experts prepared by the Doctoral Committee shall be submitted to the University by the concerned Head of Institution which will be forwarded to the Dean of the Faculty concerned for verification. The panel should contain names of at least ten experts not below the rank of an Associate Professor of a University or an equivalent rank in a reputed research institution working in the area of research of the thesis. At least SEVEN experts of this panel should be from outside the State/Country.

21.2 The thesis to be adjudicated shall be forwarded to THREE external examiners nominated by the Vice-Chancellor from the panel of experts of which at least TWO shall be from outside the State/Country.

21.3 Each examiner shall be requested to send a report on adjudication of the thesis, wherein it shall be specifically stated, whether or not the examiner recommends the award of the degree based on the written thesis, with reasons for the recommendation. If the thesis does not meet the standard expected of a Ph.D. thesis, the examiner may recommend that the thesis be rejected or resubmitted after doing additional work.

21.4 In the event of the receipt of the evaluation reports from all the examiners, if any two out of the three examiners recommend the thesis for the award of Ph.D. Degree, the University shall make arrangements for the conduct of the open defence and viva voce examination.

21.5 In case only one examiner has recommended and the other two have not recommended, then the thesis shall be sent to a fourth examiner whose recommendations shall be binding on the University for accepting or rejecting the thesis.

21.6 But if any of the examiners suggests resubmission of the thesis, the candidate may resubmit the thesis incorporating the changes proposed by the examiner (s) after payment of such fees as may be prescribed by the University.

21.7 On resubmission, the thesis shall again be sent for adjudication to the same examiner who had recommended revision. If the same examiner is not available, another examiner shall be selected from the same panel by the Vice-Chancellor.

21.8 The candidate shall have no further chance for resubmission of the thesis and the decision to accept or reject the thesis at this stage shall be final.

**22. Open defence and viva voce**

22.1 If the examiners recommend for the award of the Ph.D. Degree, the University shall make arrangements for the conduct of open defence and a viva voce examination. If corrections or modifications are suggested by the examiners the candidate shall be required to submit the hard copy of the thesis along with a soft copy in PDF format after incorporating all correction/suggestions made by the examiners along with a certificate from the supervisor to this effect before scheduling of the Open Defence.

22.1.1 The open defence/viva voce board shall consist of the Dean of the Faculty as Chairman and any one of the examiners (preferably one among the thesis examiners) nominated by the Vice-Chancellor from the panel of adjudicators of the thesis, the Research Supervisor and Joint Supervisor, if any, as members. The Supervisor shall be the convener of the Open Defence.

22.1.2 Open defence and viva voce examination shall be held at a place and time decided by the University after making prior announcement of the same in the website and issuing the notice to all the Departments/Schools/Centres/Recognized Institutions coming under the faculty.

22.1.3 During the Open Defence of the thesis, the candidate has to explain the motivation and relevance of the work, innovation in methodology and salient features of the findings. He/She shall satisfactorily answer the questions put forward by the audience and the examiners.

22.1.4 The Chairman and the external expert shall necessarily be present at the Open Defence/viva voce examination.

22.1.5 If, in the opinion of the board of examiners, the candidate is successful in defending the thesis satisfactorily, a consolidated report is prepared and presented to the University recommending the award of the Degree.

22.1.6 If, in the opinion of the board, the candidate is not successful in defending the thesis, he/she shall be given an additional opportunity after one month, after payment of the prescribed fee, and the decision of the board at this examination shall be final.

22.1.7 The award of Ph.D. Degree will be with effect from the date of successful completion of viva voce examination as noted by the consolidated report of the Board of Examiners. On successful completion of the viva-voce examination, a notification shall be issued which shall contain the Name of the Candidate, Name(s) of the Supervisor(s), Title of Thesis, Subject and Faculty under which the Degree is awarded.

22.1.8 The University shall issue a provisional certificate to the candidate to the effect that he/she has successfully fulfilled the entire requirement including course work for the award of the degree of Doctor of Philosophy in accordance with the UGC guidelines. The regular Ph.D. Degree Certificate shall be issued thereafter.

**23. Period of Registration/Duration of the Programme**

23.1 A candidate who is registered as a research student shall remain on the rolls of the University for a maximum period of FIVE years provided that he/she satisfies the periodic progress and the dues are cleared as per rules. On receipt of an application for extension duly recommended by the Doctoral Committee (DC) of the research scholar concerned along with the fees for the application duly paid, the Research Committee (RC) shall have the powers to grant an extension for a maximum period of one year, which will be intimated to the University for recording the same. However, the application should be submitted before the expiry of the registration period.

23.2 If the candidate (a) completes the research work, (b) has two UGC approved journal publications/at least one research Publication in a UGC approved Journal and one conference paper presentation (c) presents the Pre-Synopsis submission seminar within the extended period of one year granted by the Research Committee (RC), then the scholar is eligible to seek another extension for a maximum period of one more year for completing the publication requirements and submission of the thesis. The Vice-Chancellor shall have the powers to sanction this extension of one year based on the application of the candidate and recommendations of the DC and RC concerned.

23.3 No more extension will be granted after the expiry of SEVEN years.

23.4 The candidate shall cease to be on the rolls of the University as a research student on submission of the thesis or from the date on which his/her registration is cancelled or lapsed for any reason.

**24. Publication of the Thesis**

24.1 Following the successful completion of the evaluation process and announcement of the award of the Ph.D. degree to the candidate, the Ph.D. Thesis shall be uploaded to the National Repository for hosting the same so as to make it accessible to all Institutions, after a period of six months from the date of award.

24.2 A candidate who has been awarded the Degree of Doctor of Philosophy shall be free to publish his/her thesis with a proper acknowledgement to the University. A copy of the thesis so published shall be given by the candidate to the University.

**25. Transitory Provisions**

25.1 The present regulations shall supersede all earlier regulations in the matter, and all registrations of candidates from the date notified by the University, for the degree of Ph.D. shall be made under these regulations.

25.2 A student registered under the earlier regulations shall be eligible to opt to come under these regulations, but such options shall be exercised within a period of six months from the date of notification of these regulations. All students who do not exercise their option to move to this regulation by submitting an option letter to the University through proper channel shall be deemed to have decided to continue under their present regulations.

**26. Payment of Fees**

Every research student shall be required to pay, in time, the fees prescribed by the University every semester. The registration of the research student will be cancelled, if he/she fails to pay the fee in the stipulated time (December 31$^{st}$ for odd semester and June 30$^{th}$ for even semester). The University shall fix the fees to be paid by the student for applying for various permissions and relaxations provided for in these regulations, such as condonation of attendance shortage, conversion of registration from Full-Time to Part-Time, or any other matter. Any modifications in this regard will be binding on all research scholars on the rolls at that time.

## ACADEMIC CALENDAR 2021-22

| JULY 2021 | | |
|---|---|---|
| **Date** | **Day** | **Remarks** |
| 1 | Thursday | |
| 2 | Friday | |
| 3 | Saturday | |
| 4 | Sunday | |
| 5 | Monday | |
| 6 | Tuesday | |
| 7 | Wednesday | |
| 8 | Thursday | |
| 9 | Friday | |
| 10 | Saturday | |
| 11 | Sunday | |
| 12 | Monday | |
| 13 | Tuesday | |
| 14 | Wednesday | |
| 15 | Thursday | |
| 16 | Friday | |
| 17 | Saturday | |
| 18 | Sunday | |
| 19 | Monday | |
| 20 | Tuesday | Id-ul-Ad'ha (BAKRID) |
| 21 | Wednesday | |
| 22 | Thursday | |
| 23 | Friday | |
| 24 | Saturday | |
| 25 | Sunday | |
| 26 | Monday | |
| 27 | Tuesday | |
| 28 | Wednesday | |
| 29 | Thursday | |
| 30 | Friday | |
| 31 | Saturday | |

| ACADEMIC CALENDAR 2021-2022 | | |
|---|---|---|
| **AUGUST 2021** | | |
| **Date** | **Day** | **Remarks** |
| 1 | Sunday | |
| 2 | Monday | |
| 3 | Tuesday | |
| 4 | Wednesday | |
| 5 | Thursday | |
| 6 | Friday | |
| 7 | Saturday | |
| 8 | Sunday | KARKKIDA VAVU |
| 9 | Monday | Commencement of classes of Odd Semester & CBCS Registration (Except I Semester) |
| 10 | Tuesday | |
| 11 | Wednesday | |
| 12 | Thursday | |
| 13 | Friday | |
| 14 | Saturday | |
| 15 | Sunday | INDEPENDENCE DAY |
| 16 | Monday | |
| 17 | Tuesday | |
| 18 | Wednesday | Last Date for CBCS Course Registration(odd semesters Except I Semester) |
| 19 | Thursday | MUHARRAM |
| 20 | Friday | FIRST ONAM |
| 21 | Saturday | THIRU ONAM |
| 22 | Sunday | THIRD ONAM |
| 23 | Monday | |
| 24 | Tuesday | |
| 25 | Wednesday | |
| 26 | Thursday | |
| 27 | Friday | |
| 28 | Saturday | AYYAN KALI JAYANTHI |
| 29 | Sunday | |
| 30 | Monday | SREEKRISHNA JAYANTHI |
| 31 | Tuesday | |

| ACADEMIC CALENDAR 2021-2022 | | |
|---|---|---|
| **SEPTEMBER 2021** | | |
| **Date** | **Day** | **Remarks** |
| 1 | Wednesday | Election to CUSU |
| 2 | Thursday | |
| 3 | Friday | |
| 4 | Saturday | |
| 5 | Sunday | |
| 6 | Monday | |
| 7 | Tuesday | Uploading of End-Semester Question Papers (B.Tech of CUSAT Campuses) (odd semesters except I Semester) |
| 8 | Wednesday | |
| 9 | Thursday | |
| 10 | Friday | |
| 11 | Saturday | |
| 12 | Sunday | |
| 13 | Monday | |
| 14 | Tuesday | |
| 15 | Wednesday | |
| 16 | Thursday | |
| 17 | Friday | All India South Zone Inter University Selection Trials DAY-I |
| 18 | Saturday | All India South Zone Inter University Selection Trials DAY-II |
| 19 | Sunday | |
| 20 | Monday | |
| 21 | Tuesday | SREE NARAYAN GURU SAMADHI DAY |
| 22 | Wednesday | |
| 23 | Thursday | |
| 24 | Friday | • Commencement of First Internal Series(odd semesters Except I Semester)<br>• Submission of Exam Proposals(odd semesters Except I Semester) |
| 25 | Saturday | |
| 26 | Sunday | |
| 27 | Monday | |
| 28 | Tuesday | |
| 29 | Wednesday | |
| 30 | Thursday | |

| ACADEMIC CALENDAR 2021-2022 | | |
|---|---|---|
| **OCTOBER 2021** | | |
| **Date** | **Day** | **Remarks** |
| 1 | Friday | Commencement of classes of I Semester & CBCS Registration |
| 2 | Saturday | |
| 3 | Sunday | |
| 4 | Monday | |
| 5 | Tuesday | |
| 6 | Wednesday | |
| 7 | Thursday | |
| 8 | Friday | |
| 9 | Saturday | Last Date for CBCS Course Registration-I Semester |
| 10 | Sunday | |
| 11 | Monday | |
| 12 | Tuesday | |
| 13 | Wednesday | • Exam Notification & Start of online/offline Registration for Examination(odd semesters except I Semester) |
| 14 | Thursday | MAHA NAVAMI |
| 15 | Friday | VIJAYA DASAMI |
| 16 | Saturday | |
| 17 | Sunday | |
| 18 | Monday | |
| 19 | Tuesday | Milad-i-Sheriff |
| 20 | Wednesday | |
| 21 | Thursday | |
| 22 | Friday | |
| 23 | Saturday | |
| 24 | Sunday | |
| 25 | Monday | • Commencement of Second Internal Series (odd semesters except I Semester) |
| 26 | Tuesday | |
| 27 | Wednesday | |
| 28 | Thursday | |
| 29 | Friday | |
| 30 | Saturday | • Last date for Exam Registration (Without Fine) (odd semesters except I Semester) |
| 31 | Sunday | |

| ACADEMIC CALENDAR 2021-2022 | | |
|---|---|---|
| NOVEMBER 2021 | | |
| Date | Day | Remarks |
| 1 | Monday | |
| 2 | Tuesday | |
| 3 | Wednesday | |
| 4 | Thursday | DEEPAVALI |
| 5 | Friday | |
| 6 | Saturday | • Last Date for Exam Registration (With Fine) (odd semesters other than I Semester) |
| 7 | Sunday | |
| 8 | Monday | Submission of DCB, Matriculation, Recognition Applications and Qualifying Certificates of First Semester to the University(odd semesters except I Semester) |
| 9 | Tuesday | |
| 10 | Wednesday | |
| 11 | Thursday | |
| 12 | Friday | Publication for Time-Table of Odd Semester Examinations (All UG Programmes and PG Programmes of Recognised Institutions. (odd semesters except I Semester) |
| 13 | Saturday | |
| 14 | Sunday | |
| 15 | Monday | Submission of Exam Time Table (PG Programmes) by the University Departments(odd semesters except I Semester) |
| 16 | Tuesday | |
| 17 | Wednesday | • Commencement of First Internal Series I Semester<br>• Submission of Exam Proposals I Semester |
| 18 | Thursday | |
| 19 | Friday | Appointment Letters to Examiners(odd semesters except I Semester) |
| 20 | Saturday | |
| 21 | Sunday | |
| 22 | Monday | |
| 23 | Tuesday | |
| 24 | Wednesday | Last date for submission of Attendance as on date of the University (UG and PG) (odd semesters except I Semester) |
| 25 | Thursday | |
| 26 | Friday | |
| 27 | Saturday | |
| 28 | Sunday | |
| 29 | Monday | |
| 30 | Tuesday | |

| ACADEMIC CALENDAR 2021-2022 | | |
|---|---|---|
| **DECEMBER 2021** | | |
| **Date** | **Day** | **Remarks** |
| 1 | Wednesday | • Last date for submission of Internal Marks (UG) (odd semesters except I Semester)<br>• Issue of Nominal Roll & Hall Ticket/Submission of Internal Marks (UG Programmes) (odd semesters other than I Semester) |
| 2 | Thursday | |
| 3 | Friday | |
| 4 | Saturday | |
| 5 | Sunday | |
| 6 | Monday | Exam Notification & Start of Online/Offline Registration for Examination I Semester |
| 7 | Tuesday | |
| 8 | Wednesday | End of Classes (odd semesters except I Semester) |
| 9 | Thursday | |
| 10 | Friday | |
| 11 | Saturday | |
| 12 | Sunday | |
| 13 | Monday | • Commencement of Odd Semester Examination (UG) (odd semesters except I Semester)<br>• Odd Semester Examinations (PG) (odd semesters except I Semester) |
| 14 | Tuesday | |
| 15 | Wednesday | |
| 16 | Thursday | |
| 17 | Friday | Commencement of Second Internal Series1 Semester |
| 18 | Saturday | |
| 19 | Sunday | |
| 20 | Monday | |
| 21 | Tuesday | |
| 22 | Wednesday | |
| 23 | Thursday | Last date for Exam Registration (Without Fine)<br>I Semester |
| 24 | Friday | End of Odd Semester Examinations (For UG and PG) (odd semesters except I Semester) |
| 25 | Saturday | CHRISTMAS |
| 26 | Sunday | |
| 27 | Monday | Commencement of Valuation (odd semesters except I Semester) |

| | | |
|---|---|---|
| 28 | Tuesday | |
| 29 | Wednesday | Last date for Exam Registration (with Fine)<br>I Semester |
| 30 | Thursday | |
| 31 | Friday | Submission of DCB, Matriculation, Recognition Applications and Qualifying Certificates of First Semester to the University. |

| ACADEMIC CALENDAR 2021-2022 | | |
|---|---|---|
| **JANUARY 2022** | | |
| Date | Day | Remarks |
| 1 | Saturday | |
| 2 | Sunday | |
| 3 | Monday | Commencement of Even Semester Classes & CBCS Registration ( Even semesters except II Semester) |
| 4 | Tuesday | |
| 5 | Wednesday | Publication of Time Table of 1 Semester Examinations (All UG Programmes and PG Programmes of Recognized Institutions) |
| 6 | Thursday | Submission of Exam Time Table (PG Programmes)by the University Departments- I Semester |
| 7 | Friday | 39th Inter Collegiate Sports & Games Meet -Inauguration |
| 8 | Saturday | |
| 9 | Sunday | |
| 10 | Monday | |
| 11 | Tuesday | |
| 12 | Wednesday | |
| 13 | Thursday | |
| 14 | Friday | |
| 15 | Saturday | Last date for submission of attendance as on date to the University (UG and PG) -I Semester |
| 16 | Sunday | |
| 17 | Monday | Last date for submission of Lab marks (ODD Semester) to the University. Except I semester |
| 18 | Tuesday | |
| 19 | Wednesday | 39th Inter Collegiate Sports & Games Meet concluding ceremony |
| 20 | Thursday | |
| 21 | Friday | |
| 22 | Saturday | |
| 23 | Sunday | |

| | | |
|---|---|---|
| 24 | Monday | • Last date for submission of Internal Marks (UG) I Semester<br>• Issue of Nominal Roll & Hall Ticket/Submission of Internal Marks (UG Programmes) I Semester |
| 25 | Tuesday | • Publication of PG results (ODD Semester except I Semester),<br>• Commencement of first internal series ( Even semesters except II Semester)<br>• Completion of valuation – UG programme (ODD Semester except I Semester),<br>• last date for submission of exam proposal for Even Semester. ( Even semesters except II Semester) |
| 26 | Wednesday | |
| 27 | Thursday | |
| 28 | Friday | |
| 29 | Saturday | End of Classes I Semester |
| 30 | Sunday | |
| 31 | Monday | Publication of Results – UG Programmes (ODD Semester) |

| ACADEMIC CALENDAR 2021-2022 | | |
|---|---|---|
| **FEBRUARY 2022** | | |
| **Date** | **Day** | **Remarks** |
| 1 | Tuesday | Knowledge Fest 'MEDHA 22" |
| 2 | Wednesday | |
| 3 | Thursday | |
| 4 | Friday | |
| 5 | Saturday | |
| 6 | Sunday | |
| 7 | Monday | |
| 8 | Tuesday | |
| 9 | Wednesday | |
| 10 | Thursday | Commencement of I Semester Examinations (UG and PG) |
| 11 | Friday | |
| 12 | Saturday | |
| 13 | Sunday | |
| 14 | Monday | |
| 15 | Tuesday | |
| 16 | Wednesday | |
| 17 | Thursday | |
| 18 | Friday | |
| 19 | Saturday | |

| | | |
|---|---|---|
| 20 | Sunday | |
| 21 | Monday | Commencement of first Internal Series(Even Semesters except II semester) |
| 22 | Tuesday | |
| 23 | Wednesday | |
| 24 | Thursday | |
| 25 | Friday | |
| 26 | Saturday | |
| 27 | Sunday | |
| 28 | Monday | • End of I Semester Examinations (For UG and PG).<br>• Commencement of Valuation. I Semester |

| ACADEMIC CALENDAR 2021-2022 | | |
|---|---|---|
| MARCH 2022 | | |
| Date | Day | Remarks |
| 1 | Tuesday | |
| 2 | Wednesday | University Youth Festival 'SARGAM" |
| 3 | Thursday | Commencement of II Semester Classes & CBCS Registration. |
| 4 | Friday | |
| 5 | Saturday | |
| 6 | Sunday | |
| 7 | Monday | |
| 8 | Tuesday | |
| 9 | Wednesday | |
| 10 | Thursday | • Exam Notification and start of Online/Offline Examination Registration for ( Even semesters except II Semester) |
| 11 | Friday | |
| 12 | Saturday | |
| 13 | Sunday | |
| 14 | Monday | • Commencement of Second Internal Series ( Even semesters except II Semester) |
| 15 | Tuesday | |
| 16 | Wednesday | |
| 17 | Thursday | Last date for Submission of Lab Marks(I Semester) to the University. |
| 18 | Friday | |
| 19 | Saturday | |
| 20 | Sunday | |

| | | |
|---|---|---|
| 21 | Monday | |
| 22 | Tuesday | |
| 23 | Wednesday | |
| 24 | Thursday | |
| 25 | Friday | |
| 26 | Saturday | |
| 27 | Sunday | |
| 28 | Monday | • Last date for Exam Registration without fine ( Even semesters except II Semester) |
| 29 | Tuesday | |
| 30 | Wednesday | |
| 31 | Thursday | |

| APRIL 2022 | | |
|---|---|---|
| Date | Day | Remarks |
| 1 | Friday | • Last date for Exam Registration, with fine ( Even semesters except II Semester)<br>• Publication of PG Results (I Semester,<br>• Commencement of First Internal Series (II Semester)<br>• Completion of Valuation – UG programmes (I Semester),<br>• Last date for submission of Exam proposal for II Semester |
| 2 | Saturday | |
| 3 | Sunday | |
| 4 | Monday | |
| 5 | Tuesday | |
| 6 | Wednesday | Publication of time-table of odd Semester Examinations (All UG Programmes and PG Programmes of recognised Institutions) |
| 7 | Thursday | Publication of Results – UG Programmes I Semester |
| 8 | Friday | • Submission of Exam Time–table (PG Programmes) by the University Departments( Even semesters except II Semester)<br>.<br>• Submission of DCB Statement to University. ( Even semesters except II Semester) |
| 9 | Saturday | |
| 10 | Sunday | |
| 11 | Monday | |
| 12 | Tuesday | • Commencement of Second Internal Series( Even semesters except II Semester) |

| | | |
|---|---|---|
| 13 | Wednesday | |
| 14 | Thursday | Appointment letter to Examiners |
| 15 | Friday | |
| 16 | Saturday | |
| 17 | Sunday | |
| 18 | Monday | |
| 19 | Tuesday | • Submission of attendance as on date to the University. ( Even semesters except II Semester) |
| 20 | Wednesday | |
| 21 | Thursday | Commencement of First Internal Series. II Semester |
| 22 | Friday | • Issue of Nominal Roll & Hall ticket and submission of Internal marks (UG Programmes) ( Even semesters except II Semester) |
| 23 | Saturday | |
| 24 | Sunday | |
| 25 | Monday | |
| 26 | Tuesday | |
| 27 | Wednesday | |
| 28 | Thursday | |
| 29 | Friday | |
| 30 | Saturday | • End of classes and submission of Attendance to University. ( Even semesters except II Semester) |

| MAY 2022 | | |
|---|---|---|
| Date | Day | Remarks |
| 1 | Sunday | |
| 2 | Monday | |
| 3 | Tuesday | |
| 4 | Wednesday | |
| 5 | Thursday | • Commencement of Regular/Supplementary Examinations of Even Semester( Even semesters except II Semester) |
| 6 | Friday | Exam Notification and start of Online/Offline Examination Registration for II Semester |
| 7 | Saturday | |
| 8 | Sunday | |
| 9 | Monday | |
| 10 | Tuesday | |
| 11 | Wednesday | |

| | | |
|---|---|---|
| 12 | Thursday | Commencement of Second Internal Series II Semester |
| 13 | Friday | |
| 14 | Saturday | |
| 15 | Sunday | |
| 16 | Monday | |
| 17 | Tuesday | |
| 18 | Wednesday | |
| 19 | Thursday | |
| 20 | Friday | |
| 21 | Saturday | |
| 22 | Sunday | |
| 23 | Monday | |
| 24 | Tuesday | |
| 25 | Wednesday | |
| 26 | Thursday | Last date for Exam Registration without fine II Semester |
| 27 | Friday | |
| 28 | Saturday | |
| 29 | Sunday | |
| 30 | Monday | • End of the PG and UG Exams<br>• Last date for Exam Registration, with Fine ( II Semester) |
| 31 | Tuesday | |

| JUNE 2022 | | |
|---|---|---|
| Date | Day | Remarks |
| 1 | Wednesday | |
| 2 | Thursday | |
| 3 | Friday | |
| 4 | Saturday | • Publication of Time-Table of I Semester Examinations (All UG Programmes and PG Programmes of recognized Institutions) |
| 5 | Sunday | |
| 6 | Monday | • Submission of Exam Time-Table II Semester (P G Programmes) by the University Departments.<br>• Submission of DCB statement to University. II Semester |
| 7 | Tuesday | |
| 8 | Wednesday | |
| 9 | Thursday | |
| 10 | Friday | Commencement of Second Internal Series II Semester |

| | | |
|---|---|---|
| 11 | Saturday | |
| 12 | Sunday | |
| 13 | Monday | Appointment letter to Examiners II Semester |
| 14 | Tuesday | |
| 15 | Wednesday | • Last date for submission of PG results to University. ( Even semesters except II Semester) |
| 16 | Thursday | |
| 17 | Friday | Submission of Attendance as on date to the University. II Semester |
| 18 | Saturday | |
| 19 | Sunday | |
| 20 | Monday | |
| 21 | Tuesday | |
| 22 | Wednesday | Issue of Nominal Roll & Hall Ticket and submission of Internal Marks (UG Programmes). II Semester |
| 23 | Thursday | |
| 24 | Friday | |
| 25 | Saturday | • Publication of P G Results( Even semesters except II Semester) |
| 26 | Sunday | |
| 27 | Monday | |
| 28 | Tuesday | |
| 29 | Wednesday | |
| 30 | Thursday | End of classes and submission of Attendance to University. II Semester |

| JULY 2022 | | |
|---|---|---|
| Date | Day | Remarks |
| 1 | Friday | • End of UG Exams & Last date for submission of Lab marks to the University( Even semesters except II Semester) |
| 2 | Saturday | |
| 3 | Sunday | |
| 4 | Monday | |
| 5 | Tuesday | • End of Valuation (UG Even semesters except II Semester) |
| 6 | Wednesday | |
| 7 | Thursday | |
| 8 | Friday | |
| 9 | Saturday | |
| 10 | Sunday | |

| | | |
|---|---|---|
| 11 | Monday | Commencement of Regular Examinations of II Semester |
| 12 | Tuesday | |
| 13 | Wednesday | |
| 14 | Thursday | |
| 15 | Friday | |
| 16 | Saturday | |
| 17 | Sunday | |
| 18 | Monday | |
| 19 | Tuesday | |
| 20 | Wednesday | • **Publication of Results (**UG **Even semesters except II Semester)** |
| 21 | Thursday | |
| 22 | Friday | |
| 23 | Saturday | |
| 24 | Sunday | |
| 25 | Monday | |
| 26 | Tuesday | |
| 27 | Wednesday | |
| 28 | Thursday | |
| 29 | Friday | |
| 30 | Saturday | End of PG and UG Exams of II Semester |
| 31 | Sunday | |

| AUGUST 2022 | | |
|---|---|---|
| Date | Day | Remarks |
| 1 | Monday | |
| 2 | Tuesday | |
| 3 | Wednesday | |
| 4 | Thursday | |
| 5 | Friday | |
| 6 | Saturday | |
| 7 | Sunday | |
| 8 | Monday | |
| 9 | Tuesday | Last date for submission of PG Results to University. II Semester |
| 10 | Wednesday | |
| 11 | Thursday | |

| | | |
|---|---|---|
| 12 | Friday | |
| | | |
| 13 | Saturday | |
| 14 | Sunday | |
| 15 | Monday | |
| 16 | Tuesday | • Publication of PG Results II Semester<br>• Submission of Lab Marks to the University (UG II Semester. |
| 17 | Wednesday | |
| 18 | Thursday | |
| 19 | Friday | |
| 20 | Saturday | End of Valuation (UG II Semester) |
| 21 | Sunday | |
| 22 | Monday | |
| 23 | Tuesday | |
| 24 | Wednesday | |
| 25 | Thursday | |
| 26 | Friday | |
| 27 | Saturday | |
| 28 | Sunday | |
| 29 | Monday | Publication of Results (UG II Semester) |
| 30 | Tuesday | |
| 31 | Wednesday | |

Note : Co-curricular activities mentioned in the Calendar be conducted without affecting the classes and other Academic activities. Examination Notification in the website may be noted for the changes in the examination schedule from time to time, since the date mentioned above may change subject to the prevailing pandemic situations.

# FACULTY OF ENGINEERING

**Dean:**

**Dr.K.S. Beena**

**Professor**

**School of Engineering**

**Cochin University of Science and Technology**

# KUNJALI MARAKKAR SCHOOL OF MARINE ENGINEERING (UG)

**REGULATIONS FOR B.TECH. MARINE ENGINEERING DEGREE COURSE OFFERED IN KUNJALI MARAKKAR SCHOOL OF MARINE ENGINEERING**

## (With effect from 2019 Admissions)

The following regulations are made applicable to B.Tech. Programme in Marine Engineering in theUniversity under Faculty of Engineering with effect from the academic year 2019-20.

### 1 B.Tech. Programme

The duration of the B.Tech. course in Marine Engineering shall be eight semesters spanning over four Academic years. Each semester shall consist of 18 weeks except 7$^{th}$ semester. 7$^{th}$semester consist of 26 weeks.

#### 1.1 Structure of the B.Tech.Programme

**1.1.1** The programme of instruction will consist of the following:

i) General (common) core courses comprising basic sciences, mathematics and basic engineering

ii) Engineering core courses introducing the student to the foundations of engineering in the Marine
Engineering;

iii) Elective courses enabling the student to opt and undergo a set of courses of interest to him/ her;

iv) Professional practice including project, seminar, and industrial training and

v) Humanities courses on Communication Skills and Environmental Studies.

**1.1.2** The B.Tech. Marine Engineering programme will have a curriculum and syllabus for the course approved by the Academic Council.

**1.1.3** The B.Tech.Programme in Marine Engineering offered by the University shall follow the credit system.

**1.1.4** The curriculum of any branch of the B.Tech. Marine Engineering shall have a minimum total of 172 credits.

#### 1.2 Course Registration

It is mandatory for the students to register for the courses in each semester.

Before registration, the students should

a) Clear all dues including any fees to be paid and should not have any disciplinary issues pending.

b) Meet the requirements regarding the minimum number of credits for promotion stipulated in clause1.9.

The dates for registration will be announced by the School in the academic calendar. Late registrationwill be allowed up to 7 working days from the commencement of the semester with late registration fee.

## 1.3 Mode of Evaluation

**1.3.1** The performance of the students in theory courses will be evaluated based on continuous assessment and semester end examination. In the case of practical courses, the evaluation will be based on continuous assessment and semester end assessment which will be carried out internally.

**1.3.2** For theory courses, there will be 40% weightage for internal assessment and 60% weightage for semester end examination. For practical courses, continuous assessment and semester end assessment will carry 50% weightage each.

**1.3.3** In theory courses, the assessment pattern will be as follows:

Continuous assessment:

1. I Periodical Test - Maximum marks: 12.5
2. II Periodical Test - Maximum marks: 12.5
3. Assignments - Maximum marks: 10
4. Attendance - Maximum marks: 5

The Semester End Examination shall be of 3 hours duration.

At the end of the semester, semester examination will be conducted in all the theory courses offered in the semester and it will be of three hours duration unless otherwise specified. The Controller of Examinations will make necessary arrangements for setting the question papers and valuation of answer books for the semester end examination of theory courses.

Each question will carry 15 marks and the student can attend 5 questions for 75 marks. *The*

*maximum mark that can be awarded for a Semester End Examination (SEE) will be only 60, even though the questions are for 75 marks.*

**1.3.4** For each practical course, the assessment pattern will be as follows:

50% marks is earmarked for Continuous Evaluation, and 50% marks for Semester End Examination. The Semester End Examination to be conducted by a minimum of two examiners, one not below the rank of an Associate Professor. A candidate shall secure a minimum of 50% marks in the aggregate and 40% minimum in the Semester End Examination for a pass.

1. Continuous assessment: 25 marks

   For continuous assessment, the marks may be awarded on the basis of the performance of the student in the laboratory sessions. The break-up of marks for continuous assessment of laboratory courses shall be:

   a) Practical records/Outputs : 10 marks
   b) Lab work : 10 marks
   c) Attendance : 5 marks

2. Semester end assessment:25 marks

   The semester end assessment will consist of an examination and a viva voce.

   The semester end assessment for the laboratory courses shall be conducted internally by the department with at least two faculty members as examiners. One of the examiners for conducting the semester end laboratory examination shall be at the level of Associate Professor or above in the regular cadre.

**1.3.5** In the case of project work, the project guide concerned shall make the continuous assessment. A committee consisting of the Project Coordinator (nominated by the Head of the Department/Division), project guide, and at least one senior faculty member at the level of Associate Professor or above will carry out the final review.

The weightages for the reviews shall be as follows:

| | | |
|---|---|---|
| Continuous assessment | : | 40 percent |
| Project Report | : | 20 percent |
| Final review | : | 40 percent |

**1.3.6** The Viva-voce examination at the end of VIII Semester will be conducted by a panel of three examiners consisting of the Head of the Department or his/her nominee and one senior faculty at the level of Associate Professor or above of the Department and one external expert.

**1.3.7** A candidate shall not be allowed to improve the continuous assessment marks in theory / laboratory courses. A candidate who desires to improve his/her marks in the semester end examination in theory courses shall be permitted to do so in the next available chance. This facility will be available only once for a theory course.

## 1.4 Course completion and earning of credits.

Students registered for a course have to attend the course regularly and meet the attendance rules of the university and appear for all the internal evaluation procedures for the completion of the course.

However, earning of credits is only on completion of the semester examination and on getting a pass grade. Students, who have completed a course, but could not write the semester examination for valid reasons, are permitted to write the semester examination at the next opportunity and earn the credits without undergoing the course again.

## 1.5 Eligibility to appear for the Semester End Examination

**1.5.1** A candidate who has fulfilled the following conditions shall be deemed to have satisfied the requirements for completion of a semester.

Ideally every student is expected to attend all classes and earn 100% attendance. However, in order to allow provision for certain unavoidable reasons such as medical / personal grounds / participation in sports, the student is expected to earn a minimum of 75% attendance. Therefore, he/she shall secure not less than 75% of overall attendance in that semester taking into account the total number of days in all courses attended by the candidate as against the total number of days in all courses offered during that particular semester.

**1.5.2** The Head of the School shall have the power to condone shortage of attendance up to 5 percent (between less than 75% and 70%) in a particular semester due to medical reasons (hospitalization /accident / specific illness) duly verified and recommended by the Course in Charge and on production of medical certificate from a registered medical practitioner endorsed by the University Medical Officer and on payment of the required fee. However such condonation for shortage of attendance shall be given only twice during the entire duration of the B.Tech. programme.

**1.5.3** The Vice Chancellor shall have the power to condone shortage of attendance up to 10 percent(between less than 70% and 65%) in a particular semester due to medical reasons (hospitalization /accident / specific illness) duly verified and recommended by the Head of the School and on production of Medical certificate from a registered

medical practitioner endorsed by the University Medical Officer and on payment of the required fee. However such condonation for shortage of attendance shall be given only twice during the entire duration of the B.Tech. programme.

**1.5.4** Candidates who secure less than 65%overall attendance will not be permitted to write the Semester End Examinations and are not permitted to go to next /subsequent semester. They are required to repeat the incomplete semester in the next academic year.

## 1.6 Eligibility to write the Supplementary examination

Supplementary examinations for a particular semester will be conducted along with the regular examination of the next semester.

Failed candidates and those who could not write the semester examination due to health reasons or other contingencies that are approved by the Head of the School can register for the supplementary examination. Those who wish to improve their performance in the semester end examinations can also register for the same, subject to the provisions of clause 1.3.7. Grades awarded in the supplementary examination will be taken as semester grades in these subjects and will be based on the semester examination grading pattern in that subject. In the case of candidates appearing for improvement of marks, the higher mark obtained will be considered for the purpose of grading.

## 1.7 Revaluation

A candidate can apply for revaluation of his/her semester end examination answer paper in a theory course, within 2 weeks from the declaration of results, on payment of a prescribed fee along with prescribed application to the Controller of Examinations through the Head of School. The Controller of Examination will arrange for the revaluation and the results will be intimated to the candidate concerned through the Head of the School. Revaluation is not permitted for practical courses, seminar and project work.

## 1.8 Pass requirements

A candidate has to obtain a minimum of 50 percent marks for continuous assessment and semester end examination put together with a minimum of 40 percent marks in the semester end examination for a pass in theory and laboratory courses

## 1.9 Promotion to Higher Semesters

Promotion to the Vth semester and VIIth semester shall be subject to the following conditions:

Promotion to Minimum number of credits to be earned V Semester 30 out of 60 credits of Semesters I, II, &III VII Semester 55 out of 106 credits of Semesters I to V.

A student will be given one regular chance and one supplementary chance for the semester end examination of $I^{st}$ and $II^{nd}$ semesters for considering the promotion to $V^{th}$ semester and one regular chance and one supplementary chance for semester end examinations of $III^{rd}$ and $IV^{th}$ semesters for considering the promotion to the $VII^{th}$ semester.

## 1.10 Grading

**1.10.1** Grades shall be awarded to the students in each course based on the total marks obtained in continuous assessment and the semester end examination and as per the provisions of clause 1.3.1.

The grading pattern shall be as follows:

| **Marks obtained (Percentage)** | **Grade** | **Grade points** |
|---|---|---|
| 90 to 100 | S | 10 |
| 80 to 90 | A | 9 |
| 70 to 80 | B | 8 |
| 60 to 70 | C | 7 |
| 50 to 60 | D | 6 |
| Less than 50 | F | 0 |

Note: - Where X-Y range denotes 'X' inclusive and 'Y' exclusive.

**1.10.2** A student is considered to have credited a course or earned credits in respect of a course if he/she secures a grade other than F for that course.

**1.10.3 Grade Point Average.**

The academic performance of a student in a semester is indicated by the Semester Grade Point Average (SGPA).

$$SGPA = \frac{G1C1 + G2C2 + G3C3 + \text{----------} + GnCn}{C1 + C2 + C3 + \text{----------} + Cn}$$

Where 'G' refers to the grade point and 'C' refers to the credit value of corresponding course undergone by the student.

**1.10.4 Grade Card**

The Grade Card issued at the end of the semester to each student by the Controller of Examinations, will contain the following:

a) The code, title, number of credits of each course registered in the semester,
b) The letter grade obtained,
c) The total number of credits earned by the student upto the end of that semester and
d) SGPA & CGPA.

**1.10.5 Classification**

The classification based on CGPA is as follows:

CGPA 8 and above : First Class with distinction
CGPA 6.5 and above, but less than 8 : First Class
CGPA 6 and above, but less than 6.5 : Second Class

**1.10.6 Conversion of CGPA to Percentage marks**

The following formula shall be used to convert the SGPA/CGPA obtained by a student to percentage marks.

Percentage marks = (SGPA/CGPA – 0.5) 10.

## 1.11 Faculty Advisor

To help the students in planning their courses of study and for general advice on the academic programme, the Head of the Department of the student will attach a certain number of students to a teacher of the Department who shall function as Faculty Advisor for those students throughout their period of study. Such Faculty Advisor shall advise the students and monitor the courses taken by the students, check the attendance and progress of the students attached to him / her and counsel them periodically. If necessary, the Faculty Advisor may also discuss with or inform the parents about the progress / performance of the students concerned.

## 1.12 Class Committee

A class committee consists of teachers of the class concerned, student representatives and a

chairperson who does not handle any subject for the class. It is like the 'Quality Circle' more commonly used in industries), with the overall goal of improving the teaching-learning process. The functions of the class committee include:

- Solving problems experienced by students in the classroom and in the laboratories in consultation with the Course in Charge/ Director.
- Clarifying the Regulations of the degree programme and the details of rules therein.
- Informing the student representatives the academic schedule including the dates of assessments and the syllabus coverage for each assessment.
- Informing the student representatives the details of Regulations regarding weightage used for each assessment.
- Discussing in the class committee meeting the breakup of marks for each experiment / exercise / module of work, in case of practical course (laboratory / drawing / project work / seminar, etc.) and informing the students.
- Analysing the performance of the students of the class after each test and finding ways and means of improving the performance of the students.
- Identifying the students who are low achievers or weak in their subjects if any, and requesting the teachers concerned to provide some additional help or guidance or coaching to such students.

The class committee is normally constituted by the Head of the Department. The class committee shall be constituted within a week from the date of commencement of a semester. At least 3 student representatives from the respective class (usually 3 boys and 1 girl) shall be included in the class committee. The student representatives shall be nominated on the basis of their academic performance since the First Semester of the B.Tech programme. In the case of First and Second semesters, the rank obtained in the Common Admission Test (CAT) shall be the criterion for nominating the student representatives. The Chairperson of the class commit

tee may invite the Faculty Advisor(s), Course in Charge and the Head of the Department to the meeting of the class committee. The chairperson of the class committee is required to prepare the minutes of every meeting, submit the same to the Head of the Division within two days of the meeting and arrange to circulate the same among students concerned and teachers. If there are some points in the minutes requiring action by the University the same shall be brought to the attention of the Director and the Registrar.

The first meeting of the class committee shall be held within fifteen days from the date of commencement of the semester. The nature and weightage of internal assessments shall be discussed in the first meeting, within the framework of the Regulations and the same shall be communicated to the students. Two or three subsequent meetings in a semester may be held at suitable intervals. During these meetings the student members representing the entire class, shall meaningfully interact and express their opinions and suggestions of the class students to improve the effectiveness of the teaching-learning process.

1.13 **Discipline**

Every student is required to observe discipline and decorous behaviour both inside and outside the campus and refrain from any activity which may tarnish the image of the university. Any act of indiscipline, misbehaviour including unfair practice in examinations will be referred to the authorities of the University that will make a detailed enquiry on the matter and decide on the course of action to be taken.

1.14 **Amendment to Regulations**

Notwithstanding all that has been stated above, the University has the right to modify any of the above regulations from time to time.

# B.TECH. MARINE ENGINEERING

**Scheme of Examinations (2019 admission) – SEMESTER I**

| Code No | Subject | L Hrs/Wk | T Hrs/Wk | PD Hrs/Wk | C | CA | SEE | Total |
|---|---|---|---|---|---|---|---|---|
| 19-208-0101 | Mathematics-I | 4 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-208-0102 | Engineering Physics | 4 | 0 | 0 | 3 | 40 | 60 | 100 |
| 19-208-0103 | Engineering Chemistry | 4 | 0 | 0 | 3 | 40 | 60 | 100 |
| 19-208-0104 | Engineering Mechanics | 4 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-208-0105 | Basic Electrical Engineering | 4 | 0 | 0 | 3 | 40 | 60 | 100 |
| 19-208-0106 | Environmental studies and Technical Communication | 4 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-208-0107 | Electrical Engineering Workshop | 0 | 0 | 3 | 1 | 25 | 25 | 50 |
| 19-208-0108 | Language Lab | 0 | 0 | 0 | 1 | 25 | 25 | 50 |
| 19-208-0109 | NSS / Nature Conservation Activity | 0 | 0 | 1 | 0 | - | - | - |
| | **TOTAL** | **24** | **3** | **6** | **20** | **-** | **-** | **-** |

**CA**- Continuous Assessment, **SEE** – Semester End Examination

**SEMESTER II**

| Code No | Subject | L Hrs/Wk | T Hrs/Wk | PD Hrs/Wk | C | CA | SEE | Total |
|---|---|---|---|---|---|---|---|---|
| 19-208-0201 | Mathematics-II | 4 | 1 | - | 3 | 40 | 60 | 100 |
| 19-208-0202 | Applied Thermodynamics | 4 | 1 | - | 3 | 40 | 60 | 100 |
| 19-208-0203 | Engineering Graphics | 3 | 1 | - | 3 | 40 | 60 | 100 |
| 19-208-0204 | Basic Electronics and measurements | 4 | 0 | - | 3 | 40 | 60 | 100 |
| 19-208-0205 | Computer Programming | 4 | 0 | - | 3 | 40 | 60 | 100 |
| 19-208-0206 | Mechanics of solids | 4 | 1 | - | 3 | 40 | 60 | 100 |
| 19-208-0207 | Mechanical Engineering Workshop | - | - | 3 | 1 | 25 | 25 | 50 |
| 19-208-0208 | Computer Programming Laboratory | - | - | 3 | 1 | 25 | 25 | 50 |
| | **TOTAL** | **23** | **4** | **6** | **20** | **-** | **-** | **-** |

**CA**- Continuous Assessment, **SEE** – Semester End Examination

**SEMESTER III**

| Code No | Subject | L Hrs/Wk | T Hrs/Wk | PD Hrs/Wk | C | CA | SEE | Total |
|---|---|---|---|---|---|---|---|---|
| 19-208-0301 | Mathematics-III | 4 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-208-0302 | Electrical Technology | 4 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-208-0303 | Production Technology | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-208-0304 | Marine Electronics | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-208-0305 | Fluid Mechanics | 4 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-208-0306 | Machine Drawing | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-208-0307 | Strength of Materials Lab | 0 | 0 | 3 | 1 | 25 | 25 | 50 |
| 19-208-0308 | Workshop Practices | 0 | 0 | 3 | 1 | 25 | 25 | 50 |
| | **TOTAL** | **21** | **6** | **6** | **20** | - | - | - |

**CA**- Continuous Assessment, **SEE** – Semester End Examination

**SEMESTER IV**

| Code No | Subject | L Hrs/Wk | T Hrs/Wk | PD Hrs/Wk | C | CA | SEE | Total |
|---|---|---|---|---|---|---|---|---|
| 19-208-0401 | Mechanics of Machinery | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-208-0402 | Thermal Engineering & Heat Transfer | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-208-0403 | Metallurgy & Materials Science | 4 | 0 | 0 | 3 | 40 | 60 | 100 |
| 19-208-0404 | Marine Auxiliary Machinery-I | 4 | - | 0 | 3 | 40 | 60 | 100 |
| 19-208-0405 | Hydraulic Machinery | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-208-0406 | Seamanship and Navigation | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| 19-208-0407 | Ship Technology | 4 | 0 | - | 3 | 40 | 60 | 100 |
| 19-208-0408 | Electrical Machines Lab | 0 | 0 | 3 | 1 | 25 | 25 | 50 |
| 19-208-0409 | Boiler Chemistry & Heat Engines Lab | 0 | 0 | 3 | 1 | 25 | 25 | 50 |
| - | **TOTAL** | 24 | 3 | 6 | 23 | - | - | - |

**CA**- Continuous Assessment, **SEE** – Semester End Examination

**SEMESTER V**

| Code No | Subject | L Hrs/Wk | T Hrs/Wk | PD Hrs/Wk | C | CA | SEE | Total |
|---|---|---|---|---|---|---|---|---|
| 19-208-0501 | Dynamics of Machinery | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-208-0502 | Marine Boiler and Steam Engineering | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-208-0503 | Marine Economics and Commercial Geography | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-208-0504 | Marine Auxiliary Machinery-II | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-208-0505 | Marine Internal Combustian Engine — I | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-208-0506 | Marine Engineering Drawing | 2 | 1 | 3 | 3 | 40 | 60 | 100 |
| 19-208-0507 | Naval Architecture — I | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-208-0508 | Fluid Mechanics & Hydraulic Machinery Lab | 0 | 0 | 3 | 1 | 25 | 25 | 50 |
| 19-208-0509 | Electronics Lab | 0 | 0 | 3 | 1 | 25 | 25 | 50 |
| - | **TOTAL** | **20** | **7** | **9** | **23** | - | - | - |

**CA**- Continuous Assessment, **SEE** – Semester End Examination

**SEMESTER VI**

| Code No | Subject | L Hrs/Wk | T Hrs/Wk | PD Hrs/Wk | C | CA | SEE | Total |
|---|---|---|---|---|---|---|---|---|
| 19-208-0601 | Management Science | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-208-0602 | Marine Electrical Technology | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-208-0603 | Ship fire Prevention and Control | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-208-0604 | Marine Refrigeration and Air Conditioning | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-208-0605 | Marine Internal Combustion Engines — II | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-208-0606 | Machine Design | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-208-0607 | Naval Architecture — I | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-208-0608 | Fire Control Engineering Lab | 0 | 0 | 3 | 1 | 25 | 25 | 50 |
| 19-208-0609 | Mechanical Lab | 0 | 0 | 3 | 1 | 25 | 25 | 50 |
| - | **TOTAL** | **21** | **7** | **6** | **23** | **-** | **-** | **-** |

**CA**- Continuous Assessment, **SEE** – Semester End Examination

**SEMESTER VII**

| Code No | Subject | L Hrs/Wk | T Hrs/Wk | PD Hrs/Wk | C | CA | SEE | Total |
|---|---|---|---|---|---|---|---|---|
| 19-208-0701 | Ship in Campus — I | 0 | 0 | 3 | 1 | 50 | - | 50 |
| 19-208-0702 | Ship in Campus — II | 0 | 0 | 8 | 4 | 50 | - | 50 |
| 19-208-0703 | Ship in Campus — III | 0 | 0 | 4 | 2 | 50 | - | 50 |
| 19-208-0704 | Ship in Campus — IV | 0 | 0 | 6 | 3 | 50 | - | 50 |
| 19-208-0705 | Ship in Campus — V | 0 | 0 | 11 | 5 | 50 | - | 50 |
| 19-208-0706 | Ship in Campus — VI | 0 | 0 | 7 | 4 | 50 | - | 50 |
| 19-208-0707 | Ship in Campus — VII | 0 | 0 | 3 | 1 | 50 | - | 50 |
| - | **TOTAL** | **0** | **0** | **42** | **20** | **-** | **-** | **-** |

**CA**- Continuous Assessment, **SEE** – Semester End Examination

**SEMESTER VIII**

| Code No | Subject | L Hrs/Wk | T Hrs/Wk | PD Hrs/Wk | C | CA | SEE | Total |
|---|---|---|---|---|---|---|---|---|
| 19-208-0801 | Safe Watch Keeping and Engine Resource Management | 4 | - | 0 | 3 | 40 | 60 | 100 |
| 19-208-0802 | Ship Operation and Management | 4 | - | 0 | 3 | 40 | 60 | 100 |
| 19-208-0803 | Maritime Statutory Regulations | 4 | - | - | 3 | 40 | 60 | 100 |
| 19-208-08** | Elective — I | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-208-08** | Elective — II | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-208-0812 | Simulation and Control Lab | - | - | 3 | 1 | 25 | 25 | 50 |
| 19-208-0813 | Seminar | 3 | - | - | 2 | 50 | - | 50 |
| 19-208-0814 | Project | - | - | 10 | 4 | 200 | - | 200 |
| 19-208-0815 | Viva-voce | - | - | 0 | 1 | - | 50 | 50 |
| - | **TOTAL** | 21 | 2 | 13 | 23 | - | - | - |

**CA**- Continuous Assessment, **SEE** – Semester End Examination

**Details of Faculty**

| Sl. No. | Name and Designation | Communication |
|---|---|---|
| 1. | **Prof.M.P.John,**<br>Director | 2862719,2576606<br>9447190644<br>johnmukkadayil@gmail.com |
| 2. | **Prof.N.G.Nair,**<br>Course in-Charge | 0478-2813617/9349409700 (Res./Mob.)<br>2575225/2862721,2721 (Office and Intercom)<br>Ngnair2008@gmail.com |
| 3. | **Sri.RoyV.Paul,**<br>Associate Professor & Course Co-ordinator | 2575224,9605781266 (Res./Mob.)<br>roypaulmar@gmail.com |
| 4. | **Sri. R. Venugopal**<br>Professor | 9961000760<br>Venulatha2@rediffmail.com |
| 5. | **Sri. Jis George**<br>Associate Professor | 9895485037<br>mailjisgeorge@gmail.com |
| 6. | **Sri. Ayyappankutty K.M.**<br>Assistant Professor | 9961949280 |
| 7. | **Smt. Misha K.M.**<br>Assistant Professor | 9567913675 |
| 8. | **Ms. Chinchu Varghese**<br>Assistant Professor | 9496464138 |
| 9. | **Ms. Aathira M.J.**<br>Assistant Professor | 9446805156 |
| 10. | **Sri. Anoop Mathew Kurian**<br>Assistant Professor | 80897955028 |
| 11. | **Sri. Bijoydas U.R.**<br>Assistant Professor | 9744584852 |

# KUNJALI MARAKKAR SCHOOL OF MARINE ENGINEERING (PG)

## M.TECH. DEGREE IN MARINE ENGINEERING

**SEMESTER I**

| Course Code | Subject | L Hrs/Wk | T Hrs/Wk | P Hrs/Wk | No. of Credits |
|---|---|---|---|---|---|
| 18-438-0101 | Marine Diesel Engines- Design &Performance | 3 | 1 | 0 | 4 |
| 18-438-0102 | Ship Dynamics & Marine Machinery System Installation | 3 | 1 | 0 | 4 |
| 18-438-01** | Elective-I | 3 | 1 | 0 | 3 |
| 18-438-01** | Elective-II | 3 | 1 | 0 | 3 |
| 18-438-0109 | CAD/Computer | 0 | 0 | 3 | 1 |
| 18-438-0110 | Seminar I | 0 | 0 | 3 | 1 |
| 18-438-0111 | Research Methodology and IPR TOTAL | 2 | 1 | 0 | 2 |
| . | TOTAL | 14 | 5 | 6 | 18 |

**Total Credits of the M.Tech. programme =72**

**SEMESTER II**

| Course Code | Subject | L Hrs/Wk | T Hrs/Wk | P Hrs/Wk | No.of Credits |
|---|---|---|---|---|---|
| 18-438-0201 | Advanced Welding Technology | 3 | 1 | 0 | 4 |
| 18-438-0202 | Ship Design and Economics | 3 | 1 | 0 | 4 |
| 18-438-02** | Elective-III | 3 | 1 | 0 | 3 |
| 18-438-02** | Elective-IV | 3 | 1 | 0 | 3 |
| 18-438-0209 | Metallurgy Lab | 0 | 0 | 3 | 1 |
| 18-438-0210 | Seminar II | 0 | 0 | 3 | 1 |
| 18-438-0211 | Mini Project / Internship | 0 | 0 | 3 | 2 |
| . | **TOTAL** | **12** | **4** | **9** | **18** |

**Total Credits of the M.Tech. programme =72**

**SEMESTER III**

| Course Code | Subject | L Hrs/Wk | T Hrs/Wk | P Hrs/Wk | No.of Credits |
|---|---|---|---|---|---|
| 18-438-03** | Elective-V | 3 | 1 | 0 | 3 |
| 18-438-03** | Elective-VI | 3 | 1 | 0 | 3 |
| 18-438-0307 | Dissertation (Phase –I) | 0 | 0 | 20 | 12 |
| | **TOTAL** | **6** | **2** | **20** | **18** |

**Total Credits of the M.Tech. programme =72**

**SEMESTER IV**

| Course Code | Subject | L Hrs/Wk | T Hrs/Wk | P Hrs/Wk | No.of Credits |
|---|---|---|---|---|---|
| 18-438-0401 | Dissertation(Phase-II) | 0 | 0 | 30 | 18 |
| . | **TOTAL** | **0** | **0** | **30** | **18** |

**Total Credits of the M.Tech.Programme =72**

# LIST OF ELECTIVES

**ELECTIVES I & II (Semester I)**

18-438-0103 Advanced Theory of Vibrations

18-438-0104 Maritime Safety and Environment

18-438-0105 Computational Methods in Engineering

18-438-0106 Gas Turbines

18-438-0107 Port Logistics and Planning

18-438-0108 Optimization Techniques

**ELECTIVES III & IV (Semester II)**

18-438-0203 Combustion and Pollution

18-438-0204 Finite Element Analysis

18-438-0205 Energy Conservation & Management

18-438-0206 Quantitative techniques for managerial Decisions

18-438-0207 Numerical Methods in Thermal Engineering

18-438-0208 System Simulation and Modeling.

**ELECTIVES V & VI (Semester III)**

18-438-0301 Marine Corrosion & Prevention

18-438-0302 Plant Maintenance & Safety

18-438-0303 CFD and its Application

18-438-0304 Marine Transportation and Economics

18-438-0305 Automatic Control Systems

18-438-0306 Diagnostic Methods in Combustion Systems

## Details of Faculty

| Sl. No. | Name & Designation | Communication |
|---|---|---|
| 1. | **Sri.Roy V. Paul**<br>Course in-charge | 2575224, 9605781266 (Res./Mob.)<br>roypaulmar@gmail.com |
| 2. | **Sri. R. Venugopal**<br>Course Co-ordinator | 9961000760<br>veniulatha2@rediffmail.com |
| 3. | **Sri.Jis George**<br>Associate Professor | 9895485037<br>mailjisgeorge@gmail.com |

# SCHOOL OF ENGINEERING

## REGULATIONS FOR THE B.TECH. DEGREE PROGRAMMES(Except Marine Engineering) Offered under Faculty of Engineering(With effect from 2019 Admissions)

### REGULATIONS FOR B.Tech. DEGREE PROGRAMMES UNDER FACULTY OF ENGINEERING

The following regulations are made applicable to all the B.Tech. programmes offered by the University under Faculty of Engineering except Marine Engineering with effect from the academic year 2019-20.

**1. B.Tech. Programme**

The duration of the B.Tech. programme shall be eight semesters spanning over four academic years. Each semester shall consist of 15 weeks.

**1.1 Branch**

a) Civil Engineering

b) Computer Science and Engineering

c) Electrical and Electronics Engineering

d) Electronics and Communication Engineering

e) Information Technology

f) Mechanical Engineering

g) Safety and Fire Engineering

**1.2 Structure of the B.Tech. Programme**

**1.2.1** The programme of instruction will consist of the following:

a) General (common) core courses comprising basic sciences, mathematics, and basic engineering;

b) Engineering core courses introducing the student to the foundations of engineering in the respective branch;

c) Elective courses enabling the student to opt and undergo a set of courses of interest to him/her;

d) Professional practice including project, seminar, and industrial training; and

e) Humanities courses on soft skills.

**1.2.2** Every branch of the B.Tech. programme will have a curriculum and syllabus for the courses approved by the Academic Council.

**1.2.3** The B.Tech. programmes offered by the University Departments/Schools/Cochin University College of Engineering, Kuttanad shall follow the credit system.

**1.2.4** The curriculum of any branch of the B.Tech.. programme shall have a total of 160 credits as minimum.

## 1.3 Course Registration

It is mandatory for the students to register for the courses in each semester.

Before registration, the students should

a) Clear all dues including any fees to be paid and should not have any disciplinary issues pending.

b) Meet the requirements regarding the minimum number of credits for promotion stipulated in clause 1.10.

The dates for registration will be announced by the School/College in their academic calendar. Late registration will be allowed up to 7 working days from the commencement of the semester with late registration fee.

## 1.4 Mode of Evaluation

**1.4.1** The performance of the students in theory courses will be evaluated based on continuous assessment and semester end examination. In the case of laboratory courses, the evaluation will be based on continuous assessment and semester end assessment which will be carried out internally.

**1.4.2** For theory courses, there will be 40% weightage for internal assessment and 60% weightage for semester end examination. For practical courses, continuous assessment and semester end assessment will carry 50% weightage each.

**1.4.3** For theory courses, the assessment pattern will be as follows:

**Continuous Assessment:**

| | | | |
|---|---|---|---|
| a) | First Periodical Test | - | Maximum marks: 12.5 |
| b) | Second Periodical Test | - | Maximum marks: 12.5 |
| c) | Assignments | - | Maximum marks: 10 |
| d) | Attendance | - | Maximum marks: 5 |

**Semester End Examination**

| | |
|---|---|
| a) | Exam shall be shall be of 3 hours duration. |
| b) | Maximum marks: 60 |

**1.4.4** For laboratory courses, the assessment pattern will be as follows:

**Continuous Assessment:**

The marks may be awarded on the basis of the performance of the student in the laboratory sessions. The break-up of marks for continuous assessment of laboratory courses shall be:

| | | | |
|---|---|---|---|
| a) | Practical records/Outputs | - | Maximum marks: 10 |
| b) | Lab work | - | Maximum marks: 10 |
| c) | Attendance | - | Maximum marks: 5 |

**Semester End Assessment:**

The semester end assessment will consist of an examination and a viva voce.

Maximum marks for semester end examination: **25**

**1.4.5** At the end of the semester, semester examination will be conducted in all the theory courses offered in the semester and they will be of three hoursduration unless otherwise specified. The Controller of Examinations will make necessary arrangements for setting the question papers and valuation of answer books for the semester end examination of theory courses

**1.4.6** The semester end assessment for the laboratory courses shall be conducted internally by the respective department / division with at least two faculty members as examiners. One of the examiners for conducting the semester end laboratory examination shall be at the level of Associate Professor or above in the regular cadre.

**1.4.7** In the case of project work, the project guide concerned shall make the continuous assessment. A committee consisting of the Project Coordinator (nominated by the Head of the Department/ Division), project guide, and at least one senior faculty member at the level of Associate Professor or above will carry out the final review.

The weightages for the assessment of project work shall be as follows:

| | | |
|---|---|---|
| Continuous assessment | - | 40 percent |
| Project Report | - | 20 percent |
| Final review | - | 40 percent |

**1.4.8** The Viva-voce examination at the end of VIII semester will be conducted by a panel of three examiners consisting of the Head of the Department/Division or his/her nominee and one senior faculty at the level of Associate Professor or above of the Department/Division and preferably, one external expert.

**1.4.9** A candidate shall not be allowed to improve the continuous assessment marks in theory/laboratory courses. A candidate who desires to improve his/her marks in the semester end examination in theory courses shall be permitted to do so in the next available chance. This facility will be available only once for a theory course.

## 1.5 Course Completion and Earning of Credits.

Students registered for a course have to attend the course regularly and meet the attendance rules of the University and appear for all the internal evaluation procedures for the completion of the course. However, credits can be earned only on completion of the semester end examination and on getting a pass grade. Students, who have completed a course, but could not write the semester end examination for valid reasons, are permitted to write the examination at the next available chance and earn the credits without undergoing the course again.

## 1.6 Eligibility to Appear for the Semester End Examination

**1.6.1** A candidate who has fulfilled the following conditions shall be deemed to have satisfied the requirements for the completion of a semester.

A student shall secure not less than 75% of overall attendance in a semester taking into account the total number of periods in all courses attended by the candidate as against the total number of periods in all courses offered during that particular semester.

**1.6.2** The Principal/Head of the School/College shall have the power to condone shortage of attendance up to 5% (between less than 75% and 70%) in a particular semester due to medical reasons (hospitalization/accident/specific illness) duly verified and recommended by the Head of the Division/Department and on production of

medical certificate from a registered medical practitioner endorsed by the University Medical Officer and on payment of the required fee. However, such condonation for shortage of attendance shall be given only twice during the entire duration of the B.Tech.programme.

**1.6.3** The Vice Chancellor shall have the power to condone shortage of attendance up to additional 5% (between less than 70% and 65%) in a particular semester due to medical reasons (hospitalization/accident/specific illness) duly verified and recommended by the Principal/Head of the School/College and on production of Medical certificate from a registered medical practitioner endorsed by the University Medical Officer and on payment of the required fee. However, such condonation for shortage of attendance shall be given only twice during the entire duration of the B.Tech. programme.

**1.6.4** Candidates who secure overall attendance of less than 65% (subject to clauses 1.6.2 and 1.6.3 above) will not be permitted to write the semester end examinations and will not be permitted to go to next/subsequent semester. They are required to repeat the incomplete semester in the next academic year.

## 1.7 Eligibility to Write the Supplementary Examination

Failed candidates and those who could not write the semester end examination due to health reasons or other contingencies that are approved by the Head of the School/College can register for the supplementary examination. Those who wish to improve their performance in the semester end examinations can also register for the same, subject to the provisions of clause 1.4.9. Grades awarded in the supplementary examination will be taken as semester grades in these subjects and will be based on the semester examination grading pattern in that subject. In the case of candidates appearing for improvement of marks, the higher mark obtained will be considered for the purpose of grading.

A candidate who fails to obtain a pass in courses having only continuous assessment will be permitted to repeat the course along with the junior batches.

## 1.8 Revaluation

A candidate can apply for revaluation of his/her semester end examination answer paper in a theory course, within 2 weeks from the declaration of results, on payment of a prescribed fee along with prescribed application to the Controller of Examinations through the Head of Department/School/College. The Controller of Examination will arrange for the revaluation and the results will be intimated to the candidate concerned through the Head of the Department/School/College. Revaluation is not permitted for laboratory courses, courses having only continuous assessment, seminar and project work.=

## 1.9 Pass Requirements

A candidate has to obtain a minimum of 50% marks for continuous assessment and semester end examination put together with a minimum of 40%marks in the semester end examination for a pass in theory and laboratory courses.

In the case of theory/laboratory courses having only continuous assessment, a candidate has to obtain a minimum of 50% marks in continuous assessment for a pass.

## 1.10 Promotion to Higher Semesters

A student will be given at least one regular chance and one supplementary chance for the semester end examination of a particular semester in both theory and practical courses to obtain a passgrade before he/she is assessed for promotion to higher semesters.

Promotion to III, V and VII semesters shall be subject to the following conditions:

| **Promotion to** | **Minimum number of credits to be earned** |
|---|---|
| III Semester | 10 out of 20 credits of Semester I |
| V Semester | 30 out of 60 credits of Semesters I, II, &III |
| VII Semester | 50 out of 100 credits of Semesters I to V |

## 1.11 Grading

**1.11.1** Grades shall be awarded to the students in each course based on the total marks obtained in continuous assessment and at the end semester examination and as per the provisions of clause 1.4.1.

The grading pattern shall be as follows:

| **Marks obtained ( Percentage)** | **Grade** | **Grade points** |
|---|---|---|
| 90 to 100 | S | 10 |
| 80 – 90 | A | 9 |
| 70 – 80 | B | 8 |
| 60 – 70 | C | 7 |
| 50 – 60 | D | 6 |
| < 50 | F | 0 |

Note: Where X – Y range denotes 'X' inclusive and 'Y' exclusive

**1.11.2** A student is considered to have credited a course or earned credits in respect of a course if he/she secures a grade other than F for that course.

**1.11.3 Grade Point Average**.

The academic performance of a student in a semester is indicated by the Grade Point Average (GPA).

$$GPA = \frac{G_1C_1 + G_2C_2 + G_3C_3 + \text{----------} GnCn}{C_1 + C_2 + C_3 + \text{----------} Cn}$$

Where 'G' refers to the grade point and 'C' refers to the credit value of the corresponding course undergone by the student.

The Grade Point Average (GPA) for each semester will be calculated only for those students who have passed all the registered courses of that semester. Similarly, Cumulative Grade Point Average (CGPA) up to any semester will be calculated only for those students who have passed all the courses up to that semester.

### 1.11.4 Grade Card

The Grade Card issued at the end of the semester to each student by the Controller of Examinations, will contain the following:

a) The code, title, number of credits of each course registered in the semester,

b) The letter grade obtained,

c) The total number of credits earned by the student upto the end of that semester and

d) GPA & CGPA.

### 1.11.5 Classification

On successful completion of the programme, CGPA will be calculated as follows:

$$CGPA = \frac{C_1 GP_1 + C_2 GP_2 + C_3 GP_3 + \text{----------} C_n GP_n}{C_1 + C_2 + C_3 + \text{----------} C_n}$$

Where 'GP' refers to the grade point average (GPA) and 'C' refers to the total number of credits obtained by a student in a particular semester.

The classification based on CGPA is as follows:

| | | |
|---|---|---|
| CGPA 8 and above | : | First Class with distinction |
| CGPA 6.5 and above, but less than 8 | : | First Class |
| CGPA 6 and above, but less than 6.5 | : | Second Class |

### 1.11.6 Conversion of GPA/CGPA to Percentage marks

The following formula shall be used to convert the SGPA/CGPA obtained by a student to percentage marks.

Percentage marks = (GPA/CGPA – 0.5) 10

## 1.12 Electives

The curriculum for each programme consists of four Professional Electives and two Open Electives. The students shall select one Open Elective from among the courses offered in that particular semester by a Division/Department other than his/her Division/Department.

## 1.13 Faculty Advisor

To help the students in planning their courses of study and for general advice on the academic programme, the Head of the Department will attach a certain number of students to a teacher of the Department who shall function as Faculty Advisor for these students throughout their period of study. Such Faculty Advisor shall advise the students and monitor the courses taken by the students, check the attendance and progress of the students attached to him/her and counsel them periodically. If necessary, the Faculty Advisor may also discuss with or inform the parents about the progress/performance of the students concerned.

## 1.14 Class Committee

A class committee consists of teachers of the class concerned, student representatives and a chairperson who does not handle any subject for the class. It is like the 'Quality Circle' (more commonly used in industries), with the overall goal of improving the teaching-learning process. The functions of the class committee include:

a. Solving problems experienced by students in the classroom and in the laboratories in consultation with Head of the Division/Principal/Director.

b. Clarifying the regulations of the degree programme and the details of rules therein.

c. Informing the student representatives, the academic schedule including the dates of assessments and the syllabus coverage for each assessment.

d. Informing the student representatives, the details of regulations regarding weightage used for each assessment.

e. Discussing in the class committee meeting the breakup of marks for each experiment/exercise/module of work, in case of practical course (laboratory/ drawing/project work/seminar etc.) and informing the students.

f. Analysing the performance of the students of the class after each test and finding ways and means of improving the performance of the students.

g. Identifying the students who are low achievers or weak in their subjects if any, and requesting the teachers concerned to provide some additional help or guidance or coaching to such students.

The class committee is normally constituted by the Head of the Division. However, if the students of different branches are mixed in each class the class committee is to be constituted by the Principal/Director. The class committee shall be constituted within a week from the date of commencement of a semester. At least 4 student representatives from the respective class (usually 2 boys and 2 girls) shall be included in the class committee. The student representatives shall be nominated on the basis of their academic performance since the first semester of the B.Tech. programme. In the case of first and second semesters, the rank obtained in the Common Admission Test (CAT) shall be the criterion for nominating the student representatives. The Chairperson of the class committee may invite the Faculty Advisor(s) and the Head of the Division to the meeting of the class committee. The Chairperson of the class committee is required to prepare the minutes of every meeting, submit the same to the Head of the Division within two days of the meeting and arrange to circulate the same among students concerned and teachers. If there are some points in the minutes requiring action by the University, the same shall be brought to the attention of the Principal/Director and the Registrar.

The first meeting of the class committee shall be held within fifteen days from the date of commencement of the semester. The nature and weightage of internal assessments shall be decided in the first meeting, within the framework of the regulations and the same shall be communicated to the students. Two or three subsequent meetings in a semester may be held at suitable intervals. During these meetings the student members representing the entire class, shall meaningfully interact and express their opinions and suggestions of the class to improve the effectiveness of the teaching-learning process.

### 1.15 Course Committee for Common Courses

Each common theory course offered to more than one discipline or group of disciplines shall have a "Common Course Committee" comprising all the teachers teaching the common course with one of them nominated as Common Course Coordinator. The nomination of the Course Coordinator shall be made by the Principal/Director in consultation with Heads of Divisions from among the teachers teaching the common courses. The "Common Course Committee" shall meet as often as possible and ensure uniform evaluation of internal assessments after arriving at a common scheme of evaluation for the tests. Wherever feasible, the common course committee shall prepare a common question paper for the test(s).

### 1.16 Discipline

Every student is required to observe discipline and decorous 104otmail104e both inside and outside the campus and refrain from any activity which may tarnish the image of the University as per the provisions of the Cochin University Students' (Conduct and Disciplinary) Code – 2005. Any act of indiscipline, 104otmail104ed104r including unfair practice in examinations will be referred to the authorities of the University that will make a detailed enquiry on the matter and decide on the course of action to be taken.

### 1.17 Amendment to Regulations

Notwithstanding all that has been stated above, the University has the right to modify any of the above regulations from time to time.

(Amendment –pattern of QP-U O No. CUSAT /CEO.A1/597/2019 dated 19.11.2019)

# DIVISION OF CIVIL ENGINEERING

**B.Tech (Full Time)**

**Semester I – 2019 Scheme**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| 19-200-0101A | Computer Programming | 40/60 | 3 |
| 19-200-0102A | Engineering Chemistry | 40/60 | 3 |
| 19-200-0103A | Engineering Graphics | 40/60 | 3 |
| 19-200-0104A | Basic Electrical Engineering | 40/60 | 3 |
| 19-200-0105A | Basic Electronics Engineering | 40/60 | 3 |
| 19-200-0106A | Environmental Studies | 40/60 | 3 |
| 19-200-0107A | Electrical Engineering Workshop | 25/25 | 1 |
| 19-200-0108A | Computer Programming Laboratory | 25/25 | 1 |
| Total | | | |

**Semester II– 2019 Scheme**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| 19-200-0201A | Calculus | 40/60 | 3 |
| 19-200-0202A | Engineering Physics | 40/60 | 3 |
| 19-200-0203A | Engineering Mechanics | 40/60 | 3 |
| 19-200-0204A | Basic Civil Engineering | 40/60 | 3 |
| 19-200-0205A | Basic Mechanical Engineering | 40/60 | 3 |
| 19-200-0206A | Soft Skills Development | 50 | 2 |
| 19-200-0207A | Civil Engineering Workshop | 25/25 | 1 |
| 19-200-0208A | Mechanical Engineering Workshop | 25/25 | 1 |
| 19-200-0209A | Language Lab | 25/25 | 1 |
| 19-200-0210A | NSS/Nature conservation Activities | 25/25 | 0 |
| Total | | | |

**Semester III– 2019 Scheme**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| 19-200-0301* | Linear Algebra and Transform Techniques | 40/60 | 3 |
| 19-201-0302 | Surveying –I | 40/60 | 3 |
| 19-201-0303 | Strength of Materials | 40/60 | 3 |
| 19-201-0304 | Concrete Technology | 40/60 | 3 |
| 19-201-0305 | Fluid Mechanics –I | 40/60 | 3 |
| 19-201-0306 | Engineering Geology and Seismology | 40/60 | 3 |
| 19-201-0307 | Strength of Materials Lab | 25/25 | 1 |
| 19-201-0308 | Concrete Lab | 25/25 | 1 |
| Total | | | |

**Semester IV– 2019 Scheme**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| 19-200-0401* | Complex Variables and Partial Differential Equations | 40/60 | 3 |
| 19-201-0402 | Surveying –II | 40/60 | 3 |
| 19-201-0403 | Analysis of Determinate Structures | 40/60 | 3 |
| 19-201-0404 | Transportation Engineering | 40/60 | 3 |
| 19-201-0405 | Fluid Mechanics II | 40/60 | 3 |
| 19-201-0406 | Building Technology and Planning | 40/60 | 3 |
| 19-200-0407* | Universal Human Values | 50 | 3 |
| 19-201-0408 | Survey Practical | 25/25 | 1 |
| 19-201-0409 | Fluid Mechanics Lab | 25/25 | 1 |
| Total | | | |

**Semester V – 2019 Scheme**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| 19-200-0501* | Numerical and Statistical Methods | 40/60 | 3 |
| 19-201-0502 | Design of Concrete Structures-I | 40/60 | 3 |
| 19-201-0503 | Analysis of Indeterminate Structures | 40/60 | 3 |
| 19-201-0504 | Geotechnical Engineering –I | 40/60 | 3 |
| 19-201-0505 | Water Resources and irrigation Engineering | 40/60 | 3 |
| 19-201-05** | Professional Elective -I | 40/60 | 3 |
| 19-201-0510 | Geotechnical Engineering Lab | 25/25 | 1 |
| 19-201-0511 | Transportation Engineering Lab | 25/25 | 1 |
| Total | | | |

| 19-201-0506 to 0509 Professional Elective - I | |
|---|---|
| **Course code** | **Course** |
| 19-201-0506 (IE) | Precast Construction of Structures |
| 19-201-0507 | Rail and Water Transport Engineering |
| 19-201-0508 | Functional Planning of Buildings |
| 19-201-0509 | Disaster Management |

**Semester VI – 2019 Scheme**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| 19-201-0601 | Environmental Engineering -I | 40/60 | 3 |
| 19-201-0602 | Design of Steel Structures | 40/60 | 3 |
| 19-201-0603 | Advanced Method of Structural Analysis | 40/60 | 3 |
| 19-201-0604 | Geotechnical Engineering –II | 40/60 | 3 |
| 19-201-0605 | Construction Management | 40/60 | 3 |
| 19-201-06** | Professional Elective- II | 40/60 | 3 |
| 19-201-0610 | Environmental Engineering Lab | 25/25 | 1 |
| 19-201-0611 | Computer Applications in Civil Engineering - I | 25/25 | 1 |
| Total | | | |

| 19-201-0606 to 0609 Professional Elective – II | |
|---|---|
| Course Code | Course |
| 19-201-0606 (IE) | Sustainable Construction Techniques |
| 19-201-0607 | Traffic Engineering and Management |
| 19-201-0608 | Air Pollution Control and Management |
| 19-201-0609 | Ground Water Engineering |

**Semester VII – 2015 Scheme**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| CE15-1701 | Environmental Engineering - II | 40/60 | 3 |
| CE15-1702 | Design of Concrete Structures-II | 40/60 | 3 |
| CE15-1703 | Construction Management | 40/60 | 3 |
| CE15-1704 | Quantity Surveying and Valuation | 40/60 | 3 |
| CE15-1705 | Elective -II | 40/60 | 3 |
| CE15-17L1 | Computer Applications in Civil Engineering - II | 25/25 | 2 |
| CE15-17L2 | Structural Engineering and NDT Lab | 25/25 | 2 |
| GE15-17L3 | Entrepreneurship Development | 50 | 1 |
| CE15-17L4 | Industrial Training | 50 | 1 |
| CE15-17L5 | Project – Phase I | 50 | 1 |
| Total | | | |

| **Industry Based Electives** | |
|---|---|
| Code | Name of Subject |
| CE15- 1705 IE1 | Applied Finite Element Method |
| CE15- 1705 IE2 | Pavement Design and Evaluation |
| CE15- 1705 IE3 | Ground Modification Techniques |
| | |
| CE15- 1705 IE4 | Solid and Industrial Waste Management |
| CE15- 1705 IE5 | Remote Sensing and GIS in Civil Engineering |

**Semester VIII – 2015 Scheme**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| CE15-1801 | Architecture and Town Planning | 40/60 | 3 |
| CE15-1802 | Earthquake Engineering | 40/60 | 3 |
| CE15-1803 | Construction Safety and Fire Engineering | 40/60 | 3 |
| CE15-1804 | Elective –III | 40/60 | 3 |
| CE15-18L1 | Seminar | 50 | 2 |
| CE15-18L2 | Project – Phase II | 200 | 6 |
| CE15-18L3 | Comprehensive Viva Voce | 50 | 2 |
| Total | | | |

**CE15 – 1804 Elective – III**

| Code | Name of Subject |
|---|---|
| E1 | Bridge Engineering |
| E2 | Environmental Geotechnics |
| E3 | Construction Engineering and Materials Management |
| E4 | Industrial Waste Engineering and Management |
| E5 | Environmental Impact Assessment |
| E6 | Sustainable Construction Techniques |

## M.Tech(Specialisation: Structural Engineering)

**Semester I**

| Course code | Course | Hours/Week | | | Credits |
|---|---|---|---|---|---|
| | | L | T | P | |
| 18-472-0101 | Advanced solid mechanics | 3 | 1 | 0 | 4 |
| 18-472-0102 | Finite Element Analysis | 3 | 1 | 0 | 4 |
| 18-472-01** | Elective I: | 3 | 1 | 0 | 3 |
| 18-472-01** | Elective II: | 3 | 1 | 0 | 3 |
| 18-472-0109 | Structural Engineering Lab-I | 0 | 0 | 3 | 1 |
| 18-472-0110 | Seminar I | 0 | 0 | 3 | 1 |
| 18-472-0111 | Research Methodology & IPR | 2 | 1 | 0 | 2 |
| Total | | 14 | 5 | 6 | 18 |

**ELECTIVES I & II (Semester I)**

| Course Code | Course |
|---|---|
| 18-472-0103 | Stability of Structures |
| 18-472-0104 | Bridge Engineering |
| 18-472-0105 | Design of Metal Structures |
| 18-472-0106 | High Rise Structures |
| 18-472-0107 | Design of Prestressed Concrete Structures |
| 18-472-0108 | Structural Reliability |

**Semester II**

| Course code | Course | Hours/Week | | | Credits |
|---|---|---|---|---|---|
| | | L | T | P | |
| 18-472-0201 | Structural Dynamics | 3 | 1 | 0 | 4 |
| 18-472-0202 | Theory of Plates and shells | 3 | 1 | 0 | 4 |
| 18-472-02** | Elective III | 3 | 1 | 0 | 3 |
| 18-472-02** | Elective IV | 3 | 1 | 0 | 3 |
| 18-472-0209 | Structural Engineering Lab-II | 0 | 0 | 3 | 1 |
| 18-472-0210 | Seminar II | 0 | 0 | 3 | 1 |
| 18-472-0211 | Internship | 0 | 0 | 3 | 2 |
| Total | | 12 | 4 | 9 | 18 |

**ELECTIVES III & IV (Semester II)**

| Course Code | Course |
|---|---|
| 18-472-0203 | Earthquake Resistant Design of Structures |
| 18-472-0204 | Composite Structures |
| 18-472-0205 | Experimental Stress Analysis |
| 18-472-0206 | Structural design of Foundations |
| 18-472-0207 | Soil structure Interaction |
| 18-472-0208 | Structural Optimization |

**Semester III**

| Course code | Course | Hours/Week | | | Credits |
|---|---|---|---|---|---|
| | | L | T | P | |
| 18-472-03** | Elective V | 3 | 1 | 0 | 3 |
| 18-472-03** | Elective VI | 3 | 1 | 0 | 3 |
| 18-472-0307 | Dissertation Phase - I | 0 | 0 | 20 | 12 |
| Total | | 6 | 2 | 20 | 18 |

**ELECTIVES V & VI (Semester III)**

| Course Code | Course |
|---|---|
| 18-472-0301 | Design of Offshore Structures |
| 18-472-0302 | Computational Methods in Structural Engineering |
| 18-472-0303 | Engineering Fracture Mechanics |
| 18-472-0304 | Design ofSpecialStructures |
| 18-472-0305 | Advanced Concrete Technology |
| 18-472-0306 | Retrofitting and Rehabilitation of Structures |

**Semester IV**

| Course code | Course | Hours/Week | | | Credits |
|---|---|---|---|---|---|
| | | L | T | P | |
| 18-472-0401 | Dissertation Phase - II | 0 | 0 | 30 | 18 |
| Total | | 0 | 0 | 30 | 18 |

# M.Tech(Specialisation: Geotechnical Engineering)

| SEMESTER I | | | | | | |
|---|---|---|---|---|---|---|
| Sl No. | Course Code | Course Name | Hours/Week | | | Credits |
| | | | L | T | P | |
| 1 | 18-449-0101 | Advanced Soil Mechanics | 3 | 1 | 0 | 4 |
| 2 | 18-449-0102 | Subsurface Investigations and Instrumentation | 3 | 1 | 0 | 4 |
| 3 | 18-449-01** | Elective I | 3 | 1 | 0 | 3 |
| 4 | 18-449-01** | Elective II | 3 | 1 | 0 | 3 |
| 5 | 18-449-0109 | Geotechnical Engineering Lab | 0 | 0 | 3 | 1 |
| 6 | 18-449-0110 | Seminar I | 0 | 0 | 3 | 1 |
| 7 | 18-449-0111 | Research Methodology & IPR | 2 | 1 | 0 | 2 |
| Total | | | 14 | 5 | 6 | **18** |

## ELECTIVES I & II (Semester I)

| Course Code | Course |
|---|---|
| 18-449-0103 | Ground Improvement Techniques |
| 18-449-0104 | Theoretical Soil Mechanics |
| 18-449-0105 | Geosynthetics in Geotechnical Engineering |
| 18-449-0106 | Finite Element Analysis |
| 18-449-0107 | Pavement Design and Evaluation |
| 18-449-0108 | Ground Water Engineering |

**SEMESTER II**

| Sl No. | Course Code | Course Name | Hours/Week | | | Credits |
|---|---|---|---|---|---|---|
| | | | L | T | P | |
| 1 | 18-449-0201 | Soil Dynamics and Machine Foundations | 3 | 1 | 0 | 4 |
| 2 | 18-449-0202 | Advanced Foundation Engineering | 3 | 1 | 0 | 4 |
| 3 | 18-449-02** | Elective III: | 3 | 1 | 0 | 3 |
| 4 | 18-449-02** | Elective IV: | 3 | 1 | 0 | 3 |
| 5 | 18-449-0209 | Computer Applications Lab | 0 | 0 | 3 | 1 |
| 6 | 18-449-0210 | Seminar II | 0 | 0 | 3 | 1 |
| 7 | 18-449-0211 | Internship | 0 | 0 | 3 | 2 |
| Total | | | 12 | 4 | 9 | **18** |

**ELECTIVES III & IV (Semester II)**

| Course Code | Course |
|---|---|
| 18-449-0203 | Earth Pressure and Retaining Structures |
| 18-449-0204 | Geotechnical Earthquake Engineering |
| 18-449-0205 | Marine Geotechnical Engineering |
| 18-449-0206 | Structural Design of Foundations |
| 18-449-0207 | Soil Structure Interaction |
| 18-449-0208 | Foundations on Expansive soils |

**SEMESTER III**

| Sl No. | Course Code | Course Name | Hours/Week | | | Credits |
|---|---|---|---|---|---|---|
| | | | L | T | P | |
| 1 | 18-449-03** | Elective V | 3 | 1 | 0 | 3 |
| 2 | 18-449-03** | Elective VI | 3 | 1 | 0 | 3 |
| 3 | 18-449-0307 | Dissertation Phase - I | 0 | 0 | 20 | 12 |
| Total | | | 6 | 2 | 20 | **18** |

**ELECTIVES V & VI (Semester III)**

| Course Code | Course |
|---|---|
| 18-449-0301 | Geo-environmental Engineering |
| 18-449-0302 | Rock Mechanics |
| 18-449-0303 | Landslide Engineering |
| 18-449-0304 | Statistical and Computational Methods |
| 18-449-0305 | Sustainable Built Environment |
| 18-449-0306 | Remote Sensing, GIS and its Applications in Civil Engineering |

| SEMESTER IV | | | | | | |
|---|---|---|---|---|---|---|
| Sl No. | Course Code | Course Name | Hours/Week | | | Credits |
| | | | L | T | P | |
| 1 | 18-449-0401 | Dissertation Phase - II | 0 | 0 | 30 | 18 |
| Total | | | 0 | 0 | 30 | **18** |

# B.Tech (Part Time)

**Semester II**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| AS17P-1201 | Complex Variables and Transform Techniques | 40/60 | 3 |
| CE17P-1202 | Surveying | 40/60 | 3 |
| CE17P-1203 | Analysis of Determinate Structures | 40/60 | 3 |
| CE17P-1204 | Engineering Geology and Seismology | 40/60 | 3 |
| CE17P-1205 | Fluid Mechanics II | 40/60 | 3 |
| CE17P-12L1 | Survey Practical | 25/25 | 2 |
| Total17 | | | |

**Semester III**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| AS17P-1301 | Numerical and statistical Methods | 40/60 | 3 |
| HS17P-1302 | Technical Communication and Professional Ethics | 40/60 | 3 |
| CE17P-1303 | Analysis of Indeterminate Structures | 40/60 | 3 |
| CE17P-1304 | Geotechnical Engineering –I | 40/60 | 3 |
| CE17P-1305 | Transportation Engineering -I | 40/60 | 3 |
| CE17P-13L1 | Transportation Engineering Lab | 25/25 | 2 |
| Total17 | | | |

**Semester IV**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| CE17P-1401 | Environmental Engineering -I | 40/60 | 3 |
| CE17P-1402 | Design of Concrete Structures I | 40/60 | 3 |
| CE17P-1403 | Matrix Methods of Structural Analysis | 40/60 | 3 |
| CE17P-1404 | Geotechnical Engineering –II | 40/60 | 3 |
| CE17P-1405 | Transportation Engineering- II | 40/60 | 3 |
| CE17P-14L1 | Geotechnical engineering lab | 25/25 | 2 |
| Total17 | | | |

# M.Tech (Part Time) (Specialization: Construction Engineering & Management)

**Semester I**

| Course Code | Course | Credits |
|---|---|---|
| CEC 3101 | Applied Mathematics | 3 |
| CEC 3102 | Construction Management | 3 |
| CEC 3103 | Advanced Geotechnical Engineering | 3 |
| CEC 3104 | Structural Dynamics | 3 |
| CEC 3105 | Seminar | 1 |
| Total | | 13 |

**Semester II**

| Course Code | Course | Credits |
|---|---|---|
| CEC 3201 | Computational Techniques | 3 |
| CEC 3202 | Construction Engineering | 3 |
| CEC 3203 | Foundation Engineering | 3 |
| CEC 3204 | Elective I | 3 |
| CEC 3205 | Computational Laboratory | 1 |
| Total | | 13 |

**Semester III**

| Course Code | Course | Credits |
|---|---|---|
| CEC 3301 | Construction Equipments and Management | 3 |
| CEC 3302 | Construction Safety and Fire Engineering | 3 |
| CEC 3303 | Design of Prestressed Concrete Structures | 3 |
| CEC 3304 | Elective II | 3 |
| CEC 3305 | Computer Applications Laboratory | 1 |
| **Total** | | **13** |

**Semester IV**

| Course Code | Course | Credits |
|---|---|---|
| CEC 3401 | MIS & Finance Management | 3 |
| CEC 3402 | Elective III | 3 |
| CEC 3403 | Elective IV | 3 |
| CEC 3404 | Project – Preliminary Evaluation | 4 |
| **Total** | | **13** |

**Elective List**

| Course Code | Course |
|---|---|
| E1 | Earthquake resistant design of structures |
| E2 | Design of Metal structures |
| E3 | Design of special structures |
| E4 | Finite element Method |
| E5 | Eco-friendly Constructions |
| E6 | Building Services |
| E7 | Modern Construction Materials |
| E8 | Innovative Construction Practices |

| | |
|---|---|
| E9 | Ground Improvement Techniques |
| E10 | Maintenance and Rehabilitation of Structures |
| E11 | Contracts and Legal Aspects in Construction |
| E12 | Structural Design of Foundations |
| E13 | Advanced Concrete Technology |

**Semester V**

| Course Code | Course | Credits |
|---|---|---|
| CEC 3501 | Project Progress Evaluation | 13 |
| Total | | 13 |

**Semester VI**

| Course Code | Course | Credits |
|---|---|---|
| CEC 3601 | Project Dissertation Evaluation and Viva Voce | 13 |
| Total | | 13 |

# Details of Faculty

| Sl.No | Name & Designation | Specialization | Communication (Contact No.& email ID) |
|---|---|---|---|
| 1 | Dr.JobThomas,Head& Professor | Structural Engineering | 9846545824 job_thomas@yahoo.com |
| 2 | Dr. Sobha Cyrus, Professor | Geotechnical Engineering | 9846146198 sobharoymthomas@gmail.com |
| 3 | Dr.K.SBeena, Professor | Geotechnical Engineering | 9447329888 beenavg@gmail.com |
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| 7 | Dr.Glory Joseph, Professor | Offshore Structures | 9745229596 josephglory1@gmail.com |
| 8 | Dr.AbduRahiman K.U, Professor | Hydraulics Engineering | 9497683196 arku@cusat.ac.in |
| 9 | Dr. Bindu C.S ,Professor | Transportation Engineering | 9495429703 binduromeo@gmail.com |

| | | | |
|---|---|---|---|
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| 15 | AryadeviS,Assistant Professor | Geotechnical Engineering | 9188572181<br>aryadevisreekumar@gmail.com |
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| 18 | MetildaPaulose N, Assistant Professor | Integrated Water Resources Management | 8281291466<br>meticivil@gmail.com |
| 19 | Viji A J, Assistant Professor | Construction Engineering and Management | 9947738887<br>aj_viji@yahoo.co.in |

# DIVISION OF ELECTRICAL ENGINEERING

## B.TECH. (FT) DEGREE COURSE IN ELECTRICAL AND ELECTRONICS ENGINEERING

**Scheme of Examinations (2019 admissions)**

**Semester I [Stream A]**

***Stream A*:** Civil Engineering, Electrical and Electronics Engineering, Mechanical Engineering and Safety and Fire Engineering.

| Code No. | Subject | L Hrs /Wk | T Hrs /Wk | P/D Hrs/ Wk | C | Marks | | Total |
|---|---|---|---|---|---|---|---|---|
| | | | | | | CA | SEE | |
| 19-200-0101A | Computer Programming | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-200-0102A | Engineering Chemistry | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-200-0103A | Engineering Graphics | 2 | 1 | 3 | 3 | 40 | 60 | 100 |
| 19-200-0104A | Basic Electrical Engineering | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| 19-200-0105A | Basic Electronics Engineering | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| 19-200-0106A | Environmental Studies | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-200-0107A | Electrical Engineering Workshop | 0 | 0 | 3 | 1 | 25 | 25 | 50 |
| 19-200-0108A | Computer Programming Laboratory | 0 | 0 | 3 | 1 | 25 | 25 | 50 |
| | **TOTAL** | **17** | **4** | **9** | **20** | | | |

**CA – Continuous Assessment, SEE – Semester End Examination**

## Semester II [stream A]

| Code No. | Subject | L Hrs /W k | T Hrs/ Wk | P/D Hrs/ Wk | C | Marks | | Total |
|---|---|---|---|---|---|---|---|---|
| | | | | | | CA | SEE | |
| 19-200-0201A | Calculus | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-200-0202A | Engineering Physics | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-200-0203A | Engineering Mechanics | 4 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-200-0204A | Basic Civil Engineering | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| 19-200-0205A | Basic Mechanical Engineering | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| 19-200-0206A | Soft Skills Development | 2 | 1 | 0 | 2 | 50 | - | 50 |
| 19-200-0207A | Civil Engineering Workshop | 0 | 0 | 3 | 1 | 25 | 25 | 50 |
| 19-200-0208A | Mechanical Engineering Workshop | 0 | 0 | 3 | 1 | 25 | 25 | 50 |
| 19-200-0209A | Language Lab | 0 | 0 | 1 | 1 | 25 | 25 | 50 |
| 19-200-0210A | NSS/Nature conservation Activities | 0 | 0 | 1 | 0 | - | - | - |
| | **TOTAL** | **18** | **4** | **8** | **20** | | | |

**Semester III**

| Code No. | *Subject* | L Hrs/W k | T Hrs/ Wk | P/D Hrs/ Wk | *C* | *Marks* | | *Total* |
|---|---|---|---|---|---|---|---|---|
| | | | | | | *CA* | *SEE* | |
| 19-200-0301* | Linear Algebra & Transform Techniques* | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-209-0302 | Electrical Machines I | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-209-0303 | Circuits and Networks | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-209-0304 | Electrical Measurements & Measuring Instruments | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-209-0305 | Electronic Devices and Circuits | 3 | 1 | 0 | 3 | 40 | 60 | 100 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 19-209-0306 | Electrical Engineering Materials | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-209-0307 | Electronics Circuits Lab | 0 | 0 | 3 | 1 | 25 | 25 | 50 |
| 19-209-0308 | Electrical Measurements Lab | 0 | 0 | 3 | 1 | 25 | 25 | 50 |
| TOTAL | | 18 | 6 | 6 | 20 | | | |

*Common to all branches

**Semester IV**

| Code No. | *Subject* | L Hrs/ Wk | T Hrs/ Wk | P/D Hrs / Wk | *C* | *Marks* | | *Total* |
|---|---|---|---|---|---|---|---|---|
| | | | | | | *CA* | *SEE* | |
| 19-200-0401* | Complex Variables and Partial Differential Equations* | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-209-0402 | Circuits, Signals & Systems | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-209-0403 | Electrical Machines II | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-209-0404 | Power Electronics | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-209-0405 | Digital Electronics | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-209-0406 | Electromagnetic field Theory | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-200-0407* | Universal Human Values* | 3 | 0 | 0 | 3 | 50 | 0 | 50 |
| 19-209-0408 | Digital Electronics Lab | 0 | 0 | 3 | 1 | 25 | 25 | 50 |
| 19-209-0409 | Electrical Machines Lab I | 0 | 0 | 3 | 1 | 25 | 25 | 50 |
| TOTAL | | 21 | 6 | 6 | 23 | | | |

*Common to all branches

**Semester V**

| Course Code | Subject | L Hrs/ Wk | T Hrs/ Wk | P/D Hrs/ Wk | C | Marks | | Total |
|---|---|---|---|---|---|---|---|---|
| | | | | | | CA | SEE | |
| 19-200-0501* | Numerical and Statistical Methods* | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-209-0502 | Control System I | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-209-0503 | Microprocessor and Microcontroller Based systems | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-209-0504 | Power Systems I | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-209-0505 | Linear Integrated Circuits | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-209-050** | Professional Elective I | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-209-0511 | Electrical Machines Lab II | 0 | 0 | 3 | 1 | 25 | 25 | 50 |
| 19-209-0512 | Microprocessor & Microcontroller Lab | 0 | 0 | 3 | 1 | 25 | 25 | 50 |
| TOTAL | | 18 | 6 | 6 | 20 | | | |

*Common to all branches

*CA – Continuous Assessment, SEE – Semester End Examination*

| **19-209-0506 to 19-209-0509 Professional Elective – I** | |
|---|---|
| **Code No.** | **Subject** |
| 19-209-0506(IE) | Introduction to Machine Learning |
| 19-209-0507 | Special Electric Machines |
| 19-209-0508 | Advanced Power Electronics |
| 19-209-0509 | Electrical Safety |
| 19-209-0510 | Fluid Machinery and Heat Engines |

**Semester VI**

| *Course Code* | *Subject* | **L Hrs/ Wk** | **T Hrs/ Wk** | **P/D Hrs/ Wk** | ***C*** | ***Marks*** | | ***Total*** |
|---|---|---|---|---|---|---|---|---|
| | | | | | | *CA* | *SEE* | |
| 19-209-0601 | Electric Drives | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-209-0602 | Digital Signal Processing | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-209-0603 | Power Systems II | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-209-0604 | Electrical Drawing | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-209-0605 | Control Systems II | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-209-06** | Professional Elective II | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-209-0610 | Linear Integrated Circuits Lab | 0 | 0 | 3 | 1 | 25 | 25 | 50 |
| 19-209-0611 | Mini Project | 0 | 0 | 3 | 1 | 25 | 25 | 50 |
| TOTAL | | 18 | 6 | 6 | 20 | | | |

| **19-209-0606 to 19-209-0609 Professional Elective – II** | |
|---|---|
| **Code No.** | **Subject** |
| 19-209-0606(IE) | Industrial Automation |
| 19-209-0607 | Embedded Systems |
| 19-209-0608 | Soft Computing |
| 19-209-0609 | Electrical Machine Design |

**Semester VII**

| *Course Code* | *Subject* | L Hrs/ Wk | T Hrs/ Wk | P/D Hrs/ Wk | *C* | *Marks* | | *Total* |
|---|---|---|---|---|---|---|---|---|
| | | | | | | *CA* | *SEE* | |
| 19-209-0701* | Principles of Management* | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-209-0702 | HVDC and FACTS | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-209-0703 | Communication Engineering | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-209-07** | Professional Elective III | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-209-07** | Open Elective I | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| 19-209-0712 | Power Electronics Lab | 0 | 0 | 3 | 1 | 25 | 25 | 50 |
| 19-209-0713 | Advanced Electrical Engineering Lab | 0 | 0 | 3 | 1 | 25 | 25 | 50 |
| 19-209-0714 | Entrepreneurship Development | 0 | 0 | 2 | 1 | 50 | - | 50 |
| 19-209-0715 | Project Phase I | 0 | 0 | 3 | 1 | 50 | - | 50 |
| 19-209-0716** | Industrial Internship** | 0 | 0 | 0 | 1 | 50 | - | 50 |
| TOTAL | | 15 | 4 | 11 | 20 | | | |

*common for CS/EC/EE/IT

| 19-209-0704 to 19-209-0707 Professional Elective – III | |
|---|---|
| *Code No.* | *Subject* |
| 19-209-0704(IE) | Electric and Hybrid Vehicles |
| 19-209-0705 | Digital Control System |
| 19-209-0706 | Energy Auditing and Analysis |
| 19-209-0707 | Dynamics of Electric Machines |

| 19-209-0708 to 19-209-0711 Open Elective – I | |
|---|---|
| *Code No.* | *Subject* |
| 19-209-0708*** | Universal Human Values-Undivided Society and Human Order*** |
| 19-209-0709 | New and Renewable Sources of Energy |
| 19-209-0710 | IoT System Design |
| 19-209-0711 | Research Methodology |

*** Common to EC and EE

**Semester VIII**

| ***Course Code*** | ***Subject*** | **L Hrs /Wk** | **T Hrs /Wk** | **P/D Hrs/ Wk** | ***C*** | ***Marks*** | | ***Total*** |
|---|---|---|---|---|---|---|---|---|
| | | | | | | *CA* | *SEE* | |
| 19-209-0801 | Electrical System Design | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-209-08** | Professional Elective IV | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-209-08** | Professional Elective V | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-209-08** | Open Elective II | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| 19-209-0815 | Seminar | 0 | 0 | 3 | 1 | 50 | - | 50 |
| 19-209-0816 | Project Phase II | 0 | 0 | 12 | 6 | 200 | - | 200 |
| 19-209-0817 | Comprehensive Viva-Voce | 0 | 0 | 0 | 1 | - | 50 | 50 |
| TOTAL | | 12 | 3 | 15 | 20 | | | |

| 19-209-0802 to 19-209-0805 Professional Elective – IV | |
|---|---|
| Code No. | Subject |
| 19-209-0802 | Electronic Instrumentation |
| 19-209-0803 | Artificial Intelligence and Robotics |
| 19-209-0804 | Solar PV Systems |
| 19-209-0805 | Power Quality |

| 19-209-0806 to 19-209-0809 Professional Elective – V | |
|---|---|
| Code No. | Subject |
| 19-209-0806 | Utilization of Electrical Power |
| 19-209-0807 | Power System Operation and Control |
| 19-209-0808 | Digital Simulation of Power Electronic Systems |
| 19-209-0809 | Smart Grid Technologies and Applications |

| 19-209-0810 to 19-209-0813 Open Elective – II | |
|---|---|
| Code No. | Subject |
| 19-209-0810 | Statistical Methods for Engineers |
| 19-209-0811 | Optimization Techniques and Algorithm |
| 19-209-0812 | Sustainability Engineering |
| 19-209-0813*** | Self Awareness and Integral Development*** |
| 19-209-0814* | Constitutional Law* |

*** Common to EC and EE

*Common to all branches

# M.TECH. (PT) DEGREE COURSE IN ELECTRICAL AND ELECTRONICS ENGINEERING

## (SPECIALIZATION: POWER ELECTRONICS)

**Revised curriculum from 2021 onwards**

**Semester I**

| *Course Code* | *Subject* | *No of Credits* |
|---|---|---|
| EEP 3101 | Applied Mathematics | 3 |
| EEP 3102 | Power Electronics Circuits | 3 |
| EEP 3103 | Modern Control Theory | 3 |
| EEP 3104 | Electric drives | 3 |
| EEP 3105 | Seminar I | 1 |
| **Total** | | 13 |

**Semester II**

| *Course Code* | *Subject* | *No of Credits* |
|---|---|---|
| EEP 3201 | Advanced Power Electronics Circuits | 3 |
| EEP 3202 | Distributed Energy Systems | 3 |
| EEP 3203 | Power Quality | 3 |
| EEP 3204 | Elective I | 3 |
| EEP 3205 | Seminar II | 1 |
| **Total** | | 13 |

**Elective I**

| | |
|---|---|
| EEP 3204 A | Digital Signal Processing |
| EEP 3204 B | Special Electric Machines & Control |
| EEP 3204 C | Modern Communication Engineering |
| EEP 3204 D | FPGA based system design |

**Semester III**

| *Course Code* | *Subject* | *No of Credits* |
|---|---|---|
| EEP 3301 | Energy Management in Electrical System | 3 |
| EEP 3302 | Solar Photovoltaic Systems | 3 |
| EEP 3303 | Power Electronics Applications to Modern Power Systems | 3 |
| EEP 3304 | Elective II | 3 |
| EEP 3305 | Seminar III | 1 |
| **Total** | | 13 |

**Elective II**

| | |
|---|---|
| EEP 3304 A | Statistical Methods for Engineers |
| EEP 3304 B | Process Control & Automation |
| EEP 3304 C | Dynamics of Electric Machines |
| EEP 3304 D | Reliability |

**Semester IV**

| *Course Code* | *Subject* | *No of Credits* |
|---|---|---|
| EEP 3401 | Power Electronic Converters For Distributed Energy and EV applications | 3 |
| EEP 3402 | Elective III | 3 |
| EEP 3403 | Elective IV | 3 |
| EEP 3404 | Project – Preliminary Evaluation | 2 |
| Total | | 11 |

**Elective III**

| | |
|---|---|
| EEP 3402A | Research Methodology |
| EEP 3402B | Soft computing |
| EEP 3402C | Digital Simulation of Power electronic Systems |
| EEP 3402D | Industrial Instrumentation |

**Elective IV**

| | |
|---|---|
| EEP 3403A | Smart Grid Technologies & Applications |
| EEP 3403B | Hybrid & Electric vehicle |
| EEP 3403C | SCADA Systems & Applications |
| EEP 3403D | Digital Control System |

**Semester V**

| ***Course Code*** | ***Subject*** | ***No of Credits*** |
|---|---|---|
| EEP 3501 | Project-Progress Evaluation | 10 |
| Total | | 10 |

**Semester VI**

| ***Course Code*** | ***Subject*** | ***No of Credits*** |
|---|---|---|
| EEP 3601 | Project-Dissertation Evaluation &Viva Voce | 12 |
| Total | | 12 |
| Grand Total | | 72 |

**Details of Faculty**

| Sl No | Name & Designation | Specialization | Communication (Contact No.& e-mail id) | |
|---|---|---|---|---|
| 1 | Dr. Asha Elizabeth Daniel | Ph.D Communication Engineering | *ashapalal@gmail.com* | 9446128079 |
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| 3 | Dr.P.G. Latha | Ph.D Energetics | pglatha@gmail.com | 9446147780 |
| 4 | Dr.K .Vinida | Ph.D Industiral Drives and Control | vinijan1968@gmail.com | 9446535296 |
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| 12 | Rosamma Thomas | M.Tech<br>Power Electronics and Power Systems | *rosamma.tk@gmail.com* | 9495848456 |
| 13 | Ragi R Menon | M.Tech<br>Power Electronics and Drives | *ragirmenon@gmail.com* | 9846828982 |
| 14 | Jassia M A | M.Tech<br>Industiral Drives and Control | *jassianadeer@gmail.com* | 9495551993 |

## DIVISION OF ELECTRONICS AND COMMUNICATION ENGINEERING

## B.TECH. (FT) DEGREE COURSE IN ELECTRONICS AND COMMUNICATION ENGINEERING

(Semester I and II is common to all branches)

**Scheme of Examinations (2019 admissions)**

**Semester III**

| Code No. | Subject | L H/W | T H/W | P/D H/W | C | Marks | | Total |
|---|---|---|---|---|---|---|---|---|
| | | | | | | CA | SEE | |
| 19-200-0301 | Linear Algebra & Transformation Techniques | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-203-0302 | Computational Techniques for Electronics & Communication Engineering | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-203-0303 | Network Theory | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-203-0304 | Digital Electronics | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-203-0305 | Solid State Electronics | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-203-0306 | Electronic Circuits I | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-203-0307 | Basic Electronics Lab | 0 | 0 | 3 | 1 | 25 | 25 | 50 |
| 19-203-0308 | Digital Electronics Lab | 0 | 0 | 3 | 1 | 25 | 25 | 50 |
| | **TOTAL** | **18** | **6** | **6** | **20** | | | |

* Common for CE/CS/EC/EE/IT/ME/SE

CA – Continuous Assessment**,** SEE – Semester End Examination

**Semester IV**

| Code No. | Subject | L H/W | T H/W | P/D H/W | C | Marks | | Total |
|---|---|---|---|---|---|---|---|---|
| | | | | | | CA | SEE | |
| 19-200-0401 | Complex Variables and Partial Differential Equations | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-203-0402 | Microprocessor Architecture | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-203-0403 | Signals & Systems | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-203-0404 | Digital System Design | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-203-0405 | Communication Engineering I | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-203-0406 | Electronic Circuits II | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-200-0407 | Universal Human Values | 2 | 0 | 0 | 2 | 50 | 0 | 50 |
| 19-203-0408 | Digital Systems & Programming Lab | 0 | 0 | 3 | 1 | 25 | 25 | 50 |
| 19-203-0409 | Electronic Circuits Lab I | 0 | 0 | 3 | 1 | 25 | 25 | 50 |
| | **TOTAL** | **19** | **7** | **6** | **22** | | | |

* Common for CE/CS/EC/EE/IT/ME/SE

**Semester V**

| Code No. | Subject | L H/W | T H/W | P/D H/W | C | Marks | | Total |
|---|---|---|---|---|---|---|---|---|
| | | | | | | CA | SEE | |
| 19-200-0501 | Numerical and Statistical Methods | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-203-0502 | Electromagnetic Theory | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-203-0503 | Communication Engineering II | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-203-0504 | Analog & Integrated Circuits | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-203-0505 | Digital Signal Processing | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-203-050** | Professional Elective I | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-203-0510 | Digital Signal Processing Lab | 0 | 0 | 3 | 1 | 25 | 25 | 50 |
| 19-203-0511 | Electronic Circuits Lab II | 0 | 0 | 3 | 1 | 25 | 25 | 50 |
| | **TOTAL** | **18** | **6** | **6** | **20** | | | |

* Common for CE/CS/EC/EE/IT/ME/SE

**A student should opt for atleast one industry based elective during the B.Tech Programme**

| 19-203-0506 to 19-203-0509 Professional Elective – I | |
|---|---|
| **Code No.** | **Subject** |
| 19-203-0506(IE) | Embedded Systems |
| 19-203-0507 | Power Electronics |
| 19-203-0508 | Advanced Digital System Design |
| 19-203-0509 | Probability and Random Process |

**Semester VI**

| Code No. | Subject | L H/W | T H/W | P/D H/W | C | Marks | | Total |
|---|---|---|---|---|---|---|---|---|
| | | | | | | CA | SEE | |
| 19-203-0601 | Control Systems Engineering | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-203-0602 | Microwave Techniques & Devices | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-203-0603 | VLSI Design | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-203-0604 | Information Theory & Coding | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-203-0605 | Data Structures and Algorithms | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-203-06** | Professional Elective – II | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-203-0610 | Electronic Product Design Project | 0 | 0 | 3 | 1 | 25 | 25 | 50 |
| 19-203-0611 | Communication Lab | 0 | 0 | 3 | 1 | 25 | 25 | 50 |
| | **TOTAL** | **18** | **6** | **6** | **20** | | | |

| 19-203-0606 to 19-203-0609 Professional Elective – II | |
|---|---|
| **Code No.** | **Subject** |
| 19-203-0606(IE) | FPGA based System Design |
| 19-203-0607 | Object Oriented Programming |
| 19-203-0608 | Optical Fiber Communication |
| 19-203-0609 | Electronic Measurements & Instrumentation |

**Semester VII**

| Code No. | Subject | L H/W | T H/W | P/D H/W | C | Marks | | Total |
|---|---|---|---|---|---|---|---|---|
| | | | | | | CA | SEE | |
| 19-203-0701* | Principles of Management | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-203-0702 | Antennas & Propagation | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-203-0703 | Digital Image Processing | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-203-07** | Professional Elective – III | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-203-07** | Open Elective I | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-203-0712 | Microwave Engineering Lab | 0 | 0 | 3 | 1 | 25 | 25 | 50 |
| 19-203-0713 | Image Processing Lab | 0 | 0 | 3 | 1 | 25 | 25 | 50 |
| 19-203-0714 | Entrepreneurship Development | 0 | 0 | 2 | 1 | 50 | - | 50 |
| 19-203-0715 | Project Phase I | 0 | 0 | 2 | 1 | 50 | - | 50 |
| 19-203-0716 | Industrial Internship | 0 | 0 | 0 | 1 | 50 | - | 50 |
| | **TOTAL** | **15** | **5** | **10** | **20** | | | |

*common for CS/EC/EE/IT

| **19-203-0704 to 19-203-0707 Professional Elective – III** | |
|---|---|
| Code No. | Subject |
| 19-203-0704 (IE) | IoT System Design |
| 19-203-0705 | Satellite Communication |
| 19-203-0706 | Digital Integrated Circuit Design |
| 19-203-0707 | Adaptive Signal Processing |

| **19-203-0708 to 19-203-0711 Open Elective – I** | |
|---|---|
| Code No. | Subject |
| 19-203-0708 | Self-awareness and Integral Development |
| 19-203-0709 | Advanced Computer Architecture |
| 19-203-0710 | Mechatronics |
| 19-203-0711 | Intellectual Property Rights |

**Semester VIII**

| Code No. | Subject | L H/W | T H/W | P/D H/W | C | Marks | | Total |
|---|---|---|---|---|---|---|---|---|
| | | | | | | CA | SEE | |
| 19-203-0801 | Wireless Communication | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-203-08** | Professional Elective IV | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-203-08** | Professional Elective V | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-203-08** | Open Elective II | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-203-0814 | Seminar | 0 | 0 | 3 | 1 | 50 | - | 50 |
| 19-203-0815 | Project Phase II | - | - | 11 | 6 | 200 | - | 200 |
| 19-203-0816 | Comprehensive Viva Voce | - | - | 0 | 1 | - | 50 | 50 |
| | **TOTAL** | **12** | **4** | **14** | **20** | | | |

| **19-203-0802 to 19-203-0805 Professional Elective – IV** | |
|---|---|
| Code No. | Subject |
| 19-203-0802 | Computer Communication and Networking |
| 19-203-0803 | Radar Systems |
| 19-203-0804 | Neuro-Fuzzy Systems |
| 19-203-0805 | Low Power VLSI Design |

| **19-203-0806 to 19-203-0809 Professional Elective – V** | |
|---|---|
| Code No. | Subject |
| 19-203-0806 | Multimedia Communication System |
| 19-203-0807 | Electromagnetic Interference and Compatibility |
| 19-203-0808 | ASIC Design |
| 19-203-0809 | Industrial Electronics |

## DIVISION OF COMPUTER SCIENCE AND ENGINEERING

## B.TECH(FT) DEGREE COURSE IN COMPUTER SCIENCE AND ENGINEERING

**SemesterI**

| CourseCode | Course | C / E | Credits |
|---|---|---|---|
| 19-200-0101B | Calculus | C | 3 |
| 19-200-0102B | EngineeringPhysics | C | 3 |
| 19-200-0103B | EngineeringMechanics | C | 3 |
| 19-200-0104B | BasicCivilEngineering | C | 3 |
| 19-200-0105B | BasicMechanicalEngineering | C | 3 |
| 19-200-0106B | SoftSkillsDevelopment | C | 2 |
| 19-200-0107B | CivilEngineeringWorkshop | C | 1 |
| 19-200-0108B | MechanicalEngineeringWorkshop | C | 1 |
| 19-200-0109B | LanguageLab | C | 1 |
| 19-200-0110B | NSS/NatureconservationActivities | C | 0 |
| Total | | | **20** |

**SemesterII**

| CourseCode | Course | C / E | Credits |
|---|---|---|---|
| 19-200-0201B | ComputerProgramming | C | 3 |
| 19-200-0202B | EngineeringChemistry | C | 3 |
| 19-200-0203B | EngineeringGraphics | C | 3 |
| 19-200-0204B | BasicElectricalEngineering | C | 3 |
| 19-200-0205B | BasicElectronicsEngineering | C | 3 |
| 19-200-0206B | EnvironmentalStudies | C | 3 |
| 19-200-0207B | ElectricalEngineeringWorkshop | C | 1 |
| 19-200-0208B | ComputerProgrammingLaboratory | C | 1 |
| Total | | | **20** |

**SemesterIII**

| CourseCode | Course | C / E | Credits |
|---|---|---|---|
| 19-200-0301 | *LinearAlgebraandTransformTechniques | C | 3 |
| 19-202-0302 | LogicDesign | C | 3 |
| 19-202-0303 | **DiscreteComputationalStructures | C | 3 |
| 19-202-0304 | ObjectOrientedProgramming | C | 3 |
| 19-202-0305 | PrinciplesofProgrammingLanguages | C | 3 |
| 19-202-0306 | DataandComputerCommunication | C | 3 |
| 19-202-0307 | DigitalElectronicsLaboratory | C | 1 |
| 19-202-0308 | ObjectOrientedProgrammingLaboratory | C | 1 |
| | Total | | 20 |

**SemesterIV**

| CourseCode | Course | C / E | Credits |
|---|---|---|---|
| 19-200-0401 | *ComplexVariablesandPartialDifferentialEquations | C | 3 |
| 19-202-0402 | Microprocessors | C | 3 |
| 19-202-0403 | ComputerArchitectureandOrganization | C | 3 |
| 19-202-0404 | AutomataLanguagesandComputations | C | 3 |
| 19-202-0405 | DataStructuresandAlgorithms | C | 3 |
| 19-202-0406 | DatabaseManagementSystems | C | 3 |
| 19-200-0407 | *UniversalHumanValues | C | 3 |
| 19-202-0408 | DatabaseManagementSystemsLaboratory | C | 1 |
| 19-202-0409 | DataStructuresLaboratory | C | 1 |
| Total | | | **23** |

**SemesterV**

| CourseCode | Course | C / E | Credits |
|---|---|---|---|
| 19-200-0501 | *NumericalandStatisticalMethods | C | 3 |
| 19-202-0502 | SystemProgramming | C | 3 |
| 19-202-0503 | ObjectOrientedSoftwareEngineering | C | 3 |
| 19-202-0504 | ComputerGraphics | C | 3 |
| 19-202-0505 | AdvancedMicroprocessorsandMicrocontrollers | C | 3 |
| 19-202-05** | ProfessionalElectiveI | E | 3 |
| 19-202-0510 | ComputerGraphicsLaboratory | C | 1 |
| 19-202-0511 | MicroprocessorsLaboratory | C | 1 |
| Total | | | **20** |

**PROFESSIONALELECTIVEI**

| CourseCode | Course |
|---|---|
| 19-202-0506(IE) | WebTechnologies |
| 19-202-0507 | MachineLearning |
| 19-202-0508 | EmbeddedSystemDesign |
| 19-202-0509 | Bioinformatics |

**SemesterVI**

| CourseCode | Course | C / E | Credits |
|---|---|---|---|
| 19-202-0601 | ComputerNetworks | C | 3 |
| 19-202-0602 | *CompilerConstruction | C | 3 |
| 19-202-0603 | AnalysisandDesignofAlgorithms | C | 3 |
| 19-202-0604 | DataMining | C | 3 |
| 19-202-0605 | OperatingSystem | C | 3 |
| 19-202-06** | ProfessionalElectiveII | E | 3 |
| 19-202-0610 | OperatingSystemLaboratory | C | 1 |
| 19-202-0611 | MiniProject | C | 1 |
| Total | | | **20** |

**PROFESSIONALELECTIVEII**

| CourseCode | Course |
|---|---|
| 19-202-0606(IE) | NeuralNetworksandDeepLearning |
| 19-202-0607 | SoftwareProjectManagement |
| 19-202-0608 | DigitalImageProcessing |
| 19-202-0609 | EthicalHacking |

**SemesterVII**

| CourseCode | Course | C / E | Credits |
|---|---|---|---|
| 19-202-0701 | *PrinciplesofManagement | C | 3 |
| 19-202-0702 | AdvancedArchitectureandParallelProcessing | C | 3 |
| 19-202-0703 | CryptographyandNetworkSecurity | C | 3 |
| 19-202-07** | ProfessionalElectiveIII | E | 3 |
| 19-202-07** | OpenElectiveI | E | 3 |
| 19-202-0712 | LanguageProcessorsLaboratory | C | 1 |
| 19-202-0713 | NetworksLaboratory | C | 1 |
| 19-202-0714 | EntrepreneurshipDevelopment | C | 1 |
| 19-202-0715 | ProjectPhaseI | C | 1 |
| 19-202-0716 | IndustrialInternship | C | 1 |
| Total | | | **20** |

**PROFESSIONALELECTIVEIII**

| CourseCode | Course |
|---|---|
| 19-202-0704(IE) | ***MobileComputingTechnology |
| 19-202-0705 | InternetofThingsandApplications |
| 19-202-0706 | BiometricTechnologies |
| 19-202-0707 | ComputerVision |

**OPENELECTIVEI**

| CourseCode | Course |
|---|---|
| 19-202-0708 | MobileApplicationDevelopment |
| 19-202-0709 | SystemModelingandSimulation |
| 19-202-0710 | CyberLawandEthics |
| 19-202-0711 | BusinessIntelligenceandAnalytics |

**SemesterVIII**

| CourseCode | Course | C / E | Credits |
|---|---|---|---|
| 19-202-0801 | ArtificialIntelligence | C | 3 |
| 19-202-08** | ProfessionalElectiveIV | E | 3 |
| 19-202-08** | ProfessionalElectiveV | E | 3 |
| 19-202-08** | OpenElectiveII | E | 3 |
| 19-202-0815 | Seminar | C | 1 |
| 19-202-0816 | ProjectPhaseII | C | 6 |
| 19-202-0817 | ComprehensiveVivaVoce | C | 1 |
| Total | | | **20** |

**PROFESSIONALELECTIVE IV**

| CourseCode | Course |
|---|---|
| 19-202-0802 | BigDataAnalytics |
| 19-202-0803 | AugmentedReality |
| 19-202-0804 | ComputationalLinguistics |
| 19-202-0805 | RecommenderSystems |

**PROFESSIONALELECTIVE V**

| CourseCode | Course |
|---|---|
| 19-202-0806 | Cloud Computing |
| 19-202-0807 | AgentBasedIntelligentSystem |
| 19-202-0808 | Blockchain |
| 19-202-0809 | AdvancedCompilerDesignandOptimization |

**OPENELECTIVEII**

| Course Code | Course |
|---|---|
| 19-202-0810 | HighPerformanceEmbeddedComputing |
| 19-202-0811 | CyberspaceandInformationSystemSecurity |
| 19-202-0812 | SoftComputing |
| 19-202-0813 | InternetofThings |
| 19-200-0814 | ConstitutionalLaw |

## M.TECH DEGREE IN COMPUTER SCIENCE AND ENGINEERING

**Semester 1**

| Course Code | Courses | Hrs/week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | external | Total |
| 18-454-0101 | Mathematical Foundations of Computer Science | 3 | 1 | 0 | 4 | | | |
| 18-454-0102 | Parallel and Distributed Computing | 3 | 1 | 0 | 4 | | | |
| 18-454-01** | Elective I | 3 | 1 | 0 | 3 | | | |
| 18-454-01** | Elective II | 3 | 1 | 0 | 3 | | | |
| 18-454-0109 | Network Programming and Simulation Lab | 0 | 0 | 3 | 1 | | | |
| 18-454-0110 | Seminar I | 0 | 0 | 3 | 1 | | | |
| 18-454-0111 | Research Methodology and IPR | 2 | 1 | 0 | 2 | | | |

**Elective I & II**

| Course Code | Course |
|---|---|
| 18-454-0103 | Compiler for High Performance Computing |
| 18-454-0104 | Theory of Computation |
| 18-454-0105 | Advanced Data Mining |
| 18-454-0106 | Advanced Database Management System |
| 18-454-0107 | Wireless Sensor Networks |
| 18-454-0108 | Artificial Intelligence and Machine Learning |

**Semester II**

| Course Code | Courses | Hrs/week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | external | Total |
| 18-454-0201 | Cluster and Grid Computing | 3 | 1 | 0 | 4 | | | |
| 18-454-0202 | Cloud Computing | 3 | 1 | 0 | 4 | | | |
| 18-454-02** | Elective III | 3 | 1 | 0 | 3 | | | |
| 18-454-02** | Elective IV | 3 | 1 | 0 | 3 | | | |
| 18-454-0209 | Parallel Computing Lab | 0 | 0 | 3 | 1 | | | |
| 18-454-0210 | Seminar II | 0 | 0 | 3 | 1 | | | |
| 18-454-0211 | Mini Project | 0 | 0 | 3 | 2 | | | |

**Elective III & IV**

| Course Code | Course |
|---|---|
| 18-454-0203 | GPU computing |
| 18-454-0204 | Soft Computing |
| 18-454-0205 | Big Data Analysis |
| 18-454-0206 | Natural Language Processing |
| 18-454-0207 | Operating System Design |
| 18-454-0208 | Cryptography and Network Security |

**Semester III**

| Course Code | Courses | Hrs/week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | external | Total |
| 18-454-03** | Elective V | 3 | 1 | 0 | 3 | | | |
| 18-454-03** | Elective VI | 3 | 1 | 0 | 3 | | | |
| 18-454-0307 | Dissertation Phase - I | 0 | 0 | 20 | 12 | | | |

**Elective V & VI**

| Course Code | Course |
|---|---|
| 18-454-0301 | Sensor Network and Internet of Things |
| 18-454-0302 | High Performance Embedded Computing |
| 18-454-0303 | Deep Learning |
| 18-454-0304 | Data Forensics |
| 18-454-0305 | Multimedia Networking |
| 18-454-0306 | Data Visualisation |

**Semester IV**

| Course Code | Courses | Hrs/week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | external | Total |
| 18-454-0401 | Dissertation Phase - II | 0 | 0 | 30 | 18 | | | |

**Details of Faculty**

| Sl No. | Name & Designation | Specialization | Conatct No: | Email ID |
|---|---|---|---|---|
| 1 | Dr. David Peter, Professor | Software Engineering | 9446366805 | davidpeter123@gmail.com |
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| | | | | |
|---|---|---|---|---|
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| 18 | Ms. Abitha P G, Assistant Professor | Computer Science | 9048049877 | pgabitha@gmail.com |
| 19 | Ms. Manjusha V, Assistant Professor | Computer Science | 9746600638 | manjushajenin@gmail.com |
| 20 | Ms. Lima Johnson K, Assistant Professor | Computer Science(Network Computing) | 9746214914 | limaj121@gmail.com |

# DIVISION OF INFORMATION TECHNOLOGY

# B.TECH DEGREE COURSE IN INFORMATION TECHNOLOGY

**Semester I – 2019 Scheme**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| 19-200-0101B | Calculus | 40/60 | 3 |
| 19-200-0102B | Engineering Physics | 40/60 | 3 |
| 19-200-0103B | Engineering Mechanics | 40/60 | 3 |
| 19-200-0104B | Basic Civil Engineering | 40/60 | 3 |
| 19-200-0105B | Basic Mechanical Engineering | 40/60 | 3 |

| | | | |
|---|---|---|---|
| 19-200-0106B | Soft Skills Development | 50 | 2 |
| 19-200-0107B | Civil Engineering Workshop | 25/25 | 1 |
| 19-200-0108B | Mechanical Engineering Workshop | 25/25 | 1 |
| 19-200-0109B | Language Lab | 25/25 | 1 |
| 19-200-0110B | NSS/Nature conservation Activities | - | 0 |

**Semester II– 2019 Scheme**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| 19-200-0201B | Computer Programming | 40/60 | 3 |
| 19-200-0202B | Engineering Chemistry | 40/60 | 3 |
| 19-200-0203B | Engineering Graphics | 40/60 | 3 |
| 19-200-0204B | Basic Electrical Engineering | 40/60 | 3 |
| 19-200-0205B | Basic Electronics Engineering | 40/60 | 3 |
| 19-200-0206B | Environmental Studies | 40/60 | 3 |
| 19-200-0207B | Electrical Engineering Workshop | 25/25 | 1 |
| 19-200-0208B | Computer Programming Laboratory | 25/25 | 1 |

**Semester III– 2019 Scheme**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| 19-200-0301 | * Linear Algebra and Transform Techniques | 40/60 | 3 |
| 19-204-0302 | Digital Electronics | 40/60 | 3 |
| 19-204-0303 | **Discrete Computational Structures | 40/60 | 3 |
| 19-204-0304 | Data Base Management Systems | 40/60 | 3 |
| 19-204-0305 | Data structures and Algorithms in C | 40/60 | 3 |
| 19-204-0306 | Computer Organization & Architecture | 40/60 | 3 |
| 19-204-0307 | Hardware Design Laboratory | 25/25 | 3 |
| 19-204-0308 | Data structures Laboratory in C | 25/25 | 1 |

**Semester IV– 2019 Scheme**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| 19-200-0401 | * Complex Variables and Partial Differential Equations | 40/60 | 3 |
| 19-204-0402 | Data Communication & Networking | 40/60 | 3 |
| 19-204-0403 | Operating Systems | 40/60 | 3 |
| 19-204-0404 | Software Engineering | 40/60 | 3 |
| 19-204-0405 | Internet Programming | 40/60 | 3 |
| 19-204-0406 | Object Oriented Programming in c++ | 40/60 | 3 |
| 19-200-0407 | *Universal Human Values | 50 | 2 |
| 19-204-0408 | Object Oriented Programming Laboratory in C++ | 25/25 | 1 |
| 19-204-0409 | Mini Project– RDBMS based | 50 | 1 |

**Semester V – 2019 Scheme**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| 19-200-0501 | * Numerical and Statistical Methods | 40/60 | 3 |
| 19-204-0502 | Object Oriented Modeling& Design | 40/60 | 3 |
| 19-204-0503 | Design and Analysis of Algorithms | 40/60 | 3 |
| 19-204-0504 | Big Data Analytics | 40/60 | 3 |
| 19-204-0505 | Formal Languages and Automata Theory | 40/60 | 3 |
| 19-204-05** | PROFESSIONAL ELECTIVE – I | 40/60 | 3 |
| 19-204-0510 | Software Systems Lab | 25/25 | 1 |
| 19-204-0511 | Software Engineering Lab | 25/25 | 1 |

**19-204-0506 to 0509 :PROFESSIONAL ELECTIVE – I**

| Course code | Course |
|---|---|
| 19-204-0506 (IE) - | Augmented Reality |
| 19-204-0507- | Software Project Management |
| 19-204-0508- | Wireless networking |
| 19-204-0509- | Artificial Intelligence & Machine Learning |

**Semester VI – 2019 Scheme**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| 19-204-0601 | Internet of Things | 40/60 | 3 |
| 19-204-0602 | *Compiler Design | 40/60 | 3 |
| 19-204-0603 | Deep Learning | 40/60 | 3 |
| 19-204-0604 | Cloud Computing | 40/60 | 3 |
| 19-204-0605 | Android Programming | 40/60 | 3 |
| 19-204-06** | Professional Elective – II | 40/60 | 3 |
| 19-204-0610 | Cloud and Data Analytics Laboratory | 25/25 | 1 |
| 19-204-0611 | Mini Project – Android based Internet Project | 50 | 1 |

**19-204-0606 to 0609: PROFESSIONAL ELECTIVE –II**

| Course code | Course |
|---|---|
| 19-204-0606 (IE): | DevOps Engineering |
| 19-204-0607: | Computer Vision |
| 19-204-0608: | Soft Computing |
| 19-204-0609: | Recommender System |

**Semester VII – 2019 Scheme**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| 19-204-0701 | *Principles of Management | 40/60 | 3 |
| 19-204-0702 | Data Security and Cryptography | 40/60 | 3 |
| 19-204-0703 | Computer Graphics and Visual Computing | 40/60 | 3 |
| 19-204-07** | Professional Elective – III | 40/60 | 3 |
| 19-204-07** | Open Elective – I | 40/60 | 3 |
| 19-204-0712 | Computer Graphics Laboratory | 25/25 | 2 |
| 19-204-0713 | Mini Project – Multimedia Project | 50 | 2 |
| 19-204-0714 | Entrepreneurship Development | 50 | 2 |
| 19-204-0715 | Project Phase I | 50 | 1 |
| 19-204-0716 | Industrial Internship | 50 | 1 |

| 19-204-0704 to 0707: PROFESSIONAL ELECTIVE – III | |
|---|---|
| 19-204-0704(IE): | **Mobile Computing Technology |
| 19-204-0705(IE): | High Performance Computing Architecture |
| 19-204-0706: | Quantum Computing |
| 19-204-0707: | Ethical Hacking |

| 19-204-0708 to 0711: OPEN ELECTIVE - I | |
|---|---|
| 19-204-0708: | Agile Methodology |
| 19-204-0709: | Game Design |
| 19-204-0710: | Multimedia Computing |
| 19-204-0711: | Mobile Data Management |

**Semester VIII – 2019 Scheme**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| 19-204-0801 | Financial Management | 40/60 | 3 |
| 19-204-08** | Professional Elective – IV | 40/60 | 3 |
| 19-204-08** | Professional Elective – V | 40/60 | 3 |
| 19-204-08** | Open Elective – II | 40/60 | 3 |
| 19-204-0815 | Seminar | 50 | 1 |
| 19-204-0816 | Project Phase – II | 200 | 6 |
| 19-204-0817 | Comprehensive Viva Voce | - | 1 |

| 19-204-0802 to 0805: PROFESSIONAL ELECTIVE – IV | |
|---|---|
| 19-204-0802: | Block Chain Technology |
| 19-204-0803: | Robotic Process Automation |
| 19-204-0804: | Service Oriented Architecture |
| 19-204-0805: | Cyber Laws and Information Security |

| 19-204-0806 to 0809: PROFESSIONAL ELECTIVE – V | |
|---|---|
| 19-204-0806: | Software Quality and Testing |
| 19-204-0807: | Electronic Business and Services |
| 19-204-0808: | Randomized Algorithms |
| 19-204-0809: | Cognitive Computing |

19-204-0810 to 0814 **OPEN ELECTIVE II**

| | |
|---|---|
| 19-204-0810: | Design Thinking |
| 19-204-0811: | Soft skills & Integral Development |
| 19-204-0812: | Social Computing |
| 19-204-0813: | Research Methodology |
| 19-200-0814: | Constitutional Law |

# M. TECH. DEGREE (FULL TIME) PROGRAMME IN SOFTWARE SYSTEMS

## Semester I

| Course code | Course | Hours/Week | | | Credits |
|---|---|---|---|---|---|
| | | L | T | P | |
| 18-451-0101 | Computational Methods in Information Technology | 3 | 1 | 0 | 4 |
| 18-451-0102 | Algorithm Design and Analysis | 3 | 1 | 0 | 4 |
| 18-451-01** | Elective I | 3 | 1 | 0 | 3 |
| 18-451-01** | Elective II | 3 | 1 | 0 | 3 |
| 18-451-0109 | Algorithm Design Lab | 0 | 0 | 3 | 1 |
| 18-451-0110 | Seminar I | 0 | 0 | 3 | 1 |
| 18-451-0111 | Research Methodology and IPR | 2 | 1 | 0 | 2 |
| Total | | 14 | 5 | 6 | **18** |

### ELECTIVES I & II (Semester I)

| Course Code | Course |
|---|---|
| 18-451-0103 | Android Programming |
| 18-451-0104 | Big Data Analytics |
| 18-451-0105 | Distributed Algorithms |
| 18-451-0106 | Randomized Algorithms |
| 18-451-0107 | Ad Hoc Wireless Networks |
| 18-451-0108 | Computational Biology |

## Semester II

| Course code | Course | Hours/Week | | | Credits |
|---|---|---|---|---|---|
| | | L | T | P | |
| 18-451-0201 | Advanced Computer Networks | 3 | 1 | 0 | 4 |
| 18-451-0202 | Software Engineering | 3 | 1 | 0 | 4 |
| 18-451-02** | Elective III | 3 | 1 | 0 | 3 |
| 18-451-02** | Elective IV | 3 | 1 | 0 | 3 |
| 18-451-0209 | Data Management Lab | 0 | 0 | 3 | 1 |
| 18-451-0210 | Seminar II | 0 | 0 | 3 | 1 |
| 18-451-0211 | Mini Project | 0 | 0 | 3 | 2 |
| Total | | 12 | 4 | 9 | **18** |

**ELECTIVES III & IV (Semester II)**

| Course Code | Course |
|---|---|
| 18-451-0203 | Cyber Physical System |
| 18-451-0204 | Recommender Systems |
| 18-451-0205 | Object Oriented Design with UML |
| 18-451-0206 | Software Test Design |
| 18-451-0207 | Real Time Operating System |
| 18-451-0208 | Cloud Computing |

**Semester III**

| Course code | Course | Hours/Week | | | Credits |
|---|---|---|---|---|---|
| | | L | T | P | |
| 18-451-03** | Elective V | 3 | 1 | 0 | 3 |
| 18-451-03** | Elective VI | 3 | 1 | 0 | 3 |
| 18-451-0307 | Dissertation Phase – I | 0 | 0 | 20 | 12 |
| Total | | 6 | 2 | 20 | **18** |

**ELECTIVES V & VI (Semester III)**

| Course Code | Course |
|---|---|
| 18-451-0301 | Internet of Things |
| 18-451-0302 | Agile Project Management |
| 18-451-0303 | Artificial Intelligence and Soft Computing |
| 18-451-0304 | Advanced Computer Architectures |
| 18-451-0305 | Information Security and Cyber Laws |
| 18-451-0306 | Systems Thinking |

**Semester IV**

| Course code | Course | Hours/Week | | | Credits |
|---|---|---|---|---|---|
| | | L | T | P | |
| 18-451-0401 | Dissertation Phase – II | 0 | 0 | 30 | 18 |
| Total | | 0 | 0 | 30 | **18** |

**Details of Faculty**

| Sl.No | Name & Designation | Specialization | Communication (Contact No.& email ID) |
|---|---|---|---|
| 1 | Dr.Binsu C Kovoor, Professor & Head | Computer & Information Science | 9847788551 binsu.kovoor@gmail.com |
| 2 | Dr.Santosh Kumar M B Associate Professor | Computer Science | 9746622326 santo.mb10@gmail.com |
| 3 | Dr.Shelbi Joseph Associate Professor | Computer Science | 9446221045 achayanshelbi@gmail.com |
| 4 | Dr.Renumol V G Professor | Computer Engineering,SoftwareEngineering, Education Technology | 9446475103 renumolvg@gmail.com |
| 5 | Ms.Sariga Raj Associate Professor | Software Engineering | 9446556876 sariga.raj@gmail.com |
| 6 | Dr.Daleesha M Viswanathan Associate Professor | Computer & Information Science | 9446218042 daleesha88@gmail.com |

| | | | |
|---|---|---|---|
| 7 | Akhil P V<br>Assistant Professor | Computer Science And Information Systems | 9447785097<br>akhil.soe@gmail.com |
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# DIVISION OF MECHANICAL ENGINEERING

## B.TECH. (FT) DEGREE COURSE IN MECHANICAL ENGINEERING

**Scheme of Examinations (2019 admissions)**

(Semester I and II is common to all branches)

**Semester III**

| Code No. | Subject | L Hours/ Week | T Hours/ Week | P/D Hours/ Week | C | Marks | | Total |
|---|---|---|---|---|---|---|---|---|
| | | | | | | CA | SEE | |
| 19-200-0301 | *Linear Algebra & Transform Techniques | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-205-0302 | Electrical Technology | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-205-0303 | Mechanics of Solids | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-205-0304 | Fluid Mechanics | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-205-0305 | Metallurgy & Materials Science | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-205-0306 | Machine Drawing | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-205-0307 | Strength of Materials Lab | 0 | 0 | 3 | 1 | 25 | 25 | 50 |
| 19-205-0308 | Fluid Mechanics Lab | 0 | 0 | 3 | 1 | 25 | 25 | 50 |
| | **TOTAL** | **18** | **6** | **6** | **20** | | | |

* Common for CE/CS/EC/EE/IT/ME/SE

CA – Continuous Assessment**,** SEE – Semester End Examination

**Semester IV**

| Code No. | Subject | L Hours/ Week | T Hours /Week | P/D Hours / Week | C | Marks | | Total |
|---|---|---|---|---|---|---|---|---|
| | | | | | | CA | SEE | |
| 19-200-0401 | *Complex Variables and Partial Differential Equations | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-205-0402 | Metrology & Instrumentation | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-205-0403 | Mechatronics | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-205-0404 | Applied Thermodynamics | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-205-0405 | Hydraulic Machinery | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-205-0406 | Manufacturing Processes | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-200-0407 | *Universal Human Values | 3 | 0 | 0 | 3 | 50 | | 50 |
| 19-205-0408 | Metrology Lab | 0 | 0 | 3 | 1 | 25 | 25 | 50 |
| 19-205-0409 | Hydraulic Machinery Lab | 0 | 0 | 3 | 1 | 25 | 25 | 50 |
| | **TOTAL** | **21** | **6** | **6** | **23** | | | |

* Common for CE/CS/EC/EE/IT/ME/SE

**Semester V**

* Common for CE/CS/EC/EE/IT/ME/SE

| Code No. | Subject | L Hours/ Week | T Hours /Week | P/D Hours / Week | C | Marks | | Total |
|---|---|---|---|---|---|---|---|---|
| | | | | | | CA | SEE | |
| 19-200-0501 | *Numerical and Statistical Methods | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-205-0502 | Mechanics of Machinery | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-205-0503 | Machining Science & Machine Tools | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-205-0504 | Thermal Engineering | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-205-0505 | Power Plant Engineering | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-205-05** | Professional Elective – I | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-205-0510 | Computational Methods Lab | 0 | 0 | 3 | 1 | 25 | 25 | 50 |
| 19-205-0511 | Machine Shop | 0 | 0 | 3 | 1 | 25 | 25 | 50 |
| | **TOTAL** | **18** | **6** | **6** | **20** | | | |

**A student should opt for atleast one industry based elective during the B.Tech Programme.**

**19-205-0506 to 0509: PROFESSIONAL ELECTIVE – I**

19-205-0506(IE): Industrial Management
19-205-0507: Computational Methods for Engineers
19-205-0508: : Smart Materials
19-205-0509: Principles of Turbomachinery

**Semester VI**

| Code No. | Subject | L Hours/ Week | T Hours/ Week | P/D Hours/ Week | C | Marks | | Total |
|---|---|---|---|---|---|---|---|---|
| | | | | | | CA | SEE | |
| 19-205-0601 | Dynamics of Machinery | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-205-0602 | Machine Design – I | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-205-0603 | Operations Management | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-205-0604 | Heat and Mass Transfer | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-205-0605 | CAD/CAM | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-205-06** | Professional Elective – II | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-205-0610 | CAD/CAM Lab | 0 | 0 | 3 | 1 | 25 | 25 | 50 |
| 19-205-0611 | Heat and Mass Transfer Lab | 0 | 0 | 3 | 1 | 25 | 25 | 50 |
| | **TOTAL** | **18** | **6** | **6** | **20** | | | |

**19-205-0606 to 0609: PROFESSIONAL ELECTIVE – II**

19-205-0606(IE): Additive Manufaturing
19-205-0607: Energy Conservation and Environment Protection
19-205-0608: Advanced Mechanics of Solids
19-205-0609: Fundamentals of Combustion & Pollution

**Semester VII**

| Code No. | Subject | L Hours/ Week | T Hours/ Week | P/D Hours/ Week | C | Marks | | Total |
|---|---|---|---|---|---|---|---|---|
| | | | | | | CA | SEE | |
| 19-205-0701 | Refrigeration & Air Conditioning | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-205-0702 | Vibration & Noise Control | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-205-0703 | Machine Design – II | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-205-07** | Professional Elective - III | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-205-07** | Open Elective - I | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| 19-205-0712 | Thermal Engineering Lab | 0 | 0 | 3 | 1 | 25 | 25 | 50 |
| 19-205-0713 | Automation Lab | 0 | 0 | 3 | 1 | 25 | 25 | 50 |
| 19-205-0714 | Entrepreneurship Development | 0 | 0 | 2 | 1 | 50 | - | 50 |
| 19-205-0715 | Project Phase I | 0 | 0 | 3 | 1 | 50 | - | 50 |
| 19-205-0716 | Industrial Internship*** | 0 | 0 | - | 1 | 50 | - | 50 |
| | **TOTAL** | **15** | **4** | **11** | **20** | | | |

**** A student should opt for atleast one open elective offered by a Division other than their branch of study in the 7th or 8th semester.**

***** Industrial internship of a minimum duration of two weeks must be completed after the 4th semester and before the commencement of 7th semester classes. The evaluation of internship shall be conducted along with Project Phase I.**

**19-205-0704 to 0707: PROFESSIONAL ELECTIVE – III**

19-205-0704(IE): Robotics & Artificial Intelligence Management

19-205-0705: Supply Chain Management Behaviour

19-205-0706: Automobile Engineering Engineers

19-205-0707: Computational Fluid Dynamics

**19-205-0708 to 0711: OPEN ELECTIVE – I**

19-205-0708: Quality Engineering and

19-205-0709: HRD and Organisational

19-205-0710: Computational Statistics for

19-205-0711: Finite Element Method

**Semester VIII**

| Code No. | Subject | L Hours/ Week | T Hours/Week | P/D Hours/ Week | C | Marks | | Total |
|---|---|---|---|---|---|---|---|---|
| | | | | | | CA | SEE | |
| 19-205-0801 | Compressible Fluid Flow | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-205-08** | Professional Elective - IV | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-205-08** | Professional Elective - V | 3 | 1 | 0 | 3 | 40 | 60 | 100 |
| 19-205-08** | Open Elective - II | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| 19-205-0815 | Seminar | | | 3 | 1 | 50 | - | 50 |
| 19-205-0816 | Project Phase - II | | | 12 | 6 | 200 | - | 200 |
| 19-205-0817 | Comprehensive Viva Voce | | | 0 | 1 | - | 50 | 50 |
| | **TOTAL** | **12** | **3** | **15** | **20** | | | |

**19-205-0802 to 0805: PROFESSIONAL ELECTIVE – IV19-205-0806 to 0809: PROFESSIONAL ELECTIVE - V**

19-205-0802: Materials Management

19-205-0803: Hydraulic and Pneumatic drives Materials

19-205-0804: :Aerospace Engineering

19-205-0805: Cryogenic Engineering

19-205-0806: Production Technology

19-205-0807: Mechanical Behaviour of

19-205-0808: Theory of Plates and Shells

19-205-0809: Propulsion Engineering

19-205-0810 to 0813: **OPEN ELECTIVE – II**

19-205-0810: Operations Research

19-205-0811: Nano Technology and Surface Engineering

19-205-0812: Mechanics of Composite Materials

19-205-0813: Engineering Economics, Estimation and Costing

19-200 - 0814: Constitutional Law

# B.TECH. (PT) DEGREE COURSE IN MECHANICAL ENGINEERING

## (2017 ADMISSIONS ONWARDS)

### Scheme Of Examinations

**Semester I**

| Code No. | Subject | L Hrs/Wk | P/D Hrs/ Wk | C | Marks | | Total |
|---|---|---|---|---|---|---|---|
| | | | | | CA | ESE | |
| AS17P-1101* | Linear Algebra & Calculus | 3 | 0 | 3 | 40 | 60 | 100 |
| GE17P-1102* | Computer Programming | 3 | 0 | 3 | 40 | 60 | 100 |
| ME17P-1103 | Mechanics of Solids | 3 | 0 | 3 | 40 | 60 | 100 |
| ME17P-1104 | Fluid Mechanics | 3 | 0 | 3 | 40 | 60 | 100 |
| ME17P-1105 | Electrical Technology | 3 | 0 | 3 | 40 | 60 | 100 |
| ME17P-11L1 | Strength of Materials Lab | 0 | 3 | 2 | 25 | 25 | 50 |
| | **TOTAL** | **15** | **3** | **17** | | | |

* Common for ALL CA – Continuous Assessment, ESE – End Semester Examination

**Semester II**

| Code No. | Subject | L Hrs/Wk | P/D Hrs/ Wk | C | Marks | | Total |
|---|---|---|---|---|---|---|---|
| | | | | | CA | ESE | |
| AS17P-1201* | Complex Variables and Transform Techniques | 3 | 0 | 3 | 40 | 60 | 100 |
| ME17P-1202 | Manufacturing Processes | 3 | 0 | 3 | 40 | 60 | 100 |
| ME17P-1203 | Metallurgy & Material Science | 3 | 0 | 3 | 40 | 60 | 100 |
| ME17P-1204 | Applied Thermodynamics | 3 | 0 | 3 | 40 | 60 | 100 |
| ME17P-1205 | Hydraulic Machinery | 3 | 0 | 3 | 40 | 60 | 100 |
| ME17P-12L1 | Fluid Mechanics & Machinery Lab | 0 | 3 | 2 | 25 | 25 | 50 |
| | **TOTAL** | **15** | **3** | **17** | | | |

* Common for all

**Semester III**

| Code No. | Subject | L Hrs/Wk | P/D Hrs/ Wk | C | Marks | | Total |
|---|---|---|---|---|---|---|---|
| | | | | | CA | ESE | |
| AS17P-1301* | Numerical and Statistical Methods | 3 | 0 | 3 | 40 | 60 | 100 |
| HS17P-1302* | Technical Communication & Professional Ethics | 3 | 0 | 3 | 40 | 60 | 100 |
| ME17P-1303 | Mechanics of Machinery | 3 | 0 | 3 | 40 | 60 | 100 |
| ME17P-1304 | Machine Tools & Machining Science | 3 | 0 | 3 | 40 | 60 | 100 |
| ME17P-1305 | Metrology & Instrumentation | 3 | 0 | 3 | 40 | 60 | 100 |
| ME17P-13L1 | Machine Shop | 0 | 3 | 2 | 25 | 25 | 50 |
| | **TOTAL** | **15** | **3** | **17** | | | |

**Semester IV**

| Code No. | Subject | L Hrs/Wk | P/D Hrs/ Wk | C | Marks | | Total |
|---|---|---|---|---|---|---|---|
| | | | | | CA | ESE | |
| ME17P-1401 | Dynamics of Machinery | 3 | 0 | 3 | 40 | 60 | 100 |
| ME17P-1402 | Machine Design – I | 3 | 0 | 3 | 40 | 60 | 100 |
| ME17P-1403 | Industrial Management | 3 | 0 | 3 | 40 | 60 | 100 |
| ME17P-1404 | Thermal Engineering | 3 | 0 | 3 | 40 | 60 | 100 |
| ME17P-1405 | CAD/CAM | 3 | 0 | 3 | 40 | 60 | 100 |
| ME17P-14L1 | Metrology Lab | 0 | 3 | 2 | 25 | 25 | 50 |
| | **TOTAL** | **15** | **3** | **17** | | | |

**Semester V**

| Code No. | Subject | L Hrs/Wk | P/D Hrs/ Wk | C | Marks | | Total |
|---|---|---|---|---|---|---|---|
| | | | | | CA | ESE | |
| ME17P-1501 | Operations Management | 3 | 0 | 3 | 40 | 60 | 100 |
| ME17P-1502 | Heat & Mass Transfer | 3 | 0 | 3 | 40 | 60 | 100 |
| ME17P-1503 | Machine Design – II | 3 | 0 | 3 | 40 | 60 | 100 |
| ME17P-1504 | Mechatronics | 3 | 0 | 3 | 40 | 60 | 100 |
| ME17P-1505 | Elective I | 3 | 0 | 3 | 40 | 60 | 100 |
| ME17P-15L1 | CAD/CAM Lab | 0 | 3 | 2 | 25 | 25 | 50 |
| | **TOTAL** | **15** | **3** | **17** | | | |

**ME17P-1505 ELECTIVE – I**

E1: Hydraulic and Pneumatic drives
E2: Advanced Mechanics of Solids
E3: Energy Conservation and Environment Protection
E4: Advanced Engineering Materials
E5: Automobile Engg

**Semester VI**

| Code No. | Subject | L Hrs/Wk | P/D Hrs/ Wk | C | Marks | | Total |
|---|---|---|---|---|---|---|---|
| | | | | | CA | ESE | |
| ME17P-1601 | Vibration & Noise Control | 3 | 0 | 3 | 40 | 60 | 100 |
| ME17P-1602 | Production Technology | 3 | 0 | 3 | 40 | 60 | 100 |
| ME17P-1603 | Operations Research | 3 | 0 | 3 | 40 | 60 | 100 |
| ME17P-1604 | Refrigeration & Air-conditioning | 3 | 0 | 3 | 40 | 60 | 100 |
| ME17P-1605 | Elective II | 3 | 0 | 3 | 40 | 60 | 100 |
| ME17P-16L1 | Seminar & Project Preliminaries | | 3 | 2 | 50 | - | 50 |
| | **TOTAL** | **15** | **3** | **17** | | | |

**ME17P-1605 ELECTIVE – II**

E1: Aerospace Engineering
E2: Finite Element Method
E3: Quality Engineering
E4: Mechanical Behaviour of Materials
E5: Supply Chain Management

**Semester VII**

| Code No. | Subject | L Hrs/Wk | | P/D Hrs/ Wk | C | Marks | | Total |
|---|---|---|---|---|---|---|---|---|
| | | | | | | CA | ESE | |
| ME17P-1701 | Compressible Fluid Flow | 3 | | 0 | 3 | 40 | 60 | 100 |
| ME17P-1702 | Elective III | 3 | | 0 | 3 | 40 | 60 | 100 |
| ME17P-17L1 | Thermal Engg Lab | | | 3 | 2 | 25 | 25 | 50 |
| ME17P-17L2 | Project | | | 9 | 7 | 200 | - | 200 |
| ME17P-17L3 | Comprehensive Viva Voce | | | 0 | 2 | - | 50 | 50 |
| | **TOTAL** | **6** | | **12** | **17** | | | |

**ME17P-1702 ELECTIVE – III**

E1: Propulsion Engineering
E2: Materials Management
E3: Computational Fluid Dynamics
E4: Cryogenic Engineering
E5: Theory of Plates and Shells

**The regulation is same for all the branches of study – B.Tech (PT) in Civil, Mechanical and Chemical Engineering**

****M.Tech Mechanical Engineering Design course is not offering**

## M.TECH. (PT) DEGREE COURSE IN MECHANICAL ENGINEERING

## (SPECIALIZATION: PRODUCTION ENGINEERING)

**(Revised Curriculum from 2021 Onwards)**

**Semester I**

| CourseCode | Subject | Credit |
|---|---|---|
| MEP3101 | Applied Mathematics | 3 |
| MEP3102 | Advanced Materials and Processes | 3 |
| MEP3103 | Metal Forming Theory | 3 |
| MEP3104 | Maintenance and Reliability Engineering | 3 |
| MEP3105 | Seminar | 1 |
| Total | | 13 |

**Semester II**

| CourseCode | Subject | Credit |
|---|---|---|
| MEP3201 | Additive Manufacturing | 3 |
| MEP3202 | Advanced Computer Integrated Manufacturing | 3 |
| MEP3203 | Computational Methods in Engineering | 3 |
| MEP3204 | Elective I | 3 |
| MEP3205 | Computational Methods Laboratory | 1 |
| Total | | 13 |

**Semester III**

| CourseCode | Subject | Credit |
|---|---|---|
| MEP3301 | Finite Element Method and Applications | 3 |
| MEP3302 | Mechanical Behaviour of Materials | 3 |
| MEP3303 | Modern Machining Processes | 3 |
| MEP3304 | Elective II | 3 |
| MEP3305 | CAD/CAM Laboratory | 1 |
| Total | | 13 |

**Semester IV**

| CourseCode | Subject | Credit |
|---|---|---|
| MEP3401 | Computer Numerical Control of Machine Tools | 3 |
| MEP3402 | Elective III | 3 |
| MEP3403 | Elective IV | 3 |
| MEP3404 | Project – Phase I | 2 |
| Total | | 11 |

**Semester V**

| CourseCode | Subject | Credit |
|---|---|---|
| MEP3501 | Project – Phase II | 11 |
| Total | | 11 |

**Semester VI**

| Course Code | Subject | Credit |
|---|---|---|
| MEP3601 | Project – Phase III | 11 |
| Total | | 11 |

**Total credits for the programme = 13 +13 +13+11+11+11 = 72**

**Electives**

| **Course code** | **Subject** | **No of credits** |
|---|---|---|
| **E1** | Mechatronics | **3** |
| **E2** | Nano Technology and Surface Engineering | **3** |
| **E3** | Six Sigma | **3** |
| **E4** | Process Control and Automation | **3** |
| **E5** | Machine Learning and AI | **3** |
| **E6** | Bio Materials | **3** |
| **E7** | Material Behaviour at High Temperatures | **3** |
| **E8** | Industrial Tribology | **3** |

| | | |
|---|---|---|
| **E9** | Hydraulic and Pneumatic Drives | **3** |
| **E10** | Mechanical Vibrations | **3** |
| **E11** | Special Purpose Machine Tools | **3** |
| **E12** | Quality Engineering and Management | **3** |
| **E13** | Logistics and Supply Chain Management | **3** |
| **E14** | Engineering Optimization | **3** |

**Details of Faculty**

| Sl.No | Name & Designation | Communication |
|---|---|---|
| 1. | Dr.Ajithkumar.G.<br>Professor | 9446495639<br>ajithkumar@cusat.ac.in |
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| 12. | Dr.Saju.K.K.<br>Professor & Syndicate Member, CUSAT | 9895593988<br>kksaju@cusat.ac.in |
| 13. | Dr.Tide.P.S.<br>Professor | 9497366401<br>tideps@cusat.ac.in |

# DIVISION OF SAFETY AND FIRE ENGINEERING

## B.TECH DEGREE PROGRAMME IN SAFETY & FIRE ENGINEERING

**(Scheme of Examinations (2019 admissions)**

**SEMESTER I [Stream A]**

| Code No. | Subject | C | Marks | |
|---|---|---|---|---|
| | | | CA | SEE |
| 19-200-0101A | Computer Programming | 3 | 40 | 60 |
| 19-200-0102A | Engineering Chemistry | 3 | 40 | 60 |
| 19-200-0103A | Engineering Graphics | 3 | 40 | 60 |
| 19-200-0104A | Basic Electrical Engineering | 3 | 40 | 60 |
| 19-200-0105A | Basic Electronics Engineering | 3 | 40 | 60 |
| 19-200-0106A | Environmental Studies | 3 | 40 | 60 |
| 19-200-0107A | Electrical Engineering Workshop | 1 | 25 | 25 |
| 19-200-0108A | Computer Programming Laboratory | 1 | 25 | 25 |
| | **TOTAL** | **20** | | |

**CA – Continuous Assessment, SEE – Semester End Examination**

***Stream A*:** Civil Engineering, Electrical and Electronics Engineering, Mechanical Engineering and Safety and Fire Engineering.

SEMESTER II [Stream A]

| Code No. | Subject | C | Marks | |
|---|---|---|---|---|
| | | | CA | SEE |
| 19-200-0201A | Calculus | 3 | 40 | 60 |
| 19-200-0202A | Engineering Physics | 3 | 40 | 60 |
| 19-200-0203A | Engineering Mechanics | 3 | 40 | 60 |
| 19-200-0204A | Basic Civil Engineering | 3 | 40 | 60 |
| 19-200-0205A | Basic Mechanical Engineering | 3 | 40 | 60 |
| 19-200-0206A | Soft Skills Development | 2 | 50 | - |
| 19-200-0207A | Civil Engineering Workshop | 1 | 25 | 25 |
| 19-200-0208A | Mechanical Engineering Workshop | 1 | 25 | 25 |
| 19-200-0209A | Language Lab | 1 | 25 | 25 |
| 19-200-0210A | NSS/Nature conservation Activities | 0 | - | - |
| | **TOTAL** | **20** | | |

**SEMESTER III**

| Code No. | Subject | C | CA | SEE |
|---|---|---|---|---|
| 19-200-0301 | Linear Algebra & Transform Techniques* | 3 | 40 | 60 |
| 19-206-0302 | Chemical Process Principles | 3 | 40 | 60 |
| 19-206-0303 | Engineering Fluid Mechanics and Machinery | 3 | 40 | 60 |
| 19-206-0304 | Fire Engineering Fundamentals | 3 | 40 | 60 |
| 19-206-0305 | Elements of Machine Drawing | 3 | 40 | 60 |
| 19-206-0306 | Principles of Safety Management | 3 | 40 | 60 |
| 19-206-0307 | Fluid Mechanics and Machinery Laboratory | 1 | 25 | 25 |
| 19-206-0308 | Safety Engineering Laboratory | 1 | 25 | 25 |
| | **TOTAL** | **20** | | |

***Common for CE/CS/EC/EE/IT/ME/SE**

**SEMESTER IV**

| Code No. | Subject | C | CA | SEE |
|---|---|---|---|---|
| 19-200-0401 | Complex Variables and Partial Differential Equations* | 3 | 40 | 60 |
| 19-206-0402 | Heat and Mass Transfer Operations | 3 | 40 | 60 |
| 19-206-0403 | Strength of Materials | 3 | 40 | 60 |
| 19-206-0404 | Planning and Design of Fire Protection Systems | 3 | 40 | 60 |
| 19-206-0405 | Electrical Technology and Safety | 3 | 40 | 60 |
| 19-206-0406 | Occupational Health and First Aid | 3 | 40 | 60 |
| 19-200-0407 | Universal Human Values* | 3 | 50 | - |
| 19-206-0408 | Strength of Materials Laboratory | 1 | 25 | 25 |
| 19-206-0409 | Electrical Technology Laboratory | 1 | 25 | 25 |
| | **TOTAL** | **23** | | |

*** Common for CE/CS/EC/EE/IT/ME/SE**

**SEMESTER V**

| Code No. | Subject | C | CA | SEE |
|---|---|---|---|---|
| 19-200-0501 | Numerical and Statistical Methods* | 3 | 40 | 60 |
| 19-206-0502 | Chemical Technology and Reaction Engineering | 3 | 40 | 60 |
| 19-206-0503 | Principles of Engineering Design | 3 | 40 | 60 |
| 19-206-0504 | Structural Fire Safety | 3 | 40 | 60 |
| 19-206-0505 | Manufacturing Processes | 3 | 40 | 60 |
| 19-206-05** | Professional Elective - I | 3 | 40 | 60 |
| 19-206-0510 | Chemical Engineering Laboratory | 1 | 25 | 25 |
| 19-206-0511 | Fire Safety Training | 1 | 25 | 25 |
| | **TOTAL** | **20** | | |

*** Common for**
**CE/CS/EC/EE/IT/ME/SE**
**Professional Elective – I**

19-206-0506 Disaster Management
19-206-0507 (IE) Aviation Safety and Safety of Space
Missions 19-206-0508 Safety in Fireworks Industry
19-206-0509 Introduction to Process Plant Security and Information Security

**SEMESTER VI**

| Code No. | Subject | C | CA | SEE |
|---|---|---|---|---|
| 19-206-0601 | Legal Aspects of HSE | 3 | 40 | 60 |
| 19-206-0602 | Process Instrumentation and Control | 3 | 40 | 60 |
| 19-206-0603 | Chemical Process Safety | 3 | 40 | 60 |
| 19-206-0604 | Life Safety in Building Fire | 3 | 40 | 60 |
| 19-206-0605 | Environmental Engineering and Management | 3 | 40 | 60 |
| 19-206-06** | Professional Elective II | 3 | 40 | 60 |
| 19-206-0610 | Machine Shop | 1 | 25 | 25 |
| 19-206-0611 | Computational Laboratory | 1 | 25 | 25 |
| | **TOTAL** | **20** | | |

****Professional Elective II**

19-206-0606 Power Plant Engineering
19-206-0607(IE) Safety in Petroleum and Petrochemical Industries 19-206-0608 Food and Bio safety1 9-206-0609 Fault Detection and Diagnosis

**SEMESTER VII**

| Code No. | Subject | C | CA | SEE |
|---|---|---|---|---|
| 19-206-0701 | Hazard Identification and Risk Assessment | 3 | 40 | 60 |
| 19-206-0702 | Transportation Systems and Safety | 3 | 40 | 60 |
| 19-206-0703 | Safety in Construction | 3 | 40 | 60 |
| 19-206-07** | Professional Elective III | 3 | 40 | 60 |
| 19-206-07*** | Open Elective I | 3 | 40 | 60 |
| 19- 206 -0712 | Fire Engineering Laboratory | 1 | 25 | 25 |
| 19-206-0713 | Industrial Hygiene Laboratory | 1 | 25 | 25 |
| 19-206-0714 | Entrepreneurship Development | 1 | 50 | - |
| 19-206-0715 | Project Phase – I | 1 | 50 | - |
| 19-206-0716 | Industrial Internship | 1 | 50 | - |
| | **TOTAL** | **20** | | |

****Professional Elective III**

19-206-0704 Principles of Industrial Management 19-206-0705(IE) HSE Aspects of Fertiliser Industry 19-206-0706 Automobile Engineering and Safety 19-206-0707 Reliability Engineering

## ***Open Elective I

19-206-0708 Industrial Psychology

19-206-0709 Entrepreneurship and Small Business Enterprises 19-206-0710 Science and Technology of Nano Materials

19-206-0711 Energy Management and Conservation

**SEMESTER VIII**

| Code No. | Subject | C | CA | SEE |
|---|---|---|---|---|
| 19-206-0801 | Hazard Control in Manufacturing | 3 | 40 | 60 |
| 19-206-08** | Professional Elective IV | 3 | 40 | 60 |
| 19-206-08** | Professional Elective V | 3 | 40 | 60 |
| 19-206-08** | Open Elective II | 3 | 40 | 60 |
| 19-206-0815 | Seminar | 1 | 50 | - |
| 19-206-0816 | Project Phase II | 6 | 200 | - |
| 19-206-0817 | Comprehensive Viva Voce | 1 | - | 50 |
| | **TOTAL** | **20** | | |

****Professional Elective IV**

19-206-0802 Total Quality Management 19-206-0803 Human Factors Engineering

19-206-0804 Computational Fluid Dynamics 19-206-0805 Intellectual Property Rights

****Professional Elective V**

19-206-0806 Advanced Safety Engineering and Management 19-206-0807 Fluid Power Safety

19-206-0808 Explosives Technology and Safety 19-206-0809 Introductory Design of Structures

****Open Elective II**

19-206-0810 History and Philosophy of Science 19-206-0811 Non-destructive Testing Methods 19-206-0812 Environmental Economics19-206-0813 Biology for Engineers 19-200-0814 Constitutional Law

# M.Tech Degree (Full Time) Programme in Industrial Safety

(Specialisation: HSE Management)

**SEMESTER I**

| Course Code | Course Name | Hours/Week | | | Credits |
|---|---|---|---|---|---|
| | | L | T | P | |
| 18-455-0101 | Statistical and Computational Methods | 3 | 1 | 0 | 4 |
| 18-455-0102 | Environmental Engineering and Management | 3 | 1 | 0 | 4 |
| 18-455-01** | Elective I | 3 | 1 | 0 | 3 |
| 18-455-01** | Elective II | 3 | 1 | 0 | 3 |
| 18-455-0109 | HSE Laboratory | 0 | 0 | 3 | 1 |
| 18-455-0110 | Seminar I | 0 | 0 | 3 | 1 |
| 18-455-0111 | Research Methodology and IPR | 2 | 1 | 0 | 2 |
| Total | | 14 | 5 | 6 | **18** |

**SEMESTER II**

| Course Code | Course Name | Hours/Week | | | Credits |
|---|---|---|---|---|---|
| | | L | T | P | |
| 18-455-0201 | Hazard Analysis and Risk Assessment | 3 | 1 | 0 | 4 |
| 18-455-0202 | Occupational Health and Hygiene | 3 | 1 | 0 | 4 |
| 18-455-02** | Elective III | 3 | 1 | 0 | 3 |
| 18-455-02** | Elective IV | 3 | 1 | 0 | 3 |
| 18-455-0209 | Fire Engineering Laboratory | 0 | 0 | 3 | 1 |
| 18-455-0210 | Seminar II | 0 | 0 | 3 | 1 |
| 18-455-0211 | Internship | 0 | 0 | 3 | 2 |
| Total | | 12 | 4 | 9 | **18** |

**SEMESTER III**

| Course Code | Course Name | Hours/Week | | | Credits |
|---|---|---|---|---|---|
| | | L | T | P | |
| 18-455-03** | Elective V | 3 | 1 | 0 | 3 |
| 18-455-03** | Elective VI | 3 | 1 | 0 | 3 |
| 18-455-0307 | Dissertation – Phase I | 0 | 0 | 20 | 12 |
| Total | | 6 | 2 | 20 | **18** |

**SEMESTER IV**

| Course Code | Course Name | Hours/Week | | | Credits |
|---|---|---|---|---|---|
| | | L | T | P | |
| 18-455-0401 | Dissertation – Phase II | 0 | 0 | 30 | 18 |
| Total | | 0 | 0 | 30 | **18** |

***Electives must be selected from the following list for the corresponding semester*

Total credits for the M.Tech programme = 72

## ELECTIVES I & II (Semester I)

| | |
|---|---|
| 18-455-0103 | Industrial Safety Management – Concepts and Practices |
| 18-455-0104 | Reliability Engineering |
| 18-455-0105 | Industrial Noise and Vibration Control |
| 18-455-0106 | Corrosion and Surface Engineering |
| 18-455-0107 | Remote Sensing and Geographic Information System |
| 18-455-0108 | Food Safety and Sanitation |

## ELECTIVES III & IV (Semester II)

| | |
|---|---|
| 18-455-0203 | Construction Safety and Fire Engineering |
| 18-455-0204 | Health, Safety and Environmental Laws |
| 18-455-0205 | Hazard Control in Manufacturing |
| 18-455-0206 | Pipeline Engineering |
| 18-455-0207 | Disaster Preparedness and Emergency Planning |
| 18-455-0208 | Ecological Engineering |

## ELECTIVES V & VI (Semester III)

| | |
|---|---|
| 18-455-0301 | Fluid Power Safety |
| 18-455-0302 | Human Factors Engineering |
| 18-455-0303 | HSE Management in Hydrocarbon Industry |
| 18-455-0304 | Fire Modelling |
| 18-455-0305 | Environmental Impact Assessment |
| 18-455-0306 | Computational Fluid Dynamics |

**Details of Faculty**

| Sl No | Name & Designation | Specialization | Communication (Contact No.& e-mail id) | |
|---|---|---|---|---|
| 1 | Dr. G. Madhu | Enviornmental Engineering and Process Safety Engineering | 9447366900 | profmadhugopal@gmail.com |
| 2 | Dr.Dipak Kumar Sahoo | Structural Fire Safety | 9496215851 | dksahoo@gmail.com |
| 3 | Shri. Nirmal Job. A | Safety Management, Reliability Engineering, Hazard control in Manufacturing | 9446740057 | nirmaljob@gmail.com |
| 4 | Dr. V. R. Renjith | Industrial Safety Engineering | 9447108856 | renjithvr75@gmail.com |
| 5 | Anish Job Kurian | M.E(CAD/CAM) | 8606707991 | *anishjob1919@gmail.com* |
| 6 | NithyaGopinath | M. Tech Computer Aided Process Design | 8593939015 | nithyakrishnang@gmail.com |
| 7 | Jiji Varghese | M.TechinIndustrial safety(HSE Management) | 8921448305 | jiji.jv27@gmail.com |
| 8 | Anju Roy | M.Tech in Industrial drives & Control | 9946114216 | anjurkp@gmail.com |

# COCHIN UNIVERSITY COLLEGE OF ENGINEERING, KUTTANADU

**DETAILS OF FACULTY**

| Sl.No. | Name | Designation | Division | Contact No.&e-mail ID | |
|---|---|---|---|---|---|
| | | | | Mobile | |
| 1 | DR. JOSEPH KUTTY JACOB | Professor &Principal | | 9447364175 | josephkutti@cusat.ac.in josephkutti@yahoo.com |
| 2 | DR . ASALETHA. R | Asso. Professor& Head | Applied Sciences & Humanities | 9400050826 9496720973 | asalethar@cusat.ac.in |
| 3 | DR.SUNIL KUMAR . N | Professor | Civil Engineering | 9447706426 | sunilkumarn@cusat.ac.in |
| 4 | MINI MOLE. A | Asso. Professor & Head | | 9074214136 | miniasif3@cusat.ac.in |
| 5 | Dr.PREETHA MATHEW K | Professor | Computer Science and Engineering | 9446249706 | preetha.mathew.k @gmail.com preethamk@cusat.ac.in |
| 6 | BINDU P KALAKKALPARAMBIL | Asso. Professor& Head | | 9656225652 | bindupk@cusat.ac.in |
| 7 | MANOJ KUMAR P | Asst. Professor | | 9895508929 | Manojkumar peethambaran @cusat.ac.in |
| 8 | MEERA A. R (on LWA) | Asst. Professor | | | |
| 9 | HARIKRISHNAN D | Asso. Professor | Information Technology | 9496800632 | dharikris@yahoo.com dhari@cusat.ac.in |
| 10 | JAYAPRABHA P | Asso. Professor& Head | | 9349921686 | jayaprabhacusat@ gmail.com jayaprabha@cusat.ac.in |
| 11 | JABIR K V T | Asst. Professor | | 9447328532 | kvtjabir@cusat.ac.in |

| | | | | | |
|---|---|---|---|---|---|
| 12 | DR. MANOJ V. J | Asso. Professor& Head | Electronics and Communication Engineering | 9447440260 | manojmvj@gmail.com |
| 13 | ANIL KUMAR K. K | Asso. Professor | | 9447058981 | kkanil@cusat.ac.in |
| 14 | DR. JOSEPH KUTTY JACOB | Professor | Electrical and Electronics Engineering | 9447364175 | josephkutti@cusat.ac.in<br>josephkutti@yahoo.com |
| 15 | Dr. SHINY PAUL | Asso. Professor & Syndicate Member | | 9496721408 | shinypaulj@cusat.ac.in |
| 17 | SAJAN JOSEPH | Asso. Professor | | 9447877333 | sajanjoseph@cusat.ac.in |
| 16 | PRIYA R KRISHNAN | Asst. Professor | | 9446603177 | priarkrishnan@cusat.ac.in |
| 19 | DR.MATHEW CHERIAN | Asso.Professor | Mechanical Engineering | 9447369654 | mathewch1@cusat.ac.in<br>mathewch1@gmail.com |
| 20 | DR.SENTHIL PRAKASH M. N | Professor | | 9496226791 | senthil@cusat.ac.in |
| 18 | THOMAS .T | Asso. Professor | | 9447041819 | thomas@cuat.ac.in |
| 21 | DR.SHIYAS C. R | Asso. Professor | | 9447893107 | crshiyas@gmail.com |
| 22 | Dr. SALAJI .S | Asso. Professor | | 9497675088 | salajisabu@gmail.com<br>salajis@cusat.ac.in |

# FACULTY OF ENVIRONMENTAL STUDIES

**Dean:**

Dr.VSivanandanAchari

Professor

School of Environmental Studies

Cochin University of Science and Technology.

# SCHOOL OF ENVIRONMENTAL STUDIES

## M.SC. ENVIRONMENTAL SCIENCE & TECHNOLOGY

**Semester I**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| 20-360-0101 | Environmental Biology | C | 3 |
| 20-360-0102 | Environmental Chemistry | C | 3 |
| 20-360-0103 | Environmental Physics | C | 2 |
| 20-360-0104 | Applied Mathematics & Statistics | C | 2 |
| 20-360-0105 | Environmental Microbiology | C | 3 |
| 20-360-0109 | Environmental Chemistry Lab | C | 2 |
| 20-360-0110 | Environmental Microbiology Lab | C | 1 |
| Total | | | 16 |

**Elective I**

| Course code | Course | C/E | Credits |
|---|---|---|---|
| 20-360-0106 | Environmental Pollution | E | 2 |
| 20-360-0107 | Chemometrics& Good Laboratory Practices | E | 2 |
| 20-360-0108 | Contemporary Environmental Issues and Laws | E | 2 |
| Total | | | 6 |

**Semester II**

| Course code | Course | C/E | Credits |
|---|---|---|---|
| 20-360-0201 | Methods in Environmental Analysis | C | 2 |
| 20-360-0202 | Environmental Engineering- Paper I | C | 2 |
| 20-360-0203 | Fluid Mechanics | C | 2 |
| 20-360-0204 | Geo informatics | C | 2 |
| 20-360-0205 | Environmental Toxicology | C | 2 |
| 20-360-0206 | Applied Environmental Microbiology | C | 2 |
| 20-360-0207 | Environmental Biotechnology | C | 2 |
| 20-360-0212 | Environmental Engineering Lab | C | 1 |
| 20-360-0213 | Chemical and Biological Methods in Environmental Analysis-Lab | C | 1 |
| 20-360-0214 | Environmental Toxicology Lab | C | 1 |
| Total | | | 17 |

**Elective II**

| Course code | Course | C/E | Credits |
|---|---|---|---|
| 20-360-0208 | Environmental Modeling | E | 2 |
| 20-360-0209 | Environmental Management and Legal Aspects | E | 2 |
| 20-360-0210 | Industrial Ecology | E | 2 |
| 20-360-0211 | Energy Resources and Management | E | 2 |
| Total | | | 8 |

**Semester III**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| 20-360-0301 | Chemistry of Water and Wastewater Treatment | C | 3 |
| 20-360-0302 | Environmental Engineering-Paper II | C | 2 |
| 20-360-0303 | Biodiversity and Conservation | C | 1 |
| 20-360-0304 | Applied Eco-Toxicology | C | 1 |
| 20-360-0305 | Environmental Impact and Risk Assessment | C | 1 |
| 20-360-0310 | Environmental Engineering Graphics Lab | C | 1 |
| 20-360-0311 | Environmental Biotechnology and Bioremediation Lab | C | 1 |
| 20-360-0312 | Biodiversity Lab | C | 1 |
| Total | | | 11 |

**Elective III**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| 20-360-0306 | Bioremediation | E | 2 |
| 20-360-0307 | Solid and Hazardous Waste Management | E | 2 |
| 20-360-0308 | Bio-nanotechnology | E | 2 |
| 20-360-0309 | Applied Eco Toxicology-Tests and Evaluation Methods | E | 2 |
| Total | | | 8 |

**Semester IV**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| 20-360-0401 | Final Semester Project Work Interim Report- Presentation [Internal] Project- Dissertation [External] | C | 14 |
| 20-360-0402 | Viva-Voce [Internal] | C | 2 |
| Total | | | 16 |

**Details of Faculty**

| Sl. No. | Name & Designation | Specialization | Communication (Contact No. & e-mail id) |
|---|---|---|---|
| 1. | Dr. RajathySivalingam, Professor | Environmental Toxicology | 9400577246, rajkumar@cusat.ac.in |
| 2. | Dr. SivanandanAchari. V, Professor | Environmental Chemistry | 9495383342, vsachari@cusat.ac.in |
| 3. | Dr. Usha KAravind, Professor | Environmental Chemistry | 9447779269, uka@cusat.ac.in |

| | | | |
|---|---|---|---|
| 4. | Dr. Suja P. Devipriya, Associate Professor | Environmental Science | 9442234169, devipriyasuja@cusat.ac.in |
| 5. | Dr.Anand M, Assistant Professor | Environmental Science | 9447254921, anandm@cusat.ac.in |
| 6. | Dr.Ratheesh Kumar C S, Assistant Professor | Environmental Chemistry | 9447372208, ratheeshses@cusat.ac.in |
| 7. | Dr. PreethyChandran, Assistant Professor | Environmental Microbiology | 9751275798, preethychandran@cusat.ac.in |
| 8. | Dr.Krishna Mohan K S, Assistant Professor | Environmental Physics | 9846392428, krishnamohan@cusat.ac.in |

## NATIONAL CENTRE FOR AQUATIC ANIMAL HEALTH

### M.TECH. MARINE BIOTECHNOLOGY
### (Sponsored by the Department of Biotechnology, Government of India)

**Semester I**

| Course Code | Course | Hours/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-431-0101 | Biotechnological Interventions in Marine Biodiversity Conservation | | 2 | | 2 | 60 | 40 | 100 |
| 20-431-0102 | Marine Genomics and Proteomics | | 3 | | 3 | 60 | 40 | 100 |
| 20-431-0103 | Marine Bioprospecting and Drug Discovery | | 3 | | 3 | 60 | 40 | 100 |
| 20-431-0104 | Bioprocess Engineering -1 | | 3 | | 3 | 60 | 40 | 100 |
| 20-431-0109 | Skill Development in Recombinant DNA Technology (Lab) | | | 2 | 2 | 50 | 50 | 100 |
| 20-431-0110 | Skill Development in Marine Microbial Diversity Determination (Lab) | | | 2 | 2 | 50 | 50 | 100 |
| 20-431-0111 | Skill Development in Cell culture and hybridoma/Antibody Technology (Lab) | | | 1 | 1 | 50 | 50 | 100 |

**Electives**

| Course Code | Course | Credits |
|---|---|---|
| 20-431-0105 | Cell and Hybridoma Technology | 2 |
| 20-431-0106 | Marine Microbiology | 2 |
| 20-431-0107 | Bio informatics, Systems and Computational Biology | 3 |
| 20-431-0108 | Nano-biotechnology | 2 |

**Total Credit: Core 16; Elective 9**

**Semester II**

| Course Code | Course | Hours/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-431-0201 | Biotechnological interventions in Aquatic Animal Health | | 3 | | 3 | 60 | 40 | 100 |
| 20-431-0202 | Bioprocess Engineering (Marine Natural Products, Biomaterials and Probiotics)-II | | 3 | | 3 | 60 | 40 | 100 |
| 20-431-0203 | Marine Algal Biotechnology | | 3 | | 2 | 60 | 40 | 100 |
| 20-431-0204 | Genetic Improvement for High health brood stock | | 3 | | 2 | 60 | 40 | 100 |
| 0-431-0209 | Skill Development in Biotechnological Interventions in Aquatic Animal Health Management | | | 2 | 2 | 50 | 50 | 100 |
| 20-431-0210 | Skill Development in Maine Bioprospecting and Bioprocess Engineering. | | | 2 | 2 | 50 | 50 | 100 |
| 20-431-0211 | Skill Development in Model systems, Molecular genetics and Genome engineering | | | 1 | 1 | 50 | 50 | 100 |

**Electives**

| Course Code | Course | Credits |
|---|---|---|
| 20-431-0205 | Model systems, Molecular Genetics and Genome engineering | 2 |
| 20-431-0206 | Advances in marine drug discovery | 2 |
| 20-439-0202 | Environmental Ocean Technology (Inter disciplinary Elective) | 3 |
| 20-431-0208 | Enzyme Engineering & Technology | 2 |

**Total Credit: 25,Core 15; Elective 10**

**Semester III**

| Course Code | Course | Hours/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-431-0301 | Bioentrepreneusrhip and industry management | | 2 | | 2 | 60 | 40 | 100 |
| 20-431-0302 | Research Methodology and Scientific Communication | | 2 | | 2 | 60 | 40 | 100 |
| 20-431-0303 | Intellectual Property Rights, Biosafety and Bioethics | | 2 | | 2 | 60 | 40 | 100 |
| 20-431-0304 | Project proposal preparation and submission | | 2 | | 2 | 60 | 40 | 100 |
| 20-431-0310 | Research Project in the Area of Specialization: Progress Review 1 | | | 10 | 10 | 50 | 50 | 100 |

**Electives**

**Skill development in any one of the areas given below.**

| Course Code | Course | Credits |
|---|---|---|
| 20-431-0305 | Drug discovery from marine biologicals | 2 |
| 20-431-0306 | Model systems, molecular genetics and Genome engineering | 2 |
| 20-431-0307 | Marine algae for bio-fuel production and animal nutrition | 2 |
| 20-431-0308 | Molecular diagnostics and therapeutics/ health management strategies | 2 |
| 20-431-0309 | Bioprocess engineering and computational modeling | 10 |

**Total Credit:23, Core 18; Elective 5**

**Semester IV**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| 20-431-0401 | Research Project in the Area of Specialization: Progress Review 2 and Report Submission and Presentation | C | 12 |
| 20-431-0402 | Viva Voce Examination (Comprehensive) | C | 6 |
| **Total Credit** | | | **18** |

**Credits**
**Total credits: 91 (Core: 67 Elective: 24)**
**Semester 1: 25; Semester 2: 25; Semester 3: 23; Semester 4: 18.**

**Details of Faculty**

Coordinating Department: National Centre for Aquatic Animal Health

| SI.No. | Name and Designation | Specialization | Communication |
|---|---|---|---|
| 1. | Dr.Valsamma Joseph Professor, Director and Course Co-ordinator | Marine Biotechnology | 04842381120 (O)<br>9846047433 (Mob)<br>valsamma@cusat.ac.in. |
| 2 | Prof. I.S. Bright Singh KSCSTE-Emeritus Scientist | Aquatic Animal Health/ Marine Biotechnology | 04842381120 (O)<br>9447631101<br>isbsingh@gmail.com |
| 3. | Dr.Sajeevan T.P. Assistant Professor | Marine Biotechnology | 04842381120 (O)<br>9946099408 (Mob)<br>sajeevantp@gmail.com |
| 4. | Dr.JayeshPuthumana Assistant Professor | Marine Biotechnology | 04842381120 (O)<br>9447719804<br>jayesh@cusat.ac.in |
| 5. | Mr. Shibin S.P. Assistant Professor | Bioprocess Technology | 0484 -2381120<br>09447714543<br>sp.shibin@gmail.com |

Core and Associated Faculty Members from Collaborating Departments

| S. No. | Name and Designation | Specialization | Contact Details |
|---|---|---|---|
| 1. | Dr.Suja P. Devipriya, Associate Professor, School of Environmental Studies | Biotechnology | M: 9442234169<br>E-mail: devipriyasuja@cusat.ac.in |
| 2. | Dr. Baby Chakrapani P.S., Assistant Professor, Department of Biotechnology | Environmental Biotechnology | M: 9495109908<br>E-mail: bcps80@gmail.com |
| 3. | Dr. N. Manoj, Professor , Department of Applied Chemistry | Organic Chemistry | M: 9447704531<br>E-mail: manoj.n@cusat.ac.in |
| 4. | Dr. SM Sunoj, Professor, Department of Statistics | Statistics | M: 9495109908<br>E-mail: bcps80@gmail.com |
| 5. | Dr. Judy MV, Professor, Department of Computer Applications | Big Data Analytics | M: 9048991368<br>E-mail: judy.nair@gmail.com |
| 6. | Dr.Jereesh C.S., Assistant Professor, Department of Computer Science | Bioinformatics | M: 9495576665<br>E-mail: jereesh@cusat.ac.in |

| | | | |
|---|---|---|---|
| 7. | Dr.SwapnaP.Antony, Assistant Professor, Department of Marine Biology, Microbiology, and Biochemistry | Aquaculture and Marine Biotechnology | M: 8089131058<br>E-mail: swapnapantony@gmail.com |
| 8. | Dr.Priyaja P., Assistant Professor, Department of Marine Biology, Microbiology, and Biochemistry | Marine biodiversity conservation | M: 9447444882<br>E-mail: priyaja@cusat.ac.in |
| 9. | Dr. KB Padmakumar, Assistant Professor, Department of Marine Biology, Microbiology, and Biochemistry | Marine Biology and Phytoplankton ecology | M: 9847255972<br>E-mail: kbpadmakumar@gmail.com |
| 10. | Dr. A.A. Ambily, Assistant Professor, Department of Mathematics | Mathematics | M: 908751352<br>E-mail: ambily@cusat.ac.in |
| 11. | Dr. V. Vijith<br>Assistant Professor, Department of Physical Oceanography | Physical Oceanography and Marine Ecosystem Dynamics | M:9421747872<br>E-mail: vijith@cusat.ac.in |

# FACULTY OF HUMANITIES

**Dean:**

Dr.K.Ajitha

Professor

Department of Hindi

Cochin University of Science and Technology

Kochi- 682 022

# DEPARTMENT OF HINDI

## MA DEGREE IN HINDI LANGUAGE AND LITERATURE

**Revised Syllabus**

**(2020 Admission Onwards)**

**Nature of Course : CBCS**

**Semester I**

| Course Code | Course – CBCS/OBE | Hours/Week | | | Credits | Marks | | Total |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | |
| 20 – 362- 0101 | Ancient and Post Medieval Poetry (प्राचीनऔरउत्तरमध्यकालीनकविता) | 4 | 3 | 0 | 4 Credits | 50 | 50 | 100 |
| 20- 362 - 0102 | Short Story (हिदीकहानी) | 4 | 3 | 0 | 4 Credits | 50 | 50 | 100 |
| 20 -362- 0103 | Functional Hindi and Translation (प्रयोजनमलूकहिदी औरअनुवाद ) | 4 | 3 | 0 | 4 Credits | 50 | 50 | 100 |
| 20 -362- 0104 | History of Literature: Ancient and Medieval Periods (हिंदीसाहित्यकाइतिहास:प्राचीनऔरमध्यकाल | 3 | 2 | 0 | 3 Credits | 50 | 50 | 100 |
| 20 – 362 – 01-- | Elective **(वैकल्पिक)** | 3 | 2 | 0 | 3 Credits | 50 | 50 | 100 |
| | Total | | | | 18 Credits | | | |

**Semester II**

| Course Code | Course | Hours/Week | | | Credits | Marks | | Total |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | |
| 20 -362-0201 | Bhakti Poetry<br>**((भक्तिकाव्य)** | 4 | 3 | 0 | 4Credits | 50 | 50 | 100 |
| 20 – 362 - 0202 | Essays, Sketches and Other Prose Forms<br>**( निबंध,रेखाचित्रएवंअन्यगद्यविधाएँ)** | 4 | 3 | 0 | 4 Credits | 50 | 50 | 100 |
| 20 -362-0203 | History of Literature: Modern Period<br>**(हिंदीसाहित्यकाइतिहास:आधुनिककाल)** | 4 | 3 | 0 | 4 Credits | 50 | 50 | 100 |
| 20 – 362 - 0204 | Hindi Drama and Theatre<br>(**हिंदीनाटकऔररंगमंच)**) | 3 | 2 | 0 | 3 Credits | 50 | 50 | 100 |
| 20 – 362 – 02-- | Elective **(वैकल्पिक )** | 3 | 2 | 0 | 3 Credits | 50 | 50 | 100 |
| | Total | | | | 18 credits | | | |

**Semester III**

| Course Code | Course | Hours/Week | | | Credits | Marks | | Total |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | |
| 20 -362-0301 | Modern Poetry - I<br>(**आधुनिककविता– I**) | 4 | 3 | 0 | 4 Credits | 50 | 50 | 100 |
| 20 – 362 - 0302 | Hindi Novel<br>**(हिंदीउपन्यास)**) | 4 | 3 | 0 | 4 Credits | 50 | 50 | 100 |
| 20 -362-0303 | Development and Structure of Hindi<br>**(हिंदीभाषाकाविकासऔरसंरचना)** | 4 | 3 | 0 | 3 Credits | 50 | 50 | 100 |
| 20 – 362 - 0304 | Indian Literary Thoughts<br>**(भारतीयसाहित्यिकचिंतन)** | 3 | 2 | 0 | 4 Credits | 50 | 50 | 100 |
| 20 -362 – 03-- | Elective<br>**(वैकल्पिक )** | 3 | 2 | 0 | 3 Credits | 50 | 50 | 100 |
| | Total | | | | 18 Credits | | | |

**Semester IV**

| Course Code | Course | Hours/Week | | | Credits | Marks | | Total |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | |
| 20 -362- 0401 | Modern Poetry-II **(आधुनिककविता –II)** | 4 | 3 | 0 | 4 Credits | 50 | 50 | 100 |
| 20 – 362 - 0402 | Indian Literature **(भारतीयसाहित्य)** | 4 | 3 | 0 | 4 Credits | 50 | 50 | 100 |
| 20 -362- 0403 | Western Literary Thoughts **(पाश्चात्यसाहित्यिकचिंतन)** | 4 | 3 | 0 | 4 Credits | 50 | 50 | 100 |
| 20 – 362 - 0404 | General Linguistics **(सामान्यभाषाविज्ञान)** | 3 | 2 | 0 | 3 Credits | 50 | 50 | 100 |
| 20 – 362 – 04--- | Elective **(वैकल्पिक )** | 3 | 2 | 0 | 3 Credits | 50 | 50 | 100 |
| | Total | | | | 18 Credits | | | |

**Total Credit : 72**

**List Electives**

10. Indian Culture

11. Hindi Renaissance

12. Hindi Literature ((for the Students of Other Departments)

13. Comparative Literature

14. Hindi Writings of Kerala

15. Indian Drama and Theatre

16. Feminine Discourse in Hindi Literature

17. Ecological Discourse in Hindi Literature

18. Aadivasi Discourse in Hindi Literature

19. Dalit Literature

20. Literature and Sociology

21. Human Rights in Literature

22. Communicative Hindi

23. Mass Communication and Media Writing

27. Special Author: Premchand

28. Special Author :SarveshwarDayalSaxena

29. Special Author :Dhoomil

30. Special Author :BhishmaSahni

31. GandhianLiterature in Hindi

32.Contemporary Hindi Short Story

33.Contemporary Hindi Drama and Theatre

34. Contemporary Hindi Poetry

05.MalayalathinteVarthamanam (Program ID -706)

## POST GRADUATE DIPLOMA IN TRANSLATION JOURNALISM AND HINDI LANGUAGE COMPUTING

| Sl.No | Course Code | Title of the Paper | Continuous Evaluation (50) | Year Ending Examination (50) | Total Marks (100) | Hours/ Week |
|---|---|---|---|---|---|---|
| 1 | PGDT-01 | Paper -I Theory and Principles of Translation | 50 | 50 | 100 | 2 hours |
| 2 | PGDT-02 | Paper – 2 Official Language and Hindi Language Computing | 50 | 50 | 100 | 2hours |
| 3 | PGDT-03 | Paper – 3 Translation of Science, Technology and Social Science Literature | 50 | 50 | 100 | 2hours |
| 4 | PGDT-04 | Paper – 4 Literary Translation | 50 | 50 | 100 | 2 hours |
| 5 | PGDT-05 | Paper – 5 Principles of Journalism | 50 | 50 | 100 | 2hours |
| 6 | PGDT-06 | Paper – 6 Internship/Translation Project | 50 | 50 | 100 | 2 hours |
| | | Total | | | 600 | |

## SHORT TERM COMPUTER COURSE BASED IN HINDI (CALT COURSE)

Duration : 2 Months

**Computer Fundamentals:**

- Introduction to Computers
- History of Computers
- Components of Hardware Peripherals
- Concept of Operating System-Windows XP
- Exploring & Configuring the Windows XP
- Desk top Environment—Customize the Desktop, Start Menu, and Task bar etc
- Configuring & Migrating Files, Folders & Settings
- Accessibility Settings
- Features of Windows XP

**MS-Office**

Ms Word

- Creating, Organizing & Formatting Content
- Collaborating — Merge, Insert, View, Edit, Track Mode etc.
- Formatting & managing documents
- Create and run the Mail merge

MS Excel

- Creating, Analyzing & Formatting Data & Content
- Collaborating—Insert, View, Edit etc.
- Managing Workbooks
- Creating the various types Charts
- Create and Run Macros

- Database - operations

MS PowerPoint

- Creating & Formatting Content
- Collaborating — Track, Edit, Add, Delete Comments, Merge
- Managing & Delivering Presentations

Internet

- Opening websites and downloading data from them
- Understanding concepts of URL.
- Creating and Opening an E-mail account.
- Receiving and sending emails with attachments.
- Searching information on Internet.
- Social Media

Hindi

- Hindi Software-Kruti Dev, Leap Office, Microsoft Indic language tool, Hindi Unicode, Hindi lndic, IMI, ISM, Lipikaar, SonmaType
- Use proper keyboarding techniques.
- Improve speed and accuracy while keyboarding.
- Identify and correct common typing errors.

**Details of Faculty**

| Sl. No | Name | Designation | Specialization | Communication | |
|---|---|---|---|---|---|
| | | | | Contact No | Email id |
| 1 | Dr.K.Ajitha | Senior Professor and Head | Ancient & Modern Hindi Literature, Drama and Theatre, Subaltern Studies, Comparative Literature | 9447646240 | ajiravi@cusat.ac.in 123ajeeta@gmail.com |
| 2 | Dr.Prabhakaran Hebbar Illath | Associate Professor | Criticism and Modern Hindi Poetry | 9446661250 | hebbar@cusat.ac.in |
| 3 | Dr.Praneetha.P | Associate Professor | Ancient & Modern Hindi Literature, Drama and Theatre, Comparative Literature | 9495677720 | dr.praneetha.p@cusat.ac.in |
| 4 | Dr.Aneesh K.N | Assistant Professor | Modern Hindi Literature, Drama and Theatre, Comparative Literature | 9446426447 | aneeshkn1@gmail.com |
| 5 | Dr.Girishkumar K.K | Assistant Professor | Modern and Contemporary Hindi Literature, Comparative Literature, Contemporary Hindi Poetry | 9495106637 | girish372@cusat.ac.in |
| 6 | Ms.Sreelekha K.N | Assistant Professor | Short Story & Tribal Discourse | 8330013928 | sreelekhakn103@cusat.ac.in |
| 7 | Dr.Sheena M.A | Assistant Professor | Modern Hindi Literature, Hindi Novel & Short Story | 8547403966 | sheenus.ma@gmail.com |
| 8 | Dr.R.Sasidharan | Emeritus Professor | Ancient and Modern Hindi Literature, Translation Studies, Comparative Literature,Drama and Theatre, Dalit Literature | 9447052840 | rsd@cusat.ac.in sreeragamsasi@gmail.com |

## DEPARTMENT OF ENGLISH AND FOREIGN LANGUAGE

## POST GRADUATE DIPLOMA IN COMMUNICATIVE ENGLISH

## REGULATION AND COURSE STRUCTURE
## (REVISED WITH EFFECT FROM 2020 ADMISSIONS)

### Course Objectives

- To train and prepare students to seek and find employment in teaching Communicative English.
- To develop Communicative competence in students.
- To impart Knowledge, ideas and concepts in the technicalities of proper pronunciation, structure, appropriate use and style of the English Language as well as the application areas of English Communication.
- To enable students to collect and analyse data, prepare and present reports and projects.
- To Guide the students to establish self-employment strategies.

### Course Outcome

At the completion of the course the learner will be able to:

- Develop vocabulary and improve the accuracy in Grammar.
- Improve LSRW Skills
- Procure an Introductory knowledge of English Language.
- Acquire Knowledge on various types of Reading and Writing.
- Will be able to handle Communicative English classes for school students.

### Regulations

**1. Eligibility for Admission**

Candidate for admission to this programme should be Bachelor's Degree holder of any University recognized by CUSAT. The selection for the programme will be based on an entrance test to be conducted by the Department.

Matters concerning admission procedure, payment of fee etc., will be as per University rules and regulations.

**2. Duration**

The Programme will be of one year duration with terminal University Examinations.

**3. Course of Study**

The course work for the P.G. Diploma Programme in Communicative English shall be in accordance with the scheme of examination and syllabi prescribed.

**4. Eligibility for the Post Graduate Diploma in Communicative English**

No candidate is eligible for the **Post Graduate Diploma in Communicative English**unless he/she has undergone the prescribed Course of study in the Department for one Academic Year and has passed all the prescribed examinations.

**5. Examinations**

There will be University Examination at the end of the Programme in the subjects as prescribed under the Scheme of Evaluation.

**6. Pass minimum**

A Candidate who secures not less than 50% aggregate marks and 40% separate minimum both in written and oral examinations shall be declared to have passed the examination.

**7. Classification**

Range of Marks Class

| | |
|---|---|
| 75% and above | I Class with Distinction |
| 60% and above & less than 75% | I Class |
| 50% and above& less than 60% | II Class |
| Below 50% | Failed |

There will be a paper minimum of 40

**8. Course Structure**

| Sl.No. | Course Code | Title of Paper | Continuous Evaluation (50) | Year- end Examination (50) | Total Marks (100) | Hours/ Week |
|---|---|---|---|---|---|---|
| 1 | PGDCE-01 | PAPER -1 COMMUNICATIVE GRAMMAR | 50 | 50 | 100 | 2 Hours |
| 2 | PGDCE-02 | PAPER- II VOCABULARY AND WRITING | 50 | 50 | 100 | 2 Hours |
| 3 | PGDCE-03 | PAPER- III ENGLSIH LANGUAGE AND ITS VARIETIES | 50 | 50 | 100 | 2 Hours |
| 4 | PGDCE-04 | PAPER –IV ASPECTS AND PATTERNS OF COMMUNICATION | 50 | 50 | 100 | 2 Hours |
| 5 | PGDCE-05 | PAPER –V COMMUNICATION SKILLS | 50 | 50 | 100 | 2 Hours |
| 6 | PGDCE-06 | PAPER –VI DISSERTATION/ VIVAVOCE | 50 | 50 | 100 | |

## CERTIFICATE PROGRAMME IN GERMAN

**INTRODUCTION:** German is an official language of Austria, Switzerland, Luxembourg, and Liechtenstein. And it is the native language of a significant portion of the population in northern Italy, eastern Belgium, the Netherlands, Denmark, eastern France, parts of Poland, the Czech Republic, Russia, and Romania, as well as in other parts of Europe. It is the 3rd most popular foreign language taught worldwide and the second most popular in Europe and Japan, after English. Multinational business opportunities exist throughout the European Union and in the Eastern European countries, where German is the second most spoken language after Russian. Companies like BMW, Daimler, Siemens, Lufthansa, SAP, Bosch, Infineon, BASF, and many others need international partners.

**OBJECTIVE:**

This course focuses on basic linguistic and communicative structures of the German language.

Students will be introduced to various aspects of German culture and learn to communicate in simple everyday situations and personal interaction.

The module will adopt an integrated approach to language learning and will emphasize equally all the four skills of reading, writing, listening and speaking as well as the acquisition of grammar structures and vocabulary. Audio and video materials will also be used to supplement the textbook and to provide students with a better insight into Germany, her culture and the life of her people.

**Course Structure and Scheme of Exam:**

The duration of the course is 180 hours and final exam will be conducted at the end of the course. The exam comprises reading, listening, writing and speaking sections of total 100 marks. As these all four sections have equal weightage, each section will contain 25 marks. To pass the exam one has to score minimum 60 out of 100.

1. **Listening**

The student understands authentic texts related to situations, the contents of which correspond to their spheres of experience and interest.

They are ready and able to hear others speaking and to listen to them attentively. They are in a position to grasp what they hear from the context, even when some expressions are unknown to them.

2. **Speaking**

• Self introduction

Communication

The students are ready and able to participate actively in a conversation. They express their thoughts, opinions and feelings as the situation requires.

• Use of language

They make use of vocabulary available and employ their knowledge of grammar structures.

• Pronunciation and Intonation

3. **Reading**

• Reading and understanding

The student understands graded texts, grasp their contents, order the information acquired and combine new with known. They also enjoy reading texts in a foreign language.

4. **Writing**

Informal letter writing and filling the application form or Profile creation form.

**Course Content**

| **Topics/Communicative Situations** | **Grammar** |
|---|---|
| Greetings<br>Self-Introduction<br>German Alphabet<br>International Words in German Vocabulary<br>Working with a Dictionary<br>Numbers 0-1000<br>Communication and Things in the Classroom<br>Asking Questions about a Person<br>Travelling/Living Abroad<br>Geography of Europe<br>Describing One's Hobbies and Interests<br>Describing a Person<br>Conversational Discourse (Dialogues)<br>Conversing over the Phone<br>Vocabulary Learning & Grouping<br>Meeting People<br>Small Talk in a Café<br>Food & Drinks<br>Ordering Food in a Restaurant<br>Writing a Letter<br>Payment in a Restaurant<br>Telling Time<br>Time Phrases<br>Days of the Week<br>Fixing an Appointment<br>Making and Accepting an Invitation<br>Introducing the Family/Family Life<br>Food Items<br>Measurements,<br>Clothing &Colours<br>Doing the Groceries | Intonation of Words and Sentences<br>Conjugation of Regular Verbs<br>Conjugation of Irregular Verbs<br>Nouns and Gender<br>Plural Forms of Nouns<br>Definite and Indefinite Articles<br>Word Order: Statements and Questions<br>Interrogative Pronouns<br>Personal Pronouns<br>Interrogative Pronouns<br>Sentence Structures<br>Negation using nicht<br>Negation using kein/keine<br>Imperative (formal, informal)<br>Nominative, Accusative Case and Dativ Case<br>Negation in Accusative Case<br>Syntax: Nominative, Accusative Complements<br>Separable Verbs<br>Modalverbs: möchten, können, wollen, sollen, müssen & mögen<br>Prepositions with the Accusative and Dative Case<br>Possessive Pronouns<br>Demonstrative Pronouns<br>Possessivpronoun in Nominative and Accusative<br>Welcher/dieser in Nominative and Accusative |

Text Book: NETZWERK Deutsch also Fremds prache A1 Lesson 1-12 with Platforms and Exam preparation Training By:Stefanie Dengler Paul Rusch Helen Schmitz

Published in India by: Goyal Publishers &Dist (P) Ltd – 86 U.B. Jawahar Nagar, Delhi – 110 007(INDIA)

## CERTIFICATE PROGRAMME IN FRENCH

SYLLABUS AND SCHEME OF EXAMINATION W.E.F 2021 ADMISSIONS

## REGULATIONS

### 1. PROGRAMME STRUCTURE: -

The duration of the Certificate Programme in French is 180 hours in one academic year and the University Examination will be conducted at the end of the course. The examination consists of three papers, two written examinations and one oral examination, each carrying a total of 100 marks (i.e. Internal marks 40 plus final exam marks 60). In the case all the three papers continuous evaluation will be conducted and internal marks will be awarded out of 40 marks. Final examinations will be out of 60 marks.

### 2. Eligibility for Admission

Candidates who have passed Plus Two examination of Higher Secondary / Vocational Higher Secondary Department of Kerala or an examination equivalent thereto are eligible for admission. Holders of 3 year diploma of issued by the Directorate of Technical Education, Government of Kerala or and equivalent diploma are also eligible for admission.

### 3. Requirements for Passing / Classification:

A candidate should get aggregate minimum of 50% in the examination. A separate minimum of 40% each in the three papers is also essential. A minimum of 75% attendance is also required.

Candidates who get 50% and above but below 60% shall be declared to have passed the examination in SECOND CLASS.

Candidates who get 60% but below 75% shall be declared to have passed in FIRST CLASS.

Candidates who secure 75% and above shall be declared to have passed in FIRST CLASS WITH DISTINCTION.

Those who secure less than 50% marks are deemed to have failed in the examination.

The marks obtained in all the three papers will be considered for classification.

### 4. SCHEME OF THE EXAM: -

The Examination shall consist of three papers, two written examinations and one oral examination.

**PAPER 1: INTRODUCTION TO FRENCH CULTURE AND LANGUAGE**

DURATION: 3 Hours

TOTAL MARKS -100 [External Assessment: 60 Marks and Internal Assessment:40 Marks]

a) One simple unseen comprehension passage (a factual/descriptive passage based on all the vocabulary and grammar learnt from the prescribed text book in one academic year) and replying to questions based on the given passage - 10 marks
b) Writing section: Informal letter (80 words)/ short messages (invitation, accepting or refusing an invitation) / email /French recipe – 10 marks
c) Grammar – 30 marks.
d) d)Culture and civilization (questions based on prescribed text book) – 10 marks

**PAPER II: TRANSLATION**

DURATION: 3 hours

TOTAL MARKS: 100 [External Assessment: 60 Marks and Internal Assessment: 40 Marks]

a) Translation from French to English (seen passage from the prescribed text) – 20 marks
b) Translation from English to French (Simple unseen passage based on all the vocabulary and grammar learnt from the prescribed text book in one academic year) – 20 marks
c) Translation of simple sentences into French – 20 marks

**PAPER III: ORAL EXAM** (To be conducted in a person to person manner by the examiner).

DURATION: 3 hours

TOTAL MARKS: 100 [External Assessment: 60 and Internal Assessment: 40]

a) Listening to a French audio and noting down the main information from the audio and then afterwards, answering the questions related to it. - 20 marks
b) Reading a text/ passage /dialogue from the prescribed text. – 20 marks
c) Guided conversation /exchanging information / role play - 20 marks

## INTEGRATED DIPLOMA IN JAPANES EPROGRAMME

## REVISED SYLLABUS AND REGULATIONS W.E.F 2021-22 ADMISSIONS

### Programme Objectives

- To train students to read, write and communicate in simple Japanese language.
- ToimpartknowledgeinthenuancesofproperpronunciationandappropriateuseofJapanese.
- To provide a basic knowledge in language interpretation/translation, to build into future careers for students as desired.

### Programme Outcome

On successful completion of the course the student will be able to:

- Procure an introductory knowledge of Japanese language.
- Develop LSRW skills in Japanese.
- Acquire reading and writing knowledge of the three Japanese scripts (Hiragana, Katakana and a limited number of Kanji characters).
- Will have learned about 400 Kanji characters and about 1500 vocabulary including nouns, verbs, adjective types, adverbs and their grammatical and conjugative forms. (Equivalent to the JLPTN4.)
- AcquiresomedeeperunderstandingofJapan,itsuniqueculture andsocio-economicpositionforcareerprospects.

### Regulations

**1. Eligibility**

Candidates for admission to the integrated Diploma in Japanese Programme in shall be required to have passed Pre-Degree/ Plus-Two examination or equivalent there of recognized by CUSAT (qualifying examination). Previous knowledge in the language is not essential. If necessary, applicants may be ranked on the basis of the ire total marks obtained for qualifying examination and admission shall be done on the basis of the rank.

2. **Duration**

The duration of the Course is one academic year. Total of 240 teaching hours is recommended for the whole programme. This is a part-time Course and daily classesoftwohoursdurationshallbeconductedeitherinthemorningorintheevening. Online or offline mode of classes or even hybrid mode may be resorted to.

**3. Course Work**

The Course work for the study for the Integrated Diploma in Japanese shall be according to the Scheme of Examination and syllabi prescribed. No candidate is eligible for the examinations unless the student has under gone the prescribed Course in the Department kinder the University for one academic year and has completed all the prescribed tests and assignments.

The minimum attendance required by a candidate will be 75% of the total number of working hours.

**4. Examinations**

There will be University examinations at the end of the Course as per the Scheme of Examination.

There shall be two written papers and viva-voce as detailed in the Scheme of Examination.

**5.** Eligibility for Integrated Diploma in Japanese

A Candidate should get a separate minimum of 40% in each paper and aggregateminimumof50%intheexamination.Aminimum40%inviva-voceisalsoessential.

**6. Gradation**

Those who get 50% and above but below 60% shall be declared to have passed the examination in **Second Class.** Candidates who get 60% and above but below 75%shall be declared to have passed in **First Class.** Candidates who secure 75% and above shall be declared to have passed in **First Class** with **Distinction.**

**Faculty**

1. Dr.Brinda Bala Sreenivasan, Assistant Professor

# FACULTY OF LAW

**Dean:**

Dr.K.C.Sunny

Vice Chancellor

NUALS,NUALS Campus,

H.M.T.Colony P.O.

Kalamassery,

Kochi-683 503

# SCHOOL OF LEGAL STUDIES

## U.G. Course - B.B.A., LL.B (HONS)

**Semester I**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-272-0101 | General English -1 | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0102 | Business Organisation and Management | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0103 | Business Statistics | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0104 | Managerial Economics | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0105 | General Principles of Contract (Law of Contract-I) | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0106 | Law of Torts and Motor Vehicles Accidents | 6 | 2 | | NA | 50 | 50 | 100 |

**Semester II**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-272-0201 | General English-II | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0202 | Business Communication | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0203 | Business Environment | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0204 | Financial Accounting | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0205 | Constitutional Law-I | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0206 | Special Contracts (Law of Contract-II) | 6 | 2 | | NA | 50 | 50 | 100 |

**Semester III**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-272-0301 | Advertising and Publicity Management | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0302 | Cost Accounting | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0303 | Modern Banking | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0304 | Constitutional Law-II | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0305 | Jurisprudence (Legal Method,Indian Legal System andBasic Theory of Law) | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0306 | Law of Crimes-I | 6 | 2 | | | 50 | 50 | 100 |

**Semester IV**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-272-0401 | Financial Management | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0402 | Human Resources Management | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0403 | Marketing Management | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0404 | Administrative Law | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0405 | Family Law -1 | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0406 | Law of Crimes-II | 6 | 2 | | NA | 50 | 50 | 100 |
| | | | | | | | | |

**Semester V**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-272-0501 | Business Ethics | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0502 | Information Technology for Managers | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0503 | Consumer Protection Law | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0504 | Family Law -II | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0505 | Law of Criminal Procedure | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0506 | Law of Evidence | 6 | 2 | | NA | 50 | 50 | 100 |

**Semester VI**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-272-0601 | Research Methodology | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0602 | Operations Management | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0603 | Civil Procedure Code and limitation Act | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0604 | Company Law | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0605 | Labour Law-1 (Trade Unions and Industrial Disputes) | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0606 | Public International Law | 6 | 2 | | NA | 50 | 50 | 100 |

**Semester VII**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-272-0701 | Management Project | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0702 | Environmental Law | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0703 | Labour Law-II (Social Securities Law) | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0704 | Principles of Taxation Law | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0705 | Property Law | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0706 | Drafting, Pleading and Conveyance | 6 | 2 | | NA | 50 | 50 | 100 |

**Semester VIII**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-272-0801 | Professional Ethics & Professional Accounting System | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0802 | Organisational Dynamics | 6 | 2 | | NA | 50 | 50 | 100 |

**General Electives for VIII**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-272-0803 | Air and Space Law | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0804 | Criminology Penology and Victimology | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0805 | Disaster Management Law | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0806 | Human Rights Law | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0807 | Intellectual Property Laws | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0808 | International Humanitarian and Refugee Law | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0809 | International Trade Law | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0810 | Interpretation of Statutes | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0811 | Land Utilization Law | 6 | 2 | | NA | 50 | 50 | 100 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 20-272-0812 | Law and Medicine | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0813 | Low Governing Scientific Research | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0814 | Law of Co-Operative Societies | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0815 | Law on Building on and Engineering Contracts | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0816 | Law relating to Child | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0817 | Law relating to Ship | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0818 | Laws relating to Armed Forces | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0819 | Marine Safety Law | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0820 | Science, Technology Law | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0821 | Securities Law | 6 | 2 | | NA | 50 | 50 | 100 |

**Semester IX**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-272-0901 | Mediation Conciliation and Arbitration | 6 | 2 | | NA | 50 | 50 | 100 |

**General Electives for IX**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-272-0902 | Animal Protection Law | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0903 | Disability Law | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0904 | Forensic Science and Medical Jurisprudence | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0905 | Healthcare Law | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0906 | Law of Local Self Government | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0907 | Law of the Sea | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0908 | Law, Poverty and Development | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0909 | Laws Relating To Agriculture | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0910 | Private International Law | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-0911 | Women and Law | 6 | 2 | | NA | 50 | 50 | 100 |

**Special Electives for IX**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-272-931 | Bankruptcy and Insolvency Law | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-932 | Information Technology Law | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-933 | Insurance Law | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-934 | Law of Merger and Acquisition | 6 | 2 | | NA | 50 | 50 | 100 |

**Semester X**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-272-1001 | Moot Court Exercise and Internship | 6 | 2 | | NA | 100 | | 100 |

**Special Electives for IX**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-272-1002 | Banking Law | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-1003 | Competition Law | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-1004 | Foreign Trade Law | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-1005 | Law of Carriages | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-1006 | Law on Corporate Finance | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-1007 | Law of Corporate Governance | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-272-1050 | Viva Voce | | | | | | 100 | 100 |

## U.G. Course - B.Com.LL.B (HONS)

**Semester I**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-273-0101 | General English I | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0102 | Business Organisation and Management | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0103 | Business Statistics | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0104 | Managerial Economics | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0105 | General Principles of Contract (Law of Contract-I) | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0106 | Law of Torts andMotor Vehicles Accidents | 6 | 2 | | NA | 50 | 50 | 100 |

**Semester II**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-273-0201 | General English II | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0202 | Business Communication | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0203 | Business Environment | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0204 | Financial Accounting | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0205 | Constitutional Law-I | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0206 | Special Contracts (Law of Contract-II | 6 | 2 | | NA | 50 | 50 | 100 |

**Semester III**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-273-0301 | Life Insurance and Social Security | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0302 | Cost Accounting | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0303 | Modern Banking | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0304 | Constitutional Law-II | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0305 | Jurisprudence (Legal Method,Indian Legal System and Basic Theory of Law) | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0306 | Law of Crimes-I | 6 | 2 | | NA | 50 | 50 | 100 |

**Semester IV**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-273-0401 | Financial Management | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0402 | Human Resource Management | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0403 | Marketing Management | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0404 | Administrative Law | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0405 | Family Law -1 | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0406 | Law of Crimes-II | 6 | 2 | | NA | 50 | 50 | 100 |

**Semester V**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-273-0501 | Cooperation and Rural Development | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0502 | Information Technology for Business and Law | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0503 | Consumer Protection Law | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0504 | Family Law -II | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0505 | Law of Criminal Procedure | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0506 | Law of Evidence | 6 | 2 | | NA | 50 | 50 | 100 |

**Semester VI**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-273-0601 | Corporate Accounting | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0602 | Entrepreneurship Development | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0603 | Civil Procedure Code and Limitation Act | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0604 | Company Law | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0605 | Labour Law-I (Trade Unions and Industrial Disputes) | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0606 | Public International Law | 6 | 2 | | NA | 50 | 50 | 100 |

**Semester VII**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-273-0701 | Accounting for Specialised Institutions | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0702 | Environmental Law | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0703 | Labour Law-II (Social Securities Law) | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0704 | Principles of Taxation Law | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0705 | Property Law | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0706 | Drafting , Pleading and Conveyance | 6 | 2 | | NA | 100 | -- | 100 |

**Semester VIII**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-273-0801 | Professional Ethics & Professional Accounting System | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0802 | Auditing Principles and Practice | 6 | 2 | | NA | 100 | -- | 100 |

**General Electives for VIII**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-273-0803 | Air and Space Law | 6 | 2 | | NA | 100 | -- | 100 |
| 20-273-0804 | Criminology, Penology and Victimology | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0805 | Disaster Management Law | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0806 | Human Rights Law | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0807 | Intellectual Property Laws | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0808 | International Humanitarian and Refugee Law | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0809 | International Trade Law | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0810 | Interpretation of Statutes | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0811 | Land Utilization Law | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0812 | Law and Medicine | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0813 | Law Governing Scientific Research | 6 | 2 | | NA | 50 | 50 | 100 |
| 0-273-0814 | Law of Co-Operatives Societies | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0815 | Law on Building and Engineering Contracts | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0816 | Law relating to child | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0817 | Law relating to Ships | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0818 | Law relating to Armed Forces | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0819 | Marine Safety Law | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0820 | Science, Technolgy and Law | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0821 | Securities Law | 6 | 2 | | NA | 50 | 50 | 100 |

**Semester IX**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-273-0901 | Mediation , Conciliation and Arbritration | 6 | 2 | | NA | 100 | -- | 100 |

**General Electives for IX**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-273-0902 | Animal Protection Law | 6 | 2 | | NA | 100 | -- | 100 |
| 20-273-0903 | Disability Law | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0904 | Forensic Science and Medical Jurisprudence | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0905 | Healthcare Law | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0906 | Law of Local Self Government | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0907 | Law of the Sea | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0908 | Law ,Poverty and Development | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0909 | Laws Relating To Agriculture | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0910 | Private International Law | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-0911 | Women and Law | 6 | 2 | | NA | 50 | 50 | 100 |

**Special Electives for IX**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-273-931 | Bankruptcy and Insolvency Law | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-932 | Information Technology Law | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-933 | Insurance Law | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-934 | Law of Merger and Acquisition | 6 | 2 | | NA | 50 | 50 | 100 |

**Semester X**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-273-1001 | Moot Court Exercise and Internship | 6 | 2 | | NA | | 100 | 100 |

**Special Electives for IX**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-273-1002 | Banking Law | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-1003 | Competition Law | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-1004 | Foreign Trade Law | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-1005 | Law of Carriages | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-1006 | Law on Corporate Finance | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-1007 | Law of Corporate Governance | 6 | 2 | | NA | 50 | 50 | 100 |
| 20-273-1050 | Viva Voce | | | | | | | |

***** The Elective courses will be decided according to the availability of teachers at the beginning of each semester.

. **General Elective Courses in Law:**

**Semester VIII (Choose any 4 Papers)**

1. Air and Space Law
2. Criminology, Penology and Victimology
3. Disaster Management Law
4. Human Rights Law
5. Intellectual Property Laws
6. International Humanitarian and Refugee Law
7. International Trade Law
8. Interpretation of Statutes
9. Land Utilization Law
10. Law and Medicine
11. Law Governing Scientific Research
12. Law of Co-operative Societies
13. Law on Building and Engineering Contracts
14. Law Relating to Child
15. Law Relating to Ships
16. Laws Relating to Armed Forces
17. Marine Safety Law
18. Science, Technology and Law
19. Securities Laws

**Semester IX**

**General Electives for IX (Choose any 2 papers)**

1. Animal Protection Law
2. Disability Law
3. Forensic Science and Medical Jurisprudence
4. Healthcare Law
5. Law of Local Self Government
6. Law of the Sea
7. Law, Poverty and Development
8. Laws Relating to Agriculture
9. Private International Law
10. Women and Law
11. Bankruptcy and Insolvency Law
12. Information Technology Law
13. Insurance Law
14. Law of Merger and Acquisition

**Special Electives for IX (Choose any 5 papers)**

1. Banking Law
2. Competition Law
3. Foreign Trade Law
4. Law of Carriages
5. Law on Corporate Finance
6. Law of Corporate Governance

## U.G. Course – 3 Year LL.B.

**Semester I**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-271-0101 | Family Law – I | 5 | 1 | | NA | 50 | 50 | 100 |
| 20-271-0102 | General Principles of Contract(Law of Contract-I) | 5 | 1 | | NA | 50 | 50 | 100 |
| 20-271-0103 | Law of Crimes-I | 5 | 1 | | NA | 50 | 50 | 100 |
| 20-271-0104 | Law of Torts and Motor Vehicles Accidents | 5 | 1 | | NA | 50 | 50 | 100 |
| | Elective – I* | 5 | 1 | | NA | 50 | 50 | 100 |

**Semester II**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-271-0201 | Administrative Law | 5 | 1 | | NA | 50 | 50 | 100 |
| 20-271-0202 | Constitutional Law-I | 5 | 1 | | NA | 50 | 50 | 100 |
| 20-271-0203 | Family Law –II | 5 | 1 | | NA | 50 | 50 | 100 |
| 20-271-0204 | Special Contracts (Law of Contract- II) | 5 | 1 | | NA | 50 | 50 | 100 |
| | Elective – II* | 5 | 1 | | NA | 50 | 50 | 100 |

**Semester III**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-271-0301 | Drafting, Pleading and Conveyance | 5 | 1 | | NA | 50 | 50 | 100 |
| 20-271-0302 | Constitutional Law-II | 5 | 1 | | NA | 50 | 50 | 100 |
| 20-271-0303 | Jurisprudence (Legal Method, Indian Legal System and Basic Theory of Law | 5 | 1 | | NA | 50 | 50 | 100 |
| 20-271-0304 | Law of Evidence | 5 | 1 | | NA | 50 | 50 | 100 |
| | Elective – III* | 5 | 1 | | NA | 50 | 50 | 100 |

**Semester IV**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-271-0401 | Professional Ethics & Professional Accounting System | 5 | 1 | | NA | 50 | 50 | 100 |
| 20-271-0402 | Civil Procedure Code and Limitation Act | 5 | 1 | | NA | 50 | 50 | 100 |
| 20-271-0403 | Company Law | 5 | 1 | | NA | 50 | 50 | 100 |
| 20-271-0404 | Law of Criminal Procedure | 5 | 1 | | NA | 50 | 50 | 100 |
| | Elective – IV* | 5 | 1 | | NA | 50 | 50 | 100 |

**Semester V**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-271-0501 | Mediation, Conciliation and Arbritration | 5 | 1 | | NA | 50 | 50 | 100 |
| 20-271-0502 | Property Law | 5 | 1 | | NA | 50 | 50 | 100 |
| 20-271-0503 | Public International Laws | 5 | 1 | | NA | 50 | 50 | 100 |
| 20-271-0504 | Labour Law-I (Trade Unions and Industrial Disputes) | 5 | 1 | | NA | 50 | 50 | 100 |
| | Elective – V* | 5 | 1 | | NA | 50 | 50 | 100 |

**Semester VI**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-271-0601 | Moot Court Exercise and Internship | 5 | 1 | | NA | 50 | 50 | 100 |
| 20-271-0602 | Environmental Law | 5 | 1 | | NA | 50 | 50 | 100 |
| 20-271-0603 | Labour Law-II (Social Securities Law) | 5 | 1 | | NA | 50 | 50 | 100 |
| 20-271-0604 | Principles of Taxation Law | 5 | 1 | | NA | 50 | 50 | 100 |
| | Elective – VI* | 5 | 1 | | NA | 50 | 50 | 100 |

***** The Elective courses will be decided according to the availability of teachers at the beginning of each semester.

. **General Elective Courses in Law:**

**Semester I**

20. Criminology, Penology and Victimology
21. Human Rights Law
22. International Humanitarian and Refugee Law
23. Law of Co-operative Societies

**Semester II**

1. Animal Protection Law
2. Disability Law
3. Law and Medicine
4. Law of the Sea
5. Laws Relating to Agriculture

**Semester III**

1. Disaster Management Law
2. Law on Building and Engineering Contracts
3. Law, Poverty and Development
4. Laws Relating to Armed Forces
5. Law Relating to Ships

**Semester IV**

1. Interpretation of Statutes
2. Land Utilization Law
3. Law Relating to Child
4. Marine Safety Law
5. Women and Law

**Semester V**

1. Forensic Science and Medical Jurisprudence
2. Health Care Law
3. Intellectual Property Laws
4. Law Governing Scientific Research
5. Science, Technology and Law

**Semester VI**

1. Air and Space Law
2. International Trade Law
3. Law of Local Self Government
4. Private International Law
5. Securities Laws

## ONE YEAR LL.M PROGRAMME

**Semester I**

| Course Code | Paper | C/E | Credits | Pre-requisites |
|---|---|---|---|---|
| 17-401-0101 | Law & Justice in a Globalised World Stream I | C | 3 | LL.B |
| 17-401-0105 | Comparative Public Law Stream III (Compulsory Course) | C | 3 | LL.B |
| 17-401-0109 | Research Methodology and Legal Writing | C | 3 | LL.B |
| 17-401-01-- | (Specialization) | C | 2 | LL.B |
| 17-401-01-- | (Specialization) | C | 2 | LL.B |
| 17-401-01-- | Elective | E | 2 | LL.B |
| | Elective | | | |
| 17-401-0101 | Communicative English I (Interdisciplinary Elective) | E | 3 | LL.B |
| 17-401-0110 | Seminar Course on Dissertation I | C | 2 | LL.B |

**Semester II**

| Course Code | Paper | C/E | Credits | Pre-requisites |
|---|---|---|---|---|
| 17-401-02-- | (Specialization) | C | 2 | LL.B |
| 17-401-02-- | (Specialization) | C | 2 | LL.B |
| 17-401-02-- | (Specialization) | C | 2 | LL.B |
| 17-401-02-- | (Specialization) | C | 2 | LL.B |
| 17-401-0201 | Dissertation & Viva Voce | C | 3 | LL.B |
| 17-401-0201 | Seminar Course on Dissertation II | C | 2 | LL.B |

**Group A: Administrative Law**

| Course Code | Name of Course | Credit |
|---|---|---|
| 17-401-0111 | Basic Principles of Administrative Process and Good Governance | 2 |
| 17-401-0203 | Judicial Control Over Administrative Process | 2 |
| 17-401-0204 | Administrative Process and Law Making | 2 |
| 17-401-0205 | Governmental Accountability and Liabilities | 2 |
| 17-401-0206 | Public Services : Status and Accountability | 2 |
| 17-401-0207 | Administrative Control Over Public Enterprises | 2 |

**Group B: Commercial Law**

| Course Code | Name of Course | Credit |
|---|---|---|
| 17-401-0112 | Foundations of Contractual Liability | 2 |
| 17-401-0208 | Sale and Supply of goods | 2 |
| 17-401-0209 | Corporate Governance | 2 |
| 17-401-0210 | Insurance Law | 2 |
| 17-401-0211 | Banking Law | 2 |
| 17-401-0212 | International Trade Law | 2 |

**Group C: Constitutional Law**

| Course Code | Name of Course | Credit |
|---|---|---|
| 17-401-0213 | Central –State Legislative Relationship | 2 |
| 17-401-0113 | Fundamental Rights and the Constitution | 2 |
| 17-401-0214 | Parliamentary Form of Government | 2 |
| 17-401-0215 | Emergency Powers under the Constitution | 2 |
| 17-401-0216 | Judiciary under the Indian Constitution | 2 |
| 17-401-0217 | Interstate Trade and Commerce and Right to Property | 2 |
| 17-401-0218 | Constitutional Scheme and Pluralist Society | 2 |

**Group D: Consumer Protection Law**

| Course Code | Name of Course | Credit |
|---|---|---|
| 17-401-0114 | General Principles of Consumer Law | 2 |
| 17-401-0219 | Quality Control and Professional Services | 2 |
| 17-401-0220 | Consumer Dispute Resolution | 2 |
| 17-401-0221 | Competition Law | 2 |
| 17-401-0222 | International and Comparative Competition Law | 2 |
| 17-401-0223 | Issues in Competition Law | 2 |

**Group E: Corporate Governance and Securities Law**

| Course Code | Name of Course | Credit |
|---|---|---|
| 17-401-0115 | Law of Corporate Governance | 2 |
| 17-401-0224 | Corporate Finance and Securities Law | 2 |
| 17-401-0225 | Administration of Securities Law | 2 |
| 17-401-0226 | Law of Corporate Reorganization | 2 |
| 17-401-0227 | Law of Mutual Funds and Collective Investment Schemes | 2 |
| 17-401-0228 | Corporate Bankruptcy Law | 2 |

**Group F: Criminal Law**

| Course Code | Name of Course | Credit |
|---|---|---|
| 17-401-0116 | Fundamentals of Criminal Liability | 2 |
| 17-401-0229 | Penal System and Penal Policy | 2 |
| 17-401-0230 | Criminology | 2 |
| 17-401-0231 | Penology | 2 |
| 17-401-0232 | Crime Investigation | 2 |
| 17-401-0233 | Criminal Trial | 2 |

**Group G: Environmental Law**

| Course Code | Name of Course | Credit |
|---|---|---|
| 17-401-0117 | Environmental Protection: National and International Perspectives | 2 |
| 17-401-0234 | Protection and Conservation of Land , Water and Air | 2 |
| 17-401-0235 | Conservation of Forests, Wild Life and Biological Diversity | 2 |
| 17-401-0236 | Conservation and Protection of Coastal Zone and Wet Lands | 2 |
| 17-401-0237 | Regulation of Trans-Boundary pollution | 2 |
| 17-401-0238 | Environment and Development | 2 |

**Group H: Human Rights Law**

| Course Code | Name of Course | Credit |
|---|---|---|
| 17-401-0118 | Legal Rights and Duties | 2 |
| 17-401-0239 | International Human Rights Law | 2 |
| 17-401-0240 | International Human Rights Law & Vulnerable Populations | 2 |
| 17-401-0241 | Human Rights and Indian Legal System | 2 |
| 17-401-0242 | Science, Technology and Human Rights | 2 |
| 17-401-0243 | Human Rights and Right to Development | 2 |

**Group I: Intellectual Property Law**

| Course Code | Name of Course | Credit |
|---|---|---|
| 17-401-0119 | Intellectual Property Rights and Development | 2 |
| 17-401-0244 | Access to Information and Copyright | 2 |
| 17-401-0245 | Affordability under Patent Regime-Patents and Right to Health | 2 |
| 17-401-0246 | Patent and Biotechnology | 2 |
| 17-401-0247 | TRIPS Flexibilities and Development | 2 |
| 17-401-0248 | Collective Property as Intellectual Property | 2 |

**Group J: International Criminal Law**

| Course Code | Name of Course | Credit |
|---|---|---|
| 17-401-0120 | General Principles of Liability in International Law | 2 |
| 17-401-0249 | International Crimes | 2 |
| 17-401-0250 | International Criminal Procedure | 2 |
| 17-401-0251 | International Standards on Criminal Defence Rights | 2 |
| 17-401-0252 | Prosecution of International Crimes, Institutional Arrangements | 2 |
| 17-401-0253 | International Standards on Pre-trial Detention Procedure | 2 |

**Group K: International Trade Law**

| Course Code | Name of Course | Credit |
|---|---|---|
| 17-401-0121 | World Trading System | 2 |
| 17-401-0254 | International Trade in Investments and Services | 2 |
| 17-401-0255 | International Trade and Environment | 2 |
| 17-401-0256 | International Trade in Agriculture and Food | 2 |
| 17-401-0257 | International Commercial Arbitration and Conciliation | 2 |
| 17-401-0258 | State Control of International Trade | 2 |

**Group L: Labour and Service Laws**

| Course Code | Name of Course | Credit |
|---|---|---|
| 17-401-0122 | Trade Unionism, Collective Bargaining and Industrial Democracy | 2 |
| 17-401-0259 | Industrial Disputes & its Resolution | 2 |
| 17-401-0260 | Wages | 2 |
| 17-401-0261 | Monetary Benefits | 2 |
| 17-401-0262 | Social Security Laws | 2 |
| 17-401-0263 | Law relating to Public Servants | 2 |

**Group M: Maritime Law**

| Course Code | Name of Course | Credit |
|---|---|---|
| 17-401-0123 | Admiralty and Maritime Jurisdiction | 2 |
| 17-401-0264 | Ownership and Management of Ships | 2 |
| 17-401-0265 | Carriage of Goods by Sea | 2 |
| 17-401-0266 | Marine Insurance | 2 |
| 17-401-0267 | International Maritime and Commercial Arbitration and Conciliation | 2 |
| 17-401-0268 | Maritime Safety and Security Law | 2 |

| Course Code | Foundation Courses/Compulsory | Credits |
|---|---|---|
| 17-401-0101 | Law & Justice in a Globalised World Stream I | 3 |
| 17-401-0102 | Law & Justice in a Globalised World Stream II | 3 |
| 17-401-0103 | Comparative Public Law Stream I | 3 |
| 17-401-0104 | Comparative Public Law Stream II | 3 |
| 17-401-0105 | Comparative Public Law Stream III | 3 |
| 17-401-0106 | Comparative Public Law Stream IV | 3 |
| 17-401-0107 | Comparative Public Law Stream V | 3 |
| 17-401-0108 | Comparative Public Law Stream VI | 3 |
| 17-401-0109 | Research Methodology and Legal Writing | 3 |

| | | |
|---|---|---|
| 17-401-0110 | Seminar Course on Dissertation I | 2 |
| 17-401-0201 | Dissertation & Viva-Voce | 3 |
| 17-401-0202 | Seminar Course on Dissertation | 2 |
| | | |
| **Course Code** | **Open Elective Courses in Law** | **Credits** |
| 17-401-0124 | Constitutional rights and criminal Justice process | 3 |
| 17-401-0125 | Criminal Procedure and Rights of the Accused | 3 |
| 17-401-0126 | Fair Trial | 3 |
| 17-401-0127 | Human Rights : Conceptual foundation | 3 |
| 17-401-0128 | Human Rights : Historical Development | 3 |
| 17-401-0129 | Protection of Environment : Role of Law | 3 |
| 17-401-0130 | IP and Management | 3 |
| 17-401-0131 | Patenting Inventions: Practice and access to tools | 4 |
| | | |
| | **Elective Courses in Law** | |
| 17-401-0132 | Judicial Process | 2 |
| 17-401-0133 | Jurisprudence and Legal Theory | 2 |
| 17-401-0134 | Law and Social Transformation in India | 2 |
| 17-401-0135 | Law in Society | 2 |
| 17-401-0136 | Legal Education | 2 |
| 17-401-0137 | International Law | 2 |
| 17-401-0138 | Law of International Organisations | 2 |
| 17-401-0139 | Law of Armed Conflicts | 2 |
| 17-401-0140 | Private International Law | 2 |
| 17-401-0141 | International Labour Organisation | 2 |
| 17-401-0142 | Constitutionalism | 2 |
| 17-401-0143 | Constitutionalism: Pluralism and Federalism | 2 |
| 17-401-0144 | Centre- State Relations | 2 |

| | | |
|---|---|---|
| 17-401-0145 | Parliamentary Government | 2 |
| 17-401-0146 | Emergency and Defense Power | 2 |
| 17-401-0147 | Protection of life and personal liberty | 2 |
| 17-401-0148 | Fundamental Rights and Constitutional Protection | 2 |
| 17-401-0149 | Indian Constitutional Law: The New Challenges | 2 |
| 17-401-0150 | International Humanitarian Law & Refugee Law | 2 |
| 17-401-0151 | Collective bargaining and industrial democracy | 2 |
| 17-401-0152 | Coastal Zone Management | 2 |
| 17-401-0153 | Legal Control of Industrial Pollution | 2 |
| 17-401-0154 | Legal control of Marine Pollution | 2 |
| 17-401-0155 | Law of Agency | 2 |
| 17-401-0156 | Law of Carriages | 2 |
| 17-401-0157 | Banking and Insurance Laws | 2 |
| 17-401-0158 | Law on International Sales | 2 |
| 17-401-0159 | Law on International Trade Finance | 2 |
| 17-401-0160 | Remedies under Contract Law | 2 |
| 17-401-0161 | Sale and supply of goods | 2 |
| 17-401-0162 | Marine Insurance | 2 |
| 17-401-0163 | Competition Law | 2 |
| 17-401-0164 | International Commercial Arbitration and Conciliation | 2 |
| 17-401-0165 | Socio-economic offences and the Criminal Justice Process | 2 |
| 17-401-0166 | Criminal Justice Standards for Police | 2 |
| 17-401-0167 | International Criminal Justice and Children | 2 |
| 17-401-0168 | International Standards on Pre-trial Detention Procedure | 2 |
| 17-401-0169 | International standards on Sentencing Procedure | 2 |
| 17-401-0170 | International Norms on Treatment of Prisoners | 2 |

| | | |
|---|---|---|
| 17-401-0171 | Law and Medicine | 2 |
| 17-401-0172 | International Law of Foreign Investments | 2 |
| | | |
| | **Interdisciplinary Electives** | |
| 17-401-0173 | Community Informatics | 4 |
| 17-401-0266 | Consumer Protection Law | 4 |
| 16-401-0174 | General Principles on IPR | 3 |
| 17-401-0175 | Banking Theory and Practice | 3 |
| 17-401-0176 | Information Security Management | 4 |
| 19-401-0177 | Fundamentals of Corporate Law | 3 |

**Details of Faculty**

| Sl. No. | Name & Designation | Specialisation | Communication |
|---|---|---|---|
| 1. | Dr.VaniKesari A. (Associate Professor & Director) | Jurisprudence, Administrative Law, Human Rights Law& Constitutional Law | vanikesaria@gmail.com<br>Ph: 0484-2543744<br>9495953744 |
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| 8. | Smt. Jean Vinitha Peter (Assistant Professor) | Jurisprudence, Criminal Law & Constitutional Law | vinithajean@gmail.com ,<br>jeanvinithapeter@cusat.ac.in<br>9947987614 |
| 9. | Sri. Naveen S. (Assistant Professor) | Environmental Law, Constitutional Law, IPR , International Organisation and Human Rights | naveensukumaran@gmail.com<br>naveensukumaran@cusat.ac.in<br>9400250724 |

| | | | |
|---|---|---|---|
| 10. | Dr.NematSheereen S. (Assistant Professor) | Financial Management, Marketing Management | nematsheerin3@gmail.com 9446208502 |
| 11. | Dr.Preetha S. (Assistant Professor) | Jurisprudence, Commercial Law & Criminal Law | preetha.sadasivan@gmail.com preetha@cusa.ac.in 9446208509 |
| 12. | Dr. P.S. Seema (Associate Professor) | Jurisprudence, Criminal Law, Constitutional Law & Human Rights Law | pss_sls@yahoo.co.in, drpsseema@gmail.com Ph: 0484-2233411 9496943875 |
| 13. | Dr.Sreejith S. (Assistant Professor) | Management, Finance, Marketing | lamjith@gmail.com 9995510007 |

# INTER UNIVERSITY CENTRE FOR IPR STUDIES

## LLM (IPR) PHD/LL.M (IP) PHD

**Semester I**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| IUC 2101 | The Concept of Law and Justice | C | 4 |
| IUC 2102 | Foundation Course I on IPR – Intellectual Property – General Principles | C | 4 |
| IUC 2103 | Seminar Course – 1 | C | 4 |
| IUC 2104 | Elective I * | E | 4 |

**Semester II**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| IUC 2201 | Law and Social Change | C | 4 |
| IUC 2202 | Foundation Course II on IPR – Intellectual Property Rights – The Social Relevance | C | 4 |
| IUC 2203 | Seminar Course – II | C | 4 |
| IUC 2204 | Elective II * | E | 4 |

**Semester III**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| IUC 2301 | Research Methodology | C | 4 |
| IUC 2302 | Course work on IPR – I | C | 8 |
| IUC 2303 | Elective III* | E | 4 |
| IUC 2304 | Elective IV * | E | 4 |

**Semester IV**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| IUC 2401 | Course work on IPR – II | C | 8 |
| IUC 2402 | Course work on IPR – III | C | 8 |
| IUC 2403 | Elective V* | E | 4 |

**Semester V**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| IUC 2501 | Course work on IPR – IV | C | 8 |
| IUC 2502 | Course work on IPR – V | C | 8 |

**Semester VI**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| IUC 2601 | Course work on IPR – VI | C | 8 |
| IUC 2602 | Course work on IPR – VII | C | 8 |

**Semester VII**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| IUC 2701 | Course work on IPR – VIII | C | 8 |
| IUC 2702 | Course work on IPR – IX | C | 8 |

**Semester VIII**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| IUC 2801 | Course work on IPR – X | C | 8 |
| IUC 2802 | Course work on IPR – XI | C | 8 |

**Semester IX & X**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| IUC 2901 | Thesis on IPR | C | 32 |

**ELECTIVE COURSES**

1. Patent Law and TRIPS Agreement
2. IPR and Computer Programme
3. Protection of Traditional Knowledge
4. TRIPS Agreement and Access to Medicine
5. Genetic Resources and Associated Traditional Knowledge
6. World Intellectual Property Organisation (WIPO) Development Agenda
7. WTO Dispute Settlement and TRIPS Agreement
8. Protection of Broadcasting Organisations
9. Copyright and Entertainment Industry
10. Acquisition of intellectual Property Rights: International Aspects

## ONE YEAR PG DIPLOMA IN INTELLECTUAL PROPERTY RIGHTS

**Semester – I**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| | General Principles of IPR | C | 4 |
| | Patent Drafting and Filing (National and International) and Enforcement of Rights | C | 4 |
| | Trademarks Drafting and Filing (National and International and Enforcement Rights | C | 4 |

**Semester – II**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| | Transfer of Technology | C | 4 |
| | Electives (2)<br>a. Electives 1<br>b. Electives 2<br>Or<br>Project Work/Internship | <br>E<br>E<br><br><br>E | <br>4<br>4<br><br><br>8 |
| | **TOTAL** | | **24** |

**ELECTIVE COURSES**

1. Patent Law and TRIPS Agreement
2. IPR and Computer Programme
3. TRIPS Agreement and Access to Medicine

# ONE YEAR LL.M (IPR)

**(Notif.No.Conf.II/2941/3/2018 (5) dated 21.01.2019)**

**Semester –I**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| IUCI 2101 | Justice in a Globalised World | C | 3 |
| IUCI 2102 | Comparative Public Law | C | 3 |
| IUCI 2103 | Research Methodology | C | 3 |
| IUCI 2104 | Intellectual Property Rights and Development : Flexibilities under International IP System | C | 2 |
| IUCI 2105 | Access to Information and Copyright | E | 2 |
| IUCI 2106 | Seminar course on Dissertation | C | 2 |

**Semester –II**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| IUCI 2201 | Affordability under Patent Regime-Patents and Right to Health | C | 2 |
| IUCI 2202 | Patent and Biotechnology | C | 2 |
| IUCI 2203 | Trips Flexibilities and Development | C | 2 |
| IUCI 2204 | Collective property as Intellectual Property | C | 2 |
| IUCI 2205 | Dissertation & Viva Voce | C | 3 |
| IUCI 2206 | Seminar course on Dissertation II | C | 2 |

**ELECTIVE COURSES OFFERED TO NON-LAW STUDENTS OF CUSAT**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| IUC EL01 | Introduction to IPR – Patent Law and Practice | E | 2 |
| IUC EL02 | IP and Management | E | 3 |
| IUC EL03 | Patenting Inventions: Practice and Access to Tools | E | 4 |

## DETAILS OF FACULTY

| Sl. No. | Name & Designation | Specialisation | Communication |
|---|---|---|---|
| 1. | Dr.N.S. Gopalakrishnan<br>(Honorary Professor) | Commercial Law, Criminal Law & IPL | nsg@cusat.ac.in<br>Ph:0484-2577542<br>9447077542 |
| 2. | Dr.I.G. Rathish<br>Assistant Professor (contract | Chemistry | rathishig@gmail.com<br>Ph:8108074199<br>8921982102 |
| 3. | Ms.Anjana Girish<br>Assistant Professor (contract) | Public Law & IPR | anjana.girish87@gmail.com<br>Ph:9847063736 |
| 5. | Dr.Anson C J<br>Assistant Professor (contract) | IPR & Management | 777anson@gmail.com<br>9400610461 |

# FACULTY OF MARINE SCIENCES

**Dean:**


Dr.S Bijoy Nandan

Professor

Department of Marine Biology,

Microbiology & Biochemistry

Cochin University of Science and Technology

Kochi- 682 016

# SCHOOL OF INDUSTRIAL FISHERIES

## M.SC. (INDUSTRIAL FISHERIES)

**Semester I**

| Course code | Course | Credits | Core/ Elective | | MARKS | |
|---|---|---|---|---|---|---|
| | | | | Continuous Evaluation ( Internal) | End Sems. Exam (External) | Total |
| 20-308-0101 | Taxonomy and Life History Traits of Commercially Important Fin Fishes and Shell Fishes | 3 | C | 50 | 50 | 100 |
| 20-308-0102 | Principles of Fishing Technology | **2** | **C** | 50 | 50 | 100 |
| 20-308-0103 | Food Chemistry and Fish Biochemistry | **3** | **C** | 50 | 50 | 100 |
| 20-308-0104 | Managerial Economics | **3** | **C** | 50 | 50 | 100 |
| 20-308-0105 | Principles of Fish Business Management | **3** | **E** | 50 | 50 | 100 |
| 20-308-0106 | Research Methodology and Quantitative Techniques | **2** | **E** | 50 | 50 | 100 |
| 20-308-0107 | Taxonomy and Life History Traits of Commercially Important Fin Fishes and Shell Fishes (Practical) | **1** | **C** | 100 | | 100 |
| 20-308-0108 | Food chemistry and Fish Biochemistry (Practical) | **1** | **C** | 100 | | 100 |
| 20-308-0109 | Climate change Impact on Marine Ecosystem and Fisheries | **2** | **E** | 50 | 50 | 100 |

Maximum Total credit Offered in 1st Semester: 20( 13 credits for Core and 07 credits for Elective Courses)

**Semester II**

| Course code | Course | Credits | Core/ Elective | | MARKS | |
|---|---|---|---|---|---|---|
| | | | | Continuous Evaluation ( Internal) | End Sems. Exam (External) | Total |
| 20-308-0201 | Fisheries Resources and Management | 3 | C | 50 | 50 | 100 |
| 20-308-0202 | Fishing Craft and Gear Technology | 3 | E | 50 | 50 | 100 |
| 20-308-0203 | Freezing, Canning and Packaging Technology | 3 | C | 50 | 50 | 100 |
| 20-308-0204 | Production and Operations Management in Fisheries Industry | 3 | C | 50 | 50 | 100 |
| 20-308-0205 | Economics of Fisheries Production & Marketing | 3 | C | 50 | 50 | 100 |
| 20-308-0206 | Analytical Methods for Seafood Quality Assurance | 2 | E | 50 | 50 | 100 |
| 20-308-0207 | Fisheries Resources and Management (Practical) | 1 | E | 100 | | 100 |
| 20-308-0208 | Fish Processing and Quality Control (Practical) | 1 | C | 100 | | 100 |
| 20-308-0209 | Fishing Craft and Gear Technology (Practical) | 1 | C | 100 | | 100 |
| 20-308-0210 | Field Study of Economics of Fisheries Production and Marketing (Practical) | 1 | E | 100 | | 100 |
| 20-308-0211 | Oceanic and Deep Sea Fisheries | 3 | E | 50 | 50 | 100 |
| 0-308-0212 | Food Science and Nutrition | 3 | E | 50 | 50 | 100 |
| 20-308-0213 | Aquaculture Economics | 3 | E | 50 | 50 | 100 |

Maximum Total credit Offered in 2nd Semester: 30 Credits

( 14 credits for Core and 16 credits for Elective Courses)

**Semester III**

| Course code | Course | Credits | Core/ Elective | | MARKS | |
|---|---|---|---|---|---|---|
| | | | | Continuous Evaluation ( Internal) | End Sems. Exam (External) | Total |
| 20-308-0301 | Seed Production and Hatchery Management of Cultivable Finfishes and Shell fishes | 3 | C | 50 | 50 | 100 |
| 20-308-0302 | Aquaculture Systems and Practices | 3 | E | 50 | 50 | 100 |
| 20-308-0303 | Fishing Operation, Seamanship and Navigation | 2 | C | 50 | 50 | 100 |
| 20-308-0304 | By-products and Value Added Products Technology | 3 | C | 50 | 50 | 100 |
| 20-308-0305 | Quality Assurance and Seafood Safety | 3 | E | 50 | 50 | 100 |
| 20-308-0306 | Fisheries Management for Sustainable Development | 3 | C | 50 | 50 | 100 |
| 20-308-0307 | Marketing Management | 2 | C | 50 | 50 | 100 |
| 20-308-0308 | Management Accounting and Finance Management for Fisheries | 3 | E | 50 | 50 | 100 |
| 20-308-0309 | Aquaculture Systems and Practices (Practical) | 1 | E | 100 | 0 | 100 |
| 20-308-0310 | By-products, Value Added Products and Microbiology (Practical) | 1 | C | 100 | 0 | 100 |
| 20-308-0311 | Fishing Operation/Onboard Training (Practical) | 1 | E | 100 | 0 | 100 |
| 20-308-0312 | Fish Genetics and Hybridization | 3 | E | 50 | 50 | 100 |
| 20-308-0313 | Inland Fishing Gears, Designs and Operation | 3 | E | 50 | 50 | 100 |
| 20-308-0314 | Fisheries and Rural Development | 3 | E | 50 | 50 | 100 |

Maximum Total credit Offered in 3rd Semester : 34 Credits

( 14 credits for Core and 20 credits for Elective Courses)

**Semester IV**

| Course code | Course | Credits | Core/ Elective | | MARKS | |
|---|---|---|---|---|---|---|
| | | | | Continuous Evaluation ( Internal) | End Sems. Exam (External) | Total |
| 20-308-0401 | Internship in Seafood Industry and Report Evaluation | 4 | C | 100 | | 100 |
| 20-308-0402 | Internship in Hatchery/Farm/Aqua culture Industry | 4 | E | 100 | | 100 |
| 20-308-0403 | Entrepreneurship/Start-ups/Business Incubation Initiatives | 2 | E | 100 | | 100 |
| 20-308-0404 | Dissertation/Project report Evaluation | 8 | C | 100<br>100 | | 100<br>100 |
| 20-308-0405 | Course Viva-Voce | 1 | C | 100 | | 100 |

Maximum Total credit Offered in 4th Semester: 19 Credits

(13 credits for Core and 6 credits for Elective Courses)

**TOTAL CREDITS OFFERED IN DIFFERENT SEMESTERS**

| Maxi-mum Credits offered | Semester 1 | Semester 2 | Semester 3 | Semester 4 | Total Credits |
|---|---|---|---|---|---|
| **CORE** | 13 | 14 | 14 | 13 | 54 |
| **ELECTIVE** | 7 | 16 | 20 | 6 | 49 |
| **TOTAL** | 20 | 30 | 34 | 19 | 103 |

# M.FSC. (SEAFOOD SAFETY AND TRADE)

**FIRST SEMESTER**

| Course code | Course | Credits | Core/ Elective | | **MARKS** | |
|---|---|---|---|---|---|---|
| | | | | Continuous Evaluation ( Internal) | End Sems. Exam (External) | Total |
| 20-386-0101 | Taxonamy and Life History Traits of Commercially Important Fin Fishes and Shell Fishes | 3 | E | 50 | 50 | 100 |
| 20-386-0102 | Managerial Economics | **3** | **C** | 50 | 50 | 100 |
| 20-386-0103 | Food Chemistry and Fish Biochemistry | **3** | **C** | 50 | 50 | 100 |
| 20-386-0104 | Principles of Fish Business Management | **3** | **C** | 50 | 50 | 100 |
| 20-386-0105 | Market Research for Seafood Business | **3** | **E** | 50 | 50 | 100 |
| 20-386-0106 | Research Methodology and Quantitative Techniques | **2** | **E** | 50 | 50 | 100 |
| 20-386-0107 | Fish Harvest Technologies and Onboard Facilities | **2** | **C** | 50 | 50 | 100 |
| 20-386-0108 | Taxonomy and Life History Traits of Commercially Important Fin Fishes and shell fishes (Practical) | **1** | **E** | 50 | 50 | 100 |
| 20-386-0109 | Food chemistry and Fish Biochemistry(Practical) | **1** | **C** | 50 | 50 | 100 |

Maximum Total credit Offered in 1st Semester: 21

(12 credits for Core and 09 credits for Elective Courses)

**Semester II**

| Course code | Course | Credits | Core/ Elective | MARKS | | |
|---|---|---|---|---|---|---|
| | | | | Continuous Evaluation ( Internal) | End Sems. Exam (External) | Total |
| 20-386-0201 | Freezing, Canning and Packaging Technology | 3 | C | 50 | 50 | 100 |
| 20-386-0202 | Fundamentals of Food Microbiology | 2 | E | 50 | 50 | 100 |
| 20-386-0203 | Economics of Seafood Production and Marketing | 3 | C | 50 | 50 | 100 |
| 20-386-0204 | Supply Chain Management in Seafood Industry | 3 | C | 50 | 50 | 100 |
| 20-386-0205 | International Trade and Development | 3 | E | 50 | 50 | 100 |
| 20-386-0206 | Food Science and Nutrition | 3 | E | 50 | 50 | 100 |
| 20-386-0207 | Freezing, Canning and Packaging Technology(Practical) | 1 | C | 50 | 50 | 100 |
| 20-386-0208 | Fundamentals of Food Microbiology (Practical) | 1 | E | 50 | 50 | 100 |
| 20-386-0209 | Economics of seafood Production and Marketing (Practical) | 1 | C | 50 | 50 | 100 |

Maximum Total credit Offered in 2nd Semester : 20 credits

( 11 credits for Core and 09 credits for Elective Courses)

**Semester III**

| Course code | Course | Credits | Core /Elective | | MARKS | |
|---|---|---|---|---|---|---|
| | | | | Continuous Evaluation ( Internal) | End Sems. Exam (External) | Total |
| 20-386-0301 | Sustainable Aquaculture for Safe food Production | 3 | C | 50 | 50 | 100 |
| 20-386-0302 | By products and value added Products Technology | 3 | C | 50 | 50 | 100 |
| 20-386-0303 | Food safety | 3 | C | 50 | 50 | 100 |
| 20-386-0304 | Environmental and Natural Resource Economics | 3 | E | 50 | 50 | 100 |
| 20-386-0305 | International Business Environment and Finance Management | 3 | C | 50 | 50 | 100 |
| 20-386-0306 | International Marketing | 3 | C | 50 | 50 | 100 |
| 20-386-0307 | Food safety Management Systems | 3 | C | 50 | 50 | 100 |
| 20-386-0308 | Analytical Methods for Seafood Quality Assurance | 2 | E | 50 | 50 | 100 |
| 20-386-0309 | Value Added Products technology and Food Safety (Practical) | 1 | C | 50 | 50 | 100 |
| 20-386-0310 | Sustainable Aquaculture for Safe food Production (Practical) | 1 | E | 50 | 50 | 100 |

Maximum Total credit Offered in 3rd Semester : 25 credits
( 19 credits for Core and 06 credits for Elective Courses)

**Semester IV**

| Course code | Course | Credits | Core/ Elective | MARKS | | |
|---|---|---|---|---|---|---|
| | | | | Continuous Evaluation ( Internal) | End Sems.Exam (External) | Tota l |
| 20-386-0401 | Internship in Seafood Industry and Report Evaluation | 4 | C | 100 | | 100 |
| 20-386-0402 | Entrepreneurship/Startups /Business Incubation Initiatives | 2 | E | 100 | | 100 |
| 20-386-0403 | Dissertation/Project report Evaluation | 8 | C | 100<br>100 | | 100<br>100 |
| 20-386-0404 | Course Viva-Voce | 1 | C | 100 | | 100 |

Maximum Total credit Offered in 4th Semester : 15 credits

( 13 credits for Core and 02 credits for Elective Courses)

**TOTAL CREDITS OFFERED IN DIFFERENT SEMESTERS**

| **Maxi-mum Credits offered** | **Semester1** | **Semester2** | **Semester 3** | **Semester 4** | **Semester 5** |
|---|---|---|---|---|---|
| **CORE** | **12** | **11** | **19** | **13** | **55** |
| **ELECTIVE** | **9** | **9** | **6** | **2** | **26** |
| **TOTAL** | **21** | **20** | **25** | **15** | **81** |

**DETAILS OF FACULTY**

| Sl. No | Name & Designation | Specialization | Communication (Contact No.) | Email id |
|---|---|---|---|---|
| 1 | Dr. M.Harikrishnan , Professor | Fisheries, Fish Biology, Aquaculture | 9447327804 | mahadevhari@hotmail.com |
| 2 | Dr. Mini Sekharan , Assistant Professor | Fisheries Business Management | 9895070310 | minisekharan@yahoo,com |
| 3 | Dr. S.Sabu, Assistant Professor | Fish Processing Technology | 9847233764 | sabuif@gmail.com |
| 4 | Dr. ShibuA.V. , Assistant Professor | Fishing Craft & Gear Technology, Fisheries Business Management | 8129511388 | avshibu@gmail.com |
| 5 | Dr.Ancy V.P., Assistant Professor | Fisheries Economics | 9895040045 | ancyvp@gmail.com |
| 6 | Dr. Ginson Joseph, Assistant Professor | Fish Processing Technology | 8848095895 | ginsonjoseph@cusat.ac.in |
| 7 | Dr. K.T. Thomson , Adjunct Faculty | Fisheries Economics | 9388482279 | thomsonkt@rediffmail.com |
| 8 | Dr.MadhusoodanaKurup, Adjunct Faculty | Fisheries Fish Biology,Aquaculture | 9847295252 | kurup424@gmail.com |
| 9 | Dr. Sanjeev S., Adjunct Faculty | Fisheries Microbiology | 9446383529 | sanjeevsreenivasan@gmail.com |

# DEPARTMENT OF ATMOSPHERIC SCIENCES

## M.SC. METEOROLOGY

**Semester I**

| Course Code | Course | Core/Elective | Credits |
|---|---|---|---|
| ATM 2101 | Geophysical Fluid Dynamics | C | 4 |
| ATM 2102 | Atmospheric Physics | C | 4 |
| ATM 2103 | Observational Techniques | C | 3 |
| ATM 2104 | Computing and Programming-I (Practical) | C | 3 |
| ATM 2105 | Viva – Voce | C | 1 |
| ATM 2106 | Introductory Physical Oceanography | E | 3 |
| ATM 2107 | Advanced Mathematics | E | 4 |
| ATM 2108 | Numerical and Statistical Methods | E | 3 |
| | | Total | |

**Elective I**

| Course Code | Course |
|---|---|
| ATM 2102 | Atmospheric Physics |

**Semester II**

| Course Code | Course | Core/ Elective | Credits |
|---|---|---|---|
| ATM 2201 | Synoptic and Tropical Meteorology | C | 4 |
| ATM 2202 | Dynamic Meteorology | C | 4 |
| ATM 2203 | Meteorological Analysis I (Practical) | C | 2 |
| ATM 2204 | Computing and Programming II (Practical) | C | 2 |
| ATM 2205 | Viva – Voce | C | 1 |
| ATM 2206 | Climate and Climate Change | E | 4 |
| ATM 2207 | Satellite Remote Sensing | E | 4 |
| Total | | | |

**Elective II**

| Course Code | Course |
|---|---|
| ATM 2201 | Synoptic and Tropical Meteorology |

**Semester III**

| Course Code | Course | Core/Elective | Credits |
|---|---|---|---|
| ATM 2301 | Numerical Weather Prediction | C | 4 |
| ATM 2302 | Applied Meteorology | C | 4 |
| ATM 2303 | Meteorological Analysis –II (Practical) | C | 2 |
| ATM 2304 | Meteorological Computations (Practical) | C | 2 |
| ATM 2305 | Viva – Voce | C | 1 |
| ATM 2306 | Cloud Physics and Atmospheric Electricity | E | 3 |
| ATM 2307 | Air – Sea Interaction | E | 3 |
| ATM 2308 | Middle Atmosphere | E | 3 |
| ATM 2309 | Disaster Management | E | 3 |
| Total | | | |

**Semester IV**

| Course Code | Course | Core/Elective | Credits |
|---|---|---|---|
| ATM 2401 | Project | C | 16 |
| ATM 2402 | Comprehensive Viva | C | 2 |

# M.TECH ATMOSPHERIC SCIENCE

**Semester1**

| Course Code | Paper | Core/Elective | Credits |
|---|---|---|---|
| ATM 3101 | General Circulation and Climate | C | 4 |
| ATM 3102 | Atmospheric Dynamics | C | 4 |
| ATM 3103 | High Speed Computations (Practical) | C | 2 |
| ATM 3104 | Viva Voce | C | 1 |
| ATM 3105 | Physics of Atmosphere and Ocean | E | 4 |
| ATM 3106 | Diagnostic Meteorology | E | 4 |
| ATM 3107 | Remote Sensing Applications | E | 4 |
| ATM 3108 | Applied Statistics | E | 4 |
| ATM 3109 | Advanced Mathematics | E | 4 |
| ATM 3110 | Physics and Chemistry of the Stratosphere | E | 3 |
| ATM 3111 | Meteorological Analysis (Practical) | E | 2 |
| Total | | | |

**Elective I**

| Course Code | Course |
|---|---|
| ATM 3105 | Physics of Atmosphere and Ocean |

**Semester II**

| Course Code | Paper | Core/ Elective | Credits |
|---|---|---|---|
| ATM 3201 | Atmosphere and Ocean Modeling | C | 4 |
| ATM 3202 | Climate Dynamics | C | 4 |
| ATM 3203 | Modeling Laboratory (Practical) | C | 2 |
| ATM 3204 | Viva Voce | C | 1 |
| ATM 3205 | Advanced Atmospheric Dynamics | E | 4 |
| ATM 3206 | Air Pollution Meteorology | E | 2 |
| ATM 3207 | Agricultural Meteorology | E | 2 |
| ATM 3208 | Hydro Meteorology | E | 2 |
| ATM 3209 | Regional Climate change | E | 2 |
| ATM 3210 | Boundary Layer Meteorology | E | 2 |
| Total | | | |

**Semester III**

| Course Code | Paper | Core/ Elective | Credits |
|---|---|---|---|
| ATM 3301 | Mid – Term Evaluation of Project | C | 18 |

**Semester4**

| Course Code | Paper | Core/Elective | Credits |
|---|---|---|---|
| ATM 3401 | Project Dissertation Evaluation & Viva Voce | C | 18 |

## Details Of Faculty

| Sl. No | Name & Designation | Specialization | Communication (Contact no. & e-mail id) |
|---|---|---|---|
| 1. | **Dr.C.A. Babu (CAB)** Professor | Boundary Layer Meteorology | 0480 2881651/ 0484 2863813 babuca@cusat.ac.in |
| 2. | **Baby Chakrapani (BC)** Assoc. Professor | Numerical Modelling of Atmospheric and Ocean Processes | 0487 2428620 /0484 2863803 bcpani@cusat.ac.in |
| 3. | **Dr. K. Satheesan (KS)** Assoc. Professor& Head | Remote Sensing, Radar Meteorology | 9400810099 04842863815 satheesan.k@gmail.com |
| 4. | **Dr. V. Madhu (VM)** Asst. Professor | Middle Atmospheric Dynamics, Tropical Meteorology | 9495424310/ 0484 2863814 madhuv@cusat.ac.in |
| 5. | **Dr.Lekshmy P R(PRL)** Asst. Professor | Isotope Hydrology, Tropical Meteorology, Paleo Climatology | 7878320842/04842863802 rarylekshmy@gmail.com |
| 6. | **Dr.Abhilash S (AS)** Asst. Professor | Tropical Meteorology, Climate Modelling | 9561642841, 04842863816 abhimets@gmail.com |
| 7. | **Dr.Midhun M (MM)** Asst. Professor | Climate Dynamics, Paleo Climatology | 9662735653, 04842863802 midhun.ndr@gmail.com |

# DEPARTMENT OF CHEMICAL OCEANOGRAPHY

## M.Sc. HYDROCHEMISTRY

**Semester I**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| 20-304-0101 | Co-ordination Chemistry | C | 3 |
| 20-304-0102 | Marine Environment | C | 3 |
| 20-304-0103 | Quantum Mechanics | C | 3 |
| 20-304-0104 | Stereochemistry, Pericyclic Reactions and Photochemistry | C | 3 |
| 20-304-0105 | Practical I – Analytical Techniques | C | 2 |
| 20-304-0106 | Practical II – Quantitative Chemical Analysis | C | 2 |
| | **Total Credits (Core) – I Semester** | | **16** |
| 20-304-0001 | Analytical Chemistry | E | 3 |
| 20-304-0015 | Introduction to Hydrochemistry | E | 3 |
| 20-304-0023 | Solid State Chemistry | E | 3 |

**Semester II**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| 20-304-0201 | Chemical Oceanography | C | 3 |
| 20-304-0202 | Group Theory and Spectroscopy | C | 3 |
| 20-304-0203 | Natural Products and Organic Synthesis | C | 3 |
| 20-304-0204 | Thermodynamics and Statistical Mechanics | C | 3 |
| 20-304-0205 | Practical III – Separation and Synthetic Methods | C | 2 |
| 20-304-0206 | Practical IV- Water and Sediment Analysis | C | 2 |
| | **Total Credits (Core) - II Semester** | | **16** |
| 20-304-0002 | Applications of Coordination Compounds | E | 2 |
| 20-304-0005 | Chemistry of Biomolecules | E | 2 |
| 20-304-0006 | Chemistry of Radiations, Surface and Inorganic Materials | E | 3 |
| 20-304-0010 | General Chemical Oceanography*** | E | 3 |
| 20-304-0011 | General Chemical Oceanography Practical*** | E | 2 |
| 20-304-0012 | Green Chemistry | E | 2 |
| 20-304-0013 | Instrumental Techniques | E | 3 |
| 20-304-0016 | Marine Biogeochemistry | E | 3 |
| 20-304-0020 | Nanomaterials and Supramolecular Chemistry | E | 3 |
| 20-304-0021 | Organometallic Chemistry | E | 3 |
| 20-304-0022 | Polar Sciences | E | 2 |
| 20-304-0024 | Water Management | E | 3 |

**Semester III**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| 20-304-0301 | Aquatic Chemical Resources | C | 2 |
| 20-304-0302 | Organic Spectroscopy | C | 3 |
| 20-304-0303 | Solution Chemistry | C | 3 |
| 20-304-0304 | Practical V - Instrumental Techniques 1 | C | 2 |
| 20-304-0305 | Practical VI- Physicochemical Methods | C | 2 |
| | **Total Credits (Core) - III Semester** | | **12** |
| 20-304-0003 | Aquatic Pollution | E | 3 |
| 20-304-0004 | Atmospheric Chemistry | E | 3 |
| 20-304-0007 | Computational Chemistry | E | 3 |
| 20-304-0008 | Environmental Law And EIA | E | 2 |
| 20-304-0009 | Estuarine Chemistry | E | 3 |
| 20-304-0014 | Instrumental Techniques II- Practical | E | 2 |
| 20-304-0017 | Marine Geochemistry | E | 3 |
| 20-304-0018 | Marine Natural Products | E | 3 |
| 20-304-0019 | Marine Organic Chemistry | E | 3 |

**Semester IV**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| 20-304-0401 | Dissertation (Project work in the Department/Universities/Scientific institutes/Industrial Organizations etc.)* | C | 14 |
| 20-304-0402 | Project Viva-voce* | C | 2 |
| | **Total Credits (Core) – IV Semester** | | **16** |

| | |
|---|---|
| **Total number of credits for all the four semesters (Core Courses)** | **60** |
| **Minimum number of credits required for the completion of M.Sc. (Hydrochemistry) programme.** | **72** |
| **Minimum number of credits to be taken as elective courses** | **12** |

**Audit Courses****

| Course code | Course Name | Credits | Total Teaching Hours | Semester |
|---|---|---|---|---|
| 20-304-0025 | Good Laboratory Practice and Safety | 0 | 12 | I |
| 20-304-0026 | Research Methodology | 0 | 12 | III |

*The Project dissertation will be assessed by the department examination committee constituted by the Department Council.

**Depends on faculty/ infrastructural facilities.

***This course is meant for M.Sc . programmes other than M.Sc. Hydrochemistry.

**Elective Courses** offered by the Department**

| Course Code | Course Name | Credits |
|---|---|---|
| 20-304-0001 | Analytical Chemistry | 3 |
| 20-304-0002 | Applications of Coordination Compounds | 2 |
| 20-304-0003 | Aquatic pollution | 3 |
| 20-304-0004 | Atmospheric Chemistry | 3 |
| 20-304-0005 | Chemistry of Biomolecules | 2 |
| 20-304-0006 | Chemistry of Radiation, Surface and Inorganic Materials | 3 |
| 20-304-0007 | Computational Chemistry | 3 |
| 20-304-0008 | Environment Law And EIA | 2 |
| 20-304-0009 | Estuarine Chemistry | 3 |
| 20-304-0010 | General Chemical Oceanography*** | 3 |
| 20-304-0011 | General Chemical Oceanography Practical*** | 2 |
| 20-304-0012 | Green Chemistry | 2 |

| | | |
|---|---|---|
| 20-304-0013 | Instrumental Techniques | 3 |
| 20-304-0014 | Instrumental Techniques II- Practical VII | 2 |
| 20-304-0015 | Introduction to the Hydrochemistry | 3 |
| 20-304-0016 | Marine Biogeochemistry | 3 |
| 20-304-0017 | Marine Geochemistry | 3 |
| 20-304-0018 | Marine Natural Products | 3 |
| 20-304-0019 | Marine Organic Chemistry | 3 |
| 20-304-0020 | Nanomaterials and Supramolecular Chemistry | 3 |
| 20-304-0021 | Organometallic Chemistry | 3 |
| 20-304-0022 | Polar Sciences | 2 |
| 20-304-0023 | Solid Sate Chemistry | 3 |
| 20-304-0024 | Water Management | 3 |

## Details of Faculty

| Sl. No | Name & Designation | Specialisation | Communication |
|---|---|---|---|
| 1 | **Dr.Habeeb Rahman K**<br>Assistant Professor &<br>Head of the Department | Chemical Oceanography<br>Isotope Geochemistry | 8281256045<br>habeebcusat@gmail.com |
| 2 | **Dr.Jorphin Joseph**<br>Assistant Professor | Membranes for water Purification,<br>Electrochemical energy storage and conversion. | 9495283270<br>jorphin@cusat.ac.in |
| 3 | **Dr.Shaju S S**<br>Assistant Professor | Biogeo- chemistry,<br>Bio- optics<br>Ocean colour Remote sensing | 9895909457<br>shaju@cusat.ac.in |
| 4 | **Dr.SreejithS .S**<br>Assistant Professor<br>(on- contract) | Coordination chemistry,<br>$CO_2$ reduction,<br>DFT studies. | 9567813008<br>sreejithss@cusat.ac.in |
| 5 | **Dr. Asha T M**<br>Assistant Professor<br>(on- contract) | Coordination Chemistry Catalysis<br>Biological studies | 9746824678<br>ashatm1989@cusat.ac.in |
| 6 | **Dr.Jacob Chacko (JC)**<br>Emeritus Professor | Chemical Oceanography,<br>Analytical Techniques, Organic Chemistry | 0484 - 2540699<br>jchacko@cusat.ac.in |

# DEPARTMENT OF MARINE BIOLOGY, MICROBIOLOGY AND BIOCHEMISTRY

## M.Sc. MARINE BIOLOGY

**Semester 1**

| Course code | Course | Hrs/week | | | Credit | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-315-0101 | Marine Biology | 3 | 2 | - | 3 | 50 | 50 | 100 |
| 20-315-0102 | 2 Cytology and Fish Genetics | 3 | 2 | - | 3 | 50 | 50 | 100 |
| 20-315-0103 | Biochemistry | 3 | 2 | | 3 | 50 | 50 | 100 |
| 20-315-0104 | Marine Biology - Practical | - | - | 4 | 2 | 100 | - | 100 |
| 20-315-0105 | Biochemistry and Instrumentation - Practical | - | - | 4 | 2 | 100 | - | 100 |

**Elective 1**

| Course Code | Course |
|---|---|
| 20-315-0106 | Planktonology |
| 20-315-0107 | Coral Reef Ecology |
| 20-315-0108 | Ornamental Fish culture |
| 20-315-0109 | Biological Ocenography |

**Semester II**

| Course code | Course | Hrs/week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-315-0201 | Marine Microbiology | 2 | 2 | 4 | 3 | 50 | 50 | 100 |
| 20-315-0202 | Fish and Fisheries | 2 | 2 | 4 | 3 | 50 | 50 | 100 |
| 20-315-0203 | Marine Pollution | 3 | | 1 | 3 | 50 | 50 | 100 |
| 20-315-0204 | Marine Biotechnology | 2 | 2 | - | 3 | 50 | 50 | 100 |
| 20-315-0205 | Marine Microbiology and Biotechnology – Practical | - | - | 4 | 2 | 100 | - | 100 |
| 20-315-0206 | Fish and Fisheries – Practical | - | - | 4 | 2 | 100 | - | 100 |

**Elective**

| Course Code | Course |
|---|---|
| 20-315-0207 | Aquarium plants and culture of live feed organisms |
| 20-315-0208 | Marine Conservation Biology |
| 20-315-0209 | Ornamental fish culture and live food organisms-Practical |

**Semester III**

| Course code | Course | Hrs/ week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-315-0301 | Fish Pathology | 3 | - | 4 | 3 | 50 | 50 | 100 |
| 20-315-0302 | Aquaculture | 3 | 2 | - | 3 | 50 | 50 | 50 |
| 20-315-0303 | General Animal Physiology | 3 | | - | 3 | 50 | 50 | 100 |
| 20-315-0304 | Marine Ecology | 3 | | | 3 | 50 | 50 | 50 |
| 20-315-0305 | Marine Ecology and Aquaculture - Practical | 3 | | 4 | 2 | 100 | - | 100 |
| 20-315-0306 | Fish Physiology and Pathology – Practical | **3** | | 4 | 2 | 100 | - | 100 |

**Semester IV**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| 20-315-0401 | Project work and Dissertation | C | 18 |
| | MOOC | E | - |

**DETAILS OF FACULTY**

| Sl No | Name & Designation | Specilization | Communication (Contact No. & Mail) |
|---|---|---|---|
| 1 | Dr. A.A. Mohamed Hatha<br>Professor | Fish Pathology, Fish Nutrition & Fish Genetics | Phone: 0484-2505099; 9446866050<br>mohamedhatha@cusat.ac.in<br>mohamedhatha@gmail.com |
| 2 | Dr. S. BijoyNandan<br>Professor | Marine Ecology & Marine Pollution | Phone: 9446022880/ 7025150844<br>bijoynandan@yahoo.co.in |
| | Dr. Priyaja P<br>Assistant Professor | Marine Biology with Invertebrata | Phone: 9447444882<br>Priyaja59@gmail.com |
| 3 | Dr. Padmakumar K B<br>Assistant Professor | Algology | Phone: 9847255972<br>kbpadmakumar@cusat.ac.in<br>kbpadmakumar@gmail.com |
| 4 | Dr. Swapna P Antony<br>Assistant Professor | Aquaculture | Phone: 8089131058/ 0484-2863214<br>swapnapantony@gmail.com<br>swapnapantony@cusat.ac.in |
| 5 | Dr.LathikaCicily Thomas | Marine Micro Biology | Phone:9446011630<br>latikacicily@gmail.com |
| 6 | Dr.Sreerekha P R | Marine Biochemistry | Phone:9895999556<br>Prs222@gmail.com |

# DEPT. OF MARINE GEOLOGY & GEOPHYSICS

## M.Sc. MARINE GEOLOGY

**(Effective from 2020-21 Academic year)**

**SEMESTER I**

| Course Code | Paper | Core/Elective | Credit |
|---|---|---|---|
| 20-316-0101 | Mineralogy | C | 3 |
| 20-316-0102 | Igneous and Metamorphic Petrology | C | 3 |
| 20-316-0103 | Structural and Engineering Geology | C | 4 |
| 20-316-0104 | Ground Water Geology | C | 3 |
| 20-316-0105 | Mineralogy and Petrology (Practical) | C | 1 |
| 20-316-0106 | Structural Geology (Practical) | C | 1 |
| 20-316-0107 | General Geology | E | 3 |
| 20-316-0108 | Physical Geology & Geomorphology | E | 3 |
| **Total** | | | **21** |

**SEMESTER II**

| Course Code | Paper | Core/Elective | Credit |
|---|---|---|---|
| 20-316-0201 | Geochemistry | C | 3 |
| 20-316-0202 | Sedimentary Geology | C | 3 |
| 20-316-0203 | Indian Stratigraphy | C | 3 |
| 20-316-0204 | Invertebrate and Micro Paleontology | C | 3 |
| 20-316-0205 | Geochemistry (Practical) | C | 1 |
| 20-316-0206 | Sedimentary Geology (Practical) | C | 1 |
| 20-316-0207 | Invertebrate and Micro Paleontology (Practical) | C | 1 |
| 20-316-0208 | Remote Sensing & GIS | E | 3 |
| 20-316-0209 | Marine Mineral Resources | E | 3 |
| **Total** | | | **21** |

**SEMESTER III**

| Course Code | Paper | Core/Elective | Credit |
|---|---|---|---|
| 20-316-0301 | Marine Geology | C | 3 |
| 20-316-0302 | Coastal Process and Evolution | C | 3 |
| 20-316-0303 | Petroleum Geology | C | 3 |
| 20-316-0304 | Geophysics and Offshore Exploration | C | 2 |
| 20-316-0305 | Marine Geology (Practical) | C | 1 |
| 20-316-0306 | Coastal Geology (Practical) | C | 1 |
| 20-316-0307 | Economic Geology | E | 3 |
| 20-316-0308 | Environmental Geology and Disaster Management | E | 3 |
| 20-316-0309 | Paleoceanography& Climate | E | 3 |
| **Total** | | | **22** |

**SEMESTER IV**

| Course Code | Paper | Core/Elective | Credit |
|---|---|---|---|
| 20-316-0401 | Project Work and Presentation | C | 10 |
| 20-316-0402 | Mid Term Evaluation | C | 3 |
| 20-316-0403 | Comprehensive Viva | C | 3 |
| **Total** | | | **16** |

# M.Sc. MARINE GEOPHYSICS

**(Effective from 2020-21 Academic year)**

**SEMESTER I**

| Course Code | Paper | Core/Elective | Credit |
|---|---|---|---|
| 20-317-0101 | Electronics for Instrumentation | C | 3 |
| 20-317-0102 | Physics of the Earth | C | 2 |
| 20-317-0103 | Gravity and Magnetic Prospecting | C | 4 |
| 20-317-0104 | Ground Water Geophysics | C | 3 |
| 20-317-0105 | Computer Programming in Earth Sciences (Practical) | C | 2 |
| 20-317-0106 | Electronics (Practical) | C | 1 |
| 20-317-0107 | Gravity & Magnetic Computations (Practical) | C | 1 |
| 20-317-0108 | Physical Geology and Geomorphology | E | 3 |
| 20-317-0109 | General Geology | E | 3 |
| Total | | | 22 |

**SEMESTER II**

| Course Code | Paper | Core/Elective | Credit |
|---|---|---|---|
| 20-317-0201 | Digital Signal Processing | C | 3 |
| 20-317-0202 | Geodynamics | C | 3 |
| 20-317-0203 | Seismology | C | 3 |
| 20-317-0204 | Electrical & Electromagnetic Prospecting | C | 3 |
| 20-317-0205 | Digital Signal Processing (Practical) | C | 1 |
| 20-317-0206 | Seismology (Practical) | C | 1 |
| 20-317-0207 | Remote Sensing & GIS | E | 3 |
| 20-317-0208 | Structural Geology and Stratigraphy | E | 3 |
| 20-317-0209 | Structural Geology (Practical) | E | 1 |
| 20-317-0210 | Engineering Geology | E | 2 |
| Total | | | 23 |

**SEMESTER III**

| Course Code | Paper | Core/Elective | Credit |
|---|---|---|---|
| 20-317-0301 | Seismic Prospecting | C | 3 |
| 20-317-0302 | Well Logging | C | 3 |
| 20-317-0303 | Offshore Exploration | C | 3 |
| 20-317-0304 | Marine Geology | C | 3 |
| 20-317-0305 | Geophysical Field Work (Practical) | C | 1 |
| 20-317-0306 | Seismic Prospecting (Practical) | C | 1 |
| 20-317-0307 | Petroleum Geology | E | 3 |
| 20-317-0308 | Environmental Geology & Disaster Management | E | 3 |
| 20-317-0309 | Marine Mineral Resources | E | 3 |
| 20-317-0310 | Marine Geology and Offshore (Practical) | E | 1 |
| **Total** | | | **24** |

**SEMESTER IV**

| Course Code | Paper | Core/Elective | Credit |
|---|---|---|---|
| 20-317-0401 | Project Work and Presentation | C | 10 |
| 20-317-0402 | Mid Term Evaluation | C | 3 |
| 20-317-0403 | Comprehensive Viva | C | 3 |
| **Total** | | | **16** |

**DETAILS OF FACULTY**

| Sl. No. | Name & Designation | Specialization | Communication |
|---|---|---|---|
| 1 | Dr. Sunil P S<br>(Associate Professor) | Soild-Earth Geophysics, Tectonics & Space Geodesy, Earthquake & Ionosphere Seismology, Glacier Dynamics | 9869801448<br>sunilps@cusat.ac.in |
| 2 | Dr.Joji V.S.<br>(Associate Professor) | Ground water studies,Rain water harvesting, Artificial recharge, Hydrochemistry,Trainer development (National Trainer) & Training Needs Analysis (GOI Consultant) | 9446361319<br>jojivsdeepam@**gmail.com** |
| 3 | Dr. P. Ajayakumar<br>(Assistant Professor) | Gravity, Magnetic Seismology | 9495365980<br>ajaycochin@cusat.ac.in |
| 4 | Dr. N. R. Nisha<br>(Assistant Professor) | Marine Micropaleontology, Paleoceanography, Paleoclimatology | 9846929649<br>nrnisha@cusat.ac.in |
| 5 | Dr.Ratheesh Kumar R T<br>(Assistant Professor) | Plate tectonics, Geodynamics, Hard-rock Petrology, Solid Earth Geophysics, Planetary Science | 8592082811<br>ratheesh@cusat.ac.in |
| 6 | Dr.Amaldev T.<br>(Assistant Professor) | Igneous and Metamorphic Petrology, Environmental Geology | 9567870988<br>amaldev@cusat.ac.in |
| 7 | Dr. Honey H.Das<br>(Assistant Professor) | Plate tectonics, Hard rock Petrology, Structural Geology | 7356087161<br>honeyhdas@cusat.ac.in |
| 8 | Mr. Naveen P.U.<br>(Assistant Professor) | Gravity and Magnetic Methods, Geodynamics | 9656769939<br>punaveenpu@gmail.com<br>naveenpu@cusat.ac.in |

# DEPARTMENT OF PHYSICAL OCEANOGRAPHY

## M.SC. OCEANOGRAPHY

**(Scheme & Syllabus applicable from 2020 Admission)**

**Semester – I (CORE COURSES)**

| Course Code | Course Title | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-319-0101 | Introduction Physical Oceanography | -- | 4 | -- | 4 | 50 | 50 | 100 |
| 20-319-0102 | Geophysical Fluid Dynamics | -- | 4 | -- | 4 | 50 | 50 | 100 |
| 20-319-0103 | Ocean Instrumentation | -- | 3 | -- | 3 | 50 | 50 | 100 |
| 20-319-0104 | Ocean Observations (Practical) | -- | -- | 2 | 1 | 100 | -- | 100 |
| 20-319-0105 | Physical Oceanographic Computations(Practical) | -- | -- | 4 | 2 | 100 | -- | 100 |
| 20-319-0106 | Oceanographic Application Tools-I (Practical) | -- | -- | 4 | 2 | 100 | -- | 100 |
| **Total** | | | | | **C = 16** | | | |

**Semester – II (CORE COURSES)**

| Course Code | Course Title | Hrs/Week | | | Credit | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-319-0201 | Ocean Dynamics | -- | 4 | -- | 4 | 50 | 50 | 100 |
| 20-319-0202 | Air Sea Interaction | -- | 3 | -- | 3 | 50 | 50 | 100 |
| 20-319-0203 | Coastal and Estuarine Oceanography | -- | 3 | -- | 3 | 50 | 50 | 100 |
| 20-319-0204 | Dynamical Computations (Practical) | -- | -- | 2 | 1 | 100 | -- | 100 |
| 20-319-0205 | Coastal Oceanography (Practical) | -- | -- | 4 | 2 | 100 | -- | 100 |
| 20-319-0206 | Air-Sea Interaction (Practical) | -- | -- | 2 | 1 | 100 | -- | 100 |
| **Total** | | | | | **C = 14** | | | |

**Semester – III (CORE COURSES)**

| Course Code | Course Title | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-319-0301 | Ocean Remote Sensing | -- | 4 | -- | 4 | 50 | 50 | 100 |
| 20-319-0302 | Numerical Ocean Modelling | -- | 3 | -- | 3 | 50 | 50 | 100 |
| 20-319-0303 | Ocean and Climate | -- | 3 | -- | 3 | 50 | 50 | 100 |
| 20-319-0304 | Ocean Climate Data Analytics(Practical) | -- | -- | 4 | 2 | 100 | | 100 |
| 20-319-0305 | Ocean Modelling (Practical) | -- | -- | 4 | 2 | 100 | | 100 |
| **Total** | | | | | **C=14** | | | |

**Semester – IV * (CORE COURSES)**

| Course Code | Course Title | Hrs/Week | | | Credit | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-319-0401 | Project Dissertation** | -- | -- | -- | **16** | **100** | -- | **100** |
| **Total** | | | | | **C=16** | | | |

**List of Electives**

| Course Code | Course title | Credits | Pre-requisites |
|---|---|---|---|
| 20-319-0001 | General Oceanography | 3 | GS |
| 20-319-0002 | Marine Hazards and Management | 2 | GS |
| 20-319-0003 | Marine Pollution | 3 | GS |
| 20-319-0004 | Ocean Optics | 2 | 20-319-0101 |
| 20-319-0005 | Marine Acoustics | 4 | 20-319-0101 |
| 20-319-0006 | Coastal Zone Management – I | 3 | GS |
| 20-319-0007 | Coastal Zone Management – II | 3 | 20-319-0006 |

| | | | |
|---|---|---|---|
| 20-319-0008 | Beach Dynamics | 2 | 20-319-0101&20-319-0203 |
| 20-319-0009 | GIS in Oceanography | 2 | GS |
| 20-319-0010 | Advanced Ocean Dynamics | 3 | 20-319-0102&20-319-0201 |
| 20-319-0011 | Wave Dynamics | 3 | 20-319-0102&20-319-0201 |
| 20-319-0012 | Marine Biogeochemistry | 3 | GS |
| 20-319-0013 | Ocean Circulation | 2 | 20-319-0102& 20-319-0201 |
| 20-319-0014 | Remote Sensing (Practical) | 2 | 20-319-0301 |
| 20-319-0015 | Marine Remote Sensing Applications | 3 | GS |
| 20-319-0016 | Regional Oceanography | 3 | 20-319-0101 |
| 20-319-0017 | Ocean Engineering | 4 | 20-319-0101& 20-319-0203 |
| 20-319-0018 | Applied and Computational Mathematics | 4 | GM/GP |
| 20-319-0019 | Ocean Ecosystem Modelling | 2 | 20-319-0101& 20-319-0201 |
| 20-319-0020 | Statistical Methods in Oceanography (Practical) | 1 | GM/GP |
| 20-319-0021 | Polar Oceanography | 3 | 20-319-0101 |
| 20-319-0022 | Oceanographic Application Tools-II(Practical) | 1 | GS |

**GS – Graduate in Science GM – Graduate in Mathematics GP – Graduate in Physics**

* A student shall register for a minimum of 56 credits in the first three semesters before he/she registers for the fourth semester.

** The student will devote the fourth semester on dissertation work, related to a relevant area of specialization either in the department or in an industrial/ research/ academic institutions outside the University. They will be sent to outside institution based upon their performance in their previous semesters on the consent of the departmental council. All the students have to submit their project dissertation at the end of the semester.

The award of maximum 100 marks for the project dissertation to student is based on:

**A)** *Continuous assessment by his/her guide based on his/her performance and progress during the course of dissertation work will carry a maximum of 50 marks.*

**B)** *On submission of the project dissertation, an assessment by the Department Examination Committee constituted by the Department Council, based on a presentation and Viva Voce conducted in the parent department will carry a maximum of 50 marks.*

# M. TECH. OCEAN TECHNOLOGY

[Scheme & Syllabus applicable from 2020 Admission onwards]

**SEMESTER I (CORE COURSES)**

| Course Code | Course Title | Hrs/Week | | | Credit | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-439-0101 | Ocean Physics | -- | 3 | -- | 3 | 50 | 50 | 100 |
| 20-439-0102 | Coastal Engineering | -- | 4 | -- | 4 | 50 | 50 | 100 |
| 20-439-0103 | Marine Hydrodynamics | -- | 3 | -- | 3 | 50 | 50 | 100 |
| 20-439-0104 | Coastal Oceanography (Practical) | -- | -- | 2 | 1 | 100 | -- | 100 |
| 20-439-0105 | Computer Programming in Oceanography (Practical) | -- | -- | 4 | 2 | 100 | -- | 100 |
| **Total** | | | | | **C= 13** | | | |

**SEMESTER II (CORE COURSES)**

| Course Code | Course Title | Hrs/Week | | | Credit | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-439-0201 | Advanced Marine Technology | -- | 4 | -- | 4 | 50 | 50 | 100 |
| 20-439-0202 | Environmental Ocean Technology | -- | 3 | -- | 3 | 50 | 50 | 100 |
| 20-439-0203 | Ocean Modelling | -- | 3 | -- | 3 | 50 | 50 | 100 |
| 20-439-0204 | Ocean Modelling Lab(Practical) | -- | -- | 2 | 1 | 100 | | 100 |
| **Total** | | | | | **C=11** | | | |

**SEMESTER III**

| | | |
|---|---|---|
| **20-439-0301** | **Project Dissertation-Phase I** | **C=18** |

**SEMESTER IV**

| | | |
|---|---|---|
| **20-439-0401** | **Project Dissertation-Phase II** | **C= 18** |

**LIST OF ELECTIVES**

| Course Code | Course Title | Credits | Pre-Requisites |
|---|---|---|---|
| 20-439-0001 | Ocean Circulation and Dynamics | 4 | MO,MP,MM,BT |
| 20-439-0002 | Boundary Layer Dynamics | 4 | OT,MM, |
| 20-439-0003 | Marine Environmental Pollution | 4 | OT,MB |
| 20-439-0004 | Ocean Resources | 4 | MO,MGP,MM,GP |
| 20-439-0005 | Ocean Instrumentation | 4 | OT,ME |
| 20-439-0006 | Integrated Coastal Zone Management | 4 | OT,MB |
| 20-439-0007 | Ocean Acoustics | 4 | OT,MO,MP |
| 20-439-0008 | Satellite Oceanography | 4 | OT,MM,ES,BT |
| 20-439-0009 | Ocean Material Technology | 4 | OT,NA,BTM |
| 20-439-0010 | Observational Techniques & Instrumentation | 4 | OT,MO,M- GP,MP,MM,ME |
| 20-439-0011 | Deep Sea Submersibles and Exploration Technology | 2 | OT,NA |
| 20-439-0012 | Satellite Image Processing & GIS (P) | 2 | 20-439-0008 |
| 20-439-0013 | Marine Geotechnical Engineering | 4 | MO,MGP,BT,BTM,MG |
| 20-439-0014 | Dynamics of Ocean Structures | 4 | MO,MGP,BT,BTM,MG |
| 20-439-0015 | Modelling offshore and coastal processes | 3 | 20-439-0102 |
| 20-439-0016 | Descriptive Oceanography | 3 | BT,MP,MO,MM,MG,NA,MB |

OT- M.Tech Ocean Technology Students

MP- M.Sc. Physics

MM- M.Sc. Meteorology

BT- B.Tech. Civil/ Environmental Science

MO- M.Sc. Oceanography

MGP – M.Sc. Marine Geophysics

BTM – B.Tech. Mechanical Engineering

NA – B.Tech. Naval Architecture & Ship Building

MB- M.Tech. Marine Bio Technology Students

ES- M.Sc. Environmental Sciences

MG- M.Sc. Marine Geology

**DETAILS OF FACULTY**

| Sl. No. | Name & Designation | Specialisation | Communication |
|---|---|---|---|
| 1 | Dr.R.Sajeev (RS)<br>Associate Professor & Head | Coastal Oceanography | Ph: Off: 0484-2363950<br>rsajeev@cusat.ac.in |
| 2 | Dr.P.K.Saji (PKS)<br>Assistant Professor | Ocean Circulation<br>Ocean Modeling | Ph: Off: 0484-2363950<br>pksaji@cusat.ac.in |
| 3 | Dr.V.Vijith<br>Assistant Professor | Estuarine Oceanography<br>Ocean Modeling | Ph: Off: 0484-2363950<br>vijithpod@cusat.ac.in |

# FACULTY OF SCIENCE

**Dean:**

Dr.K Girish Kumar

Professor

Department of Applied Chemistry

Cochin University of Science and Technology

Kochi- 682 022

# CENTRE FOR INTEGRATED STUDIES

## INTEGRATED M.SC. COURSE IN SCIENCES

**Semester I**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| ENG 10101 | English- I | 2 | 2 | | 2 | 50 | 50 | 100 |
| MAL 10101 | Malayalam- I | 2 | 1 | | 2 | 50 | 50 | 100 |
| HIN 10101 | Hindi- I | 2 | 1 | | 2 | 50 | 50 | 100 |
| FLG 10101 | Foreign Language (German) | 2 | 1 | | 2 | 50 | 50 | 100 |
| CHE 10101 | Atomic Structure and Chemical Bonding | 3 | 1 | | 3 | 50 | 50 | 100 |
| PHY 10101 | Mechanics | 4 | 1 | | 3 | 50 | 50 | 100 |
| MAM 10101 | Calculus I | 4 | 1 | | 4 | 50 | 50 | 100 |
| BIO 10101 | Basic Principles of Biology | 3 | 1 | | 3 | 50 | 50 | 100 |
| CHE 10102 | Chemistry Lab - Quantitative Analysis I | | | 6 | 2 | 100 | - | 100 |
| PHY 10102 | Physics Lab - Mechanics | | | 6 | 2 | 100 | - | 100 |
| BIO 10102 | Basic Principles of Biology Lab | | | 6 | 2 | 100 | - | 100 |
| | **Total** | | | | **23** | **600** | **300** | **900** |

**Semester II**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| ENG 10201 | English II | 2 | 2 | | 2 | 50 | 50 | 100 |
| MAL 10201 | Malayalam-II | 2 | 1 | | 2 | 50 | 50 | 100 |
| HIN 10201 | Hindi- II | 2 | 1 | | 2 | 50 | 50 | 100 |
| FLG 10201 | Foreign Language -II (German) | 2 | 1 | | 2 | 50 | 50 | 100 |
| CHE 10201 | Periodicity, Nuclear Chemistry, Acid Base Chemistry and Metallurgy | 3 | 1 | | 3 | 50 | 50 | 100 |
| PHY 10201 | Waves and Optics | 3 | 1 | | 3 | 50 | 50 | 100 |
| MAM 10201 | Linear Algebra and Group Theory | 4 | 1 | | 4 | 50 | 50 | 100 |
| BIO 10201 | Biomolecules of Life | 3 | 1 | | 3 | 50 | 50 | 100 |
| CHE 10202 | Chemistry Lab - Qualitative Analysis I | | | 6 | 2 | 100 | - | 100 |
| PHY 10202 | Physics Lab - Waves and Optics | | | 6 | 2 | 100 | - | 100 |
| BIO 10202 | Biomolecules of Life Lab | | | 6 | 2 | 100 | - | 100 |
| | **Total** | | | | **23** | **600** | **300** | **900** |

**Semester III**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| CHE 10301 | Introductory Organic Chemistry | 3 | 1 | | 3 | 50 | 50 | 100 |
| PHY 10301 | Electricity and Magnetism I | 3 | 1 | | 3 | 50 | 50 | 100 |
| MAM 10301 | Calculus II | 4 | 1 | | 4 | 50 | 50 | 100 |
| MAM 10302 | Mathematical Methods I | 4 | 1 | | 4 | 50 | 50 | 100 |
| BIO 10302 | Introduction to Cell Biology and Signaling | 3 | 1 | | 3 | 50 | 50 | 100 |
| EVS 10301 | Environmental Science | 2 | 1 | | 2 | 50 | 50 | 100 |
| CHE 10302 | Chemistry Lab - Qualitative Analysis II | | | 6 | 2 | 100 | - | 100 |
| PHY 10302 | Physics Lab – Electricity and Magnetism | | | 6 | 2 | 100 | - | 100 |
| BIO 10302 | Cell Biology and Signaling Lab | | | 6 | 2 | 100 | - | 100 |
| | **Total** | | | | **25** | **600** | **300** | **900** |

**Semester IV**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| CHE 10401 | Introductory Physical Chemistry | 3 | 1 | | 3 | 50 | 50 | 100 |
| PHY 10401 | Quantum Physics and Relativity | 3 | 1 | | 3 | 50 | 50 | 100 |
| MAM10401 | Mathematical Methods - II | 4 | 1 | | 4 | 50 | 50 | 100 |
| STA 10401 | Statistics - I (Probability and Statistics) | 4 | 1 | | 4 | 50 | 50 | 100 |
| BIO10401 | Fundamental of Molecular Biology and Genetics | 3 | 1 | | 3 | 50 | 50 | 100 |
| COM 10401 | Basic Computer Science | 2 | 1 | | 2 | 50 | 50 | 100 |
| CHE 10402 | Chemistry Lab- Physical Chemistry | | | 6 | 2 | 100 | - | 100 |
| PHY 10402 | Physics Lab- Modern Physics | | | 6 | 2 | 100 | - | 100 |
| BIO 10402 | Molecular Biology and Genetics Lab | | | 6 | 2 | 100 | - | 100 |
| | **Total** | | | | **25** | **600** | **300** | **900** |

**Semester V (CHEMISTRY)**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| CHE 10501 | Analytical Chemistry | 2 | 1 | | 2 | 50 | 50 | 100 |
| CHE 10502 | Inorganic Chemistry Main Group Chemistry | 3 | 1 | | 3 | 50 | 50 | 100 |
| CHE 10503 | Chemical Kinetics and Thermodynamics | 3 | 1 | | 3 | 50 | 50 | 100 |
| CHE 10504 | Organic Functional Group Chemistry | 3 | 1 | | 3 | 50 | 50 | 100 |
| CHE 10505 | Elements of Symmetry and Molecular Spectroscopy | 3 | 1 | | 3 | 50 | 50 | 100 |
| CHE 10506 | Inorganic Chemistry Lab-Inorganic Synthesis and Separation | | | 6 | 2 | 100 | - | 100 |
| CHE 10507 | Organic Chemistry Lab-Synthesis and Separation | | | 6 | 2 | 100 | - | 100 |
| CHE 10508 | Open Ended Lab - I | | | 6 | 2 | 100 | - | 100 |
| CHE 10509 | Mathematics for Chemists | 2 | 1 | | 2 | 50 | 50 | 100 |
| | **Total** | | | | **22** | **550** | **250** | **800** |

**Semester VI (CHEMISTRY)**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| CHE 10601 | Instrumental Methods of Analysis | 2 | 1 | | 2 | 50 | 50 | 100 |
| CHE 10602 | Coordination Chemistry and Organometallic Chemistry | 3 | 1 | | 3 | 50 | 50 | 100 |
| CHE 10603 | Electrochemistry, Solid State and Liquid State | 3 | 1 | | 3 | 50 | 50 | 100 |
| CHE 10604 | Organic Reactions and Mechanism | 3 | 1 | | 3 | 50 | 50 | 100 |
| CHE 10605 | Industrial Chemistry | 3 | 1 | | 3 | 50 | 50 | 100 |
| CHE 10606 | Chemistry Lab - Physical | | | 6 | 2 | 100 | - | 100 |
| CHE 10607 | Chemistry Lab - Industrial | | | 6 | 2 | 100 | - | 100 |
| CHE 10608 | Open Ended Lab - II | | | 6 | 2 | 100 | - | 100 |
| CHE 10609 | Computer Programming and Numerical Methods | 2 | 1 | | 2 | 50 | 50 | 100 |
| | **Total** | | | | **22** | **550** | **250** | **800** |

**Semester VII (CHEMISTRY)**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| CHE 10701 | Quantum Chemistry | 3 | 1 | | 3 | 50 | 50 | 100 |
| CHE 10702 | Structural Inorganic Chemistry of Main Group | 3 | 1 | | 3 | 50 | 50 | 100 |
| CHE 10703 | Statistical and Non-Equilibrium Thermodynamics | 3 | 1 | | 3 | 50 | 50 | 100 |
| CHE 10704 | Sterochemistry | 3 | 1 | | 3 | 50 | 50 | 100 |
| CHE 10705 | Organic Photochemistry, Pericyclic Reactions and Rearrangements | 3 | 1 | | 3 | 50 | 50 | 100 |
| CHE 107XX | Elective -I | 2 | 1 | | 2 | 50 | 50 | 100 |
| CHE 10706 | Physical Chemistry Lab | | | 6 | 2 | 100 | - | 100 |
| CHE 10707 | Organic Chemistry Lab – Estimation and Seperation | | | 6 | 2 | 100 | - | 100 |
| CHE 10708 | Open Ended Lab - III | | | 6 | 2 | 100 | - | 100 |
| | **Total** | | | | **23** | **550** | **250** | **800** |

**Elective – VII**

| Course Code | Course |
|---|---|
| CHE 10709 | Chemistry of Polymers |
| CHE 10710 | Materials Chemistry |
| CHE 10711 | Advanced Equilibrium Thermodynamics |
| CHE 10711 | Environmental Chemistry |
| CHE 10711 | Biomolecules and Bioorganic Chemistry |

**Semester VIII (CHEMISTRY)**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| CHE 10801 | Group Theory and Spectroscopy | 3 | 1 | | 3 | 50 | 50 | 100 |
| CHE 10802 | Chemistry of Transition metals | 3 | 1 | | 3 | 50 | 50 | 100 |
| CHE 10803 | Chemical Kinetics and Surface Chemistry | 3 | 1 | | 3 | 50 | 50 | 100 |
| CHE 10804 | Reagents and Organic Synthesis | 3 | 1 | | 3 | 50 | 50 | 100 |
| CHE 10805 | Organic Spectroscopy | 3 | 1 | | 3 | 50 | 50 | 100 |
| CHE 108xx | Elective II | 2 | 1 | | 2 | 50 | 50 | 100 |
| CHE 10806 | Inorganic Chemistry Lab | | | 6 | 2 | 100 | - | 100 |
| CHE 10807 | Organic Chemistry Lab Multistep synthesis, purification and Characterization | | | 6 | 2 | 100 | - | 100 |
| CHE 10809 | Open ended Lab - IV | | | 6 | 2 | 100 | - | 100 |
| | **Total** | | | | **23** | **550** | **250** | **800** |

**Elective – VIII**

| Course Code | Course |
|---|---|
| CHE 10809 | Quantum Chemistry of Molecules ande Macromolecules |
| CHE 10810 | Adsorption and Catalysis |
| CHE 10811 | Crystallography |
| CHE 10812 | Bioanalytical Chemistry |

**Semester IX (CHEMISTRY)**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| CHE 10901 | Organomettalic and Bioinorganic Chemistry | 3 | 1 | | 3 | 50 | 50 | 100 |
| CHE 10902 | Advanced Solid State and Electrochemistry | 3 | 1 | | 3 | 50 | 50 | 100 |
| CHE 10903 | Chemistry of Natural Products | 3 | 1 | | 3 | 50 | 50 | 100 |
| CHE 10904 | Biological Chemistry | 3 | 1 | | 3 | 50 | 50 | 100 |
| CHE 109xx | Elective - III | 2 | 1 | | 2 | 50 | 50 | 100 |
| CHE 109xx | Elective - IV | 2 | 1 | | 2 | 50 | 50 | 100 |
| CHE 10905 | Computational Chemistry Lab | | | 6 | 2 | 100 | - | 100 |
| CHE 10906 | Chemistry Lab - Instrumentational | | | 6 | 2 | 100 | - | 100 |
| CHE 10907 | Open Ended Lab - V | | | 6 | 2 | 100 | - | 100 |
| | **Total** | | | | **22** | **600** | **300** | **900** |

**Elective – IX**

| Course Code | Course |
|---|---|
| CHE 10908 | Computational Chemistry |
| CHE 10909 | Green Chemistry |
| CHE 10910 | Electroanalytical Techniques |
| CHE 10911 | Advanced Photochemistry |
| CHE 10912 | Microbial Technology |
| CHE 10913 | Advanced Solid-State Chemistry |
| CHE 10914 | Polymer Technology |
| CHE 10915 | Chemistry of Carbohydrates |
| CHE 10916 | Medicinal Chemistry |

**Semester X (CHEMISTRY)**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| CHE 11001 | Dissertation | | | | 18 | | 250 | 250 |
| CHE 11002 | Viva | | | | 2 | | 50 | 50 |
| | **Total** | | | | **20** | | **300** | **300** |

**Semester V (PHYSICS)**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| PHY 10501 | Thermal Physics | 4 | 1 | | 4 | 50 | 50 | 100 |
| PHY 10502 | Electricity and Magnetism - II | 4 | 1 | | 4 | 50 | 50 | 100 |
| PHY 10503 | Basic Mathematical Physics | 4 | 1 | | 4 | 50 | 50 | 100 |
| PHY 10504 | Basic Solid State Physics | 4 | 1 | | 4 | 50 | 50 | 100 |
| PHY 10505 | Physics Lab – V (Computer Lab) | | | 6 | 4 | 100 | - | 100 |
| | **Total** | | | | **20** | **300** | **200** | **500** |

**Semester VI (PHYSICS)**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| PHY 10601 | Modern Optics | 4 | 1 | | 4 | 50 | 50 | 100 |
| PHY 10602 | Electronics | 4 | 1 | | 4 | 50 | 50 | 100 |
| PHY 10603 | Basic Nuclear Physics | 4 | 1 | | 4 | 50 | 50 | 100 |
| PHY 10604 | Minor Project | 4 | 1 | | 4 | 50 | 50 | 100 |
| PHY 10605 | Physics Lab – VI | | | 6 | 4 | 100 | - | 100 |
| | **Total** | | | | **20** | **300** | **200** | **500** |

**Semester VII (PHYSICS)**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| PHY 10701 | Mathematical Physics | 4 | 1 | | 4 | 50 | 50 | 100 |
| PHY 10702 | Classical Mechanics | 4 | 1 | | 4 | 50 | 50 | 100 |
| PHY 10703 | Electrodynamics | 4 | 1 | | 4 | 50 | 50 | 100 |
| PHY 10704 | Quantum Mechanics - I | 4 | 1 | | 4 | 50 | 50 | 100 |
| PHY 10705 | Advanced Experiments in Physics Lab - I | | | 6 | 3 | 100 | - | 100 |
| | **Total** | | | | **19** | **300** | **200** | **500** |

**Semester VIII (PHYSICS)**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| PHY 10801 | Quantum Mechanics - II | 4 | 1 | | 4 | 50 | 50 | 100 |
| PHY 10802 | Statistical Mechanics | 4 | 1 | | 4 | 50 | 50 | 100 |
| PHY 10803 | Atomic and Molecular Spectroscopy | 4 | 1 | | 4 | 50 | 50 | 100 |
| PHY 10804 | Advanced Electronics | 4 | 1 | | 4 | 50 | 50 | 100 |
| PHY 10805 | Advanced Experiments in Physical Lab - II | | | 6 | 4 | 100 | - | 100 |
| | **Total** | | | | **20** | **300** | **200** | **500** |

**Semester IX (PHYSICS)**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| PHY 10901 | Nuclear and Particle Physics | 4 | 1 | | 4 | 50 | 50 | 100 |
| PHY 10902 | Advanced Solid State Physics | 4 | 1 | | 4 | 50 | 50 | 100 |
| PHY 109xx | Elective - 1* | 4 | 1 | | 4 | 50 | 50 | 100 |
| PHY 109yy | Elective - II* | 4 | 1 | | 4 | 50 | 50 | 100 |
| PHY 10903 | Advanced Experiments in Physics Lab - III | | | 6 | 4 | 100 | - | 100 |
| | **Total** | | | | **20** | **300** | **200** | **500** |

**Elective – IX**

| Course Code | Course |
|---|---|
| PHY 109xx | |
| PHY 109yy | |

**Semester X (PHYSICS)**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| PHY 11001 | Major Project[@] | 4 | 1 | | 16 | 200 | 200 | 400 |
| PHY 11002 | Online course** | 4 | 1 | | 2 | 50 | - | 50 |
| PHY 110zz | Elective – II1 (Online Mode)* | 4 | 1 | | 4 | 50 | 50 | 100 |
| | **Total** | | | | **22** | **300** | **250** | **550** |

**Elective – X**

| Course Code | Course |
|---|---|
| PHY 11002 | Online course** |
| PHY 110zz | Elective – II1 (Online Mode)* |

**Semester V (STATISTICS)**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| MAM 10501 | Analysis I | 4 | 1 | | 4 | 50 | 50 | 100 |
| MAM 10502 | Linear Algebra and Geometry in $R^n$ | 4 | 1 | | 4 | 50 | 50 | 100 |
| MAM 10503 | Algebra: Groups and Rings | 4 | 1 | | 4 | 50 | 50 | 100 |
| MAM 10504 | Introduction to Complex Analysis | 4 | 1 | | 4 | 50 | 50 | 100 |
| STA 10501 | Statistics and Probability II | 4 | 1 | | 4 | 50 | 50 | 100 |
| | **Total** | | | | **20** | **250** | **250** | **500** |

## Semester VI (STATISTICS)

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| MAM 10601 | Analysis II | 4 | 1 | | 4 | 50 | 50 | 100 |
| MAM 10602 | Ordinary and Partial Differential Equations | 4 | 1 | | 4 | 50 | 50 | 100 |
| MAM 10603 | Complex Analysis and Number Theory | 4 | 1 | | 4 | 50 | 50 | 100 |
| STA10601 | Design of Experiments and Sample Surveys (Elective I) | 4 | 1 | | 4 | 50 | 50 | 100 |
| STA 10602 | Applied Statistics (Elective II) | 4 | 1 | | 4 | 50 | 50 | 100 |
| | **Total** | | | | **20** | **250** | **250** | **500** |

**Elective – VI**

| Course Code | Course |
|---|---|
| STA10601 | Design of Experiments and Sample Surveys (Elective I) |
| STA 10602 | Applied Statistics (Elective II) |

## Semester VII (STATISTICS)

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| STA 10701 | Mathematical Methods for Statistics | 4 | 1 | | 4 | 50 | 50 | 100 |
| STA 10702 | Probability Theory I | 4 | 1 | | 4 | 50 | 50 | 100 |
| STA 10703 | Probability Distributions | 4 | 1 | | 4 | 50 | 50 | 100 |
| STA 10704 | Sampling Theory & Methods | 4 | 1 | | 4 | 50 | 50 | 100 |
| STA 10705 | Elective – I: Data Analytics using R | 3 | 1 | | 3 | 50 | 50 | 100 |
| STA 10706 | Statistical Computing | 3 | 1 | | 3 | 50 | 50 | 100 |
| | **Total** | | | | **20** | **250** | **250** | **500** |

**Elective – I**

| Course Code | Course |
|---|---|
| STA 10705 | Elective – I: Data Analytics using R |
| STA 10706 | Statistical Computing |

**Semester VIII (STATISTICS)**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| STA 10801 | Statistical Inference I | 4 | 1 | | 4 | 50 | 50 | 100 |
| STA 10802 | Probability Theory II | 4 | 1 | | 4 | 50 | 50 | 100 |
| STA 10803 | Stochastic Processes | 4 | 1 | | 4 | 50 | 50 | 100 |
| STA 10804 | Practical – I and Viva Voce | 2 | 1 | | 2 | 50 | 50 | 100 |
| STA 10805 | Statistics for National Development | 3 | 1 | | 3 | 50 | 50 | 100 |
| STA 10806 | Reliability Modeling and Analysis | 3 | 1 | | 3 | 50 | 50 | 100 |
| STA 10807 | A suitable Online course | 2 | 1 | | 2 | 50 | 50 | 100 |
| | **Total** | | | | **19** | **350** | **250** | **600** |

**Elective – II**

| Course Code | Course |
|---|---|
| STA 10805 | Statistics for National Development |
| STA 10806 | Reliability Modeling and Analysis |

**Elective – III**

| Course Code | Course |
|---|---|
| STA 10807 | A suitable Online course |

**Semester IX (STATISTICS)**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| STA 10901 | Statistical Inference II | 4 | 1 | | 4 | 50 | 50 | 100 |
| STA 10902 | Multivariate Analysis | 4 | 1 | | 4 | 50 | 50 | 100 |
| STA 10903 | Applied Regression Analysis | 4 | 1 | | 4 | 50 | 50 | 100 |
| STA 10904 | Practical – II using SPSS/MATLAB | 2 | 1 | | 2 | 50 | 50 | 100 |
| STA 10905 | Topics in Stochastic Finance | 3 | 1 | | 3 | 50 | 50 | 100 |
| STA 10906 | Operations Research - II | 3 | 1 | | 3 | 50 | 50 | 100 |
| STA 10907 | STA 10907 Elected course | 3 | 1 | | 3 | 50 | 50 | 100 |
| | **Total** | | | | **20** | **350** | **250** | **600** |

**Elective – IV**

| Course Code | Course |
|---|---|
| STA 10905 | Topics in Stochastic Finance |
| STA 10906 | Operations Research - II |

**Elective – V**

| Course Code | Course |
|---|---|
| STA 10907 | STA 10907 Elected course |

**Semester X (STATISTICS)**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| STA 11001 | Design and Analysis of Experiments | 4 | 1 | | 4 | 50 | 50 | 100 |
| STA 11002 | Practical – III using SAS/R, and Viva Voce | 4 | 1 | | 4 | 50 | 50 | 100 |
| STA 11003 | Project *** | 5 | 1 | | 5 | 100 | - | 100 |
| STA 11004 | Statistical Quality Assurance | 3 | 1 | | 3 | 50 | 50 | 100 |
| STA 11005 | Time Series Analysis | 3 | 1 | | 3 | 50 | 50 | 100 |
| STA 11006 | Lifetime data analysis | 3 | 1 | | 3 | 50 | 50 | 100 |
| STA 11007 | Applied Multivariate Statistical Analysis | 3 | 1 | | 3 | 50 | 50 | 100 |
| STA 11008 | Statistical Forecasting | 3 | 1 | | 3 | 50 | 50 | 100 |
| STA 11009 | Inference for Stochastic Processes | 3 | 1 | | 3 | 50 | 50 | 100 |
| STA 11010 | Online course ** | 3 | 1 | | 3 | 50 | 50 | 100 |
| | **Total** | | | | **22** | **350** | **250** | **600** |

**Elective – VI,VII,VIII**

| Course Code | Course |
|---|---|
| STA 11004 | Statistical Quality Assurance |
| STA 11005 | Time Series Analysis |
| STA 11006 | Lifetime data analysis |
| STA 11007 | Applied Multivariate Statistical Analysis |
| STA 11008 | Statistical Forecasting |
| STA 11009 | Inference for Stochastic Processes |
| STA 11010 | Online course ** |

**Semester V (MATHEMATICS)**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| MAM 10501 | Analysis I | 4 | 1 | | 4 | 50 | 50 | 100 |
| MAM 10502 | Linear Algebra and Geometry in $R^n$ | 4 | 1 | | 4 | 50 | 50 | 100 |
| MAM 10503 | Algebra: Groups and Rings | 4 | 1 | | 4 | 50 | 50 | 100 |
| MAM 10504 | Introduction to Complex Analysis | 4 | 1 | | 4 | 50 | 50 | 100 |
| STA 10501 | Statistics and Probability II | 4 | 1 | | 4 | 50 | 50 | 100 |
| | **Total** | | | | **20** | **250** | **250** | **500** |

**Semester VI (MATHEMATICS)**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| MAM 10601 | Analysis II | 4 | 1 | | 4 | 50 | 50 | 100 |
| MAM 10602 | Ordinary and Partial Differential Equations | 4 | 1 | | 4 | 50 | 50 | 100 |
| MAM 10603 | Complex Analysis and Number Theory | 4 | 1 | | 4 | 50 | 50 | 100 |
| MAM **** | Design of Experiments and Sample Surveys (ElectiveI) | 4 | 1 | | 4 | 50 | 50 | 100 |
| MAM **** | Applied Statistics (Elective II) | 4 | 1 | | 4 | 50 | 50 | 100 |
| | **Total** | | | | **20** | **250** | **250** | **500** |

**Elective – VI**

| Course Code | Course |
|---|---|
| MAM 10601 | Design of Experiments and Sample Surveys (Elective I) |
| MAM 10602 | Applied Statistics (Elective II) |

**Semester VII (MATHEMATICS)**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| MAM 10701 | Linear Algebra | 4 | 1 | | 4 | 50 | 50 | 100 |
| MAM10702 | Real Analysis | 4 | 1 | | 4 | 50 | 50 | 100 |
| MAM 10703 | Measure and Integration | 4 | 1 | | 4 | 50 | 50 | 100 |
| MAM 10704 | Groups and Rings | 4 | 1 | | 4 | 50 | 50 | 100 |
| MAM 10705 | Computational Mathematical Laboratory | 4 | 1 | | 4 | 50 | 50 | 100 |
| | Viva Voce | | | | | | | |
| | **Total** | | | | **20** | **250** | **250** | **500** |

**Semester VIII (MATHEMATICS)**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| MAM 10801 | Fields and Modules | 4 | 1 | | 4 | 50 | 50 | 100 |
| MAM 10802 | Functional Analysis | 4 | 1 | | 4 | 50 | 50 | 100 |
| MAM 10803 | Complex Analysis | 4 | 1 | | 4 | 50 | 50 | 100 |
| MAM 10804 | Topology I | 4 | 1 | | 4 | 50 | 50 | 100 |
| MAM 10805 | Functions of Several variables & Geometry | 4 | 1 | | 4 | 50 | 50 | 100 |
| | Viva Voce | | | | | | | |
| | **Total** | | | | **20** | **250** | **250** | **500** |

**Semester IX (MATHEMATICS)**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| MAM 10901 | Operator Theory | 4 | 1 | | 4 | 50 | 50 | 100 |
| MAM 10902 | Topology II | 4 | 1 | | 4 | 50 | 50 | 100 |
| MAM 10903 | Ordinary Differential Equations & Integral Equations | 4 | 1 | | 4 | 50 | 50 | 100 |
| MAM 10904 | Probability Theory | 4 | 1 | | 4 | 50 | 50 | 100 |
| MAM ***** | Elective I | 3 | 1 | | 3 | 50 | 50 | 100 |
| | Viva Voce | | | | | | | |
| | **Total** | | | | **19** | **250** | **250** | **500** |

**Elective – IX**

| Course Code | Course |
|---|---|
| MAM 10905 | Topics in Applied Mathematics |

**Semester X (MATHEMATICS)**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| MAM 11001 | Partial Differential Equations &Variational Calculus | 4 | 1 | | 4 | 50 | 50 | 100 |
| MAM***** | Elective II | 4 | 1 | | 4 | 50 | 50 | 100 |
| MAM***** | Elective III | 4 | 1 | | 4 | 50 | 50 | 100 |
| MAM***** | Elective IV | 3 | 1 | | 4 | 50 | 50 | 100 |
| MAM***** | Elective V | 4 | 1 | | 4 | 50 | 50 | 100 |
| | Viva Voce | | | | 1 | | | |
| | Project (Optional) | | | | 8* | | | |
| | **Total** | | | | **21** | **250** | **250** | **500** |

**Elective – X**

| Course Code | Course |
|---|---|
| MAM 11002 | Wavelets |
| MAM 11003 | Optimization & Mathematical methods for deep learning |
| MAM 11004 | Commutative Algebra |
| MAM 11005 | Graph Theory |
| MAM 11006 | Advanced Linear Algebra |
| MAM 11007 | Discrete Framelets |
| MAM 11008 | Harmonic Analysis |
| MAM 11009 | Integral Transforms |
| MAM 11010 | Functions of Several Variables |
| MAM 11011 | Advanced Spectral Theory |
| MAM 11012 | Branch Algebras and Spectral Theory |
| MAM 11013 | Number Theory |
| MAM 11014 | Representation Theory of Finite Groups |
| MAM 11015 | Algebraic Topology |
| MAM 11016 | Differential Geometry |

**Details of Faculty**

| Sl.No. | Name & Designation | Specialization | Communication (Contact No. & e-mail id) |
|---|---|---|---|
| 1 | Guest Faculty (Dr. Lalitha Mathew) | ENGLISH | |
| 2 | Dr. Aneesh K N<br>Assistant Professor | HINDI | 9446426447,<br>aneeshkn1@gmail.com |
| 3 | Guest Faculty | MALAYALAM | |
| 4 | Guest Faculty | GERMAN | |
| 5 | Dr. Kuriachan,<br>(Adjunct Faculty) | BIOLOGY | |
| 6 | Dr. Thomas Mathew P<br>(Adjunct Faculty) | BIOLOGY | 9446479124,<br>tmperak@yahoo.com |
| 7 | Dr. Thomas Philip<br>Adjunct Faculty<br>Biotechnology | BIOLOGY | 9446214877,<br>pthanuveli@yahoo.com |
| 8 | Dr. Asha. A. S. | PHYSICS | 9495042275<br>asha@cusat.ac.in |
| 9 | Dr. Manoj. E | CHEMISTRY | |
| 10 | Dr. Sebastian NybinRemello<br>Asst. Professor | CHEMISTRY | 8921952631<br>nybinremello@cusar.ac.in |
| 11 | Dr. Sabeena. M.<br>Asst. Professor | PHYSICS | 9445884591<br>sabeenamannilthodi@gmail.com |
| 12 | Dr. K P Naveenachandran<br>(Adjunct Faculty) | MATHEMATICS | 9447311751<br>kpnchn@gmail.com |
| 13 | Dr.Hitha. N. | STATISTICS | 9447291473<br>Nhitha4@gmail.com |
| 14 | Sindhu Mathai, | CHEMISTRY | |
| 15 | Dr. Kala R | CHEMISTRY | 7373852607<br>kalaramakrishnan@gmail.com |
| 16 | Dr. Leena. R. Asst. Professor | CHEMISTRY | 9495818133<br>leenar@gmail.com |
| 17 | Guest Faculty | BASIC COMPUTER SCIENCE | |

# M.SC. FORENSIC SCIENCE

## Semester I

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| FSC1C01 | FUNDAMENTALS OF FORENSIC SCIENCE & CRIMINAL LAWS | 3 | 1 | | 3 | 50 | 50 | 100 |
| FSC1C02 | CRIME & CRIMINAL JUSTICE SYSTEM | 3 | 1 | | 3 | 50 | 50 | 100 |
| FSC1C03 | FORENSIC & CORRECTIONAL PSYCHOLOGY | 3 | 1 | | 3 | 50 | 50 | 100 |
| FSC1C04 | LABORATORY QUALITY MANAGEMENT, RESEARCH METHODOLOGY & STATISTICS | 3 | 1 | | 3 | 50 | 50 | 100 |
| FSC1C05 | PRACTICAL ON FSC1C01 & FSC1C02 | 2 | 1 | | 2 | 50 | 50 | 100 |
| FSC1C06 | PRACTICAL ON FSC1C03 &FSC1C04 | 2 | 1 | | 2 | 50 | 50 | 100 |
| | **Total** | | | | **16** | **300** | **300** | **600** |

## Semester II

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| FSC2C07 | PHYSICAL EVIDENCE & INSTRUMENTAL TECHNIQUES PHYSICAL | 3 | 1 | | 3 | 50 | 50 | 100 |
| FSC2C08 | DIGITAL & CYBER EVIDENCE | 3 | 1 | | 3 | 50 | 50 | 100 |
| FSC2C09 | CHEMICAL EVIDENCE & INSTRUMENTAL TECHNIQUES CHEMICAL | 3 | 1 | | 3 | 50 | 50 | 100 |
| FSC2C10 | BIOLOGICAL EVIDENCE & INSTRUMENTAL TECHNIQUES BIOLOGICAL | 3 | 1 | | 3 | 50 | 50 | 100 |
| FSC2C11 | PRACTICAL ON FSC2C07 & FSC2C08 | 2 | 1 | | 2 | 50 | 50 | 100 |
| FSC2C12 | PRACTICAL ON FSC2C09 & FSC2C10 | 2 | 1 | | 2 | 50 | 50 | 100 |
| | **Total** | | | | **16** | **300** | **300** | **600** |

## Semester III

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| FSC3C13 | FORENSIC PHOTOGRAPHY | 3 | 1 | | 3 | 50 | 50 | 100 |
| FSC3C14 | CRIME SCENE INVESTIGATION, MANAGEMENT & RECONSTRUCTION | 3 | 1 | | 3 | 50 | 50 | 100 |
| FSC3E15 | QUESTIONED DOCUMENTS# | 4 | 1 | | 4 | 50 | 50 | 100 |
| FSC3E16 | FORENSIC DERMATOGLYPHICS# | 4 | 1 | | 4 | 50 | 50 | 100 |
| FSC3E17 | FORENSIC PHYSICS# | 4 | 1 | | 4 | 50 | 50 | 100 |
| FSC3E18 | FORENSIC BALLISTICS# | 4 | 1 | | 4 | 50 | 50 | 100 |
| FSC3E19 | FORENSIC CHEMISTRY# | 4 | 1 | | 4 | 50 | 50 | 100 |
| FSC3E20 | FORENSIC MEDICINE & TOXICOLOGY# | 4 | 1 | | 4 | 50 | 50 | 100 |
| FSC3E21 | FORENSIC BIOLOGY# | 4 | 1 | | 4 | 50 | 50 | 100 |
| FSC3E22 | FORENSIC SEROLOGY & DNA PROFILING# | 4 | 1 | | 4 | 50 | 50 | 100 |
| FSC3E23 | COMPUTER & SMART PHONE FORENSIC# | 4 | 1 | | 4 | 50 | 50 | 100 |
| FSC3E24 | CYBER FORENSICS & CYBER SECURITY# | 4 | 1 | | 4 | 50 | 50 | 100 |
| FSC3C25 | PRACTICAL ON FSC3C13 &FSC3C14 | 2 | 1 | | 2 | 50 | 50 | 100 |
| FSC3E26 | PRACTICAL ON FSC3E15 &FSC3E16# | 2 | 1 | | 2 | 50 | 50 | 100 |
| FSC3E27 | PRACTICAL ON FSC3E17 & FSC3E18# | 2 | 1 | | 2 | 50 | 50 | 100 |
| FSC3E28 | PRACTICAL ON FSC3E19 & FSC3E20# | 2 | 1 | | 2 | 50 | 50 | 100 |
| FSC3E29 | PRACTICAL ON FSC3E21 & FSC3E22# | 2 | 1 | | 2 | 50 | 50 | 100 |
| FSC3E30 | PRACTICAL ON FSC3E23 & FSC3E24# | 2 | 1 | | 2 | 50 | 50 | 100 |
| | **Total** | | | | **18** | **300** | **300** | **600** |

**Semester IV**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| FSC4C31 | PROJECT | 10 | 1 | | 10 | 50 | 50 | 100 |
| FSC4E32 | ADVANCED FINGERPRINT DEVELOPMENT METHODS* | 4 | 1 | | 4 | 50 | 50 | 100 |
| FSC4E33 | FORGERY & IT"S FORENSIC DETECTION * | 4 | 1 | | 4 | 50 | 50 | 100 |
| FSC4E34 | FORENSIC AUDIO VIDEO ANALYSIS* | 4 | 1 | | 4 | 50 | 50 | 100 |
| FSC4E35 | ADVANCED FORENSIC BALLISTICS* | 4 | 1 | | 4 | 50 | 50 | 100 |
| FSC4E36 | EXPLOSIVES & EXPLOSION* | 4 | 1 | | 4 | 50 | 50 | 100 |
| FSC4E37 | PHARMACOLOGY & FORENSIC ANALYSIS OF DRUGS* | 4 | 1 | | 4 | 50 | 50 | 100 |
| FSC4E38 | FORENSIC-ANTHROPOLOGY, ENTOMOLOGY & ODONTOLOGY* | 4 | 1 | | 4 | 50 | 50 | 100 |
| FSC4E39 | FORENSIC- BOTANY, WILDLIFE & MICROBIAL FORENSIC* | 4 | 1 | | 4 | 50 | 50 | 100 |
| FSC4E40 | ETHICAL HACKING & RECOVERY FORENSIC* | 4 | 1 | | 4 | 50 | 50 | 100 |
| FSC4E41 | DIGITAL IMAGE PROCESSING* | 4 | 1 | | 4 | 50 | 50 | 100 |
| FSC4E42 | PRACTICAL ON FSC4E32* | 2 | 1 | | 2 | 50 | 50 | 100 |
| FSC4E43 | PRACTICAL ON FSC4E33* | | | | | | | |
| FSC4E44 | PRACTICAL ON FSC4E34* | 2 | 1 | | 2 | 50 | 50 | 100 |
| FSC4E45 | PRACTICAL ON FSC4E35* | | | | | | | |
| FSC4E46 | PRACTICAL ON FSC4E36* | 2 | 1 | | 2 | 50 | 50 | 100 |
| FSC4E47 | PRACTICAL ON FSC4E37* | | | | | | | |
| FSC4E48 | PRACTICAL ON FSC4E38* | 2 | 1 | | 2 | 50 | 50 | 100 |
| FSC4E49 | PRACTICAL ON FSC4E39* | | | | | | | |
| FSC4E50 | PRACTICAL ON FSC4E40* | 2 | 1 | | 2 | 50 | 50 | 100 |
| FSC4E51 | PRACTICAL ON FSC4E41* | | | | | | | |
| | **Total** | | | | **22** | **480** | **120** | **600** |

# DEPARTMENT OF APPLIED CHEMISTRY

## M.SC. CHEMISTRY

**SEMESTER: 1**

***Semester Credit: 21(Core: 16; Elective: 5) Cumulative Credit:21***

| Course Code | Course Name | Course Type | Credits | L-T-P | CE | ESE | Total Marks |
|---|---|---|---|---|---|---|---|
| CHE 2101 | Inorganic Chemistry -I (Concepts and Developments) | Core | 3 | 3-1-0 | 50 | 50 | 100 |
| CHE 2102 | Organic Chemistry-I (Reactivity and Mechanisms) | Core | 4 | 4-1-0 | 50 | 50 | 100 |
| CHE 2103 | Theoretical Chemistry-I (Quantum Chemistry) | Core | 3 | 3-1-0 | 50 | 50 | 100 |
| CHE 2104 | Theoretical Chemistry-II (Group Theory and Spectroscopy) | Core | 4 | 4-1-0 | 50 | 50 | 100 |
| CHE 2105 | Advanced Chemical Synthesis Lab | Core | 2 | 0-0-6 | 100 | - | 100 |
| CHE 2106 | Open Ended Lab-I | Core | - | 0-0-6 | - | - | - |
| CHE 2107 | Equilibrium Thermodynamics | Elective | 3 | 3-1-0 | 50 | 50 | 100 |
| CHE 2108 | Environmental Chemistry | Elective | 2 | 2-1-0 | 50 | 50 | 100 |
| CHE 2109 | Advanced Stereochemistry | Elective | 2 | 2-1-0 | 50 | 50 | 100 |
| CHE 2110 | Professional and Career Development in Chemistry | Audit [a] | - | 2-0-0 | - | - | - |

**SEMESTER: 2**

***Semester Credit: 22 (Core: 16; Elective: 6) Cumulative Credit:43***

| Course Code | Course Name | Course Type | Credits | L-T-P | CE | ESE | Total Marks |
|---|---|---|---|---|---|---|---|
| CHE 2201 | Inorganic Chemistry-II (Chemistry of d- and f- Block Elements) | Core | 3 | 3-1-0 | 50 | 50 | 100 |
| CHE 2202 | Organic Chemistry -II (Reactions, Reagents and Synthesis) | Core | 4 | 4-1-0 | 50 | 50 | 100 |
| CHE 2203 | Organic Chemistry -III (Spectroscopy of Organic Compounds) | Core | 2 | 2-1-0 | 50 | 50 | 100 |
| CHE 2204 | Physical Chemistry-I (Nonequilibrium and Statistical Thermodynamics) | Core | 3 | 3-1-0 | 50 | 50 | 100 |
| CHE 2205 | Theoretical Chemistry-III (Chemical Bonding and Computational Chemistry) | Core | 2 | 1-1-3 | 50 | 50 | 100 |
| CHE 2206 | Advanced Physical Chemistry Lab | Core | 2 | 0-0-6 | 100 | - | 100 |
| CHE 2207 | Open Ended Lab-II | Core[c] | - | 0-0-6 | - | - | - |
| CHE 2208 | Bioanalytical Chemistry | Elective | 2 | 2-1-0 | 50 | 50 | 100 |
| CHE 2309 | Polymer Chemistry | Elective | 2 | 2-1-0 | 50 | 50 | 100 |
| CHE 2210 | Advanced Photochemistry | Elective | 2 | 2-1-0 | 50 | 50 | 100 |
| CHE 2211 | Theory of Orbital Interactions in Chemistry | Elective | 2 | 1-1-3 | 50 | 50 | 100 |
| CHE 2212 | Chemical Crystallography | Elective | 4 | 4-1-0 | 50 | 50 | 100 |

**SEMESTER: 3**

***Semester Credit: 21(Core: 17; Elective: 4) Cumulative Credit:64***

| Course Code | Course Name | Course Type | Credits | L-T-P | CE | ESE | Total Marks |
|---|---|---|---|---|---|---|---|
| CHE 2301 | Analytical Chemistry (Advanced Analytical Techniques and Instrumental Methods) | Core | 4 | 4-1-0 | 50 | 50 | 100 |
| CHE 2302 | Inorganic Chemistry -III (Organometallic and Bioinorganic Chemistry) | Core | 3 | 3-1-0 | 50 | 50 | 100 |
| CHE 2303 | Organic Chemistry-IV (Chemistry of Natural Products) | Core | 3 | 2-1-0 | 50 | 50 | 100 |
| | | | | | | | |
| CHE 2304 | Physical Chemistry-II (Kinetics, Adsorption & Catalysis, Surface Chemistry) | Core | 3 | 3-1-0 | 50 | 50 | 100 |
| CHE 2305 | Physical Chemistry-III (Advanced Electrochemistry) | Core | 2 | 2-1-0 | 50 | 50 | 100 |
| CHE 2306 | Open Ended Lab-III | Core | 2 | 0-0-6 | 100 | - | 100 |
| CHE 2307 | Interdepartmental Elective | Elective | 4 | 4-1-0 | 50 | 50 | 100 |
| CHE 2309 | Oleochemicals, Nutraceuticals, Surfactant Technology | Elective | 2 | 2-1-0 | 50 | 50 | 100 |
| CHE 2310 | Materials Chemistry | Elective | 2 | 2-1-0 | 50 | 50 | 100 |
| CHE 2311 | Bonds and Bands in Solids | Elective b | 2 | 2-1-0 | 50 | 50 | 100 |

**SEMESTER: 4**

***Semester Credit: 16(Core: 16; Elective: 0) Cumulative Credit:80***

| Course Code | Course Name | Course Type | Credits | L-T-P | CE | ESE | Total Marks |
|---|---|---|---|---|---|---|---|
| CHE 2401 | Project Dissertation and Viva Voce | Core | 16 | - | - | 300 | 300 |

a-Value Added Course

b-MOOC Coursec-evaluation in third semester

# M.Tech. INDUSTRIAL CATALYSIS

**Semester I**

| Course Code | Course | C/ E | Credits |
|---|---|---|---|
| CHE 3101 | Surface Chemistry and Catalysis | C | 4 |
| CHE 3102 | Catalyst Technology – I | C | 4 |
| CHE 3103 | Physical Methods in Catalysis – I | C | 4 |
| CHE 3104 | Chemical Reaction Engineering | E | 3 |
| CHE 3105 | Enzyme Catalysis | E | 3 |
| CHE 3106 | Electro Catalysis | E | 3 |
| CHE 3107 | Lab Course | C | 2 |
| CHE 3108 | Viva – voce | C | - |
| | Total | | 23 |

**Semester II**

| Course Code | Course | C/ E | Credits |
|---|---|---|---|
| CHE 3201 | Surface Characterization Techniques | C | 4 |
| CHE 3202 | Catalysis by Metal Complexes | C | 4 |
| CHE 3203 | Catalyst Technology – II | C | 4 |
| CHE 3204 | Industrial **C**atalytic Processes | E | 3 |
| CHE 3205 | Phase Transfer Catalysis | E | 3 |
| CHE 3206 | Polymer Supported **C**atalysis | E | 3 |
| CHE 3207 | Photo catalysis | E | 3 |
| CHE 3208 | Lab Course | C | 2 |
| CHE 3209 | Viva – voce | C | - |
| | Total | | 26 |

**Semester III**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| CHE 3301 | Project dissertation work: Project progress evaluation. | C | 16 |
| | Total | | 16 |

(The project work, extending to the whole Semester and next semester, is carried out at National R&D laboratories.)

**Semester IV**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| CHE 3401 | Project dissertation work: Project progress evaluation. | C | 16 . |
| | Total | | 16 |

**Details of Faculty**

| Details of Faculty | | | |
|---|---|---|---|
| **SI No.** | **Name and Designation** | **Specialization** | **Communication** |
| 1. | Dr. K. Girish Kumar (GK)<br>Professor and Head of the Department | Analytical Chemistry | 0484-2577813;<br>2862420<br>giri@cusat.ac.in |
| 2. | Dr. K. Sreekumar (KSK)<br>Professor | Polymer Chemistry/Catalysis | 0484-2421530;<br>2862430<br>ksk@cusat.ac.in |
| 3. | Dr. N. Manoj<br>(MN)<br>Professor | Organic Chemistry | 0484-2301268;<br>2862422<br>manoj.n@cusat.ac.in |
| 4. | Dr. P. M. Sabura Begum (PMS)<br>Professor | Organic Chemistry | 0484-2577539;<br>2862426<br>pmsabura@cusat.ac.in |
| 5. | Dr.P.V.Mohanan (PVM)<br>Professor | Analytical Chemistry | 0484-2508947;<br>2862429<br>mohan@cusat.ac.in |
| 6. | Dr. SujaHaridas<br>(SH)<br>Assistant Professor | Physical Chemistry / Catalysis | 0484-2408438;<br>2862428<br>sujaharidas@cusat.ac.in |
| 7. | Dr. Sebastian NybinRemello(SNR)<br>Assistant Professor | Inorganic Chemistry / Catalysis | 0484-2575804<br>2862421<br>nybinremello@cusat.ac.in |
| 8. | Dr. Susmita De<br>(SD)<br>Assistant Professor | Computational / Theoretical Chemistry | 0484-2575804<br>2862421<br>susmita@cusat.ac.in |
| 9. | Dr. Kala R.<br>(KR)<br>Assistant Professor | Inorganic Chemistry | 0484-2575804<br>2862423<br>kala@cusat.ac.in |
| 10. | Dr. Leena R. (LR)<br>Assistant Professor | Physical Chemistry | 0484-2575804<br>2862656<br>leenarajith@ gmail.com |
| 11 | Dr. Manoj E (ME)<br>Assistant Professor | Inorganic Chemistry | 2862424<br>manojepotti@gmail.com |
| 12. | Dr. Sindhu Mathai (SM)<br>Assistant Professor | Organic Chemistry | 2862425<br>sindhumathai@cusat.ac.in |

# DEPARTMENT OF BIOTECHNOLOGY

## M.Sc. BIOTECHNOLOGY

**Semester I**

| Course code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-303-0101 | Metabolism and Bioenergetics(C ) | 3 | 1 | 1 | 4 | 50 | 50 | 100 |
| 20-303-0102 | Genetics(C ) | 2 | 1 | 0 | 2 | 50 | 50 | 100 |
| 20-303-0103 | Molecular Biology(C ) | 3 | 1 | 0 | 3 | 50 | 50 | 100 |
| 20-303-0104 | Microbiology(C ) | 3 | 1 | 1 | 4 | 50 | 50 | 100 |
| 20-303-0105 | Biostatistics and Principles of Analytical Techniques(C ) | 3 | 1 | 1 | 4 | 50 | 50 | 100 |
| 20-303-0106 | Molecular Cell biology(C ) | 3 | 1 | 1 | 4 | 50 | 50 | 100 |
| **Total** | | | | | **21C** | **300** | **300** | **600** |

**Semester-II**

| Course code | Course | Hrs/Week | | Credits | | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-303-0201 | Enzymology(C ) | 3 | 1 | 1 | 4 | 50 | 50 | 100 |
| 20-303-0202 | Bioprocess Technology(C ) | 3 | 1 | 1 | 4 | 50 | 50 | 100 |
| 20-303-0203 | Biosafety, Bioethics and IPR(C ) | 2 | 1 | 0 | 2 | 50 | 50 | 100 |
| 20-303-0204 | Bioinformatics(C ) | 2 | 1 | 1 | 3 | 50 | 50 | 100 |
| 20-303-0205 | Project Proposal Preparation and Presentation(C ) | 1 | 1 | 0 | 1 | 100 | - | 100 |
| 20-303-0206 | Critical Analysis of Classical Papers(C ) | 0 | 1 | 1 | 1 | 100 | - | 100 |
| 20-303-0207 | Cancer Biology(E) | 3 | 1 | 0 | 3 | 50 | 50 | 100 |
| 20-303-0208 | Plant Biotechnology(E) | 2 | 1 | 1 | 3 | 50 | 50 | 100 |
| 20-303-0209 | Nano Biotechnology(E) | 2 | 1 | 1 | 3 | 50 | 50 | 100 |
| 20-303-0210 | Neurobiology(E) | 2 | 1 | 1 | 3 | 50 | 50 | 100 |
| **Total** | | | | **15 C**<br>**12 E** | | **400**<br>**200** | **200**<br>**200** | **600**<br>**400** |

**Semester-III**

| Course code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-303-0301 | Recombinant DNA Technology(C ) | 3 | 1 | 1 | 4 | 50 | 50 | 100 |
| 20-303-0302 | Immunology and Immunotechnology(C ) | 3 | 1 | 1 | 4 | 50 | 50 | 100 |
| 20-303-0303 | Biopharmaceuticals(C ) | 2 | 1 | 1 | 3 | 50 | 50 | 100 |
| 20-303-0304 | Functional Genomics | 1 | 1 | 1 | 2 | 50 | 50 | 100 |
| 20-303-0305 | Industrial &Environmnetal Biotechnology(Applications of Biotechnology-I) (E) | 3 | 1 | 1 | 4 | 50 | 50 | 100 |
| 20-303-0306 | Medical & Animal Biotechnology(Applications of Biotechnology-II) (E) | 3 | 1 | 1 | 4 | 50 | 50 | 100 |
| 20-303-0307 | Stem cell biology& Regenerative Medicine (E) | 1 | 1 | 1 | 2 | 50 | 50 | 100 |
| **Total** | | | | | **11 C**<br>**12 E** | **150**<br>**200** | **150**<br>**200** | **300**<br>**400** |

**Semester-IV**

| Course code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-303-0401 | Innovation and Entrepreneurship for Biologists(E) | - | - | - | 4 | 100 | - | 100 |
| 20-303-0402 | Dissertation(C )<br>Comprehensive viva voce&Seminar(C ) | - | - | - | 12<br>1 | 200<br>100 | 200<br>100 | 400<br>200 |
| Total | | | | | **13 C**<br>**4 E** | **300**<br>**100** | **300**<br>**-** | **600**<br>**100** |
| Compulsory | Swayam/NPTEL Elective(E) | | | | 3 | 100 | - | 100 |
| **GRAND TOTAL FOR M.Sc BIOTECHNOLOGY PROGRAM** | | | | | **60 C**<br>**28 E** | **1200**<br>**500** | **800**<br>**400** | **2000**<br>**900** |

# M.SC MICROBIOLOGY

**Semester I**

| Course code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | **L** | **T** | **P** | | **Internal** | **External** | **Total** |
| 20-340-0101 | Bacteriology(C ) | 3 | 1 | 1 | 4 | 50 | 50 | 100 |
| 20-340-0102 | Fungi(C ) | 3 | 1 | 1 | 4 | 50 | 50 | 100 |
| 20-340-0103 | Microbial Genetics(C ) | 3 | 1 | 1 | 4 | 50 | 50 | 100 |
| 20-340-0104 | Microbial biochemistry(C ) | 3 | 1 | 1 | 4 | 50 | 50 | 100 |
| 20-340-0105 | Biostatistics and Principles of Analytical Techniques(C ) | 3 | 1 | 1 | 4 | 50 | 50 | 100 |
| **Total** | | | | | **20C** | **250** | **250** | **500** |

**Semester-II**

| Course code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-340-0201 | Microbial Physiology(C ) | 3 | 1 | 1 | 4 | 50 | 50 | 100 |
| 20-340-0202 | Fermentation technology(C ) | 3 | 1 | 1 | 4 | 50 | 50 | 100 |
| 20-340-0203 | Biosafety, Bioethics and IPR(C ) | 2 | 1 | 0 | 2 | 50 | 50 | 100 |
| 20-340-0204 | Bioinformatics(C ) | 3 | 1 | 1 | 3 | 50 | 50 | 100 |
| 20-340-0205 | Project Proposal Preparation and Presentation(C ) | 1 | 1 | 0 | 1 | 100 | - | 100 |
| 20-340-0206 | Critical Analysis of Classical Papers(C ) | 0 | 1 | 1 | 1 | 100 | - | 100 |
| 20-340-0207 | Enzymology(E) | 3 | 1 | 1 | 4 | 50 | 50 | 100 |
| 20-340-0208 | Food Microbiology(E) | 3 | 0 | 1 | 3 | 50 | 50 | 100 |
| 20-340-0209 | Plant microbe interactions(E) | 2 | 1 | 1 | 3 | 50 | 50 | 100 |
| 20-340-0210 | Biofuels and Bioenergy(E) | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| **Total** | | | | | **15 C**<br>**13 E** | **400**<br>**200** | **200**<br>**200** | **600**<br>**400** |

**Semester-III**

| Course code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-340-0301 | Recombinant DNA Technology(C ) | 3 | 1 | 1 | 4 | 50 | 50 | 100 |
| 20-340-0302 | Immunology and Immunotechnology(C ) | 3 | 1 | 1 | 4 | 50 | 50 | 100 |
| 20-340-0303 | Molecular Virology(C ) | 3 | 1 | 1 | 4 | 50 | 50 | 100 |
| 20-340-0304 | Industrial microbiology(E) | 2 | 1 | 1 | 3 | 50 | 50 | 100 |
| 20-340-0305 | Functional Genomics(E) | 1 | 1 | 1 | 2 | 50 | 50 | 100 |
| 20-340-0306 | Environmental Microbiology(E) | 2 | 1 | 1 | 3 | 50 | 50 | 100 |
| 20-340-0307 | Diagnostic and Pharmaceutical microbiology(E) | 2 | 1 | 1 | 3 | 50 | 50 | 100 |
| 20-340-0308 | Biodegradation and Solid waste management(E) | 2 | 1 | 1 | 2 | 50 | 50 | 100 |
| **Total** | | | | | **12 C**<br>**15 E** | **150**<br>**250** | **150**<br>**250** | **300**<br>**500** |

**Semester-IV**

| Course code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-340-0401 | Skill development and Entrepreneurship(E) | 2 | 0 | 2 | 4 | 100 | - | 100 |
| 20-340-0402 | Dissertation(C )<br>Comprehensive viva voce&Seminar(C ) | - | - | - | 12<br>1 | 200<br>100 | 200<br>100 | 400<br>200 |
| Total | | | | | **13 C**<br>**4 E** | **300**<br>**100** | **300**<br>**-** | **600**<br>**100** |
| Compulsory | Swayam/NPTEL Elective(E) | | | | 3 | 100 | - | 100 |
| **GRAND TOTAL FOR M.Sc BIOTECHNOLOGY PROGRAM** | | | | | **60 C**<br>**32 E** | **1100**<br>**550** | **900**<br>**550** | **2000**<br>**1100** |

**Details of Faculty**

| Sl. No | Name & Designation | Specialization | Communication (Contact No. & e-mail id) |
|---|---|---|---|
| 1 | Dr. Sarita G Bhat<br>Professor& Head | Microbial Genetics,<br>Bacteriophage Therapy | 9846033486<br>sgbhat@cusat.ac.in |
| 2 | Dr. Parvathi A<br>Professor | Microbiology,Virology<br>Molecular Biology | 9847358540<br>parubfsc@gmail.com |
| 3 | Dr. AjithVengellur,<br>Assistant Professor | Genetics,Cancer Biology<br>Molecular Biology | 7558996850<br>vengellur@gmail.com |
| 4 | Dr. Baby Chakrapani P S<br>Assistant Professor | Neurobiology | 9495109908<br>bcps@gmail.com,<br>chakrapani@cusat.ac.in |
| 5 | Dr. BhavyaBalan Chandrika<br>Assistant Professor | Cancer Biology<br>Biotechnology | 8157025337<br>bhavyabc@gmail.com |
| 6 | Dr. Rajesh P P<br>Assistant Professor | Bioelectrochemical System | 8927962495<br>rajosone86@gmail.com |
| 7 | Dr. Sreekanth P M<br>Assistant Professor | Plant Genetics,<br>Molecular Biology,<br>Conservation biology | 9482438168<br>sreekanthpm@gmail.com |
| 8 | Dr. SnehaYoginran<br>Assistant Professor | Molecular Biology,<br>Plant Biotechnology | 9868594069<br>snehayogindran@cusat.ac.in |
| 9 | Dr. Sayuj K P<br>Assistant Professor | Plant Pathology,<br>Bioinformatics | 9895921594<br>sayuj@cusat.ac.in |
| 10 | Dr. Manjusha S<br>Assistant Professor(on contract) | Biochemistry<br>Molecular biology | 7907436274<br>biomanjusha@yahoo.com |
| 11 | Dr. Sreeja Narayanan<br>DBT Welcome Trust Fellow | Nanobiotechnology | 8156866922<br>narayanan.sreeja@gmail.com |
| 12 | Dr. AnushaAshokan<br>DST- INSPIRE Faculty | Cancer biology<br>Molecular biology | 9645095089<br>anushaashokan@gmail.com |

# DEPARTMENT OF MATHEMATICS

## M.Sc. MATHEMATICS

### Semester I

| Course Code | Name of the Course | Credits | Marks | | | Pre-Requisites |
|---|---|---|---|---|---|---|
| | | | Internal | External | Total | |
| MAM 2101 | Linear Algebra | 4 | 50 | 50 | 100 | |
| MAM 2102 | Real Analysis | 4 | 50 | 50 | 100 | |
| MAM 2103 | Measure and Integration | 4 | 50 | 50 | 100 | |
| MAM 2104 | Groups and Rings | 4 | 50 | 50 | 100 | |
| MAM 2105 | Computational Mathematical Laboratory | 4 | 50 | 50 | 100 | |
| | VIVA VOCE | 0 | | | | |
| **Total Credits** | | **20** | | | | |

**Elective I - Nil**

### Semester II

| Course Code | Name of the Course | Credits | Marks | | | Pre-Requisites |
|---|---|---|---|---|---|---|
| | | | Internal | External | Total | |
| MAM 2201 | Fields and Modules | 4 | 50 | 50 | 100 | MAM 2104 |
| MAM 2202 | Functional Analysis | 4 | 50 | 50 | 100 | MAM 2101-2103 |
| MAM 2203 | Complex Analysis | 4 | 50 | 50 | 100 | MAM 2102 |
| MAM 2204 | Topology I | 4 | 50 | 50 | 100 | MAM 2102 |
| MAM 2205 | Functions of Several variables and Geometry | 4 | 50 | 50 | 100 | MAM 2101-2102 |
| | VIVA VOCE | 0 | | | | |
| **Total Credits** | | **20** | | | | |

**Elective II - Nil**

**Semester III**

| Course Code | Name of the Course | Credits | Marks | | | Pre-Requisites |
|---|---|---|---|---|---|---|
| | | | Internal | External | Total | |
| MAM 2301 | Operator Theory | 4 | 50 | 50 | 100 | MAM 2202 |
| MAM 2302 | Topology II | 4 | 50 | 50 | 100 | MAM 2204 |
| MAM 2303 | Ordinary Differentia lEquations and Integral Equations | 4 | 50 | 50 | 100 | |
| MAM 2304 | Probability Theory | 4 | 50 | 50 | 100 | MAM 2101-2103 |
| | Elective I | 3 | 50 | 50 | 100 | |
| | VIVA VOCE | 0 | | | | |
| **Total Credits** | | **19** | | | | |

**Semester IV**

| Course Code | Name of the Course | Credits | Marks | | | Pre-Requisites |
|---|---|---|---|---|---|---|
| | | | Internal | External | Total | |
| MAM 2401 | Partial Differential Equations and VariationalCalculus | 4 | 50 | 50 | 100 | MAM 2303 |
| | Elective I | 4 | 50 | 50 | 100 | |
| | Elective I | 4 | 50 | 50 | 100 | |
| | Elective III | 4 | 50 | 50 | 100 | |
| | Elective IV | 4 | 50 | 50 | 100 | |
| | *Project (Optional) | 8* | 50 | 50 | 100 | |
| | VIVA VOCE | 1 | - | 100 | 100 | |
| **Total Minimum Credits** | | **21** | | | | |
| **Minimum Credits for Pass** | | **80** | | | | |

*Project is optional to the students. The students opt for project shall start the work immediately after the second semester. The project is equivalent to two Electives in the fourthsemester.

**List of Elective Courses**

| Course Code | Name of the Course |
|---|---|
| MAM 2305 | Topics in Applied Mathematics<br>(Inter-Departmental Elective) |
| MAM 2402 | Wavelets |
| MAM 2403 | Optimization and Mathematical Methods For Deep Learning |
| MAM 2404 | Commutative Algebra |
| MAM 2405 | Graph Theory |
| MAM 2406 | Advanced Linear Algebra |
| MAM 2407 | Discrete Framelets |
| MAM 2408 | Harmonic Analysis |
| MAM 2409 | Integral Transforms |
| MAM 2410 | Functions of Several Variables |
| MAM 2411 | Advanced Spectral Theory |
| MAM 2412 | Banach Algebras and Spectral Theory |
| MAM 2413 | Number Theory |
| MAM 2414 | Representation Theory of Finite Groups |
| MAM 2415 | Algebraic Topology |
| MAM 2416 | Differential Geometry |

TOTAL CREDITS FOR THE SUCCESSFUL COMPLETION OF THE COURSE -80

TOTAL MARKS -2100

## Details of Faculty

| Sl. No. | Name & Designation | Specialisation | Communication (Contact No. & e-mail id) |
|---|---|---|---|
| 1 | Dr. Sasi Gopalan (SG)<br>Professor and Head | Analysis and Approximations in Deep Learning, Optimization Techniques, Fuzzy Mathematics, Wavelets Analysis, Mathematical Morphology | 9495363385<br>sgcusat@gmail.com<br>sasigopalan@cusat.ac.in |
| 2 | Prof. P.G. Romeo (PGR)<br>Professor | Algebra, Category Theory, Algebraic Topology, Universal Algebras | 9447663109<br>romeo_parackal@yahoo.com<br>romeopg@cusat.ac.in |
| 3 | Dr.Shery Fernandez (SF)<br>Associate Professor | Representation Theory, Fuzzy Mathematics | 9846762450<br>sheryfernandez@yahoo.co.in<br>sheryfernandez@cusat.ac.in |
| 4 | Dr. V.B. Kiran Kumar (VBK)<br>Assistant Professor | Functional Analysis | 8547496594<br>kiranbalu36@gmail.com<br>vbk@cusat.ac.in |
| 5 | Dr.Ambily A.A. (AAA)<br>Assistant Professor | Algebraic K-theory , Commutative Algebra, Computational Algebra, Non-Commutative Algebras | 9496530225<br>aaambily@gmail.com<br>ambily@cusat.ac.in |
| 6 | Dr.Noufal A. (AN)<br>Assistant Professor | Functional Analysis, Framelets, Partial Differential Equations | 9447327154<br>noufalasharaf@gmail.com<br>noufal@cusat.ac.in |
| 7 | Prof. M.N. Narayanan Namboodiri (MNN)<br>Emeritus Scientist | Functional Analysis | 9446505953<br>mnnadri@gmail.com |
| 8 | Prof. A. Vijayakumar(AV)<br>Emeritus Professor | Discrete Mathematics | 9447608851<br>vambat@gmail.com<br>vijay@cusat.ac.in |
| 9 | Dr.AparnaLakshmanan S (AL)<br>Assistant Professor | Graph Theory, Algebra | 9847742405<br>aparnaren@gmail.com<br>aparnals@cusat.ac.in |

| | | | |
|---|---|---|---|
| 10 | Dr.Tathagata Banerjee (TB)<br>Assistant Professor | Operator Algebras , Operator Theory and Coarse Geometry | 7022518702<br>tathagatabanerjee85@gmail.com<br>tathagata@cusat.ac.in |
| 11 | Dr.TanushreePandit (TP)<br>Assistant Professor | Convex Optimization, Variational Inequalities, Equilibrium Problems | 8960419388<br>tanushreepandit91@gmail.com<br>tpandit@cusat.ac.in |
| 12 | Dr. Shankar P (SP)<br>Assistant Professor | Functional Analysis , Operator Algebras and Operator Theory | 9786698534<br>shankarsupy@gmail.com<br>shankarsupy@cusat.ac.in |

# DEPARTMENT OF PHYSICS

## M.Sc. PHYSICS

**Semester I**

| Course code | Course | Hrs /Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 21-318-0101 | Mathematical Physics | | | | 4 | 50 | 50 | 100 |
| 21-318-0102 | Classical Mechanics | | | | 4 | 50 | 50 | 100 |
| 21-318-0103 | Electrodynamics | | | | 4 | 50 | 50 | 100 |
| 21-318-0104 | Quantum Mechanics - I | | | | 4 | 50 | 50 | 100 |
| 21-318-0104 | Advanced Experiments in Physics Lab - I | | | | 3 | 100 | - | 100 |
| **Total** | | | | | **19** | | | **500** |

## Semester II

| Course code | Course | Hrs /Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 21-318-0201 | Quantum Mechanics - II | | | | 4 | 50 | 50 | 100 |
| 21-318-0202 | Statistical Mechanics | | | | 4 | 50 | 50 | 100 |
| 21-318-0203 | Atomic and Molecular Spectroscopy | | | | 4 | 50 | 50 | 100 |
| 21-318-0204 | Advanced Electronics | | | | 4 | 50 | 50 | 100 |
| 21-318-0205 | Advanced Experiments in Physics Lab - 11 | | | | 4 | 100 | - | 100 |
| **Total** | | | | | **20** | | | **500** |

## Semester III

| Course code | Course | Hrs /Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 21-318-0301 | Nuclear and Particle Physics | | | | 4 | 50 | 50 | 100 |
| 21-318-0302 | Advanced Solid State Physics | | | | 4 | 50 | 50 | 100 |
| 21-318-0303 | Elective I | | | | 4 | 50 | 50 | 100 |
| 21-318-0304 | Elective II (Inter-departmental) | | | | 4 | 50 | 50 | 100 |
| 21-318-0305 | Advanced Experiments in Physics Lab - III | | | | 4 | 50 | 50 | 100 |
| **Total** | | | | | **20** | | | **500** |

**Semester IV**

| Course code | Course | Hrs /Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 21-318-0401 | Major Project | | | | 16 | 200 | 200 | 400 |
| 21-318-0402 | Online Course | | | | 2 | 50 | - | 50 |
| 21-318-0403 | Elective - III (online mode) | | | | 4 | 50 | 50 | 100 |
| **Total** | | | | | **22** | | | **550** |

## Electives Courses

Elective courses, from 2021 admission onward, are offered for IIIrd and IVth semester only. Department will offer, in the required semesters, 4 to 5 elective courses from the list below.

| Course Code | Course |
|---|---|
| 06 | 2D Materials . . . . . |
| 07 | Advanced Magnetism and Magnetic Materials . . . . . |
| 08 | Advanced mathematical physics . . . . . |
| 09 | Advanced Raman Spectroscopy . . . . . |
| 10 | Advanced solid state physics-II . . . . . |
| 11 | Applied Vibrational Spectroscopy . . . . . |
| 12 | Astrophysics . . . . . |
| 13 | Biophysics . . . . . |
| 14 | Complex networks . . . . . |
| 15 | Computational Physics . . . . . |
| 16 | Crystal Growth . . . . . |

| | |
|---|---|
| 17 | Elementary astronomy . . . . . |
| 18 | Fundamentals of Photovoltaics . . . . . |
| 19 | Gravitation and Cosmology . . . . . |
| 20 | Laser and Nonlinear Optics . . . . . |
| 21 | Light Sources and Detectors . . . . . |
| 22 | Measurements and Optical Instrumentation . . . . . |
| 23 | Modern Optics . . . . . |
| 24 | Molecular physics and laser spectroscopy . . . . . |
| 25 | Nondestructive measurement techniques and applications |
| 26 | Non-equilibrium statistical physics . . . . . |
| 27 | Non-linear dynamics and chaos . |
| 28 | Non-linear optics . . . . . |
| 29 | Phase transition and critical phenomena . . . . . |
| 30 | Physics of Nanomaterials . . . . . |
| 31 | Principles of Biomedical instruments . . . . . |
| 32 | Quantum field theory . . . . . |
| 33 | Quantum Computation and Information . . . . . |
| 34 | Quantum optics . . . . . |
| 35 | Solar Photovoltaic Technology . . . . . |
| 36 | Sophisticate Material Characterization Techniques |
| 37 | Thin film physics . . . . . |
| 38 | Ultrashort Pulse Lasers and Applications . |

## Details of Faculty

| Sl No | Name & Designation | Specialization | Communication (Contact No.& e-mail id) |
|---|---|---|---|
| 1 | Prof. Titus K Mathew, Professor and Head | Theoretical Physics | 9995438460 titus@cusat.ac.in |
| 2 | Prof.JunaidBushiri, Professor | Condensed Matter Physics | 9048183372 junaidbushiri@cusat.ac.in |
| 3 | Dr. Aldrin Antony, Associate Professor | Condensed Matter Physics | 8879007890 aldrin@cusat.ac.in |
| 4 | Dr.RijuIssac, Associate Professor | Laser Physics | 8943914464 riju@cusat.ac.in |
| 5 | Dr.Anoop K K, Assistant Profesor | Condensed MatterPhysics | 8589855747 anoopkk@cusat.ac.in |
| 6 | Dr. Seno Thomas, assistant Professor | Condensed Matter Physics | 9645826550 senoy.thomas@cusat.ac.in |
| 7 | Dr. Prasad V V, Assistant Professor | Theoretical Physics | 9036897515 prasad.vv@cusat.ac.in |
| 8 | Dr. Charles Jose, Assistant Professor | AStrophysics | 8606434507 charles.jose@cusat.ac.in |
| 9 | Dr. Rhine Kumar , Assistant Professor | Nuclear Physics | 9447982019 rhinekumar@cusat.ac.in |
| 10 | Dr. Asha A S, Assistant Professor | Condensed Matter Physics | 9495042275 asa@cusat.ac.in |
| 11 | Dr.Sabeena M, Assistant Professor | Condensed Matter Physics | 9446996841 sabeena@cusat.ac.in |
| 12 | Dr.Sasidevan, Assistant Professor | Theoretical Physics | 9004625745 sasidevan@cusat.ac.in |
| 13 | Dr.VineethMohanan, Assistant Professor | Condensed Matter Physics | 6235459762 vineethmp@cusat.ac.in |
| 14 | Dr. Ronald Benjamin, UGC-FRP Assistant Professor | Theoretical Physics | 9040000584 benjamin.phys@gmail.com |
| 15 | Prof. Ramesh babu. Adjunct Faculty | Particle Physics | 9447608852 rbt@cusat.ac.in |
| 16 | Dr. N Shaji,, Adjunct Faculty | Quantum Computation and Quantum Information Physics | 9447792427 shajin@cusat.ac.in |

# DEPARTMENT OF STATISTICS

## M.Sc. STATISTICS

**Semester I**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 21-322-0101 | Mathematical Methods for Statistics | | | | 4 | 50 | 50 | 100 |
| 21-322-0102 | Probability Theory I | | | | 4 | 50 | 50 | 100 |
| 21-322-0103 | Probability Distributions | | | | 4 | 50 | 50 | 100 |
| 21-322-0104 | Sampling Theory &Methods | | | | 4 | 50 | 50 | 100 |
| **Total** | | | | | **16** | | | |

**Elective I**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| 21-322-0105 | Data Analytics using R | E | 3 |
| 21-322-0106 | Statistical Computing | E | 3 |

**Semester II**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 21-322-0201 | Statistical Inference I | | | | 4 | 50 | 50 | 100 |
| 21-322-0202 | Probability Theory II | | | | 4 | 50 | 50 | 100 |
| 21-322-0203 | Stochastic Processes | | | | 4 | 50 | 50 | 100 |
| 21-322-0204 | Practical -I and Viva Voce | | | | 2 | 100 | - | 100 |
| **Total** | | | | | **14** | | | |

**Elective II (Choose any one)**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| 21-322-0205 | Statistics for National Development | E | 3 |
| 21-322-0206 | Reliability Modeling and Analysis | E | 3 |

**Elective III**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| 21-322-0207 | A suitable Online course | E | 2 |

**Semester III**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 21-322-0301 | Statistical Inference II | | | | 4 | 50 | 50 | 100 |
| 21-322-0302 | Multivariate Analysis | | | | 4 | 50 | 50 | 100 |
| 21-322-0303 | Applied Regression Analysis | | | | 4 | 50 | 50 | 100 |
| 21-322-0304 | Practical – II using SPSS/MATLAB | | | | 2 | 50(practical) + 50 (viva) | - | 100 |
| **Total** | | | | | **14** | | | |

**Elective IV (Choose any one of the following)**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| 21-322-0305 | Topics in Stochastic Finance | E | 3 |
| 21-322-0306 | Operations Research -II | E | 3 |

**Elective V (Either an inter-departmental course or an online course)**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| 21-322-0307 | Elected course | E | 3 |

**Semester IV**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 21-322-0401 | Design and Analysis of Experiments | | | | 4 | 50 | 50 | 100 |
| 21-322-0402 | Practical – III using SAS/R, and Viva Voce | | | | 4 | 50 | 50 | 100 |
| 21-322-0403 | Project | | | | 5 | 100 | -- | 100 |
| **Total** | | | | | **13** | | | |

**Electives – VI, VII, VIII. (Choose any three)**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| 21-322-0404 | Statistical Quality Assurance | E | 3 |
| 21-322-0405 | Time Series Analysis | E | 3 |
| 21-322-0406 | Lifetime data analysis | E | 3 |
| 21-322-0407 | Applied Multivariate Statistical Analysis | E | 3 |
| 21-322-0408 | Statistical Forecasting | E | 3 |
| 21-322-0409 | Inference for Stochastic Processes | E | 3 |
| 21-322-0410 | Online course | E | 3 |

****List of Electives**

1. Actuarial Statistics.
2. Applied Multivariate Statistical Analysis.
3. Life time data analysis.
4. Official Statistics
5. Operations Research.
6. Reliability Modeling and Analysis.
7. Statistical Computing.
8. Statistical Decision Theory.
9. Statistical Forecasting.
10. Statistical Quality Assurance
11. Time Series Analysis.
12. Topics in Stochastic Finance.
13. Data Analytics using R
14. Basic Industrial Statistics using R

## M.TECH IN DATA SCIENCE AND ANALYTICS

### Semester I

| Sl. No. | Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | L | T | P | | Internal | External | Total |
| 1 | 21-458-0101 | Mathematical Methods for Data Science | | 5 | | 3 | 60 | 40 | 100 |
| 2 | 21-458-0102 | Probability and Statistical Inference | | 5 | | 4 | 60 | 40 | 100 |
| 3 | 21-458-0103 | Data Structures and Algorithms | | 5 | | 3 | 60 | 40 | 100 |
| 4 | 21-458-0104 | Python Programming – Practical I | | | 5 | 2 | 60 | 40 | 100 |
| 5 | | Elective I | | 5 | | 3 | 60 | 40 | 100 |
| 6 | | Elective II | | 5 | | 3 | 60 | 40 | 100 |

**Minimum Credit:18(Core:12, Elective:6)**

**List of Electives**

| Sl.No. | Course Code | Course |
|---|---|---|
| 1 | 21-458-0105 | Systems and Decision Analytics |
| 2 | 21-458-0106 | Data Warehousing and Data Mining |
| 3 | 21-458-0107 | Data Analysis and Visualization using Python |
| 4 | 21-458-0108 | Operations and Supply Chain Management |
| 5 | 21-458-0109 | System Reliability and Risk Analysis |

### Semester II

| Sl. No. | Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | L | T | P | | Internal | External | Total |
| 1 | 21-458-0201 | Simulation Modelling and Analysis | | 5 | | 3 | 60 | 40 | 100 |
| 2 | 21-458-0202 | Machine Learning | | 5 | | 4 | 60 | 40 | 100 |
| 3 | 21-458-0203 | Multivariate Analysis and Statistical Techniques for Data Mining | | 5 | | 3 | 60 | 40 | 100 |
| 4 | 21-458-0204 | R/R-Studio Programming – Practical II | | | 5 | 2 | 60 | 40 | 100 |
| 5 | | Elective III | | 5 | | 3 | 60 | 40 | 100 |
| 6 | | Elective IV | | 5 | | 3 | 60 | 40 | 100 |

**Minimum Credit:18(Core:12, Elective:6)**

**List of Electives**

| Sl.No. | Course Code | Course |
|---|---|---|
| 1 | 21-458-0205 | Business Analytics |
| 2 | 21-458-0206 | Optimization Techniques |
| 3 | 21-458-0207 | Design of Experiments (Integrated with R) |
| 4 | 21-458-0208 | Artificial Intelligence and Deep Learning |
| 5 | 21-458-0209 | Natural Language Processing |
| 6 | 21-458-0210 | Financial Risk Analytics and Management |
| 7 | 21-458-0211 | Marketing and HR Analytics |
| 8 | 21-458-0212 | Bioinformatics |
| 9 | 21-458-0213 | Big Data Technology |

**Semester III**

| Sl. No | Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | L | T | P | | Internal | External | Total |
| 1 | 21-458-0301 | Project on Data Analytics in Industry | | | | 15 | 180 | 120 | 300 |
| 2 | | Elective V | | 5 | | 3 | 60 | 40 | 100 |

**Minimum Credit:18(Core:15, Elective:3)**

**List of Electives**

| Sl.No. | Course Code | Course |
|---|---|---|
| 1 | 21-458-0302 | Statistical Forecasting Methods |
| 2 | 21-458-0303 | Quality Management and Six Sigma |
| 3 | 21-458-0304 | Applied Longitudinal Data Analysis |
| 4 | 21-458-0305 | Lifetime Studies in Data Science (Integrated with R) |
| 5 | 21-458-0306 | Bayesian Computing & Analysis |

**Semester IV**

| Sl. No. | Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | L | T | P | | Internal | External | Total |
| 1 | 21-458-0401 | Project Dissertation Evaluation and Viva | | | | 18 | 240 | 160 | 400 |

**Minimum Credit:18(Core:18)**

***Additional electives from Industry/Institutions can be offered during third and fourth semesters with the approval of Department Council and University**

## DETAILS OF FACULTY

| Sl.No. | Name & Designation | Specialization | Communication |
|---|---|---|---|
| 1 | Dr.N.Balakrishna<br>Professor | Stochastic Processes and Inference, Time Series Models, Data Analysis, Chaos and nonlinear time series | 0484-2555497(R)<br>9446605682(M)<br>nb@cusat.ac.in |
| 2 | Dr.K.C.James | Industrial Engineering, DE Simulation, Reliability, TQM | 0484-2475767(R)<br>9446605183(M)<br>jamesmech@cusat.ac.in |
| 3 | Dr.AshaGopalakrishnan<br>Professor | Reliability Theory, Survival Analysis | 0484-2335390(R)<br>9447220353(M)<br>asha@cusat.ac.in<br>asha.gopalakrishnan@gmail.com |
| 4 | Dr.P.G.Sankaran<br>Professor (Now on Deputation as PVC) | Distribution Theory, Reliability Theory, Data Analysis, Survival Analysis | 0484-2741693(R)<br>9847348528(M)<br>sankaranpg@yahoo.com |
| 5 | Dr.S.M.Sunoj<br>Professor | Distribution Theory, Reliability Theory | 0487-2428214(R)<br>9446627103(M)<br>smsunoj@cusat.ac.in<br>smsunoj@gmail.com |
| 6 | Dr.Rajesh G<br>Professor<br>and Head | Distribution Theory, Information Theory | 9447280968(M)<br>rajeshgstat@gmail.com |
| 7 | Dr.Irshad M.R.<br>Assistant Professor | Order Statistics, Distribution Theory | 9497240876(M)<br>irshadm24@gmail.com<br>irshadmr@cusat.ac.in |
| 8 | Dr.Princy T<br>Assistant Professor | Distribution Theory | 9446682020(M)<br>princyt@cusat.ac.in<br>princyt.t@gmail.com |

# FACULTY OF SOCIAL SCIENCES

**Dean:**

Dr.SHarikumar
Govind,Geethanjali
Opp.Changampuzha Library
Edappally P O
Kochi- 682 024

# DEPARTMENT OF APPLIED ECONOMICS

## M.A APPLIED ECONOMICS

**SEMESTER – I**

| Course Code | Title of Paper | Core/ Elective | Credits | Contact Hours / Week | Continuous evaluation marks | External Evaluation Marks | Total Marks |
|---|---|---|---|---|---|---|---|
| ECO 2101 | Microeconomics I | C | 4 | 5 | 50 | 50 | 100 |
| ECO 2102 | Macroeconomics I | C | 4 | 5 | 50 | 50 | 100 |
| ECO 2103 | Mathematical Methods for Economics | C | 4 | 5 | 50 | 50 | 100 |
| ECO 2104 | Statistics for Economic Analysis | C | 4 | 5 | 50 | 50 | 100 |
| ECO 2105 | Indian Economy | C | 4 | 5 | 50 | 50 | 100 |

**SEMESTER – II**

| Course Code | Title of Paper | Core/ Elective | Credits | Contact Hours/ Week | Continuous evaluation marks | External Evaluation Marks | Total Marks |
|---|---|---|---|---|---|---|---|
| ECO 2201 | Microeconomics II | C | 4 | 5 | 50 | 50 | 100 |
| ECO 2202 | Macroeconomics II | C | 4 | 5 | 50 | 50 | 100 |
| ECO 2203 | Econometrics | C | 4 | 5 | 50 | 50 | 100 |
| ECO 2204 | Development Economics | C | 4 | 5 | 50 | 50 | 100 |
| ECO 2205 | International Economics | C | 4 | 5 | 50 | 50 | 100 |

**SEMESTER –III**

| Course Code | Title of Paper | Core/ Elective | Credits | Contact Hours/ Week | Continuous evaluation marks | External Evaluation Marks | Total Marks |
|---|---|---|---|---|---|---|---|
| ECO 2301 | Environmental Economics | **C** | 4 | 4 | 50 | 50 | 100 |
| ECO 2302 | Public Economics | C | 4 | 4 | 50 | 50 | 100 |
| ECO 2303 | Research Methodology | C | 4 | 4 | 50 | 50 | 100 |
| ECO 2304 | Elective | E | 3 | 3 | 50 | 50 | 100 |
| ECO 2305 | Elective | E | 3 | 3 | 50 | 50 | 100 |

**SEMESTER –IV**

| Course Code | Title of Paper | Core/ Elective | Credits | Contact Hours/ Week | Continuous evaluation marks | External Evaluation Marks | Total Marks |
|---|---|---|---|---|---|---|---|
| ECO 2401 | Elective | E | 3 | 4 | 50 | 50 | 100 |
| ECO 2402 | Elective | E | 3 | 4 | 50 | 50 | 100 |
| ECO 2403 | Elective | E | 3 | 4 | 50 | 50 | 100 |
| ECO 2404 | Project Report | C | 3 | 4 | 50 | 50 | 100 |
| ECO 2405 | Comprehensive Viva Voce | C | 2 | 4 | - | 100 | 100 |

**Total Marks 2000 and Total 72 credits (core 58 credits and optional 14 credits)**

**Elective Papers (code ECO ELE)**

1. Project Planning and Appraisal
2. Kerala Economy
3. Industrial Economics
4. Advanced Econometrics
5. Social Exclusion and Inclusive Policy Studies

6. International Finance
7. Financial Institutions and Markets
8. Financial Economics
9. GenderStudies
10. Economicsoflabourmarket
11. BehavioralEconomics
12. AgriculturalEconomics
13. HealthEconomics
14. OptimisationTechniques
15. Economic Theory (Inter departmentalElective)
16. EnvironmentManagement(InterdepartmentalElective)

**Faculty Details**

| SL. No. | Name & Designation | Specialization | Communication (Contact No.& e-mail id) |
|---|---|---|---|
| 1 | Dr.P.Arunachalam<br>Professor & Head | InternationalEconomics, Quantitative methods, Indian Economy and Statistics | 9746770732<br>8848522390<br>arunachalam14@yahoo.co.in<br>arunachalam@cusat.ac.in |
| 2 | Dr.Manoj P.K<br>Assistant Professor | Business Finance & Econometrics | 9447664949<br>manoj_p_k@cusat.ac.in<br>manoj_p_k2004@yahoo.co.in |
| 3 | Dr.P.R.Suresh<br>Assistant Professor | Quantitative Economics, Econometrics and Social Exclusion | 9037284525<br>psuresh@cusat.ac.in |
| 4 | Dr.S.Harikumar<br>Adjunct Faculty | Agricultural Economics, Environmental Economics | 9446578289<br>vinvij2003@gmail.com |

# CENTRE FOR BUDGET STUDIES

## MSC ECONOMETRICS AND FINANCIAL TECHNOLOGY

**SEMESTER - I**

| Course Code | Title of Paper | Core/ Elective | Credits | Contact Hours/ Week | Continuous evaluation marks | End Semester Marks | Total Marks |
|---|---|---|---|---|---|---|---|
| 21-345-0101 | Theories of Consumption, Production and Market Structure | C | 4 | 4 | 50 | 50 | 100 |
| 21-345-0102 | Macroeconomics: Theories and Policies | C | 4 | 4 | 50 | 50 | 100 |
| 21-345-0103 | Mathematicsfor Economics and Finance | C | 4 | 4 | 50 | 50 | 100 |
| 21-345-0104 | Statistics for Economics and Finance | C | 4 | 4 | 50 | 50 | 100 |
| 21-345-0105 | Financial Economics | C | 4 | 4 | 50 | 50 | 100 |
| 21-345-0106 | Financial Reporting andAnalysis (Audited Course) | C | | | | | |

**SEMESTER – II**

| Course Code | Title of Paper | Core/ Elective | Credits | Contact Hours/ Week | Continuous evaluation marks | End Semester Marks | Total Marks |
|---|---|---|---|---|---|---|---|
| 21-345-0201 | Theory of the Firm: Equilibrium and Information | C | 4 | 4 | 50 | 50 | 100 |
| 21-345-0202 | Corporate Finance | C | 4 | 4 | 50 | 50 | 100 |
| 21-345-0203 | Econometrics | C | 4 | 4 | 50 | 50 | 100 |
| 21-345-0204 | Security Analysis and Portfolio Management | C | 4 | 4 | 50 | 50 | 100 |
| 21-345-0205 | Behavioral Finance | C | 4 | 4 | 50 | 50 | 100 |
| 21-345-0206 | Internship | | | | | | Audited course |
| 21-345-0207 | Computational Techniques for Economics and Finance1: Data Analysis Using Microsoft Excel and SPSS (Audited Course) | C | 1 | 2 | 50 | | |

## SEMESTER – III

| Course Code | Title of Paper | Core/ Elective | Credits | Contact Hours/ Week | Continuous evaluation marks | External Evaluation Marks | Total Marks |
|---|---|---|---|---|---|---|---|
| 21-345-0301 | Applied Econometrics | C | 4 | 4 | 50 | 50 | 100 |
| 21-345-0302 | Financial Technology | C | 4 | 4 | 50 | 50 | 100 |
| 21-345-0303 | Research Methods in Economics and Finance | C | 4 | 4 | 50 | 50 | 100 |
| 21-345-0311 | Elective | E | 3 | 3 | 50 | 50 | 100 |
| 21-345-0312 | Elective | E | 3 | 3 | 50 | 50 | 100 |
| 21-345-0306 | Computational Techniques for Economics and Finance 2: Econometric Packages- Eviews (Audited Course) | C | 1 | 2 | | | |
| 21-345-0307 | Major Issues in Indian Economy with Special Reference to Kerala | Audited course | | | | | |

## SEMESTER - IV

| Course Code | Title of Paper | Core/ Elective | Credits | Contact Hours/ Week | Continuous evaluation marks | External Evaluation Marks | Total Marks |
|---|---|---|---|---|---|---|---|
| 21-345-0413 | Elective | E | 3 | 3 | 50 | 50 | 100 |
| 21-345-0414 | Elective | E | 3 | 3 | 50 | 50 | 100 |
| 21-345-0415 | Elective | E | 3 | 3 | 50 | 50 | 100 |
| 21-345-0404 | Project Report and Viva Voce | C | 2 | 2 | - | 100 | 100 |
| 21-345-0405 | Computational Techniques for Economics and Finance 3: Econometric and Statistical Packages- STATA and R (Audited Course) | C | 1 | 2 | 50 | | |

**Total seventy-two credits**. PG Regulations of CUSAT is applicable to this programme.

## List of Electives

| |
|---|
| 1. Asset Pricing: Theory and Practice |
| 2. Artificial Intelligence and Blockchain Technology |
| 3. Insurance Economics |
| 4. Investment Banking Services |
| 5. Financial Derivatives and Risk Management |
| 6. Data Analytics |
| 7. Financial Econometrics |
| 8. Multivariate Methods |
| 9. Budgetary Analysis and Fiscal Management in India |
| 10. Fiscal Federalism: Theory and Practice with Special Reference to Kerala |
| 11. Public Economics |
| 12. International Trade and Finance |
| 13. Public Choice and Policy (Inter departmental Course) |

## Credit Distribution Semester wise

| Semester | Credits |
|---|---|
| 1 | 20 |
| 2 | 21 |
| 3 | 19 |
| 4 | 12 |
| Total credits | 72 |

## DETAILS OF FACULTY

| Sl. No | Name and Designation | Specialisation | Mob. No. | Email |
|---|---|---|---|---|
| 1 | Dr. M.K. Sukumaran Nair<br>Honorary Director, Centre for Budget Studies | Economic Development<br>Public Economics | 8921499157 | director.cbs@cusat.ac.in |
| 2. | Dr. S. Harikumar,<br>Asst. Director, Centre for Budget Studies | Economic Development<br>Financial Economics | 9446578289 | vinvij2003@gmail.com |
| 3. | Dr. P.K. Santhosh Kumar<br>Finance-in-Charge & Academic Co-ordinator<br>Centre for Budget Studies | Econometrics/ Financial Econometrics | 9620569469 | s.kumar@cusat.ac.in |
| 4. | Dr. Martin Patrick<br>Honorary Fellow<br>Centre for Budget Studies | Economic Policy<br>Public Finance | 9447664270 | pmartin47@rediffmail.com |
| 5. | Dr. S. Muraleedharan<br>Honorary Fellow<br>Centre for Budget Studies | Industrial Economics<br>Health Economics | 9446744881 | muraleedharanvarsha@yahoo.com |

# SCHOOL OF MANAGEMENT STUDIES

## MBA(FULL TIME)

***FIRST SEMESTER***

| Course Code | Name of Course | L/T Hrs./Week | CC/EC | Credit | Marks | | Total Marks |
|---|---|---|---|---|---|---|---|
| | | | | | CES | ESE | |
| 20-371-0101 | Management Concepts and Organisational Behaviour | 3 | CC | 3 | 50 | 50 | 100 |
| 20-371-0102 | Statistics for Managers | 3 | CC | 3 | 50 | 50 | 100 |
| 20-371-0103 | Managerial Economics | 3 | CC | 3 | 50 | 50 | 100 |
| 20-371-0104 | Business Communication | 3 | CC | 3 | 50 | 50 | 100 |
| 20-371-0105 | Financial Accounting | 3 | CC | 3 | 50 | 50 | 100 |
| 20-371-0106 | Business Environment | 3 | CC | 3 | 50 | 50 | 100 |
| 20-371-0107 | Indian Ethos and Business Ethics | 3 | CC | 3 | 50 | 50 | 100 |
| 20-371-0108 | IT for Business and Management | 3 | CC | 3 | 50 | 50 | 100 |
| | Managerial Skill Development | | NC | Nil | | | |

CC – Core Course

EC- Elective Course

NC – Non Credit

*CES – Continuous Evaluation System ESE – End Semester Examination*

**SECOND SEMESTER**

| Course Code | Name of Course | L/T Hrs./Week | CC/EC | Credit | Marks | | Total Marks |
|---|---|---|---|---|---|---|---|
| | | | | | CES | ESE | |
| 20-371-0201 | Financial Management | 3 | CC | 3 | 50 | 50 | 100 |
| 20-371-0202 | Marketing Management | 3 | CC | 3 | 50 | 50 | 100 |
| 20-371-0203 | Operations Management | 3 | CC | 3 | 50 | 50 | 100 |
| 20-371-0204 | Human Resource Management | 3 | CC | 3 | 50 | 50 | 100 |
| 20-371-0205 | Management Accounting | 3 | CC | 3 | 50 | 50 | 100 |
| 20-371-0206 | Business Research Methods | 3 | CC | 3 | 50 | 50 | 100 |
| 20-371-0207 | Legal Aspects of Business | 3 | CC | 3 | 50 | 50 | 100 |
| 20-371-0208 | Innovation and Entrepreneurship | 3 | CC | 3 | 50 | 50 | 100 |
| | Managerial Skill Development | | NC | Nil | | | |

**THIRD SEMESTER**

| Course Code | Name of Course | L/T Hrs. /Week | CC/EC | Credit | Marks | | Total Marks |
|---|---|---|---|---|---|---|---|
| | | | | | CES | ESE | |
| 20-371-0301 | Management Science | 3 | CC | 3 | 50 | 50 | **100** |
| 20-371-0302 | Organizational Structure, Design and Change | 3 | CC | 3 | 50 | 50 | 100 |
| 20-371-0303 | Business Analytics | 3 | CC | 3 | 50 | 50 | 100 |
| 20-371-0304 | Summer Project Work* | 3 | CC | 4 | 50 | 50 | 100 |
| 20-371-0305 | Elective –1 | 3 | EC | 3 | 50 | 50 | 100 |
| 20-371-0306 | Elective –2 | 3 | EC | 3 | 50 | 50 | 100 |
| 20-371-0307 | Elective –3 | 3 | EC | 3 | 50 | 50 | 100 |
| 20-371-0308 | Elective –4 | 3 | EC | 3 | 50 | 50 | 100 |

**FOURTH SEMESTER**

| Course Code | Name of Course | L/T Hrs. /Week | CC/EC | Credit | Marks | | Total Marks |
|---|---|---|---|---|---|---|---|
| | | | | | CES | ESE | |
| 20-371-0401 | Corporate Governance and Strategic Management | 3 | CC | 3 | 50 | 50 | 100 |
| 20-371-0402 | Environment Management | 3 | CC | 3 | 50 | 50 | 100 |
| 20-371-0403 | Elective –5 | 3 | EC | 3 | 50 | 50 | 100 |
| 20-371-0404 | Elective –6 | 3 | EC | 3 | 50 | 50 | 100 |
| 20-371-0405 | Elective –7 | 3 | EC | 3 | 50 | 50 | 100 |
| 20-371-0406 | Comprehensive Viva-Voce | 3 | CC | 3 | -- | 100 | 100 |

*****Each student should carryout a summer project work in a company after the completion of second semester for a period of six to eight weeks. The work shall be carried out during the summer break after the second semester examination under the supervision of a guide assigned by the School. The report of the summer project must be submitted during the third semester.

*Evaluation of project work shall be made as in the other Core courses. If a candidate fails in evaluation he/she has to complete the project work and obtain pass grade along with next batch.

## LIST OF ELECTIVES

### ELECTIVES IN FUNCTIONAL AREAS OF MANAGEMENT

1. Finance Area
2. Marketing Area
3. Human Resource Management Area
4. Production and Operations Management Area
5. Information Technology Area
6. International Business Area
7. General Management Area

### LIST OF ELECTIVE COURSES IN FINANCE AREA

1. Security Analysis and Portfolio Management
2. International Finance
3. Working Capital Management
4. Management of Financial Services
5. Financial Derivatives and Risk Management
6. Corporate Restructuring
7. Financial Modelling
8. Analytics for Finance
9. Behavioural Finance
10. Project Management
11. Bank Financial Management
12. Fundamentals of Insurance

### LIST OF ELECTIVE COURSES IN MARKETING AREA

1. Consumer Behaviour
2. Integrated Marketing Communication
3. E-Commerce
4. Marketing Research
5. Strategic Marketing
6. International Marketing
7. Sales Management
8. Services Marketing
9. Brand and Product Management
10. Retail Management
11. Digital Marketing
12. Customer Relationship Management
13. Marketing Analytics

**LIST OF ELECTIVE COURSES IN HUMAN RESOURCEMANAGEMENT AREA**

1. Strategic Human Resource Management
2. Management of Industrial Relations
3. Training and Development
4. Global Human Resource Management
5. Compensation Management
6. Human Resource Planning and Development
7. Organisational Change and Development
8. Managing Interpersonal and Group Processes
9. Performance Management
10. HR Analytics

**LIST OF ELECTIVE COURSES IN PRODUCTION AND OPERATIONS MANAGEMENT AREA**

1. Supply Chain Management
2. Purchasing and Materials Management
3. Quality Management
4. International Logistics Management
5. Service Operations Management
6. Simulation and Modelling
7. Enterprise Resource Planning
8. Project Management
9. Supply Chain Analytics
10. Customer Relationship Management

**LIST OF ELECTIVE COURSES IN INFORMATION TECHNOLOGYAREA**

1. Enterprise Resource Planning
2. Strategic Management of Information Technology
3. Data Base Management Systems
4. Business Process Reengineering
5. System Analysis and Design
6. Technical Foundation for E-Business
7. Data Mining for Business Intelligence
8. Advanced Data Analytics for Business Decisions
9. Technology Management
10. E-Commerce
11. Customer Relationship Management
12. Digital Marketing

**LIST OF ELECTIVE COURSES IN INTERNATIONAL BUSINESS AREA**

1. International Finance
2. Supply Chain Management
3. International Logistics Management
4. Global Human Resource Management
5. International Marketing
6. Export Import Policies and Procedures
7. Enterprise Resource Planning

**LIST OF ELECTIVE COURSES IN GENERAL MANAGEMENTAREA**

1. Technology Innovation and Entrepreneurship
2. Corporate Social Responsibility
3. Management of NGOs
4. Management Consulting

# MBA(PART TIME)

## FIRST SEMESTER

| Course Code | Name of Course | L/T Hrs. /Week | CC/EC | Credit | Marks | | Total Marks |
|---|---|---|---|---|---|---|---|
| | | | | | CES | ESE | |
| 20-372-0101 | Management Concepts and Organisational Behaviour | 3 | CC | 3 | 50 | 50 | 100 |
| 20-372-0102 | Statistics for Managers | 3 | CC | 3 | 50 | 50 | 100 |
| 20-372-0103 | Managerial Economics | 3 | CC | 3 | 50 | 50 | 100 |
| 20-372-0104 | Indian Ethos and Business Ethics | 3 | CC | 3 | 50 | 50 | 100 |
| 20-372-0105 | Financial Accounting | 3 | CC | 3 | 50 | 50 | 100 |

## SECOND SEMESTER

| Course Code | Name of Course | L/T Hrs. /Week | CC/EC | Credit | Marks | | Total Marks |
|---|---|---|---|---|---|---|---|
| | | | | | CES | ESE | |
| 20-372-0201 | Business Environment | 3 | CC | 3 | 50 | 50 | 100 |
| 20-372-0202 | Marketing Management | 3 | CC | 3 | 50 | 50 | 100 |
| 20-372-0203 | Human Resource Management | 3 | CC | 3 | 50 | 50 | 100 |
| 20-372-0204 | Management Accounting | 3 | CC | 3 | 50 | 50 | 100 |
| 20-372-0205 | Financial Management | 3 | CC | 3 | 50 | 50 | 100 |

## THIRD SEMESTER

| Course Code | Name of Course | L/T Hrs. /Week | CC/EC | Credit | Marks | | Total Marks |
|---|---|---|---|---|---|---|---|
| | | | | | CES | ESE | |
| 20-372-0301 | Business Communication | 3 | CC | 3 | 50 | 50 | 100 |
| 20-372-0302 | Management Science | 3 | CC | 3 | 50 | 50 | 100 |
| 20-372-0303 | Organisational Structure, Design And Change | 3 | CC | 3 | 50 | 50 | 100 |
| 20-372-0304 | IT for Business and Management | 3 | CC | 3 | 50 | 50 | 100 |
| 20-372-0305 | Legal Aspects of Business | 3 | CC | 3 | 50 | 50 | 100 |
| 20-372-0306 | Summer Project Work* | 3 | CC | 4 | 50 | 50 | 100 |

CC – Core course

EC–Elective Course

CES – Continuous Evaluation System

ESE – End Semester Examination

## FOURTH SEMESTER

| Course Code | Name of Course | L/T Hrs. /Week | CC/EC | Credit | Marks | | Total Marks |
|---|---|---|---|---|---|---|---|
| | | | | | CES | ESE | |
| 20-372-0401 | Business Research Methods | 3 | CC | 3 | 50 | 50 | 100 |
| 20-372-0402 | Operations Management | 3 | CC | 3 | 50 | 50 | 100 |
| 20-372-0403 | Environment Management | 3 | CC | 3 | 50 | 50 | 100 |
| 20-372-0404 | Elective1 | 3 | EC | 3 | 50 | 50 | 100 |
| 20-372-0405 | Elective2 | 3 | EC | 3 | 50 | 50 | 100 |

## FIFTHSEMESTER

| Course Code | Name of Course | L/T Hrs. /Week | CC/EC | Credit | Marks | | Total Marks |
|---|---|---|---|---|---|---|---|
| | | | | | CES | ESE | |
| 20-372-0501 | Innovation and Entrepreneurship | 3 | CC | 3 | 50 | 50 | 100 |
| 20-372-0502 | Business Analytics | 3 | CC | 3 | 50 | 50 | 100 |
| 20-372-0503 | Elective3 | 3 | EC | 3 | 50 | 50 | 100 |
| 20-372-0504 | Elective4 | 3 | EC | 3 | 50 | 50 | 100 |

## SIXTH SEMESTER

| Course Code | Name of Course | L/T Hrs. /Week | CC/EC | Credit | Marks | | Total Marks |
|---|---|---|---|---|---|---|---|
| | | | | | CES | ESE | |
| 20-372-0601 | Corporate Governance and Strategic Management | 3 | CC | 3 | 50 | 50 | 100 |
| 20-372-0602 | Elective5 | 3 | EC | 3 | 50 | 50 | 100 |
| 20-372-0603 | Elective6 | 3 | EC | 3 | 50 | 50 | 100 |
| 20-372-0604 | Elective7 | 3 | EC | 3 | 50 | 50 | 100 |
| 20-372-0605 | Comprehensive Viva-Voce | 3 | CC | 3 | --- | 100 | 100 |

*****Each student should carry out a summer project work in a company after the completion of second semester for a period of six to eight weeks. The work shall be carried out during the summer break after the second semester examination under the supervision of a guide assigned by the School. The report of the summer project must be submitted during the third semester.

*EvaluationofprojectworkshallbemadeasintheotherCorecourses.Ifacandidate fails in evaluation he/she has to complete the project work and obtain pass grade along with next batch.

**Details of Faculty**

| Sl. No. | Name & Designation | Specialization | Communication (Contact No. & e-mail id) |
|---|---|---|---|
| 1 | Dr. Jagathy Raj V P<br>Director & Senior Professor | Systems and Operations Management – Logistics, Supply Chain Management, IT Applications in Business and Management, ERP, MIS, Engineering and Technology Management | 9847220016<br>jagathy@cusat.ac.in |
| 2 | Dr. M Bhasi<br>Senior Professor | Logistics, Supply Chain, Quality, Safety and Crisis Management, Management of Scientists & Engineers, Operations Management & Systems | 9447419863<br>mbhasi@gmail.com |
| 3 | Dr. D Mavoothu<br>Professor | HRM, Industrial Relations and Business Ethics | 9400076884<br>mavoothu@rediffmail.com |

| | | | |
|---|---|---|---|
| 4 | Dr. Rajitha Kumar S<br>Professor | Finance and General Management | 9400019611<br>rajithakumar@cusat.ac.in |
| 5 | Dr. Zakkariya K A<br>Professor | OrganisationalBehaviour, Marketing & Sales Management, Managerial Skills Development | 9846554444<br>zakkariya@gmail.com |
| 6 | Dr. Sam Thomas<br>Professor | Systems and Finance | 9846152127<br>sam@cusat.ac.in |
| 7 | Dr.Santhosh Kumar S<br>Professor | Finance Management | 9446041325<br>drsan@cusat.ac.in |
| 8 | Dr. Manoj Edward<br>Professor | Operations, Marketing and Service Management& Digital Marketing | 9846280535<br>manojedw@gmail.com |
| 9 | Dr. Saji T G<br>Associate Professor | Corporate Finance & Asset Pricing, Tax Management, Data Analytics, Risk Management | 9446869214<br>sajthazhungal@gmail.com |
| 10 | Dr. Sangeetha K Prathap<br>Assistant Professor | Management, Banking, Financial Services, Financial Management | 9995775239<br>angeethakprathap@gmail.com |
| 11 | Dr.Santhosh Kumar P K<br>Assistant Professor | Finance and Open economy macroeconomics | 9620569469<br>s.kumar@cusat.ac.in |
| 12 | Dr.ManuMelwin Joy<br>Assistant Professor | Production & Human Resource Management | 9744551114<br>manu_melwinjoy@yahoo.com |
| 13 | Dr.DeviSoumyaja<br>Assistant Professor | Human Resource Management | 9972309166<br>devisoumyaja@gmail.com |
| 14 | Dr. Remya Ramachandran<br>Assistant Professor | Finance, Capital Market, Security Analysis and Portfolio Management & Financial Accounting | 9446035607<br>remya.rc2323@gmail.com |
| 15 | Dr. Rakesh Krishnan M<br>Assistant Professor | Finance-Corporate Finance, Financial Markets, Behavioural Finance, Derivatives & Securities Analysis | 9447700081<br>mrakeshkrishnan@gmail.com |
| 20 | Dr. MeeraPrathapan<br>Assistant Professor | Marketing and Tourism | 8943284573<br>meeraprathapan@gmail.com |
| 17 | Mr. Lithin Thomas<br>Assistant Professor | Operations / Production management | 9645784323<br>lithinthomas@cusat.ac.in |

# DDU KAUSHAL KENDRA

## B.VOC IN BUSINESS PROCESS & DATA ANALYTICS

**SEMESTER I**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| KBD 1101 | English Language Skills | 4 | 1 | 0 | 4 | 50 | 50 | 100 |
| KBD 1102 | Principles of Management and Organizations | 5 | 0 | 0 | 5 | 50 | 50 | 100 |
| KBD 1103 | Statistics for Business | 5 | 2 | 0 | 5 | 50 | 50 | 100 |
| KBD 1104 | Functional Management for Business | 5 | 1 | 0 | 5 | 50 | 50 | 100 |
| KBD 1105 | Programming Languages for Data Analytics | 2 | 0 | 6 | 5 | 50 | 50 | 100 |
| KBD 1106 | Business Environment Analysis | 4 | 1 | 0 | 4 | 50 | 50 | 100 |
| KBD 1107 | Workshop on Business communication skills (5 Days) | 30 hrs / Semester | | | 2 | | 50 | 50 |

**SEMESTER II**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| KBD 1201 | Strategic Communication for Workplaces | 5 | 2 | 0 | 5 | 50 | 50 | 100 |
| KBD 1202 | Information Systems for Business | 4 | 0 | 2 | 5 | 50 | 50 | 100 |
| KBD 1203 | Operations Research | 6 | 2 | 0 | 6 | 50 | 50 | 100 |
| KBD 1204 | Fundamentals of Business Process Management | 4 | 1 | 2 | 5 | 50 | 50 | 100 |
| KBD 1205 | Database Fundamentals | 3 | 0 | 4 | 5 | 50 | 50 | 100 |
| KBD 1206 | Project I (Organization Study- 15 working days.<br><br>50 marks for continuous assessment and 50 for written report after completion of the project) | | | | 4 | | 100 | 100 |

**SEMESTER III**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| KBD 1301 | Managerial Skill Development & Design Thinking | 3 | 2 | 4 | 5 | 50 | 50 | 100 |
| KBD 1302 | Financial Accounting | 5 | 0 | 0 | 5 | 50 | 50 | 100 |
| KBD 1303 | Business Ethics and Cyber Law | 4 | 0 | 0 | 4 | 50 | 50 | 100 |
| KBD 1304 | Production and Operations Management | 4 | 1 | 0 | 4 | 50 | 50 | 100 |
| KBD 1305 | Data Visualization for Analytics | 2 | 0 | 6 | 5 | 50 | 50 | 100 |
| KBD 1306 | Data Mining Techniques | 2 | 0 | 6 | 5 | 50 | 50 | 100 |
| KBD 1307 | Workshop on Personal Productivity Improvement (5Days) | 30 hrs/ Semester | | | 2 | | 50 | 50 |

**SEMESTER IV**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| KBD 1401 | Research Methodology | 3 | 0 | 2 | 4 | 50 | 50 | 100 |
| KBD 1402 | Environmental Management | 3 | 0 | 2 | 4 | 50 | 50 | 100 |
| KBD 1403 | Modern Project Management Practices | 3 | 0 | 2 | 4 | 50 | 50 | 100 |
| KBD 1404 | Introduction to Econometrics Methods | 5 | 1 | 0 | 5 | 50 | 50 | 100 |
| KBD 1405 | Predictive Modelling | 2 | 0 | 6 | 5 | 50 | 50 | 100 |
| KBD 1406 | Elective 1 | 3 | 0 | 2 | 4 | 50 | 50 | 100 |
| KBD 1407 | Project II Business Process Mapping for a duration of 15 working days. (50 Marks for continuous assessment,50 marks for a written report after the completion of the project) | | | | 4 | | 100 | 100 |

**SEMESTER V**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| KBD 1501 | Entrepreneurship Development and Management of Startups | 4 | 0 | 2 | 4 | 50 | 50 | 100 |
| KBD 1502 | Strategic Self Marketing & Personal Branding | 5 | 2 | 0 | 4 | 50 | 50 | 100 |
| KBD 1503 | Digital Marketing and social media analytics | 2 | 3 | 4 | 4 | 50 | 50 | 100 |
| KBD 1504 | Big DataAnalytics | 2 | 0 | 4 | 4 | 50 | 50 | 100 |
| KBD 1505 | Text and Web Analytics | 3 | 0 | 4 | 5 | 50 | 50 | 100 |
| KBD 1506 | Business Model Analysis | 5 | 1 | 0 | 5 | 50 | 50 | 100 |
| KBD 1507 | Elective 2 | 3 | 1 | 2 | 4 | 50 | 50 | 100 |

**SEMESTER VI**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| KBD 1601 | Project III - Main Project & Viva-Voce (Duration – 80 days) Evaluation scheme will consist of i) Continuous assessment – 100 marks ii) Final report – 100 marks & iii) Viva-Voce – 100 marks)<br>This project intends to provide students with real hands-on experience on data analytics. Students can attach themselves to an organisation or work independently for this project. However, the project requires real business data for analytics. | | | | 26 | 300 | | 300 |
| KBD 1602 | Workshop on Career Building (10 Days) | | | | 4 | | 100 | 100 |

**List of Electives**

| | **Course** |
|---|---|
| E-1 | Practical Accounting in Business Organizations |
| E-2 | Computational Finance |
| E-3 | Investment Analysis and Portfolio Management |
| E-4 | HR Analytics |
| E-5 | Introduction to Machine Learning |
| E-6 | Case Development Skills for Analysts |

| | **Credits** |
|---|---|
| Skill Component | 109 |
| General Component | 71 |
| Total Credit | 180 |

## M.VOC IN TECHNOLOGY AND MANAGEMENT CONSULTING

### SEMESTER I

| **Course Code** | **Course** | **C/E** | **Credit** |
|---|---|---|---|
| KMC2101 | Business Communication Skills - I | C | 3 |
| KMC2102 | Contemporary Management | C | 3 |
| KMC2103 | Introduction to Technology and ManagementConsulting | C | 3 |
| KMC2104 | Economics for Business Decisions | C | 3 |
| KMC2105 | Accounting and Financial Management forConsultants | C | 3 |
| KMC2106 | Research Skills for Consulting | C | 4 |
| KMC2107 | Quantitative Techniques | C | 4 |
| KMC2108 | Professional Skills Development (Training Programme) | C | 3 |
| **Total** | | | **26** |

**SEMESTER II**

| Course Code | Name of the Course | C/E | Credit |
|---|---|---|---|
| KMC2201 | Operations Management | C | 4 |
| KMC2202 | Integrated Management Systems | C | 3 |
| KMC2203 | Management of Consulting Firms and Developing Consulting Career | C | 3 |
| KMC2204 | New Age Marketing fo Business Consulting r | | 3 |
| KMC2205 | Project Management | C | 3 |
| KMC2206 | Business Analytics | C | 3 |
| KMC2207 | Business Communication Skills – II | C | 3 |
| KMC2209 | Internship : Initial diagnosis of client issues in a consulting project (40 working days duration, 50 marks for continuous assessment & Report; and 50 marks for Viva Voce by a Board of Internal Examiners) | C | 12 |
| **Total** | | | **34** |

**SEMESTERIII**

| Course No. | Name of the Course | C/E | Credit |
|---|---|---|---|
| KMC2301 | Business, Government and Society | C | 4 |
| KMC2302 | Business Model Analysis and Strategy | C | 4 |
| KMC2303 | Managing Change in Organisations | C | 4 |
| KMC2304 | Entrepreneurship and New Venture Planning | C | 4 |
| KMC2305 | Elective-I | E | 3 |
| KMC2306 | Elective-II | E | 3 |
| KMC2307 | Elective-III | E | 3 |
| KMC2308 | Elective-IV | E | 3 |
| **Total** | | | **28** |

**List of Electives**

1. HR Analytics
2. Corporate Training Consulting
3. Technology Enabled HR
4. HR Strategies for the New World
5. Consulting Expertise in Performance Management
6. Total Reward Management
7. Strategic Branding
8. Consulting in CRM Design and Management
9. Consulting in Marketing Research
10. Strategic Consulting for Service Organisations
11. Strategic Marketing
12. Marketing Communication Consulting
13. Retail Management
14. Technology and Innovation Management
15. Environmental Consulting (Impact Assessment & Certifications)
16. Enterprise Resource Planning
17. Supply Chain Management
18. Investment Banking & Financial Services
19. Financial Risk Management
20. Banking and Financial Services and Insurance
21. Securities Market.
22. Tax Consulting
23. Corporate Governance and Social Responsibility of Business
24. Consulting for Mergers, Acquisitions and Corporate Restructuring
25. Consulting for Public Private Partnership Projects

**SEMESTER IV**

| Course No. | Name of the Course | C/E | Credit |
|---|---|---|---|
| KMC2401 | *Major Project (Duration – 90 working days during Semester IV in a consulting firm or any other business organisation where the student can undertake a consulting project in management or technology. (Continuous assessment – 100, Final report – 100 marks & Viva-Voce – 100 marks) | C | 28 |
| KMC2402 | Case Development Skills for Consultants (Training Programme) | C | 4 |
| **Total** | | | **32** |

**Details of Faculty**

| Sl. No. | Name & Designation | Specialization | Communication Mobile/email |
|---|---|---|---|
| 1 | Prof.(Dr)..K.A.Zakkariya Director | OB, Human Resource Management & Marketing | 9846554444 zakkariya@gmail.com |
| 2 | Dr.Renjini.D., Associate Professor | Marketing, Business Model Analysis,,Marketing Research | 9895888599 renjinidas@yahoo.com |
| 3 | VinuVarghees.V.V, Assistant Professor | Android App Development, Data Mining, Network Security | 9446655362 vinghese@gmail.com |
| 4 | Dr. NimithaAboobaker Assistant Professor | General Management, Strategic Human Resource Management | 9497732021 nimis540@gmail.com |
| 5 | Dr. Elizabeth George Assistant Professor | Human Resource Management, Organization Behaviour | 9846043420 elizabethgeorge04@gmail.com |
| 6 | AthulMithran Assistant Professor | Mobile & Web Development | 9946132746 athul@cusat.ac.in |
| 7 | Hashmy Hassan Assistant Professor | Data Science & Network Computing, Information Retrieval | 9995867891 HASHMYHAS123@gmail.com |
| 8 | Suji Jose Assistant Professor | Cyber forensics and information security | 9745463039 sujijose007@gmail.com |
| 9 | Dr. Rajeswari.R Assistant Professor | Human Resource Management, Marketing | 9846919863 sterlingrajeswari@gmail.com |
| 10 | Vinney Zephaniah Vincent Assistant Professor | General Management, Entrepreneurship,Operation Management | 8075301118 vinneyzephaniah@gmail.com |
| 11 | Shajin.P Assistant Professor | Operations Management & Human Resource Management | 9995567922 Shasyed62@gmail.com |

# FACULTY OF TECHNOLOGY

**Dean:**

Dr.C K Aanandan

Professor(Retd)

Department of Electronics

Cochin University of Science and Technology

# DEPARTMENT OF COMPUTER APPLICATIONS

## M.SC. COMPUTER SCIENCE WITH SPECIALIZATION IN ARTIFICIAL INTELLIGENCE

**Course Structure (2021 admission onwards)**

**Semester I**

| Course Code | Course | C/E | Credit |
|---|---|---|---|
| 21-344-0101 | Mathematics for AI | C | 4 |
| 21-344-0102 | Computer System Design and Architecture | C | 4 |
| 21-344-0103 | Advanced Data Structures and Algorithms | C | 4 |
| 21-344-0104 | Data Science and Machine Learning | C | 4 |
| 21-344-0105 | Foundations of Artificial Intelligence | C | 4 |
| 21-344-0106 | Data Science and Machine Learning Lab | C | 2 |
| 21-344-0107 | Data Structure Lab | C | 2 |
| | | | 24 |

**Semester II**

| Course Code | Course | C/E | Credit |
|---|---|---|---|
| 21-344-0201 | Advanced Computer Networks | C | 4 |
| 21-344-0202 | Emerging Technologies in Data Processing and Management | C | 4 |
| 21-344-0203 | Pattern Recognition | C | 4 |
| 21-344-0204 | Information Security | C | 4 |
| | Elective I | E | 3 |
| 21-344-0206 | Data Management Lab | C | 2 |
| | | | 21 |

**Semester III**

| Course Code | Course | C/E | Credit |
|---|---|---|---|
| 21-344-0301 | Deep Learning | C | 4 |
| | Elective II | E | 3 |
| | Elective III | E | 3 |
| | Elective IV | E | 3 |
| | Elective V | E | 3 |
| 21-344-0306 | Seminar | C | 1 |
| 21-344-0307 | Internship/Project Phase - 1 | C | 3 |
| Total | | | 20 |

**Semester IV**

| Course Code | Course | C/E | Credit |
|---|---|---|---|
| 21-344-0401 | Internship/Final Project Work | C | 18 |
| | Total | | 18 |

| Semester II | | Semester III | |
|---|---|---|---|
| **Course Code** | **Paper** | **Course Code** | **Paper** |
| 21-344-0211 | Distributed Computing | 21-344-0311 | Swarm Intelligence |
| 21-344-0212 | Intelligent System# | 21-344-0312 | Fuzzy Logic |
| 21-344-0213 | Cloud Computing | 21-344-0313 | Computer Vision |
| 21-344-0214 | Software Defined Networks | 21-344-0314 | Computer Forensics |
| 21-344-0215 | Mobile Application Development using Android | 21-344-0315 | Knowledge Based Systems # |
| 21-344-0216 | Internet of Things | 21-344-0316 | Full Stack Web Development # |
| 21-344-0217 | Digital Image Processing # | 21-344-0317 | Natural Language Processing |
| | | 21-344-0318 | Block Chain Technology |
| | | 21-344-0319 | Explainable Artificial Intelligence # |
| | | 21-344-0320 | Introduction to Game Theory# |
| | | 21-344-0321 | Machine Learning for Big Data Analytics # |
| | | 21-344-0322 | Data Visualization # |
| # Syllabus to be approved | | | |

## M.SC. COMPUTER SCIENCE WITH SPECIALIZATION IN DATA SCIENCE

(2020 Admission onwards)

**Semester I**

| Course Code | Paper | C/E | Credit |
|---|---|---|---|
| 20-359-0101 | Statistical Foundations for data Science | C | 4 |
| 20-359-0102 | Operating System Concepts* | C | 4 |
| 20-359-0103 | Data Structures and Algorithms* | C | 3 |
| 20-359-0104 | Python for Data Analytics | C | 3 |
| 20-359-0105 | Mathematics for Machine Learning | C | 3 |
| 20-359-0106 | Python Programming LAB | C | 1 |
| 20-359-0107 | Mini Project | C | 1 |
| | | | 19 |

**Semester II**

| Course Code | Paper | C/E | Credit |
|---|---|---|---|
| 20-359-0201 | Networks and Data Communications* | C | 4 |
| 20-359-0202 | Database Management Systems* | C | 4 |
| 20-359-0203 | R for Data Analytics | C | 3 |
| 20-359-0204 | Data Mining & Machine Learning** | C | 3 |
| | Elective I | E | 3 |
| 20-359-0206 | R Programming LAB | C | 1 |
| 20-359-0207 | Mini Project | C | 1 |
| | | | 19 |

**Semester III**

| Course Code | Paper | C/E | Credit |
|---|---|---|---|
| 20-359-0301 | Soft Computing Techniques | C | 4 |
| | Elective II | E | 3 |
| | Elective III | E | 3 |
| | Elective IV | E | 3 |
| | Elective V | E | 3 |
| 20-359-0306 | Seminar | C | 1 |
| 20-359-0307 | Mini Project | C | 1 |
| | | | 18 |

**Semester IV**

| Course Code | Paper | C/E | Credit |
|---|---|---|---|
| 20-359-0401 | Internship/Project Work | C | 18 |

**Second Semester Electives**

20-359-0211 - Predictive Analytics

20-359-0212 - Text Analytics.

20-359-0213 - Social Network Analysis

**Third Semester Electives**

20-359-0311 - No SQL Databases

20-359-0312 - Image and Video Analytics

20-359-0313 - Healthcare Data Analytics

20-359-0314 - Fraud Analytics

20-359-0315 - Block Chain Technologies (Industry Oriented course/ MCA)

20-359-0316 - Big Data Analytics **

20-359-0317 - Natural Language Processing **

20-359-0318 - Information Retrieval *

20-359-0319 - Deep Learning **

20-359-0320 - Business Analytics **

20-359-0321 - Data Visualization #

20-359-0322 - Data warehousing #

20-359-0323 - Computational modelling #

20-359-0324 - Time Series Analysis and SEM Modeling #

20-359-0325 - AI & Knowledge representation #

* Subjects from M.Sc. Computer Science with specialization in Soft Computing

** Subjects from MCA

# Syllabus to be approved

## MASTER OF COMPUTER APPLICATIONS (MCA) COURSE STRUCTURE

**(2020 Admission onwards)-(for DCA& CUCEK)**

**Bridge Courses**

| |
|---|
| Principles of Programming |
| Basic Mathematics for Computer Applications |

**Semester I**

| Course Code | Paper | C/E | Credit |
|---|---|---|---|
| 20-382-0101 | Data Structures using C | C | 3 |
| 20-382-0102 | Mathematical Foundations and Numerical Techniques | C | 3 |
| 20-382-0103 | Digital Electronics and Computer Organization | C | 3 |
| 20-382-0104 | Database Management System | C | 3 |
| 20-382-0105 | Operating Systems (MOOC Course) | C | 2 |
| 20-382-0106 | C Programming LAB | C | 2 |
| 20-382-0107 | DBMS LAB | C | 1 |
| | | | 17 |

**Semester II**

| Course Code | Paper | C/E | Credit |
|---|---|---|---|
| 20-382-0201 | Object Oriented Programming | C | 3 |
| 20-382-0202 | Design and Analysis of Algorithms | C | 3 |
| 20-382-0203 | Fundamentals of Software Engineering. | C | 3 |
| 20-382-0204 | Data Mining and Machine Learning | C | 3 |
| 20-382-0205 | Information Security | C | 3 |
| 20-382-0206 | JAVA Programming LAB. | C | 2 |
| 20-382-0207 | Data Mining LAB using Python | C | 2 |
| | | | 19 |

**Semester III**

| Course Code | Paper | C/E | Credit |
|---|---|---|---|
| 20-382-0301 | Data Communication and Networks | C | 3 |
| | Elective I | E | 3 |
| | Elective II | E | 3 |
| | Elective III (Industry Elective) | E | 3 |
| | Elective IV ( IE) | E | 3 |
| 20-382-0306 | Mini Project | C | 2 |
| 20-382-0307 | Technical Communication | C | 2 |
| | | | 19 |

**Semester IV**

| Course Code | Paper | C/E | Credit |
|---|---|---|---|
| 20-382-0601 | Project Work and Course Viva Voce. | C | 15 |

**LIST OF ELECTIVES**

**Elective I**

**20-382-0311** Android Application Development

**20-382-0312** Web Application Design using PHP

**20-382-0313** Network Security and Wireless Security

**20-382-0314** Artificial Intelligence

**20-382-0315** Security Threats and Vulnerabilities

**Elective II**

**20-382-0321**BlockChain Technology

**20-382-0322** Bioinformatics

**20-382-0323** Internet of Things

**20-382-0324** Real Time Systems

**20-382-0325** Distributed and Cloud Computing

**20-382-0326** Software project management/ Software testing

**20-382-0327** Introduction to Cryptography

**Elective III**

**20-382-0331** Big Data Analytics

**20-382-0332** Natural Language Processing

**20-382-0333** Digital Image Processing

**20-382-0334** Deep Learning

**Elective IV**

20-382-0341 Design Thinking

20-382-0342 Project Management

**Details of Faculty**

| Sl. No. | Name & Designation | Specialisation | Communication |
|---|---|---|---|
| 1 | Dr. Sabu M. K.<br>Professor & Head | Artificial Intelligence<br>Data Mining | 0484-2576253/2577602 (O)<br>0484-2518861(R)<br>9446128197 (M)<br>sabu.mes@gmail.com<br>sabumk@cusat.ac.in |
| 2 | Dr. A. Sreekumar<br>Professor | Compiler Design<br>Operating System<br>Cryptography<br>Number Theory | 0484-2576253 (O)<br>9495427491 (M)<br>sreekumar@cusat.ac.in<br>askcusat@gmail.com |
| 3 | Dr. Judy M. V.<br>Professor | Soft Computing<br>Data mining | 0484-2576253 (O)<br>9048991368 (M)<br>judy.nair@gmail.com<br>judy_nair@yahoo.com |
| 4 | Dr. Vinod P<br>Professor | Information Security<br>Malware Analysis<br>Deep Learning | 0484-2576253 (O)<br>9497179735(M)<br>vinod.p@cusat.ac.in |
| 5 | Dr. Vishnukumar S<br>Associate Professor | Image Processing<br>Machine Learning<br>Deep Learning | 0484-2576253 (O)<br>9497359253(M)<br>vks@cusat.ac.in |
| 6 | Ms. Malathi S.<br>Assistant Professor | Software Engineering | 0484-2576253 (O)<br>9495968765 (M)<br>malathi_s@cusat.ac.in |
| 7 | Dr. RafidhaRehiman K A<br>Assistant Professor | Cryptography<br>Network Security | 0484-2576253 (O)<br>9947142132(M)<br>rafidharehimanka@gmail.com |

# DEPARTMENT OF COMPUTER SCIENCE

## M TECH COMPUTER AND INFORMATION SCIENCE

**Semester I**

| Course Code | Paper | C/E | Credits | Pre-requisites |
|---|---|---|---|---|
| 20-435-0101 | Mathematical Concepts for Computer Science | C | 4 | |
| 20-435-0102 | Machine Learning Algorithms | C | 4 | |
| 20-435-0103 | Design and Analysis of Algorithms | C | 4 | |
| | Elective I | E | 3 | |
| | Elective II | E | 3 | |

**Electives**

| | |
|---|---|
| 20-435-0104 | Virtualized Systems |
| 20-435-0105 | Computational Linguistics |
| 20-435-0106 | Advanced Optimization Techniques |
| 20-435-0107 | Algorithms for Modern Data Models |
| 20-435-0108 | Digital Image and Video Processing |
| 20-435-0109 | Mathematics for Machine Learning |
| 20-435-0110 | Number Theory and Cryptography |

**Semester II**

| Course Code | Paper | C/E | Credits | Pre-requisites |
|---|---|---|---|---|
| 20-435-0201 | Algorithms for Massive Datasets | C | 4 | |
| 20-435-0202 | Probabilistic Graphical Models | C | 4 | |
| 20-435-0203 | Seminar | C | 1 | |
| | Elective III | E | 3 | |
| | Elective IV | E | 3 | |
| | Elective V | E | 3 | |

**Electives**

| | |
|---|---|
| 20-435-0204 | Bioinformatics |
| 20-435-0205 | Programming Massively Parallel Processors |
| 20-435-0206 | Deep Learning |
| 20-435-0207 | Modelling Cyber Physical Systems |
| 20-435-0208 | Algorithmic Game Theory |
| 20-435-0209 | Deep Learning for Computer Vision |
| 20-435-0210 | Image and Video Coding |
| 20-435-0211 | Reinforcement Learning |
| 20-435-0212 | Natural Language Processing with Deep Learning |

**Semester III**

| Course Code | Paper | C/E | Credits | Pre-requisites |
|---|---|---|---|---|
| 20-435-0301 | 20-435-0302 | E | 2 | |
| 20-435-0302 | Project & Viva Voce | C | 16 | |

**Semester IV**

| Course Code | Paper | C/E | Credits | Pre-requisites |
|---|---|---|---|---|
| 20-435-0401 | Project & Viva Voce | C | 18 | |

## M TECH SOFTWARE ENGINEERING

**Semester I**

| Course Code | Paper | C/E | Credits | Pre-requisites |
|---|---|---|---|---|
| 20-436-0101 | Mathematical Concepts for Computer Science | C | 4 | |
| 20-436-0102 | Machine Learning Algorithms | C | 4 | |
| 20-436-0103 | Design and Analysis of Algorithms | C | 4 | |
| | Elective I | E | 3 | |
| | Elective II | E | 3 | |

**Electives**

| | |
|---|---|
| 20-436-0104 | Artificial Intelligence |
| 20-436-0105 | Human Computer Interaction |
| 20-436-0106 | Information Retrieval and Web search |
| 20-436-0107 | Functional Programming |
| 20-436-0108 | Software Quality Management |

**Semester II**

| Course Code | Paper | C/E | Credits | Pre-requisites |
|---|---|---|---|---|
| 20-436-0201 | Big Data Analytics | C | 4 | |
| 20-436-0202 | Agile Software Engineering | C | 4 | |
| 20-436-0203 | Seminar | C | 1 | |
| | Elective III | E | 3 | |
| | Elective IV | E | 3 | |
| | Elective V | E | 3 | |

**Electives**

| | |
|---|---|
| 20-436-0204 | Software Architecture |
| 20-436-0205 | Software Agent Systems |
| 20-436-0206 | Enterprise Application Integration and Business Process Management |
| 20-436-0207 | Advanced Data Mining |
| 20-436-0208 | Fuzzy Set Theory: Foundations and Applications |
| 20-436-0209 | Complex Networks: Theory and Applications |
| 20-436-0210 | Advances in Databases |

**Semester III**

| Course Code | Paper | C/E | Credits | Pre-requisites |
|---|---|---|---|---|
| 20-436-0301 | Elective - VI | E | 2 | |
| 20-436-0302 | Project & Viva Voce | C | 16 | |

**Semester IV**

| Course Code | Paper | C/E | Credits | Pre-requisites |
|---|---|---|---|---|
| 20-436-0401 | Project & Viva Voce | C | 18 | |

## M TECH DATASCIENCE AND ARTIFICIAL INTELLIGENCE

**Semester I**

| Course Code | Paper | C/E | Credits | Pre-requisites |
|---|---|---|---|---|
| 19-475-0101 | Mathematical Concepts for Computer Science | C | 4 | |
| 19-475-0102 | Artificial Intelligence | C | 4 | |

**Semester II**

| Course Code | Paper | C/E | Credits | Pre-requisites |
|---|---|---|---|---|
| 19-475-0201 | Foundations of Datascience | C | 4 | |
| 19-475-0202 | Machine Learning Algorithms | C | 4 | |

**Semester III**

| Course Code | Paper | C/E | Credits | Pre-requisites |
|---|---|---|---|---|
| 19-475-0301 | Probabilistic Graphical Models | C | 4 | |
| | Elective I | E | 4 | |

**Electives**

| | |
|---|---|
| 19-475-0302 | Image and Video Processing |
| 19-475-0303 | Complex Networks: Theory and Applications |
| 19-475-0304 | Advanced Optimization Techniques |

**Semester IV**

| Course Code | Paper | C/E | Credits | Pre-requisites |
|---|---|---|---|---|
| 19-475-0401 | Deep Learning Architectures | C | 4 | |
| | Elective-II | E | 4 | |

**Electives**

| | |
|---|---|
| 19-475-0402 | Natural Language Processing with Deep Learning |
| 19-475-0403 | Real Time Video Analytics |
| 19-475-0404 | Bioinformatics |

**Semester V**

| Course Code | Paper | C/E | Credits | Pre-requisites |
|---|---|---|---|---|
| 19-475-0501 | Project&Viva Voce | C | 16 | |
| | Elective-III | E | 4 | |

**Electives**

| | |
|---|---|
| 19-475-0502 | Parallel Computing with GPU |
| 19-475-0503 | Mining of Massive Datasets |
| 19-475-0504 | Reinforcement Learning |

**Semester VI**

| Course Code | Paper | C/E | Credits | Pre-requisites |
|---|---|---|---|---|
| 19-475-0601 | Project&Viva Voce | C | 20 | |

## MSC ( FIVE YEAR INTEGRATED ) IN COMPUTER SCIENCE (ARTIFICIAL INTELLIGENCE & DATASCIENCE)

**Semester I**

| Course Code | Paper | C/E | Credits | Pre-requisites |
|---|---|---|---|---|
| 21-XXX-0101 | Mathematics for Data Science | C | 4 | |
| 21-XXX-0102 | Communicative English | C | 3 | |
| 21-XXX-0103 | Object Oriented Programming | C | 4 | |
| 21-XXX-0104 | Computational Thinking for Problem Solving | C | 4 | |
| 21-XXX-0105 | Environmental Studies | C | 3 | |
| 21-XXX-0106 | Lab 1-Python Programming Lab | C | 1 | |
| 21-XXX-0107 | Lab2-C++ Programming Lab | C | 1 | |

**Semester II**

| Course Code | Paper | C/E | Credits | Pre-requisites |
|---|---|---|---|---|
| 21-XXX-0201 | Linier Algebra | C | 4 | |
| 21-XXX-0202 | Data Structures | C | 4 | |
| 21-XXX-0203 | Introduction to Artificial Intelligence | C | 4 | |
| 21-XXX-0204 | Operating Systems | C | 3 | |
| 21-XXX-0205 | Java programming | C | 3 | |
| 21-XXX-0206 | Lab 3-Data Structure Lab | C | 1 | |
| 21-XXX-0207 | Lab 4-Java Programming Lab | C | 1 | |

**Semester III**

| Course Code | Paper | C/E | Credits | Pre-requisites |
|---|---|---|---|---|
| 21-XXX-0301 | Design and Analysis of Algorithms | C | 4 | |
| 21-XXX-0302 | Probability and Statistics for Data Science | C | 4 | |
| 21-XXX-0303 | Mathematics for Machine Learning | C | 4 | |
| 21-XXX-0304 | Database Systems | C | 3 | |
| 21-XXX-0305 | Theory of Computation | C | 3 | |
| 21-XXX-0306 | Lab 5-Algorithms Lab | C | 1 | |
| 21-XXX-0307 | Lab 6- Database Systems Lab | C | 1 | |

**Semester IV**

| Course Code | Paper | C/E | Credits | Pre-requisites |
|---|---|---|---|---|
| 21-XXX-0401 | Foundations of Data Science | C | 4 | |
| 21-XXX-0402 | Numerical Methods | C | 4 | |
| 21-XXX-0403 | Digital Signal Processing | C | 4 | |
| 21-XXX-0404 | Agile Software Engineering | C | 3 | |
| 21-XXX-0405 | Optimization Techniques | C | 3 | |
| 21-XXX-0406 | Lab 7-Numerical Methods Lab | C | 1 | |
| 21-XXX-0407 | Lab 8- Optimization Techniques Lab | C | 1 | |

**Semester V**

| Course Code | Paper | C/E | Credits | Pre-requisites |
|---|---|---|---|---|
| 21-XXX-0501 | Regression Analysis | C | 4 | |
| 21-XXX-0502 | Big Data Analytics | C | 4 | |
| 21-XXX-0503 | Cloud Computing | C | 4 | |
| 21-XXX-0504 | R for Data Science | C | 3 | |
| 21-XXX-0505 | Number Theory and Cryptography | C | 3 | |
| 21-XXX-0506 | Lab 9- R for Data Science Lab | C | 1 | |
| 21-XXX-0507 | Lab 10- Data Analytics Lab | C | 1 | |

**Semester VI**

| Course Code | Paper | C/E | Credits | Pre-requisites |
|---|---|---|---|---|
| 21-XXX-0601 | Inferential Statistics | C | 4 | |
| 21-XXX-0602 | Machine Learning Algorithms | C | 4 | |
| 21-XXX-0603 | Feature Engineering | C | 4 | |
| 21-XXX-0604 | Soft Computing Techniqes | C | 3 | |
| 21-XXX-0605 | Parallel Computing | C | 3 | |
| 21-XXX-0606 | Lab 11- Machine Learning and Parallel Computing Lab | C | 1 | |
| 21-XXX-0607 | Project | C | 1 | |

**Semester VII**

| Course Code | Paper | C/E | Credits | Pre-requisites |
|---|---|---|---|---|
| 21-XXX-0701 | Computational Lingistics | C | 4 | |
| 21-XXX-0702 | Digital Image and Video Processing | C | 4 | |
| 21-XXX-0703 | Deep Learning | C | 4 | |
| 21-XXX-0704 | Lab 12-Computational Linguistics Lab | C | 1 | |
| 21-XXX-0705 | Lab 13- Image and Video Processing Lab | C | 1 | |
| | Elective I | E | 3 | |
| | Elective II | E | 3 | |

**Electives**

| | |
|---|---|
| 21-XXX-0706 | Reinforcement Learning |
| 21-XXX-0707 | Algorithmic Game Theory |
| 21-XXX-0708 | Virtualized Systems |
| 21-XXX-0709 | Advanced Optimization Techniques |
| 21-XXX-0710 | Bioinformatics |
| 21-XXX-0711 | Algorithms for Modern data Models |
| 21-XXX-0712 | Complex Network Analysis |

**Semester VIII**

| Course Code | Paper | C/E | Credits | Pre-requisites |
|---|---|---|---|---|
| 21-XXX-0801 | Computer Vision | C | 4 | |
| 21-XXX-0802 | Probabilistic Graphical Models | C | 4 | |
| 21-XXX-0803 | Algorithms for Massive Datasets | C | 4 | |
| 21-XXX-0804 | Professional Communication | C | 1 | |
| 21-XXX-0805 | Project | C | 1 | |
| | Elective III | E | 3 | |
| | Elective IV | E | 3 | |

**Electives**

| | |
|---|---|
| 21-XXX-0806 | Deep Learning for Computer Vision |
| 21-XXX-0807 | Natural L:anguage Processing with Deep Learning |
| 21-XXX-0808 | Image and Video Coding |
| 21-XXX-0809 | Functional Programming |
| 21-XXX-0810 | Information Retrieval and Web Search |
| 21-XXX-0811 | Human Computer Interaction |
| 21-XXX-0812 | Cyber Physical Systems |

**Semester IX**

| Course Code | Paper | C/E | Credits | Pre-requisites |
|---|---|---|---|---|
| 21-XXX-0901 | Research Methodology | C | 2 | |
| 21-XXX-0902 | Project & Viva Voce | C | 12 | |
| 21-XXX-0903 | Elective V* | E | 2 | |

*Elective of the MOOC Course

**Semester X**

| Course Code | Paper | C/E | Credits | Pre-requisites |
|---|---|---|---|---|
| 21-XXX-1001 | Project & Viva Voce | C | 16 | |

**Details of Faculty**

| Sl No | Name&Designation | Specialization | Communication (Contact Number & e-mail id) |
|---|---|---|---|
| 1 | Dr. Philip Samuel, Professor & HOD | Object Oriented Modelling /Artificial Intelligence/Big Data | 9495467252,philipcusat@gmail.com |
| 2 | Dr. Santhosh Kumar G, Professor | Cyber Physical Systems/Computer Vision/NLP | 9447305879,san@cusat.ac.in |
| 3 | Dr. Madhu S Nair, Associate Professor | Computer Vision/Image Processing/Machine Learning/Pattern Recognition | 9447364158,msn@cusat.ac.in |
| 4 | Dr. Bijoy Antony Jose, Associate Professor | Embedded Software, Cyber Physical Systems, Internet of Things. | 9900634422,bijoyjose@cusat.ac.in |
| 5 | Mr. K B Muralidharan, Asst Professor | Information Management, Software Engineering | 9447708473, kbmuralidharan@gmail.com |
| 6 | Dr. Jereesh A S , Asst Professor | Bioinformatics/Datamining/ Image Processing | 9495576665,jereesh@cusat.ac.in |

# DEPARTMENT OF ELECTRONICS

## M.TECH IN ELECTRONICS & COMMUNICATION ENGINEERING

**Semester I**

| Course Code | Name of the Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Int | Ext | Total |
| 20-437-0101 | Embedded Architecture and Interfacing | 3 | 2 | 0 | 3 | 50 | 50 | 100 |
| 20-437-0102 | Advanced Digital Communication | 3 | 2 | 0 | 3 | 50 | 50 | 100 |
| 20-437-0103 | Advanced Digital Signal Processing | 3 | 2 | 0 | 3 | 50 | 50 | 100 |
| 20-437-0104 | Embedded Systems Laboratory | 0 | 0 | 4 | 1 | 100 | 0 | 100 |
| | Elective-I (Specialization) | | | | 3 | 50 | 50 | 100 |
| | Elective-Lab (Specialization) | | | | 1 | 100 | 0 | 100 |
| | Elective-II (General) | | | | 3 | 50 | 50 | 100 |
| | Elective-Lab (General) | | | | 1 | 100 | 0 | 100 |
| | **Total credits** | | | | **18** | | | |
| **Specialization Electives** | | | | | | | | |
| **VLSI and Embedded Systems** | | | | | | | | |
| 20-437-0105 | VLSI Technology and Design | 3 | 2 | 0 | 3 | 50 | 50 | 100 |
| 20-437-0106 | VLSI Laboratory | 0 | 0 | 4 | 1 | 100 | 0 | 100 |
| **Microwave and Radar Engineering** | | | | | | | | |
| 20-437-0107 | Microwave Devices & Circuits Design | 3 | 2 | 0 | 3 | 50 | 50 | 100 |
| 20-437-0108 | Microwave Circuits Lab | 0 | 0 | 4 | 1 | 100 | 0 | 100 |
| **Robotics and Intelligent Systems** | | | | | | | | |
| 20-437-0109 | Robotics and Automation | 3 | 2 | 0 | 3 | 50 | 50 | 100 |
| 20-437-0110 | Robotics Lab | 0 | 0 | 4 | 1 | 100 | 0 | 100 |
| **General Electives** | | | | | | | | |
| 20-437-0111 | FPGA Based System Design | 3 | 2 | 0 | 3 | 50 | 50 | 100 |
| 20-437-0112 | FPGA Based System Design Lab | 0 | 0 | 4 | 1 | 100 | 0 | 100 |
| 20-437-0113 | Antenna Theory | 3 | 2 | 0 | 3 | 50 | 50 | 100 |
| 20-437-0114 | Antenna Design Lab | 0 | 0 | 4 | 1 | 100 | 0 | 100 |
| 20-437-0115 | Neural Networks | 3 | 2 | 0 | 3 | 50 | 50 | 100 |
| 20-437-0116 | Neural Networks Lab | 0 | 0 | 41 | 1 | 100 | 0 | 100 |

**Semester II**

| Course Code | Name of the Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Int | Ext | Total |
| 20-437-0201 | Seminar | 0 | 0 | 2 | 1 | 100 | 0 | 100 |
| 20-437-0202 | Image and Video Processing | 3 | 2 | 0 | 3 | 50 | 50 | 100 |
| 20-437-0203 | Wireless Communication Techniques | 3 | 2 | 0 | 3 | 50 | 50 | 100 |
| 20-437-0204 | Communications Laboratory | 0 | 0 | 4 | 1 | 100 | 0 | 100 |
| | Elective-III (Specialization) | | | | 3 | 50 | 50 | 100 |
| | Elective-IV (Specialization) | | | | 3 | 50 | 50 | 100 |
| | Elective-Lab (Specialization) | | | | 1 | 100 | 0 | 100 |
| | Elective-V (General) | | | | 3 | 50 | 50 | 100 |
| | **Total credits** | | | | **18** | | | |
| **Specialization Electives** | | | | | | | | |
| **VLSI and Embedded Systems** | | | | | | | | |
| 20-437-0205 | Design Verification and Testing | 3 | 2 | 0 | 3 | 50 | 50 | 100 |
| 20-437-0206 | Design Verification Lab | 0 | 0 | 4 | 1 | 100 | 0 | 100 |
| 20-437-0207 | Real Time Operating Systems | 3 | 2 | 0 | 3 | 50 | 50 | 100 |
| 20-437-0208 | Real Time Operating Systems Lab | 0 | 0 | 4 | 1 | 100 | 0 | 100 |
| **Microwave and Radar Engineering** | | | | | | | | |
| 20-437-0209 | Electromagnetic Interference and Compatibility | 3 | 2 | 0 | 3 | 50 | 50 | 100 |
| 20-437-0210 | EMI/EMC Lab | 0 | 0 | 4 | 1 | 100 | 0 | 100 |
| 20-437-0211 | Radar Systems | 3 | 2 | 0 | 3 | 50 | 50 | 100 |
| **Robotics and Intelligent Systems** | | | | | | | | |
| 20-437-0212 | Mobile Robotics | 3 | 2 | 0 | 3 | 50 | 50 | 100 |
| 20-437-0213 | Mobile Robotics Lab | 0 | 0 | 4 | 1 | 100 | 0 | 100 |
| 20-437-0214 | Deep Neural Network Signal Processing | 3 | 2 | 0 | 3 | 50 | 50 | 100 |
| 20-437-0215 | Deep Neural Network Signal Processing Lab | 0 | 0 | 4 | 1 | 100 | 0 | 100 |
| **General Electives** | | | | | | | | |
| 20-437-0216 | Machine Learning | 3 | 2 | 0 | 3 | 50 | 50 | 100 |
| 20-437-0217 | Analog Integrated Circuits | 3 | 2 | 0 | 3 | 50 | 50 | 100 |
| 20-437-0218 | Adaptive Signal Processing | 3 | 2 | 0 | 3 | 50 | 50 | 100 |
| 20-437-0219 | RFIC Design | 3 | 2 | 0 | 3 | 50 | 50 | 100 |
| 20-437-0220 | Signal Integrity for High-Speed Digital Design | 3 | 2 | 0 | 3 | 50 | 50 | 100 |
| 20-437-0221 | Advanced Electromagnetic Engineering | 3 | 2 | 0 | 3 | 50 | 50 | 100 |
| 20-437-0222 | Computational Electromagnetics | 3 | 2 | 0 | 3 | 50 | 50 | 100 |
| 20-437-0223 | Software Defined Radios | 3 | 2 | 0 | 3 | 50 | 50 | 100 |

**Semester III**

| Course Code | Name of the Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Int | Ext | Total |
| 20-437-0301 | Project Part 1 | 0 | 0 | 24 | 15 | 100 | 200 | 300 |
| 20-437-0302 | NPTEL(minimum 8 weeks duration) /MOOC course (with pre approval of Department) | 3 | 0 | 0 | 3 | 0 | 100 | 100 |

**Semester IV**

| Course Code | Name of the Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Int | Ext | Total |
| 20-437-0401 | Project Part 2 | 0 | 0 | 24 | 18 | 100 | 200 | 300 |

**Total credits for the course =18+18+18+18 = 72**

# M.SC IN ELECTRONIC SCIENCE

**Semester I**

| Course Code | Name of the Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Int | Ext | Total |
| 20-305-0101 | Electronic Circuits | 4 | 1 | 0 | 4 | 50 | 50 | 100 |
| 20-305-0102 | Signals & Systems | 4 | 1 | 0 | 4 | 50 | 50 | 100 |
| 20-305-0103 | Digital System Design | 4 | 1 | 0 | 4 | 50 | 50 | 100 |
| 20-305-0104 | RF & Microwave Technology | 4 | 1 | 0 | 4 | 50 | 50 | 100 |
| 20-305-0105 | Programming for Embedded Systems(Lab oriented) | 4 | 0 | 2 | 4 | 100 | 0 | 100 |
| 20-305-0106 | Electronic Circuits Lab | 0 | 0 | 4 | 1 | 100 | 0 | 100 |
| 20-305-0107 | Signals & Systems Lab | 0 | 0 | 4 | 1 | 100 | 0 | 100 |
| | **Total credits** | | | | **22** | | | |

**Semester II**

| Course Code | Name of the Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Int | Ext | Total |
| 20-305-0201 | Embedded System Design | 4 | 1 | 0 | 4 | 50 | 50 | 100 |
| 20-305-0202 | Control Systems | 4 | 1 | 0 | 4 | 50 | 50 | 100 |
| 20-305-0203 | Digital Signal Processing | 4 | 1 | 0 | 4 | 50 | 50 | 100 |
| 20-305-0204 | Seminar | 0 | 0 | 2 | 1 | 100 | 0 | 100 |
| 20-305-0205 | Embedded System Design Lab | 0 | 0 | 4 | 1 | 100 | 0 | 100 |
| 20-305-0206 | Control Systems Lab | 0 | 0 | 4 | 1 | 100 | 0 | 100 |
| | **Elective I** | | | | 3 | 50 | 50 | 100 |
| | **Total credits** | | | | **18** | | | |

**Semester III**

| Course Code | Name of the Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Int | Ext | Total |
| 20-305-0302 | Project Part 1 | 0 | 1 | 0 | 0 | 0 | 100 | 100 |
| 20-305-0302 | Communication Systems | 4 | 1 | 0 | 4 | 50 | 50 | 100 |
| 20-305-0303 | VLSI System Design | 4 | 1 | 0 | 4 | 50 | 50 | 100 |
| 20-305-0304 | Communications Lab | 0 | 0 | 4 | 1 | 100 | 0 | 100 |
| | **Elective II** | | | | 3 | 50 | 50 | 100 |
| | **Elective III** | | | | 3 | 50 | 50 | 100 |
| | **Elective Lab** | | | | 1 | 100 | 0 | 100 |
| | **Total credits** | | | | **16** | | | |

**Semester IV**

| Course Code | Name of the Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Int | Ext | Total |
| 20-305-0401 | Project Part 2 | 0 | 0 | 24 | 13 | 100 | 200 | 300 |
| | **Elective IV** | | | | **3** | 50 | 50 | 100 |
| | **Total Credits** | | | | **16** | | | |

**List of Electives***

| Course Code | Name of the Course | Pre-requisite | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | **L** | **T** | **P** | | Int | Ext | Total |
| 20-305-0001 | Machine Learning | | 3 | 2 | 0 | 3 | 50 | 50 | 100 |
| 20-305-0002 | Robotics Technology | | 3 | 2 | 0 | 3 | 50 | 50 | 100 |
| 20-305-0003 | Microwave Integrated Circuits | | 3 | 2 | 0 | 3 | 50 | 50 | 100 |
| 20-305-0004 | Data Structures | | 3 | 2 | 0 | 3 | 50 | 50 | 100 |
| 20-305-0005 | Computer Organisation | | 3 | 2 | 0 | 3 | 50 | 50 | 100 |
| 20-305-0006 | Wireless Communication | | 3 | 2 | 0 | 3 | 50 | 50 | 100 |
| 20-305-0007 | Computational Techniques | | 3 | 2 | 0 | 3 | 50 | 50 | 100 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 20-305-0008 | Microprocessors and Microcontrollers | | 3 | 2 | 0 | 3 | 50 | 50 | 100 |
| 20-305-0009 | Image Processing | | 3 | 2 | 0 | 3 | 50 | 50 | 100 |
| 20-305-0010 | Robotics and Intelligent Systems | 20-305-0002 | 3 | 2 | 0 | 3 | 50 | 50 | 100 |
| 20-305-0011 | Radar and Satellite Communication | | 3 | 2 | 0 | 3 | 50 | 50 | 100 |
| 20-305-0012 | Embedded Software and Real Time Systems | | 3 | 2 | 0 | 3 | 50 | 50 | 100 |
| 20-305-0013 | Antennas | | 3 | 2 | 0 | 3 | 50 | 50 | 100 |
| 20-305-0014 | Computer Architecture | | 3 | 2 | 0 | 3 | 50 | 50 | 100 |
| 20-305-0015 | Neural Networks | | 3 | 2 | 0 | 3 | 50 | 50 | 100 |
| 20-305-0016 | Machine Learning Lab | 20-305-0001 | 0 | 0 | 4 | 1 | 100 | 0 | 100 |
| 20-305-0017 | Robotics Technology Lab | 20-305-0002 | 0 | 0 | 4 | 1 | 100 | 0 | 100 |
| 20-305-0018 | Microwave Circuits Lab | 20-305-0003 | 0 | 0 | 4 | 1 | 100 | 0 | 100 |
| 20-305-0019 | Data Structures Lab | 20-305-0004 | 0 | 0 | 4 | 1 | 100 | 0 | 100 |
| 20-305-0020 | Image Processing Lab | 20-305-0009 | 0 | 0 | 4 | 1 | 100 | 0 | 100 |
| 20-305-0021 | Robotics and Intelligent Systems Lab | 20-305-0010 | 0 | 0 | 4 | 1 | 100 | 0 | 100 |
| 20-305-0022 | EM Radiation Lab | 20-305-0011 | 0 | 0 | 4 | 1 | 100 | 0 | 100 |
| 20-305-0023 | Embedded Software Lab | 20-305-0012 | 0 | 0 | 4 | 1 | 100 | 0 | 100 |
| 20-305-0024 | VLSI System Design Lab | 20-305-0303 | 0 | 0 | 4 | 1 | 100 | 0 | 100 |
| 20-305-0025 | MOOC/NPTEL Course | | 3 | 0 | 0 | 3 | - | - | 100 |

**Total credits - 72**

* Electives offered will be subject to availability of expertise in the field.

# M.TECH (DEFENCE TECHNOLOGY)

**Semester - 1**

| S. No. | Course Code | Course of study and scheme of examination | M.Tech Semester-1 | | | Branch Defence Technology |
|---|---|---|---|---|---|---|
| | | **Compulsory Courses** | **Periods/Week** | | | **Total Credits** |
| | | | **L** | **T** | **P** | |
| 1. | DT-01-01 | Systems and warfare Platforms | 4 | - | - | 4 |
| 2. | DT-01-02 | Warfare Simulations & Strategies | 4 | - | - | 4 |
| 3. | DT-01-03 | Advanced Engineering Mathematics | 4 | - | - | 4 |
| 4. | DT-01-L01 | Systems and Platforms Lab | - | - | 2 | 2 |
| 5. | DT-01-L02 | Warfare Simulations & Strategies Lab | - | - | 2 | 2 |
| | | **Elective Courses** | | | | |
| 6. | | Elective 1 | 3 | - | - | 3 |
| 7. | | Elective 2 | 3 | - | - | 3 |
| 8. | | Seminar | - | - | 1 | 1 |
| | | Totalcredits | | | | 23 |

**Semester -1 Elective Courses**

- Students are expected to select the Elective-I course of their choice, provided that at least a group of 7 students should opt for the similar electivecourse.

| S. No. | Course Code | Course of study and scheme of examination | M.Tech Semester-1 | | | |
|---|---|---|---|---|---|---|
| | | **Elective 1** | **Periods/Week** | | | |
| | | | **L** | **T** | **P** | **Total Credits** |
| 1. | DT-EL1-01 | Rockets & Missiles Fundamentals | 3 | - | - | 3 |
| 2. | DT-EL1-02 | Advanced Thermal Engineering | 3 | - | - | 3 |
| 3. | DT-EL1-03 | Numerical methods for science & engineering | 3 | - | - | 3 |
| 4. | DT-EL1-04 | Communication Technology | 3 | - | - | 3 |
| 5. | DT-EL1-05 | Advanced Mechanical Engineering | 3 | - | - | 3 |

| S. No. | Course Code | Course of study and scheme of examination | M.Tech Semester-1 | | | |
|---|---|---|---|---|---|---|
| | | Elective 2 | Periods/Week | | | |
| | | | L | T | P | Total Credits |
| 1. | DT-EL2-01 | Autonomy and Navigation Technology | 3 | - | - | 3 |
| 2. | DT-EL2-02 | Optimization theory & applications | 3 | - | - | 3 |
| 3. | DT-EL2-03 | Military Electronics System Engineering | 3 | - | - | 3 |
| 4. | DT-EL2-04 | System Engineering & Analysis | 3 | - | - | 3 |

**Semester - 2: Main Stream Defence Technology with following six specialization**

| S. No. | Main Stream Defence Technology |
|---|---|
| 1. | Combat Vehicle Engineering |
| 2. | AerospaceTechnology |
| 3. | Naval Technology |
| 4. | Communication Systems & Sensors |
| 5. | Directed Energy Technology |
| 6. | High Energy Materials Technology |

**1. Combat Vehicle Engineering**

| S. No. | Course Code | Course of study and scheme of examination | M.Tech Semester-2 | | | Branch Defence Technology |
|---|---|---|---|---|---|---|
| | | Compulsory Courses | Periods/Week | | | Total Credits |
| | | Combat Vehicle Engineering | L | T | P | |
| 1. | DT-CVE-01 | Combat Vehicle Dynamics | 4 | - | - | 4 |
| 2. | DT-CVE-02 | Combat System Engineering | 4 | - | - | 4 |
| 3. | DT-CVE-03 | Test & Evaluation of Weapon System | 4 | - | - | 4 |
| 4. | DT-CVE-L01 | Combat Vehicle Dynamics Lab | - | - | 2 | 2 |
| 5. | DT-CVE-L02 | Combat System Engineering Lab | - | - | 2 | 2 |
| | | **Elective Courses** | | | | |
| 6. | | Elective 1 | 3 | - | - | 3 |
| 7. | | Elective 2 | 3 | - | - | 3 |
| 8. | | Seminar | - | - | 1 | 1 |
| | | Total credits | | | | 23 |

## 2. Aerospace Technology

| S. No. | Course Code | Course of study and scheme of examination | M.Tech Semester-2 | | | Branch Defence Technology |
|---|---|---|---|---|---|---|
| | | **Compulsory Courses** | **Periods/Week** | | | **Total Credits** |
| | | **Aerospace Technology** | **L** | **T** | **P** | |
| 1. | DT-AT-01 | Aerospace System Configuration, Design & Simulation | 4 | - | - | 4 |
| 2. | DT-AT-02 | Guidance & control | 4 | - | - | 4 |
| 3. | DT-AT-03 | Aerospace Propulsion | 4 | - | - | 4 |
| 4. | DT-AT-L01 | Aerospace System Configuration, Design & Simulation Lab | - | - | 2 | 2 |
| 5. | DT-AT-L02 | Guidance & control Lab | - | - | 2 | 2 |
| | | **Elective Courses** | | | | |
| 6. | | Elective 1 | 3 | - | - | 3 |
| 7. | | Elective 2 | 3 | - | - | 3 |
| 8. | | Seminar | - | - | 1 | 1 |
| | | Total credits | | | | 23 |

**3. Naval Technology**

| S. No. | Course Code | Course of study and scheme of examination | M.Tech Semester-2 | | | Branch Defence Technology |
|---|---|---|---|---|---|---|
| | | Compulsory Courses | Periods/Week | | | Total Credits |
| | | Naval Technology | L | T | P | |
| 1. | DT-NT-01 | Naval combat system engineering | 4 | - | - | 4 |
| 2. | DT-NT-02 | Guidance, Navigation and Control of Marine Systems | 4 | - | - | 4 |
| 3. | DT-NT-03 | Marine Propulsion | 4 | - | - | 4 |
| 4. | DT-NT-L01 | Naval combat system engineering Lab | - | - | 2 | 2 |
| 5. | DT-NT-L02 | Guidance, Navigation, and Control of Marine Systems Lab | - | - | 2 | 2 |
| | | **Elective Courses** | | | | |
| 6. | | Elective 1 | 3 | - | - | 3 |
| 7. | | Elective 2 | 3 | - | - | 3 |
| 8. | | Seminar | - | - | 1 | 1 |
| | | Total credits | | | | 23 |

**4. Communication Systems & Sensors**

| S. No. | Course Code | Course of study and scheme of examination | M.Tech Semester-2 | | | Branch Defence Technology |
|---|---|---|---|---|---|---|
| | | Compulsory Courses | Periods/Week | | | Total Credits |
| | | Communication Systems & Sensors | L | T | P | |
| 1. | DT-CSS-01 | Radar Technologies | 4 | - | - | 4 |
| 2. | DT-CSS-02 | Digital & satellite Communication and Navigation from Space | 4 | - | - | 4 |
| 3. | DT-CSS-03 | Tactical battlefield Communication & Electronic Warfare | 4 | - | - | 4 |
| 4. | DT-CSS-L01 | Radar Technologies Lab | - | - | 2 | 2 |
| 5. | DT-CSS-L02 | Digital & satellite Communication and Navigation from Space Lab | - | - | 2 | 2 |
| | | **Elective Courses** | | | | |
| 6. | | Elective 1 | 3 | - | - | 3 |
| 7. | | Elective 2 | 3 | - | - | 3 |
| 8. | | Seminar | - | - | 1 | 1 |
| | | Total credits | | | | 23 |

**5. Directed Energy Technology**

| S. No. | Course Code | Course of study and scheme of examination | M.Tech Semester-2 | | | Branch Defence Technology |
|---|---|---|---|---|---|---|
| | | **Compulsory Courses** | **Periods/Week** | | | **Total Credits** |
| | | **Directed Energy Technology** | **L** | **T** | **P** | |
| 1. | DT-DET-01 | Directed Energy Sources (Lasers, Microwave) | 4 | - | - | 4 |
| 2. | DT-DET-02 | Beam Control Technology, Target acquisition, Beam Pointing & Tracking | 4 | - | - | 4 |
| 3. | DT-DET-03 | Directed Energy Weapons (DEW) System Engineering | 4 | - | - | 4 |
| 4. | DT-DET-L01 | Directed Energy Sources (Lasers, Microwave) Lab | - | - | 2 | 2 |
| 5. | DT-DET-L02 | Beam Control Technology, Target acquisition, Beam Pointing & Tracking Lab | - | - | 2 | 2 |
| | | **Elective Courses** | | | | |
| 6. | | Elective 1 | 3 | - | 0 | 3 |
| 7. | | Elective 2 | 3 | - | 0 | 3 |
| 8. | | Seminar | - | - | 1 | 1 |
| | | Total credits | | | | 23 |

**6. High Energy MaterialsTechnology**

| S. No. | Course Code | Course of study and scheme of examination | M.Tech Semester-2 | | | Branch Defence Technology |
|---|---|---|---|---|---|---|
| | | **Compulsory Courses** | **Periods/Week** | | | **Total Credits** |
| | | **High Energy Materials Technology** | **L** | **T** | **P** | |
| 1. | DT-HEM-01 | High Energy Materials Modeling & Simulation | 4 | - | - | 4 |
| 2. | DT-HEM-02 | Munitions and Target Response | 4 | - | - | 4 |
| 3. | DT-HEM-03 | Manufacturing and Materials Properties of Explosives | 4 | - | - | 4 |
| 4. | DT-HEM-L01 | High Energy Materials Modeling& Simulation Lab | - | - | 2 | 2 |
| 5. | DT-HEM-L02 | Munitions and Target | - | - | 2 | 2 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | Response Lab | | | | |
| | | **Elective Courses** | | - | | |
| 6. | | Elective 1 | 3 | - | - | 3 |
| 7. | | Elective 2 | 3 | - | - | 3 |
| 8. | | Seminar | - | - | 1 | 1 |
| | | Total credits | | | | 23 |

**Elective Courses offered for Semester 2**

- Students are expected to select the Elective-I course of their choice, provided that at least a group of 7 students should opt for the similar electivecourse.

| **S. No.** | **Course Code** | **Course of study and scheme of examination** | **M.Tech Semester-2** | | | |
|---|---|---|---|---|---|---|
| | | **Elective 1 (forall Specializations)** | **Periods/Week** | | | |
| | | | **L** | **T** | **P** | **Credits** |
| 1. | DT-EL3-01 | Robotics (MSS, MCC) | 3 | - | - | 3 |
| 2. | DT-EL3-02 | EMI/EMC in Military Systems | 3 | - | - | 3 |
| 3. | DT-EL3-03 | Defence Electro-Optics and Imaging Systems | 3 | - | - | 3 |
| 4. | DT-EL3-04 | Structural Dynamics and Aero-elasticity | 3 | - | - | 3 |
| 5. | DT-EL3-05 | Safety, Health & Hazard Management | 3 | - | - | 3 |
| 6. | DT-EL3-06 | Fundamental of telemetry, telecommand& transponder | 3 | - | - | 3 |
| 7. | DT-EL3-07 | Jamming and ECM/ECCM technologies | 3 | - | - | 3 |
| 8. | DT-EL3-08 | Software defined Radios | 3 | - | - | 3 |
| 9. | DT-EL3-09 | Advanced Lightweight and Composite Structures | 3 | - | - | 3 |
| 10. | DT-EL3-10 | Test methodologies for DEW systems (Lasers & Microwave) | 3 | - | - | 3 |
| 11. | DT-EL3-11 | Advanced Analytical Techniques / Lab testing | 3 | - | - | 3 |
| 12. | DT-EL3-12 | Sonar System Engineering | 3 | - | - | 3 |

| S. No. | Course Code | Course of study and scheme of examination | M.Tech Semester-2 | | | |
|---|---|---|---|---|---|---|
| | | Elective 2 (for all Specializations) | Periods/Week | | | |
| | | | L | T | P | Credits |
| 1. | DT-EL4-01 | Unmanned Aerial Vehicle Design | 3 | - | - | 3 |
| 2. | DT-EL4-02 | Naval Ocean Analysis and Prediction | 3 | - | - | 3 |
| 3. | DT-EL4-03 | Modeling& simulation of Laser Matter Interaction | 3 | - | - | 3 |
| 4. | DT-EL4-04 | Computational Aerodynamics | 3 | - | - | 3 |
| 5. | DT-EL4-05 | Launch Vehicle Design & Analysis | 3 | - | - | 3 |
| 6. | DT-EL4-06 | Acquisition, Tracking & Pointing Technology | 3 | - | - | 3 |
| 7. | DT-EL4-07 | Data acquisition, tracking & post flight analysis | 3 | - | - | 3 |
| 8. | DT-EL4-08 | Air independent propulsion & batteries | 3 | - | - | 3 |
| 9. | DT-EL4-09 | Advanced digital modulation technologies & standards | 3 | - | - | 3 |
| 10. | DT-EL4-10 | Trajectories modelling& simulation | 3 | - | - | 3 |
| 11. | DT-EL4-11 | Sensor Technology | 3 | - | - | 3 |

**Semester - 3**

| S. No. | Course | Credit |
|---|---|---|
| 1. | Project Dissertation- Phase 1 | 10 |
| 2. | Seminar/ Industrial training | 4 |
| | **Total credits** | **14** |

**Semester – 4**

| S. No. | Course | Credit |
|---|---|---|
| 1 | Project Dissertation Phase-2 | 20 |
| | **Total credits** | **20** |

## DETAILS OF FACULTY

| Sl. No. | Name | Designation | Qualification | Specilisation | Contact no. & email. id |
|---|---|---|---|---|---|
| 1. | Dr.Supriya M.H. | Professor & Head | B.Tech<br>M.Tech<br>Ph.D<br>MBA | Signal Processing, Network Analysis, Digital Electronics, Microprocessors, Embedded Systems, Data Structures. | 9947379396<br>supriya@cusat.ac.in |
| 2. | Arun A Balakrishnan | Assistant Professor | B.Tech<br>M.Tech | Signal Processing | 9496346370<br>arunab@cusat.ac.in |
| 3. | MithunHaridas T P | Assistant Professor | B.Tech<br>M.Tech | Embedded Systems | 9447096888<br>mithuntp@cusat.ac.in |
| 4. | Dr.Nalesh S | Assistant Professor | B.Tech<br>M.Tech<br>Ph.D | VLSI, Reconfigurable Architecture, High level Synthesis DSP Architecture | 9535163008<br>nalesh@cusat.ac.in |
| 5. | Dr.Tripti S Warrier | Assistant Professor | B.Tech<br>M.Tech<br>Ph.D | VLSI, Computer Architeture FPGA, VLSI Testing | 9495585383<br>tripti@cusat.ac.in |
| 6. | Dr.Deepti Das Krishna | Assistant Professor | M.Sc<br>M.Tech<br>Ph.D | Microwave Communication Communication Systems Antennas and Highfrequency design | 9846420928<br>deeptidas@cusat.ac.in |
| 7. | Kumary V Y Vidhu | Assistant Professor | B.Tech<br>M.Tech | Microwave & Television Engineering | 9645735550<br>vyvidhu@cusat.ac.in |

# DEPARTMENT OF INSTRUMENTATION

## B.Tech. INSTRUMENTATION AND CONTROL ENGINEERING

**Semester I**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| 20-211-0101 | Calculus | C | 3 |
| 20-211-0102 | Engineering Physics | C | 3 |
| 20-211-0103 | Basic Electronics | C | 3 |
| 20-211-0104 | Electrical Engineering – I | C | 3 |
| 20-211-0105 | Mechanical Engineering | C | 3 |
| 20-211-0106 | Soft Skill Development | C | 1 |
| | **Practicals** | | |
| 20-211-0107 | Language Lab | C | 1 |
| 20-211-0108 | Engineering Graphics | C | 2 |
| 20-211-0109 | Electrical and Mechanical Workshop | | 1 |
| | **Total** | | **20** |

**Semester II**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| 20-211-0201 | Linear Algebra and Transforms | C | 3 |
| 20-211-0202 | Engineering Chemistry | C | 3 |
| 20-211-0203 | Analog Electronics | C | 3 |
| 20-211-0204 | Electrical Engineering II | C | 3 |
| 20-211-0205 | Engineering Mechanics | C | 3 |
| 20-211-0206 | Materials Science | C | 3 |
| | **Practicals** | | |
| 20-211-0207 | Computer Programming | C | 2 |
| 20-211-0208 | Basic Electronics Lab | C | 1 |
| | **Total** | | **21** |

**Semester III**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| 20-211-0301 | Complex Analysis and Partial differential Equations | C | 3 |
| 20-211-0302 | Electrical measurements and Instrumentation | C | 3 |
| 20-211-0303 | Digital electronics | C | 3 |
| 20-211-0304 | Linear Integrated Circuits | C | 3 |
| 20-211-0305 | Transducers - I | C | 3 |
| 20-211-0306 | Principles of measurements and Instrumentation | C | 3 |
| | **Practicals** | | |
| 20-211-0307 | Analog Electronics Lab | C | 1 |
| 20-211-0308 | Electrical Machines and Measurement Lab | C | 1 |
| | **Total** | | **20** |

**Semester IV**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| 20-211-0401 | Numerical and Statistical Methods | C | 3 |
| 20-211-0402 | Transducers - II | C | 3 |
| 20-211-0403 | Control Engineering – I | C | 3 |
| 20-211-0404 | Power Electronics | C | 3 |
| 20-211-0405 | Pneumatic and Hydraulic System | C | 3 |
| 20-211-0406 | Signals and Systems | C | 3 |
| | **Practicals** | | |
| 20-211-0407 | Digital Electronics Lab | C | 1 |
| 20-211-0408 | Material Science Lab | C | 1 |
| | **Total** | | **20** |

**Semester V**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| 20-211-0501 | Control Engineering II | C | 3 |
| 20-211-0502 | Digital Signal Processing | C | 3 |
| 20-211-0503 | Microprocessors & microcontrollers | C | 3 |
| 20-211-0504 | Analytical Instruments | C | 3 |
| 20-211-0505 | Engineering Management | C | 3 |
| 20-211-05** | Elective - I | E | 3 |
| | **Practicals** | | |
| 20-211-0506 | Control System Lab | C | 1 |
| 20-211-0507 | Transducers and Industrial Instrumentation Lab | C | 1 |
| | **Total** | | **22** |

**Semester VI**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| 20-211-0601 | Vacuum and Cryogenic Instrumentation | C | 3 |
| 20-211-0602 | Embedded Systems | C | 3 |
| 20-211-0603 | Process Control | C | 3 |
| 20-211-0604 | Optoelectronic Instrumentation | C | 3 |
| 20-211-06** | Elective - II | E | 3 |
| 20-211-06** | Industry Elective | E | 2 |
| | **Practicals** | | |
| 20-211-0605 | Microprocessor and Microcontroller Lab | C | 1 |
| 20-211-0606 | Virtual Instrumentation Lab. | C | 1 |
| 20-211-0607 | Seminar | C | 1 |
| | **Total** | | **20** |

**Semester VII**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| 20-211-0701 | Biomedical Instrumentation | C | 3 |
| 20-211-0702 | Advanced Process control | C | 3 |
| 20-211-0703 | Power Plant Instrumentation | C | 3 |
| 20-211-0704 | Communication Systems and Telemetry | C | 3 |
| 20-211-0705 | Robotics and automation | C | 3 |
| 20-211-07** | Elective - III | E | 3 |
| | **Practicals** | | |
| 20-211-0706 | Process Control Lab | C | 1 |
| 20-211-0707 | Digital Signal Processing Lab | C | 1 |
| 20-211-0708 | Mini project | C | 1 |
| | **Total** | | **21** |

**Semester VIII**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| 20-211-0801 | Project Work | C | 10 |
| 20-211-0802 | Viva-Voce | C | 2 |
| 20-211-08** | Open Course 1 | E | 2 |
| 20-211-08** | Open Course 2 | C | 2 |
| 20-211-08** | Open Course 3 | | 2 |
| | **Total** | | **18** |
| **Total for Eight Semesters** | | | **160** |

# M.Sc. INSTRUMENTATION

**Semester I**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| INS 2101 | Applied Mathematics | C | 3 |
| INS 2102 | Introduction to Instrumentation systems | C | 3 |
| INS 2103 | Sensors, Transducers and Actuators | C | 3 |
| INS 2104 | Electronic Devices and Circuits | C | 3 |
| INS 2105 | Digital Electronics | C | 3 |
| INS 2101L | Computer Science Lab. | C | 2 |
| INS 2102L | Analog Electronics Lab. | C | 2 |
| | Total | | 19 |

**Semester II**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| INS 2201 | Microprocessors and Instrumentation | C | 3 |
| INS 2202 | Optical Instrumentation | C | 3 |
| INS 2203 | Control System | C | 3 |
| INS 2204 | Elective – 1 | E | 3 |
| INS 2205 | Elective – 2 | E | 3 |
| INS 2201L | Sensors and signal conditioning Lab | C | 2 |
| INS 2202L | Digital Electronics Lab | C | 2 |
| | **Total** | | **19** |

**Semester III**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| INS 2301 | Signal Processing | C | 3 |
| INS 2302 | Analytical Methods and Instrumentation | C | 3 |
| INS 2303 | Elective -3 | E | 3 |
| INS 2304 | Elective - 4 | E | 3 |
| INS 2305 | Elective - 5 | E | 3 |
| INS 2306 | Seminar | C | 1 |
| INS 2307 | Control Systems and process control Lab | C | 1 |
| INS 2308 | Microprocessor and Interfacing Lab | C | 1 |
| | **Total** | | **18** |

**Semester IV**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| INS 2401 | Project work and Viva-Voc | C | 16 |
| | **Total** | | **16** |
| | | | |

## List of Electives

1. Materials Science
2. Vacuum.Techniques and Instrumentation
3. Biomedical Instrumentation
4. MEMS and Microsystems
5. Modern Control Systems
6. Process Control
7. Microcontroller and Computer based Instrumentation.

# M.Tech. INSTRUMENTATION TECHNOLOGY

**Course Structure**

**SEMESTER I**

| Sl. No. | Course Code | Name of the Course | Core/ Elective | Credits | Marks |
|---|---|---|---|---|---|
| 1 | 21-473-0101 | Intelligent Techniques in Instrumentation | C | 3 | 100 |
| 2 | 21-473-0102 | Advanced Sensor Technology | C | 3 | 100 |
| 3 | 21-473-0103 | Adaptive and Robust Control | C | 4 | 100 |
| 4 | 21-473-0104 | Sensor Technology Lab | C | 3 | 100 |
| 5 | 21-473-0105 | Control System and Computing Lab | C | 3 | 100 |
| 6 | | Elective 1 | E | 1 | 50 |
| 7 | | Elective 2 | E | 1 | 50 |
| **Total** | | | | **18** | **600** |

**List of Electives**

21-473-0106 Advanced Digital Signal Processing

21-473-0107 Process Dynamics and Control

21-473-0108 Advanced Analytical Instruments

21-473-0109 Optimization Techniques

21-473-0110 Robotics and Automation

21-473-0111Non Linear Control Systems

21-473-0112 Advanced Biomedical Engineering

**SEMESTER II**

| Sl. No. | Course Code | Name of the Course | Core/ Elective | Credits | Marks |
|---|---|---|---|---|---|
| 1 | 21-473-0201 | Multi Sensor Data Fusion | C | 3 | 100 |
| 2 | 21-473-0202 | Wireless Sensor Networks | C | 3 | 100 |
| 3 | 21-473-0203 | Seminar | C | 1 | 50 |
| 4 | 21-473-0204 | Soft Computing Lab | E | 3 | 100 |
| 5 | 21-473-0205 | Advanced Process Control Lab | E | 3 | 100 |
| 6 | | Elective 3 | E | 3 | 100 |
| 7 | | Elective 4 | C | 1 | 50 |
| 8 | | Elective 5 | C | 1 | 50 |
| **Total** | | | | **18** | **650** |

**List of Electives**

21-473-0206 Digital Image Processing

21-473-0207 Mechatronics

21-473-0208 MEMS and Microsystems

21-473-0209 Optoelectronics and Instrumentation

21-473-0210 Non Destructive Testing and Analysis

21-473-0211 Navigation Guidance and Control

21-473-0212Embedded System Design

21-473-0213 Remote Sensing and Geographical Information Systems

21-473-0214 Internet of Things

**SEMESTER III**

| Sl. No. | Course Code | Name of the Course | Core/ Elective | Credits | Marks |
|---|---|---|---|---|---|
| 1 | 21-473-0301 | Open Elective 1* | E | 3 | 100 |
| 2 | 21-473-0302 | Project Progress Evaluation | C | 15 | 400 |

**SEMESTER IV**

| Sl. No. | Course Code | Name of the Course | Core/ Elective | Credits | Marks |
|---|---|---|---|---|---|
| 1 | 21-473-0401 | Open Elective 2* | E | 3 | 100 |
| 2 | 21-473-0402 | Project Dissertation Evaluation | C | 18 | 500 |

**Total credits for the course = 18+18+18+18 = 72**

**DETAILS OF FACULTY**

| Sl. No. | Name & Designation | Specialization | Communication |
|---|---|---|---|
| 1. | Dr. Johney Isaac,<br>Associate Professor and Head | Control Systems | johney@cusat.ac.in<br>8281535741 |
| 2. | Dr. Reju V.G<br>Associate Professor | Digital Signal Processing | reju@cusat.ac.in<br>7558065958 |
| 3. | Sri. Ratheesh P.M,<br>Assistant Professor | Signal/Image Processing | ratheeshpm@cusat.ac.in<br>9447634188 |
| 4. | Dr. Pankaj Sagar<br>Assistant Professor | Cryogenic Instrumentation | pankajs@cusat.ac.in<br>9611366896 |
| 5. | Sri. Sanoj K.P<br>Assistant Professor<br>(on contract) | Industrial and Process Instrumentation | sanjo@cusat.ac.in<br>8547854816 |
| 6. | Smt. NamithaVenugopal<br>Assistant Professor<br>(on contract) | Instrumentation and control | vg.namitha@cusat.ac.in<br>9539749496 |
| 7. | Smt. Darsana V<br>Assistant Professor<br>(on contract) | Electronics and Communication Systems | darsanavijay@cusat.ac.in<br>9400528681 |
| 8. | Smt. Soni P<br>Assistant Professor<br>(on contract) | Applied Electronics and Embedded Systems | sonip@cusat.ac.in<br>9446869524 |
| 9. | Dr. Nimmy John<br>Assistant Professor<br>(on contract) | Electronics and Instrumentation | nimmyjohnt@cusat.ac.in<br>9495565981 |
| 10. | Smt. Anju V Sathyan<br>Assistant Professor<br>(on contract) | Signal Processing | anjuvsathyan@cusat.ac.in<br>8281171094 |

# DEPARTMENT OF POLYMER SCIENCE AND RUBBER TECHNOLOGY

## B.TECH. POLYMER SCIENCE AND ENGINEERING

**SEMESTER I**

| Course Code | Subject | Hrs/Week | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Credits | Internal | External | Total |
| 20-214-0101 | Engineering Mathematics I | 2 | 1 | 0 | 3 | 50 | 50 | 100 |
| 20-214-0102 | Engineering Physics | 2 | 1 | 0 | 3 | 50 | 50 | 100 |
| 20-214-0103 | Engineering Chemistry | 2 | 1 | 0 | 3 | 50 | 50 | 100 |
| 20-214-0104 | Engineering Graphics | 1 | 2 | 0 | 3 | 50 | 50 | 100 |
| 20-214-0105 | Basic Electrical Engineering and Electronics | 2 | 1 | 0 | 3 | 50 | 50 | 100 |
| 20-214-0106 | Soft Skill Development | 2 | 0 | 0 | 2 | 50 | 50 | 100 |
| 20-214-0111 | Introduction to Industrial Chemical Analysis | 0 | 0 | 2 | 1 | 50 | 0 | 50 |
| 20-214-0112 | Basic Electrical Engineering and Electronics | 0 | 0 | 2 | 1 | 50 | 0 | 50 |
| 20-214-0113 | Language Lab | 0 | 0 | 2 | 1 | 50 | 0 | 50 |
| 20-214-0121 | Semiar (Non-Credit) | 0 | 0 | 3 | - | | | |
| 20-214-0122 | Library (Non-Credit) | 0 | 0 | 4 | - | | | |

Elective I - Nil

**SEMESTER II**

| Course Code | Subject | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-214-0201 | Engineering Mathematics II | 2 | 1 | 0 | 3 | 50 | 50 | 100 |
| 20-214-0202 | Engineering Mechanics | 2 | 1 | 0 | 3 | 50 | 50 | 100 |
| 20-214-0203 | Environmental Studies | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| 20-214-0204 | Mechanical Engineering | 2 | 1 | 0 | 3 | 50 | 50 | 100 |
| 20-214-205 | Introduction to Macromolecular Science and Engineering | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| 20-214-206 | Fluid Mechanics | 2 | 1 | 0 | 3 | 50 | 50 | 100 |
| 20-214-0211 | Mechanical Engineering Workshop | 0 | 0 | 3 | 1 | 50 | 0 | 50 |
| 20-214-0212 | Polymer Synthesis | 0 | 0 | 2 | 1 | 50 | 0 | 50 |
| 20-214-0221 | Seminar (Non-Credit) | 0 | 0 | 3 | - | | | |
| 20-214-0222 | Library(Non-Credit) | 0 | 0 | 4 | - | | | |

Elective II - Nil

**SEMESTER III**

| Course Code | Subject | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-214-0301 | Engineering Mathematics III | 2 | 1 | 0 | 3 | 50 | 50 | 100 |
| 20-214-0302 | Natural Rubber Production and Technology | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| 20-214-0303 | Strength of Materials | 2 | 1 | 0 | 3 | 50 | 50 | 100 |
| 20-214-0304 | Heat and Mass Transfer | 2 | 1 | 0 | 3 | 50 | 50 | 100 |
| 20-214-0305 | Organic Chemistry | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| 20-214-0311 | Computer Programming | 2 | 0 | 3 | 3 | 100 | | 100 |
| 20-214-0312 | Identificaton of Polymers | 0 | 0 | 2 | 1 | 50 | 0 | 50 |
| 20-214-0313 | Chemical Engineering Lab | 0 | 0 | 2 | 1 | 50 | 0 | 50 |
| 20-214-0321 | Seminar(Non-Credit) | 0 | 0 | 3 | | | | |
| 20-214-0322 | Library(Non-Credit) | 0 | 0 | 3 | | | | |

Elective III - Nil

**SEMESTER IV**

| Course Code | Subject | Hrs/Week | Credits | Marks | | | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-214-0401 | Applied Statistics | 2 | 1 | 0 | 3 | | | |
| 20-214-0402 | Quality Management Systems and Safety | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| 20-214-0403 | Polymer Synthesis and Manufacture | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| 20-214-0404 | Science and Engineering of Rubbers | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| 20-214-0405 | Plastic Materials | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| 20-214-0406 | Review Seminar | 0 | 4 | 0 | 1 | 100 | 0 | 100 |
| 20-214-0411 | Polymer Synthesis, Modification and characterization | 0 | 0 | 4 | 2 | 50 | 0 | 50 |
| 20-214-0421 | Seminar | 0 | 0 | 3 | 1 | 30 | | 30 |
| 20-214-0422 | Library (Non-Credit) | 0 | 0 | 4 | - | | | |

Elective IV - Nil

**SEMESTER V**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-214-0501 | Plastics Processing | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| 20-214-0502 | Polymer Physics | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| 20-214-0503 | Rubber Processing and Products Manufacture | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| 20-214-0504 | Fiber Science and Technology | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| 20-214-0521-23 | Elective I | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| 20-214-0524-26 | Elective ii | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| 20-214-0511 | Polymer Characterization and Properties | 0 | 0 | 2 | 1 | 50 | 50 | 50 |
| 20-214-0512 | Polymer Processing Lab | 0 | 0 | 3 | 1 | 50 | 50 | 50 |
| 20-214-0521 | Seminar | 0 | 0 | 3 | 1 | 30 | 0 | 30 |
| 20-214-0522 | Library(Non-Credit) | 0 | 0 | 4 | - | | | |

**SEMESTER VI**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-214-0601 | Latex Technology | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| 20-214-0602 | Characterisation and Testing Methods | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| 20-214-0603 | Polymer Products Design | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| 20-214-0604 | Polymer Rheology | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| 20-214-0621-23 | Elective iii | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| 20-214-0624-26 | Elective iv | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| 20-214-0605 | Minor Project | 0 | 0 | 3 | 1 | 100 | 0 | 100 |
| 20-214-0611 | Latex Technology Practical | 0 | 0 | 2 | 1 | 100 | 0 | 100 |
| 20-214-0621 | Seminar | 0 | 0 | 3 | 1 | 30 | | 30 |
| 20-214-0622 | Library(Non-Credit) | 0 | 0 | 4 | - | | | |

**SEMESTER VII**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-214-0701 | Polymer Composites and Blends | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| 20-214-0702 | Introduction to Mould and Design | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| 20-214-0703 | Failure Analysis of Polymers | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| 20-214-0704 | Industrial Management | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| 20-214-0721-23 | Elective V | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| 20-214-0724-26 | Elective Vi | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| 20-214-0711 | Polymer Products Testing | 0 | 0 | 2 | 1 | 50 | 0 | 50 |
| 20-214-0712 | Review paper based on Elective | 0 | 0 | 4 | 1 | 60 | 0 | 60 |
| 20-214-0721 | Soft Skill/start up workshop (Non-Credit) | | | 3 | | | | |
| 20-214-0722 | Library (Non-Credit) | | | 3 | | | | |

**SEMESTER VIII**

| Course Code | Course | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | Internal | External | Total |
| 20-214-0801 | Project Work Report and Viva Voce | 0 | 0 | 22 | 12 | 200 | 200 | 400 |
| 20-214-0802 | Industrial Training | 0 | 0 | 4 | 3 | 50 | 50 | 100 |
| 20-214-0821 | Open Elective I | 2 | 0 | 0 | 2 | | 50 | 50 |
| 20-214-0822 | Open Elective ii | 2 | 0 | 0 | 2 | | 50 | 50 |

**Electives**

| | |
|---|---|
| Elective I | 20-214-0521 Adhesives Technology |
| | 20-214-0522 Surface Coatings |
| | 20-214-0523 Disaster Management |
| Elective ii | 20-214-0524 Biodegradable Polymers |
| | 20-214-0525 Polymers and Environment |
| | 20-214-0526 Polymers for Packaging |
| Elective iii | 20-214-0621 Polymers for Electrical & Electronics Applications |
| | 20-214-0622 Footwear Technology |
| | 20-214-0623 Polymer Recycling |
| Elective IV | 20-214-0624 Specialty Polymers |
| | 20-214-0625 Materials Science |
| | 20-214-0626 Introduction to Biomaterials and Medical Devices |
| Elective V | 20-214-0721 Tyre Technology |
| | 20-214-0722 Polymer process modelling and simulation |
| | 20-214-0723 Smart and intelligent polymers |
| Elective VI | 20-214-0724 Polymers in space |
| | 20-214 – 0725 Polymer Nan composites |
| | 20-214-0726- Professional Ethics in Engineering |

# M. TECH POLYMER TECHNOLOGY

**SEMESTER I**

| Course Code | Course | Scheme of study per week | | | Credit |
|---|---|---|---|---|---|
| | | L | T | P | 3 |
| 20-440-0101 | Advanced Polymer Science | 3 | 0 | 0 | 3 |
| 20-440-0102 | Polymer Materials | 3 | 0 | 0 | 3 |
| 20-440-012 | Prog.Elective I | 3 | 0 | 0 | 3 |
| 20-440-012 | Prog.Elecvtive ii | 3 | 0 | 0 | 3 |
| 20-440-0103 | Research Methodology and IPR | 2 | 0 | 0 | 2 |
| 20-440-013 | Audit Course | 2 | 0 | 0 | 0 |
| 20-440-011 | Lab 1 (Prog.Core based) | 0 | 0 | 4 | 2 |
| 20-440-011* | Lab 2 (Elective based) | 0 | 0 | 4 | 2 |

**SEMESTER II**

| Course Code | Course | Scheme of study per week | | | Credit |
|---|---|---|---|---|---|
| | | L | T | P | 3 |
| 20-440-0201 | Plastic Processing | 3 | 0 | 0 | 3 |
| 20-440-0202 | Rubber Processing and Product Manufacturing | 3 | 0 | 0 | 3 |
| 20-440-022 | Prog.Elective iii | 3 | 0 | 0 | 3 |
| 20-440-022 | Prog.Elective IV | 3 | 0 | 0 | 3 |
| 20-440-0231 | Audit Course | 2 | 0 | 0 | 0 |
| 20-440-021 | Lab 3 | 0 | 0 | 4 | 2 |
| 20-440-021 | Lab 4 | 0 | 0 | 4 | 2 |
| 20-440-02 | Mini Project with Seminar | 2 | | | 2 |

**SEMESTER III**

| Course Code | Course | Scheme of study per week Credit | | | Credit |
|---|---|---|---|---|---|
| | | **L** | **T** | **P** | |
| 20-440-032 | Prog.Elective V | 3 | 0 | 0 | 3 |
| 20-440-03 | Open Elective | 3 | 0 | 0 | 3 |
| 20-440-03 | Dissertation-1/Ind.Project | 0 | 0 | 20 | 10 |

**SEMESTER IV**

| Course Code | Course | Scheme of Study per week Credit | | | Credit |
|---|---|---|---|---|---|
| | | L | T | P | |
| 20-440-04 | Dissertation – Ii | 0 | 0 | 32 | 16 |

**Programme Elective I**

| | |
|---|---|
| 20-440-0121 | Chemical Engineering |
| 20-440-0122 | Polymer Products Design |
| 20-440-0123 | Characterisation and Testing Methods |

**Programme Elective II**

| | |
|---|---|
| 20-440-0124 | Polymers for Advanced Electrical and Electronics Applications |
| 20-440-0125 | Advanced Polymer Rheology |
| 20-440-0126 | Polymers for Packaging |

**Programme Elective III**

| | |
|---|---|
| 20-440-0221 | Speciality Polymers |
| 20-440-0222 | Mould and Design |
| 20-440-0223 | Polymer Nanocomposites |

**Programme Elective IV**

| | |
|---|---|
| 20-440-0224 | Management for Scientists and Engineers |
| 20-440-0225 | Tyre Technology |

**DETAILS OF FACULTY**

| Sl.No. | Name & Designation | Specialization | Communication |
|---|---|---|---|
| 1. | Dr. Sunil K. Narayanankutty<br>Professor & Head | Polymer Science/ Technology | 0484-2551922, 9995300093<br>sncusat@gmail.com |
| 2. | Dr. Honey John<br>Professor | Polymer Science/ Technology | 9446372997<br>honey@cusat.ac.in |
| 3 | Dr.Prasanth R.<br>Associate Professor | Polymer Science/ Technology | 9497205352<br>dr.prasanthr@gmail.com |
| 4. | Dr.Sailaja G.S.<br>Associate Professor | Polymer Science/ Technology | 0471-2595136, 9744799643<br>sailajags@gmail.com |
| 5 | Dr.JayalathaGopalakrishnan G<br>Assistant Professor | Polymer Science/ Technology | 9847672916<br>gjayalatha@gmail.com |

| | | | |
|---|---|---|---|
| 6 | Dr.Jinu Jacob George<br>Assistant Professor | Polymer Science/ Technology | 0481-2598155, 9497792092<br>jinujac@gmail.com |
| 7 | Dr.Abhitha K.<br>Assistant Professor | Polymer Science/ Technology | 9847654544<br>abhithak80@gmail.com/<br>abhithak80@cusat.ac.in |
| 8 | Dr.Reghunathan Nair<br>Emeritus Professor | Polymer Science/ Technology | 9496020080<br>cprnair@gmail.com |
| 9 | Dr.Sari P.S.<br>Assistant Professor<br>(On contract) | Polymer Science/ Technology | 8921970724<br>sarips1@gmail.com |
| 10 | Ms.Shanila Rahman<br>Assistant Professor<br>(On contract) | Polymer Science/ Technology | 9074977702<br>shanilarahman860@gmail.com |

# INTERNATIONAL SCHOOL OF PHOTONICS

## M.TECH. (OPTO-ELECTRONICS & LASER TECHNOLOGY)

**Semester I**

| Course Code | Subject | C/E | Credits |
|---|---|---|---|
| 20-441-0101 | Modern Optics | C | 4 |
| 20-441-0102 | Laser Technology | C | 4 |
| 20-441-0103 | Opto-electronics | C | 4 |
| 20-441-0104 | Lab Course I | C | 3 |
| ***Any one Elective*** | | | |
| 20-441-0105 | Advanced Engineering Physics | E | 3 |
| 20-441-0106 | Digital Communication | E | 3 |
| | **Total for semester I** | | **18** |

**Semester II**

| Course Code | Subject | C/E | Credits |
|---|---|---|---|
| 20-441-0201 | Fibre Optics & Applications | C | 4 |
| 20-441-0202 | Lab Course II | C | 3 |
| 20-441-0203 | Mini Project, Seminar | C | 2 |
| | | | |

| *Any three Elective* | | | |
|---|---|---|---|
| 20-441-0204 | Laser Applications | E | 3 |
| 20-441-0205 | Optical Communication Technology | E | 3 |
| 20-441-0206 | Non-Linear Optics, OSP & OC | E | 3 |
| 20-441-0207 | Biophotonics | E | 3 |
| 20-441-0208 | Laser Spectroscopy | E | 3 |
| 20-441-0209 | Science and Technology of Plasma | E | 3 |
| | **Total for semester II** | **13** | **18** |

**Semester III**

| Course Code | Subject | C/E | Credits |
|---|---|---|---|
| 20-441-0301 | Project | C | 15 |
| 20-441-03XX | Open Elective* | E | 3 |
| | **Total for semester III** | | **18** |

**Semester IV**

| Course Code | Subject | C/E | Credits |
|---|---|---|---|
| 20-441-0301 | Project | C | 18 |
| | **Total for semester IV** | | **18** |
| | **Total credit for the course** | | **72** |

**Name of Programme: M.Sc (5 year Integrated) in Photonics**

**Semester I**

| Course Code | Subject | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | CA | SEE | Total |
| 20-351-0101 | Mechanics | 3 | | 1 | 3 | 50 | 50 | 100 |
| 20-351-0102 | Electricity and Magnetism | 3 | | 1 | 3 | 50 | 50 | 100 |
| 20-351-0103 | Optics I Geometrical Optics | 3 | | 1 | 3 | 50 | 50 | 100 |
| 20-351-0104 | Mathematics I | 3 | | 1 | 3 | 50 | 50 | 100 |
| 20-351-0105 | Statistical Methods | 3 | | 1 | 3 | 50 | 50 | 100 |
| 20-351-0106 | Lab + Viva | | **6** | | 3 | 100+50 | | 150 |
| 20-351-0107 | Communicative English | 2 | | 1 | 2 | 50 | 50 | 100 |
| | **Total for semester I** | 17 | **6** | **6** | **20** | **450** | 300 | 750 |

**Semester II**

| Course Code | Subject | Hrs/Week | | | Credits | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | CA | SEE | Total |
| 20-351-0201 | Electronics -I Basic Electronics | 3 | | 1 | 3 | 50 | 50 | 100 |
| 20-351-0202 | Optics II - Physical Optics | 3 | | 1 | 3 | 50 | 50 | 100 |
| 20-351-0203 | Mathematics II | 3 | | 1 | 3 | 50 | 50 | 100 |
| 20-351-0204 | Thermodynamics and Thermal Physics | 3 | | 1 | 3 | 50 | 50 | 100 |
| 20-351-0205 | Nuclear and Particle Physics | 3 | | 1 | 3 | 50 | 50 | 100 |
| 20-351-0206 | Lab + Viva | | **6** | | 3 | 100+50 | | 150 |
| 20-351-0207 | History of Science and Technology | 2 | | 1 | 2 | 50 | 50 | 100 |
| | **Total for semester II** | 17 | **6** | **6** | **20** | **450** | 300 | 750 |

**Semester III**

| Course Code | Course Title | Hours per week | | | Credit | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | CA | SEE | Total |
| 20-351-0301 | Electronics II Analog Electronics | 3 | | 1 | 3 | 50 | 50 | 100 |
| 20-351-0302 | Classical Mechanics | 3 | | 1 | 3 | 50 | 50 | 100 |
| 20-351-0303 | Optics III- Optical Instrumentation | 3 | | 1 | 3 | 50 | 50 | 100 |
| 20-351-0304 | Mathematics III | 3 | | 1 | 3 | 50 | 50 | 100 |
| 20-351-0305 | Atomic Spectroscopy | 3 | | 1 | 3 | 50 | 50 | 100 |
| 20-351-0306 | Lab+Viva | | 6 | | 3 | 100+50 | | 150 |
| 20-351-0307 | Seminar | 1 | | 0 | 1 | 50 | | 50 |
| **Total for Semester III** | | **16** | **6** | **5** | **19** | **450** | **250** | **700** |

**SEMESTER IV**

| Course Code | Course Title | Hours per week | | | Credit | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | CA | SEE | Total |
| 20-351-0401 | Electronics III Digital circuits and Microprocessors | 3 | | 1 | 3 | 50 | 50 | 100 |
| 20-351-0402 | Statistical Mechanics | 3 | | 1 | 3 | 50 | 50 | 100 |
| 20-351-0403 | Quantum Mechanics I | 3 | | 1 | 3 | 50 | 50 | 100 |
| 20-351-0404 | Electromagnetic Theory and Relativistic Phenomena | 3 | | 1 | 3 | 50 | 50 | 100 |
| 20-351-0405 | Mathematics IV | 3 | | 1 | 3 | 50 | 50 | 100 |
| 20-351-0406 | Lab+ Viva | | 6 | | 3 | 100+50 | | 150 |
| 20-351-0407 | Workshop | | 2 | 0 | 1 | 100 | | 100 |
| 20-351-0408 | Seminar | 1 | | | 1 | 50 | | 50 |
| **Total for Semester IV** | | **16** | **8** | **5** | **20** | **550** | **250** | **800** |

**SEMESTER V**

| Course Code | Course Title | Hours per week | | | Credit | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | CA | SEE | Total |
| 20-351-0501 | Optics IV -Applied Optics | 3 | | 1 | 3 | 50 | 50 | 100 |
| 20-351-0502 | Electronics-IV Electronic Instrumentation | 3 | | 1 | 3 | 50 | 50 | 100 |
| 20-351-0503 | Quantum Mechanics II | 3 | | 1 | 3 | 50 | 50 | 100 |
| 20-351-0504 | Materials Science | 3 | | 1 | 3 | 50 | 50 | 100 |
| 20-351-0505 | Molecular Spectroscopy | 3 | | 1 | 3 | 50 | 50 | 100 |
| 20-351-0506 | Lab + Viva | | 6 | | 3 | 100+ 50 | | 150 |
| 20-351-0507 | Seminar | 1 | | | 1 | 50 | | 50 |
| **Total for Semester V** | | **16** | **6** | **5** | **19** | **450** | **250** | **700** |

**SEMESTER VI**

| Course Code | Course Title | Hours per week | | | Credit | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | CA | SEE | Total |
| 20-351-0601 | Photonics-I Optoelectronics | 3 | | 1 | 3 | 50 | 50 | 100 |
| 20-351-0602 | Photonics-II Fiber Optics | 3 | | 1 | 3 | 50 | 50 | 100 |
| 20-351-0603 | Photonics-III Laser Physics | 3 | | 1 | 3 | 50 | 50 | 100 |
| 20-351-0604 | Mathematical Modeling and Computational Techniques | 3 | | 1 | 3 | 50 | 50 | 100 |
| 20-351-0605 | Project & Project Viva | | 9 | | 3 | 100+50 | | 150 |
| 20-351-0606 | Computer Lab + Viva | | 6 | | 3 | 100+50 | | 150 |
| **Total for Semester VI** | | **12** | **15** | **4** | **18** | **500** | **200** | **700** |
| **Total for Semester I-VI** | | | | | **116** | | | **4400** |

**Project guidance of 9 hours shall be considered as equivalent to 3 lab hours per project for workload calculation**

**SEMESTER VII**

(Course Code of electives **20-351-0X2X** correspond to course code of electives chosen from the list of electives in each semester. For example, if Advanced Quantum Mechanics and Nanophotonics are offered as the Elective I and Elective II respectively in the VII semester then 20-351-0X2X will be 20-351-0721 and 20-351-0723, respectively)

| Course Code | Course Title | Hours per week | | | Credit | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | CA | SEE | Total |
| 20-351-0701 | Advanced Solid State Theory | 4 | | 1 | 4 | 50 | 50 | 100 |
| 20-351-0702 | Laser Systems | 4 | | 1 | 4 | 50 | 50 | 100 |
| 20-351-072X | Elective I | 3 | | 1 | 3 | 50 | 50 | 100 |
| 20-351-072X | Elective II | 3 | | 1 | 3 | 50 | 50 | 100 |
| 20-351-0703 | Lab I Photonics Lab I | | 4 | | 2 | 100 | | 100 |
| 20-351-0704 | Lab II ElectronicsLab I | | 4 | | 2 | 100 | | 100 |
| 20-351-0705 | Seminar+ Viva | 1 | | | 1 | 50+50 | | 100 |
| **Total for Semester VII** | | **15** | **8** | **4** | **19** | **500** | **200** | **700** |

**SEMESTER VIII**

| Course Code | Course Title | Hours per week | | | Credit | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | CA | SEE | Total |
| 20-351-0801 | Nonlinear Optics | 4 | | 1 | 4 | 50 | 50 | 100 |
| 20-351-0802 | Digital Signal Processing and Optical Signal Processing | 4 | | 1 | 4 | 50 | 50 | 100 |
| 20-351-082X | Elective III | 3 | | 1 | 3 | 50 | 50 | 100 |
| 20-351-082X | Elective IV | 3 | | 1 | 3 | 50 | 50 | 100 |
| 20-351-0803 | Lab I Photonics Lab II | | 4 | | 2 | 100 | | 100 |
| 20-351-0804 | Lab II Electronics Lab II | | 4 | | 2 | 100 | | 100 |
| 20-351-0805 | Seminar+ Viva | 1 | | | 1 | 50+50 | | 100 |
| **Total for Semester VIII** | | **15** | **8** | **4** | **19** | **500** | **200** | **700** |

**SEMESTER IX**

| Course Code | Course Title | Hours per week | | | Credit | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | CA | SEE | Total |
| 20-351-0901 | Optical Communication | 4 | | 1 | 4 | 50 | 50 | 100 |
| 20-351-0902 | Lab I Photonics Lab III | | 4 | | 2 | 100 | | 100 |
| 20-351-0903 | Lab II Computational Photonics Lab | | 4 | | 2 | 100 | | 100 |
| 20-351-0904 | Seminar + Viva | 1 | | | 1 | 50+50 | | 100 |
| 20-351-092X | Elective V | 3 | | 1 | 3 | 50 | 50 | 100 |
| 20-351-092X | Elective VI | 3 | | 1 | 3 | 50 | 50 | 100 |
| 20-351-092X | Elective VII | 3 | | 1 | 3 | 50 | 50 | 100 |
| **Total for Semester IX** | | **14** | **8** | **4** | **18** | **500** | **200** | **700** |

**LIST OF ELECTIVES**

| Semester | Course Code | Course Title |
|---|---|---|
| VII | 20-351-0721 | Advanced Quantum Mechanics |
| | 20-351-0722 | Advanced Electromagnetic Theory and Computational Methods |
| | 20-351-0723 | Nanophotonics |
| | 20-351-0724 | Optical Sensor Technology |
| VIII | 20-351-0821 | Quantum Optics |
| | 20-351-0822 | Biophotonics |
| | 20-351-0823 | Optomechanical Engineering |
| IX | 20-351-0921 | Industrial Photonics |
| | 20-351-0922 | Photonic Bandgap Structures and Metamaterials |
| | 20-351-0923 | Holography and Speckle Metrology |
| | 20-351-0924 | Laser Spectroscopy |
| | 20-351-0925 | Computational Material Science |

**SEMESTER X**

| Course Code | Course Title | Hours per week | | | Credit | Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | Theory | Lab | Tutorial | | CA | SEE | Total |
| 20-351-1001 | Project &ProjectViva | | | | 16 | 200+ 100 | 200+ 100 | 600 |
| **Total for Semester X** | | | | | **16** | **300** | **300** | **600** |
| **Total credit for sem VII-X** | | | | | **72** | | | |

*** Project guidance of tenth semester shall be considered as equivalent to 6 lab hours (per project) for workload calculation .**

**Details of Faculty**

| Sl. No. | Name and Designation | Specialization | Communication Residence |
|---|---|---|---|
| 1 | Dr.PramodGopinath<br>Professor & Director | Laser Plasma Spectroscopy, Non linear Optics, Nanophotonics, Magnetoplasmonics | 9446069743<br>pramod@cusat.ac.in |
| 2 | Dr. A. Mujeeb<br>Senior Professor | Opto electronics, Nanophotonics,Optical NDT | 0471-2455786, 9447419505<br>mujeeb@cusat.ac.in,<br>mujeebcoover@gmail.com |
| 3 | Dr. M. Kailasnath<br>Professor | Optical fibre devices, Nano Photonics | 0484-2711525, 9447213863<br>kailas@cusat.ac.in |
| 4 | Dr.Sheenu Thomas<br>Professor | Experimental Solidstate Physics | 0484-2577505, 9349405537<br>st@cusat.ac.in |
| 5 | Dr.Saji K.J<br>Assistant Professor | Condensed matter Physics, Optoelectronics, Nanophotonics | 9400217723<br>saji@cusat.ac.in |
| 6. | Dr. Manu Vaishakh<br>Assistant Professor | Microscopy, Biophotonics | 9496061610<br>manu.vaisakh@cusat.ac.in |
| 7 | Muhammad Rishad K P<br>Assistant Professor | Ultrafast Photonics, Metamaterials | 9400876955<br>kpmrishad@cusat.ac.in |
| 8 | Dr.Priya Rose T<br>Assistant Professor | Nonlinear Optics, Ultrafast Lasers, Laser Plasma, Photonic bandgap materials | 8281982228<br>priyarose@cusat.ac.in |
| 9 | Dr. Praveen C S<br>Assistant Professor | Applied electronics, Computational material science | 0484-2404641, 7510511129<br>mnr.praveen@cusat.ac.in |
| 10 | Dr. Mohammed Ameen P<br>Assistant Professor | Plasmonics, Computational Photonics | 9123526041<br>ameenpoyli@cusat.ac.in |

# DEEN DAYAL UPADHYAY KAUSHAL KENDRA

## M.VOC IN MOBILE PHONE APPLICATION DEVELOPMENT

**SEMESTER I**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| KAD 2101 | Communication Skills Development (G-T) | C | 3 |
| KAD 2102 | Fundamentals of Management (G-T) | C | 3 |
| KAD 2103 | Object Oriented Programming with Java and SQL (G-P) | C | 4 |
| KAD 2104 | Introduction to Mobile Application Development and Web Technologies (D-T) | C | 3 |
| KAD 2105 | Software Engineering and Testing (D-T) | C | 3 |
| KAD 2106 | User Interface Design and User Experience (D-P) | C | 3 |
| KAD 2107 | Android App Development I (D-P) | C | 3 |
| KAD 2108 | Software Lab I (Android I, Java &SQL) (LAB) | C | 2 |
| **Total** | | | **24** |

**SEMESTER II**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| KAD 2201 | Professional Skills Development (Training Programme) (G-T) | C | 3 |
| KAD 2202 | Project Management (G-T) | C | 3 |
| KAD 2203 | Database and Backend Technologies. (G-P) | C | 3 |
| KAD 2204 | Android App Development II (D-P) | C | 3 |
| KAD 2205 | Cloud and Advanced Technologies (D-P) | C | 4 |
| KAD 2206 | Elective – I (G-T/D-T)* | E | 3 |
| KAD 2207 | Elective – II (D-T) | E | 3 |
| KAD 2208 | Software Lab II (Android II and Database) (LAB) | C | 2 |
| KAD 2209 | Internship – Android App Development (40 working days) | C | 12 |
| **Total** | | | **36** |

**SEMESTER III**

| Course Code | Name of the Course | C/E | Credits |
|---|---|---|---|

| | | | |
|---|---|---|---|
| KAD 2301 | Entrepreneurship and New Venture Planning (G-T) | C | 3 |
| KAD 2302 | Software Product Design and Agile Process Management. (G-T) | C | 3 |
| KAD 2303 | Programming with Swift (D-P) | C | 3 |
| KAD 2304 | IOS App Development – I (D-P) | C | 3 |
| KAD 2305 | IOS App Development – II (D-P) | C | 3 |
| KAD 2306 | Elective – III (G-T/D-T)* | E | 3 |
| KAD 2307 | Elective – IV(D-T) | E | 3 |
| KAD 2308 | Software Lab III (IOS and Swift) (LAB) | C | 3 |
| | **Total** | | **24** |

**SEMESTER IV**

| Course No. | Name of the Course | C/E | Credits |
|---|---|---|---|
| KAD 2401 | Main Project (90 working days during Semester IV in an IT firm where students contribute to a live IOS/Android/Cross-platform app development) and Viva voce<br>(Continuous Assessment – 100Marks, Final report – 100 marks, Viva-Voce – 100 marks) | C | 24 |
| **Total** | | | **24** |

**LIST OF ELECTIVES**

E-1. Wearable Technologies in Android

E-2. Cross Platform App Development Using React Native

E-3. IOS App Development - Advanced Technologies

E-4. Watch OS Programming

E-5. Home kit and Health kit programming

E-6. Retail App Development Frameworks

E-7. Programming with Objective-C

E-8. Programming with Python

E-9. Data Analytics

E-10. Kotlin Programming

E-11. Internet of Things (IoT)

E-12. Low Code Platform

## Details of Faculty

| Sl. No. | Name & Designation | Specialization | Communication Mobile /email |
|---|---|---|---|
| 1 | Prof.(Dr)..K.A.Zakkariya<br>Director | Organization Behaviour, Human Resource Management, Marketing | 9846554444<br>zakkariya@gmail.com |
| 2 | Dr.Renjini.D.,<br>Associate Professor | Marketing, Business Model Analysis, Marketing Research | 9895888599<br>renjinidas@yahoo.com |
| 3 | VinuVarghees.V.V,<br>Assistant Professor | Android App Development, Data Mining , Network Security | 9446655362<br>vinghese@gmail.com |
| 4 | Dr. NimithaAboobaker<br>Assistant Professor | General Management, Human Resource Management | 9497732021<br>nimis540@gmail.com |
| 5 | Dr. Elizabeth George<br>Assistant Professor | Human Resource Management, Organization Behaviour | 9846043420<br>elizabethgeorge04@gmail.com |
| 6 | AthulMithran<br>Assistant Professor | Mobile & Web Development | 9946132746<br>athul@cusat.ac.in |
| 7 | Suji Jose<br>Assistant Professor | Cyber forensic & Information Security | 9745463039<br>sujijose007@gmail.com |
| 8 | Dr. Rajeswari.R<br>Assistant Professor | Human Resource Management, Marketing | 9846919863<br>sterlingrajeswari@gmail.com |
| 09 | Vinney Zephaniah Vincent<br>Assistant Professor | General Management, Entrepreneurship, Operation Management | 8075301118<br>vinneyzephaniah@gmail.com |
| 10 | Shajin.P<br>Assistant Professor | Human Resource Management, Operation Management | 9995567922<br>shasyed62@gmail.com |

# DEPARTMENT OF SHIP TECHNOLOGY

## M.TECH COMPUTER AIDED STRUCTURAL ANALYSIS & DESIGN

**Semester I**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| 20-457-0101 | Advanced Engineering Mathematics | C | 4 |
| 20-457-0102 | Computer Aided Design in Offshore Engineering | C | 4 |
| 20-457-0103 | Advanced Structural Analysis | C | 4 |
| | Elective I | E | 4 |
| | Elective II | E | 4 |
| | Total | | 20 |

**Electives**

| |
|---|
| 20-457-0104 Marine Hydrodynamics |
| 20-457-0105 Fracture Mechanics |
| 20-457-0106 Application of Stochastic Process Theory in Ocean Engineering |
| 20-457-0107 Stability of Structures |
| 20-457-0108 Marine Corrosion and Prevention |
| 20-457-0109 Marine Pollution and its effect |
| 20-457-0110 Pollution Control Technique |
| 20-457-0111 Advanced Joining Techniques |

**Semester II**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| 20-457-0201 | Dynamics of Structures | C | 4 |
| 20-457-0202 | Finite Element Methods Applied to Offshore Engineering | C | 4 |
| | Elective III | E | 4 |
| | Elective IV | E | 4 |
| | Elective V | E | 4 |

**Electives**

| |
|---|
| 20-457-0203 Ocean Waves and Effects |
| 20-457-0204 Analysis of Special Structures |
| 20-457-0205 Design of Offshore Structures |
| 20-457-0206 Fatigue Problems in Ships and Marine Structures |
| 20-457-0207 Computer Application in Ship Manoeuvring |

**Semester III**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| 20-457-0301 | Project Progress Evaluation | C | 18 |

**Semester IV**

| Course Code | Course | C/E | Credits |
|---|---|---|---|
| 20-457-0401 | Project Dissertation Evaluation and Viva Voce | C | 18 |

# B.TECH(NAVAL ARCHITECTURE &SHIP BUILDING)

**SEMESTER I**

| Code | Subject | Hrs/Week | | | | Credit | Marks | | |
|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Total | | Internal Exam | University Exam | Total |
| 20-215-0101 | Technical Communication | 2 | 1 | - | 3 | 2 | 100 | 100 | 200 |
| 20-215-0102 | Mathematics I | 3 | 1 | - | 4 | 3 | 100 | 100 | 200 |
| 20-215-0103 | Applied Physics | 3 | 1 | - | 4 | 3 | 100 | 100 | 200 |
| 20-215-0104 | Applied Chemistry | 3 | 1 | - | 4 | 3 | 100 | 100 | 200 |
| 20-215-0105 | Engineering Mechanics I | 4 | 1 | - | 5 | 4 | 100 | 100 | 200 |
| 20-215-0106 | Engineering Graphics | 4 | 1 | - | 5 | 4 | 100 | 100 | 200 |
| 20-215-0107 | Workshop Practice I | 2 | - | 3 | 5 | 1 | 50 | - | 50 |
| **Total** | | **21** | **6** | **3** | **30** | **20** | **650** | **600** | **1250** |

**SEMESTER II**

| Code | Subject | Hrs/Week | | | | Credit | Marks | | |
|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Total | | Internal Exam | University Exam | Total |
| 20-215-0201 | Mathematics II | 3 | 1 | - | 4 | 3 | 100 | 100 | 200 |
| 20-215-0202 | Computer Programming | 3 | - | 1 | 4 | 3 | 100 | 100 | 200 |
| 20-215-0203 | Professional Ethics | 2 | 1 | - | 3 | 2 | 100 | 100 | 200 |
| 20-215-0204 | Electrical Engineering | 3 | 1 | - | 4 | 3 | 100 | 100 | 200 |
| 20-215-0205 | Machine Drawing | 4 | 1 | | 5 | 4 | 100 | 100 | 200 |
| 20-215-0206 | Introduction to Naval Architecture | 3 | 1 | - | 4 | 3 | 100 | 100 | 200 |
| 20-215-0207 | Workshop Practice II | 1 | - | 2 | 3 | 1 | 50 | - | 50 |
| 20-215-0208 | Electrical Engineering Lab | 1 | - | 2 | 3 | 1 | 50 | - | 50 |
| **Total** | | **20** | **5** | **5** | **30** | **20** | **700** | **600** | **1300** |

**SEMESTER III**

| Code | Subject | Hrs/Week | | | | Credit | Marks | | |
|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Total | | Internal Exam | University Exam | Total |
| 20-215-0301 | Mathematics III | 3 | 1 | - | 4 | 3 | 100 | 100 | 200 |
| 20-215-0302 | Fluid Mechanics I | 3 | 1 | - | 4 | 3 | 100 | 100 | 200 |
| 20-215-0303 | Mechanics of Solids | 3 | 1 | - | 4 | 3 | 100 | 100 | 200 |
| 20-215-0304 | Instrumentation | 3 | 1 | | 4 | 3 | 100 | 100 | 200 |
| 20-215-0305 | Applied Thermodynamics | 3 | 1 | - | 4 | 3 | 100 | 100 | 200 |
| 20-215-0306 | Basic Ship Theory | 3 | 1 | - | 4 | 3 | 100 | 100 | 200 |
| 20-215-0307 | Fluid Mechanics Lab | 2 | - | 4 | 6 | 1 | 50 | - | 50 |
| 20-215-0308 | Internship | - | - | - | - | 1 | 50 | - | 50 |
| | **Total** | **20** | **6** | **4** | **30** | **20** | **700** | **600** | **1300** |

**SEMESTER IV**

| Code | Subject | Hrs/Week | | | | Credit | Marks | | |
|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Total | | Internal Exam | University Exam | Total |
| 20-215-0401 | Mathematics IV | 3 | 1 | - | 4 | 3 | 100 | 100 | 200 |
| 20-215-0402 | Fluid Mechanics II | 3 | 1 | - | 4 | 3 | 100 | 100 | 200 |
| 20-215-0403 | Design of Machine Elements | 2 | 2 | - | 4 | 3 | 100 | 100 | 200 |
| 20-215-0404 | Analysis of Structures | 3 | 1 | - | 4 | 3 | 100 | 100 | 200 |
| 20-215-0405 | Material Science | 3 | 1 | - | 4 | 3 | 100 | 100 | 200 |
| 20-215-0406 | Stability of Ships | 3 | 1 | - | 4 | 3 | 100 | 100 | 200 |
| 20-215-0407 | Language Lab | - | - | 2 | 2 | 1 | 50 | - | 50 |
| 20-215-0408 | Material Testing Lab | - | - | 4 | 4 | 1 | 50 | - | 50 |
| **Total** | | **17** | **7** | **6** | **30** | **20** | **700** | **600** | **1300** |

**SEMESTER V**

| Code | Subject | Hrs/Week | | | | Credit | Marks | | |
|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Total | | Internal Exam | University Exam | Total |
| 20-215-0501 | Resistance of Ships | 3 | 1 | - | 4 | 3 | 100 | 100 | 200 |
| 20-215-0502 | Propulsion of Ships | 3 | 1 | - | 4 | 3 | 100 | 100 | 200 |
| 20-215-0503 | Controllability of Ships | 3 | 1 | - | 4 | 3 | 100 | 100 | 200 |
| 20-215-0504 | Ship Motions in Seaway | 3 | 1 | - | 4 | 3 | 100 | 100 | 200 |
| 20-215-0505 | Electrical Systems on Ships & Shipyards | 3 | 1 | - | 4 | 3 | 100 | 100 | 200 |
| 20-215-0506 | Joining Techniques in Ship building Technology | 3 | 1 | - | 4 | 3 | 100 | 100 | 200 |
| 20-215-0507 | Model Making Techniques Lab | 2 | - | 4 | 6 | 1 | 50 | - | 50 |
| 20-215-0508 | Internship | - | - | - | - | 1 | 50 | - | 50 |
| **Total** | | **20** | **6** | **4** | **30** | **20** | **700** | **600** | **1300** |

**SEMESTER VI**

| Code | Subject | Hrs/Week | | | | Credit | Marks | | |
|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Total | | Internal Exam | University Exam | Total |
| 20-215-0601 | Computer Aided Design & Drafting | 3 | 1 | - | 4 | 3 | 100 | 100 | 200 |
| 20-215-0602 | Ship Structural Analysis – I | 3 | 1 | - | 4 | 3 | 100 | 100 | 200 |
| 20-215-0603 | Structural Design of Ships | 3 | 1 | - | 4 | 3 | 100 | 100 | 200 |
| 20-215-0604 | Ship Design | 3 | 1 | - | 4 | 3 | 100 | 100 | 200 |
| 20-215-0605 | Ship Production Technology | 3 | 1 | - | 4 | 3 | 100 | 100 | 200 |
| 20-215-0606 | Marine Engineering | 3 | 1 | - | 4 | 3 | 100 | 100 | 200 |
| 20-215-0607 | Marine Hydrodynamics Lab | 1 | - | 2 | 3 | 1 | 50 | - | 50 |
| 20-215-0608 | Marine Engineering Lab | 1 | - | 2 | 3 | 1 | 50 | - | 50 |
| **Total** | | **20** | **6** | **4** | **30** | **20** | **700** | **600** | **1300** |

**SEMESTER VII**

| Code | Subject | Hrs/Week | | | | Credit | Marks | | |
|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Total | | Internal Exam | University Exam | Total |
| 20-215-0701 | Ship Production Management | 4 | - | - | 4 | 3 | 100 | 100 | 200 |
| 20-215-0702 | Ship Structural Analysis–II | 3 | 1 | - | 4 | 3 | 100 | 100 | 200 |
| 20-215-0703 | Practical Ship Design | 3 | 1 | 2 | 6 | 3 | 200 | | 200 |
| 20-215-E7n | Elective I | 3 | 1 | - | 4 | 3 | 100 | 100 | 200 |
| 20-215-E7n | Elective II | 3 | 1 | - | 4 | 3 | 100 | 100 | 200 |
| 20-215-0704 | Project Work | 2 | 2 | 4 | 8 | 4 | 100 | | 100 |
| 20-215-0705 | Internship | - | - | - | - | 1 | 50 | - | 50 |
| **Total** | | **18** | **6** | **6** | **30** | **20** | **750** | **400** | **1150** |

**SEMESTER VIII**

| Code | Subject | Hrs/Week | | | | Credit | Marks | | |
|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Total | | Internal Exam | University Exam | Total |
| 20-215-0801 | Special Problem &Seminar | - | 2 | - | 2 | 2 | 100 | - | 100 |
| 20-215-E8n | Elective III | 3 | 1 | - | 4 | 3 | 100 | 100 | 200 |
| 20-215-E8n | Elective IV | 3 | 1 | - | 4 | 3 | 100 | 100 | 200 |
| 20-215-0802 | Project Work& Viva Voce | 12 | - | 8 | 20 | 12 | 300 | 200 | 500 |
| **Total** | | **18** | **2** | **10** | **30** | **20** | **800** | **400** | **1200** |

## Details of Faculty

| Sl.No | Name & Designation | Specialisation | Communication |
|---|---|---|---|
| 1 | Dr. A Mathiazhagan<br>Professor & Head | Material Science and Corrosion Engineering | alagan@cusat.ac.in<br>9400336441 |
| 2 | Dr. K Sivaprasad<br>Professor | Ship Building Technology, Ship Design & Ship Recycling | sivaprasad@cusat.ac.in<br>9349265677 |
| 3 | Dr. Mariamma Chacko<br>Professor | Electrical Engineering and Electronics | mariamma@cusat.ac.in<br>9446077226 |
| 4 | Dr. SatheeshBabu<br>Associate Professor | Ship Hydrodynamics, Naval Architecture & Corrosion Engineering | satheeshbabu@cusat.ac.in<br>9946063772 |
| 5 | Dr. Manoj T Issac<br>Assistant Professor | Hydrodynamics of underwater vehicles | m.issac@gmail.com<br>9495519287 |
| 6 | Dr. Rajesh P Nair<br>Assistant Professor | Finite Element Method and Impact Analysis | rajeshpnair@cusat.ac.in<br>9744297106 |
| 7 | Dr. Favas T K<br>Assistant Professor | Fluid Mechanics | favastk@cusat.ac.in<br>9497302979 |

| | | | |
|---|---|---|---|
| 8 | Mr. Aravind K R<br>Assistant Professor | Marine Engineering & Naval Architecture | aravind@cusat.ac.in<br>8089866415 |
| 9 | Mr. Mohammed Ashiqu<br>Assistant Professor | Naval Architecture | ashique@cusat.ac.in<br>9745225996 |
| 10 | Mr. AnoopChitrasenan<br>Assistant Professor | Naval Architecture & Ocean Engineering | Anoop.c@cusat.ac.in<br>6238558867 |
| 11 | Mr. Akram P A<br>Assistant Professor | Civil Engineering &Ocean Engineering | akrampa@cusat.ac.in<br>9447537092 |
| 12 | Dr. D.D Ebeneezer<br>Adjunct Professor | Naval Architecture, Ocean Engineering, Accoustics&<br>Transducers | d.d.ebenezer@gmail.com<br>9446577239 |
| 13 | Dr. Beena Mary John<br>Assistant Professor<br>(Contract) | Civil Engg./Applied mechanics | Beena.marie.john@gmail.com<br>9497276435 |
| 14 | Dr. C B Sudheer<br>(Adjuct Professor) | Naval Architecture & Ship Building Technology | sudheer@cusat.ac.in<br>9895074930 |

**PROFORMA – A**

**(For Student Registration)**

School / Department of ……..

**COCHIN UNIVERSITY OF SCIENCE AND TECHNOLOGY**

**Registration Form**

Name of Teacher :

Course Code :

Name of the Course :

Number of Credits :

| Sl. No. | Name of Student | Semester | C/E | Programme of study | Department | Signature of Student |
|---|---|---|---|---|---|---|
| | | | | | | |

**PROFORMA – B**

School / Department of ……..

**COCHIN UNIVERSITY OF SCIENCE AND TECHNOLOGY**

I / II / III / IV Semester M.Sc. / M.Tech. / …….....

Name of Student: .....

| Sl. No. | Course Code | C/E | Name of Course | No. of Credits | Name of the Teacher &Department | Signature of Teacher |
|---|---|---|---|---|---|---|
| | | | | | | |

Number of Credits (Core) :

Number of Credits (Elective) :

Total Credits :

Student Advisor