VISVESVARAYA TECHNOLOGICAL UNIVERSITY

BELAGAVI

Scheme of Teaching and Examinations

M. Tech. in Electronics and Communication Engineering

(Specialization in Digital Electronics and Communication)

Choice Based Credit System (CBCS) and Outcome Based Education (OBE)

(Effective from the academic year 2024-25)

II SEMESTER

Sl. No	Course Type	Course Code	Course Title	Teaching Hours per Week			Examination				Credits
				Theory	Practical/ Seminar	Tutorial/SDA	Duration in hours	CIE Marks	SEE Marks	Total Marks	
				L	P	T/SDA					
1	IPCC	MLEC201	Antenna Theory and Design	3	2	0	03	50	50	100	4
2	PCC	MLEC202	Advanced Communication system	3	0	0	03	50	50	100	3
3	PCC	MLEC203	Error Control Coding	3	0	0	03	50	50	100	3
4	PCC	MLEC204	Multimedia Over Communication Links	3	0	0	03	50	50	100	3
5	PEC	MLEC215x	**Professional Elective III**	3	0	0	03	50	50	100	3
6	PEC	MLEC216x	**Professional Elective IV**	3	0	0	03	50	50	100	3
7	PCCL	MLECL207	Advanced Communication Laboratory	0	4	0	03	50	50	100	2
8	AEC/SEC	MLEC258x	Ability/Skill Enhancement Course (Offline/Online)	00 01	02 00		02 01	50	50	100	1
								400	**400**	**800**	**22**

Professional Elective III		Professional Elective IV	
MLEC215A	Wireless Sensor Networks	MLEC216A	Statistical Signal Processing
MLEC215B	Cryptography and Network Security	MLEC216B	Array Signal Processing
MLEC215C	Biomedical Signal Processing	MLEC216C	Digital Compression
MLEC215D	Advances in Image Processing	MLEC216D	Wavelet Transforms and Applications

Skill Enhancement Course			
MLECL258A	Modeling and Simulation of Antenna Using Simulation Tool	MLECL258C	Python Programming
MLECL258B	MATLAB and Simulink		

Note: **PCC**: Professional core. **IPCC**-Integrated Professional Core Courses, **PCC(PB):** Professional Core Courses (Project Based), **PCCL**-Professional Core Course lab **,NCMC**- None Credit Mandatory Course, ,**L-**Lecture**, P-**Practical**, T/SDA-**Tutorial **/** Skill Development Activities(Hours are for Interaction between faculty and students)

PCC: Professional Core Course: Courses related to the stream of engineering, which will have both CIE and SEE components, students have to qualify in the course for the award of the degree. **Integrated Professional Core Course (IPCC)**: Refers to a Professional Theory Core Course Integrated with practicals of the same course. The IPCC's theory part shall be evaluated 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. **Project Based Learning Course (PCC(PB):** Project Based Learning course is a professional core Course only Students have to complete a project out of learning from the course and SEE will be viva voce on project work. **PCCL: Professional Core Course Laboratory:** Practical courses whose CIE will be evaluated by the class teacher and SEE will be evaluated by the two examiners.

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 the 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 are to be involved 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 that will enhance their skills. The prepared report shall be evaluated for CIE marks.

For the students who are willing to take up a two-semester duration Industry/Research Internship Leading to Project work /start-up

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IIISEMESTER (A)

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.	PEC	MLEC311x	Professional Elective (Online Courses)	03	00	00	03	100	-	100	3
2.	PEC	MLEC312x	Professional Elective (Online Courses)	03	00	00	03	100		100	3
3.	INT	**MINT383**	Research Internship /Industry-Internship leading to project work/ Startup	Two-semester duration, SEE in the IV semester which leads to project work /start-up			03	100	---	100	4
4.	**PROJ**	**MPRJ384**	**Project Phase I**	**06**	**00**	**00**	**12**	100	**-**	100	**2**
TOTAL								400	**-**	**400**	**12**

Note: **PEC**: Professional Elective Courses, **L-Lecture, P-Practical, T/SDA-Tutorial / Skill Development Activities** (Hours are for Interaction between faculty and students).
INT: Internship: Research Internship / Industry Internship Leading to the project work /start-up, **PROJ: Project Phase-I**: Problem statement out of undergone Internship (Industry /Research) report submission

IV SEMESTER (A)

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	INT	**MINT481**	Research Internship / Industry Internship Leading to Project Work/Start-up	Two Semester Duration		03	100	100	200	12
2	PROJ	**MPRJ482**	Project Phase II			03	100	100	200	16
			TOTAL			**06**	**200**	**200**	**400**	**28**

INT: Industry/ Research Internship leading to the project work /startup **PROJ**: Project work outcome of Internship (Project Phase-II is Viva voce SEE)

Taking up a two-semester Industry/Research Internship that leads to project work or a start-up can be a highly rewarding experience for students. It allows them to apply theoretical knowledge in practical settings, gain valuable industry or research experience, and potentially develop innovative solutions or business ideas. Here are some key steps and considerations for students pursuing such an internship:

Industry Internship: The main objective of the industry internship is to ensure that the intern is exposed to a real-world environment and gain practical experience. Often, it may be a practical exposure to the theory that has been learned during the academic period. The industry internship helps students understand of analytical concepts and tools, hone their skills in real-life situations, and build confidence in applying the skills learned.

Research Internship: A research internship is an opportunity for students or early career professionals to gain hands-on experience in conducting research under the guidance of a mentor or within a research team. These internships can take place in academic institutions, research organizations, government agencies, or private companies

Research /Industry Internship: In the third-semester Students have to be in touch with a guide/mentor/coordinator and regularly submit the report referred to the progress internship. Based on the progress report the Guide/Mentor/coordinator has to enter the CIE marks at the end of the 3rd semester. At the beginning of the 4th semester, students have to define the project topic out of the learning due to the Internship, upon completion of the project work he/she has to attend the SEE at the parent Institute.

Internship Leading to Start-up: An internship that leads to a startup is an exciting pathway, blending real-world experience with entrepreneurial ambition. Here's a comprehensive guide to transitioning an internship experience into launching your startup: 1)

Maximize your internship experience, 2) Identifying Viable Business Ideas, 3) Research and Validation 4) Building a Business Plan 5) Networking and Mentorship 6) Securing Funding 7) Establishing Startup 8) Launching and Marketing. By following these steps, you can effectively transition from an internship to launching a successful startup. This journey requires dedication, resilience, and a willingness to learn and adapt.

24LEC301 and 24LEC302: MOOC courses of 12 weeks duration are the courses suggested by the Board of Studies of the University and will be displayed on www.online.vtu.ac.in. The online courses selected should not be the same as those studied in the first and second semesters of the program. The student will not be eligible to get their degree if they unintentionally select online courses that match previously finished courses. These courses are not considered for the vertical progression; however, qualifying for these courses and earning the credits is a must for the award of the degree. It is permitted to complete these online MOOC courses either in 3rd semester or in 4th semester.

For the students who are willing to take an Industry Internship for one-semester duration and independent project work next semester

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IIISEMESTER (B)

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	PEC	MLEC311x	Professional Elective (Online Course)	03	00	00	03	100		100	3
	PEC	MLEC312x	Professional Elective (Online Course)	03	00	00	03	100		100	3
2	PEC	MLEC313x	Professional Elective (Online Courses)	03	00	00	03	100		100	3
3	INT	**MINT384**	Industry Internship	One semester Duration			03	100	100	200	11
TOTAL				**09**	**00**	**00**	**12**	**400**	**100**	**500**	**20**

IV SEMESTER (B)										
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	**MPRJ481**	Project work	--	08	03	100	100	200	20
TOTAL					**08**	**03**	**100**	**100**	**200**	**20**

Industry Internship: The main objective of the industry internship is to ensure that the intern is exposed to a real-world environment and gains practical experience. Often, it may be a practical exposure to the theory that has been learned during the academic period. The industry internship helps students understand of analytical concepts and tools, hone their skills in real-life situations, and build confidence in applying the skills learned. The students who take up a one-semester Internship in the Industry have to appear SEE at the institute at the end of the semester as per the examination calendar.

Project Work: Students in consultation with the guide shall carry out literature survey/ visit industries to finalize the topic of the Project. Subsequently, the students shall collect the material required for the selected project, prepare a synopsis, and narrate the methodology to carry out the project work. Each student, under the guidance of a Faculty, is required to

- Present the seminar on the selected project orally and/or through Power Point slides.
- Answer the queries and be involved in debate/discussion.
- Submit two copies of the typed report with a list of references.
- The participants shall take part in discussions to foster a friendly and stimulating environment in which the students are motivated to reach high standards and become self-confident

CIE marks for the project report (40 marks), seminar (40 marks) and question and answer (20 marks) shall be awarded (based on the quality of report and presentation skill, participation in the question and answer session by the student) by the committee constituted for the purpose by the Principal. The committee shall consist of internal guide and a faculty from the department with the senior most acting as the Chairperson.

Semester End Examination SEE marks for the project report (60 marks), seminar (20 marks) and question and answer session (20 marks) shall be awarded (based on the quality of the report and presentation skill, participation in the question and answer session) by the

examiners appointed by the University.

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For the students who are willing to take a research-leading paper publication in Q1/Q2/Q3 Journals and to a PhD Registration

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IIISEMESTER (C)

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	PEC	MLEC311x	Professional Elective (Online Course)	03	00	00	03	100		100	3
	PEC	MLEC312x	Professional Elective (Online Course)	03	00	00	03	100		100	3
2	PEC	MLEC313x	Professional Elective (Online Courses)	03	00	00	03	100		100	3
	PEC	MLEC314x	Professional Elective (Online Courses	03	00	00	03	100		100	3
3	PROJ	MPROJ385	Project Phase-I	One semester Duration			03	100	---	100	6
TOTAL				**12**	**00**	**00**	**15**	500		**500**	**18**

IV SEMESTER (C)

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	MPROJ481	Project work Phase-II	--	08	03	100	100	200	22
					08	**03**	**100**	**100**	**200**	**22**

The research section of the university has to announce the number of seats for M. Tech. students who are seeking PhD (research study) admission through a project leading to the publication of the paper in Q1/Q2/Q3 journals. Only full-time research work will

be permitted in the university department or approved research centers of the affiliated colleges of the university (guidelines need to be set up). Based on seat availability, the students are permitted to register for project work leading to the publication of papers in Q1/Q2/Q3 journals and admission to research (PhD) in their 3rd semester of the M. Tech., program

Project Phase-1 Project Phase-I, typically the initial phase in any project, is crucial as it lays the foundation for the entire project. This phase involves defining the project's scope, objectives, and initial planning. Here's a structured approach to effectively carry out Project Phase-I:

- **Project Charter:** Outlines the project's purpose, objectives, and stakeholders.
- **Scope Statement:** Defines the project boundaries and deliverables.
- **Requirements Document:** Captures all project requirements.
- **Project Plan:** Details the approach, timeline, and resource allocation.
- **Risk Management Plan:** Identifies and plans for potential risks.
- **Feasibility Study Report:** Assesses technical, economic, and operational feasibility.

Students in consultation with the guide shall carry out literature survey/visit industries to finalize the topic of the Project. Subsequently, the students shall collect the material required for the selected project, prepare a synopsis, and narrate the methodology to carry out the project work. Each student, under the guidance of a faculty, is required to

- Present the seminar on the selected project orally and/or through power point slides.
- Answer the queries and be involved in debate/discussion.
- Submit two copies of the typed report with a list of references.
- The participants shall take part in discussions to foster a friendly and stimulating environment in which the students are motivated to reach high standards and become self-confident.

Continuous Internal Evaluation(100 Marks).

CIE marks for the project report (60 marks), seminar (20 marks) and question and answer (20marks) shall be awarded (based on the quality of report and presentation skill, participation in the question and answer session by the student) by the committee constituted for the purpose by the Principal. The committee shall consist of an internal guide and a faculty from the department with the senior most acting as the Chairperson.

Project Work Phase-II: Each student shall be involved in carrying out the project work jointly in constant consultation with internal guide and external guide and prepare the project report as per the norms of the university to avoid plagiarism. Phase II of a project typically involves the detailed execution of the planned activities, continuous monitoring and control of the project's progress, and making necessary adjustments to ensure the project stays on track. Keep detailed records of all project activities, decisions, and changes. Ensure all project documentation is organized and accessible. Conduct a final project review to evaluate overall performance, achievements, and lessons learned. Document best practices and areas for improvement for future projects.

Paper Publication Process: Publishing a research paper based on your project in a Q1/Q2/Q3 journal involves several key steps, from writing the manuscript to navigating the peer review process. Here's a comprehensive guide:

Writing the Manuscript: Choose a clear and concise title that accurately reflects the content. Write an abstract summarizing the research question, methods, results, and conclusions.

Literature Review: Review relevant existing research to establish the foundation of your study. Identify gaps that your research aims to fill.

Methodology: Describe the research design, methods, and procedures in detail. Include information on data collection, analysis, and any tools or software used.

Results: Present the findings of your research clearly and logically. Use tables, figures, and charts to illustrate key results.

Discussion: Interpret the results and explain their implications. Compare your findings with existing research and discuss any discrepancies or new insights.

Conclusion: Summarize the main findings and their significance. Suggest potential future research directions.

References: Cite all sources used in your research following the journal's citation style.

Journal Selection: Choose a journal that aligns with the scope and focus of your research. Consider the journal's impact factor (Q1, Q2, Q3) and audience.

Review Journal Guidelines: Carefully read the journal's submission guidelines and ensure your manuscript adheres to them.

Prepare Your Manuscript: Format your manuscript according to the journal's guidelines. Include all required sections and supplementary materials.

Cover Letter: Write a cover letter to the journal editor highlighting the significance of your research and why it fits the journal.

Submit the Manuscript: Use the journal's online submission system to submit your manuscript. Ensure all required information and documents are included.

Semester End Examination SEE marks for the project report (60 marks), seminar (20marks) and question and answer session (20 marks) shall be awarded (based on the quality of report and presentation skill, participation in the question and answer session)by the examiners appointed by the University.

24LEC301 24LEC302 24LEC303 and 24LEC304**:**MOOC courses of 12 weeks duration are the courses suggested by the Board of Studies of the University and will be displayed on www.online.vtu.ac.in. The online courses selected should not be the same as those studied in the first and second semesters of the program. The student will not be eligible to get their degree if they unintentionally select online courses that match previously finished courses. These courses are not considered for the vertical progression; however, qualifying for these courses and earning the credits is a must for the award of the degree. It is permitted to complete these online MOOC courses either in 3rd semester or in 4th semester.