

# ACADEMIC BULLETIN

2022-2023



COCHIN UNIVERSITY OF SCIENCE AND TECHNOLOGY

KOCHI 682 022, KERALA, INDIA

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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 specialisations 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. Suja Haridas

Dr. S.M. Sunoj (Convenor)





# CUSAT

## ACADEMIC CALENDAR 2022-23

For Under Graduate & Post Graduate Programmes



**ACADEMIC CALENDAR 2022-23**

**JULY 2022**

Date	Day	Remarks
1	Friday	
2	Saturday	
3	Sunday	
4	Monday	
5	Tuesday	
6	Wednesday	
7	Thursday	
8	Friday	
9	Saturday	Id-ul-Ad'ha (BAKRID)
10	Sunday	
11	Monday	Re-opening of the University PG. III Semester Commencement
12	Tuesday	
13	Wednesday	
14	Thursday	
15	Friday	
16	Saturday	
17	Sunday	
18	Monday	Anti ragging awareness week-DYW B.Tech. VII Semester Commencement PG. I Semester Commencement
19	Tuesday	Anti ragging awareness week-DYW
20	Wednesday	Anti ragging awareness week-DYW
21	Thursday	Anti ragging awareness week-DYW
22	Friday	Anti ragging awareness week-DYW
23	Saturday	
24	Sunday	
25	Monday	Cultural Evening/ Induction Programme for I Year PG Students
26	Tuesday	Cultural Evening-DYW



27	Wednesday	Cultural Evening-DYW
28	Thursday	KARKKADA VAVU
29	Friday	
30	Saturday	
31	Sunday	

ACADEMIC CALENDAR 2022-23		
AUGUST 2022		
Date	Day	Remarks
1	Monday	
2	Tuesday	
3	Wednesday	
4	Thursday	
5	Friday	
6	Saturday	
7	Sunday	
8	Monday	MUHARAM
9	Tuesday	
10	Wednesday	
11	Thursday	
12	Friday	All India /South zone Inter University Selection Trials
13	Saturday	All India /South zone Inter University Selection Trials Monsoon Madness-DYW
14	Sunday	Monsoon Madness-DYW
15	Monday	INDEPENDENCE DAY Monsoon Madness-DYW
16	Tuesday	
17	Wednesday	
18	Thursday	SREEKRISHNA JAYANTHI Dance Workshop-DYW
19	Friday	Dance Workshop-DYW

20	Saturday	Dance Workshop- DYW
21	Sunday	Dance Workshop- DYW
22	Monday	
23	Tuesday	Cochin University Student Union Election
24	Wednesday	
25	Thursday	
26	Friday	Music workshop & Theatre Workshop-DYW
27	Saturday	Music workshop & Theatre Workshop-DYW
28	Sunday	<b>AYYANKALI JAYANTHI</b> Music workshop & Theatre Workshop-DYW
29	Monday	
30	Tuesday	
31	Wednesday	
<b>ACADEMIC CALENDAR 2022-23</b>		
<b>SEPTEMBER 2022</b>		
Date	Day	Remarks
1	Thursday	
2	Friday	Onam Vacation commencement
3	Saturday	
4	Sunday	
5	Monday	
6	Tuesday	
7	Wednesday	<b>FIRST ONAM</b>
8	Thursday	<b>THIRU ONAM</b>
9	Friday	<b>THIRD ONAM</b>
10	Saturday	<b>FORTH ONAM &amp; SREE NARAYANA GURU JAYANTHI</b>
11	Sunday	
12	Monday	Reopening after Onam Vacation
13	Tuesday	
14	Wednesday	B.Tech. I Semester Commencement
15	Thursday	
16	Friday	

17	Saturday	
18	Sunday	
19	Monday	CUSAT Film festival
20	Tuesday	CUSAT Film festival
21	Wednesday	<b>SREE NARAYAN GURU SAMADHI DAY</b> CUSAT Film festival
22	Thursday	CUSAT Film festival
23	Friday	CUSAT Film festival
24	Saturday	
25	Sunday	
26	Monday	Selection to Inter University Competitions (Music/fine Arts/Dance/Theatre/Literary events)
27	Tuesday	Selection to Inter University Competitions
28	Wednesday	Selection to Inter University Competitions
29	Thursday	Selection to Inter University Competitions
30	Friday	Selection to Inter University Competitions B.Tech II Semester Ending

**ACADEMIC CALENDAR 2022-23**

**OCTOBER 2022**

Date	Day	Remarks
1	Saturday	
2	Sunday	<b>GANDHI JAYNTHI</b>
3	Monday	B.Tech. V Semester Commencement
4	Tuesday	<b>MAHANAVAMI</b>
5	Wednesday	<b>VIJAYADASAMI</b>
6	Thursday	
7	Friday	
8	Saturday	<b>MILAD-E SHERIFF</b> National Colloquim
9	Sunday	National Colloquim

10	Monday	B.Tech II Semester Exam Starting
11	Tuesday	
12	Wednesday	
13	Thursday	
14	Friday	
15	Saturday	
16	Sunday	
17	Monday	
18	Tuesday	
19	Wednesday	
20	Thursday	
21	Friday	B.Tech II Semester Exam Ending
22	Saturday	Frames-Digital Photography Workshop
23	Sunday	Frames-Digital Photography Workshop
24	Monday	DEEPAVALI Frames-Digital Photography Workshop
25	Tuesday	B.Tech. III Semester Commencement
26	Wednesday	
27	Thursday	
28	Friday	
29	Saturday	
30	Sunday	
31	Monday	

**ACADEMIC CALENDAR 2022-23**

**NOVEMBER 2022**

Date	Day	Remarks
1	Tuesday	Skill training
2	Wednesday	Skill training
3	Thursday	Skill training
4	Friday	Skill training
5	Saturday	Skill training

6	Sunday	
7	Monday	
8	Tuesday	
9	Wednesday	
10	Thursday	
11	Friday	
12	Saturday	Popular Science Lecture
13	Sunday	
14	Monday	
15	Tuesday	PG. I Semester Ending PG. III Semester Ending B.Tech II Semester Result Publication
16	Wednesday	
17	Thursday	
18	Friday	B.Tech VII Semester Ending
19	Saturday	
20	Sunday	
21	Monday	PG. I Semester Exam Starting PG. III Semester Exam Starting
22	Tuesday	
23	Wednesday	
24	Thursday	
25	Friday	
26	Saturday	
27	Sunday	
28	Monday	B.Tech VII Semester Exam Starting
29	Tuesday	
30	Wednesday	PG. III Semester Exam Ending
<b>ACADEMIC CALENDAR 2022-23</b>		
<b>DECEMBER 2022</b>		
Date	Day	Remarks
1	Thursday	PG. I Semester Exam Ending PG IV Semester Commencement B.Tech VIII Semester Commencement
2	Friday	
3	Saturday	
4	Sunday	

5	Monday	PG II Semester Commencement
6	Tuesday	
7	Wednesday	
8	Thursday	
9	Friday	B.Tech VII Semester Exam Ending
10	Saturday	
11	Sunday	
12	Monday	
13	Tuesday	
14	Wednesday	
15	Thursday	
16	Friday	
17	Saturday	
18	Sunday	
19	Monday	
20	Tuesday	
21	Wednesday	
22	Thursday	
23	Friday	
24	Saturday	Christmas Vacation commencement
25	Sunday	CHRISTMAS
26	Monday	
27	Tuesday	
28	Wednesday	
29	Thursday	
30	Friday	B.Tech VII Semester Result Publication PG. III Semester Result Publications
31	Saturday	

ACADEMIC CALENDAR 2022-23		
JANUARY 2023		
Date	Day	Remarks
1	Sunday	
2	Monday	
3	Tuesday	Reopening after Christmas Vacation.
4	Wednesday	

5	Thursday	
6	Friday	Literature/Film Camp
7	Saturday	Popular Science Lecture / Literature/Film Camp
8	Sunday	40 <sup>th</sup> Inter College Sports & Games Meet / Literature/Film Camp
9	Monday	“
10	Tuesday	“
11	Wednesday	“
12	Thursday	“
13	Friday	“ /CUSAT-Model United Nations B.Tech.V Semester Ending PG. I Semester Result Publications
14	Saturday	“/CUSAT-Model United Nations
15	Sunday	“/CUSAT-Model United Nations
16	Monday	“
17	Tuesday	“
18	Wednesday	40 <sup>th</sup> Inter College Sports & Games Meet
19	Thursday	Back to village Education through Experience
20	Friday	Back to village Education through Experience
21	Saturday	Back to village Education through Experience
22	Sunday	Back to village Education through Experience
23	Monday	
24	Tuesday	
25	Wednesday	
26	Thursday	Republic Day
27	Friday	
28	Saturday	
29	Sunday	
30	Monday	Cultural Fest
31	Tuesday	Cultural Fest

ACADEMIC CALENDAR 2022-23		
FEBRUARY 2023		
Date	Day	Remarks
1	Wednesday	Cultural Fest B.Tech V Semester Exam Starting
2	Thursday	
3	Friday	Green Room :Cultivating Creativity
4	Saturday	Green Room :Cultivating Creativity
5	Sunday	Green Room :Cultivating Creativity
6	Monday	
7	Tuesday	
8	Wednesday	
9	Thursday	
10	Friday	
11	Saturday	
12	Sunday	
13	Monday	Knowledge fest ' Medha' Commencement
14	Tuesday	
15	Wednesday	B.Tech V Semester Exam Ending
16	Thursday	
17	Friday	
18	Saturday	Shivaratri
19	Sunday	
20	Monday	B.Tech VI Semester Commencement
21	Tuesday	
22	Wednesday	
23	Thursday	B.Tech. I Semester Ending
24	Friday	
25	Saturday	
26	Sunday	
27	Monday	
28	Tuesday	



ACADEMIC CALENDAR 2022-23		
MARCH 2023		
Date	Day	Remarks
1	Wednesday	B.Tech I Semester Exam Starting
2	Thursday	Cochin University youth Festival ' Sargam ' Commencement
3	Friday	
4	Saturday	
5	Sunday	
6	Monday	
7	Tuesday	
8	Wednesday	
9	Thursday	
10	Friday	
11	Saturday	
12	Sunday	
13	Monday	
14	Tuesday	
15	Wednesday	B.Tech. III Semester Ending B.Tech.I Semester Exam Ending
16	Thursday	
17	Friday	
18	Saturday	
19	Sunday	
20	Monday	B.Tech V Semester Result Publication
21	Tuesday	
22	Wednesday	B.Tech III Semester Exam Starting
23	Thursday	
24	Friday	
25	Saturday	
26	Sunday	
27	Monday	
28	Tuesday	

29	Wednesday	
30	Thursday	
31	Friday	PG IV Semester Ending

ACADEMIC CALENDAR 2022-23		
APRIL 2023		
Date	Day	Remarks
1	Saturday	
2	Sunday	
3	Monday	B.Tech III Semester Exam Ending
4	Tuesday	
5	Wednesday	B.Tech IV Semester Commencement PG II Semester Ending PG IV Semester Exam Starting
6	Thursday	Maundy Thursday
7	Friday	Good Friday
8	Saturday	
9	Sunday	Easter
10	Monday	PG II Semester Exam Starting
11	Tuesday	
12	Wednesday	B.Tech VIII Semester Ending
13	Thursday	
14	Friday	Dr.AmbedkarJayanthi
15	Saturday	Vishu
16	Sunday	
17	Monday	B.Tech I Semester Result Publication B.Tech VIII Semester Exam Starting PG IV Semester Exam Ending
18	Tuesday	
19	Wednesday	
20	Thursday	

21	Friday	
22	Saturday	Eid-UI-Fitar
23	Sunday	
24	Monday	PG II Semester Exam Ending
25	Tuesday	
26	Wednesday	
27	Thursday	
28	Friday	
29	Saturday	B.Tech VIII Semester Exam Ending
30	Sunday	B.Tech III Semester Result Publication

*Note : Co-curricular activities mentioned in the Calendar be conducted without affecting the classes and other Academic activities. Examination Notification in the website may noted for the changes in the examination schedule from time to time.*

# FACULTY OF ENGINEERING

**Dean:**

**Dr. Narayanan Namboothiri V.N**

**Professor**

**School of Engineering,CUSAT**

# KUNJALI MARAKKAR SCHOOL OF MARINE ENGINEERING

## B.TECH. MARINE ENGINEERING

### Programme Outcomes (POs)

The twelve programme objectives of B. Tech in Marine Engineering are mentioned below.

#### **PO1: Engineering knowledge**

Apply the knowledge of mathematics, science and engineering fundamentals for the solution of engineering problems.

#### **PO2: Problem analysis Identify**

Formulate research literature and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

#### **PO3: Design/Development of Solutions**

Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for public health and safety, cultural, societal and environmental considerations.

#### **PO4: Conduct investigations of complex problems**

Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of the information to provide valid conclusions.

#### **PO5: Modern tool usage**

Create, select and apply appropriate techniques, resources, modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations

#### **PO6: The engineer and society**

Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

**PO7: Environment and sustainability**

Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and the need for sustainable development.

**PO8: Ethics**

Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

**PO 9: Individual and team work**

Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

**PO 10: Communication**

Communicate effectively on complex engineering activities with the engineering community and with the society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

**PO11: Project management and finance**

Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

**PO12: Life-long learning**

Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

**Programme Specific Outcomes (PSOs)**

1. Graduate will acquire professional skill and knowledge to become an efficient marine engineer.
2. Graduates will be equipped / encouraged to work on research projects and developmental activities.

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

**SEMESTER I**

Code No.	Subject	L Hrs/Wk	T Hrs/Wk	P/D Hrs/ Wk	C	Marks		Total
						CA	SEE	
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	2	1	25	25	50
19-208-0109	NSS/Nature Conservation Activity	0	0	1	0	-	-	-
	<b>TOTAL</b>	<b>24</b>	<b>3</b>	<b>6</b>	<b>20</b>			

CA – Continuous Assessment, SEE –Semester End Examination

**SEMESTER II**

Code No.	Subject	L Hrs/Wk	T Hrs/ Wk	P/D Hrs/ Wk	C	Marks		Total
						CA	SEE	
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
	<b>TOTAL</b>	<b>23</b>	<b>4</b>	<b>6</b>	<b>20</b>			

**SEMESTER III**

Code No.	Subject	L Hrs/Wk	T Hrs/ Wk	P/D Hrs/ Wk	C	Marks		Total
						CA	SEE	
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
<b>TOTAL</b>		<b>21</b>	<b>6</b>	<b>6</b>	<b>20</b>			

**SEMESTER IV**

Code No.	Subject	L Hrs/Wk	T Hrs/ Wk	P/D Hrs/ Wk	C	Marks		Total
						CA	SEE	
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
<b>TOTAL</b>		<b>24</b>	<b>3</b>	<b>6</b>	<b>23</b>			

**SEMESTER V**

Code No.	Subject	L Hrs/Wk	T Hrs/ Wk	P/D Hrs/ Wk	C	Marks		Total
						CA	SEE	
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 Combustion 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
	<b>TOTAL</b>	<b>20</b>	<b>7</b>	<b>9</b>	<b>23</b>			

#### SEMESTER VI

Code No.	Subject	L Hrs/Wk	T Hrs/ Wk	P/D Hrs/ Wk	C	Marks		Total
						CA	SEE	
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
	<b>TOTAL</b>	<b>21</b>	<b>7</b>	<b>6</b>	<b>23</b>			

#### SEMESTER VII

Code No.	Subject	L Hrs/Wk	T Hrs/ Wk	P/D Hrs/ Wk	C	Marks		Total
						CA	SEE	
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
	<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>42</b>	<b>20</b>			

**SEMESTER VIII**

Code No.	Subject	L Hrs/Wk	T Hrs/ Wk	P/D Hrs/ Wk	C	Marks		Total
						CA	SEE	
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
		<b>21</b>	<b>2</b>	<b>13</b>	<b>23</b>			

19-205-0804 to 0807: **ELECTIVE – I**19-208-0808 to 0811: **ELECTIVE – II**

19-208-0804: Marine Machinery System Design

19-208-0808: Fluid Circuits and Controls

19-208-0805: Marine Control Engg. &amp; Automation

19-208-0809: Hydraulic and Pneumatic Drive

19-208-0806: Double Hull Tank Vessels

19-208-0810: Renewable Energy Sources &  
Applications

19-208-0807: Cryogenic Engineering

19-208-0811: Tribology

**DETAILS OF FACULTY (Permanent)**

Sl. No.	Name and Designation	Specialization	Communication
1	Dr. Akhil S. Karun Assistant Professor (Course Co-Ordinator)	Mechanical Engineering, Machine Design, LLB, MBA	9496325080 akhilskarun@cusat.ac.in

**DETAILS OF FACULTY (Contract)**

<b>Sl. No.</b>	<b>Name and Designation</b>	<b>Specialization</b>	<b>Communication</b>
1	Prof. M P John Director	Marine Engineering and Maritime Statutory	9447190644 johnmukkadayil@gmail.com
2	Mr.Venugopal R Professor	Marine Aux.Machinery, Marine Internal Combustion Engine.	9961000760 venugopal@cusat.ac.in
3	Mr.Jis George Associate Professor	Marine Internal Combustion Engine, Marine Refrigeration and Air Conditioning	9895485037 mailjisgeorge@gmail.com
4	Mr. Rames V S Associate Professor	Mechanical Engineering MEO CLASS I (M)	9447805911 ramesvs80@gmail.com
5	Mr. Rajappan T B Associate Professor	Mechanical Engineering MEO CLASS I (M)	9446217615 rajananka@gmail.com
6	Mr. Biswajith H	Automotive Engineering	9495275832 haridasanbiswajit@gmail.com
7	Mrs Jayarani M A	VLSI Design	9495235313 jayarani90@gmail.com
8	Mr. Pramod Ramakrishnan	Production and Industrial Engineering	9446950318 pramodram.84@gmail.com
9	Mr. Kriparaj K G	Thermal Engineering	8921342623 kriparajkg@gmail.com
10	Dr. Jayaram S	Computer Aided Structural Analysis and Design	9495434885 jayaramsomarajan@gmail.com
11	Mrs. Anitha George	Electrical and Electronics Engineering, Power Electronics & Drives	9539396217 anithageorge22@gmail.com
12	Mr. Vishnu S Kumar	Thermal Engineering	9562728849 <a href="mailto:vishnuskumar7@gmail.com">vishnuskumar7@gmail.com</a>
13	Mr. Najdan Waris C P	Marine Engineering	9746284803 najdanwariscp@cusat.ac.in

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<b>Sl. No.</b>	<b>Name and Designation</b>	<b>Specialization</b>	<b>Communication</b>
1	Mr. Joseph Malcom Oliver Course in Charge	Mechanical Engineering MEO CLASS I (M)	7012404553 malcolmkochi@gmail.com
2	Capt. R S Menon	Ship Operation and Management	0484 2316934
3	Dr. V J Peter	Physics	9447700025 petervj@cusat.ac.in
4	Mr. Sanjeev K K	Mechanical Engineering , MEO Class I(M)	8879366414 sanjeevkk@cusat.ac.in
5	Mr. George Paul	Marine Machinery System Design, MEO Class I(M)	8281166031, <a href="mailto:georgepaulkmsme@cusat.ac.in">georgepaulkmsme@cusat.ac.in</a>
6	Mrs. Betsy Kurian	Economics	9388416194 betsyjoben04@gmail.com
7	Mrs. Chinchu Varghese	VLSI and Embedded System Design	9496464138 chinchuvarghese@cusat.ac.in
8	Mrs. Janet Maria Thomas	Applied Electronics	9995676898 janetmt4@gmail.com
9	Dr Joseph George	Mechanical Engineering Design, Project Management	9895393877, <a href="mailto:josephgeorge@cusat.ac.in">josephgeorge@cusat.ac.in</a>
10	Dr. K U Abdul Salam	Chemistry, Mechanical Engineering Design	9447174078 abdelsalam@cusat.ac.in
11	Mrs. Geethanjali C D	English Literature	9567175232 <a href="mailto:geethudm@cusat.ac.in">geethudm@cusat.ac.in</a>
12	Mrs. Smijas J	VLSI and Embedded System Design	9745449419
13	Mr. Edwin Tomson V T	Mathematics	9447570562 <a href="mailto:edwintomson@cusat.ac.in">edwintomson@cusat.ac.in</a>

## **SCHOOL OF ENGINEERING**

### **B.TECH (FULL TIME)**

**(B.Tech. (FT) programmes are common to SOE & CUCEK)**

### **DIVISION OF CIVIL ENGINEERING**

#### **Semester I – 2019 Scheme**

<b>Course Code</b>	<b>Course</b>	<b>C/E</b>	<b>Credits</b>
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**

<b>Course Code</b>	<b>Course</b>	<b>C/E</b>	<b>Credits</b>
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			

<b>19-201-0606 to 0609 Professional Elective – II</b>	
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			

<b>Industry Based Electives</b>	
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**

<b>Course Code</b>	<b>Course</b>	<b>C/E</b>	<b>Credits</b>
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 of Special Structures
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	<b>18</b>

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

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

<b>SEMESTER II</b>						
SI 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	<b>18</b>

**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	<b>18</b>

**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	<b>18</b>

**M.TECH (PART TIME)**

**(SPECIALIZATION: CONSTRUCTION ENGINEERING & MANAGEMENT)**

**Semester I**

<b>Course Code</b>	<b>Course</b>	<b>Credits</b>
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**

<b>Course Code</b>	<b>Course</b>	<b>Credits</b>
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**

<b>Course Code</b>	<b>Course</b>	<b>Credits</b>
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
<b>Total</b>		<b>13</b>



**Semester IV**

<b>Course Code</b>	<b>Course</b>	<b>Credits</b>
CEC 3401	MIS & Finance Management	3
CEC 3402	Elective III	3
CEC 3403	Elective IV	3
CEC 3404	Project – Preliminary Evaluation	4
<b>Total</b>		<b>13</b>

**Elective List**

<b>Course Code</b>	<b>Course</b>
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.Job Thomas,Head & Professor	Structural Engineering	9846545824 <a href="mailto:job_thomas@yahoo.com">job_thomas@yahoo.com</a>
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## **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.

Course code	Course	Hrs/week			Credits	Marks		
		L	T	P		Internal	External	Total
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
	<b>TOTAL</b>	17	4	9	20			

**Semester II (Stream A)**

Course code	Course	Hrs/week			Credits	Marks		
		L	T	P		Internal	External	Total
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 Skill 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			
	<b>TOTAL</b>	18	4	8	20			

**Semester III**

Course code	Course	Hrs/week			Credits	Marks		
		L	T	P		Internal	External	Total
19-200-0301*	Linear Algebra & Transform Techniques*	3	1	0	3	40	60	100
19-209-0302	Electrical Mechines 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 Measurement Lab	0	0	3	1	25	25	50
	<b>TOTAL</b>	18	6	6	20			

\*Common to all branches

**Semester IV**

Course code	Course	Hrs/week			Credits	Marks		
		L	T	P		Internal	External	Total
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
19-209-0407*	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
	<b>TOTAL</b>	21	6	6	23			

\*Common to all branches

**Semester V**

Course code	Course	Hrs/week			Credits	Marks		
		L	T	P		Internal	External	Total
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
	<b>TOTAL</b>	18	6	6	20			

\*Common to all branches

**Professional Elective - I**

Course code	Course
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	Course	Hrs/Week			Credits	Marks		
		L	T	P		Internal	External	Total
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
	<b>TOTAL</b>	18	6	6	20			

**Professional Elective – II**

Course code	Course
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	Course	Hrs/week			Credits	Marks		
		L	T	P		Internal	External	Total
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	0	50
19-209-0715	Project Phase I	0	0	3	1	50	0	50
19-209-0716**	Industrial Internship**	0	0	0	1	50	0	50
	<b>TOTAL</b>	15	4	11	20			

\*Common for CS/EC/EE/IT

**Professional Elective – III**

Course code	Course
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

**Open Elective – I**

Course code	Course
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	Course	Hrs/Week			Credits	Marks		
		L	T	P		internal	External	Total
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	0	50
19-209-0816	Project Phase II	0	0	12	6	200	0	200
19-209-0817	Comprehensive Viva-Voce	0	0	0	1	0	50	50
	<b>TOTAL</b>	12	3	15	20			

**Professional Elective - IV**

Course code	Course
19-209-0802	Electronic Instrumentation
19-209-0803	Artificial Intelligence and Robotics
19-209-0804	Solar PV Systems
19-209-0805	Power Quality



**Professional Elective - V**

Course code	Course
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

**Open Elective - II**

Course code	Course
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**

<i>Course Code</i>	<i>Subject</i>	<i>No of Credits</i>
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
<b>Total</b>		13

**SEMESTER II**

<i>Course Code</i>	<i>Subject</i>	<i>No of Credits</i>
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
<b>Total</b>		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**

<i>Course Code</i>	<i>Subject</i>	<i>No of Credits</i>
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
<b>Total</b>		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**

<i>Course Code</i>	<i>Subject</i>	<i>No of Credits</i>
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**

<i>Course Code</i>	<i>Subject</i>	<i>No of Credits</i>
EEP 3501	Project-Progress Evaluation	10
Total		10

**SEMESTER VI**

<i>Course Code</i>	<i>Subject</i>	<i>No of Credits</i>
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	<a href="mailto:ashapalal@gmail.com">ashapalal@gmail.com</a>	9446128079
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3	Dr.P.G. Latha	Ph.D Energetics	<a href="mailto:pglatha@gmail.com">pglatha@gmail.com</a>	9446147780
4	DR. K VINIDA	Ph.D Industiral Drives and Control	<a href="mailto:vinijan1968@gmail.com">vinijan1968@gmail.com</a>	9446535296
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8	JASSIA M A	M.Tech Industiral Drives and Control	<a href="mailto:jassianadeer@gmail.com">jassianadeer@gmail.com</a>	9495551993
9	RAGI R MENON	M.Tech Power Electronics and Drives	<a href="mailto:ragirmenon@gmail.com">ragirmenon@gmail.com</a>	9846828982
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**DIVISION OF ELECTRONICS AND COMMUNICATION ENGINEERING**

**B.TECH. (FT) DEGREE COURSE IN ELECTRONICS AND  
COMMUNICATION ENGINEERING**

Scheme of Examinations (2019 admissions)

**SEMESTER I [STREAM B]**

Code No.	Subject	L H/W	T H/W	P/D H/ W	C	Marks		Total
						CA	SEE	
19-200-0101B	Calculus	3	1	0	3	40	60	100
19-200-0102B	Engineering Physics	3	1	0	3	40	60	100
19-200-0103B	Engineering Mechanics	4	1	0	3	40	60	100
19-200-0104B	Basic Civil Engineering	3	0	0	3	40	60	100
19-200-0105B	Basic Mechanical Engineering	3	0	0	3	40	60	100
19-200-0106B	Soft Skills Development	2	1	0	2	50	-	50
19-200-0107B	Civil Engineering Workshop	0	0	3	1	25	25	50
19-200-0108B	Mechanical Engineering Workshop	0	0	3	1	25	25	50
19-200-0109B	Language Lab	0	0	1	1	25	25	50
19-200-0110B	NSS/Nature conservation Activities	0	0	1	0	-	-	-
	<b>TOTAL</b>	<b>18</b>	<b>4</b>	<b>8</b>	<b>20</b>			

CA – Continuous Assessment, SEE – Semester End Examination

**SEMESTER II (STREAM B)**

Code No.	Subject	L H/W	T H/W	P/D H/ W	C	Marks		Total
						CA	SEE	
19-200-0201B	Computer Programming	3	1	0	3	40	60	100
19-200-0202B	Engineering Chemistry	3	1	0	3	40	60	100
19-200-0203B	Engineering Graphics	2	1	3	3	40	60	100
19-200-0204B	Basic Electrical Engineering	3	0	0	3	40	60	100
19-200-0205B	Basic Electronics Engineering	3	0	0	3	40	60	100
19-200-0206B	Environmental Studies	3	1	0	3	40	60	100
19-200-0207B	Electrical Engineering Workshop	0	0	3	1	25	25	50
19-200-0208B	Computer Programming Laboratory	0	0	3	1	25	25	50
	<b>TOTAL</b>	<b>17</b>	<b>4</b>	<b>9</b>	<b>20</b>			

**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 & Transform 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 Laboratory	0	0	3	1	25	25	50
19-203-0308	Digital Electronics Laboratory	0	0	3	1	25	25	50
	<b>TOTAL</b>	<b>18</b>	<b>6</b>	<b>6</b>	<b>20</b>			

\*Common to all branches

**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 Laboratory	0	0	3	1	25	25	50
19-203-0409	Electronic Circuits Laboratory I	0	0	3	1	25	25	50
	<b>TOTAL</b>	<b>20</b>	<b>6</b>	<b>6</b>	<b>22</b>			

\*Common to all branches

**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 Laboratory	0	0	3	1	25	25	50
19-203-0511	Electronic Circuits Laboratory II	0	0	3	1	25	25	50
	<b>TOTAL</b>	<b>18</b>	<b>6</b>	<b>6</b>	<b>20</b>			

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
	<b>TOTAL</b>	<b>18</b>	<b>6</b>	<b>6</b>	<b>20</b>			

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	0	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	3	1	50	-	50
19-203-0716	Industrial Internship	0	0	0	1	50	-	50
	<b>TOTAL</b>	<b>15</b>	<b>5</b>	<b>10</b>	<b>20</b>			

\*Common for CS/EC/EE/IT

<b>19-203-0704 to 19-203-0707 Professional Elective – III</b>	
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*	Universal Human Values- Undivided Society & Human Order
19-203-0709	Advanced Computer Architecture
19-203-0710	Mechatronics
19-203-0711	Intellectual Property Rights

\*Common to EE/EC

### 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	0	0	3	40	60	100
19-203-0814	Seminar	0	0	3	1	50	-	50
19-203-0815	Project Phase II	0	0	12	6	200	-	200
19-203-0816	Comprehensive Viva Voce	-	-	0	1	-	50	50
	<b>TOTAL</b>	<b>12</b>	<b>4</b>	<b>14</b>	<b>20</b>			

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

19-203-0810 to 19-203-0813 Open Elective – II	
Code No.	Subject
19-203-0810	Memory and interconnects
19-203-0811	Introduction to Machine Learning
19-203-0812	Non-Conventional Sources of Energy
19-203-0813*	Self-awareness and Integral Development
19-200-0814	Constitutional Law

\*Common to EE/EC

## **DIVISION OF COMPUTER SCIENCE AND ENGINEERING**

### **B.TECH (FT) DEGREE COURSE IN COMPUTER SCIENCE AND ENGINEERING**

#### **SEMESTER I [STREAM B]**

Code No.	Subject	L H/W	T H/W	P/D H/ W	C	Marks		Total
						CA	SEE	
19-200-0101B	Calculus	3	1	0	3	40	60	100
19-200-0102B	Engineering Physics	3	1	0	3	40	60	100
19-200-0103B	Engineering Mechanics	4	1	0	3	40	60	100
19-200-0104B	Basic Civil Engineering	3	0	0	3	40	60	100
19-200-0105B	Basic Mechanical Engineering	3	0	0	3	40	60	100

19-200-0106B	Soft Skills Development	2	1	0	2	50	-	50
19-200-0107B	Civil Engineering Workshop	0	0	3	1	25	25	50
19-200-0108B	Mechanical Engineering Workshop	0	0	3	1	25	25	50
19-200-0109B	Language Lab	0	0	1	1	25	25	50
19-200-0110B	NSS/Nature conservation Activities	0	0	1	0	-	-	-
	<b>TOTAL</b>	<b>18</b>	<b>4</b>	<b>8</b>	<b>20</b>			

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

**SEMESTER II (STREAM B)**

Code No.	Subject	L H/W	T H/W	P/D H/ W	C	Marks		Total
						CA	SEE	
19-200-0201B	Computer Programming	3	1	0	3	40	60	100
19-200-0202B	Engineering Chemistry	3	1	0	3	40	60	100
19-200-0203B	Engineering Graphics	2	1	3	3	40	60	100
19-200-0204B	Basic Electrical Engineering	3	0	0	3	40	60	100
19-200-0205B	Basic Electronics Engineering	3	0	0	3	40	60	100
19-200-0206B	Environmental Studies	3	1	0	3	40	60	100
19-200-0207B	Electrical Engineering Workshop	0	0	3	1	25	25	50
19-200-0208B	Computer Programming Laboratory	0	0	3	1	25	25	50
	<b>TOTAL</b>	<b>17</b>	<b>4</b>	<b>9</b>	<b>20</b>			

**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 & Transform Techniques	3	1	0	3	40	60	100
19-202-0302	Logic Design	3	1	0	3	40	60	100
19-203-0303	**Discrete Computational Structures	3	1	0	3	40	60	100
19-202-0304	Object Oriented Programming	3	1	0	3	40	60	100
19-202-0305	Principles of Programming Languages	3	1	0	3	40	60	100
19-202-0306	Data and Computer Communication	3	1	0	3	40	60	100
19-202-0307	Digital Electronics Laboratory	0	0	3	1	25	25	50
19-202-0308	Object Oriented Programming Laboratory	0	0	3	1	25	25	50
<b>TOTAL</b>		<b>18</b>	<b>6</b>	<b>6</b>	<b>20</b>			

\*Common to all branches

\*\* Common for CS/IT

**SEMESTER IV**

Code No.	Subject	L H/ W	T H/W	P/D H/W	C	Marks		Total
						CA	SE E	
19-200-0401*	Complex Variables and Partial Differential Equations	3	1	0	3	40	60	100
19-202-0402	Microprocessors	3	1	0	3	40	60	100
19-202-0403	Computer Architecture and Organization	3	1	0	3	40	60	100
19-202-0404	Automata Languages and Computations	3	1	0	3	40	60	100
19-202-0405	Data Structures and Algorithms	3	1	0	3	40	60	100
19-202-0406	Database Management Systems	3	1	0	3	40	60	100
19-200-0407*	Universal Human Values	3	0	0	2	50	0	50
19-202-0408	Database Management Systems Laboratory	0	0	3	1	25	25	50
19-202-0409	Data Structures Laboratory	0	0	3	1	25	25	50
<b>TOTAL</b>		<b>21</b>	<b>6</b>	<b>6</b>	<b>23</b>			

\*Common to all branches

**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
19-202-0502	System Programming	3	1	0	3	40	60	100
19-202-0503	Object Oriented Software Engineering	3	1	0	3	40	60	100
19-202-0504	Computer Graphics	3	1	0	3	40	60	100
19-202-0505	Advanced Microprocessors and Microcontrollers	3	1	0	3	40	60	100
19-202-050**	Professional Elective I	3	1	0	3	40	60	100
19-202-0510	Computer Graphics Laboratory	0	0	3	1	25	25	50
19-202-0511	Microprocessors Laboratory	0	0	3	1	25	25	50
	<b>TOTAL</b>	<b>18</b>	<b>6</b>	<b>6</b>	<b>20</b>			

**19-202-0506 to 19-202-0509 Professional Elective – I**

Code No.	Subject
19-202-0506(IE)	Web Technologies
19-202-0507	Machine Learning
19-202-0508	Embedded System Design
19-202-0509	Bioinformatics

**SEMESTER VI**

Code No.	Subject	L H/W	T H/W	P/D H/W	C	Marks		Total
						CA	SEE	
19-202-0601	Computer Networks	3	1	0	3	40	60	100
19-202-0602	*Compiler Construction	3	1	0	3	40	60	100
19-202-0603	Analysis and Design of Algorithms	3	1	0	3	40	60	100
19-202-0604	Data Mining	3	1	0	3	40	60	100
19-202-0605	Operating System	3	1	0	3	40	60	100
19-202-06**	Professional Elective – II	3	1	0	3	40	60	100
19-202-0610	Operating System Laboratory	0	0	3	1	25	25	50
19-202-0611	Mini Project	0	0	3	1	25	25	50
	<b>TOTAL</b>	<b>18</b>	<b>6</b>	<b>6</b>	<b>20</b>			

\* Common for CS/IT

<b>19-202-0606 to 19-202-0609 Professional Elective – II</b>	
<b>Code No.</b>	<b>Subject</b>
19-202-0606(IE)	Neural Networks and Deep Learning
19-202-0607	Software Project Management
19-202-0608	Digital Image Processing
19-202-0609	Ethical Hacking

\*Common for CS/EC/EE/IT

**SEMESTER VII**

Code No.	Subject	L	T	P/D	C	Marks		Total
		H/W	H/W	H/W		CA	SE E	
19-202-0701*	Principles of Management	3	1	0	3	40	60	100
19-202-0702	Advanced Architecture and Parallel Processing	3	1	0	3	40	60	100
19-202-0703	Cryptography and Network Security	3	1	0	3	40	60	100
19-202-07**	Professional Elective – III	3	1	0	3	40	60	100
19-202-07**	Open Elective I	3	0	0	3	40	60	100
19-202-0712	Language Processors Laboratory	0	0	3	1	25	25	50
19-202-0713	Networks Laboratory	0	0	3	1	25	25	50
19-202-0714	Entrepreneurship Development	0	0	2	1	50	-	50
19-202-0715	Project Phase I	0	0	3	1	50	-	50
19-202-0716	Industrial Internship	0	0	0	1	50	-	50
	<b>TOTAL</b>	<b>15</b>	<b>4</b>	<b>11</b>	<b>20</b>			

<b>19-202-0704 to 19-202-0707 Professional Elective – III</b>	
Code No.	Subject
9-202-0704 (IE)	***Mobile Computing Technology
19-202-0705	Internet of Things and Applications
19-202-0706	Biometric Technologies
19-202-0707	Computer Vision

\*\*\* Common for CS/IT



19-202-0708 to 19-202-0711 Open Elective – I	
Code No.	Subject
19-202-0708	Mobile Application Development
19-202-0709	System Modeling and Simulation
19-202-0710	Cyber Law and Ethics
19-202-0711	Business Intelligence and Analytics

**SEMESTER VIII**

Code No.	Subject	L H/ W	T H/W	P/D H/W	C	Marks		Total
						CA	SEE	
19-202-0801	Artificial Intelligence	3	1	0	3	40	60	100
19-202-08**	Professional Elective IV	3	1	0	3	40	60	100
19-202-08**	Professional Elective V	3	1	0	3	40	60	100
19-202-08**	Open Elective II	3	0	0	3	40	60	100
19-202-0814	Seminar	0	0	3	1	50	-	50
19-202-0815	Project Phase II	0	0	12	6	200	-	200
19-202-0816	Comprehensive Viva Voce	-	-	0	1	-	50	50
	<b>TOTAL</b>	<b>12</b>	<b>3</b>	<b>15</b>	<b>20</b>			

**19-202-0802 to 19-202-0805 Professional Elective – IV**

Code No.	Subject
19-202-0802	Big Data Analytics
19-202-0803	Augmented Reality
19-202-0804	Computational Linguistics
19-202-0805	Recommender Systems

<b>202-0806 to 19-202-0809 Professional Elective – V</b>	
Code No.	Subject
19-202-0806	Cloud Computing
19-202-0807	Agent Based Intelligent System
19-202-0808	Blockchain
19-202-0809	Advanced Compiler Design and Optimization

<b>19-202-0810 to 19-202-0814 Open Elective – II</b>	
Code No.	Subject
19-202-0810	High Performance Embedded Computing
19-202-0811	Cyberspace and Information System Security
19-202-0812	Soft Computing
19-202-0813	Internet of Things
19-200-0814	Constitutional Law

#### **Details of Faculty**

Sl No.	Name & Designation	Specialization	Contact No:	Email ID
1	Dr. David Peter, Professor	Software Engineering	9446366805	davidpeter123@gmail.com
2	Dr. Latha R Nair, Associate Professor	Artificial Intelligence and Machine Learning	9567489098	latharnair@cusat.ac.in
3	Dr. M.Sudheep Elayidom, Professor	Data science	0484 2463306	sudheepelayidom@hotmail.com
4	Dr. Sheena Mathew, Professor	Network Security	9446509508	sheenamathew@cusat.ac.in
5	Mr. Vinod Kumar P P, Associate Professor	Computer & Information Science	9447222647	ppvinoth@gmail.com
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13	Ms. Nitha C Pankajakshan, Assistant Professor	Computer and Information Science	9746076738	nithacp17@gmail.com
14	Ms. Minu Poulouse, Assistant Professor	Computer Science and Engineering	9440539990	minupoulouse88@gmail.com
15	Ms. Lino Murali, Assistant Professor	Information Systems	9447084643	linomurali@gmail.com
16	Ms. Mahima Mary Mathews, Assistant Professor	Spcl. in Data Security	8075589582	mahimamarymathews@gmail.com
17	Ms. Jithi P V, Assistant Professor	Information systems	9447718764	pvjithi@gmail.com
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 (STREAM B)

*Stream B:* Computer Science and Engineering, Electronics and Communication Engineering and Information Technology

CodeNo.	Subject	L H/W	T H/W	P/D H/W	C	Marks		Total
						CA	SEE	
19-200-0101B	Calculus	3	1	0	3	40	60	100
19-200-0102B	Engineering Physics	3	1	0	3	40	60	100
19-200-0103B	Engineering Mechanics	4	1	0	3	40	60	100
19-200-0104B	Basic Civil Engineering	3	0	0	3	40	60	100
19-200-0105B	Basic Mechanical Engineering	3	0	0	3	40	60	100
19-200-0106B	Soft Skills Development	2	1	0	2	50	-	50
19-200-0107B	Civil Engineering Workshop	0	0	3	1	25	25	50
19-200-0108B	Mechanical Engineering Workshop	0	0	3	1	25	25	50
19-200-0109B	Language Lab	0	0	1	1	25	25	50
19-200-0110B	NSS/Nature conservation Activities	0	0	1	0	-	-	-
	<b>TOTAL</b>	<b>18</b>	<b>4</b>	<b>8</b>	<b>20</b>			

CA–Continuous Assessment, SEE–Semester End Examination

#### SEMESTER II (STREAM B)

CodeNo.	Subject	L H/W	T H/W	P/D H/W	C	Marks		Total
						CA	SEE	
19-200-0201B	Computer Programming	3	1	0	3	40	60	100
19-200-0202B	Engineering Chemistry	3	1	0	3	40	60	100
19-200-0203B	Engineering Graphics	2	1	3	3	40	60	100

19-200-0204B	Basic Electrical Engineering	3	0	0	3	40	60	100
19-200-0205B	Basic Electronics Engineering	3	0	0	3	40	60	100
19-200-0206B	Environmental Studies	3	1	0	3	40	60	100

19-200-0207B	Electrical Engineering Workshop	0	0	3	1	25	25	50
19-200-0208B	Computer Programming Laboratory	0	0	3	1	25	25	50
	<b>TOTAL</b>	<b>17</b>	<b>4</b>	<b>9</b>	<b>20</b>			

### SEMESTER III

CodeNo.	Subject	L Hrs/ Wk	T Hrs/ Wk	P/D Hrs/ Wk	C	Marks		Total
						CA	SEE	
19-200-0301	*Linear Algebra and Transform Techniques	3	1	0	3	40	60	100
19-204-0302	Digital Electronics	3	1	0	3	40	60	100
19-204-0303	**Discrete Computational Structures	3	1	0	3	40	60	100
19-204-0304	DataBase Management Systems	3	1	0	3	40	60	100
19-204-0305	Data structures and Algorithms in C	3	1	0	3	40	60	100
19-204-0306	Computer Organization & Architecture	3	1	0	3	40	60	100
19-204-0307	Hardware Design Laboratory	0	0	3	1	25	25	50
19-204-0308	Data structures Laboratory in C	0	0	3	1	25	25	50
	<b>TOTAL</b>	<b>18</b>	<b>6</b>	<b>6</b>	<b>20</b>			

\* Common for CE/CS/EC/EE/IT/ME/SE

\*\* Common for CS/IT

### SEMESTER IV

CodeNo.	Subject	L Hrs/ Wk	T Hrs/ Wk	P/ DH rs/ Wk	C	Marks		Total
						CA	SEE	
19-200-0401	*Complex Variable and Partial Differential Equations	3	1	0	3	40	60	100
19-204-0402	Data Communication & Networking	3	1	0	3	40	60	100

19-204-0403	Operating Systems	3	1	0	3	40	60	100
19-204-0404	Software Engineering	3	1	0	3	40	60	100
19-204-0405	Internet Programming	3	1	0	3	40	60	100
19-204-0406	ObjectOrientedProgramminginc++	3	1	0	3	40	60	100
19-200-0407	*UniversalHumanValues	3	0	0	3	50	-	50
19-204-0408	Object Oriented Programming Laboratory in C++	0	0	3	1	25	25	50
19-204-0409	MiniProject–RDBMSbased	0	0	3	1	50	-	50
	<b>TOTAL</b>	<b>21</b>	<b>6</b>	<b>6</b>	<b>23</b>			

\*Common for  
CE/CS/EC/EE/IT/ME/SE

#### SEMESTER V

CodeNo.	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
19-204-0502	Object Oriented Modeling & Design	3	1	0	3	40	60	100
19-204-0503	Design and Analysis of Algorithms	3	1	0	3	40	60	100
19-204-0504	Big Data Analytics	3	1	0	3	40	60	100
19-204-0505	Formal Languages and Automata Theory	3	1	0	3	40	60	100
19-204-05**	PROFESSIONALELECTIVE-I	3	1	0	3	40	60	100
19-204-0510	Software Systems Lab	0	0	3	1	25	25	50
19-204-0511	Software Engineering Lab	0	0	3	1	25	25	50
	<b>TOTAL</b>	<b>18</b>	<b>6</b>	<b>6</b>	<b>20</b>			

\*Common for CE/CS/EC/EE/IT/ME/SE

#### 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

**SEMESTERVI**

CodeNo.	Subject	L Hrs/W k	T Hrs/ Wk	P/D H/W	C	Marks		Total
						CA	SEE	
19-204-0601	Internet of Things	3	1	0	3	40	60	100
19-204-0602	*Compiler Design	3	1	0	3	40	60	100
19-204-0603	Deep Learning	3	1	0	3	40	60	100
19-204-0604	Cloud Computing	3	1	0	3	40	60	100
19-204-0605	Android Programming	3	1	0	3	40	60	100
19-204-06**	Professional Elective-II	3	1	0	3	40	60	100
19-204-0610	Cloud and Data Analytics Laboratory	0	0	3	1	25	25	50
19-204-0611	Mini Project-Android based Project	0	0	3	1	50	-	50
<b>TOTAL</b>		<b>18</b>	<b>6</b>	<b>6</b>	<b>20</b>			

\*Common for CS/IT

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

**SEMESTERVII**

Code No.	Subject	L Hrs/Wk	T Hrs/W	P/DH/ W	C	Marks		Total
						CA	SEE	
19-204-0701	*PrinciplesofManagement	3	1	0	3	40	60	100
19-204-0702	DataSecurityandCryptography	3	1	0	3	40	60	100
19-204-0703	Computer GraphicsandVisualComputing	3	1	0	3	40	60	100
19-204-07**	ProfessionalElective- III	3	1	0	3	40	60	100
19-204-07**	Open Elective -I	3	0	0	3	40	60	100
19-204-0712	ComputerGraphicsLaboratory	0	0	3	1	25	25	50
19-204-0713	MiniProject- Multimedia Project	0	0	3	1	50	-	50
19-204-0714	EntrepreneurshipDevelopment	0	0	2	1	50	-	50
19-204-0715	ProjectPhaseI	0	0	3	1	50	-	50
19-204-0716	IndustrialInternship***	0	0	-	1	50	-	50
<b>TOTAL</b>		<b>15</b>	<b>4</b>	<b>11</b>	<b>20</b>			

\*CommonforCS/EC/EE/IT

<b>19-204-0704 to 0707: PROFESSIONAL ELECTIVE – III</b>	
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

<b>19-204-0708 to 0711: OPEN ELECTIVE - I</b>	
19-204-0708:	Agile Methodology
19-204-0709:	Game Design
19-204-0710:	Multimedia Computing
19-204-0711:	Mobile Data Management

### SEMESTER VIII

CodeNo.	Subject	L H/W	T H/W	P/DH/ W	C	Marks		Total
						CA	SEE	
						19-204-0801	Financial Management & E-banking	
19-204-08**	Professional Elective–IV	3	1	0	3	40	60	100
19-204-08**	Professional Elective– V	3	1	0	3	40	60	100
19-204-08**	Open Elective –II	3	0	0	3	40	60	100
19-204-0815	Seminar	0	0	3	1	50	-	50
19-204-0816	Project Phase – II	0	0	12	6	200	-	200
19-204-0817	Comprehensive VivaVoce	0	0	0	1	-	50	50
	<b>TOTAL</b>	<b>12</b>	<b>3</b>	<b>15</b>	<b>20</b>			

### 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

**Details of Faculty**

Sl.No	Name & Designation	Specialization	Communication (Contact No.& email ID)
1	Dr.Binsu C Kovoov, Professor & Head	Computer & Information Science	9847788551 binsu.kovoov@gmail.com
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6	Dr.Daleesha M Viswanathan Associate Professor	Computer & Information Science	9446218042 daleesha88@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 [Stream A]**

Code No.	Subject	L Hrs/Wk	T Hrs/Wk	P/D Hrs/ Wk	C	Marks		Total
						CA	ESE	
23-205-0101A	Computer Programming	3	1	0	3	40	60	100
23-205-0102A	Engineering Chemistry	3	1	0	3	40	60	100
23-205-0103A	Engineering Graphics	2	1	3	3	40	60	100
23-205-0104A	Basic Electrical Engineering	3	0	0	3	40	60	100
23-205-0105A	Basic Electronics Engineering	3	0	0	3	40	60	100
23-205-0106A	Environmental Studies	3	1	0	3	40	60	100
23-205-0107A	Electrical Engineering Workshop	0	0	3	1	25	25	50
23-205-0108A	Computer Programming Laboratory	0	0	3	1	25	25	50
	<b>TOTAL</b>	<b>17</b>	<b>4</b>	<b>9</b>	<b>20</b>			

CA – Continuous Assessment, ESE – End Semester Examination

**SEMESTER II [Stream A]**

Code No.	Subject	L Hrs/Wk	T Hrs/Wk	P/D Hrs/ Wk	C	Marks		Total
						CA	ESE	
23-205-0201A	Calculus	3	1	0	3	40	60	100
23-205-0202A	Engineering Physics	3	1	0	3	40	60	100
23-205-0203A	Engineering Mechanics	4	1	0	3	40	60	100

23-205-0204A	Basic Civil Engineering	3	0	0	3	40	60	100
23-205-0205A	Basic Mechanical Engineering	3	0	0	3	40	60	100
23-205-0206A	Soft Skills Development	2	1	0	2	50	-	50
23-205-0207A	Civil Engineering Workshop	0	0	3	1	25	25	50
23-205-0208A	Mechanical Engineering Workshop	0	0	3	1	25	25	50
23-205-0209A	Language Lab	0	0	1	1	25	25	50
23-205-0210A	NSS/Nature conservation Activities	0	0	1	0	-	-	-
	<b>TOTAL</b>	<b>18</b>	<b>4</b>	<b>8</b>	<b>20</b>			

### SEMESTER III

Code No.	Subject	L Hours/ Week	T Hours/ Week	P/D Hours/ Week	C	Marks		Total
						CA	SEE	
23-205-0301	*Linear Algebra & Transform Techniques	3	1	0	3	40	60	100
23-205-0302	Electrical Technology	3	1	0	3	40	60	100
23-205-0303	Mechanics of Solids	3	1	0	3	40	60	100
23-205-0304	Fluid Mechanics	3	1	0	3	40	60	100
23-205-0305	Metallurgy & Materials Science	3	1	0	3	40	60	100
23-205-0306	Machine Drawing	3	1	0	3	40	60	100
23-205-0307	Strength of Materials Lab	0	0	3	1	25	25	50
23-205-0308	Fluid Mechanics Lab	0	0	3	1	25	25	50
	<b>TOTAL</b>	<b>18</b>	<b>6</b>	<b>6</b>	<b>20</b>			

\* 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	
23-205-0401	*Complex Variables and Partial Differential Equations	3	1	0	3	40	60	100
23-205-0402	Metrology & Instrumentation	3	1	0	3	40	60	100

23-205-0403	Mechatronics	3	1	0	3	40	60	100
23-205-0404	Applied Thermodynamics	3	1	0	3	40	60	100
23-205-0405	Hydraulic Machinery	3	1	0	3	40	60	100
23-205-0406	Manufacturing Processes	3	1	0	3	40	60	100
23-205-0407	*Universal Human Value							
23-205-0408	Metrology Lab	0	0	3	1	25	25	50
23-205-0409	Hydraulic Machinery Lab	0	0	3	1	25	25	50
	<b>TOTAL</b>	<b>18</b>	<b>6</b>	<b>6</b>	<b>20</b>			

\* Common for CE/CS/EC/EE/IT/ME/SE

#### SEMESTER V

Code No.	Subject	L Hours/ Week	T Hours/ Week	P/D Hours/ Week	C	Marks		Total
						CA	SEE	
23-205-0501	*Numerical and Statistical Methods	3	1	0	3	40	60	100
23-205-0502	Mechanics of Machinery	3	1	0	3	40	60	100
23-205-0503	Machining Science & Machine Tools	3	1	0	3	40	60	100
23-205-0504	Thermal Engineering	3	1	0	3	40	60	100
23-205-0505	Power Plant Engineering	3	1	0	3	40	60	100
23-205-05**	Professional Elective - I	3	1	0	3	40	60	100
23-205-0510	Computational Methods Lab	0	0	3	1	25	25	50
23-205-0511	Machine Shop	0	0	3	1	25	25	50
	<b>TOTAL</b>	<b>18</b>	<b>6</b>	<b>6</b>	<b>20</b>			

\*Common for CE/CS/EC/EE/IT/ME/SE

**A student should opt for atleast one industry based elective during the B.Tech Programme.**

23-205-0506to0509: **PROFESSIONAL ELECTIVE - I**

23-205-0506(IE): Industrial Management

23-205-0507: Computational Methods for engineers

23-205-0508: Smart Materials

23-205-0509: Principles of Turbo machinery

#### SEMESTER VI

Code No.	Subject	L Hours/ Week	T Hours/ Week	P/D Hours/ Week	C	Marks		Total
						CA	SEE	
23-205-0601	Dynamics of Machinery	3	1	0	3	40	60	100
23-205-0602	Machine Design – I	3	1	0	3	40	60	100
23-205-0603	Operations Management	3	1	0	3	40	60	100

23-205-0604	Heat and Mass Transfer	3	1	0	3	40	60	100
23-205-0605	CAD/CAM	3	1	0	3	40	60	100
23-205-06**	Professional Elective – II	3	1	0	3	40	60	100
23-205-0610	CAD/CAM Lab	0	0	3	1	25	25	50
23-205-0611	Heat and Mass Transfer Lab	0	0	3	1	25	25	50
	<b>TOTAL</b>	<b>18</b>	<b>6</b>	<b>6</b>	<b>20</b>			

**23-205-0606 to 0609: PROFESSIONALELECTIVE – II**

23-205-0606(IE): Additive Manufacturing

23-205-0607: Energy Conservation and Environment Protection

23-205-0608: Advanced Mechanics of Solids

23-205-0609: Fundamentals of Combustion & Pollution

**SEMESTER VII**

Code No.	Subject	L Hours/ Week	T Hours/ Week	P/D Hours/ Week	C	Marks		Total
						CA	SEE	
23-205-0701	Refrigeration & Air Conditioning	3	1	0	3	40	60	100
23-205-0702	Vibration & Noise Control	3	1	0	3	40	60	100
23-205-0703	Machine Design – II	3	1	0	3	40	60	100
23-205-07**	Professional Elective - III	3	1	0	3	40	60	100
23-205-07**	Open Elective - I	3	0	0	3	40	60	100
23-205-0712	Thermal Engineering Lab	0	0	3	1	25	25	50
23-205-0713	Automation Lab	0	0	3	1	25	25	50
23-205-0714	Entrepreneurship Development	0	0	2	1	50	-	50
23-205-0715	Project Phase I	0	0	3	1	50	-	50
23-205-0716	Industrial Internship***	0	0	-	1	50	-	50
	<b>TOTAL</b>	<b>15</b>	<b>4</b>	<b>11</b>	<b>20</b>			

**23-205-0704 to 0707: PROFESSIONAL ELECTIVE – III**

**23-205-0708 to 0711: OPEN ELECTIVE – I**

23-205-0704(IE): Robotics & Artificial Intelligence 23-205-0708: Quality Engineering and Management

23-205-0705: Supply Chain Management 23-205-0709: HRD and Organisational Behaviour

23-205-0706: Automobile Engineering 23-205-0710: Computational Statistics for engineers

23-205-0707: Computational Fluid Dynamics 23-205-0711: Finite Element Method

**\*\* A student should opt for atleast one open elective offered by a Division other than their branch of study in the 7<sup>th</sup> or 8<sup>th</sup> semester.**

**\*\*\* Industrial internship of a minimum duration of two weeks must be completed after the 4<sup>th</sup> semester and before the commencement of 7<sup>th</sup> semester classes. The evaluation of internship shall be conducted along with Project Phase I.**

**SEMESTER VIII**

Code No.	Subject	L Hours/ Week	T Hours/ Week	P/D Hours/ Week	C	Marks		Total
						CA	SEE	
23-205-0801	Compressible Fluid Flow	3	1	0	3	40	60	100
23-205-08**	Professional Elective - III	3	1	0	3	40	60	100
23-205-08**	Professional Elective - IV	3	1	0	3	40	60	100
23-205-08**	Open Elective - II	3	1	0	3	40	60	100
23-205-0815	Seminar			3	1	50	-	50
23-205-0816	Project Phase - II			11	6	205	-	205
23-205-0817	Comprehensive Viva Voce			0	1	-	50	50
	<b>TOTAL</b>	<b>12</b>	<b>4</b>	<b>14</b>	<b>20</b>			

**23-205-0802 to 0805: PROFESSIONAL ELECTIVE – IV**

23-205-0802: Materials Management

23-205-0803: Hydraulic and Pneumatic drives

23-205-0804: Aerospace Engineering

23-205-0805: Cryogenic Engineering

**23-205-0810 to 0813: OPEN ELECTIVE – II**

23-205-0810: Operations Research

23-205-0811: Nano Technology and Surface Engineering

23-205-0812: Mechanics of Composite methods

23-205-0813: Engineering Economics, Estimation and Costing

23-205-0814: Constitutional Law

**23-205-0806 to 0809: PROFESSIONAL ELECTIVE - V**

23-205-0806: Production Technology

23-205-0807: Mechanical Behaviour of Materials

23-205-0808: Petroleum Resource Management

23-205-0809: Propulsion Engineering

**M.TECH. (PT) DEGREE COURSE IN MECHANICAL ENGINEERING**

**(SPECIALIZATION: PRODUCTION ENGINEERING)**

**(Revised Curriculum from 2021 Onwards)**

**Semester I**

Course Code	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**

Course Code	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**

Course Code	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**

Course Code	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**

Course Code	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
<b>E1</b>	Mechatronics	<b>3</b>
<b>E2</b>	Nano Technology and Surface Engineering	<b>3</b>
<b>E3</b>	Six Sigma	<b>3</b>
<b>E4</b>	Process Control and Automation	<b>3</b>
<b>E5</b>	Machine Learning and AI	<b>3</b>
<b>E6</b>	Bio Materials	<b>3</b>
<b>E7</b>	Material Behaviour at High Temperatures	<b>3</b>
<b>E8</b>	Industrial Tribology	<b>3</b>
<b>E9</b>	Hydraulic and Pneumatic Drives	<b>3</b>
<b>E10</b>	Mechanical Vibrations	<b>3</b>
<b>E11</b>	Special Purpose Machine Tools	<b>3</b>
<b>E12</b>	Quality Engineering and Management	<b>3</b>
<b>E13</b>	Logistics and Supply Chain Management	<b>3</b>
<b>E14</b>	Engineering Optimization	<b>3</b>



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### 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
	<b>TOTAL</b>	<b>20</b>		

**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	-	-
	<b>TOTAL</b>	<b>20</b>		

**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
	<b>TOTAL</b>	<b>20</b>		

\*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
	<b>TOTAL</b>	<b>23</b>		
	<b>L</b>			

\* 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
	<b>TOTAL</b>	<b>20</b>		

\* 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
	<b>TOTAL</b>	<b>20</b>		

**\*\*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 safety

19-206-0609 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	-
	<b>TOTAL</b>	<b>20</b>		

**\*\*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
	<b>TOTAL</b>	<b>20</b>		

**\*\*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 Economics 19-206-0813

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	<b>18</b>

### 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	<b>18</b>

### 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	<b>18</b>

### 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	<b>18</b>

*\*\*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

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**COCHIN UNIVERSITY COLLEGE OF ENGINEERING,**  
**KUTTANADU**

**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**

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19	DR.MATHEW CHERIAN	Asso.Professor	Mechanical Engineering	9447369654	<a href="mailto:mathewchl@cusat.ac.in">mathewchl@cusat.ac.in</a> <a href="mailto:mathewchl@gmail.com">mathewchl@gmail.com</a>
20	DR.SENTHIL PRAKASH M. N	Professor		9496226791	<a href="mailto:senthil@cusat.ac.in">senthil@cusat.ac.in</a>
18	THOMAS .T	Asso. Professor		9447041819	<a href="mailto:thomas@cuat.ac.in">thomas@cuat.ac.in</a>
21	DR.SHIYAS C. R	Asso. Professor		9447893107	<a href="mailto:crshiyas@gmail.com">crshiyas@gmail.com</a>
22	Dr. SALAJI .S	Asso. Professor		9497675088	<a href="mailto:salajisabu@gmail.com">salajisabu@gmail.com</a> <a href="mailto:salajis@cusat.ac.in">salajis@cusat.ac.in</a>

# FACULTY OF ENVIRONMENTAL STUDIES

**Dean:**

Dr.V Sivanandan Achari  
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

**Inter Departmental Electives**

Course Code	Course	C/E	Credits
20-360-0313	Energy Resources and Management	IDE	3
20-360-0314	Industrial Ecology	IDE	3
Total			6

**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. Rajathy Sivalingam, Professor (Rtd)	Environmental Toxicology	9400577246, rajkumar@cusat.ac.in
2.	Dr. Sivanandan Achari. V, Professor	Environmental Chemistry	9495383342, vsachari@cusat.ac.in
3.	Dr. Usha K Aravind, Professor& Director	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, ratheeshes@cusat.ac.in
7.	Dr. Preethy Chandran, Assistant Professor	Environmental Microbiology	9751275798, preethychandran@cusat.ac.in
8.	Dr.Krishna Mohan K S, Assistant Professor	Environmental Physics	9846392428, krishnamohan@cusat.ac.in
9.	Dr.Vrinda S, Assistant Professor	Environmental Toxicology	9895839534, vrindas@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 Marine 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	Bioentrepreneurship 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
<b>Total Credit</b>			<b>18</b>

**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

Sl.No.	Name and Designation	Specialization	Communication
1.	Dr. Valsamma Joseph Professor, Director and Course Co-ordinator	Marine Biotechnology	04842381120 (O) 9846047433 (Mob) valsamma@cusat.ac.in.
2	Prof. I.S. Bright Singh KSCSTE-Emeritus Scientist	Aquatic Animal Health/ Marine Biotechnology	04842381120 (O) 9447631101 isbsingh@gmail.com
3.	Dr. Sajeevan T.P. Assistant Professor	Marine Biotechnology	04842381120 (O) 9946099408 (Mob) sajeevantp@gmail.com
4.	Dr. Jayesh Puthumana Assistant Professor	Marine Biotechnology	04842381120 (O) 9447719804 jayesh@cusat.ac.in
5.	Mr. Shibin S.P. Assistant Professor	Bioprocess Technology	0484 -2381120 09447714543 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 E-mail: <a href="mailto:devipriyasuja@cusat.ac.in">devipriyasuja@cusat.ac.in</a>
2.	Dr. Baby Chakrapani P.S., Assistant Professor, Department of Biotechnology	Environmental Biotechnology	M: 9495109908 E-mail: bcps80@gmail.com
3.	Dr. N. Manoj, Professor , Department of Applied Chemistry	Organic Chemistry	M: 9447704531 E-mail: manoj.n@cusat.ac.in
4.	Dr. SM Sunoj, Professor, Department of Statistics	Statistics	M: 9495109908 E-mail: bcps80@gmail.com
5.	Dr. Judy MV, Professor, Department of Computer Applications	Big Data Analytics	M: 9048991368 E-mail: judy.nair@gmail.com
6.	Dr. Jereesh C.S., Assistant Professor, Department of Computer Science	Bioinformatics	M: 9495576665 E-mail: jereesh@cusat.ac.in
7.	Dr. Swapna P. Antony, Assistant Professor, Department of Marine Biology, Microbiology, and Biochemistry	Aquaculture and Marine Biotechnology	M: 8089131058 E-mail: swapnapantony@gmail.com

8.	Dr. Priyaja P., Assistant Professor, Department of Marine Biology, Microbiology, and Biochemistry	Marine biodiversity conservation	M: 9447444882 E-mail: <a href="mailto:priyaja@cusat.ac.in">priyaja@cusat.ac.in</a>
9.	Dr. KB Padmakumar, Assistant Professor, Department of Marine Biology, Microbiology, and Biochemistry	Marine Biology and Phytoplankton ecology	M: 9847255972 E-mail: <a href="mailto:kbpadmakumar@gmail.com">kbpadmakumar@gmail.com</a>
10.	Dr. A.A. Ambily, Assistant Professor, Department of Mathematics	Mathematics	M: 908751352 E-mail: <a href="mailto:ambily@cusat.ac.in">ambily@cusat.ac.in</a>
11.	Dr. V. Vijith Assistant Professor, Department of Physical Oceanography	Physical Oceanography and Marine Ecosystem Dynamics	M:9421747872 E-mail: <a href="mailto:vijith@cusat.ac.in">vijith@cusat.ac.in</a>

# FACULTY OF HUMANITIES

Dean:

Dr.K.Ajitha

Professor

Department of Hindi

Cochin University of Science and Technology

Kochi- 682 022

## DEPARTMENT OF HINDI

### M.A Hindi

#### Semester I

Course Code	Course	C/E	Credits	Marks		
				CE	ES	Total
20-362-0101	Ancient and Post Medieval Poetry (प्राचीन और उत्तर मध्यकालीन कविता)	Core	4Credits	50	50	100
20-362-0102	Hindi Short Story (हिन्दी कहानी)	Core	4Credits	50	50	100
20-362-0103	Functional Hindi and Translation (प्रयोजनमूलक हिंदी और अनुवाद)	Core	4Credits	50	50	100
20-362-0104	History of Hindi Literature: Ancient and Medieval Periods (हिंदी साहित्य का इतिहास: प्राचीन और मध्यकाल)	Core	3Credits	50	50	100
20-362-01--	Elective – (वैकल्पिक)	Elective	3Credits	50	50	100
	<b>Total Credits</b>		<b>18 Credits</b>			

#### Semester II

Course Code	Course	C/E	Credits	Marks		
				CE	ES	Total
20-362-0201	Bhakti Poetry (भक्तिकाव्य)	Core	4Credits	50	50	100
20-362-0202	Essays, Sketches and Other Prose Forms (निबंध, रेखाचित्र एवं गद्य की अन्य गद्यविधाएँ)	Core	4Credits	50	50	100
20-362-0203	History of Literature: Modern Period (हिंदी साहित्य का इतिहास : आधुनिक काल)	Core	4Credits	50	50	100
20-362-0204	Hindi Drama and Theatre (हिंदी नाटक और रंगमंच)	Core	3Credits	50	50	100
20-362-02--	Elective – (वैकल्पिक)	Core	3Credits	50	50	100
	<b>Total Credits</b>		<b>18 Credits</b>			

**Semester III**

Course Code	Course	C/E	Credits	Marks		
				CE	ES	Total
20-362-0301	Modern Poetry – I (आधुनिक कविता – I)	Core	4Credits	50	50	100
20-362-0302	Hindi Novel (हिंदी उपन्यास)	Core	4Credits	50	50	100
20-362-0303	Development and Structure of Hindi Language (हिंदी भाषा का विकास और संरचना)	Core	4Credits	50	50	100
20-362-0304	Indian Literary Thoughts (भारतीय साहित्यिक चिंतन)	Core	3Credits	50	50	100
20-362- 03 - -	Elective – (वैकल्पिक)		3Credits	50	50	100
<b>Total Credits</b>			<b>18 Credits</b>			

**Semester IV**

Course Code	Course	C/E	Credits	Marks		
				CE	ES	Total
20-362-0401	Modern Poetry II (आधुनिक कविता –II)	Core	4Credits	50	50	100
20-362-0402	Indian Literature (भारतीय साहित्य)	Core	4Credits	50	50	100
20-362-0403	Western Literary Thoughts (पश्चात्य साहित्यिक चिंतन)	Core	4Credits	50	50	100
20-362-0404	General Linguistics (सामान्य भाषाविज्ञान)	Core	3Credits	50	50	100
20-362- 04 - -	Elective – (वैकल्पिक)		3Credits	50	50	100
<b>Total Credits</b>			<b>18 Credits</b>			

**List of Electives offered**

(Code of electives start only from no. 10 for clarity)

10. Indian Culture
11. Hindi Renaissance
12. Hindi Literature (for the Students of Other Departments)
13. Comparative Literature
14. Hindi Writings of Kerala
15. Feminine Discourse in Hindi Literature
16. Ecological Discourse in Hindi Literature

17. Adivasi Discourse in Hindi Literature
18. Dalit Literature
19. Human Rights in Literature
20. Communicative Hindi
21. Mass Communication and Media Writing
22. Special Author: Premchand
23. Special Author: Sarveshwar Dayal Saxena
24. Special Author: BhismaSahni
25. Gandhian Literature in Hindi
26. Transgender Literature in Hindi

## POSTGRADUATE DIPLOMA IN TRANSLATION, JOURNALISM AND COMPUTING

(HINDI ENGLISH)

Sl.	Course Code	Title of Paper	Continu- ous Evaluati- on(50)	Year End Examination(50)	Total Marks( 100)	Hours/ Week	Credits
1	PGDT 01	COURSE- I THEORY AND PRINCIPLES OF TRANSLATION	50	50	100	2 HOURS	4
2	PGDT -02	COURSE -II OFFICIAL LANGUAGE AND HINDI LANGUAGE COMPUTING	50	50	100	2 HOURS	4
3	PGDT -03	COURSE -III TRANSLATION OF SCIENCE, TECHNOLOGY AND SOCIAL SCIENCE LITERATURE HINDI, ENGLISH & VICE VERSA	50	50	100	2 HOURS	4
4	PGDT -04	COURSE-IV LITERARY TRANSLATION HINDI, ENGLISH, MALAYALAM & VICE VERSA	50	50	100	2 HOURS	4
5	PGDT -05	COURSE-V JOURNALISM AND MEDIA TRANSLATION	50	50	100	2 HOURS	4
6	PGDT -06	COURSE-VI INTERNSHIP/ TRANSLATION PROJECT	-	-	100		8
7	PGDT -07	VIVA -VOCE	-	-	100		2
<b>TOTAL</b>					<b>700</b>	<b>10</b>	<b>30</b>

**PROGRAMME STRUCTURE**  
**COMPUTER AIDED LANGUAGE TRAINING (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, Track Mode etc.
- Formating & 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

**MS Power Point**

- Creating & Formatting Content
- Collaborating – Track, Edit, Add, Delete Comments, Merge
- Managing & Delivering Presentation

**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 Indic, IMI, ISM, Lipikaar, Sonma Type
- Use proper Keyboarding techniques.
- Improve speed and accuracy while keyboarding
- Identify and correct common typing errors.

**Data base – Operations**



**Details of Faculty : Permanent**

Sl. No.	Name & Designation	Specialization	Communication (Contact No. & e-mail id)
1	Dr. K Ajitha, Senior Professor & Head	Modern and Contemporary Hindi Literature, Drama and Theatre, Subaltern Studies	9447646240 ajiravi@cusat.ac.in
2	Dr.Praneetha P, Associate Professor	Ancient & Modern Hindi Literature, Drama and Theatre, Comparative Literature	9495677720 dr.praneetha.p@cusat.ac.in
3	Dr. Aneesh. K. N, Assistant Professor	Modern Hindi Literature, Drama and Theatre, Comparative Literature	9446426447 aneeshkn1@gmail.com
4	Dr. Girish Kumar. K.K, Assistant Professor	Modern and Contemporary Hindi Literature, Comparative Literature, Contemporary Hindi Poetry	9495106637 <a href="mailto:girish372@gmail.com">girish372@gmail.com</a>
5	Miss. Sreelekha K.N, Assistant Professor	Hindi Short Story, Linguistics, Tribal Discourse & Translation	8330013928 sayinith@gmail.com
6	Dr. Sheena M. A Assistant Professor	Modern Hindi Literature, Hindi Novel & Short Story	8547403966 sheenus.ma@gmail.com

**Emeritus Professor**

Sl. No.	Name & Designation	Specialization	Communication (Contact No. & e-mail id)
1	Dr.R. Sasidharan, Emeritus Professor	Ancient and Modern Hindi Literature, Drama & Theatre, Comparative Literature, Translation Studies, Dalit Literature	9447052840, sreeragamsasi@gmail.com

**Guest Faculty**

Sl. No.	Name & Designation	Specialization	Communication (Contact No. & e-mail id)
1	Ajna M.A, Guest Faculty Malayalam	Malayalam Literature	8547403966 ajna.abbas16@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 recognised 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 ENGLISH 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/ VIVA VOCE	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	Intonation of Words and Sentences
Self-Introduction	Conjugation of Regular Verbs
German Alphabet	Conjugation of Irregular Verbs
International Words in German Vocabulary	Nouns and Gender
Working with a Dictionary	Plural Forms of Nouns
Numbers 0-1000	Definite and Indefinite Articles
Communication and Things in the Classroom	Word Order: Statements and Questions
Asking Questions about a Person	Interrogative Pronouns
Travelling/Living Abroad	Personal Pronouns
Geography of Europe	Interrogative Pronouns
Describing One's Hobbies and Interests	Sentence Structures
Describing a Person	Negation using nicht
Conversational Discourse (Dialogues)	Negation using kein/keine
Conversing over the Phone	Imperative (formal, informal)
Vocabulary Learning & Grouping	Nominative, Accusative Case and Dative Case
Meeting People	Negation in Accusative Case
Small Talk in a Café	Syntax: Nominative, Accusative Complements
Food & Drinks	Separable Verbs
Ordering Food in a Restaurant	Modalverbs: möchten, können, wollen, sollen, müssen & mögen
Writing a Letter	Prepositions with the Accusative and Dative Case
Payment in a Restaurant	Possessive Pronouns
Telling Time	Demonstrative Pronouns
Time Phrases	Possessive pronoun in Nominative and Accusative
Days of the Week	Welcher /dieser in Nominative and Accusative
Fixing an Appointment	
Making and Accepting an Invitation	
Introducing the Family/Family Life	
Food Items	
Measurements,	
Clothing & Colours	
Doing the Groceries	

Text Book: NETZWERK Deutsch als Fremdsprache 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 civilisation (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 JAPANESE PROGRAMME**

REVISED SYLLABUS AND REGULATIONS W.E.F 2021-22  
ADMISSIONS

### **Programme Objectives**

- To train students to read, write and communicate in simple Japanese language.
- To impart knowledge in the nuances of proper pronunciation and appropriate use of Japanese.
- 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.)
- Acquire some deeper understanding of Japan, its unique culture and socio-economic position for career prospects.

### **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 thereof recognized by CUSAT (qualifying examination). Previous knowledge in the language is not essential. If necessary, applicants may be ranked on the basis of their total marks obtained for qualifying examination and admission shall be done on the basis of the rank.

z. **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 classes of two hours duration shall be conducted either in the morning or in the evening. On line 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 undergone the prescribed Course in the Department 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 aggregate minimum of 50% in the examination. A minimum 40% in viva-voce is also essential.

**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 and Basic Theory of Law)	6	2		NA	50	50	100
20-272-0306	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
20-272-0401	Financial Management	6	2		NA	50	50	100
20-272-0402	Human Resources	6	2		NA	50	50	100

	Management							
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 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
20-273-0201	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, Technology 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 Arbitration	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 Arbitration	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**

<b>Course Code</b>	<b>Paper</b>	<b>C/E</b>	<b>Credits</b>	<b>Pre-requisites</b>
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
<b>Course Code</b>	<b>Open Elective Courses in Law</b>	<b>Credits</b>
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
	<b>Elective Courses in Law</b>	
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
	<b>Interdisciplinary Electives</b>	
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 Ph: 0484-2543744 9495953744
2.	Dr. Aneesh V. Pillai (Assistant Professor)	Consumer Law & Human Rights Law	<a href="mailto:dr.avpillai@cusat.ac.in">dr.avpillai@cusat.ac.in</a> , <a href="mailto:advavpillai@gmail.com">advavpillai@gmail.com</a> 8606558242
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9.	Sri. Naveen S. (Assistant Professor)	Environmental Law, Constitutional Law, IPR , International Organisation and Human Rights	<a href="mailto:naveensukumaran@gmail.com">naveensukumaran@gmail.com</a> <a href="mailto:naveensukumaran@cusat.ac.in">naveensukumaran@cusat.ac.in</a> 9400250724
10.	Dr. Nemat Sheereen S. (Assistant Professor)	Financial Management, Marketing Management	<a href="mailto:nematsheerin3@gmail.com">nematsheerin3@gmail.com</a> 9446208502
11.	Dr. Preetha S. (Assistant Professor)	Jurisprudence, Commercial Law & Criminal Law	<a href="mailto:preetha.sadasivan@gmail.com">preetha.sadasivan@gmail.com</a> <a href="mailto:preetha@cusa.ac.in">preetha@cusa.ac.in</a> 9446208509
12.	Dr. P.S. Seema (Associate Professor)	Jurisprudence, Criminal Law, Constitutional Law & Human Rights Law	<a href="mailto:pss_sls@yahoo.co.in">pss_sls@yahoo.co.in</a> , <a href="mailto:drpsseema@gmail.com">drpsseema@gmail.com</a> Ph: 0484-2233411 9496943875
13.	Dr. Sreejith S. (Assistant Professor)	Management, Finance, Marketing	<a href="mailto:lamjith@gmail.com">lamjith@gmail.com</a> 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)		
	a. Electives 1	E	4
	b. Electives 2	E	4
	Or		
	Project Work/Internship	E	8
	<b>TOTAL</b>		<b>24</b>

### 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 (Honorary Professor)	Commercial Law, Criminal Law & IPL	<a href="mailto:nsg@cusat.ac.in">nsg@cusat.ac.in</a> Ph:0484-2577542 9447077542
2.	Dr.I.G. Rathish Assistant Professor (contract)	Chemistry	<a href="mailto:rathishig@gmail.com">rathishig@gmail.com</a> Ph:8108074199 8921982102
3.	Ms.Anjana Girish Assistant Professor (contract)	Public Law & IPR	<a href="mailto:anjana.girish87@gmail.com">anjana.girish87@gmail.com</a> Ph:9847063736
5.	Dr.Anson C J Assistant Professor (contract)	IPR & Management	<a href="mailto:777anson@gmail.com">777anson@gmail.com</a> 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	Title of the Paper	Credits	Core	Marks		
				Continuous assessment	End Sem. Exam.	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- 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

(13 credits for Core )

Maximum Total Credit Offered in 1<sup>st</sup> Semester: 20

Course Code	Title of the Paper	Credits	Elective	Marks		
				Continuous assessment	End Sem. Exam.	Total
20-308- 0105	Principles of Fisheries Business Management	3	E	50	50	100
20-308- 0106	Research methodology and Quantitative techniques	2	E	50	50	100
20-308- 0109	Climate change impact on marine ecosystem and fisheries	2	E	50	50	100

(07 credits for Elective Courses)

Maximum Total Credit Offered in 1<sup>st</sup> Semester: 20

**Semester II**

Course Code	Title of the Paper	Credit	Core	Marks		
				Continuous assessment	End Sem. Exam.	Total
20-308- 0201	Fisheries Resources and Management	3	C	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- 0208	Fish processing and quality control (Practical)	1	C	100	---	100
20-308- 0209	Fishing Craft and Gear Technology (Practical)	1	C	100	----	100

( 14 Credits for Core)

Maximum Total Credits offered in Second Semester: 30 Credits

Course Code	Title of the Paper	Credit	Elective	Marks		
				Continuous assessment	End Sem. Exam.	Total
20-308- 0202	Fishing Craft and Gear Technology	3	E	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- 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
20-308- 0212	Food Science and Nutrition	3	E	50	50	100
20-308- 0213	Aquaculture Economics	3	E	50	50	100

(16 Credits for Elective Courses)

Maximum Total Credits offered in Second Semester: 30 Credits

**Semester III**

Course Code	Title of the Paper	Credit	Core	Marks		
				Continuous assessment	End Sem. Exam.	Total
20-308- 0301	Seed Production and Hatchery Management of Cultivable Finfishes and Shellfishes	3	C	50	50	100
20-308- 0303	Fishing operation, Seamanship and Navigation	2	C	50	50	100
20-308- 0304	Byproducts and Value Added Products Technology	3	C	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- 0310	Byproducts, Value added products and Microbiology (Practical)	1	C	100	---	100
(14 Credits for Core)						
Maximum Total Credits offered in Third Semester: 34 Credits						

Course Code	Title of the Paper	Credit	Elective	Marks		
				Continuous assessment	End Sem. Exam.	Total
20-308- 0302	Aquaculture Systems and Practices	3	E	50	50	100
20-308- 0305	Quality Assurance and Seafood Safety	3	E	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	---	100
20-308- 0311	Fishing operation/Onboard Training (Practical)	1	E	100	---	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
(20 Credits for Elective Courses)						
Maximum Total Credits offered in Third Semester: 34 Credits						

**Semester IV**

Course Code	Title of the Paper	Credit	Core	Marks		
				Continuous assessment	End Sem. Exam.	Total
20-308- 0401	Internship in Seafood Industry & Report evaluation	4	C	100	----	100
20-308- 0404	Dissertation/ Project Report Evaluation	8	C	100 100	----	100 100
20-308- 0405	Course Viva-voce	1	C	100	----	100
(13 credits for Core)						
Maximum Total Credit Offered in 4 <sup>th</sup> Semester: 19						

Course Code	Title of the Paper	Credit	Elective	Marks		
				Continuous assessment	End Sem. Exam.	Total
20-308- 0402	Internship in Hatchery/Farm/Aquaculture industry	4	E	100	----	100
20-308- 0403	Entrepreneurship / Startups/ Business Incubation Initiatives	2	E	100	----	100
(6 credits for Electives)						
Maximum Total Credit Offered in 4 <sup>th</sup> Semester: 19						

**TOTAL CREDITS OFFERED IN SEMESTERS (I TO IV)**

Maximum 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. (SEA FOOD SAFETY AND TRADE)**

**Semester I**

Course Code	Title of the Paper	Credits	Core	Marks		
				Continuous evaluation	End Sem. Exam.	Total
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
20-386-0107	Fish Harvest Technologies and Onboard Facilities	2	C	50	50	100
20-386-0109	Food chemistry and Fish Biochemistry ( Practical)	1	C	100	---	100
(12 credits for Core) Maximum Total Credit Offered in 1 <sup>st</sup> Semester: 21						

Course Code	Title of the Paper	Credits	Elective	Marks		
				Continuous evaluation	End Sem. Exam.	Total
20-386-0101	Taxonomy and Life History Traits of Commercially Important Fin Fishes and Shell Fishes	3	E	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
20-386-0108	Taxonomy and Life History Traits of Commercially Important Fin Fishes and Shell Fishes (Practical)	1	E	100	---	100
(09 credits for Elective Courses) Maximum Total Credit Offered in 1 <sup>st</sup> Semester: 21						

**Semester II**

Course Code	Title of the Paper	Credit	Core	Marks		
				Continuous assessment	End Sem. Exam.	Total
20-386-0201	Freezing, Canning and Packaging Technology	3	C	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
20-386-0207	Freezing, Canning and Packaging Technology (Practical)	1	C	100	----	100
20-386-0209	Economics of Seafood Production and Marketing (Practical)	1	C	100	----	100
( 11 Credits for Core) Maximum Total Credits offered in Second Semester: 20 Credits						

Course Code	Title of the Paper	Credit	Elective	Marks		
				Continuous assessment	End Sem. Exam.	Total
20-386-0202	Fundamentals of Food Microbiology	2	E	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
20-386-0208	Fundamentals of Food Microbiology (Practical)	1	E	100	----	100
(09 Credits for Elective Courses)						
Maximum Total Credits offered in Second Semester: 20 Credits						

### **Semester III**

Course Code	Title of the Paper	Credit	Core	Marks		
				Continuous assessment	End Sem. Exam.	Total
20-386-0301	Sustainable Aquaculture for Safe Food Production	3	C	50	50	100
20-386-0302	Byproducts and Value added Products Technology	3	C	50	50	100
20-386-0303	Food Safety	3	C	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
20-386-0309	Value Added Products technology and Food Safety (Practical)	1	C	100	---	100
(19 Credits for Core)						
Maximum Total Credits offered in Third Semester: 25 Credits						

Course Code	Title of the Paper	Credit	Elective	Marks		
				Continuous assessment	End Sem. Exam.	Total
20-386-0304	Environmental and Natural Resource Economics	3	E	50	50	100
20-386-0308	Analytical methods for Seafood Quality Assurance	2	E	50	50	100
20-386-0310	Sustainable Aquaculture for Safe Food Production (Practical)	1	E	100	---	100
(06 Credits for Elective Courses)						
Maximum Total Credits offered in Third Semester: 25 Credits						



**Semester IV**

Course Code	Title of the Paper	Credit	Core	Marks		
				Continuous assessment	End Sem. Exam.	Total
20-386-0401	Internship in Seafood Industry and Report Evaluation	4	C	100		100
20-386-0403	Dissertation/ Project report Evaluation	8	C	100		100
20-386-0404	Course Viva-voce	1	C	100		100
(13 credits for Core)						
Maximum Total Credit Offered in 4 <sup>th</sup> Semester: 15						

Course Code	Title of the Paper	Credit	Elective	Marks		
				Continuous assessment	End Sem. Exam.	Total
20-386-0402	Entrepreneurship/Startups/ Business Incubation Initiatives	2	E	100		100
(02 credits for Electives)						
Maximum Total Credit Offered in 4 <sup>th</sup> Semester: 15						

**TOTAL CREDITS OFFERED IN SEMESTERS (I TO IV)**

Maxi-mum Credits Offered	Semester 1	Semester 2	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**

<b>Sl.No</b>	<b>Name &amp; Designation</b>	<b>Specialization</b>	<b>Communication (Contact No.)</b>	<b>Email id</b>
1	Dr. S. Sabu Associate Professor & Director	Fish Post Harvest Technology	9847233764	<a href="mailto:directorsif@cusat.ac.in">directorsif@cusat.ac.in</a> <a href="mailto:sabuif@cusat.ac.in">sabuif@cusat.ac.in</a>
2	Dr. M Harikrishnan, Professor	Industrial Fisheries	9447327804	<a href="mailto:mahadevhari@cusat.ac.in">mahadevhari@cusat.ac.in</a>
3.	Dr. Santhoshkumar P. K Associate Professor	Fisheries Economics	9620569469	<a href="mailto:s.kumar@cusat.ac.in">s.kumar@cusat.ac.in</a>
4	Dr. Mujeeb Rahiman Associate Professor	Fisheries	9249722109	<a href="mailto:mujeebrkm@cusat.ac.in">mujeebrkm@cusat.ac.in</a>
5	Dr. Hareesh N Ramanathan Associate Professor	Fish Business Management	9447476660	<a href="mailto:hareeshramanathan@cusat.ac.in">hareeshramanathan@cusat.ac.in</a>
6	Dr. Mini Sekharan Assistant Professor	Fisheries Management	9895070310	<a href="mailto:minisekharan@cusat.ac.in">minisekharan@cusat.ac.in</a>
7	Dr. Shibu A V Assistant Professor	International Marketing and Trade	8129511388	<a href="mailto:avshibu@cusat.ac.in">avshibu@cusat.ac.in</a>
8	Dr. Ancy V P  Assistant Professor	Fisheries Economics	9895040045	<a href="mailto:ancyvp@cusat.ac.in">ancyvp@cusat.ac.in</a>
9	Dr. Ginson Joseph Assistant Professor	Fish Processing Technology	8848095895	<a href="mailto:ginsonjosephif@cusat.ac.in">ginsonjosephif@cusat.ac.in</a>

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**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.	<b>Dr.C.A. Babu (CAB)</b> Professor	Boundary Layer Meteorology	0480 2881651/ 0484 2863813 <a href="mailto:babuca@cusat.ac.in">babuca@cusat.ac.in</a>
2.	<b>Baby Chakrapani (BC)</b> Assoc. Professor	Numerical Modelling of Atmospheric and Ocean Processes	0487 2428620 /0484 2863803 <a href="mailto:bcpaani@cusat.ac.in">bcpaani@cusat.ac.in</a>
3.	<b>Dr. K. Satheesan (KS)</b> Assoc. Professor& Head	Remote Sensing, Radar Meteorology	9400810099 04842863815 <a href="mailto:satheesan.k@gmail.com">satheesan.k@gmail.com</a>
4.	<b>Dr. V. Madhu (VM)</b> Asst. Professor	Middle Atmospheric Dynamics, Tropical Meteorology	9495424310/ 0484 2863814 <a href="mailto:madhuv@cusat.ac.in">madhuv@cusat.ac.in</a>
5.	<b>Dr. Lekshmy P R(PRL)</b> Asst. Professor	Isotope Hydrology, Tropical Meteorology, Paleo Climatology	7878320842/04842863802 <a href="mailto:rarlyekshmy@gmail.com">rarlyekshmy@gmail.com</a>
6.	<b>Dr. Abhilash S (AS)</b> Asst. Professor	Tropical Meteorology, Climate Modelling	9561642841, 04842863816 <a href="mailto:abhimets@gmail.com">abhimets@gmail.com</a>
7.	<b>Dr. Midhun M (MM)</b> Asst. Professor	Climate Dynamics, Paleo Climatology	9662735653, 04842863802 <a href="mailto:midhun.ndr@gmail.com">midhun.ndr@gmail.com</a>

**DEPARTMENT OF CHEMICAL OCEANOGRAPHY**

**M.Sc. HYDROCHEMISTRY**

**Semester I**

Course Code	Course	C/E	Credits	Marks		
				CE	ES	Total
20-304-0101	Co-ordination Chemistry	C	3	50	50	100
20-304-0102	Marine Environment	C	3	50	50	100
20-304-0103	Quantum Mechanics	C	3	50	50	100
20-304-0104	Stereochemistry, Pericyclic Reactions and Photochemistry	C	3	50	50	100
20-304-0105	Practical I – Analytical Techniques	C	2	100	-	100
20-304-0106	Practical II – Quantitative Chemical Analysis	C	2	100	-	100
<b>Total</b>			<b>16</b>	<b>400</b>	<b>200</b>	<b>600</b>

**Elective I**

Course Code	Course
20-304-0001	Analytical Chemistry
20-304-0015	Introduction to Hydrochemistry
20-304-0023	Solid State Chemistry

**Semester II**

Course Code	Course	C/E	Credits	Marks		
				CE	ES	Total
20-304-0201	Chemical Oceanography	C	3	50	50	100
20-304-0202	Group Theory and Spectroscopy	C	3	50	50	100
20-304-0203	Natural Products and Organic Synthesis	C	3	50	50	100
20-304-0204	Thermodynamics and Statistical Mechanics	C	3	50	50	100
20-304-0205	Practical III – Separation and Synthetic Methods	C	2	100	-	100
20-304-0206	Practical IV- Water and Sediment Analysis	C	2	100	-	100
<b>Total</b>			<b>16</b>	<b>400</b>	<b>200</b>	<b>600</b>

**Elective II**

Course Code	Course
20-304-0002	Applications of Coordination Compounds
20-304-0005	Chemistry of Biomolecules
20-304-0006	Chemistry of Radiations, Surface and Inorganic Materials
20-304-0010	General Chemical Oceanography***
20-304-0011	General Chemical Oceanography Practical***
20-304-0012	Green Chemistry
20-304-0013	Instrumental Techniques
20-304-0016	Marine Biogeochemistry
20-304-0020	Nano materials and Supra molecular Chemistry
20-304-0021	Organo metallic Chemistry
20-304-0022	Polar Sciences
20-304-0024	Water Management

**Semester III**

Course Code	Course	C/E	Credits	Marks		
				CE	ES	Total
20-304-0301	Aquatic Chemical Resources	C	2	50	50	100
20-304-0302	Organic Spectroscopy	C	3	50	50	100
20-304-0303	Solution Chemistry	C	3	50	50	100
20-304-0304	Practical V - Instrumental Techniques 1	C	2	100	-	100
20-304-0305	Practical VI- Physicochemical Methods	C	2	100	-	100
<b>Total</b>			<b>12</b>	<b>350</b>	<b>150</b>	<b>500</b>

**Elective III**

Course Code	Course
20-304-0003	Aquatic Pollution
20-304-0004	Atmospheric Chemistry
20-304-0007	Computational Chemistry
20-304-0008	Environmental Law And EIA
20-304-0009	Estuarine Chemistry
20-304-0014	Instrumental Techniques II- Practical
20-304-0017	Marine Geochemistry
20-304-0018	Marine Natural Products
20-304-0019	Marine Organic Chemistry

**Semester IV**

Course Code	Course	C/E	Credits	Marks		
				CE	ES	Total
20-304-0401	Dissertation (Project work in the Department/Universities/Scientific institutes/Industrial Organizations etc.)*	C	14	50	50	100
20-304-0402	Project Viva-voce*	C	2	-	100	100
<b>Total</b>			<b>16</b>	<b>50</b>	<b>150</b>	<b>200</b>

<b>Total number of credits for all the four semesters (Core Courses)</b>	<b>60</b>
<b>Minimum number of credits required for the completion of M.Sc. (Hydrochemistry) programme.</b>	<b>72</b>
<b>Minimum number of credits to be taken as elective courses</b>	<b>12</b>

**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	Nano materials and Supra molecular Chemistry	3
20-304-0021	Organo metallic Chemistry	3
20-304-0022	Polar Sciences	2
20-304-0023	Solid State Chemistry	3
20-304-0024	Water Management	3

#### **DETAILS OF FACULTY**

##### **Permanent Faculty**

Sl No	Name & Designation	Specialization	Communication (Contact No & e-mail id)
1	<b>Dr. Shaju S S</b> Assistant Professor & Head of the Department	Bio geo- chemistry, Bio- optics Ocean colour Remote sensing	9895909457 <a href="mailto:shaju@cusat.ac.in">shaju@cusat.ac.in</a>
2	<b>Dr. Habeeb Rahman K</b> Assistant Professor	Chemical Oceanography Isotope Geochemistry	8281256045 <a href="mailto:habeebcusat@gmail.com">habeebcusat@gmail.com</a>
3	<b>Dr. Jorphin Joseph</b> Assistant Professor	Membranes for water Purification, Electrochemical energy storage and conversion.	9495283270 <a href="mailto:jorphin@cusat.ac.in">jorphin@cusat.ac.in</a>

**Contract Faculty**

Sl No	Name & Designation	Specialization	Communication (Contact No & e-mail id)
1	<b>Dr. Sreejith S .S</b> Assistant Professor (on- contract)	Coordination chemistry, CO <sub>2</sub> reduction, DFT studies.	9567813008 <a href="mailto:sreejithss@cusat.ac.in">sreejithss@cusat.ac.in</a>
2	<b>Dr. Asha T M</b> Assistant Professor (on- contract)	Coordination Chemistry Catalysis Biological studies	9746824678 <a href="mailto:ashatm1989@cusat.ac.in">ashatm1989@cusat.ac.in</a>

**UGC BSR Faculty**

Sl No	Name & Designation	Specialization	Communication (Contact No & e-mail id)
1	<b>Dr. C.H. Sujatha</b> UGC BSR Faculty	Chemical Oceanography, Marine organic chemistry, Pesticides in the aquatic chemistry, Aerosol Chemistry	9995991778 <a href="mailto:drchsujatha@yahoo.co.in">drchsujatha@yahoo.co.in</a>

**DEPARTMENT OF MARINE BIOLOGY, MICROBIOLOGY AND BIOCHEMISTRY****M.Sc. MARINE BIOLOGY****Program Outcome (PO)**

PO 1	Bridging the knowledge of basic sciences and technologies to understand marine ecosystem
PO 2	Problem analysis: Identify, formulate, research and analyse
PO 3	Develop analytical and computational skills to address challenges in environmental issues

**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	Plantonology
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 Professor	Fish Pathology, Fish Nutrition & Fish Genetics	Phone: 0484-2505099; 9446866050 mohamedhatha@cusat.ac.in mohamedhatha@gmail.com
2	Dr. S. Bijoy Nandan Professor	Marine Ecology & Marine Pollution	Phone: 9446022880/ 7025150844 bijoynandan@yahoo.co.in
	Dr. Priyaja P Assistant Professor	Marine Biology with Invertebrata	Phone: 9447444882 Priyaja59@gmail.com
3	Dr. Padmakumar K B Assistant Professor	Algology	Phone: 9847255972 <a href="mailto:kbpadmakumar@cusat.ac.in">kbpadmakumar@cusat.ac.in</a> kbpadmakumar@gmail.com
4	Dr. Swapna P Antony Assistant Professor	Aquaculture	Phone: 8089131058/ 0484-2863214 <a href="mailto:swapnapantony@gmail.com">swapnapantony@gmail.com</a> swapnapantony@cusat.ac.in
5	Dr.Lathika Cicily Thomas	Marine Micro Biology	Phone:9446011630 <a href="mailto:latikacicily@gmail.com">latikacicily@gmail.com</a>
6	Dr.Sreerexha P R	Marine Biochemistry	Phone:9895999556 <a href="mailto:Prs222@gmail.com">Prs222@gmail.com</a>

**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
<b>Total</b>			<b>21</b>

**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
<b>Total</b>			<b>21</b>

**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
<b>Total</b>			<b>22</b>

**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
<b>Total</b>			<b>16</b>

**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
<b>Total</b>			<b>22</b>

**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
<b>Total</b>			<b>23</b>

**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
<b>Total</b>			<b>24</b>

**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
<b>Total</b>			<b>16</b>

**DETAILS OF FACULTY**

Sl. No.	Name & Designation	Specialization	Communication
1	Dr. Sunil P S (Associate Professor)	Soiled-Earth Geophysics, Tectonics & Space Geodesy, Earthquake & Ionosphere Seismology, Glacier Dynamics	9869801448 sunilps@cusat.ac.in
2	Dr. Joji V.S. (Associate Professor)	Ground water studies,Rain water harvesting, Artificial recharge, Hydrochemistry,Trainer development (National Trainer) & Training Needs Analysis (GOI Consultant)	9446361319 jojivsdeepam@gmail.com
3	Dr. P. Ajayakumar (Assistant Professor)	Gravity, Magnetic Seismology	9495365980 ajaycochin@cusat.ac.in
4	Dr. N. R. Nisha (Assistant Professor)	Marine Micropaleontology, Paleoceanography, Paleoclimatology	9846929649 nrnisha@cusat.ac.in
5	Dr. Ratheesh Kumar R T (Assistant Professor)	Plate tectonics, Geodynamics, Hard-rock Petrology, Solid Earth Geophysics, Planetary Science	8592082811 ratheesh@cusat.ac.in
6	Dr. Amaldev T. (Assistant Professor)	Igneous and Metamorphic Petrology, Environmental Geology	9567870988 amaldev@cusat.ac.in
7	Dr. Honey H.Das (Assistant Professor)	Plate tectonics, Hard rock Petrology, Structural Geology	7356087161 honeyhdas@cusat.ac.in
8	Mr. Naveen P.U. (Assistant Professor)	Gravity and Magnetic Methods, Geodynamics	9656769939 punaveenpu@gmail.com naveenpu@cusat.ac.in

**DEPARTMENT OF PHYSICAL OCEANOGRAPHY**

**M.SC. OCEANOGRAPHY**

**Semester – I (CORE COURSES)**

Course Code	Course Title	Hrs/Week			Credits	Marks		
		L	T	P		Internal	External	Total
20-319-0101	Introductory 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 (P)	-	-	2	1	100	-	100
20-319-0105	Physical Oceanographic Computations (P)	-	-	4	2	100	-	100
20-319-0106	Oceanographic Application Tools-I (P)	-	-	4	2	100	-	100
<b>Total</b>					<b>C = 16</b>			

**Semester – II (CORE COURSES)**

Course Code	Course Title	Hrs/Week			Credits	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 (P)	-	-	2	1	100	-	100
20-319-0205	Coastal Oceanography (P)	-	-	4	2	100	-	100



Course Code	Course Title	Hrs/Week			Credits	Marks		
20-319-0206	Air-Sea Interaction (P)	-	-	2	1	100	-	100
<b>Total</b>					<b>C = 14</b>			

#### 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 (P)	-	-	4	2	100	-	100
20-319-0305	Ocean Modelling (Practical)	-	-	4	2	100	-	100
<b>Total</b>					<b>C=14</b>			

#### 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
<b>Total</b>					<b>C=16</b>			

#### 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 GM – 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.*

#### **Details of Faculty**

<b>Sl. No.</b>	<b>Name &amp; Designation</b>	<b>Specialization</b>	<b>Communication</b>
1	Dr.R.Sajeev (RS) Associate Professor & Head	Coastal Oceanography	Ph: Off: 0484-2363950 rsajeev@cusat.ac.in
2	Dr.P.K.Saji (PKS) Assistant Professor	Ocean Circulation Ocean Modeling	Ph: Off: 0484-2363950 pksaji@cusat.ac.in
3	Dr.V.Vijith Assistant Professor	Estuarine Oceanography Ocean Modeling	Ph: Off: 0484-2363950 vijithpod@cusat.ac.in
4	Dr K M Santhosh Assistant Professor on contract	Remote Sensing	Ph: Off: 0484-2363950 <a href="mailto:drsanthoshkm@cusat.ac.in">drsanthoshkm@cusat.ac.in</a>
5	Mr.Lix K John Assistant Professor on contract	Air Sea Interaction	Ph: Off: 0484-2363950 <a href="mailto:lix@cusat.ac.in">lix@cusat.ac.in</a>
6	Mrs.Thanvi Fathima Rahman Assistant Professor on contract	Ocean Engineering	Ph: Off: 0484-2363950 thanvirahman@cusat.ac.in

## M. Tech. Ocean Technology

### 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	60	40	100
20-439-0102	Coastal Engineering	-	4	-	4	60	40	100
20-439-0103	Marine Hydrodynamics	-	3	-	3	60	40	100
20-439-0104	Coastal Oceanography (P)	-	-	2	1	100	-	100
20-439-0105	Computer Programming in Oceanography (Practical)	-	-	4	2	100	-	100
<b>Total</b>					<b>C= 13</b>			

### 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	60	40	100
20-439-0202	Environmental Ocean Technology	-	3	-	3	60	40	100
20-439-0203	Ocean Modelling	-	3		3	60	40	100
20-439-0204	Ocean Modelling Lab (P)	-	-	2	1	100	-	100
<b>Total</b>					<b>C= 11</b>			

### SEMESTER III

<b>20-439-0301</b>	<b>Project Dissertation – Phase-I</b>	<b>C=18</b>
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### SEMESTER IV

<b>20-439-0401</b>	<b>Project Dissertation Phase - II</b>	<b>C= 18</b>
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#### LIST OF ELECTIVES

Course Code	Course Title	Credits	Pre-Requisites
20-439-0001	Boundary Layer Dynamics	4	OT,MM,
20-439-0002	Marine Environmental Pollution	4	OT,MB
20-439-0003	Ocean Resources	4	MO,MGP,MM,GP
20-439-0004	Ocean Instrumentation	4	OT,ME
20-439-0005	Ocean Circulation and Dynamics	4	MO,MP,MM,BT
20-439-0006	Satellite Oceanography	4	OT,MM,ES,BT
20-439-0007	Integrated Coastal Zone Management	4	OT,MB
20-439-0008	Ocean Acoustics	4	OT,MO,MP
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	.....	3	20-439-0102
20-439-0016	Descriptive Oceanography	3	BT,MP,MO,MM,MG,NA,MB

OT- M.Tech Ocean Technology Students

MM- M.Sc. Meteorology

MO- M.Sc. Oceanography

BTM – B.Tech. Mechanical Engineering

MB- M.Tech. Marine Bio Technology Students

MG- M.Sc. Marine Geology

MP- M.Sc. Physics

BT- B.Tech. Civil/ Environmental Science

MGP – M.Sc. Marine Geophysics

NA – B.Tech. Naval Architecture & Ship Building

ES- M.Sc. Environmental Sciences

#### Details of Faculty

Sl. No.	Name & Designation	Specialization	Communication
1	Dr.R.Sajeev (RS) Associate Professor & Head	Coastal Oceanography	Ph: Off: 0484-2363950 rsajeev@cusat.ac.in
2	Dr.P.K.Saji (PKS) Assistant Professor	Ocean Circulation Ocean Modeling	Ph: Off: 0484-2363950 pksaji@cusat.ac.in
3	Dr.V.Vijith Assistant Professor	Estuarine Oceanography Ocean Modeling	Ph: Off: 0484-2363950 <a href="mailto:vijithpod@cusat.ac.in">vijithpod@cusat.ac.in</a>
4	Dr K M Santhosh Assistant Professor on contract	Remote Sensing	Ph: Off: 0484-2363950 <a href="mailto:drsanthoshkm@cusat.ac.in">drsanthoshkm@cusat.ac.in</a>
5	Mr. Lix K John Assistant Professor on contract	Air Sea Interaction	Ph: Off: 0484-2363950 <a href="mailto:lix@cusat.ac.in">lix@cusat.ac.in</a>
6	Mrs.Thanvi Fathima Rahman Assistant Professor on contract	Ocean Engineering	Ph: Off: 0484-2363950 thanvirahman@cusat.ac.in

# FACULTY OF SCIENCE

Dean:

Dr. N Balakrishna  
Professor  
Department of Statistics  
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
	<b>Total</b>				<b>23</b>	<b>600</b>	<b>300</b>	<b>900</b>

**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
	<b>Total</b>				<b>23</b>	<b>600</b>	<b>300</b>	<b>900</b>

### 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
	<b>Total</b>				<b>25</b>	<b>600</b>	<b>300</b>	<b>900</b>

### 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
	<b>Total</b>				<b>25</b>	<b>600</b>	<b>300</b>	<b>900</b>

#### **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
	<b>Total</b>				<b>22</b>	<b>550</b>	<b>250</b>	<b>800</b>

**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
	<b>Total</b>				<b>22</b>	<b>550</b>	<b>250</b>	<b>800</b>

**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	Stereochemistry	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 Separation			6	2	100	-	100
CHE 10708	Open Ended Lab - III			6	2	100	-	100
	<b>Total</b>				<b>23</b>	<b>550</b>	<b>250</b>	<b>800</b>

**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	Bio molecules 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
	<b>Total</b>				<b>23</b>	<b>550</b>	<b>250</b>	<b>800</b>

**Elective – VIII**

Course Code	Course
CHE 10809	Quantum Chemistry of Molecules and 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	Organometallic 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
	<b>Total</b>				<b>22</b>	<b>600</b>	<b>300</b>	<b>900</b>

**Elective – IX**

Course Code	Course
CHE 10908	Computational Chemistry
CHE 10909	Green Chemistry
CHE 10910	Electro analytical 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
	<b>Total</b>				<b>20</b>		<b>300</b>	<b>300</b>

**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
	<b>Total</b>				<b>20</b>	<b>300</b>	<b>200</b>	<b>500</b>

**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
	<b>Total</b>				<b>20</b>	<b>300</b>	<b>200</b>	<b>500</b>

**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
	<b>Total</b>				<b>19</b>	<b>300</b>	<b>200</b>	<b>500</b>

**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
	<b>Total</b>				<b>20</b>	<b>300</b>	<b>200</b>	<b>500</b>

**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 - I*	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
	<b>Total</b>				<b>20</b>	<b>300</b>	<b>200</b>	<b>500</b>

**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 <sup>@</sup>	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
	<b>Total</b>				<b>22</b>	<b>300</b>	<b>250</b>	<b>550</b>

**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
	<b>Total</b>				<b>20</b>	<b>250</b>	<b>250</b>	<b>500</b>

**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
	<b>Total</b>				<b>20</b>	<b>250</b>	<b>250</b>	<b>500</b>

**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
	<b>Total</b>				<b>20</b>	<b>250</b>	<b>250</b>	<b>500</b>

**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
	<b>Total</b>				<b>19</b>	<b>350</b>	<b>250</b>	<b>600</b>

**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
	<b>Total</b>				<b>20</b>	<b>350</b>	<b>250</b>	<b>600</b>

**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
	<b>Total</b>				<b>22</b>	<b>350</b>	<b>250</b>	<b>600</b>

**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
	<b>Total</b>				<b>20</b>	<b>250</b>	<b>250</b>	<b>500</b>

**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 (Elective I)	4	1		4	50	50	100
MAM ****	Applied Statistics (Elective II)	4	1		4	50	50	100
<b>Total</b>					<b>20</b>	<b>250</b>	<b>250</b>	<b>500</b>

**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							
<b>Total</b>					<b>20</b>	<b>250</b>	<b>250</b>	<b>500</b>

**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							
	<b>Total</b>				<b>20</b>	<b>250</b>	<b>250</b>	<b>500</b>

**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							
	<b>Total</b>				<b>19</b>	<b>250</b>	<b>250</b>	<b>500</b>

**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*			
	<b>Total</b>				<b>21</b>	<b>250</b>	<b>250</b>	<b>500</b>

### 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 Assistant Professor	HINDI	9446426447, <a href="mailto:aneeshkn1@gmail.com">aneeshkn1@gmail.com</a>
3	Guest Faculty	MALAYALAM	
4	Guest Faculty	GERMAN	
5	Dr. Kuriachan, (Adjunct Faculty)	BIOLOGY	
6	Dr. Thomas Mathew P (Adjunct Faculty)	BIOLOGY	9446479124, <a href="mailto:tmperak@yahoo.com">tmperak@yahoo.com</a>
7	Dr. Thomas Philip Adjunct Faculty Biotechnology	BIOLOGY	9446214877, <a href="mailto:pthanuveli@yahoo.com">pthanuveli@yahoo.com</a>
8	Dr. Asha. A. S.	PHYSICS	9495042275 <a href="mailto:asha@cusat.ac.in">asha@cusat.ac.in</a>
9	Dr. Manoj. E	CHEMISTRY	
10	Dr. Sebastian Nybin Remello Asst. Professor	CHEMISTRY	8921952631 <a href="mailto:nybinremello@cusar.ac.in">nybinremello@cusar.ac.in</a>
11	Dr. Sabeena. M. Asst. Professor	PHYSICS	9445884591 <a href="mailto:sabeenamannilthodi@gmail.com">sabeenamannilthodi@gmail.com</a>
12	Dr. K P Naveenachandran (Adjunct Faculty)	MATHEMATICS	9447311751 <a href="mailto:kpchn@gmail.com">kpchn@gmail.com</a>
13	Dr.Hitha. N.	STATISTICS	9447291473 <a href="mailto:Nhitha4@gmail.com">Nhitha4@gmail.com</a>
14	Sindhu Mathai,	CHEMISTRY	
15	Dr. Kala R	CHEMISTRY	7373852607 <a href="mailto:kalaramakrishnan@gmail.com">kalaramakrishnan@gmail.com</a>
16	Dr. Leena. R. Asst. Professor	CHEMISTRY	9495818133 <a href="mailto:leelar@gmail.com">leelar@gmail.com</a>
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
	<b>Total</b>				<b>16</b>	<b>300</b>	<b>300</b>	<b>600</b>

### 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
	<b>Total</b>				<b>16</b>	<b>300</b>	<b>300</b>	<b>600</b>



### 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
	<b>Total</b>				<b>18</b>	<b>300</b>	<b>300</b>	<b>600</b>

**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*							
	<b>Total</b>				<b>22</b>	<b>480</b>	<b>120</b>	<b>600</b>

**DEPARTMENT OF APPLIED CHEMISTRY**  
**M.Sc.CHEMISTRY**

**Programme Outcomes:**

*On successful completion of M. Sc. Chemistry programme, students will be able to*

**PSO 1:** Acquire systematic and coherent understanding of the fundamental concepts.

**PSO 2:** Demonstrate comprehensive knowledge and understanding of both theoretical and experimental/applied chemistry in various fields.

**PSO 3:** Design and perform the chemical synthesis and characterise the products.

**PSO 4:** Design and execute experimental routines for the detection and quantification of chemical entities.

**PSO 5:** Analyse the kinetics and energetics of chemical processes and infer the mechanism.

**PSO 6:** Demonstrate the basic principles of instrumental methods of analysis.

**PSO 7:** Operate advanced instruments and related soft-wares to execute in-depth analysis of chemical problems.

**PSO 8:** Acquire core competency in the subject.

**PSO 9:** Acquire skills for future employment in academia and industry.

**PSO 10:** Demonstrate knowledge relevant to the regional, national and international development needs.

## 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 <sup>e</sup>	-	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 <sup>a</sup>	-	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 (Non equilibrium 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 <sup>c</sup>	-	0-0-6	-	-	-
CHE 2208	Bio analytical 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 <sup>b</sup>	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 (Organo metallic 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	Oleo chemicals, 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 <sup>b</sup>	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 Course

c-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 Catalytic Processes	E	3
CHE 3205	Phase Transfer Catalysis	E	3
CHE 3206	Polymer Supported Catalysis	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) Professor	Analytical Chemistry	0484-2577813; 2862420 giri@cusat.ac.in
2.	Dr. K. Sreekumar (KSK) Professor	Polymer Chemistry/Catalysis	0484-2421530; 2862430 ksk@cusat.ac.in
3.	Dr. N. Manoj (MN) Professor and Head of the Department	Organic Chemistry	0484-2301268; 2862422 manoj.n@cusat.ac.in
4.	Dr. P. M. Sabura Begum (PMS) Professor	Organic Chemistry	0484-2577539; 2862426 pmsabura@cusat.ac.in
5.	Dr.P.V.Mohanan (PVM) Professor	Analytical Chemistry	0484-2508947; 2862429 mohan@cusat.ac.in
6.	Dr. Suja Haridas (SH) Assistant Professor	Physical Chemistry / Catalysis	0484-2408438; 2862428 sujaharidas@cusat.ac.in
7.	Dr. Sebastian Nybin Remello(SNR) Assistant Professor	Inorganic Chemistry / Catalysis	0484-2575804 2862421 nybinremello@cusat.ac.in
8.	Dr. Susmita De (SD) Assistant Professor	Computational / Theoretical Chemistry	0484-2575804 2862421 susmita@cusat.ac.in
9.	Dr. Kala R. (KR) Assistant Professor	Inorganic Chemistry	0484-2575804 2862423 kala@cusat.ac.in
10.	Dr. Leena R. (LR) Assistant Professor	Physical Chemistry	0484-2575804 2862656 leenarajith@ gmail.com
11.	Dr. Manoj E (ME) Assistant Professor	Inorganic Chemistry	2862424 manojepotti@gmail.com
12.	Dr. Sindhu Mathai (SM) Assistant Professor	Organic Chemistry	2862425 sindhumathai@cusat.ac.in

## DEPARTMENT OF BIOTECHNOLOGY

### M.Sc. BIOTECHNOLOGY

#### PROGRAM OUTCOMES FOR MSc. BIOTECHNOLOGY

After finishing the program, the MSc. Biotechnology students will be able:

**PO 1.** Demonstrate a degree of mastery in the various fields of Biotechnology and acquire interdisciplinary /multidisciplinary/trans disciplinary knowledge base and develop a collaborative approach to formulate constructive arguments and rational analysis for achieving common goals and objectives.

**PO 2.** Communicate effectively by gaining the ability to reflect and express thoughts and ideas effectively in verbal and nonverbal way; Ability to acquire knowledge and skills, including unlearning misconceptions and relearning concepts necessary for participating in learning activities throughout life, through self-paced and self-directed learning.

**PO 3.** Demonstrate leadership qualities that span the ability to work effectively and lead respectfully with diverse teams; setting direction, formulating a goal, building a team that can help achieve the goal, motivating and inspiring team members to engage with the goal.

**PO 4.** Demonstrate analytical thinking and problem-solving abilities enabling them to analyze, evaluate and interpret evidence, arguments, and claims; reflect relevant implications to the reality; formulate logical arguments; critically evaluate practices, policies and theories to develop knowledge and understanding.

**PO 5.** Identify a problem using literature survey, formulate hypothesis, develop a research plan, execute the research plan, write the project report and communicate effectively through written, oral and visual methods and develop the capacity to extrapolate from what one has learned and apply their competencies to solve problems and later contextualize into research and apply one's learning to real life situations.

**PO 6.** Identify and evaluate new business ideas in the field of life science and take it forward by creating a business plan by identifying funding source and executing the plan; collaborate and network with personnel in educational institutions, research organizations and entrepreneurial ventures in India and abroad and using management skills to guide people to the right destination, in a smooth and efficient way..

**PO 7.** Nurture the right ethical and social consciousness that contemplates the research implications and understands societal needs and responsibilities; appreciates and develops environmentally sound and sustainable solutions.

**PO 8.** Develop the correct attitude and mindset that appreciate equity, inclusiveness and sustainability and diversity; acquire ethical and moral reasoning and values of unity, secularism and national integration to enable to act as dignified citizens; able to understand and appreciate diversity, managing diversity and use of an inclusive approach to the extent possible.

**PO 9.** Ability to aim at personal development by meeting economic, social, and cultural objectives, and adapting to changing trades and demands of work place through knowledge/skill development/ re-skilling.

**PROGRAMME SPECIFIC OUTCOMES OF MSC BIOTECHNOLOGY**

**PSO1.** Develop rigorous academic standard and in-depth understanding of the fundamentals through deep and meticulous theoretical and practical knowledge as well as gain competence and understanding in the physiological, cellular, and biochemical functions and organization of biological systems at molecular and functional level.

**PSO2.** Show proficiency in performing and analysis of the various basic and advanced laboratory techniques employed, including analytical techniques by obtaining the ability to analyze, discuss, interpret, draw conclusions from quantitative/qualitative data and experimental evidences as well as critically evaluate ideas, evidence and experiences from an unprejudiced and reasoned perspective.

**PSO3.** Acquire good skill of handling and troubleshooting in instrumentation, techniques, analysis of bio molecules and its role and fate for understanding the biological systems/ processes.

**PSO4.** Execute the gathered technical knowhow to carry out cell-based cloning, PCR cloning, production of metabolites from Plant/animal/microbial cells, bioinformatics, designing of green technologies for environmental management for sustainable development, animal and plant cell culture and other biotechnological methods.

**PSO5.** Nurture excellent research aptitude enabling to design, execute, analyze and interpret a research problem with statistical tools and bring a meaningful scientific conclusion maintaining scientific ethics.

**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
<b>Total</b>					<b>21C</b>	<b>300</b>	<b>300</b>	<b>600</b>

**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

<b>Elective-II</b>								
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
<b>Total</b>					<b>15 C</b> <b>12 E</b>	<b>400</b> <b>200</b>	<b>200</b> <b>200</b>	<b>600</b> <b>400</b>

### **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
<b>Elective-III</b>								
20-303-0304	Functional Genomics(E)	1	1	1	2	50	50	100
20-303-0305	Industrial & Environmental 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
20-303-0308	Basic Neuroscience *	3	0	0	3	50	50	100
21-303-0309	RNA Interference and Genome Editing(E)	3	1	1	3	50	50	100
21-303-0310	Next-Generation Sequencing and Data Analysis(E)	3	1	1	3	50	50	100
<b>Total</b>					<b>11 C</b> <b>18 E</b>	<b>150</b> <b>300</b>	<b>150</b> <b>300</b>	<b>300</b> <b>600</b>

\*IDE offered by Department hence marks and credits not added to the semester.

### **Semester-IV**

Course code	Course	Hrs/Week			Credits	Marks		
		L	T	P		Internal	External	Total
20-303-0402	Dissertation(C )	-	-	-	12	200	200	400
	Comprehensive viva voce & Seminar(C )	-	-	-	1	100	100	200
<b>Elective-IV</b>								
20-303-0401	Innovation and Entrepreneurship for Biologists(E)	-	-	-	4	100	-	100
<b>Total</b>					<b>13 C</b> <b>4 E</b>	<b>300</b> <b>100</b>	<b>300</b> <b>-</b>	<b>600</b> <b>100</b>
Compulsory	Swayam/NPTEL Elective(E)				3	100	-	100
<b>GRAND TOTAL FOR M.Sc BIOTECHNOLOGY PROGRAM</b>					<b>60 C</b> <b>34 E</b>	<b>1200</b> <b>600</b>	<b>800</b> <b>500</b>	<b>2000</b> <b>1100</b>

## **M.SC MICROBIOLOGY**

### **PROGRAM OUTCOMES FOR MSc. MICROBIOLOGY**

**After finishing the program, the MSc. Microbiology students will be able:**

**PO 1.** Demonstrate a degree of mastery in the various fields of Microbiology and acquire interdisciplinary /multidisciplinary/transdisciplinary knowledge base and develop a collaborative approach to formulate constructive arguments and rational analysis for achieving common goals and objectives.

**PO 2.** Communicate effectively by gaining the ability to reflect and express thoughts and ideas effectively in verbal and nonverbal way; Ability to acquire knowledge and skills, including unlearning misconceptions and relearning concepts necessary for participating in learning activities throughout life, through self-paced and self-directed learning.

**PO 3.** Demonstrate leadership qualities that span the ability to work effectively and lead respectfully with diverse teams; setting direction, formulating a goal, building a team that can help achieve the goal, motivating and inspiring team members to engage with the goal.

**PO 4.** Demonstrate analytical thinking and problem-solving abilities enabling them to analyze, evaluate and interpret evidence, arguments, and claims; reflect relevant implications to the reality; formulate logical arguments; critically evaluate practices, policies and theories to develop knowledge and understanding.

**PO 5.** Identify a problem using literature survey, formulate hypothesis, develop a research plan, execute the research plan, write the project report and communicate effectively through written, oral and visual methods and develop the capacity to extrapolate from what one has learned and apply their competencies to solve problems and later contextualize into research and apply one's learning to real life situations.

**PO 6.** Identify and evaluate new business ideas in the field of life science and take it forward by creating a business plan by identifying funding source and executing the plan; collaborate and network with personnel in educational institutions, research organizations and entrepreneurial ventures in India and abroad and using management skills to guide people to the right destination, in a smooth and efficient way..

**PO 7.** Nurture the right ethical and social consciousness that contemplates the research implications and understands societal needs and responsibilities; appreciates and develops environmentally sound and sustainable solutions.

**PO 8.** Develop the correct attitude and mindset that appreciate equity, inclusiveness and sustainability and diversity; acquire ethical and moral reasoning and values of unity, secularism and national integration to enable to act as dignified citizens; able to understand and appreciate diversity, managing diversity and use of an inclusive approach to the extent possible.

**PO 9.** Ability to aim at personal development by meeting economic, social, and cultural objectives, and adapting to changing trades and demands of work place through knowledge/skill development/ re-skilling.

### **PROGRAMME SPECIFIC OUTCOMES OF MSC MICROBIOLOGY**

**PSO1.** Develop rigorous academic standard and in-depth understanding of the fundamentals through deep and meticulous theoretical and practical knowledge as well as gain competence and understanding in the various fields of microbiology: bacteriology, mycology, virology, parasitology and other allied subjects.

**PSO2.** Show proficiency in performing and analysis of the various basic and advanced laboratory techniques employed, including analytical techniques by obtaining the ability to analyze, discuss, interpret, draw conclusions from quantitative/qualitative data and experimental evidences as well as critically evaluate ideas, evidence and experiences from an unprejudiced and reasoned perspective.

**PSO3.** Understand and apply microbiological techniques and their handling; Acquire good skill of handling and troubleshooting in instrumentation, techniques, analysis of biomolecules and its role and fate for understanding the biological systems/ processes.

**PSO4.** Execute the gathered technical knowhow to carry out cell-based cloning, PCR cloning, production of metabolites from Plant/animal/microbial cells, culture and plating-based techniques, sterilization methods, bioinformatics, designing of green technologies for environmental management for sustainable development.

**PSO5.** Understand, apply and follow good laboratory practices; handling pathogens and their subsequent related research following biosafety practices as defined by WHO; keeping personal and ambient safety into concern.

**PSO6.** Nurture excellent research aptitude enabling to design, execute, analyze and interpret a research problem with statistical tools and bring a meaningful scientific conclusion maintaining scientific ethics.

#### **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 Physiology(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
<b>Total</b>					<b>20C</b>	<b>250</b>	<b>250</b>	<b>500</b>

#### **Semester-II**

Course code	Course	Hrs/Week			Credits	Marks		
		L	T	P		Internal	External	Total
20-340-0201	Microbial Genetics(C )	3	1	1	4	50	50	100
20-340-0202	Fermentation technology(C )	3	1	1	4	50	50	100
20-340-0203	Bio safety, 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
<b>Elective-II</b>								
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
<b>Total</b>					<b>15 C</b>	<b>400</b>	<b>200</b>	<b>600</b>
					<b>13 E</b>	<b>200</b>	<b>200</b>	<b>400</b>

### **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
<b>Elective-III</b>								
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
<b>Total</b>					<b>12 C</b>	<b>150</b>	<b>150</b>	<b>300</b>
					<b>15 E</b>	<b>250</b>	<b>250</b>	<b>500</b>

### **Semester-IV**

Course code	Course	Hrs/Week			Credits	Marks		
		L	T	P		Internal	External	Total
20-340-0402	Dissertation(C ) Comprehensive viva voce&Seminar(C )	-	-	-	12	200	200	400
					1	100	100	200
<b>Elective-IV</b>								
20-340-0401	Skill development and Entrepreneurship(E)	2	0	2	4	100	-	100
<b>Total</b>					<b>13 C</b>	<b>300</b>	<b>300</b>	<b>600</b>
					<b>4 E</b>	<b>100</b>	<b>-</b>	<b>100</b>
Compulsory	Swayam/NPTEL Elective(E)				3	100	-	100
<b>GRAND TOTAL FOR M.Sc MICROBIOLOGY PROGRAM</b>					<b>60 C</b>	<b>1100</b>	<b>900</b>	<b>2000</b>
					<b>32 E</b>	<b>550</b>	<b>550</b>	<b>1100</b>

**Details of Faculty**

Sl.No	Name & Designation	Specialization	Communication (Contact No. & e-mail id)
1	Dr. Parvathi A Professor & Head	Micro biology, Virology Molecular Biology	9847358540 <a href="mailto:parubfsc@gmail.com">parubfsc@gmail.com</a> parvathy@cusat.ac.in
2	Dr. Sarita G Bhat Professor	Microbial Genetics, Bacteriophage Therapy	9846033486 saritagbhat@gmail.com sgbhat@cusat.ac.in
3	Dr. Ajith Vengellur, Assistant Professor	Genetics, Cancer Biology Molecular Biology	7558996850 vengellur@gmail.com
4	Dr. Baby Chakrapani P S Assistant Professor	Neurobiology	9495109908 <a href="mailto:bcps@gmail.com">bcps@gmail.com</a> , chakrapani@cusat.ac.in
5	Dr. Bhavya Balan Chandrika Assistant Professor	Cancer Biology Biotechnology	8157025337 <a href="mailto:bhavyabc@gmail.com">bhavyabc@gmail.com</a> bhavya@cusat.ac.in
6	Dr. Rajesh P P Assistant Professor	Bioelectrochemical System	8927962495 rajosone86@gmail.com
7	Dr. Sreekanth P M Assistant Professor	Plant Genetics, Molecular Biology, Conservation biology	9482438168 sreekanthpm@gmail.com
8	Dr. Sneha Yoginran Assistant Professor	Molecular Biology, Plant Biotechnology	9868594069 <a href="mailto:snehayogindran@cusat.ac.in">snehayogindran@cusat.ac.in</a> sneha.yogindran@yahoo.com
9	Dr. Sayuj K P Assistant Professor	Plant Pathology, Bioinformatics	9895921594 <a href="mailto:sayuj@cusat.ac.in">sayuj@cusat.ac.in</a> sayujiisr@gmail.com

**Contract Faculty**

1	Dr. Manjusha S Assistant Professor (on contract)	Biochemistry Molecular biology	7907436274 biomanjusha@yahoo.com
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**Welcome Trust Fellow**

1	Dr. Sreeja Narayanan DBT	Nano biotechnology	8156866922 narayanan.sreeja@gmail.com
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# 1. DEPARTMENT OF MATHEMATICS

## M.Sc. MATHEMATICS

### Semester I

Course Code	Name of the Course	Credits	Marks			Pre-Requisites
			Internal	External	Total	
21-314-0101	Linear Algebra	4	50	50	100	
21-314-0102	Real Analysis	4	50	50	100	
21-314-0103	Measure and Integration	4	50	50	100	
21-314-0104	Groups and Rings	4	50	50	100	
21-314-0105	Computational Mathematical Laboratory	4	50	50	100	
	VIVA VOCE	0				
<b>Total Credits</b>		<b>20</b>				

Elective - Nil

### Semester II

Course Code	Name of the Course	Credits	Marks			Pre-Requisites
			Internal	External	Total	
21-314-0201	Fields and Modules	4	50	50	100	21-314-2104
21-314-0202	Functional Analysis	4	50	50	100	21-314-2101 & 21-314-2103
21-314-0203	Complex Analysis	4	50	50	100	21-314-2102
21-314-0204	Topology I	4	50	50	100	21-314-2102
21-314-0205	Functions of Several variables and Geometry	4	50	50	100	21-314-2101 & 21-314-2102
	VIVA VOCE	0				
<b>Total Credits</b>		<b>20</b>				

Elective - Nil

### Semester III

Course Code	Name of the Course	Credits	Marks			Pre-Requisites
			Internal	External	Total	
21-314-0301	Operator Theory	4	50	50	100	21-314-2202
21-314-0302	Topology II	4	50	50	100	21-314-2204
21-314-0303	Ordinary Differential Equations and Integral Equations	4	50	50	100	
21-314-0304	Probability Theory	4	50	50	100	21-314-2101-2103
	Elective I	3	50	50	100	
	VIVA VOCE	0				
<b>Total Credits</b>		<b>19</b>				

### Semester IV

Course Code	Name of the Course	Credits	Marks			Pre-Requisites
			Internal	External	Total	
21-314-0401	Partial Differential Equations and Variational Calculus	4	50	50	100	21-314-2303
	Elective I	4	50	50	100	
	Elective II	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	
<b>Total Minimum Credits</b>		<b>21</b>				
<b>Minimum Credits for Pass</b>		<b>80</b>				

\*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 fourth semester. Students can opt for additional elective courses for extra credits.

**List of Elective Courses**

<b>Course Code</b>	<b>Name of the Course</b>
21-314-2305	Topics in Applied Mathematics (Inter-Departmental Elective)
21-314-2402	Wavelets
21-314-2403	Optimization and Mathematical Methods For DeepLearning
21-314-2404	Commutative Algebra
21-314-2405	Graph Theory
21-314-2406	Advanced Linear Algebra
21-314-2407	Discrete Framelets
21-314-2408	Harmonic Analysis
21-314-2409	Integral Transforms
21-314-2410	Functions of Several Variables
21-314-2411	Advanced Spectral Theory
21-314-2412	Banach Algebras and Spectral Theory
21-314-2413	Number Theory
21-314-2414	Representation Theory of Finite Groups
21-314-2415	Algebraic Topology
21-314-2416	Differential Geometry
21-314-2417	Topics in Algebraic Graph Theory

TOTAL CREDITS REQUIRED 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) Professor and Head	Approximation Theory, Optimization Techniques, Fuzzy Mathematics	9495363385 sgcusat@gmail.com <a href="mailto:sasigopalan@cusat.ac.in">sasigopalan@cusat.ac.in</a>
2	Dr. Shery Fernandez (SF) Associate Professor	Representation Theory, Fuzzy Mathematics	9846762450 sheryfernandez@cusat.ac.in sheryfernandez@yahoo.co.in
3	Dr. Aparna Lakshmanan S (AL) Associate Professor	Graph Theory, Algebraic Graph Theory	9847742405 <a href="mailto:aparnaren@gmail.com">aparnaren@gmail.com</a> <a href="mailto:aparnals@cusat.ac.in">aparnals@cusat.ac.in</a>
4	Dr. V.B. Kiran Kumar (VBK) Assistant Professor	Functional Analysis	8547496594 kiranbalu36@gmail.com vbk@cusat.ac.in
5	Dr. Ambily A.A. (AAA) Assistant Professor	Algebraic K-theory, Commutative Algebra, Computational Algebra, Non- Commutative Algebras	9048751352 aaambily@gmail.com ambily@cusat.ac.in
6	Dr. Noufal A. (AN) Assistant Professor	Functional Analysis, Framelets, Partial Differential Equations	9447327154 noufalasharaf@gmail.com noufal@cusat.ac.in
7	Dr. Tanushree Pandit (TP) Assistant Professor	Convex Optimization, Variational Inequalities, Equilibrium Problems	8960419388 <a href="mailto:tanushreepandit91@gmail.com">tanushreepandit91@gmail.com</a> <a href="mailto:tpandit@cusat.ac.in">tpandit@cusat.ac.in</a>
8	Dr. Tathagata Banerjee (TB) Assistant Professor	Operator Algebras, Operator Theory and Coarse Geometry	7022518702 <a href="mailto:tathagatabanerjee85@gmail.com">tathagatabanerjee85@gmail.com</a> m tathagata@cusat.ac.in
9	Dr. Shankar P (SP) Assistant Professor	Functional Analysis, Operator Algebras and Operator Theory	9786698534 <a href="mailto:shankarsupy@gmail.com">shankarsupy@gmail.com</a> <a href="mailto:shankarsupy@cusat.ac.in">shankarsupy@cusat.ac.in</a>
10	Prof. M.N. Narayanan Namboodiri (MNN) Emeritus Professor	Functional Analysis	9446505953 mnnadri@gmail.com
11	Prof. A. Vijayakumar (AV) Emeritus Professor	Discrete Mathematics	9447608851 vambat@gmail.com <a href="mailto:vijay@cusat.ac.in">vijay@cusat.ac.in</a>
12	Prof. P.G. Romeo (PGR) CSIR Emeritus Scientist	Algebra, Category Theory, Algebraic Topology, Universal Algebras	9447663109 romeo_parackal@yahoo.com romeopg@cusat.ac.in
13	Dr. K P Naveena Chandran (KPN) Adjunct Faculty	Algebra, Topology	9447311751 <a href="mailto:kpchn@gmail.com">kpchn@gmail.com</a> kpchn@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
<b>Total</b>					<b>19</b>	<b>500</b>		

**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
<b>Total</b>					<b>20</b>	<b>500</b>		

**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
					22	550		

## Electives Courses

Elective courses, from 2021 admission onward, are offered for III<sup>rd</sup> and IV<sup>th</sup> 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 Photo voltaics . . . . .
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 Nano materials . . . . .
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	Ultra short 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. Junaid Bushiri, 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. Riju Issac, Associate Professor	Laser Physics	8943914464 riju@cusat.ac.in
5	Dr. Anoop K K, Assistant Profesor	Condensed Matter Physics	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. Vineeth Mohanan, 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	21-478-0101	Mathematical Methods for Data Science		5		3	60	40	100
2	21-478-0102	Probability and Statistical Inference		5		4	60	40	100
3	21-478-0103	Data Structures and Algorithms		5		3	60	40	100
4	21-478-0104	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	21-478-0105	Systems and Decision Analytics
2	21-478-0106	Data Warehousing and Data Mining
3	21-478-0107	Data Analysis and Visualization using Python
4	21-478-0108	Operations and Supply Chain Management
5	21-478-0109	System Reliability and Risk Analysis

### Semester II

Sl.No.	Course Code	Course	Hrs/Week			Credits	Marks		
			L	T	P		Internal	External	Total
1	21-478-0201	Simulation Modelling and Analysis		5		3	60	40	100
2	21-478-0202	Machine Learning		5		4	60	40	100
3	21-478-0203	Multivariate Analysis and Statistical Techniques for Data Mining		5		3	60	40	100
4	21-478-0204	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	21-478-0205	Business Analytics
2	21-478-0206	Optimization Techniques
3	21-478-0207	Design of Experiments (Integrated with R)
4	21-478-0208	Artificial Intelligence and Deep Learning
5	21-478-0209	Natural Language Processing
6	21-478-0210	Financial Risk Analytics and Management
7	21-478-0211	Marketing and HR Analytics
8	21-478-0212	Bioinformatics
9	21-478-0213	Big Data Technology

### Semester III

Sl.No.	Course Code	Course	Hrs/Week			Credits	Marks		
			L	T	P		Internal	External	Total
1	21-478-0301	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	21-478-0302	Statistical Forecasting Methods
2	21-478-0303	Quality Management and Six Sigma
3	21-478-0304	Applied Longitudinal Data Analysis
4	21-478-0305	Lifetime Studies in Data Science (Integrated with R)
5	21-478-0306	Bayesian Computing & Analysis

### Semester IV

Sl.No.	Course Code	Course	Hrs/Week			Credits	Marks		
			L	T	P		Internal	External	Total
1	21-478-0401	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 Senior Professor	Stochastic Processes and Inference, Time Series Models, Data Analysis, Chaos and nonlinear time series	0484-2555497(R) 9446605682(M) <a href="mailto:nb@cusat.ac.in">nb@cusat.ac.in</a>
2	Dr.K.C.James Professor	Industrial Engineering, DE Simulation, Reliability, TQM	0484-2475767(R) 9446605183(M) <a href="mailto:jamesmech@cusat.ac.in">jamesmech@cusat.ac.in</a>
3	Dr.Asha Gopalakrishnan Senior Professor	Reliability Theory, Survival Analysis	0484-2335390(R) 9447220353(M) <a href="mailto:asha@cusat.ac.in">asha@cusat.ac.in</a> <a href="mailto:asha.gopalakrishnan@gmail.com">asha.gopalakrishnan@gmail.com</a>
4	Dr.P.G.Sankaran Senior Professor (Now on Deputation as PVC)	Distribution Theory, Reliability Theory, Data Analysis, Survival Analysis	0484-2741693(R) 9847348528(M) <a href="mailto:sankaranpg@yahoo.com">sankaranpg@yahoo.com</a>
5	Dr.S.M.Sunoj Professor	Distribution Theory, Reliability Theory	0487-2428214(R) 9446627103(M) <a href="mailto:smsunoj@cusat.ac.in">smsunoj@cusat.ac.in</a> <a href="mailto:smsunoj@gmail.com">smsunoj@gmail.com</a>
6	<b>Dr.Rajesh G Professor and Head</b>	Distribution Theory, Information Theory	9447280968(M) <a href="mailto:rajeshgstat@gmail.com">rajeshgstat@gmail.com</a>
7	Dr.Irshad M.R. Assistant Professor	Order Statistics, Distribution Theory	9497240876(M) <a href="mailto:irshadm24@gmail.com">irshadm24@gmail.com</a> <a href="mailto:irshadmr@cusat.ac.in">irshadmr@cusat.ac.in</a>
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9	Ms.Hashmy Hassan Assistant Professor (Contract)	Data Science and Analytics, Information Retrieval, Text Mining	9995867891 <a href="mailto:hashmyhas123@gmail.com">hashmyhas123@gmail.com</a>
10	Dr.Ambily Jose Assistant Professor (Contract)	Stochastic Processes	9048080975 <a href="mailto:ambilystat06@gmail.com">ambilystat06@gmail.com</a>
11	Ms.Anila P. Guest Faculty	Statistical Quality Control	8589967627 <a href="mailto:anilap11495@gmail.com">anilap11495@gmail.com</a>

# FACULTY OF SOCIAL SCIENCES

Dean:

Dr.SamThomas

Professor

School of Management Studies

CUSAT, Kochi-22

## **DEPARTMENT OF APPLIED ECONOMICS**

### **M.A APPLIED ECONOMICS**

#### **M.A Applied Economics Programme Outcomes (POs)**

1. To equip students with advanced knowledge of Applied Economics & Development Issues of Indian Economy in general as well as Kerala Economy
2. To familiarise the students with suitable alternative methods of knowledge on the basis of the heterogeneity of societies
3. To develop right skills in students catering to the needs of the industry and policy makers,
4. To make the students capable of addressing and solving the issues in the society and the economy by contextualising the knowledge they have acquired and finally
5. To create academic excellence through holistic education

#### **SEMESTER – I**

Course Code	Title of Paper	Core/ Elective	Credits	Contact Hours/ Week	Continuo us evaluatio n marks	External Evaluatio n 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	Continuo s evaluation marks	External Evaluatio n 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. Gender Studies
10. Economics of labour market
11. Behavioral Economics
12. Agricultural Economics
13. Health Economics
14. Optimisation Techniques
15. Economic Theory (Inter departmental Elective)
16. Environment Management (Interdepartmental Elective)

#### FACULTY DETAILS

SL. No.	Name & Designation	Specialization	Communication (Contact No. & e-mail id)
1	Dr.P.Arunachalam Professor & Head	International Economics, Quantitative methods, Indian Economy and Statistics	9746770732 8848522390 arunachalam14@yahoo.co.in arunachalam@cusat.ac.in
2	Dr.Manoj P.K Assistant Professor	Business Finance & Econometrics	9447664949 manoj_p_k@cusat.ac.in manoj_p_k2004@yahoo.co.in
3	Dr.P.R.Suresh Assistant Professor	Quantitative Economics, Econometrics and Social Exclusion	9037284525 psuresh@cusat.ac.in
4	Dr.S.Harikumar Adjunct Faculty	Agricultural Economics, Environmental Economics	9446578289 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	Mathematics for 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 and Analysis (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 Honorary Director, Centre for Budget Studies	Economic Development Public Economics	8921499157	director.cbs@cusat.ac.in
2.	Dr. S. Harikumar, Asst. Director, Centre for Budget Studies	Economic Development Financial Economics	9446578289	<a href="mailto:vinvij2003@gmail.com">vinvij2003@gmail.com</a>
3.	Dr. P.K. Santhosh Kumar Finance-in-Charge & Academic Co-ordinator Centre for Budget Studies	Econometrics/ Financial Econometrics	9620569469	s.kumar@cusat.ac.in
4.	Dr. Martin Patrick Honorary Fellow Centre for Budget Studies	Economic Policy Public Finance	9447664270	pmartin47@rediffmail.com
5.	Dr. S. Muraleedharan Honorary Fellow Centre for Budget Studies	Industrial Economics Health Economics	9446744881	muraleedharanvarsha@yahoo.com

**SCHOOL OF MANAGEMENT STUDIES**

**MBA(FULL TIME)**

**FIRST SEMESTER**

Course Code	Name of Course	CC/ EC	Credit	Marks		Total Marks
				CES	ESE	
21-371-0101	Management Concepts and Organisational Behaviour	CC	3	50	50	100
21-371-0102	Statistics for Managers	CC	3	50	50	100
21-371-0103	Managerial Economics	CC	3	50	50	100
21-371-0104	Business Communication	CC	3	50	50	100
21-371-0105	Financial Accounting	CC	3	50	50	100
21-371-0106	Business Environment	CC	3	50	50	100
21-371-0107	Indian Ethos and Business Ethics	CC	3	50	50	100
21-371-0108	IT for Business and Management	CC	3	50	50	100
21-371-0109	Managerial Skill Development -I	CC	3	100	-	100
<b>Total</b>			<b>27</b>	-	-	<b>900</b>

**SECOND SEMESTER**

Course Code	Name of Course	CC/ EC	Credit	Marks		Total Marks
				CES	ESE	
21-371-0201	Financial Management	CC	3	50	50	100
21-371-0202	Marketing Management	CC	3	50	50	100
21-371-0203	Operations Management	CC	3	50	50	100
21-371-0204	Human Resource Management	CC	3	50	50	100
21-371-0205	Management Accounting	CC	3	50	50	100
21-371-0206	Business Research Methods	CC	3	50	50	100
21-371-0207	Legal Aspects of Business	CC	3	50	50	100
21-371-0208	Innovation and Entrepreneurship	CC	3	50	50	100
21-371-0209	Managerial Skill Development-II	CC	3	100	-	100
<b>Total</b>			<b>27</b>	-	-	<b>900</b>

**THIRD SEMESTER**

Course Code	Name of Course	CC/ EC	Credit	Marks		Total Marks
				CES	ESE	
21-371-0301	Management Science	CC	3	50	50	100
21-371-0302	Organisational Structure, Design and Change	CC	3	50	50	100
21-371-0303	Business Analytics	CC	3	50	50	100
21-371-03XX*	Elective – 1	EC	3	50	50	100
21-371-03XX*	Elective – 2	EC	3	50	50	100
21-371-03XX*	Elective – 3	EC	3	50	50	100
21-371-03XX*	Elective – 4	EC	3	50	50	100
21-371-0304	Summer Project Work**	CC	4	50	50	100
	<b>Total</b>		<b>25</b>			<b>800</b>

*\*XX– is the unique two digit number of the particular elective course from the list of elective courses*

**FOURTH SEMESTER**

Course Code	Name of Course	CC/EC	Credit	Marks		Total Marks
				CES	ESE	
21-371-0401	Corporate Governance and Strategic Management	CC	3	50	50	100
21-371-0402	Environment Management	CC	3	50	50	100
21-371-04XX*	Elective – 5	EC	3	50	50	100
21-371-04XX*	Elective – 6	EC	3	50	50	100
21-371-04XX*	Elective – 7	EC	3	50	50	100

21-371-04XX*	Elective - 8	EC	3	50	50	100
21-371-0403	Online Course (MOOC)***	CC	2	50	50	100
21-371-0404	Comprehensive Viva-Voce	CC	3	-	100	100
<b>Total</b>			<b>23</b>			<b>800</b>
<b>*XX– is the unique two digit number of the particular elective course from the list of elective courses</b>						

\*XX is the unique two digit number of the particular elective course from the list of elective courses

\*\*Each student should carry out a summer project work after the completion of second semester for a minimum 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 department. The report of the summer project must be submitted at the end of the classes of the third semester by following the guidelines issued by the department.

Evaluation of project work and awarding of pass/fail grade shall be made based on the submission of final report immediately after the completion of project work, presentation by the candidates followed by viva-voce, and the quality of final report. If a candidate failed in evaluation, he/she has to complete the project work and obtain pass grade along with next batch.

\*\*\* Students should start the online MOOC course during the third semester and should complete all formalities before the end of the fourth semester. The grade will be counted as part of the fourth semester.

## I. MBA (Part-Time) Programme Structure and Scheme

### FIRST SEMESTER

Code	Name of Course	CC/ EC	Credit	Marks		Total Marks
				CES	ESE	
21-372-0101	Management Concepts and Organisational Behaviour	CC	3	50	50	100
21-372-0102	Statistics for Managers	CC	3	50	50	100
21-372-0103	Managerial Economics	CC	3	50	50	100
21-372-0104	Financial Accounting	CC	3	50	50	100
21-372-0105	Indian Ethos and Business Ethics	CC	3	50	50	100
<b>Total</b>			<b>15</b>			<b>500</b>

**SECOND SEMESTER**

Code	Name of Course	CC/ EC	Credit	Marks		Total Marks
				CES	ESE	
21-372-0201	Financial Management	CC	3	50	50	100
21-372-0202	Marketing Management	CC	3	50	50	100
21-372-0203	Human Resource Management	CC	3	50	50	100
21-372-0204	Management Accounting	CC	3	50	50	100
21-372-0205	Managerial Skill Development -I	CC	3	100	-	100
<b>Total</b>			<b>15</b>			<b>500</b>

**Note:** \*For the Part Time program **Managerial Skill Development – II (MSD II)** will be conducted through Field works after the completion of the second semester for a minimum duration of 45 hours by covering all the topics included in the MSD-II syllabus. The work shall be carried out during the summer break after the second semester examination under the supervision of the Faculty in-Charge of MSD\_ II. Faculty in-Charge of MSD\_ II can decide the structure of various components like Assignments, Viva, Field work Report, Quiz, Case studies, Tests etc. and the mode of execution of the same.

Assessment shall be carried out on the basis of the components assigned by the Faculty-in Charge, viz Viva, Quiz, Field work Report, Assignments, Case Studies, Tests etc. 50 marks will be awarded by the Faculty-in-charge based on the continuous evaluation through the above components during the course and remaining 50 marks will be awarded based on the evaluation of the Final field work report submitted by the students by the Faculty-in-charge. MSD\_II mark will be reflected in the third semester mark list.

Comment [RJ1]: caps

**THIRD SEMESTER**

Code	Name of Course	CC/ EC	Credit	Marks		Total Marks
				CES	ESE	
21-372-0301	Business Communication	CC	3	50	50	100
21-372-0302	Management Science	CC	3	50	50	100
21-372-0303	Organisational Structure, Design and Change	CC	3	50	50	100
21-372-0304	IT for Business and Management	CC	3	50	50	100
21-372-0305	Business Environment	CC	3	50	50	100
21-372-0306	*Managerial Skill Development -II	CC	3	100	-	100
<b>Total</b>			<b>18</b>			<b>600</b>

\*For the Part Time program **Managerial Skill Development – II (MSD II)** will be conducted through Field works after the completion of the second semester for a minimum duration of 45 hours by covering all the topics included in the MSD-II syllabus.

Comment [RJ2]: caps



**FOURTH SEMESTER**

Course Code	Name of Course	CC/ EC	Credit	Marks		Total Marks
				CES	ESE	
21-372-0401	Business Research Methods	CC	3	50	50	100
21-372-0402	Operations Management	CC	3	50	50	100
21-372-0403	Legal Aspects of Business	CC	3	50	50	100
21-372-04XX**	Elective 1	EC	3	50	50	100
21-372-04XX**	Elective2	EC	3	50	50	100
<b>Total</b>			<b>15</b>			<b>500</b>

**\*\*XX is the unique two digit number of the particular elective course from the list of elective courses**

**FIFTH SEMESTER**

Code	Name of Course	CC/ EC	Credit	Marks		Total Marks
				CES	ESE	
21-372-0501	Innovation and Entrepreneurship	CC	3	50	50	100
21-372-0502	Business Analytics	CC	3	50	50	100
21-372-05XX**	Elective 3	EC	3	50	50	100
21-372-05XX**	Elective 4	EC	3	50	50	100
21-372-05XX**	Elective 5	EC	3	50	50	100
21-372-0503	Summer Project Work***	CC	4	100	-	100
<b>Total</b>			<b>19</b>			<b>600</b>

**\*\*XX is the unique two digit number of the particular elective course from the list of elective courses**

Comment [RJ3]: space

Comment [RJ4]:

**SIXTHSEMESTER**

Code	Name of Course	CC/ EC	Credit	Marks		Total Marks
				CES	ESE	
21-372-0601	Corporate Governance and Strategic Management	CC	3	50	50	100
21-372-0602	Environment Management	CC	3	50	50	100
21-372-06XX**	Elective 6	EC	3	50	50	100
21-372-06XX**	Elective 7	EC	3	50	50	100
21-372-06XX**	Elective 8	EC	3	50	50	100
21-372-0603	Online Course(MOOC)****	CC	2	50	50	100
21-372-0604	Comprehensive Viva-Voce	CC	3	---	100	100
<b>Total</b>			<b>20</b>			<b>700</b>
<b>**XX is the unique two digit number of the particular elective course from the list of elective courses</b>						

\*\*\*Each student should carry out a summer project work in a company after the completion of fourth semester for a minimum 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 department. The report of the summer project must be submitted at the end of the classes of the third semester by following the guidelines issues by the department. Summer Project Mark will be reflected in the Fifth Semester Mark list

**Comment [RJ5]:** minimum period of six weeks

**Comment [RJ6]:** at the end of...

Evaluation of project work and awarding of pass/fail grade shall be made based on the submission of final report immediately after the completion of project work, presentation by the candidates followed by viva-voce, and the quality of final report. If a candidate failed in evaluation, he/she has to complete the project work and obtain pass grade along with next batch.

**\*\*\*\*Students should start the online MOOC course during the fifth semester and should complete all formalities before the end of the sixth semester. The grade will be counted as part of the sixth semester.**

## II. List of ELECTIVE COURSES

CODE for the particular Elective Course : 21-37A-OBXX

Where A – stands for whether it offers to FT or PT. '1' for FT and '2' for PT

B – stands for the Semester No. in which it is offered

XX – stands for Unique Two digit No. for a particular elective

### A. LIST OF ELECTIVE COURSES IN FINANCE AND ACCOUNTING MANAGEMENT

- 21.37A-OB11: Security Analysis and Portfolio Management
- 21.37A-OB12: International Finance
- 21.37A-OB13: Working Capital Management
- 21.37A-OB14: Management of Financial Services
- 21.37A-OB15: Financial Derivatives and Risk Management
- 21.37A-OB16: Corporate Restructuring
- 21.37A-OB17: Financial Modelling
- 21.37A-OB18: Analytics for Finance
- 21.37A-OB19: Behavioral Finance
- 21.37A-OB20: Project Management
- 21.37A-OB21: Bank Financial Management
- 21.37A-OB22: Fundamentals of Insurance

### B. LIST OF ELECTIVE COURSES IN MARKETING MANAGEMENT

- 21.37A-OB26: Consumer Behaviour
- 21.37A-OB27: Integrated Marketing Communication
- 21.37A-OB28: E-Commerce
- 21.37A-OB29: Marketing Research
- 21.37A-OB30: Strategic Marketing
- 21.37A-OB31: International Marketing
- 21.37A-OB32: Sales Management
- 21.37A-OB33: Services Marketing
- 21.37A-OB34: Brand and Product Management
- 21.37A-OB35: Retail Management
- 21.37A-OB36: Digital Marketing
- 21.37A-OB37: Customer Relationship Management
- 21.37A-OB38: Marketing Analytics

**C. LIST OF ELECTIVE COURSES IN OB and HUMAN RESOURCE MANAGEMENT**

- 21.37A-OB41: Strategic Human Resource Management
- 21.37A-OB42: Management of Industrial Relations
- 21.37A-OB43: Training and Development
- 21.37A-OB44: Global Human Resource Management
- 21.37A-OB45: Compensation Management
- 21.37A-OB46: Human Resource Planning and Development
- 21.37A-OB47: Organisational Change and Development
- 21.37A-OB48: Managing Interpersonal and Group Processes
- 21.37A-OB49: Performance Management
- 21.37A-OB50: HR Analytics
- 21.37A-OB51: Diversity and Inclusion at Workplace
- 21.37A-OB52: Gender and Leadership at the Workplace

**D. LIST OF ELECTIVE COURSES IN PRODUCTION AND OPERATIONS MANAGEMENT**

- 21.37A-OB20: Project Management
- 21.37A-OB37: Customer Relationship Management
- 21.37A-OB56: Supply Chain Management
- 21.37A-OB57: Purchasing and Materials Management
- 21.37A-OB58: Quality Management
- 21.37A-OB59: International Logistics Management
- 21.37A-OB60: Service Operations Management
- 21.37A-OB61: Simulation and Modelling
- 21.37A-OB62: Enterprise Resource Planning
- 21.37A-OB63: Supply Chain Analytics

**E. LIST OF ELECTIVE COURSES IN INFORMATION TECHNOLOGY AND SYSTEMS MANAGEMENT**

- 21.37A-OB28: E-Commerce
- 21.37A-OB36: Digital Marketing
- 21.37A-OB37: Customer Relationship Management
- 21.37A-OB62: Enterprise Resource Planning
- 21.37A-OB69: Strategic Management of Information Technology
- 21.37A-OB70: Data Base Management Systems

- 21.37A-0B71:** Business Process Reengineering
- 21.37A-0B72:** System Analysis and Design
- 21.37A-0B73:** Technical Foundation for E-Business
- 21.37A-0B74:** Data Mining for Business Intelligence
- 21.37A-0B75:** Advanced Data Analytics for Business Decisions
- 21.37A-0B76:** Technology Management

**F. LIST OF ELECTIVES COURSES IN INTERNATIONAL BUSINESS MANAGEMENT**

- 21.37A-0B12:** International Finance
- 21.37A-0B31:** International Marketing
- 21.37A-0B44:** Global Human Resource Management
- 21.37A-0B56:** Supply Chain Management
- 21.37A-0B59:** International Logistics Management
- 21.37A-0B62:** Enterprise Resource Planning
- 21.37A-0B81:** Export Import Policies and Procedures

**G. LIST OF ELECTIVE COURSES IN GENERAL MANAGEMENT AREA**

- 21.37A-0B85:** Technology Innovation and Entrepreneurship
- 21.37A-0B86:** Corporate Social Responsibility
- 21.37A-0B87:** Management of NGOs
- 21.37A-0B88:** Management Consulting

**DETAILS OF FACULTY**

Sl.No.	Name	Designation	Specialisation	Mobile No.	Email ID
1	Dr. Jagathy Raj V. P	Director & Senior Professor	Systems and Operations Management - Logistics, Supply Chain Management, IT Applications in Business and Management, ERP, MIS, Engineering and Technology Management.	9847220016	jagathy@cusat.ac.in
2	Dr. M. Bhasi	Senior Professor	Logistics, Quality, Safety & Crisis Management	9447419863	mbhasi@gmail.com
3	Dr. D. Mavoothu	Professor	HRM and Business Ethics	9400076884	mavoothu@gmail.com
4	Dr. Rajitha Kumar S.	Professor	General Management, Finance Management & Accounting	9400019611	rajithakumar@cusat.ac.in

5	Dr. Zakkariya K. A	Professor	Organisational Behaviour, Marketing, & Sales Management, Managerial Skills Development	9846554444	zakkariya@gmail.com
6	Dr. Sam Thomas	Professor	Systems and operation management , project management , Quantitative Techniques & Finance	9846152127	sam@cusat.ac.in
7	Dr. Santhosh Kumar S	Professor	Finance & Accounting , Production management	9446041325	drsanstpeters@gmail.com
8	Dr. Manoj Edward	Professor	Operations and Service Management	9846280535	manojedw@gmail.com
9	Dr. Saji T G	Professor	Finance & Accounting, Quantitative Techniques	9446869214	sajthazhungal@gmail.com
10	Dr. Renjini D	Associate Professor	Human Resource and Marketing	9895888599	renjinidas@yahoo.com
11	Dr. Devi Soumyaja	Assistant Professor	Organisational behavior & HRM	9972309166	devisoumyaja@gmail.com
12	Dr. Sangeetha K. Prathap	Assistant Professor	Management, Banking, Financial Services, Financial Management	9995775239	sangeethakprathap@gmail.com
13	Dr. Manu Melwin Joy	Assistant Professor	Production Management, Human Resource Management. Gamification	9744551114	manu_melwinjoy@yahoo.com
14	Dr. Remya Ramachandran	Assistant Professor	Capital Marketing, Finance & Accounting	9446035607	remya.rc2323@gmail.com
15	Dr. Rakesh Krishnan M	Assistant Professor	General Management, Finance Management & Accounting	9447700081	mrakeshkrishnan@gmail.com
16	Mr. Lithin Thomas	Assistant Professor	Production & Operations Management	9645784323	lithinthomas@cusat.ac.in
17	Dr. Meera Prathapan	Assistant Professor	Marketing Management, Tourism Management	8943284573	meeraprathapan@gmail.com
18	Dr. Daly Paulose Meppurath	Assistant Professor	Marketing Management	9898212897	dalypaulose@cusat.ac.in
19	Dr. Nimitha Aboobaker	Assistant Professor	Information systems and HRM	94977732021	nimis540@gmail.com
20	Dr. Smiju I S	Assistant Professor	IT & Information systems	9495230636	drsmiju@gmail.com

# FACULTY OF TECHNOLOGY

Dr. M Kailasnath

Professor

International School of Photonics

CUSAT, Kochi-22

**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
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Basic Mathematics for Computer Applications
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### **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. M. V. Judy Professor & Head	Big Data Analytics Data mining	0484-2576253 (O) 9048991368 (M) <a href="mailto:judy.nair@gmail.com">judy.nair@gmail.com</a> <a href="mailto:judy_nair@yahoo.com">judy_nair@yahoo.com</a>
2	Dr. A. Sreekumar Professor	Compiler Design Operating System Cryptography Number Theory	0484-2576253 (O) 9495427491 (M) <a href="mailto:sreekumar@cusat.ac.in">sreekumar@cusat.ac.in</a> <a href="mailto:askcusat@gmail.com">askcusat@gmail.com</a>
3	Dr. Sabu M. K. Professor	Artificial Intelligence Data Mining Soft Computing	0484-2576253/2577602 (O) 0484- 2947861 (R) 9446128197 (M) <a href="mailto:sabumk@cusat.ac.in">sabumk@cusat.ac.in</a> <a href="mailto:sabu.mes@gmail.com">sabu.mes@gmail.com</a>
4	Dr. Vinod P. Professor	Information Security Malware Analysis Deep Learning	0484-2576253 (O) 9497179735(M) <a href="mailto:vinod.p@cusat.ac.in">vinod.p@cusat.ac.in</a>
5	Dr. Vishnukumar S. Associate Professor	Image Processing Machine Learning Deep Learning	0484-2862826 (O) 9497359253(M) <a href="mailto:vks@cusat.ac.in">vks@cusat.ac.in</a>
6	Ms. Malathi S. Assistant Professor	Software Engineering	0484-2576253 (O) 9495968765 (M) <a href="mailto:malathi_s@cusat.ac.in">malathi_s@cusat.ac.in</a>
7	Dr. Rafidha Rehiman K. A. Assistant Professor	Cryptography Network Security	0484-2576253 (O) 9947142132(M) <a href="mailto:rafidharehimanka@gmail.com">rafidharehimanka@gmail.com</a>
8	Dr. Deepika M. P. Assistant Professor	Data Security Number Theory Software Engineering	0484-2576253 (O) 9400874404(M) <a href="mailto:deepika.mp@cusat.ac.in">deepika.mp@cusat.ac.in</a>

## DEPARTMENT OF COMPUTER SCIENCE

### PROGRAMME STRUCTURE AND SYLLABUS (2021 ADMISSIONS)

### M.SC. (FIVE YEAR INTEGRATED) IN COMPUTER SCIENCE (ARTIFICIAL INTELLIGENCE & DATA SCIENCE)

<b>Semester - I</b>							
Sl. No.	Course code	Course Title	C/E	Cr	Lr	L/T	M
1	21-805-0101	Mathematics for Data Science	C	4	4	1	100
2	21-805-0102	Communicative English	C	3	3	1	100
3	21-805-0103	Object Oriented Programming	C	4	4	0	100
4	21-805-0104	Computational Thinking for Problem Solving	C	4	4	1	100
5	21-805-0105	Environmental Studies	C	3	3	1	100
6	21-805-0106	Lab 1 - Python Programming Lab	C	1	0	4	100
7	21-805-0107	Lab 2 - C++ Programming Lab	C	1	0	4	100
Total for Semester I				20	18	12	700
<b>Semester - II</b>							
Sl. No.	Course code	Course Title	C/E	Cr	Lr	L/T	M
1	21-805-0201	Linear Algebra	C	4	4	1	100
2	21-805-0202	Data Structures	C	4	4	1	100
3	21-805-0203	Introduction to Artificial Intelligence	C	4	4	1	100
4	21-805-0204	Operating Systems	C	3	3	1	100
5	21-805-0205	Java Programming	C	3	3	0	100
6	21-805-0206	Lab 3 - Data Structures Lab	C	1	0	4	100
7	21-805-0207	Lab 4 - Java Programming Lab	C	1	0	4	100
Total for Semester II				20	18	12	700

<b>Semester - III</b>							
Sl. No.	Course code	Course Title	C/E	Cr	Lr	L/T	M
1	21-805-0301	Design & Analysis of Algorithms	C	4	4	1	100
2	21-805-0302	Probability and Statistics for Data Science	C	4	4	1	100
3	21-805-0303	Mathematics for Machine Learning	C	4	4	1	100
4	21-805-0304	Database Systems	C	3	3	0	100
5	21-805-0305	Theory of Computation	C	3	3	1	100
6	21-805-0306	Lab 5 - Algorithms Lab	C	1	0	4	100
7	21-805-0307	Lab 6 - Database Systems Lab	C	1	0	4	100
Total for Semester III				20	18	12	700
<b>Semester - IV</b>							
Sl. No.	Course code	Course Title	C/E	Cr	Lr	L/T	M
1	21-805-0401	Foundations of Data Science	C	4	4	1	100
2	21-805-0402	Numerical Methods	C	4	4	1	100
3	21-805-0403	Digital Signal Processing	C	4	4	0	100
4	21-805-0404	Agile Software Engineering	C	3	3	1	100
5	21-805-0405	Optimization Techniques	C	3	3	1	100
6	21-805-0406	Lab 7 - Numerical Methods Lab	C	1	0	4	100
7	21-805-0407	Lab 8 - Optimization Techniques Lab	C	1	0	4	100
Total for Semester IV				20	18	12	700

<b>Semester - V</b>							
Sl. No.	Course code	Course Title	C/E	Cr	Lr	L/T	M
1	21-805-0501	Regression Analysis	C	4	4	1	100
2	21-805-0502	Big Data Analytics	C	4	4	1	100
3	21-805-0503	Cloud Computing	C	4	4	1	100
4	21-805-0504	R for Data Science	C	3	3	0	100
5	21-805-0505	Number Theory and Cryptography	C	3	3	1	100
6	21-805-0506	Lab 9 - R for Data Science Lab	C	1	0	4	100
7	21-805-0507	Lab 10 - Data Analytics Lab	C	1	0	4	100
Total for Semester V				20	18	12	700
<b>Semester - VI</b>							
Sl. No.	Course code	Course Title	C/E	Cr	Lr	L/T	M
1	21-805-0601	Inferential Statistics	C	4	4	0	100
2	21-805-0602	Machine Learning Algorithms	C	4	4	0	100
3	21-805-0603	Feature Engineering	C	4	4	1	100
4	21-805-0604	Soft Computing Techniques	C	3	3	1	100
5	21-805-0605	Parallel Computing	C	3	3	0	100
6	21-805-0606	Lab 11 - Machine Learning and Parallel Computing Lab	C	1	0	4	100
7	21-805-0607	Project	C	1	0	6	100
Total for Semester VI				20	18	12	700



<b>Semester - VII</b>							
Sl. No.	Course code	Course Title	C/E	Cr	Lr	L/T	M
1	21-805-0701	Computational Linguistics	C	4	4	1	100
2	21-805-0702	Digital Image and Video Processing	C	4	4	1	100
3	21-805-0703	Deep Learning	C	4	4	2	100
4	21-805-0704	Lab 12 - Computational Linguistics Lab	C	1	0	4	100
5	21-805-0705	Lab 13 - Image and Video Processing Lab	C	1	0	4	100
6		Elective - I	E	3	3	0	100
7		Elective - II	E	3	3	0	100
Total for Semester VII				20	18	12	700
<b>Electives</b>							
21-805-0706: Reinforcement Learning							
21-805-0707: Algorithmic Game Theory							
21-805-0708: Virtualized Systems							
21-805-0709: Advanced Optimization Techniques							
21-805-0710: Bioinformatics							
21-805-0711: Algorithms for Modern Data Models							
21-805-0712: Complex Network Analysis							
<b>Semester - VIII</b>							
Sl. No.	Course code	Course Title	C/E	Cr	Lr	L/T	M
1	21-805-0801	Computer Vision	C	4	4	1	100
2	21-805-0802	Probabilistic Graphical Models	C	4	4	1	100
3	21-805-0803	Algorithms for Massive Datasets	C	4	4	1	100
4	21-805-0804	Professional Communication	C	1	2	1	100
5	21-805-0805	Project	C	1	0	6	100
6		Elective - III	E	3	3	0	100
7		Elective - IV	E	3	3	0	100
Total for Semester VIII				20	20	10	700

Electives							
21-805-0806: Deep Learning for Computer Vision							
21-805-0807: Natural Language Processing with Deep Learning							
21-805-0808: Image and Video Coding							
21-805-0809: Functional Programming							
21-805-0810: Information Retrieval and Web Search							
21-805-0811: Human Computer Interaction							
21-805-0812: Cyber Physical Systems							
<b>Semester - IX</b>							
Sl. No.	Course code	Course Title	C/E	Cr	Lr	L/T	M
1	21-805-0901	Research Methodology	C	2	3	0	100
2	21-805-0902	Project & Viva Voce	C	12	0	16	300
3	21-805-0903	Elective - V*	E	2	3	2	100
Total for Semester IX				16	6	18	500
* Students can choose any of the MOOC courses approved by the Department Council. The approved MOOC courses will be numbered as 21-805-0903-M1, 21-805-0903-M2, etc.							
<b>Semester - X</b>							
Sl. No.	Course code	Course Title	C/E	Cr	Lr	L/T	M
1	21-805-1001	Project & Viva Voce	C	16	0	20	500
Total for Semester X				16	0	20	500
<b>Total credits for Degree: 192</b>				<b>Total Marks</b>			<b>6600</b>

**M. TECH. COMPUTER SCIENCE & ENGINEERING  
WITH SPECIALIZATION IN DATA SCIENCE & ARTIFICIAL INTELLIGENCE**

<b>Semester - I</b>							
Sl. No.	Course code	Course Title	Core /Elective	Credits	Lec	Lab/ Tutorial	Marks
1	21-479-0101	Mathematical Concepts for Computer Science	C	4	4	2	100
2	21-479-0102	Machine Learning Algorithms	C	4	4	3	100

3	21-479-0103	Design and Analysis of Algorithms	C	4	4	3	100
4	-	Elective I	E	3	4	1	100
5	-	Elective II	E	3	4	1	100
Total for Semester I				18	20	10	500
Electives							
21-479-0104: Virtualized Systems							
21-479-0105: Computational Linguistics							
21-479-0106: Advanced Optimization Techniques							
21-479-0107: Algorithms for Modern Data Models							
21-479-0108: Digital Image and Video Processing							
21-479-0109: Mathematics for Machine Learning							
21-479-0110: Number Theory and Cryptography							
<b>Semester - II</b>							
1	21-479-0201	Algorithms for Massive Datasets	C	4	4	2	100
2	21-479-0202	Probabilistic Graphical Models	C	4	4	2	100
3	21-479-0203	Seminar	C	1		3	50
4	-	Elective III	E	3	4	1	100
5	-	Elective IV	E	3	4	1	100
6	-	Elective V	E	3	4	1	100
Total for Semester II				18	20	10	550
Electives							
21-479-0204: Bioinformatics							
21-479-0205: Programming Massively Parallel Processors							
21-479-0206: Deep Learning							

21-479-0207: Modelling Cyber Physical Systems
21-479-0208: Algorithmic Game Theory
21-479-0209: Deep Learning for Computer Vision
21-479-0210: Image and Video Coding
21-479-0211: Reinforcement Learning
21-479-0212: Natural Language Processing with Deep Learning

Semester - III							
1	21-479-0301	Elective - VI	E	2	0	10	50
2	21-479-0302	Project & Viva Voce	C	16	0	20	350
Total for Semester II				18	0	30	400
Semester - IV							
1	21-479-0401	Project & Viva Voce	C	18	0	30	500
Total credits for Degree: <b>72</b>							

M. TECH. COMPUTER SCIENCE & ENGINEERING WITH SPECIALIZATION IN SOFTWARE ENGINEERING							
Semester - I							
Sl. No.	Course code	Course Title	Core/ Elective	Credits	Lec.	Lab/ Tutorial	Marks
1	21-480-0101	Mathematical Concepts for Computer Science	C	4	4	2	100
2	21-480-0102	Machine Learning Algorithms	C	4	4	3	100
3	21-480-0103	Design and Analysis of Algorithms	C	4	4	3	100
5	-	Elective I	E	3	4	1	100
6	-	Elective II	E	3	4	1	100
Total for Semester I				18	20	10	500

Electives							
21-480-0104: Artificial Intelligence							
21-480-0105: Human Computer Interaction							
21-480-0106: Information Retrieval and Web search							
21-480-0107: Functional Programming							
21-480-0108: Software Quality Management							
21-480-0109: Design and security of Internet of Things							
21-480-0110: Quantum Computing							
<b>Semester - II</b>							
Sl. No.	Course code	Course Title	Core/ Elective	Credits	Lec.	Lab/ Tutorial	Marks
1	21-480-0201	Big Data Analytics	C	4	4	2	100
2	21-480-0202	Agile Software Engineering	C	4	4	2	100
3	21-480-0203	Seminar	C	1	0	3	50
4	-	Elective III	E	3	4	1	100
5	-	Elective IV	E	3	4	1	100
6	-	Elective V	E	3	4	1	100
Total for Semester II				18	20	10	550
Electives							
21-480-0204: Software Architecture							
21-480-0205: Software Agent Systems							
21-480-0206: Enterprise Application Integration and Business Process Management							
21-480-0207: Advanced Data Mining							
21-480-0208: Fuzzy Set Theory: Foundations and Applications							
21-480-0209: Complex Networks: Theory and Applications							
21-480-0210: Advances in Databases							
21-480-0211: Blockchain Technology							

Semester - III							
1	21-480-0301	Elective VI	E	2	0	10	50
2	21-480-0302	Project & Viva Voce	C	16	0	20	350
Total for Semester III				18	0	30	400
Semester - IV							
1	21-480-0401	Project & Viva Voce	C	18	0	30	500
Total credits for Degree: 72							

#### 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, <a href="mailto:msn@cusat.ac.in">msn@cusat.ac.in</a>
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, <a href="mailto:jereesh@cusat.ac.in">jereesh@cusat.ac.in</a>
7	Dr Shailesh S Assistant Professor	Artificial Intelligence&Machine Learning ,Computer Vision,Data Science,Quantum Computing	<a href="mailto:shaileshsivan@cusat.ac.in">shaileshsivan@cusat.ac.in</a> 2308

## DEPARTMENT OF ELECTRONICS

### M.TECH IN ELECTRONICS & COMMUNICATION ENGINEERING

#### Program Outcomes of the courses offered during 2022-23

##### Courses

#### 1. M.Tech. in ELECTRONICS AND COMMUNICATION ENGINEERING – Specialization in VLSI and Embedded Systems, Microwave and Radar Engineering, and Robotics and Intelligent Systems

- PO1 : Acquired in-depth knowledge of Electronics with emphasis on thrust areas like Embedded Systems, Machine Learning, Microwave, Radar Engineering, Robotics and VLSI, including wider and global perspective, with an ability to discriminate, evaluate, analyze and synthesis existing and new knowledge, and integration of the same for enhancement of knowledge.
- PO2 : Capability to think later ally and originally, conceptualize and solve engineering problems, evaluate a wide range of potential solutions for those problems and arrive at feasible, optimal solutions
- PO3 : Communication skills to interact with the engineering community ,and with society at large, regarding complex engineering activities confidently and effectively. They would be able to comprehend and write effective reports and design documentation by adhering to appropriate standards.
- PO4 : Acquired professional and intellectual integrity, professional code of conduct, ethics of research and scholarship, consideration of the impact of research outcomes on professional practices and an understanding of responsibility to contribute to the community for sustainable development of society.

##### 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
	<b>Total credits</b>				<b>18</b>			

<b>Specialization Electives</b>								
<b>VLSI and Embedded Systems</b>								
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
<b>Microwave and Radar Engineering</b>								
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
<b>Robotics and Intelligent Systems</b>								
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
<b>General Electives</b>								
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	4	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
	<b>Total credits</b>				<b>18</b>			



<b>Specialization Electives</b>								
<b>VLSI and Embedded Systems</b>								
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
<b>Microwave and Radar Engineering</b>								
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
<b>Robotics and Intelligent Systems</b>								
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
<b>General Electives</b>								
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. ELECTRONICS SCIENCE**

- PO1 : Enhance knowledge by understanding, experimenting and comparing information (existing and new) in the field of electronics.
- PO2 : Demonstrate ability to model, simulate and evaluate the phenomenon and systems in the chosen areas of electronics.
- PO3 : Use state-of-the-art tools to design, development and analysis problems and provide time bound and economical solutions.
- PO4 : Work in collaborative manner with others in a team, contribute to the management, planning and implementations.
- PO5 : Effectively communicate technical content through written reports/design documents, and presentations.
- PO6 : Engage in lifelong learning independently to enhance knowledge and skills that can contribute to the continuous improvement of individuals and society.

**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
<b>Total credits</b>					<b>22</b>			

**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
	<b>Elective I</b>				3	50	50	100
	<b>Total credits</b>				<b>18</b>			

**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
	<b>Elective II</b>				3	50	50	100
	<b>Elective III</b>				3	50	50	100
	<b>Elective Lab</b>				1	100	0	100
	<b>Total credits</b>				<b>16</b>			

**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
	<b>Elective IV</b>				3	50	50	100
	<b>Total Credits</b>				<b>16</b>			

**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)**

- PO1 : Acquire technical competence, comprehensive knowledge and understanding the methodologies and technologies associated with land, air & naval defence systems. Apply knowledge to identify, formulate and analyse complex engineering problems.
- PO2 : Having an ability to apply knowledge of science, mathematics, engineering & technology for development of defence technologies.
- PO3 : Having an ability to design a component, subsystem or a system applying all the relevant standards and with realistic constraints, including operational and environmental.
- PO4 : Acquire the skills for uses of contemporary techniques, resources and modern engineering and IT tools Usages of Modern Techniques.
- PO5 : An ability to identify, investigate, understand and analyse complex problems, apply creativity, carry out research /investigation and development work to solve practical problems related to defence technological issues.
- PO6 : Ability to communicate effectively in both oral and written contexts in the form of technical papers, project reports, design documents and seminar presentations.  
Communication
- PO7 : Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

### Semester - 1

S. No.	Course Code	Course of study and scheme of examination	M.Tech Semester-1			Branch Defence Technology
			Periods/Week			Total Credits
			L	T	P	
<b>Compulsory Courses</b>						
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
<b>Elective Courses</b>						
6.		Elective 1	3	-	-	3
7.		Elective 2	3	-	-	3
8.		Seminar	-	-	1	1
Total credits						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 elective course.

S. No.	Course Code	Course of study and scheme of examination	M.Tech Semester-1			
			Periods/Week			Total Credits
			L	T	P	
<b>Elective 1</b>						
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.	Aerospace Technology
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			Total Credits
			Periods/Week			
			L	T	P	
<b>Combat Vehicle Engineering</b>						
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

		<b>Elective Courses</b>				
6.		Elective 1	3	-	-	3
7.		Elective 2	3	-	-	3
8.		Seminar	-	-	1	1
		Total credits				23

## 2. Aerospace Technology

	<b>Course Code</b>	<b>Course of study and scheme of examination</b>	<b>M.Tech Semester-2</b>			<b>Branch Defence Technology</b>
<b>S. No.</b>		<b>Compulsory Courses</b>	<b>Periods/Week</b>			<b>Total Credits</b>
		<b>Aerospace Technology</b>	<b>L</b>	<b>T</b>	<b>P</b>	
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
		<b>Elective Courses</b>				
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
			Periods/Week			Total Credits
Compulsory Courses						
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
			Periods/Week			Total Credits
Compulsory Courses						
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

<b>Elective Courses</b>						
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
			L	T	P	Total Credits
		<b>Directed Energy Technology</b>				
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
<b>Elective Courses</b>						
6.		Elective 1	3	-	0	3
7.		Elective 2	3	-	0	3
8.		Seminar	-	-	1	1
Total credits						23

## 6. High Energy Materials Technology

	Course Code	Course of study and scheme of examination	M.Tech Semester-2			Branch Defence Technology
S. No.		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				
		<b>Elective Courses</b>		-		
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 elective course.

S. No.	Course Code	Course of study and scheme of examination Elective 1 (for all Specializations)	M.Tech Semester-2			
			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, tele command & 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 Elective 2 (for all Specializations)	M.Tech Semester-2			
			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
<b>Total credits</b>		<b>14</b>

#### Semester – 4

S. No.	Course	Credit
1	Project Dissertation Phase-2	20
<b>Total credits</b>		<b>20</b>

#### DETAILS OF FACULTY

Sl. No.	Name	Designation	Qualification	Specilisation	Contact no. & email. id
1.	Dr.Supriya M.H.	Professor & Head	B.Tech M.Tech Ph.D MBA	Signal Processing, Network Analysis, Digital Electronics, Microprocessors, Embedded Systems, Data Structures.	9947379396 supriya@cusat.ac.in
2.	Arun A Balakrishnan	Assistant Professor	B.Tech M.Tech	Signal Processing	9496346370 arunab@cusat.ac.in
3.	Mithun Haridas T P	Assistant Professor	B.Tech M.Tech	Embedded Systems	9447096888 mithuntp@cusat.ac.in
4.	Dr. Nalesh S	Assistant Professor	B.Tech M.Tech Ph.D	VLSI, Reconfigurable Architecture, High level Synthesis DSP Architecture	9535163008 nalesh@cusat.ac.in
5.	Dr. Tripti S Warriar	Assistant Professor	B.Tech M.Tech Ph.D	VLSI, Computer Architecture FPGA, VLSI Testing	9495585383 tripti@cusat.ac.in
6.	Dr. Deepti Das Krishna	Assistant Professor	M.Sc M.Tech Ph.D	Microwave Communication Communication Systems Antennas and Highfrequency design	9846420928 deeptidas@cusat.ac.in
7.	Kumary V Y Vidhu	Assistant Professor	B.Tech M.Tech	Microwave & Television Engineering	9645735550 vyvidhu@cusat.ac.in

**DEPARTMENT OF INSTRUMENTATION**

**B.Tech. INSTRUMENTATION AND CONTROL ENGINEERING**

**Semester I**

Course Code	Course	C/E	Credits
20-219-0101	Calculus	C	3
20-219-0102	Engineering Physics	C	3
20-219-0103	Basic Electronics	C	3
20-219-0104	Electrical Engineering – I	C	3
20-219-0105	Mechanical Engineering	C	3
20-219-0106	Soft Skill Development	C	1
	<b>Practicals</b>		
20-219-0107	Language Lab	C	1
20-219-0108	Engineering Graphics	C	2
20-219-0109	Electrical and Mechanical Workshop		1
	<b>Total</b>		<b>20</b>

**Semester II**

Course Code	Course	C/E	Credits
20-219-0201	Linear Algebra and Transforms	C	3
20-219-0202	Engineering Chemistry	C	3
20-219-0203	Analog Electronics	C	3
20-219-0204	Electrical Engineering II	C	3
20-219-0205	Engineering Mechanics	C	3
20-219-0206	Materials Science	C	3
	<b>Practicals</b>		
20-219-0207	Computer Programming	C	2
20-219-0208	Basic Electronics Lab	C	1
	<b>Total</b>		<b>21</b>

**Semester III**

Course Code	Course	C/E	Credits
20-219-0301	Complex Analysis and Partial differential Equations	C	3
20-219-0302	Electrical measurements and Instrumentation	C	3
20-219-0303	Digital electronics	C	3
20-219-0304	Linear Integrated Circuits	C	3
20-219-0305	Transducers - I	C	3
20-219-0306	Principles of measurements and Instrumentation	C	3
	<b>Practicals</b>		
20-219-0307	Analog Electronics Lab	C	1
20-219-0308	Electrical Machines Lab	C	1
	<b>Total</b>		<b>20</b>

**Semester IV**

Course Code	Course	C/E	Credits
20-219-0401	Numerical and Statistical Methods	C	3
20-219-0402	Transducers - II	C	3
20-219-0403	Control Engineering – I	C	3
20-219-0404	Power Electronics	C	3
20-219-0405	Pneumatic and Hydraulic System	C	3
20-219-0406	Signals and Systems	C	3
	<b>Practicals</b>		
20-219-0407	Digital Electronics Lab	C	1
20-219-0408	Material Science Lab	C	1
	<b>Total</b>		<b>20</b>

**Semester V**

Course Code	Course	C/E	Credits
20-219-0501	Control Engineering II	C	3
20-219-0502	Digital Signal Processing	C	3
20-219-0503	Microprocessors & microcontrollers	C	3
20-219-0504	Analytical Instruments	C	3
20-219-0505	Engineering Management	C	3
20-219-05**	Elective - I	E	1
	<b>Practicals</b>		
20-219-0506	Control System Lab	C	3
20-219-0507	Transducers and Industrial Instrumentation Lab	C	1
	<b>Total</b>		<b>20</b>

**Semester VI**

Course Code	Course	C/E	Credits
20-219-0601	Vacuum and Cryogenic Instrumentation	C	3
20-219-0602	Embedded Systems	C	3
20-219-0603	Process Control	C	3
20-219-0604	Optoelectronic Instrumentation	C	3
20-219-06**	Elective - II	E	3
20-219-06**	Industry Elective	E	2
	<b>Practicals</b>		
20-219-0605	Microprocessor and Microcontroller Lab	C	1
20-219-0606	Virtual Instrumentation Lab.	C	1
20-219-0607	Seminar	C	1
	<b>Total</b>		<b>20</b>

**Semester VII**

Course Code	Course	C/E	Credits
20-219-0701	Biomedical Instrumentation	C	3
20-219-0702	Advanced Process control	C	3
20-219-0703	Power Plant Instrumentation	C	3
20-219-0704	Communication Systems and Telemetry	C	3
20-219-0705	Robotics and automation	C	3
20-219-07**	Elective - III	E	3
	<b>Practicals</b>		
20-219-0706	Process Control Lab	C	1
20-219-0707	Digital Signal Processing Lab	C	1
20-219-0708	Mini project	C	1
	<b>Total</b>		<b>21</b>

**Semester VIII**

Course Code	Course	C/E	Credits
20-219-0801	Project Work	C	10
20-219-0802	Viva-Voce	C	2
20-219-08**	Open Course 1	E	2
20-219-08**	Open Course 2	C	2
20-219-08**	Open Course 3		2
	<b>Total</b>		<b>18</b>
<b>Total for Eight Semesters</b>			<b>160</b>

**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	1	50
5	21-473-0105	Control System and Computing Lab	C	1	50
6		Elective 1	E	3	100
7		Elective 2	E	3	100
<b>Total</b>				<b>18</b>	<b>600</b>



**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
- 21-473-0111 Non Linear Control Systems
- 21-473-0112 Advanced Biomedical Instruments

**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	C	1	50
5	21-473-0205	Advanced Process Control Lab	C	1	50
6		Elective III	E	3	100
7		Elective IV	E	3	100
8		Elective V	E	3	100
<b>Total</b>				<b>18</b>	<b>650</b>

**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
- 21-473-0212 Embedded 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 I*	E	3	100
2	21-473-0302	Project Progress Evaluation	C	15	400
<b>Total</b>				18	500

**SEMESTER IV**

Sl. No.	Course Code	Name of the Course	Core/ Elective	Credits	Marks
1	21-473-0401	Open Elective II*	E	3	100
2	21-473-0402	Project Dissertation Evaluation	C	15	400
<b>Total</b>				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, Associate Professor and Head	Control Systems	johney@cusat.ac.in 8281535741
2.	Dr. Reju V.G (LWA) Associate Professor	Digital Signal Processing	reju@cusat.ac.in 7558065958
3.	Sri. Ratheesh P.M, Assistant Professor	Signal/Image Processing	ratheeshpm@cusat.ac.in 9447634188
4.	Dr. Pankaj Sagar Assistant Professor	Cryogenic Instrumentation	pankajs@cusat.ac.in 9611366896
5.	Smt. Soni P Assistant Professor (on contract)	Applied Electronics and Embedded Systems	sonip@cusat.ac.in 9446869524
6.	Dr. Nimmy John T Assistant Professor (on contract)	Electronics and Instrumentation	nimmyjohnt@cusat.ac.in 9495565981
7.	Smt. Anju V Sathyan Assistant Professor (on contract)	Signal Processing	anjuvsathyan@cusat.ac.in 8281171094
8.	Sri.Sam Varghese Assistant Professor (on contract)	Image & Signal Processing	samvarghese@cusat.ac.in 9995209568
9.	Dr. Anju Sunny Assistant Professor (on contract)	Process Simulation & Control	anjusunny@cusat.ac.in 8547919496
10.	Dr. Minu A Pillai Assistant Professor (on contract)	Signal Processing & Instrumentation	minupillai@cusat.ac.in 9074401968
11	Sri. Kiran Babu Assistant Professor (on contract)	Signal Processing	kiran@cusat.ac.in 9946445040

**DEPARTMENT OF POLYMER SCIENCE AND RUBBER  
TECHNOLOGY**

**B.TECH. POLYMER SCIENCE AND ENGINEERING**

**CURRICULUM**

**SEMESTER I**

Sl. No.	Course Code	Subject	L	T	P	Credits	Marks		
							Internal	External	Total
1	20-214-0101	Engineering Mathematics I	2	1	0	3	50	50	100
2	20-214-0102	Engineering Physics	2	1	0	3	50	50	100
3	20-214-0103	Engineering Chemistry	2	1	0	3	50	50	100
4	20-214-0104	Engineering Graphics	1	2	0	3	50	50	100
5	20-214-0105	Basic Electrical Engineering and Electronics	2	1	0	3	50	50	100
6	20-214-0106	Soft Skill Development	2	0	0	2	50	50	100
7	20-214-0111	Introduction to Industrial Chemical Analysis ( <b>Lab</b> )	0	0	2	1	50	-	50
8	20-214-0112	Basic Electrical Engineering and Electronics ( <b>Lab</b> )	0	0	2	1	50	-	50
9	20-214-0113	Language Lab	0	0	2	1	50	-	50
10	20-214-0131	Seminar (Non – Credit)	0	0	3	–			
11	20-214-0135	Library (Non – Credit)	0	0	4	–			
		<b>Total</b>	<b>11</b>	<b>6</b>	<b>13</b>	<b>20</b>	<b>450</b>	<b>300</b>	<b>750</b>

**SEMESTER II**

1	20-214-0201	Engineering Mathematics II	2	1	0	3	50	50	100
2	20-214-0202	Engineering Mechanics	2	1	0	3	50	50	100
3	20-214-0203	Environmental Studies	3	0	0	3	50	50	100
4	20-214-0204	Mechanical Engineering	2	1	0	3	50	50	100
5	20-214-0205	Introduction to Macromolecular Science and Engineering	3	0	0	3	50	50	100
6	20-214-0206	Fluid Mechanics	2	1	0	3	50	50	100
7	20-214-0211	Mechanical Engineering Workshop	0	0	3	1	50	-	50
8	20-214-0212	Polymer Synthesis <b>(Lab)</b>	0	0	2	1	50	-	50
9	20-214-0231	Seminar (Non – Credit)	0	0	3	–			
10	20-214-0235	Library (Non – Credit)	0	0	4	–			
		<b>Total</b>	<b>14</b>	<b>4</b>	<b>12</b>	<b>20</b>	<b>400</b>	<b>300</b>	<b>700</b>

**SEMESTER III**

1	20-214-0301	Engineering Mathematics III	2	1	0	3	50	50	100
2	20-214-0302	Natural Rubber Production and Technology	3	0	0	3	50	50	100
3	20-214-0303	Strength of Materials	2	1	0	3	50	50	100
4	20-214-0304	Heat and Mass Transfer	2	1	0	3	50	50	100
5	20-214-0305	Organic Chemistry	3	0	0	3	50	50	100
6	20-214-0306	Computer Programming	2	0	3	3	100	-	100
7	20-214-0311	Identification of Polymers <b>(Lab)</b>	0	0	2	1	50	-	50
8	20-214-0312	Chemical Engineering (Lab)	0	0	2	1	50	-	50
9	20-214-0331	Seminar (Non – Credit)	0	0	3	–			
10	20-214-0335	Library (Non – Credit)	0	0	3	–			
		<b>Total</b>	<b>14</b>	<b>3</b>	<b>13</b>	<b>20</b>	<b>450</b>	<b>250</b>	<b>700</b>

**SEMESTER IV**

1	20-214-0401	Applied Statistics	2	1	0	3	50	50	100
2	20-214-0402	Quality Management Systems and Safety	3	0	0	3	50	50	100
3	20-214-0403	Polymer Synthesis	3	0	0	3	50	50	100
4	20-214-0404	Science and Engineering of Rubbers	3	0	0	3	50	50	100
5	20-214-0405	Plastic Materials	3	0	0	3	50	50	100
6	20-214-0431	Review Seminar	0	4	0	1	100	-	100
7	20-214-0411	Polymer Synthesis, Modification and characterization ( <b>Lab</b> )	0	0	4	2	50	-	50
8	20-214-0432	Seminar	0	0	3	1	30		30
9	20-214-0435	Library (Non – Credit)	0	0	4	-			
		<b>Total</b>	<b>14</b>	<b>5</b>	<b>11</b>	<b>19</b>	<b>430</b>	<b>250</b>	<b>680</b>

**SEMESTER V**

1	20-214-0501	Plastic Processing	3	0	0	3	50	50	100
2	20-214-0502	Polymer Physics	3	0	0	3	50	50	100
3	20-214-0503	Rubber Processing and Products Manufacture	3	0	0	3	50	50	100
4	20-214-0504	Fiber Science and Technology	3	0	0	3	50	50	100
5	20-214-0521-23	Elective I	3	0	0	3	50	50	100
6	20-214-0524-26	Elective II	3	0	0	3	50	50	100
7	20-214-0511	Polymer Characterization and properties ( <b>Lab</b> )	0	0	2	1	50	-	50
8	20-214-0512	Analysis of Rubber Compounds and Ingredients ( <b>Lab</b> )	0	0	3	1	50	-	50
9	20-214-0531	Seminar	0	0	3	1	30		30
10	20-214-0535	Library (Non – Credit)	0	0	4	-			
		<b>Total</b>	<b>18</b>	<b>0</b>	<b>12</b>	<b>21</b>	<b>430</b>	<b>300</b>	<b>730</b>

**SEMESTER VI**

1	20-214-0601	Latex Technology	3	0	0	3	50	50	100
2	20-214-0602	Characterization and Testing Methods	3	0	0	3	50	50	100
3	20-214-0603	Polymer Products Design	3	0	0	3	50	50	100
4	20-214-0604	Polymer Rheology	3	0	0	3	50	50	100
5	20-214-0621-23	Elective III	3	0	0	3	50	50	100
6	20-214-0624-26	Elective IV	3	0	0	3	50	50	100
7	20-214-0651	Minor Project	0	0	3	1	100	-	100
8	20-214-0611	Latex and Dry rubber Technology (Lab)	0	0	2	1	100	-	100
9	20-214-0631	Seminar	0	0	3	1	30		30
10	20-214-0635	Library (Non – Credit)	0	0	4	-			
		<b>Total</b>	<b>18</b>	<b>0</b>	<b>12</b>	<b>21</b>	<b>530</b>	<b>300</b>	<b>830</b>

**SEMESTER VII**

1	20-214-0701	Polymer Composites and Blends	3	0	0	3	50	50	100
2	20-214-0702	Introduction to Mould and Die Design	3	0	0	3	50	50	100
3	20-214-0703	Failure Analysis of Polymers	3	0	0	3	50	50	100
4	20-214-0704	Industrial Management	3	0	0	3	50	50	100
5	20-214-0721-23	Elective V	3	0	0	3	50	50	100
6	20-214-0724-26	Elective VI	3	0	0	3	50	50	100
7	20-214-0711	Polymer Products Testing (Lab)	0	0	2	1	50	-	50
8	20-214-0731	Review paper based on Elective			4	1	60		60
9	20-214-0732	Soft skill/ start up workshop (Non – Credit)	0	0	3	-			
10	20-214-0735	Library (Non – Credit)	0	0	3	-			
		<b>Total</b>	<b>18</b>	<b>0</b>	<b>12</b>	<b>20</b>	<b>410</b>	<b>300</b>	<b>710</b>

**SEMESTER VIII**

1	20-214-0841	Project Work Report and Viva Voce	0	0	22	12	200	200	400
2	20-214-0842	Industrial Training	0	0	4	3	50	50	100
3	20-214-0861	Open Elective I	2	0	0	2	–	50	50
4	20-214-0862	Open Elective II	2	0	0	2	–	50	50
		<b>Total</b>	<b>4</b>	<b>0</b>	<b>26</b>	<b>19</b>	<b>250</b>	<b>350</b>	<b>600</b>
		<b>GRAND TOTAL</b>	<b>111</b>	<b>18</b>	<b>111</b>	<b>160</b>	<b>3350</b>	<b>2350</b>	<b>5700</b>

<b>Electives</b>	
Elective I	20-214-0521 Paints and Surface Coatings
	20-214-0522 Adhesives Technology
	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 nanocomposites
	20-214-0726 Professional Ethics in Engineering

<b>Credits</b>			
Category	Theory	Lab	Total
Basic Sciences	21	1	22
Eng. Sciences	16	2	18
Humanities/management/computer	14	1	15
Core	54	9	63
Prog. Elective	18	0	18
Open Elective	4	0	4
Project& Industrial training	15	0	15
Seminar & minor project	5	0	5
<b>Total Credits</b>			<b>160</b>

**TECH. (POLYMER TECHNOLOGY) CURRICULUM, JUNE 2020**

Course code	Subject	C/ E	Hrs per week			Cred it	Marks		
			L	T	P		CE	EE	Total
20-440-0101	Advanced Polymer Science	C	3	0	0	3	50	50	100
20-440-0102	Polymer Materials	C	3	0	0	3	50	50	100
20-440-0103	Advanced Polymer Product Design	C	3	0	0	3	50	50	100
20-440-012*	Prog. Elective I	E	3	0	0	3	50	50	100
20-440-0104	Research Methodology and IPR	C	2	0	0	2	50	50	100
20-440-013*	Audit course	A	2	0	0	0	-	100	100
20-440-011*	Lab 1 (Prog. Core based)	C	0	0	4	2	100	-	100
20-440-011*	Lab 2 (Elective based)	E	0	0	4	1	100	-	100
	<b>Total</b>					<b>17</b>	<b>450</b>	<b>350</b>	<b>800</b>



Course code	Subject	C/ E	Hrs per week			Cred it	Marks		
			L	T	P		CE	EE	Total
20-440-0201	Advanced Plastics processing	C	3	0	0	3	50	50	100
20-440-0202	Rubber Processing and Product Manufacture	C	3	0	0	3	50	50	100
20-440-0203	Advanced Tyre Technology	C	3	0	0	3	50	50	100
20-440-022*	Prog. Elective II	E	3	0	0	3	50	50	100
20-440-022*	Prog. Elective III	E	3	0	0	3	50	50	100
20-440-021*	Lab 3(Prog. Core based)	C	0	0	4	2	100	-	100
20-440-021*	Lab 4 (Elective based)	E	0	0	4	1	100	-	100
20-440-0251	Minor Project with Seminar	C	0	0	2	2	100	-	100
<b>Total</b>						<b>20</b>	<b>550</b>	<b>250</b>	<b>800</b>
Course code	Subject	C/ E	Hrs per week			Cred it	Marks		
			L	T	P		CE	EE	Total
20-440-032*	Prog. Elective IV	E	3	0	0	3	50	50	100
20-440-036*	Open Elective	E	3	0	0	3	-	100	100
20-440-0341	Dissertation - I	C	0	0	2	10	-	100	100
<b>Total</b>						<b>16</b>	<b>50</b>	<b>250</b>	<b>300</b>
Course code	Subject	C/ E	Hrs per week			Cred it	Marks		
			L	T	P		CE	EE	Total
20-440-0441	Dissertation - II	C	0	0	3	17	-	300	300
<b>Total</b>						<b>17</b>	<b>-</b>	<b>300</b>	<b>300</b>
<b>GRAND TOTAL</b>						<b>70</b>	<b>1050</b>	<b>1150</b>	<b>2200</b>

<b>Programme Elective I</b>	
20-440-0121	Polymers for packaging
20-440-0122	Advanced Polymer Rheology
20-440-0123	Characterisation and Testing Methods

<b>Programme Elective II</b>	
20-440-0221	Specialty polymers (I.E.)
20-440-0223	Advanced Polymer Nanocomposites (I.E.)

<b>Programme Elective III</b>	
20-440-0224	Mould and Die Design
20-440-0225	Polymers for Advanced Electrical and Electronics Applications
20-440-0226	Materials in Space Applications

<b>Programme Elective IV</b>	
20-440-0321	Adhesives and Surface Coatings
20-440-0322	Advanced Biomaterials for Medical Applications (I.E.)
20-440-0323	Modelling and Simulation

<b>Lab 1: Labs - Core based (Sem I)</b>	
20-440-0111	Advanced Polymer Science

<b>Lab 2: Labs - Elective based (Sem I)</b>	
20-440-0112	Polymers for packaging
20-440-0113	Advanced Polymer Rheology
20-440-0114	Characterisation and Testing Methods

<b>Lab 3: Labs - Core based (Sem II)</b>	
20-440-0211	Plastics and Rubber Processing

<b>Lab 4: Labs - Elective based (Sem II)</b>	
20-440-0212	Specialty polymers

20-440-0213	Advanced Polymer Nanocomposites
20-440-0214	Mould and Die Design
20-440-0215	Polymers for Advanced Electrical and Electronics Applications
20-440-0216	Materials in Space Applications

#### **Audit courses**

20-440-0131	Constitution of India and environmental governance: administrative and adjudicatory process
20-440-0132	Principles of management
20-440-0133	Technical English for engineers
20-440-0134	Entrepreneurship and IP strategy
20-440-0135	Exploring Human Values: Visions of Happiness and Perfect Society
20-440-0136	Speaking Effectively
20-440-0137	Enhancing Soft Skill and Personality
20-440-0138	Plastic Waste Management
20-440-0139	Scanning Electron / Ion / Probe Microscopy in Materials Characterization
20-440-0140	Chemical Process control
20-440-0141	Introduction to programming
20-440-0142	Managing Intellectual Property in Universities
20-440-0143	Patent drafting for beginners
20-440-0144	Development Research Methods
20-440-0145	Entrepreneurs
20-440-0146	Polymer Assisted Abrasive Finishing Processes
20-440-0147	Science and Technology of Weft and Warp Knitting

#### **Open Elective Courses**

20-440-0361	Properties of Materials
20-440-0362	Biomedical Nanotechnology

20-440-0363	Technologies For Clean And Renewable Energy Production
20-440-0364	Environmental Quality modelling and Analysis
20-440-0365	Membrane Technology
20-440-0366	Chemical Process Safety
20-440-0367	Chemical Reaction Engineering
20-440-0368	Soft Nanotechnology
20-440-0369	Waste to Energy Conversion
20-440-0370	Environmental Degradation of Materials
20-440-0371	Rheology of Complex materials
20-440-0372	Environmental Engineering
20-440-0373	Municipal solid waste management
20-440-0374	Fundamentals of combustion for propulsion
20-440-0375	Medical Biomaterials
20-440-0376	Biomass Conversion and Biorefinery
20-440-0377	Materials Science and Engineering
20-440-0378	Organometallic Chemistry
20-440-0379	Polymer Reaction Engineering
20-440-0380	Pericyclic Reactions and Organic Photochemistry
20-440-0381	Physical and Electrochemical Characterizations in Chemical Engineering
20-440-0382	Nature and Properties of Materials
20-440-0383	Fundamentals of Materials Processing - Part 2

**PO1.Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, techniques, skills, and modern tools of polymer Science and engineering to the solution of polymer engineering problems.

**PO2.Problem Analysis:** Identify, formulate, research literature, and analyze engineering problems related to Polymer Science and Engineering to arrive at substantiated conclusions using first principles of mathematics, natural, and engineering sciences.

**PO3. Design/development of solutions:** Design solutions for complex engineering problems and design system components, processes to meet the needs of public health and safety, and the cultural, societal, and environmental considerations in the field of Polymer Science and Rubber Technology.

**PO4. Conduct investigations of complex Problems:** Use research-based knowledge including design of experiments, analysis and interpretation of data, and synthesis of the **information to provide valid conclusions for broadly defined polymer science and engineering problems.**

**PO5. Modern Tool Usage:** Create, select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modelling to Polymer Science and Engineering activities with an understanding of the limitations.

**PO6. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice related to Polymer Science and Engineering.

#### DETAILS OF FACULTY

Sl.No.	Name & Designation	Specialization	Communication
1.	Dr. Sunil K. Narayanankutty Professor	Polymer Science/ Technology	0484-2551922, 9995300093 sncusat@gmail.com
2.	Dr. Honey John Professor	Polymer Science/ Technology	9446372997 honey@cusat.ac.in
3	Dr.Prasanth R. Professor& Head	Polymer Science/ Technology	9497205352 <a href="mailto:dr.prasanthr@gmail.com">dr.prasanthr@gmail.com</a>
4.	Dr.Sailaja G.S. Associate Professor	Polymer Science/ Technology	0471-2595136, 9744799643 sailajags@gmail.com
5	Dr.JayalathaGopalakrishnan G Assistant Professor	Polymer Science/ Technology	9847672916 gjyalatha@gmail.com
6	Dr.Jinu Jacob George Assistant Professor	Polymer Science/ Technology	0481-2598155, 9497792092 jinujac@gmail.com
7	Dr.Abhitha K. Assistant Professor	Polymer Science/ Technology	9847654544 abhithak80@gmail.com/ abhithak80@cusat.ac.in
8	Dr.Reghunathan Nair Emeritus Professor	Polymer Science/ Technology	9496020080 cprnair@gmail.com
9	Dr.Sari P.S. Assistant Professor (On contract)	Polymer Science/ Technology	8921970724 sarips1@gmail.com

**INTERNATIONAL SCHOOL OF PHOTONICS**  
**M.TECH. (OPTO-ELECTRONICS & LASER TECHNOLOGY)**

**SEMESTER I**

Course Code	Subject	Hrs/Week			Credit	Marks		
		L	T	P		CA	SEE	Total
20-441-0101	Modern Optics	4	1		4	40	60	100
20-441-0102	Laser Technology	4	1		4	40	60	100
20-441-0103	Opto-electronics	4	1		4	40	60	100
20-441-0104	Lab Course I			6	3		100	100
<i>Any one Elective</i>								
20-441-0105	Advanced Engineering Physics	3	1		3			
20-441-0106	Digital Communication	3	1		3			
	<b>Total for semester I</b>	<b>18</b>	<b>5</b>	<b>6</b>	<b>18</b>			

**SEMESTER II**

Course Code	Subject	Hrs/Week			Credit	Marks		
		L	T	P		CA	SEE	Total
20-441-0201	Fibre Optics & Applications	4	1		4	40	60	100
20-441-0202	Lab Course II			6	3		100	100
20-441-0203	Mini Project, Seminar				2			
<i>Any three Elective</i>								
20-441-0204	Laser Applications	3	1		3			
20-441-0205	Optical Communication Technology	3	1		3			
20-441-0206	Non-Linear Optics, OSP & OC	3	1		3			
20-441-0207	Biophotonics	3	1		3			
20-441-0208	Laser Spectroscopy	3	1		3			
20-441-0209	Science and Technology of Plasma	3	1		3			
20-441-0210	Nanophotonics	3	1		3			
	<b>Total for semester II</b>	<b>13</b>	<b>4</b>	<b>6</b>	<b>18</b>			

**SEMESTER III**

Course Code	Subject	Hrs/Week			Credit	Marks		
		L	T	P		CA	SEE	Total
20-441-0301	Project				15			
20-441-03XX	Open Elective*				3			
	<b>Total for semester III</b>				<b>18</b>			

**SEMESTER IV**

Course Code	Subject	Hrs/Week			Credit	Marks		
		L	T	P		CA	SEE	Total
20-441-0301	Project				18			
	<b>Total for semester IV</b>				<b>18</b>			
	<b>Total credit for the course</b>				<b>72</b>			

**M.Sc (5 year Integrated) in Photonics****SEMESTER I**

Course Code	Subject	Hrs/Week			Credit	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
	<b>Total for semester I</b>	<b>17</b>	<b>6</b>	<b>6</b>	<b>20</b>	<b>450</b>	<b>300</b>	<b>750</b>

**SEMESTER II**

Course Code	Subject	Hrs/Week			Credit	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	Thermo dynamics 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
<b>Total for semester II</b>		<b>17</b>	<b>6</b>	<b>6</b>	<b>20</b>	<b>450</b>	<b>300</b>	<b>750</b>

**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
<b>Total for Semester III</b>		<b>16</b>	<b>6</b>	<b>5</b>	<b>19</b>	<b>450</b>	<b>250</b>	<b>700</b>



**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
<b>Total for Semester IV</b>		<b>16</b>	<b>8</b>	<b>5</b>	<b>20</b>	<b>550</b>	<b>250</b>	<b>800</b>

**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
<b>Total for Semester V</b>		<b>16</b>	<b>6</b>	<b>5</b>	<b>19</b>	<b>450</b>	<b>250</b>	<b>700</b>

**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
<b>Total for Semester VI</b>		<b>12</b>	<b>15</b>	<b>4</b>	<b>18</b>	<b>500</b>	<b>200</b>	<b>700</b>
<b>Total for Semester I-VI</b>					<b>116</b>			<b>4400</b>

\* 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 Electronics Lab I		4		2	100		100
20-351-0705	Seminar+ Viva	1			1	50+50		100
<b>Total for Semester VII</b>		<b>15</b>	<b>8</b>	<b>4</b>	<b>19</b>	<b>500</b>	<b>200</b>	<b>700</b>

#### 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
<b>Total for Semester VIII</b>		<b>15</b>	<b>8</b>	<b>4</b>	<b>19</b>	<b>500</b>	<b>200</b>	<b>700</b>

#### 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
<b>Total for Semester IX</b>		<b>14</b>	<b>8</b>	<b>4</b>	<b>18</b>	<b>500</b>	<b>200</b>	<b>700</b>

**LIST OF ELECTIVES**

Semester	Course Code	Course Title
<b>VII</b>	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
<b>VIII</b>	20-351-0821	Quantum Optics
	20-351-0822	Biophotonics
	20-351-0823	Optomechanical Engineering
<b>IX</b>	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 & Project Viva				16	200+ 100	200+ 100	600
<b>Total for Semester X</b>					<b>16</b>	<b>300</b>	<b>300</b>	<b>600</b>
<b>Total credit for sem VII-X</b>					<b>72</b>			

\* 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. Pramod Gopinath Professor & Director	Laser Plasma Spectroscopy, Nonlinear Optics and Nanophotonics	9446069743 <a href="mailto:pramod@cusat.ac.in">pramod@cusat.ac.in</a>
2	Dr. A. Mujeeb Senior Professor	Laser Speckle Interferometry Optical NDT Nano/Biophotonics	0471-2455786, 9447419505 <a href="mailto:mujeeb@cusat.ac.in">mujeeb@cusat.ac.in</a> , <a href="mailto:mujeebcoover@gmail.com">mujeebcoover@gmail.com</a>
3	Dr. M. Kailasnath Professor	Fibre Optics & Laser Technology	0484-2711525, 9447213863 <a href="mailto:kailas@cusat.ac.in">kailas@cusat.ac.in</a>
4	Dr. Sheenu Thomas Professor	Experimental Solid State Physics	0484-2577505, 9349405537 <a href="mailto:st@cusat.ac.in">st@cusat.ac.in</a>
5	Dr. Saji K.J Associate Professor	Optoelectronic Devices, Nano materials and Solar cells	9400217723 <a href="mailto:saji@cusat.ac.in">saji@cusat.ac.in</a>
6.	Dr. Manu Vaishakh Assistant Professor	Non-linear optics, Optical imaging, Fiber optics	9496061610 <a href="mailto:manu.vaisakh@cusat.ac.in">manu.vaisakh@cusat.ac.in</a>
7	Muhammad Rishad K P Assistant Professor	Ultrafast laser-matter interactions, Metamaterials	9400876955 <a href="mailto:kpmrishad@cusat.ac.in">kpmrishad@cusat.ac.in</a>
8	Dr. Priya Rose T Assistant Professor	Photonic bandgap materials, Metamaterials, Ultrafast laser- matter Interactions	8281982228 <a href="mailto:priyarose@cusat.ac.in">priyarose@cusat.ac.in</a>
9	Dr. Praveen C S Assistant Professor	Electronics	0484-2404641, 7510511129 <a href="mailto:mnr.praveen@cusat.ac.in">mnr.praveen@cusat.ac.in</a>
10	Dr. Mohammed Ameen P Assistant Professor	Theoretical Photonics	9123526041 <a href="mailto:ameenpoyli@cusat.ac.in">ameenpoyli@cusat.ac.in</a>

### **DEPARTMENT OF SHIP TECHNOLOGY**

#### **M.TECH COMPUTER AIDED STRUCTURAL ANALYSIS & DESIGN**

After completion of the M.Tech program in Computer Aided Structural Analysis and Design, graduates will be able to:-

**PO1.** Acquire the capability to identify, formulate and solve engineering problems related, but not limited, to ocean engineering and evaluate solutions for practical engineering problems; demonstrate the ability to design and evaluate systems and components of offshore and onshore structures.

**PO2.** Acquire the capability of independently carrying out research /investigation and development work related to ocean engineering by developing and applying research skills such as literature survey and review, use of appropriate techniques and tools, design and conduct experiments, analyse and interpret data and synthesize information to provide valid conclusions.

**PO3.**Successfully engage themselves in engineering practice with an ability to assimilate undergraduate fundamentals as well as advanced knowledge to evaluate complex engineering solutions to practical problems by acquiring knowledge of advanced topics within the domain of structures in the ocean environment.

**PO4.**Demonstrate the ability to use modern engineering tools and numerical modelling techniques for the analysis and design of structures

**PO5.**Write and present a substantial technical report/document in the field of analysis and design of offshore and onshore structures.

**PO6.**Develop the capability of understanding the impact of development of technologies in ocean environment on a global, economic, environmental and societal context.

**Semester I**

Course Code	Course	C/E	Credits	Marks		
				CE	ES	Total
20-457-0101	Advanced Engineering Mathematics	C	4	50	50	100
20-457-0102	Computer Aided Design in Offshore Engineering	C	4	50	50	100
20-457-0103	Advanced Structural Analysis	C	4	50	50	100
	Elective I	E	4	50	50	100
	Elective II	E	4	50	50	100
	Total		20			500

**Elective I & II**

Course Code	Course
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	Marks		
				CE	ES	Total
20-457-0201	Dynamics of Structures	C	4	50	50	100
20-457-0202	Finite Element Methods Applied to Offshore Engineering	C	4	50	50	100
	Elective III	E	4	50	50	100
	Elective IV	E	4	50	50	100
	Elective V	E	4	50	50	100
	Total		20			500

**Electives**

Course Code	Course
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)**

### **Program Outcomes – B.Tech (NA & SB)**

Engineering Graduates will be able to:

**PO1.Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

**PO2. Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

**PO3. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

**PO4. Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

**PO5. Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

**PO6. The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

**PO7. Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

**PO8. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

**PO9. Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

**PO10. Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

**PO11. Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

**PO12. Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.



**Semester I**

Course Code	Course	Hrs/Week				Credits	Marks		
		L	T	P	Total		CE	ES	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**

Course Code	Course	Hrs/Week				Credits	Marks		
		L	T	P	Total		CE	ES	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**

Course Code	Course	Hrs/Week				Credits	Marks		
		L	T	P	Total		CE	ES	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**

Course Code	Course	Hrs/Week				Credits	Marks		
		L	T	P	Total		CE	ES	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**

Course Code	Course	Hrs/Week				Credits	Marks		
		L	T	P	Total		CE	ES	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
	<b>Total</b>	<b>20</b>	<b>6</b>	<b>4</b>	<b>30</b>	<b>20</b>	<b>700</b>	<b>600</b>	<b>1300</b>

**Semester VI**

Course Code	Course	Hrs/Week				Credits	Marks		
		L	T	P	Total		CE	ES	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
	<b>Total</b>	<b>20</b>	<b>6</b>	<b>4</b>	<b>30</b>	<b>20</b>	<b>700</b>	<b>600</b>	<b>1300</b>

**Semester VII**

Course Code	Course	Hrs/Week				Credits	Marks		
		L	T	P	Total		CE	ES	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

**Elective I & II**

Course Code	Course
20-215- E701	Marine corrosion and prevention
20-215- E702	Design of Fishing Vessels
20-215- E703	Refrigeration & Air conditioning of Ships
20-215- E704	Offshore Structure Design
20-215- E705	Ship Recycling
20-215- E706	Computer Aided Ship Design
20-215- E707	Experimental Stress Analysis
20-215- E708	Cargo Handling
20-215- E709	Inland Water Transport
20-215- E710	Design of small crafts
20-215- E711	Marine Pollution, Control and Recovery Systems
20-215- E712	Maritime Law and Shipping Management.
20-215- E713	Maritime Engineering Contracts and Commercial Management
20-215- E714	Composite Boat Design
20-215- E715	Computational Fluid Dynamics in Marine Technology

**Semester VIII**

Course Code	Course	Hrs/Week				Credits	Marks		
		L	T	P	Total		CE	ES	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	4	8	30	20	800	400	1200

**Elective III & IV**

Course Code	Course
20-215- E801	Experimental Techniques on ships and models
20-215- E802	Finite element method
20-215- E803	Ship Repairing and Surveying
20-215- E804	Advanced Computer Techniques
20-215- E805	Computer Application in Shipbuilding Technology
20-215- E806	Design of fishing systems
20-215- E807	Design of Submarines and Deep Submersibles
20-215- E808	Design of High speed crafts
20-215- E809	Quality Assurance and Management in Shipbuilding
20-215- E810	Numerical techniques in Marine Hydrodynamics
20-215- E811	Probabilistic Theory applied to ship in seaway
20-215- E812	Remote sensing Applications in Ocean Wave Data Analysis
20-215- E813	Underwater Explosions and Acoustics
20-215- E814	Design of warships
20-215- E815	Fracture Mechanics
20-215- E816	Marine Pollution Prevention and Management

**Details of Faculty****Permanent Faculty**

Sl. No.	Name & Designation	Specialisation	Communication
1.	Dr. Satheesh Babu P. K., Associate Professor and Head	Naval Achitecture, Material Science, Marine Hydrodynamics	<a href="mailto:satheeshbabu@cusat.ac.in">satheeshbabu@cusat.ac.in</a> 9946063772
2.	Dr. Mariamma Chacko, Professor	Electrical Engineering and Electronics	<a href="mailto:mariamma@cusat.ac.in">mariamma@cusat.ac.in</a> 9446077226
3.	Dr. K. Sivaprasad, Professor	Ship Building Technology, Ship Design & Ship Recycling	<a href="mailto:sivaprasad@cusat.ac.in">sivaprasad@cusat.ac.in</a> 9349265677
4.	Dr. A. Mathiazhagan, Professor	Material Science and Corrosion Engineering	<a href="mailto:alagan@cusat.ac.in">alagan@cusat.ac.in</a> 9400336441
5.	Dr. Rajesh P. Nair, Assistant Professor	Finite Element Method and Impact Analysis	<a href="mailto:rajeshpnair@cusat.ac.in">rajeshpnair@cusat.ac.in</a> 7012779642
6.	Dr. Manoj T. Issac, Assistant Professor	Hydrodynamics of underwater vehicles	<a href="mailto:m.issac@cusat.ac.in">m.issac@cusat.ac.in</a> 9495519287
7.	Dr. Favas T. K., Assistant Professor	Fluid Mechanics, Numerical Heat Transfer	<a href="mailto:favastk@cusat.ac.in">favastk@cusat.ac.in</a> 8129367615
8.	Mr. Anoop Chithrasenan, Assistant Professor	Naval Architecture & Ocean Engineering	<a href="mailto:anoop.c@cusat.ac.in">anoop.c@cusat.ac.in</a> 6238558867
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**Adjunct Faculty**

Sl. No.	Name & Designation	Specialisation	Communication
1.	Dr. D. D. Ebenezer, Adjunct Professor	Marine Acoustics, Acoustics System & Instrumentation	<a href="mailto:d.d.ebenezer@gmail.com">d.d.ebenezer@gmail.com</a> 9446577239
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**Contract Faculty**

Sl. No.	Name & Designation	Specialisation	Communication
1.	Dr. Beena Mary John, Assistant Professor	Coastal Engineering, Offshore Structures	beena.marie.john@gmail.com 9497276435

<b>DEEN DAYAL UPADHYAY KAUSHAL KENDRA</b>
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<b><u>M.VOC IN MOBILE PHONE APPLICATION DEVELOPMENT</u></b>
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(FACULTY OF TECHNOLOGY)

**PROGRAM OUTCOMES**M Voc ( Mobile Phone Application Development)

Students pursuing M.Voc in Mobile Phone Application Development program are expected to attain the following programme outcomes by the time they graduate.

- PO1:** Demonstrate skills in developing mobile application using Android and iOS.
- PO2:** Analyze customer requirements to identify software requirements.
- PO3:** Demonstrate skills in applying relevant technology/tools in mobile phone.
- PO4:** Create solutions by using modern software tools and enhance effectiveness of application development process.
- PO5:** Create solutions by utilizing modern software tools and enhance user experience.
- PO6:** Develop collaborative work and leadership skills for enhancing reliability of project execution.
- PO7:** Develop adequate communication skills to aid project information flows and client satisfaction.

**SEMESTER I**

Course Code	Course	C/E	Credits	marks		
				CE	ES	Total
KAD 2101	Communication Skills Development (G-T)	C	3	50	50	100
KAD 2102	Fundamentals of Management (G-T)	C	3	50	50	100
KAD 2103	Object Oriented Programming with Java and SQL (G-P)	C	4	50	50	100
KAD 2104	Introduction to Mobile Application Development and Web Technologies (D-T)	C	4	50	50	100
KAD 2105	Software Engineering and Testing (D-T)	C	4	50	50	100
KAD 2106	User Interface Design and User Experience (D-P)	C	4	50	50	100
KAD 2107	Android App Development I (D-P)	C	4	50	50	100
KAD 2108	Software Lab I (Android I, Java &SQL) (LAB)	C	2	50	50	100
<b>Total</b>			<b>27</b>	<b>400</b>	<b>400</b>	<b>800</b>

**SEMESTER II**

Course Code	Course	C/E	Credits	marks		
				CE	ES	Total
KAD 2201	Project Management (G-T)	C	3	50	50	100
KAD 2202	Database and Backend Technologies. (G-P)	C	3	50	50	100
KAD 2203	Android App Development II (D-P)	C	4	50	50	100
KAD 2204	Cloud and Advanced Technologies (D-P)	C	3	50	50	100
KAD 2205	Elective – I (G-T/D-T)*	E	3	50	50	100
KAD 2206	Elective – II (D-T)	E	3	50	50	100
KAD 2207	Software Lab II (Android II and Database) (LAB)	C	2	50	50	100
KAD 2208	Internship – Android App Development (40 working days)	C	12	50	50	100
<b>Total</b>			<b>33</b>	<b>400</b>	<b>400</b>	<b>800</b>

**SEMESTER III**

Course Code	Name of the Course	C/E	Credits	marks		
				CE	ES	Total
KAD 2301	Entrepreneurship and New Venture Planning (G-T)	C	4	50	50	100
KAD 2302	Software Product Design and Agile Process Management. (G-T)	C	4	50	50	100
KAD 2303	Programming with Swift (D-P)	C	4	50	50	100
KAD 2304	iOS App Development – I (D-P)	C	4	50	50	100
KAD 2305	iOS App Development – II (D-P)	C	4	50	50	100
KAD 2306	Elective – III (G-T/D-T)*	E	3	50	50	100
KAD 2307	Elective – IV(D-T)	E	3	50	50	100
KAD 2308	Software Lab III (iOS and Swift) (LAB)	C	3	50	50	100
<b>Total</b>			<b>29</b>	<b>400</b>	<b>400</b>	<b>800</b>

Note: Any general interdisciplinary subject may also be considered for KAD 2306 (Elective – III (G-T/D-T)) apart from the list of of electives given in this Syllabus.



**SEMESTER IV**

Course No.	Name of the Course	C/E	Credits	marks		
				CE	ES	Total
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 (Continuous Assessment – 100Marks, Final report – 100 marks, Viva-Voce – 100 marks)	C	28	100	200	300
KAD 2402	Professional Skills Development (Training Programme) (G-T)	C	3	100		100
<b>Total</b>			<b>31</b>	<b>200</b>	<b>200</b>	<b>400</b>

**LIST OF ELECTIVES**

- E-1. Wearable Technologies in Android
- E-2. Cross Platform 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

**B.VOC IN BUSINESS PROCESS & DATA ANALYTICS****(FACULTY OF SOCIAL SCIENCES)****B Voc ( Business Process and Data Analytics )**

Students in the B.Voc program are expected to attain the following programme outcomes by the time they graduate.

- PO1:** Apply quantitative modelling and data analysis techniques to the solution of real- world business problems, communicate findings, and effectively present results using data visualization techniques.
- PO2:** Analyse the key business processes that drive the value chain of an organization using principles of business process management, Big Data analytical techniques and data mining methodologies.
- PO3:** Identify and develop models using appropriate data analysis software for business decision making.
- PO4:** Use research-based knowledge and methods to conduct investigations on complex problems and provide valid conclusions.
- PO5:** Create solutions by utilising modern software tools and enhance organizational effectiveness.
- PO6:** Apply ethical practices in everyday business activities and make well-reasoned ethical business process and data management decisions.
- PO7:** Effectively communicate technical and non-technical information through oral, written and digital forms in an organizational environment.

**SEMESTER I**

Course Code	Course	Hrs/Week			Credits	Marks		
		L	T	P		Internal	External	Total
21-251-0101	English Language Skills	4	1	0	4	50	50	100
21-251-0102	Principles of Management and Organizations	4	0	0	4	50	50	100
21-251-0103	Statistics for Business	5	2	0	5	50	50	100
21-251-0104	Functional Management for Business	5	1	0	5	50	50	100
21-251-0105	Programming Languages for Data Analytics	2	0	6	5	50	50	100
21-251-0106	Mathematics for Data Analytics	5	1	0	5	50	50	100
21-251-0107	Workshop on Business communication skills (5 Days)	30 hrs / Semester			2		50	50
	<b>Total</b>				<b>30</b>	<b>300</b>	<b>350</b>	<b>650</b>

**SEMESTER II**

Course Code	Course	Hrs/Week			Credits	Marks		
		L	T	P		Internal	External	Total
21-251-0201	Strategic Communication for Workplaces	5	2	0	5	50	50	100
21-251-0202	Information Systems for Business	4	0	2	5	50	50	100
21-251-0203	Operations Research	6	2	0	6	50	50	100
21-251-0204	Fundamentals of Business Process Management	4	1	2	5	50	50	100
21-251-0205	Database Fundamentals	3	0	4	5	50	50	100
21-251-0206	Project I (Organization Study- 15 working days. 50 marks for continuous assessment and 50 for written report after completion of the project)				4		100	100
	<b>Total</b>				<b>30</b>	<b>250</b>	<b>350</b>	<b>600</b>

**SEMESTER III**

Course Code	Course	Hrs/Week			Credits	Marks		
		L	T	P		Internal	External	Total
21-251-0301	Managerial Skill Development & Design Thinking	3	2	4	5	50	50	100
21-251-0302	Financial Accounting	5	0	0	5	50	50	100
21-251-0303	Business Environment and Ethics	4	0	0	4	50	50	100
21-251-0304	Production and Operations Management	4	1	0	4	50	50	100
21-251-0305	Data Visualization for Analytics	2	0	6	5	50	50	100
21-251-0306	Data Mining Techniques	2	0	6	5	50	50	100
21-251-0307	Workshop on Personal Productivity Improvement (5Days)	30 hrs/ Semester			2		50	50
	<b>Total</b>				<b>30</b>	<b>300</b>	<b>350</b>	<b>650</b>

**SEMESTER IV**

Course Code	Course	Hrs/Week			Credits	Marks		
		L	T	P		Internal	External	Total
21-251-0401	Research Methodology	3	0	2	4	50	50	100
21-251-0402	Environmental Management	3	0	2	4	50	50	100
21-251-0403	Modern Project Management Practices	3	0	2	4	50	50	100
21-251-0404	Introduction to Econometric Methods	5	1	0	5	50	50	100
21-251-0405	Predictive Modelling	2	0	6	5	50	50	100
21-251-0406	Elective 1	3	0	2	4	50	50	100
21-251-0407	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
	<b>Total</b>				<b>30</b>	<b>300</b>	<b>400</b>	<b>700</b>

**SEMESTER V**

Course Code	Course	Hrs/Week			Credits	Marks		
		L	T	P		Internal	External	Total
21-251-0501	Entrepreneurship Development and Management of Startups	4	0	2	4	50	50	100
21-251-0502	Strategic Self Marketing & Personal Branding	5	2	0	4	50	50	100
21-251-0503	Digital Marketing and social media analytics	2	3	4	4	50	50	100
21-251-0504	Big Data Analytics	2	0	4	4	50	50	100
21-251-0505	Text and Web Analytics	3	0	4	5	50	50	100
21-251-0506	Business Model Analysis	5	1	0	5	50	50	100
21-251-0507	Elective 2	3	1	2	4	50	50	100
	<b>Total</b>				<b>30</b>	<b>350</b>	<b>350</b>	<b>700</b>

**SEMESTER VI**

Course Code	Course	Hrs/Week			Credits	Marks		
		L	T	P		Internal	External	Total
21-251-0601	Project III - Main Project & Viva-Voce (Duration – 80 days) Evaluation scheme will comprises i) Continuous assessment – 100 marks ii) Final report – 100 marks & iii) Viva-Voce – 100 marks) 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
21-251-0602	Workshop on Career Building (10 Days)				4		100	100
	<b>Total</b>				<b>30</b>	<b>300</b>	<b>100</b>	<b>400</b>

**List of Electives**

Course Code	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****(FACULTY OF SOCIAL SCIENCES)**

Students pursuing M.Voc in Technology and Management Consulting program are expected to attain the following programme outcomes by the time they graduate.

- PO1:** Understand business enterprises and their functions in economy.
- PO2:** Demonstrate skills in consulting and managing operations of consulting firm; and demonstrate knowledge of management functions, theories of leadership, change, business ethics, sustainability, corporate strategy and culture.
- PO3:** Demonstrate skills in applying relevant theoretical frameworks and tools in management for business decision problems.
- PO4:** Develop critical thinking and analytical skills to apply in organizational settings to create short-term and long-term value for client organizations.
- PO5:** Acquire problem solving skills through application-oriented internships and develop capability to independently develop innovative solutions through industry projects.
- PO6:** Apply ethical considerations in business consulting projects from organizational viewpoint to provide socially responsive and ethically acceptable consulting solutions

**PO7:** Develop an understanding of sustainable business practices and socially relevant issues in organizational functions

**PO8:** To understand business communication process and the role of stakeholders in the process from a consulting perspective

**PO9:** Develop adequate communication skills encompassing all domains of communication and extend these to aid information flow in consulting process.

**PO10:** The graduates will demonstrate effective written and oral communication skills covering traditional and new media that are essential to consulting in modern business and organizational environment.

**PO11:** Gain collaborative work skills as team members to minimize conflicts in teams through an understanding of the underlying mechanisms.

**PO12:** Develop leadership skills for enhancing reliability of project execution through team projects

**PO13:** Identify and select suitable business models and prepare business plans.

**PO14:** Apply cross-disciplinary knowledge in successfully managing new business ventures.

## SEMESTER I

Course Code	Course	C/E	Credit	Marks		
				CE	ES	Total
KMC2101	Business Communication Skills - I	C	3	50	50	100
KMC2102	Contemporary Management	C	3	50	50	100
KMC2103	Introduction to Technology and Management Consulting	C	3	50	50	100
KMC2104	Economics for Business Decisions	C	3	50	50	100
KMC2105	Accounting and Financial Management for Consultants	C	3	50	50	100
KMC2106	Research Skills for Consulting	C	4	50	50	100
KMC2107	Quantitative Techniques	C	4	50	50	100
KMC2108	Professional Skills Development (Training Programme)	C	3	100	-	100
<b>Total</b>			<b>26</b>	<b>450</b>	<b>350</b>	<b>800</b>

**SEMESTER II**

Course Code	Name of the Course	C/E	Credit	Marks		
				CE	ES	Total
KMC2201	Operations Management	C	4	50	50	100
KMC2202	Integrated Management Systems	C	3	50	50	100
KMC2203	Management of Consulting Firms and Developing Consulting Career	C	3	50	50	100
KMC2204	New Age Marketing for Business Consulting	C	3	50	50	100
KMC2205	Project Management	C	3	50	50	100
KMC2206	Business Analytics	C	3	50	50	100
KMC2207	Business Communication Skills – II	C	3	50	50	100
KMC2208	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	50	50	100
<b>Total</b>			<b>34</b>	<b>400</b>	<b>400</b>	<b>800</b>

**SEMESTER III**

Course No.	Name of the Course	C/E	Credit	Marks		
				CE	ES	Total
KMC2301	Business, Government and Society	C	4	50	50	100
KMC2302	Business Model Analysis and Strategy	C	4	50	50	100
KMC2303	Managing Change in Organizations	C	4	50	50	100
KMC2304	Entrepreneurship and New Venture Planning	C	4	50	50	100
KMC2305	Elective-I	E	3	50	50	100
KMC2306	Elective-II	E	3	50	50	100
KMC2307	Elective-III	E	3	50	50	100
KMC2308	Elective-IV	E	3	50	50	100
<b>Total</b>		<b>303</b>	<b>28</b>	<b>400</b>	<b>400</b>	<b>800</b>

**SEMESTER IV**

Course No.	Name of the Course	C/E	Credit	Marks		
				CE	ES	Total
KMC2401	*Major Project (Duration – 90 working days during Semester IV in a consulting firm or any other business organization 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		300	300
KMC2402	Case Development Skills for Consultants (Training Programme)	C	4	100		100
<b>Total</b>			<b>32</b>	<b>100</b>	<b>300</b>	<b>400</b>

**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 Organizations
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

### **Details of Faculty**

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**PROF. N. R. MADHAVA MENON INTERDISCIPLINARY CENTRE**  
**FOR RESEARCH ETHICS & PROTOCOLS (ICREP)**

**MASTER OF BIOETHICS DEGREE**

FACULTY OF LAW

**SEMESTER I**

<b>Course Code</b>	<b>Course</b>	<b>C/E</b>	<b>Credits</b>
MBE IC-01	Law, Society and Human Rights.	C	4
MBE IC-02	Fundamentals of BioEthics	C	4
MBE IC-03	General Microbiology	C	4
MBE IC- 04	Molecular Biology	C	4
MBE – E	E/IE	E/IE	3

**SEMESTER II**

<b>Course Code</b>	<b>Course</b>	<b>C/E</b>	<b>Credits</b>
MBE IIC-05	Molecular Cell Biology	C	4
MBE IIC- 06	Methodologies In Biosciences Research	C	4
MBE IIC-07	Legal Regulation of Scientific Research	C	4
MBE IIC-08	IPR, Bio Safety and Bio Ethics	C	4
MBE II E	E/IE	E/IE	3

**SEMESTER III**

<b>Course Code</b>	<b>Course</b>	<b>C/E</b>	<b>Credits</b>
MBE IIIC-09	Health Care Law and Bioethics	C	4
MBE IIIC-10	Clinical Research and Clinical Trials	C	4
MBE IIIE	E/IE	E/IE	3
MBE IIIE-	E/IE	E/IE	3
MBE IIIE	E/IE	E/IE	3
MBE IIIC	Seminar	C	2

**SEMESTER IV**

<b>Course Code</b>	<b>Course</b>	<b>C/E</b>	<b>Credits</b>
Dissertation IV C	C	C	14
Viva Voce IVC	C	C	4
MBE-IV E	E/IE	E/IE	3

### Core Courses

MBE I C- OI	Law , Society and Human Rights	4 Credits
MBE IC-02	Fundamentals of Bioethics	4 Credits
MBEIC-03	General MicroBiology	4 Credits
MBE IC 04	Molecular Biology	4 Credits
MBE IIC-05	Molecular Cell Biology	4 Credits
MBE IIC-06	Methodologies In Biosciences Research	4Credits
MBE IIC-07	Legal Regulation of Scientific Research	4 Credits
MBE IIC-08	IPR, Bio Safety and Bio Ethics	4 Credits
MBEIIC-0 9	Health Care Law and Bioethics	4 Credits
MBEIIC-10	Clinical Research and Clinical Trials	4Credits

### Elective Courses

MBE –E1	Philosophy of Human Rights	3 credits
MBE-E2	Public Health Research : Bioethics and Biosafety	3 credits
MBE- E3	Advances in Reproductive Biotechnology	3 credits
MBE-E4	Animal Welfare, Ethics and Jurisprudence	3 credits
MBE- E5	Plant Biotechnology : Biosafety and Bioethics	3 credits
MBE- E6	Philosophy and Religion in Ethics	3 credits
MBE- E7	Law Relating To Science and Technology	3 credits
MBE –E8	Recombinant DNA Technology	3 credits
MBE – E9	Biodiversity, Biosafety and Bioethics	3 credits



