

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI.



Draft Copy
Scheme of Teaching and Examinations
M.Tech in Digital Communication and Networking (ECS)
(Effective from the Academic year 2022-23)

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VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI
Scheme of Teaching and Examinations – 2022
M.Tech in Digital Communication and Networking (ECS)
Choice Based Credit System (CBCS) and Outcome-Based Education(OBE)

I SEMESTER

Sl. NO	Course	Course Code	Course Title	Teaching Hours per Week			Examination				Credits
				Theory	Practical/Seminar	Tutorial/ Skill Development Activities	Duration in hours	CIE Marks	SEE Marks	Total Marks	
				L	P	T/SDA					
1	BSC	22ELD11	Advanced Engineering mathematics	03	00	00	03	50	50	100	3
2	IPCC	22ECS12	Advanced Digital Signal Processing	03	02	00	03	50	50	100	4
3	PCC	22ECS13	Advanced Communication Networks	03	00	02	03	50	50	100	4
4	PCC	22ECS14	Wireless Communication	02	00	02	03	50	50	100	3
5	PCC	22EVE15	Advanced Embedded system	02	00	02	03	50	50	100	3
6	MCC	22RMI16	Research Methodology and IPR	03	00	00	03	50	50	100	3
7	PCCL	22ECSL17	Communication Networks Laboratory	01	02	00	03	50	50	100	2
8	AUD/AEC	22AUD18/ 22AEC18	BOS recommended ONLINE courses	Classes and evaluation procedures are as per the policy of the online course providers.							PP
TOTAL				17	04	06	21	350	350	700	22

Note: BSC-Basic Science Courses, PCC: Professional core. IPCC-Integrated Professional Core Courses, MCC- MandatoryCredit Course, AUD/AEC –Audit Course / Ability Enhancement Course(A pass in AUD/AEC is mandatory for the award of the degree), PCCL-Professional Core Course lab, **L-Lecture, P-Practical, T/SDA-Tutorial / Skill Development Activities**(Hours are for Interaction between faculty and students)

Integrated Professional Core Course (IPCC): **Integrated Professional Core Course (IPCC):** Refers to Professional Theory Core Course Integrated with practical of the same course. The theory part of the IPCC shall be evaluated both by CIE and SEE. The practical part shall be evaluated by only CIE (no SEE). However, questions from the practical part of IPCC shall be included in the SEE question paper.

Audit Courses /Ability Enhancement Courses Suggested by BOS (ONLINE courses): **Audit Courses:**These are prerequisite courses suggested by the concerned Board of Studies. Ability Enhancement Courses will be suggested by the BoS if prerequisite courses are not required for the programs. **Ability Enhancement Courses:**

- These courses are prescribed to help students to enhance their skills in in fields connected to the field of specialisation as well allied fields that leads to employable skills. Involving in learning such courses are impetus to lifelong learning.
- The courses under this category are online courses published in advance and approved by the concerned Board of Studies.
- Registration to Audit /Ability Enhancement Course shall be done in consultation with the mentor and is compulsory during the concerned semester.
- In case a candidate fails to appear for the proctored examination or fails to pass the selected online course, he/she can register and appear for the same course if offered during the next session or register for a new course offered during that session, in consultation with the mentor.
- The Audit Ability Enhancement Course carries no credit and is not counted for vertical progression. However, a pass in such a course is mandatory for the award of the degree.

Skill development activities:Under **Skill development activities** in a concerning course, the students should

1. Interact with industry (small, medium, and large).
2. Involve in research/testing/projects to understand their problems and help creative and innovative methods to solve the problem.
3. Involve in case studies and field visits/ fieldwork.
4. Accustom to the use of standards/codes etc., to narrow the gap between academia and industry.
5. Handle advanced instruments to enhance technical talent.
6. Gain confidence in modelling of systems and algorithms for transient and steady-state operations, thermal study, etc.
7. Work on different software/s (tools) to simulate, analyze and authenticate the output to interpret and conclude.

All activities should enhance student's abilities to employment and/or self-employment opportunities, management skills, Statistical analysis, fiscal expertise, etc.

Students and the course instructor/s to involve either individually or in groups to interact together to enhance the learning and application skills of the study they have undertaken. The students with the help of the course teacher can take up relevant technical –activities which will enhance their skill. The prepared report shall be evaluated for CIE marks.

BOS recommended ONLINE courses

Sl. No.	Course code	Course Title	National Coordinator	Instructor
1	22AUD18/ 22AEC18	Basics of software defined Radios (4 Weeks)	NPTEL	Prof. Meenakshi Rawat IIT Roorkee
2		Design Thinking - A Primer (4 Weeks)	NPTEL	Prof. Ashwin Mahalingam, Prof. Bala Ramadurai IIT Madras
3		Introduction to Computer and Network Performance Analysis using Queuing Systems (4 Weeks)	NPTEL	Prof. Varsha Apte IIT Bombay
4		LaTeX & XFig - typesetting software (06 Weeks)	AICTE	Prof Kannan Moudgalya, Principal Investigator of Spoken Tutorial Project Indian Institute of Technology Bombay
5		Evolution Of Air Interface Towards 5G (08 Weeks)	NPTEL	Prof. Suvra Sekhar Das IIT Kharagpur

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II SEMESTER											
Sl. No	Course	Course Code	Course Title	Teaching Hours /Week			Examination				Credits
				Theory	Practical/ Seminar	Tutorial/ Skill Development Activities	Duration in hours	CIE Marks	SEE Marks	Total Marks	
				L	P	T/SDA					
1	PCC	22ECS21	Advanced communication Systems	02	00	02	03	50	50	100	3
2	IPCC	22ECS22	Antenna Theory And Design	03	02	00	03	50	50	100	4
3	PEC	22ECS23x	Professional elective 1	02	00	02	03	50	50	100	3
4	PEC	22ECS24x	Professional elective 2	02	00	02	03	50	50	100	3
5	MPS	22ECS25	Mini Project with Seminar	00	04	02	--	100	--	100	3
6	PCCL	22ECSL26	Advanced Communication laboratory	01	02	00	03	50	50	100	02
7	AUD/ AEC	22AUD27	Suggested ONLINE courses	Classes and evaluation procedures are as per the policy of the online course providers.							PP
TOTAL				10	08	08	15	350	250	600	18

Note: PCC: Professional core courses, PEC: Professional Elective Courses, IPCC-Integrated Professional Core Courses. MPS-Mini Project With Seminar; AUD/AEC; Audit Courses / Ability Enhancement Courses (Mandatory), PCCL-Professional Core Course lab, L-Lecture, P-Practical, T/SDA-Tutorial / Skill Development Activities(Hours are for Interaction between faculty and students)			
Professional Elective 1		Professional Elective 2	
Course Code under 22ECS24X	Course title	Course Code under 22ECS25X	Course title
22ECS241	Wireless Sensor Networks	22ECS251	Multimedia Over Communication Links
22ECS242	Probability and Random Process	22ESP252	Statistical Signal Processing
22EVE243	Nanoelectronics	22ECS253	High speed Communication Networks
22ECS244	Cryptography and Network Security	22ECS254	Applied Cyber Security
22ECS245	Optical Communication and Networking	22ECS255	Simulation, Modelling and Analysis
<p>Note:</p> <p>1 Mini Project with Seminar: This may be hands-on practice, survey report, data collection and analysis, coding, mobile app development, field visit and report preparation, modelling of system, simulation, analysing and authenticating, case studies, etc. CIE marks shall be awarded by a committee comprising of HoD as Chairman, Guide/co-guide, if any, and a senior faculty of the department. Students can present the seminar based on the completed mini-project. Participation in the seminar by all postgraduate students of the program shall be mandatory.</p> <p>The CIE marks awarded for Mini-Project work and Seminar, shall be based on the evaluation of Mini Project work and Report, Presentation skill and performance in Question and Answer session in the ratio 50:25:25. Mini-Project with Seminar shall be considered as a head of passing and shall be considered for vertical progression as well as for the award of degree. Those, who do not take-up/complete the Mini Project and Seminar shall be declared as fail in that course and have to complete the same during the subsequent semester. There is no SEE for this course.</p> <p>2. Internship: All the students shall have to undergo a mandatory internship of 06 weeks during the vacation of II and III semesters. A University examination shall be conducted during III semester and the prescribed internship credit shall be counted in the same semester. The internship shall be considered as a head of passing and shall be considered for vertical progression as well as for the award of degree. Those, who do not take-up/complete the internship shall be declared as fail in the internship course and have to</p>			

complete the same during the subsequent University examination after satisfying the internship requirements.

Suggested ONLINE courses

Sl.No.	Course code	Course Title	National Coordinator	Instructor
1	22AUD27	Introduction To Internet Of Things (12 Weeks)	NPTEL	Prof. Sudip Misra IIT Kharagpur
2		Introduction to Cyber Security (12 Weeks)	IGNOU	Dr. Jeetendra Pande Uttarakhand Open University, Haldwani
3		Principles of Signal Estimation for MIMO/ OFDM Wireless Communication (12 Weeks)	NPTEL	Prof. Aditya K. Jagannatham IIT Kanpur
4		Programming In Java (12 Weeks)	NPTEL	Prof. Debasis Samanta IIT Kharagpur
5		Fiber Optic Communication Technology (12 Weeks)	NPTEL	Prof. Deepa Venkitesh IIT Madras
6		Introduction to Wireless and Cellular Communications (12 Weeks)	NPTEL	Prof. R. David Koilpillai IIT Madras

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III SEMESTER

Sl. No	Course	Course Code	Course Title	Teaching Hours /Week			Examination				Credits
				Theory	Practical/ Mini-Project/ Internship	Tutorial/ Skill Development Activities	Duration in hours	CIE Marks	SEE Marks	Total Marks	
				L	P	SDA					
1	PCC	22ECS31	LTE 4G Broadband	03	00	02	03	50	50	100	4
2	PEC	22ECS32X	Professional elective 3	03	00	00	03	50	50	100	3
3	OEC	22ECS33X	Open elective Courses-1	03	00	00	03	50	50	100	3
4	PROJ	22ECS34	Project Work phase -1	00	06	00	--	100	--	100	3
5	SP	22ECS35	Societal Project	00	06	00	--	100	--	100	3
6	INT	22ECSI36	Internship	(06 weeks Internship Completed during the intervening vacation of II and III semesters.)			03	50	50	100	6
TOTAL				09	12	03	12	400	200	600	22

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Professional elective 3		Open elective -1	
Course Code under 22ECS31X	Course title	Course Code under 22ECS32X	Course title
22ECS321	Cognitive Radio Networks	22ECS331	Real Time Systems
22ECS322	WDM Optical Networks	22ECS332	RF MEMS
22ESP323	Pattern Recognition and Machine Learning	22ECS333	RF and Microwave Circuit Design
22ECS324	Communication System Design using DSP Algorithm	22ECS334	Internet of Things
22ECS325	Error Control Coding	22ECS335	Introduction to 5G (NR)

Note:

1. Project Work Phase-1: The project work shall be carried out individually. However, in case a disciplinary or interdisciplinary project requires more participants, then a group consisting of not more than three shall be permitted.

Students in consultation with the guide/co-guide (if any) in disciplinary project or guides/co-guides (if any) of all departments in case of multidisciplinary projects, shall pursue a literature survey and complete the preliminary requirements of the selected Project work. Each student shall prepare a relevant introductory project document, and present a seminar.

CIE marks shall be awarded by a committee comprising of HoD as Chairman, all Guide/s and co-guide/s (if any) and a senior faculty of the concerned departments. The CIE marks awarded for project work phase -1, shall be based on the evaluation of Project Report, Project Presentation skill, and performance in the Question and Answer session in the ratio of 50:25:25.

2. Societal Project: Students in consultation with the internal guide as well as with external guide (much preferable) shall involve in applying technology to workout/proposing viable solutions for societal problems.

CIE marks shall be awarded by a committee comprising of HoD as Chairman, Guide/co-guide if any, and a senior faculty of the department. The CIE marks awarded, shall be based on the evaluation of Project Report, Project Presentation skill, and performance in the Question and Answer session in the ratio of 50:25:25.

Those, who have not pursued /completed the Societal Project, shall be declared as fail in the course and have to complete the same

during subsequent semester/s after satisfying the Societal Project requirements. There is no SEE (University examination) for this course.

3. Internship: Those, who have not pursued /completed the internship, shall be declared as fail in the internship course and have to complete the same during subsequent University examinations after satisfying the internship requirements. Internship SEE (University examination) shall be as per the University norms.

CIE marks shall be awarded by a committee comprising of HoD as Chairman, Guide/co-guide if any, and a senior faculty of the department. The CIE marks awarded for project work phase -1, shall be based on the evaluation of Project Report, Project Presentation skill, and performance in the Question and Answer session in the ratio of 50:25:25.

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IV SEMESTER										
Sl. No	Course	Course Code	Course Title	Teaching Hours /Week		Examination				Credits
				Theory	Practical/ Field work	Duration in hours	CIE Marks	SEE Marks Viva voce	Total Marks	
				L	P					
1	Project	22ECS41	Project work phase -2	--	08	03	100	100	200	18
TOTAL				--	08	03	100	100	200	18

Note:**1. Project Work Phase-2:**

Students in consultation with the guide/co-guide (if any) in disciplinary project or guides/co-guides (if any) of all departments in case of multidisciplinary projects, shall continue to work of Project Work phase -1to complete the Project work. Each student / batch of students shall prepare project document, and present a seminar.

CIE marks shall be awarded by a committee comprising of HoD as Chairman, all Guide/s and co-guide/s (if any) and a senior faculty of the concerned departments. The CIE marks awarded for project work phase -2, shall be based on the evaluation of Project Report, Project Presentation skill, and performance in the Question and Answer session in the ratio of 50:25:25.

SEE shall be at the end of IV semester. Project work evaluation and Viva-Voce examination (SEE), after satisfying the plagiarism check, shall be as per the University norms.

Total Credits 22+18+22+18 =**80**