VISVESVARAYA TECHNOLOGICAL UNIVERSITY

BELAGAVI

Scheme of Teaching and Examinations

M.Tech. in Electronics and Communication Engineering

(Specialization in)

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

I SEMESTER (Core Courses related to main Engineering Stream)

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	PCC	MEC101	Advanced Machine Learning and Deep Learning	3	0	0	03	50	50	100	3
2	IPCC	MEC102	Advanced Embedded Systems	3	2	0	03	50	50	100	4
3	PCC	MEC103	Digital Circuits & Logic Design	3	0	0	03	50	50	100	3
4	PEC	MEC114	Professional Elective I	3	0	0	03	50	50	100	3
5	PEC	MEC115	Professional Elective II	3	0	0	03	50	50	100	3
6	PECL	MECL116x	Lab Elective	0	4	0	03	50	50	100	2
7	NCMC	MRMI107	Research Methodology and IPR (Online)	Online Courses (online.vtu.ac.in)							PP
								300	**300**	**600**	**18**

Professional Elective I		Professional Elective II	
MEC114A	ASIC Design	MEC115A	SystemVerilog
MEC114B	Advanced Computer Networking	MEC115B	Advanced Wireless Communication
MEC114C	Advanced Signal Processing	MEC115C	Multimedia & Applications
MEC114D	Power Converters	MEC115D	Process Control

Lab Elective			
MECL116A	Advanced Machine Learning and Deep Learning Lab	MECL116B	Electronics and Communication Lab

Note: **BSC**-Basic Science Courses, **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) **MRMI107** - Research Methodology and IPR (**Online**) for the students who have **not studied** this course in the Undergraduate level. This course is not counted for vertical progression, Students have to qualify for the award of the master's degree.

M- Master program **xx** – **ME** for Mechanical Engineering Stream, **CV** for Civil Engineering Stream, **EE** – Electrical & Electronics Engineering Stream, **EC-** Electronics and Communication Engineering Stream, **CS**- Computer Science and Engineering, **BA**-Business Administration **AR**- Architecture- etc.

BSC: Basic Science Courses: Courses like Mathematics/ Science are the prerequisite courses that the concerned engineering stream board of Studies will decide. **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.

MRMI107 - Research Methodology and IPR- None Credit Mandatory Course (NCMC) if students have not studied this course in their undergraduate program then he /she has to take this course at **http://online.vtu.ac.in** and to qualify for this course is compulsory before completion of the minimum duration of the program (Two years), however, this course will not be considered for vertical progression.

VISVESVARAYA TECHNOLOGICAL UNIVERSITY

BELAGAVI

Scheme of Teaching and Examinations

M.Tech., in Electronics and Communication Engineering

(Specialization in Electronics)

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

II SEMESTER ELECTRONICS

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	MLEL201	Antennatheoryanddesign	3	2	0	03	50	50	100	4
2	PCC	MLEL202	Digital VLSI Design	3	0	0	03	50	50	100	3
3	PCC	MLEL203	Advanced communications systems	3	0	0	03	50	50	100	3
4	PCC	MLEL204	Real Time Operating System	3	0	0	03	50	50	100	3
5	PEC	MLEL215x	**Professional Elective III**	3	0	0	03	50	50	100	3
6	PEC	MLEL216x	**Professional Elective IV**	3	0	0	03	50	50	100	3
7	PECL	MLELL207	Advanced Communication Lab	0	4	0	03	50	50	100	2
8	SEC	MLEL258x	**Online Skill Enhancement Course**								1
								300	**300**	**600**	**22**

Professional Elective III		**Professional Elective IV**	
MLEL215A	CMOS RF Circuit Design	MLEL216A	Mechatronics
MLEL215B	Statistical signal processing	MLEL216B	Internet of Things and Applications
MLEL215C	Probability And Random Process	MLEL216C	Cyber Security
MLEL215D	Simulation,ModellingAndAnalysis	MLEL216D	Automotive Electronics
Skill Enhancement Course			
MLEL258A	Refer www.online.vtu.ac.in	**MLEL258C**	Refer www.online.vtu.ac.in
MLEL258B	Refer www.online.vtu.ac.in	**MLEL258D**	Refer www.online.vtu.ac.in

Note: **BSC**-Basic Science Courses, **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) **MRMI19**- Research Methodology and IPR (**Online**) for the students who have **not studied** this course in the Undergraduate level. This course is not

counted for vertical progression, Students have to qualify for the award of the master's degree.

BSC: Basic Science Courses: Courses like Mathematics/ Science are the prerequisite courses that the concerned engineering stream board of Studies will decide. **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

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/MDC	Mxxx311x	(Online Courses) 12 weeks duration							100	3
2		Mxxx312x	(Online Courses)12 weeks duration							100	3
		Mxxx313x	(Online Courses)12 weeks duration							100	3
3	INT	**MINT384**	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	3
TOTAL										**400**	**12**

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			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.

Mxxx301/401 to 303/403: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

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	MDC/PEC	Mxxx311x	(Online Course) (12 weeks courses)							100	3
		Mxxx312x	(Online Course) (12 weeks courses)							100	3
2		Mxxx313x	(Online Courses) (12-week course)							100	3
3	INT	MINT384	Industry Internship	One semester Duration			03	100	100	200	11
TOTAL				**06**	**00**	**00**				**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
				04	**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 (20 marks), seminar (20 marks) and question and answer (10 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 (30 marks), seminar (10 marks) and question and answer session (10 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.

Mxxx301/401 to 303/403: 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 a research-leading paper publication in Q1/Q2/Q3 Journals and to a PhD Registration												
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	PCC/IPCC/ MDC/PEC	Mxxx311x	(Online Course) (12 weeks courses)							100	3
		Mxxx312x	(Online Course) (12 weeks courses)							100	3
2		Mxxx313x	(Online Courses) (12-week course)							100	3
		Mxxx314x	(Online Courses) (12-week course)							100	3
3	PROJ	MPRJ385	Project Phase-I	One semester Duration			03	100	---	100	6
TOTAL				**06**	**00**	**00**	**09**			**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	MPRJ481	Project work	--	08	03	100	100	200	22
				04	**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 collectthematerialrequiredfortheselectedproject,prepareasynopsis,andnarratethemethodologytocarryouttheprojectwork.Eachstudent, under theguidanceofafaculty,is required to

- Presenttheseminarontheselectedprojectorallyand/orthroughpowerpointslides.
- Answerthe queries and be involved in debate/discussion.
- Submittwocopiesofthetypedreportwithalistofreferences.
- Theparticipantsshalltakepartindiscussionstofostera friendlyandstimulatingenvironmentinwhichthestudentsaremotivatedtoreachhighstandardsand becomeself-confident.

ContinuousInternalEvaluation(100 Marks).

CIE marks for the project report (60 marks), seminar (20 marks) and question and answer(20marks)shallbeawarded(basedonthequalityofreportandpresentationskill,participationinthequestionandanswersessionbythestudent)bythecommitteeconstitutedforthepurposebythePrincipal.Thecommitteeshallconsistofan internalguide and afacultyfromthedepartment with theseniormostactingastheChairperson.

ProjectWorkPhase-II: Eachstudentshallbeinvolvedincarryingouttheprojectwork jointlyinconstantconsultationwithinternalguideandexternalguideandpreparetheprojectreport as perthe norms of the university to avoidplagiarism. 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

(20marks) shall be awarded (based on the qualityofreportandpresentationskill,participationinthequestionandanswersession)bythe examiners appointedbythe University.