Department of Computer Science and Engineering
National Institute of Technology Calicut
NIT Campus (PO), Calicut-673601, India

DCC Meeting Minutes

Date:19-04-2023 & 20-04-2023   Time: 12:05 PM to 1:00 PM   Venue/Mode: CSED Seminar Hall

Agenda Items:

1. Ratification of the minutes of the DCC meeting held on 11-04-2023
2. Action Taken Action Pending Report of the last DCC meeting
3. UG Curriculum in Institute Curriculum Format
4. PG Curriculum in Institute Curriculum Format
5. Request from Mr. Akhil Joseph Sunny (B160470CS) to Continue BTech Program
6. Minor Program
7. Plan Fund
8. Non Compliance of TA Ship by MTech Students

The DCC meeting started at CSED Seminar Hall at 12:05 PM. The Chairperson welcomed all members to the meeting.

Agenda Item 1:   Ratification of the minutes of the DCC meeting held on 11-04-2023

The DCC ratified the confirmation of the minutes of the DCC meeting dated 11-04-2023.

Agenda Item 2: Action Taken Action Pending Report.

There are no actions pending and no actions to be taken, as per last DCC meeting.

Agenda Item 3: UG Curriculum in Institute Curriculum Format
The UG curriculum(Annexure I) was presented in the institute format. The course codes of Mathematics core courses are yet to be received. In addition, the EI elective course also needs to be added along with additional electives, if proposed by the faculty.

Agenda Item 4: PG Curriculum in Institute Curriculum Format
The curricula for MTech CSE, IS, and AI and DA (Annexure II to IV) were presented in the institute format. The suggestions from the 59th BoAC were incorporated in the curriculum.

Agenda Item 5: Request from Akhil Joseph Sunny (B160470CS) to Continue BTech Program

Dr P B Jayaraj, Faculty Advisor, presented a request (Annexure V) made by a former B16 student named Akhil Joseph Sunny (B160470CS) who had discontinued his BTech program. Dr. P B Jayaraj informed the DCC that the student had already earned 123 credits and had a fairly good academic record till his 6th

semester. The student was suffering from leg injury during that time and mental impairments after that. The proposed plan by the student for completing the BTech program was also shared with the DCC members.

DCC recommended that the student be allowed to continue his BTech program on compassionate grounds.

Agenda Item 6: Minor Programs for UG Students

HOD presented the guidelines given by the institute for submitting the proposals for minor programs for UG students. Additionally, the requests received from different departments to offer multidisciplinary minor programmes in partnership with CSED, were presented to the DCC members to discuss and decide the priority order among the requests.

It was decided that for each minor programme offered together with another department, DCC will require two faculty members of CSED to be the coordinators from CSE side. It is expected that a faculty member will act as coordinator for only one Minor programme.

After a detailed discussion, DCC recommended the following priority list for the minor programmes.

S.No	Minor Name	Department(s)	CSED Faculty
1	Artificial Intelligence	CSE, EEE, ECE	Dr P B Jayaraj
2	Cyber Physical Systems	CSE, MED	Dr Hiran V Nath, Dr Vinod Pathari
3	Applied Machine Learning and Process Data Optimization	CSE, CHED	Dr P N Pournami
4	Digital Supply Chain Management	CSE, MED	Dr Vasudevan A.R

Agenda Item 7: Plan Fund

Dr. Muralikrishan shared that the department of CSE can allocate a block of 7 Lakhs for each research group in the Plan Fund 2023-24 to enhance their research lab facilities. He advised the coordinators of each research group to update their proposals for the plan funds accordingly.

Agenda Item 8: Non Compliance of TA Ship by MTech Students

Dr. Saidalavi Kalady, who is in charge of the CSED Exam Cell, raised the issue of some second-year MTech students failing to comply with their TA duties during exams to the DCC.

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DCC suggested that the MTech students who do not comply with TAship need not be paid the stipend for the period in which they did not fulfill their TA duties, keeping in view that the stipend is given by the government for their TA duties.

The meeting ended at 01: 00 PM.

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Annexure I

UG Curriculum 2023 in Institute Format:

Link: https://drive.google.com/file/d/1NRK0L0XWYNiimgfykw0O-nccMRT8t8Jy/view?usp=sharing

Annexure II

MTech CSE Curriculum 2023 in Institute Format:

Link: https://drive.google.com/file/d/1FISx1UTUVmDbjT794ta6T1fCqMmw6bG0/view?usp=sharing

Annexure III

MTech IS Curriculum 2023 in Institute Format:

Link: https://drive.google.com/file/d/1udCgG0hsROHhFJO5AVY5xLrOsUjb6s5v/view?usp=sharing

Annexure IV

MTech AI and DA Curriculum 2023 in Institute Format:

Link: https://drive.google.com/file/d/12-QGhqb3ZqyJkhZd3_GmwyE3JjJ0GnqA/view?usp=sharing

Annexure V

Request from Akhil Joseph Sunny:

Link: https://drive.google.com/file/d/1UA38oloGApJbByxfBDIwCD1SbGU9BYTi/view?usp=sharing

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Annexure - 1

B.Tech.

IN

COMPUTER SCIENCE AND ENGINEERING

CURRICULUM

2023

Department of Computer Science and Engineering
NATIONAL INSTITUTE OF TECHNOLOGY CALICUT
Kozhikode - 673601, KERALA, INDIA

Dr. SUBHASREE M.
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22/05/23

The Program Educational Objectives (PEOs) of
B.Tech. in Computer Science and Engineering

PEO1	Graduates shall have sound knowledge regarding the fundamental principles and techniques in the discipline of Computer Science and Engineering.
PEO2	Graduates shall have the ability to specify, design, develop and maintain reliable and efficient software.
PEO3	Graduates shall have the necessary communication and management skills and ethical values to become competent professionals.

Programme Outcomes (POs) and Programme Specific Outcomes (PSOs) of B.Tech. in Computer Science and Engineering

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, 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 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 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.

PSO1	Analyze computational problems and design effective and efficient algorithmic solutions.
PSO2	Write effective code for implementing algorithmic solutions and use available software tools for the design of efficient software solutions.

CURRICULUM

Total credits for completing B.Tech. in Computer Science and Engineering is 150

COURSE CATEGORIES AND CREDIT REQUIREMENTS:

The structure of B.Tech. programmes shall have the following Course Categories:

Sl. No.	Course Category	Number of Courses	Minimum Credits
1.	Institute Core (IC)	8	22
2.	Program Core (PC) and Program Electives (PE)	24-25	82
3.	Open Electives (OE)	8	24
4.	Institute Electives (IE) (Entrepreneurship Innovation (EI) + Digital / Automation Technologies (DA) + Humanities, Social Science, Management (HM))	6	18
5.	Activity Credits (AC)	--	4

COURSE REQUIREMENTS

The effort to be put in by the student is indicated in the tables below as follows:
L: Lecture (One unit is of 50 minute duration)
T: Tutorial (One unit is of 50 minute duration)
P: Practical (One unit is of one hour duration)
O: Outside the class effort / self-study (One unit is of one hour duration)

1. INSTITUTE CORE (IC)

a) Mathematics

Sl. No.	Course Code	Course Title	L	T	P	O	Credits
1.	MA1002E	Mathematics I	3	1*	0	5	3
2.	MA1012E	Mathematics II	3	1*	0	5	3
3.	MA2002E	Mathematics III	3	1*	0	5	3
4.	MA2012E	Mathematics IV	3	1*	0	5	3
		Total	12	4*	0	20	12

*Optional for Students (can be replaced by self-study)

b) Basic Sciences

Sl. No.	Course Code	Course Title	L	T	P	O	Credits
1.	PH1001E	Physics of Materials	3	0	0	6	3
2.	BT1001E	Biology for Engineers	3	0	0	6	3
		Total					6

c) Professional Communication and Professional Ethics

Sl. No.	Course Code	Course Title	L	T	P	O	Credits
1.	MS1001E	Professional Communication	3	0	0	6	3
2.	CS2019E	Professional Ethics	1	0	0	2	1
		Total	4	0	0	8	4

2A. PROGRAMME CORE (PC)

Sl. No.	Course Code	Course Title	L	T	P	O	Credits
1	CS1001E	Computer Programming	3	0	0	6	3
2	CS1002E	Introduction to Computing Science	3	0	0	6	3
3	CS1003E	Discrete Structures I	3	0	0	6	3
4	CS1091E	Programming Laboratory	0	0	3	3	2
5	CS1011E	Program Design	3	0	0	6	3
6	CS1012E	Logic Design	3	0	0	6	3
7	CS1013E	Discrete Structures II	3	0	0	6	3
8	CS1092E	Program Design Laboratory	1	0	3	5	3
9	CS2001E	Data Structures and Algorithms	3	1	2	6	4
10	CS2002E	Computer Organization	3	1	2	6	4
11	CS2091E	Data Structures and Algorithms Laboratory	1	0	3	5	3
12	CS2092E	Hardware Laboratory	1	0	3	5	3
13	CS2011E	Database Management System	3	1	2	6	4
14	CS2012E	Operating Systems	3	1	2	6	4
15	CS2013E	Theory of Computation	3	0	0	6	3
16	CS3001E	Computer Networks	3	1	2	6	4
17	CS3002E	Compiler Design	3	1	2	6	4
18	CS3003E	Design and Analysis of Algorithms	3	1	2	6	4
19	CS3011E	Software Engineering	3	1	2	6	4
20	CS3012E	Artificial Intelligence	3	1	2	6	4
21	CS3099E	Project	0	0	0	9	3
22	CS4097E	Summer Internship	-	-	-	*	2
	Total		-	-	-	-	73

* *Decided by the organisation in which the internship is done*

2B. LIST OF ELECTIVES

Following elective courses may be credited under the categories mentioned in the table below.

Sl. No.	Course Code	Course Title	L	T	P	O	Credits	Additional Categories			
								PE	EI	DA	HM
1.	CS4021E	Logic for Computer Science	3	0	0	6	3	Y	N	Y	N
2.	CS4022E	Program Analysis	3	0	0	6	3	Y	N	Y	N
3.	CS4023E	Formal Semantics	3	0	0	6	3	Y	N	Y	N
4.	CS4024E	Computational Complexity	3	0	0	6	3	Y	N	Y	N
5	CS4025E	Formal Verification	3	0	0	6	3	Y	N	Y	N
6	CS4026E	Vehicular Networks: Theory to Practice	3	0	0	6	3	Y	N	Y	N
7	CS4027E	Computational Geometry	3	0	0	6	3	Y	N	Y	N
8	CS4029E	Principles of Programming Languages	3	0	0	6	3	Y	N	Y	N
9	CS4030E	Foundations of Programming	3	0	0	6	3	Y	N	Y	N
10	CS4031E	Network Security	3	0	0	6	3	Y	N	Y	N
11	CS4032E	Computer Security	3	0	0	6	3	Y	N	Y	N
12	CS4033E	Quantum Computation	3	0	0	6	3	Y	N	Y	N
13	CS4034E	Advanced Computer Networks	3	0	0	6	3	Y	N	Y	N
14	CS4035E	Probabilistic Methods in Combinatorics	3	0	0	6	3	Y	N	Y	N
15	CS4036E	Algorithms in Optimization	3	0	0	6	3	Y	N	Y	N
16	CS4037E	Algorithmic Graph Theory	3	0	0	6	3	Y	N	Y	N
17	CS4038E	Computational Algebra	3	0	0	6	3	Y	N	Y	N
18	CS4039E	Computer Architecture	3	0	0	6	3	Y	N	Y	N
19	CS4040E	Mathematical Foundations of Machine Learning	3	0	0	6	3	Y	N	Y	N
20	CS4041E	Introduction to Machine Learning	3	0	0	6	3	Y	N	Y	N
21	CS4042E	Randomized Algorithms	3	0	0	6	3	Y	N	Y	N
22	CS4043E	Introduction to Parameterized Algorithms	3	0	0	6	3	Y	N	Y	N
23	CS4044E	Introduction to Parameterized Complexity Theory	3	0	0	6	3	Y	N	Y	N

24	CS4045E	Image Processing	3	0	0	6	3	Y	N	Y	N
25	CS4046E	Deep Learning for Computer Vision	3	0	0	6	3	Y	N	Y	N
26	CS4047E	Advanced Computer Architecture and Security	3	0	0	6	3	Y	N	Y	N
27	CS4048E	Cloud Computing	3	0	0	6	3	Y	N	Y	N
28	CS4049E	Distributed Computing	3	0	0	6	3	Y	N	Y	N
29	CS4050E	Natural Language Processing	3	0	0	6	3	Y	N	Y	N
30	CS4051E	Introduction to Bioinformatics	3	0	0	6	3	Y	N	Y	N
31	CS4052E	Number Theory and Cryptography	3	0	0	6	3	Y	N	Y	N
32	CS4053E	Data Mining	3	0	0	6	3	Y	N	Y	N
33	CS4054E	Embedded Systems	3	0	0	6	3	Y	N	Y	N
34	CS4055E	Object Oriented Systems	3	0	0	6	3	Y	N	Y	N
35	CS4056E	Approximation Algorithms	3	0	0	6	3	Y	N	Y	N
36	CS4057E	Data Privacy	3	0	0	6	3	Y	N	Y	N
37	CS4058E	Coding Theory	3	0	0	6	3	Y	N	Y	N
38	CS4059E	Term Paper	3	0	0	6	3	Y	N	Y	N
39	CS4080E	Operating Systems Laboratory	1	0	3	5	3	Y	N	Y	N
40	CS4081E	Compiler Laboratory	1	0	3	5	3	Y	N	Y	N
41	CS4082E	Digital Design Laboratory	1	0	3	5	3	Y	N	Y	N
42	CS4083E	Database System Design Laboratory	1	0	3	5	3	Y	N	Y	N
43	CS4084E	Networks Laboratory	1	0	3	5	3	Y	N	Y	N
44	CS4085E	Software Engineering Laboratory	1	0	3	5	3	Y	N	Y	N
45	CS4086E	Systems Programming Laboratory	1	0	3	5	3	Y	N	Y	N
46	CS4087E	Computer Security Laboratory	1	0	3	5	3	Y	N	Y	N
47	CS4088E	Object Oriented Systems Laboratory	1	0	3	5	3	Y	N	Y	N
48	CS4089E	Machine Learning Laboratory	1	0	3	5	3	Y	N	Y	N
49	CS4090E	Image Processing Laboratory	1	0	3	5	3	Y	N	Y	N

50	CS4091E	Processor Design Lab	1	0	3	5	3	Y	N	Y	N
51	CS4098E	Project	0	0	0	9	3	Y	N	N	N
52	CS4099E	Project	0	0	0	27*	9	Y	N	N	N

* Decided by the organisation in which the project is done, if carried out outside the Institute.

3. OPEN ELECTIVES (OE)

Courses offered by other Departments / Schools / Centres or Approved Online Platforms, with a limit on the maximum number of courses from such platforms specified as per B.Tech. Ordinances and Regulations. In addition, all PE courses except Projects offered by CSE shall be permitted to be included in this category for students of B.Tech. CSE.

4. INSTITUTE ELECTIVES (IE)

In case of the Institute Electives, courses in the appropriate categories offered by other departments/schools/centres also can be credited instead of the courses offered by the Computer Science & Engineering Department, subject to the approval from the Course Faculty and Faculty Advisor.

a) Entrepreneurship / Innovation Basket (EI):

Courses proposed by the Departments/Schools/Centres and approved by Institute Innovation Council. Total credits required is 3.

b) Digital Automation Technologies (DA):

Courses related to programming / automation tools & techniques / Industry 4.0. These courses may be proposed by Departments/Schools/Centres and approved by the Senate to be included in the DA category. Total credits required is 6. All of CSE's PEs can be credited as DA electives too.

c) Humanities, Social Science, Management (HM):

Courses such as Indian and Foreign languages, Economics, Engineering Management, Financial Management and Design Thinking. These courses may be proposed by Departments/Schools/Centres and approved by the Senate to be included in HM category. Total credits required is 9.

5. ACTIVITY CREDITS (AC)

A minimum of 80 Activity Points are to be acquired for obtaining the 4 Activity Credits required in the curriculum.
Activity points acquired should be a minimum of 20 at the end of S4.
Activity points acquired should be a minimum of 40 at the end of S6.

PROGRAMME STRUCTURE

Semester I

Sl. No.	Course Code	Course Title	L	T	P	O	Credits	Category
1.	MA1002E	Mathematics I	3	1*	0	5	3	IC
2.	MS1001E	Professional Communication	3	0	0	6	3	IC
3.	CS1001E	Computer Programming	3	0	0	6	3	PC
4.	CS1002E	Introduction to Computing Science	3	0	0	6	3	PC
5.	CS1003E	Discrete Structures I	3	0	0	6	3	PC
6.	CS1091E	Programming Laboratory	0	0	3	3	2	PC
		Total					17	--

Semester II

Sl. No.	Course Code	Course Title	L	T	P	O	Credits	Category
1.	MA1012E	Mathematics II	3	1*	0	5	3	IC
2.	PH1001E	Physics of Materials	3	0	0	6	3	IC
3.	BT1001E	Biology for Engineers	3	0	0	6	3	IC
4.	CS1011E	Program Design	3	0	0	6	3	PC
5.	CS1012E	Logic Design	3	0	0	6	3	PC
6.	CS1013E	Discrete Structures II	3	0	0	6	3	PC
7.	CS1092E	Program Design Laboratory	1	0	3	5	3	PC
		Total					21	--

Semester III

Sl. No.	Course Code	Course Title	L	T	P	O	Credits	Category
1.	MA2002E	Mathematics III	3	1*	0	5	3	IC
2.	CS2001E	Data Structures and Algorithms	3	1	2	6	4	PC
3.	CS2002E	Computer Organization	3	1	2	6	4	PC
4.		EI Elective	3	0	0	6	3	EI
5.	CS2091E	Data Structures and Algorithms Laboratory	1	0	3	5	3	PC
6.	CS2092E	Hardware Laboratory	1	0	3	5	3	PC
		Total					20	--

Semester IV

Sl. No.	Course Code	Course Title	L	T	P	O	Credits	Category
1.	MA2012E	Mathematics IV	3	1*	0	5	3	IC
2.	CS2011E	Database Management Systems	3	1	2	6	4	PC
3.	CS2012E	Operating Systems	3	1	2	6	4	PC
4.	CS2013E	Theory of Computation	3	0	0	6	3	PC
5.	CS2019E	Professional Ethics	1	0	0	2	1	IC
6.		DA Elective - 1	3	0	0	6	3	DA
7.		Minor Course - 1	3	0	0	6	3*	MC
		Total (Excluding the Minor Courses)					18	--

Semester V

Sl. No	Course Code	Course Title	L	T	P	O	Credits	Category
1.	CS3001E	Computer Networks	3	1	2	6	4	PC
2.	CS3002E	Compiler Design	3	1	2	6	4	PC
3.	CS3003E	Design and Analysis of Algorithms	3	1	2	6	4	PC
4.		Humanities Elective - 1	3	0	0	6	3	HM
5.		DA Elective - 2	3	0	0	6	3	DA
6.		Minor Course - 2	3	0	0	6	3*	MC
		Total (Excluding the Minor Courses)					18	--

Semester VI

Sl. No.	Course Code	Course Title	L	T	P	O	Credits	Category
1.	CS3011E	Software Engineering	3	1	2	6	4	PC
2.	CS3012E	Artificial Intelligence	3	1	2	6	4	PC
3.		Humanities Elective - 2	3	0	0	6	3	HM
4.		Open Elective - 1	3	0	0	6	3	OE
5.		Open Elective - 2	3	0	0	6	3	OE
6.	CS3099E	Project	0	0	0	9	3	PC
7.		Minor Course - 3	3	0	0	6	3*	MC
		Total (Excluding the Minor Courses)					20	--

Semester VII

Sl. No.	Course Code	Course Title	L	T	P	O	Credits	Category
1.		Humanities Elective - 3	3	0	0	6	3	HM
2.		Open Elective - 3	3	0	0	6	3	OE
3.		Open Elective - 4	3	0	0	6	3	OE
4.		Open Elective - 5	3	0	0	6	3	OE
5.		Open Elective - 6	3	0	0	6	3	OE
6.	CS4097E	Summer Internship	-	-	-	*	2	PC
7.	CS4098E /	Project / Programme Elective - 1	-	-	-	-	3	PE
8.		Minor Course - 4	3	0	0	6	3*	MC
		Total (Excluding the Minor Courses)					20	--

* CS4097E Summer Internship (including the academic internship) is to be completed during the vacation after S6, and the evaluation will be done in S7. Working hours will be decided by the organization in which the internship is done.

Semester VIII

Sl. No.	Course Code	Course Title	L	T	P	O	Credits	Category
1.	CS4099E /	Project / Programme Elective - 2, Programme Elective - 3	-	-	-	-	6	PE
2.		Open Elective - 7	3	0	0	6	3	OE
3.		Open Elective - 8	3	0	0	6	3	OE
4.	CS4096E	Activity Credits (minimum of 80 points)	-	-	-	-	4	AC
		Total					16	--

M.Tech.

IN

Computer Science and Engineering

CURRICULUM

22/05/25

Department of Computer Science and Engineering
NATIONAL INSTITUTE OF TECHNOLOGY CALICUT
Kozhikode - 673601, KERALA, INDIA

The Program Educational Objectives (PEOs) of
M.Tech.in Computer Science and Engineering

PEO1	The graduates shall have an in-depth knowledge in the fundamentals of Computing, with the ability and confidence to specialize in topics of interest in Computing
PEO2	The graduates shall have the ability to solve problems and critically analyze solutions in the area of interest in Computing
PEO3	The graduates shall have the skillset for using knowledge in Computing for the benefit of society with sound ethical practices and a lifelong interest in contributing to knowledge in the field

Programme Outcomes (POs) & Programme Specific Outcomes (PSOs) of
M.Tech. in Computer Science and Engineering

PO1	An ability to independently carry out research/investigation and development work to solve practical problems
PO2	An ability to write and present a substantial technical report/document
PO3	Students should be able to demonstrate a degree of mastery over the area as per the specialization of the program. The mastery should be at a level higher than the requirements in the appropriate bachelor program
PO4	Ability to critically analyze solutions, proofs and programs
PO5	Ability to reflect on the thought processes used in arriving at solutions, independently review, communicate and assimilate feedback
PO6	Imbibe the practice of ethics in computing and research
PSO1	An ability to independently carry out research/investigation and development work to solve practical problems in the field of computing, and its applications
PSO2	Ability to critically analyze algorithmic solutions, mathematical proofs and computer programs

CURRICULUM

Total credits for completing M.Tech. in Computer Science and Engineering is 75.

COURSE CATEGORIES AND CREDIT REQUIREMENTS:

The structure of M.Tech. programme shall have the following Course Categories:

Sl. No.	Course Category	Minimum Credits
1.	Programme Core (PC)	16
2.	Programme Electives (PE)	22
3.	Institute Elective (IE)	2
4.	Projects	35

The effort to be put in by the student is indicated in the tables below as follows:

L: Lecture (One unit is of 50 minute duration)

T: Tutorial (One unit is of 50 minute duration)

P: Practical (One unit is of one hour duration)

O: Outside the class effort / self-study (One unit is of one hour duration)

PROGRAMME STRUCTURE

Semester I

Sl. No.	Course Code	Course Title	L	T	P	O	Credits	Category
1.	CS6101E	Mathematical Foundations of Computer Science	3	0	2	7	4	PC
2.	CS6102E	Algorithms and Complexity	3	0	2	7	4	PC
3.		Institute Elective	2	0	0	4	2	IE
4.	CS6103E	Software Systems lab	1	0	6	5	4	PC
5.		Program Elective 1	3	0	2	7	4	PE
6.		Program Elective 2	3	0	0	6	3	PE
		Total					21	

* Program Elective 1 will be offered only to M. Tech students.

Semester II

Sl. No.	Course Code	Course Title	L	T	P	O	Credits	Category
1.	CS6302E	Theoretical Foundations of Machine Learning	3	0	2	7	4	PC
2.	CS6196E	Project Phase I	0	0	4	2	2	PC
3.		Program Elective 3	3	0	0	6	3	PE
4.		Program Elective 4	3	0	0	6	3	PE
5.		Program Elective 5	3	0	0	6	3	PE
6.		Program Elective 6	3	0	0	6	3	PE
7		Program Elective 7	3	0	0	6	3	PE
		Total					21	

Semester III

Sl. No.	Course Code	Course Title	L	T	P	O	Credits	Category
1.	CS7197E	Project Phase II	0	0	6	3	3	PC
2.	CS7198E	Project Phase III	0	0	30	15	15	PC
		Total					18	

Semester IV

Sl. No.	Course Code	Course Title	L	T	P	O	Credits	Category
1.	CS7199E	Project Phase IV	0	0	30	15	15	PC
		Total					15	

List of Programme Electives*
(Common for all the M.Tech Programmes of the Department of CSE: CS61, CS62 and CS63)

Sl. No.	Course Code	Course Title	L	T	P	O	Credits
1	CS6104E	Advanced Operating System Design	3	0	0	6	3
2	CS6105E	Algorithms for Big Data	3	0	0	6	3
3	CS6106E	Bioinformatics	3	0	0	6	3
4	CS6107E	Topics in Compiler Design	3	0	0	6	3
5	CS6108E	Computer Networking	3	0	0	6	3
6	CS6109E	Topics in Image Processing	3	0	0	6	3
7	CS6110E	Pattern Recognition	3	0	0	6	3
8	CS6211E	Topics in Computational Geometry	3	0	0	6	3
9	CS6112E	Topics in Computer Architecture	3	0	0	6	3
10	CS6113E	Topics in Database Design	3	0	0	6	3

11	CS6114E	Topics in Network Systems	3	0	0	6	3
12	CS6115E	Topics in Parameterized Algorithms	3	0	0	6	3
13	CS6116E	Topics in Programming Languages	3	0	0	6	3
14	CS6117E	Topics in Quantum Computing	3	0	0	6	3
15	CS6202E	Computer Architecture and Design	3	0	0	6	3
16	CS6203E	Topics in Cryptography	3	0	0	6	3
17	CS6204E	Topics in Data Privacy	3	0	0	6	3
18	CS6205E	Topics in Information Security	3	0	0	6	3
19	CS6206E	Systems Security					
20	CS6320E	Statistical Foundations of Data Science	3	0	0	6	3
21	CS6305E	Advanced Data Structures and Algorithms	3	0	0	6	3
22	CS6306E	Advanced Deep Learning and Computer Vision	3	0	0	6	3
23	CS6307E	AI in Healthcare	3	0	0	6	3
24	CS6308E	Topics in Approximation Algorithms	3	0	0	6	3
25	CS6309E	Computational Linear Algebra	3	0	0	6	3
26	CS6310E	Computational Optimization Methods	3	0	0	6	3
27	CS6311E	Topics in Data Mining	3	0	0	6	3
28	CS6312E	Distributed Computing and Big Data	3	0	0	6	3
29	CS6313E	High Performance Computing for AI	3	0	0	6	3
30	CS6314E	Intelligent Agents	3	0	0	6	3
31	CS6315E	Internet of Things	3	0	0	6	3
32	CS6316E	Music Information Retrieval	3	0	0	6	3
33	CS6317E	Topics in Natural Language Processing	3	0	0	6	3
34	CS6318E	Neural Networks and Deep Learning	3	0	0	6	3
35	CS6319E	Speech Information Processing	3	0	0	6	3

*Students may also choose any core/elective course of appropriate level offered in the Institute as Programme Electives, with approval from the Programme Coordinator.

Notes:
- The student has to earn 75 credits to be eligible for the M. Tech Degree
- Students aiming for industry internships may complete their course requirements in the first two semesters itself.
- The student has to earn 38 credits to be eligible for PG Diploma. It may be done in the first two semesters with an optional project phase II in the department itself.
- For "Program Elective 1" in Semester I, the student should credit one of the program electives coming under the 'Systems Soft-Core Basket'. In the current curriculum, the electives CS6107E Topics in Compiler Design, CS6202E Computer Architecture and

Design and CS6312E Distributed Computing and Big Data are tagged as "Systems Soft-Core". The department may choose to tag newly proposed electives as systems sofcore based on their content.

- Students may choose any course of appropriate level offered in the institute as program electives, with approval from the programme coordinator.

22/05/23

M.Tech.

IN

Computer Science and Engineering

(Information Security)

CURRICULUM

Department of Computer Science and Engineering
NATIONAL INSTITUTE OF TECHNOLOGY CALICUT
Kozhikode - 673601, KERALA, INDIA

The Program Educational Objectives (PEOs) of M.Tech.in Computer Science and Engineering(Information Security)

PEO1	The graduates shall have an in-depth knowledge in the fundamentals of Information Security, with the ability and confidence to specialize in topics of interest in Computing
PEO2	The graduates shall have the ability to solve problems and critically analyze solutions in the area of interest in Computing and Information Security
PEO3	The graduates shall have the skillset for using knowledge in Information Security and Computing for the benefit of society with sound ethical practices and a lifelong interest in contributing to knowledge in the field

Programme Outcomes (POs) & Programme Specific Outcomes (PSOs) of M.Tech in Computer Science and Engineering((Information Security)

PO1	An ability to independently carry out research /investigation and development work to solve practical problems.
PO2	An ability to write and present a substantial technical report/document
PO3	Students should be able to demonstrate a degree of mastery over the are a of Information Security at a level higher than the requirements in the appropriate bachelor program
PO4	Ability to critically analyze solutions, proofs and programs
PO5	Ability to reflect on the thought processes used in arriving at solutions, independently review, Communicate and assimilate feedback
PO6	Imbibe the practice of ethics in computing and research

PSO 1	An ability to independently carry out research /investigation and development work to solve practical problems in the field of computing and Information Security	
PSO2	Students should be able to demonstrate a degree of mastery in Information Security	

CURRICULUM

Total credits for completing M.Tech. in Computer Science and Engineering((Information Security) is 75.

COURSE CATEGORIES AND CREDIT REQUIREMENTS:

The structure of M.Tech. programme shall have the following Course Categories:

Sl. No.	Course Category	Minimum Credits
1.	Program Core (PC)	20
2.	Program Electives (PE)	18
3.	Institute Elective (IE)	2
4.	Projects	35

The effort to be put in by the student is indicated in the tables below as follows:

L: Lecture (One unit is of 50 minute duration)
T: Tutorial (One unit is of 50 minute duration)
P: Practical (One unit is of one hour duration)
O: Outside the class effort / self-study (One unit is of one hour duration)

PROGRAMME STRUCTURE

Semester I

Sl. No.	Course Code	Course Title	L	T	P	O	Credits	Category
1.	CS6101E	Mathematical Foundations of Computer Science	3	0	2	7	4	PC
2.	CS6111E	Algorithms and Complexity	3	0	2	7	4	PC
3.		Institute Elective	2	0	0	4	2	IE
4.	CS6103E	Software Systems lab	1	0	6	5	4	PC
5.	CS6201E	Foundations of Information Security	3	0	2	7	4	PC
6.		Program Elective 1	3	0	0	6	3	PE
		Total					21	--

Semester II

Sl. No.	Course Code	Course Title	L	T	P	O	Credits	Category

1.	CS6302E	Theoretical Foundations of Machine Learning	3	1	0	8	4	PC
2.	CS6296E	Project Phase I	0	0	4	2	2	PC
3.		Program Elective 2	3	0	0	6	3	PE
4.		Program Elective 3	3	0	0	6	3	PE
5.		Program Elective 4	3	0	0	6	3	PE
6.		Program Elective 5	3	0	0	6	3	PE
7.		Program Elective 6	3	0	0	6	3	PE
		Total					21	--

Semester III

Sl. No.	Course Code	Course Title	L	T	P	O	Credits	Category
1.	CS7297E	Project Phase II	0	0	6	3	3	PC
2.	CS7298E	Project Phase III	0	0	30	15	15	PC
		Total					18	--

Semester IV

Sl. No.	Course Code	Course Title	L	T	P	O	Credits	Category
1.	CS7299E	Project Phase IV	0	0	30	15	15	PC
		Total					15	--

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(Common for all the M.Tech Programmes of the Department of CSE: CS61, CS62 and CS63)

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4	CS6107E	Topics in Compiler Design	3	0	0	6	3
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6	CS6109E	Topics in Image Processing	3	0	0	6	3
7	CS6110E	Pattern Recognition	3	0	0	6	3
8	CS6211E	Topics in Computational Geometry	3	0	0	6	3
9	CS6112E	Topics in Computer Architecture	3	0	0	6	3
10	CS6113E	Topics in Database Design	3	0	0	6	3
11	CS6114E	Topics in Network Systems	3	0	0	6	3
12	CS6115E	Topics in Parameterized Algorithms	3	0	0	6	3

13	CS6116E	Topics in Programming Languages	3	0	0	6	3
14	CS6117E	Topics in Quantum Computing	3	0	0	6	3
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18	CS6205E	Topics in Information Security	3	0	0	6	3
19	CS6206E	Systems Security					
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21	CS6305E	Advanced Data Structures and Algorithms	3	0	0	6	3
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29	CS6313E	High Performance Computing for AI	3	0	0	6	3
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