VISVESVARAYA TECHNOLOGICAL UNIVERSITY

BELAGAVI

Scheme of Teaching and Examinations

M.Tech in Mechanical Engineering

(Specialization in Robotics and Artificial Intelligence)

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

Specialization in Robotics and Artificial Intelligence

II 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	MRAI201	Industrial Robotics	3	0	0	03	50	50	100	3
2	PCC	MRAI202	Artificial Intelligence in Manufacturing	3	0	0	03	50	50	100	3
3	IPCC	MRAI203	Mobile Robots and Perception	3	2	0	03	50	50	100	4
4	PEC	MRAI214x	Professional Elective 3	3	0	0	03	50	50	100	3
5	PEC	MRAI215x	Professional Elective 4	3	0	0	03	50	50	100	3
6	PCC	MRAI206	Augmented Reality and Virtual Reality (Tract: AI)	3	0	0	03	50	50	100	3
7	PCCL	MRAIL207	Robot Programming Laboratory	0	0	2	03	50	50	100	2
8	AEC/SEC	MRAI258x	Ability/Skill Enhancement Course (Offline)	00	02	--	02	50	50	100	1
				01	00	--	01				
			TOTAL					**400**	**400**	**800**	**22**

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)

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**- BusinessAdministration **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:** A Practical course who's 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.

Ability Enhancement Courses (AEC):.These courses are designed to help students enhance their skills in communication, language, and personality development. They also promote a deeper understanding of subjects like social sciences and ethics, culture and human behaviour, human rights, and the law.

Skill Enhancement Course (SEC): Skill Enhancement Course means a course designed to provide value-based or skill-based knowledge and should contain both theory and lab/hands-on/training/fieldwork. The main purpose of these courses is to provide students with life skills in the hands-on mode to increase their employability.

If AEC/SEC courses are ONLINE (MOOCs) courses suggested by the concerned board of studies. These courses will be made available on **www. online.vtu.ac.in**, however online courses are not considered for vertical progression, but qualifying in online courses is mandatory for the award of the degree.

Core Courses	
Course Code	**Course Title**
MRAI201	Industrial Robotics
MRAI202	Artificial Intelligence in Manufacturing
MRAI203	Mobile Robots and Perception
MRAI 214x	Professional Elective 3
MRAI 215x	Professional Elective 4
MRAI206	Augmented Reality and Virtual Reality (Tract: AI)
MRAIL207	Robot Programming Laboratory
MRAI258x	Ability/Skill Enhancement Course (Offline)

Elective Courses

Professional Elective 3		**Professional Elective 4**	
Course Code under MRAI214x	Course title	Course Code under MRAI215x	Course title
MRAI214A	Agile Manufacturing	MRAI215A	Internet of Robotics and Things
MRAI214B	CAE and CIM	MRAI215B	Design of Experiments
MRAI214C	Decision Making Techniques	MRAI215C	Simulation Modeling and Production System
MRAI214D	Product Design and Manufacturing	MRAI215D	Non Destructive Testing

Ability/Skill Enhancement Courses (Offline/Online)				
Course Code	Course title	L	P Offline/Online	T/SDA
MRAI258A	Nano Technology	00	02/01	00
MRAI258B	Smart Materials	00	02/01	00
MRAI258C	Precision Engineering	00	02/01	00
MRAI258D	Advanced Processing of Materials	00	02/01	00