

SRM VALLIAMMAI ENGINEERING COLLEGE

(An Autonomous Institution)

SRM Nagar, Kattankulathur-603203.

Medical Electronics



UG- Curricula and Syllabi

B.E – MEDICAL ELECTRONICS

REGULATION 2023

SRM VALLIAMMAI ENGINEERING COLLEGE

(An Autonomous Institution, Affiliated to Anna University, Chennai)

B.E. MEDICAL ELECTRONICS

REGULATIONS – 2023

1. VISION AND MISSION

Vision of the Institute

- “Educate to Excel in Social Transformation”
- To accomplish and maintain international eminence and become a model institution for higher learning through dedicated development of minds, advancement of knowledge and professional application of skills to meet the global demands.

Mission of the Institute

- To contribute to the development of human resources in the form of professional engineers and managers of international excellence and competence with high motivation and dynamism, who besides serving as ideal citizen of our country will contribute substantially to the economic development and advancement in their chosen areas of specialization.
- To build the institution with international repute in education in several areas at several levels with specific emphasis to promote higher education and research through strong institute-industry interaction and consultancy.

Vision of the Department

- To provide quality education for improving the healthcare and well-being of humankind.

Mission of the Department

- To inculcate students with fundamental knowledge, interdisciplinary problem solving skills and confidence required to excel in Medical Electronics.
- To up skill the students with the current technological trends and carryout Quality research to meet the expectation of healthcare service sectors.
- To instil creativity, responsibility, commitment and leadership qualities with professional ethics and moral values.

2. PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

1. To facilitate the students with the profound knowledge in Medical Electronics domain so as to enhance their skills in solving health care challenges.
2. To instigate the students to exhibit their knowledge in developing therapeutic and diagnostic equipment with societal and ethical responsibility.
3. To enable the students to exhibit the research capabilities in multidisciplinary domain with ethics and to engage in lifelong learning.
4. To enrich the graduates to emerge as Entrepreneurs and recognized experts in the field of health care engineering domain and clinical standards.

3. PROGRAMME OUTCOMES (POs):

After going through the four years of study, our Electronics and Communication Engineering Graduates will exhibit ability to:

PO#	Graduate Attribute	Programme Outcome
1	Engineering knowledge	Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization for the solution of complex engineering problems.
2	Problem analysis	Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3	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 public health and safety, and cultural, societal, and environmental considerations.
4	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.
5	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.

6	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.
7	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.
8	Ethics	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9	Individual and team work	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings
10	Communication	Communicate effectively on complex engineering activities with the engineering community and with the 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.
11	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.
12	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.

4. PROGRAM SPECIFIC OUTCOMES (PSOs):

By the completion of Medical Electronics program, the student will have following Program specific outcomes

1. Ability to apply the knowledge of engineering in solving the healthcare problems.
2. Ability to propose indigenous clinical solution through the application of their domain areas and emerging ICTs

4. PEO / PO Mapping:

PROGRAMME EDUCATIONAL OBJECTIVES	PROGRAMME OUTCOMES											
	1	2	3	4	5	6	7	8	9	10	11	12
I	3	3	3	4	2	-	-	-	2	1	2	3
II	3	3	2	2	2	2	-	-	-	-	-	3
III	3	3	3	3	2	-	-	3	-	-	-	2
IV	-	-	-	-	2	2	2	2	-	-	-	-

Contribution: 1 – Reasonable, 2 – Significant, 3 – Strong

MAPPING – UG – MEDICAL ELECTRONICS

		Subject Code & Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
Year I	Sem I	EN3111- Professional English – I	2.2	2.6	2	2	2		2			2.8	1	1	-	-	-	-
		MA3122 - Matrices and Calculus	3	2	2	1	-	-	-	-	-	-	-	1	-	-	-	-
		PH3123 - Engineering Physics	2.8	1.4	1.4	1	1.25	1	1	-	-	-	-	1	-	-	-	-
		CH3124 - Engineering Chemistry	2.8	1.8	2.2	1.2	0.2	0.2	0.8	-	-	-	-	0.8	-	0.2	-	-
		GE3131 - Basic Electrical and Electronics Engineering	2.8	2.8	1.7	1.6	3	2	2	2	-	-	-	-	1.8	1.5	2.5	2
		GE3111 - தமிழர் மரபு / Heritage of Tamils																
		EN3119 - English Language Learning Laboratory	2	1	1	1	2	-	2	-	-	3	-	1	-	-	-	-
		GE3121 - Physics and Chemistry Laboratory	3	2.4	2.6	1	1	-	-	-	-	-	-	-	-	-	-	-
		GE3134 - Engineering Practices Laboratory	3	2	2.3	2	2.3	1	-	-	1	-	1	1	1.7	2	2.5	2
Year I	Sem II	EN3211 - Professional English – II	2	2	1.4	2	2		2			2.8	1	1				
		MA3222 - Statistics and Numerical Methods	3	3	-	-	-	-	-	-	-	-	-	-	1	-	-	-
		PH3226 – Medical Physics	2.4	1.6	1.5	1.5	1.6	1.5	1	-	-	-	-	1	-	-	-	-
		CH3226 - Chemistry for Bio-Medical Engineering	2.6	2.6	2.4	1.8	1.8	0.4	0.2	-	-	-	-	0.4	0.6	0.8	0.2	-
		GE3231 - Problem Solving and Python Programming	2.4	2.6	3	2.8	1.8	-	-	-	-	-	1.6	2	2.5	-	2	1
		GE3211 – தமிழரும் தொழில்நுட்பமும் / Tamils and Technology																
		GE3233 - Engineering Graphics and Design	3	1	2	-	2	-	-	-	-	3	-	2	2	1	-	1
		GE3221 - Engineering Sciences Laboratory	3	2.4	2.6	1	1	-	-	-	-	-	-	-	-	-	-	-
		GE3232 - Problem Solving and Python Programming Laboratory	2.6	2.6	3	2.8	2.2	-	-	-	-	-	2	2	1	3	1.7	2
		GE3251 - NSS / YRC / NSO / Club Activities#																

			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
Year II	Sem III	MA3321 - Transforms and Partial Differential Equations	3	3	-	-	1	-	-	-	-	-	-	1	-	-	-	-
		EC3363 - Signals and Systems	3	3	3	3	3	2	-	-	-	-	-	3	2	3	1	-
		EE3363 - Electric Circuit Analysis	1	1	1	2	2	-	-	3	-	-	3	2	1	1	2	3
		EI3361 – Electronic Devices and Circuits	2.6	2.6	2.2	2	-	-	-	1		1	-	-	1.2	-	-	2
		CS3361 -Object Oriented Programming	2	1.4	2.2	2	2	–	–	–	2.2	1.8	1.2	2.4	3	1.8	2.2	1.6
		MD3361 – Sensors and Measurements	3	2.8	2	1.2	1.4	2	2	2	2	1.4	2.6	1.3	2.2	2	1.8	2.7
		EI3365- Electronics Devices and Circuits Laboratory	3	2	1	-	-	2	-	2	2	1	-	-	-	-	-	1.4
		CS3364 - Object Oriented Programming Laboratory	2	2	2	2	2	–	–	–	2	2	2	2	2	2	2	2
Year II	Sem IV	MA3427 - Applied Mathematics for Bio-Medical Engineering	3	3	3	2	1	-	-	-	-	-	1	1	1	-	-	-
		MD3461 – Human Anatomy and Physiology	3	-	-	2	-	-	-	2.2	-	-	-	2	2	2	-	-
		MD3462 – Bio Control Systems	3	2	2	2	1.3	2	1		1	1	1	2	2	1	-	-
		MD3463 – Analog and Digital Integrated Circuits	3	3	3	1	1	1	-	-	-	-	2.2	2.2	1.4	1	1	-
		EC3464 - Microprocessors, Microcontrollers and Interfacing	2	1.2	2	1.7	3	1	-	2	-	-	2.5	2	2	1	3	2
		GE3451 - NCC Credit Course Level – I																
		MD3464 – Medical Instrumentation	2	2.7	2.7	2.5	3	2.5	2.5	2	2	2	-	2	2	3	3	-
		MD3465 – Analog and Digital Integrated Circuits Laboratory	3	2	1	1	1.4	-	-	-	-	1	2	3	1.8	1.2	-	-
		EC3467 - Microprocessors, Microcontrollers and Interfacing Laboratory	1.7	2	3	2	3	2	2	2	1.8	2	-	2.2	2	2	3	3

			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02	PS03	PS04
Year III	Sem V	MD3561 -Therapeutic Equipment	3	2	1	1	-	-	-	-	-	-	-	-	1	-	-	-
		MD3562 -Discrete Time Signal Processing	3	2	2	2	1	-	-	-	1	1	1	-	3	2	-	-
		MD3563 - Analog and Digital Communication	3	2	3	3	-	2	2	2	-	-	-	3	-	-	-	-
		Professional Elective – I																
		Professional Elective – II																
		CE3521 - Environmental Studies	2.8	1.8	1.0	1.0	0.0	2.2	2.4	0.0	0.0	0.0	0.0	1.8	0.0	0.0	0.0	0.0
		NCC Credit Course Level – II																
		EC3564- Embedded Systems and IoT Design	3	3	3	3	3	1	-	-	-	-	-	2	2	2	3	3
		MD3564-Medical Equipment Laboratory	3	2	1	1	1	-	-	-	-	1	1	-	1	-	-	-
		MD3565-Discrete Time Signal Processing Laboratory	2.6	2	1.6	2	2.3	-	2	2	2	1.8	3.3	1.3	3	-	-	-
Year III	Sem VI	MD3661-Medical Imaging Techniques	3	2	-	2	1	1	1	2	-	1	-	1	2	2	-	-
		MD3662-Hospital Administration and Management	3	2	1	2	-	1	-	1	-	1	1	-	2	2	-	-
		MD3663-Medical Image Processing	3	2	2	2	-	-	-	-	-	-	-	2	2	2	-	-
		PXXXXX- Professional Elective – III																
		PXXXXX-Professional Elective – IV																
		MANXXX-Management - Elective #																
		MXXXXX-Mandatory Course-I																
		MD3664-Medical Image Processing Laboratory	2	3	3	2	2	3	3	3	2	2	1	1	2	3	-	-
		MD3645-Mini Project Work	1.3	2	2.5	2.7	2	1	1	1	3	2	1	2	2	2.2	-	-
		EN3649-Professional Communication Laboratory	1	1	-	1	1	1	-	-	-	2	-	1	-	-	-	-

			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
Year IV	Sem VII	MD3761-Fundamentals of Health Care Analytics	3	1	1	1	1	1	-	-	-	-	-	1	1	-	-	-
		PXXXXX-Professional Elective – V																
		PXXXXX-Professional Elective – VI																
		BA3711 -Human Values and Ethics	-	-	1	2	-	-	1	-	-	-	-	-	-	-	-	-
		OXXXXX-Open Elective *																
		MXXXXX-Mandatory Course-II																
		EC3763-Artificial Intelligence and Machine Learning Techniques	2	3	3	2	-	-	-	-	-	-	-	2	2	2	-	-
		MD3762-Medical Electronics System Design Laboratory	1	3	3	2	-	-	-	-	2	-	-	-	3	1	-	-
		MD3743-Hospital Equipment Training#	3	-	3	3	-	3	3	3	3	3	-	3	3	2	-	-
Year IV	Sem VIII	MD3841 Project Work	3	3	3	3	2	2	3	3	3	3	3	3	3	3	-	-

Contribution: 1 – Reasonable, 2 – Significant, 3 – Strong

SRM VALLIAMMAI ENGINEERING COLLEGE, CHENNAI**(AN AUTONOMOUS INSTITUTION)****REGULATION-2023****CHOICE BASED CREDIT SYSTEM****B.E – MEDICAL ELECTRONICS****CURRICULUM FOR SEMESTER I TO VIII**

SEMESTER I								
S.No	Course Code	Course Title	Category	Contact Periods				C
				L	T	P	Total	
THEORY								
1.	EN3111	Professional English – I	HSMC	3	0	0	3	3
2.	MA3122	Matrices and Calculus	BSC	3	1	0	4	4
3.	PH3123	Engineering Physics	BSC	3	0	0	3	3
4.	CH3124	Engineering Chemistry	BSC	3	0	0	3	3
5.	GE3131	Basic Electrical and Electronics Engineering	ESC	3	0	0	3	3
6.	GE3111	தமிழர் மரபு/Heritage of Tamils	HSMC	1	0	0	1	1
PRACTICAL								
7.	EN3119	English Language Learning Laboratory	HSMC	0	0	2	2	1
8.	GE3121	Physics and Chemistry	BSC	0	0	4	4	2
9.	GE3134	Engineering Practices Laboratory	ESC	0	0	4	4	2
TOTAL				16	1	10	27	22

SEMESTER II								
S.No	Course Code	Course Title	Category	Contact Periods				C
				L	T	P	Total	
THEORY								
1.	EN3211	Professional English – II	HSMC	3	0	0	3	3
2.	MA3222	Statistics and Numerical Methods	BSC	3	1	0	4	4
3.	PH3226	Medical Physics	BSC	3	0	0	3	3
4.	CH3226	Chemistry for Bio - Medical Engineering	BSC	3	0	0	3	3
5.	GE3231	Problem Solving and Python Programming	ESC	3	0	0	3	3
6.	GE3211	தமிழரும் தொழில்நுட்பமும்/ Tamils and Technology	HSMC	1	0	0	1	1
THEORY CUM PRACTICAL								
7.	GE3233	Engineering Graphics and Design	ESC	1	0	4	5	3
PRACTICAL								
8.	GE3221	Engineering Sciences Laboratory	BSC	0	0	4	4	2
9.	GE3232	Problem Solving and Python Programming Laboratory	ESC	0	0	4	4	2
10.	GE3251	NSS/YRC/NSO/ Club Activities#	PCD	0	0	0	0	0
TOTAL				17	1	12	30	24

Conducted after college hours

SEMESTER III								
S.No	Course Code	Course Title	Category	Contact Periods				C
				L	T	P	Total	
THEORY								
1.	MA3321	Transforms and Partial Differential Equations	BSC	3	0	0	3	3
2.	EC3363	Signals and Systems	PCC	3	0	0	3	3
3.	EE3363	Electric Circuit Analysis	PCC	3	0	0	3	3
4.	EI3361	Electronic Devices and Circuits	ESC	3	0	0	3	3
5.	CS3361	Object Oriented Programming	ESC	3	0	0	3	3
THEORY CUM PRACTICAL								
6.	MD3361	Sensors and Measurements	PCC	3	0	2	5	4
PRACTICAL								
7.	EI3365	Electronic Devices and Circuits Laboratory	ESC	0	0	3	3	1.5
8.	CS3364	Object Oriented programming Laboratory	ESC	0	0	3	3	1.5
TOTAL				18	0	8	26	22

SEMESTER IV								
S.No	Course Code	Course Title	Category	Contact Periods				C
				L	T	P	Total	
THEORY								
1.	MA3427	Applied Mathematics for Bio-Medical Engineering	BSC	2	0	0	2	2
2.	MD3461	Human Anatomy and Physiology	PCC	3	0	0	3	3
3.	MD3462	Bio Control Systems	PCC	3	0	0	3	3
4.	MD3463	Analog and Digital Integrated Circuits	PCC	3	0	0	3	3
5.	EC3464	Microprocessors, Microcontrollers, and Interfacing	PCC	3	0	0	3	3
6.	GE3451	NCC Credit Course Level – I*	PCD	3*	0	0	3*	3*
THEORY CUM PRACTICAL								
7.	MD3464	Medical Instrumentation	PCC	3	0	2	5	4
PRACTICAL								
8.	MD3465	Analog and Digital Integrated Circuits Laboratory	PCC	0	0	3	3	1.5
9.	EC3467	Microprocessors, Microcontrollers, and Interfacing Laboratory	PCC	0	0	3	3	1.5
TOTAL				17	0	8	25	21

* NCC Credit Course level – I is offered for NCC students only. The grades earned by the students will be recorded in the Mark Sheet, however the same shall not be considered for the computation of CGPA.

SEMESTER V								
S.No	Course Code	Course Title	Category	Contact Periods				C
				L	T	P	Total	
THEORY								
1.	MD3561	Therapeutic Equipment	PCC	3	0	0	3	3
2.	MD3562	Discrete Time Signal Processing	PCC	3	0	0	3	3
3.	MD3563	Analog and Digital Communication	PCC	3	0	0	3	3
4.	PXXXXX	Professional Elective – I	PEC	3	0	0	3	3
5.	PXXXXX	Professional Elective – II	PEC	3	0	0	3	3
6.	CE3531	Environmental Studies	BSC	2	0	0	2	2
7.	GE3551	NCC Credit Course Level – II	PCD	3#	0	0	3	3#
THEORY CUM PRACTICAL								
8.	EC3564	Embedded Systems and IoT Design	PCC	3	0	2	5	4
PRACTICAL								
9.	MD3564	Medical Equipment Laboratory	PCC	0	0	3	3	1.5
10.	MD3565	Discrete Time Signal Processing Laboratory	PCC	0	0	3	3	1.5
				20	0	8	28	24

NCC Credit Course level – II is offered for NCC students only. The grades earned by the students will be recorded in the Mark Sheet, however the same shall not be considered for the computation of CGPA.

SEMESTER VI								
S.No	Course Code	Course Title	Category	Contact Periods				C
				L	T	P	Total	
THEORY								
1.	MD3661	Medical Imaging Techniques	PCC	3	0	0	3	3
2.	MD3662	Hospital Administration and Management	PCC	3	0	0	3	3
3.	MD3663	Medical Image Processing	PCC	3	0	0	3	3
4.	PXXXXX	Professional Elective – III	PEC	3	0	0	3	3
5.	PXXXXX	Professional Elective – IV	PEC	3	0	0	3	3
6.	MANXXX	Management - Elective #	HSMC	2	0	0	2	2
7.	MXXXXX	Mandatory Course-I	MC	3	0	0	3	0
PRACTICAL								
8.	MD3664	Medical Image Processing Laboratory	PCC	0	0	3	3	1.5
9.	MD3645	Mini Project Work	EEC	0	0	4	4	2
10.	EN3649	Professional Communication Laboratory	EEC	0	0	2	2	1
				20	0	9	29	21.5

Management - Elective shall be chosen from the Management Elective courses.
& Mandatory Course-I is a Non-credit Course (Student shall select one course from the list given under Mandatory Course-I)

SEMESTER VII								
S.No	Course Code	Course Title	Category	Contact Periods				C
				L	T	P	Total	
THEORY								
1.	MD3761	Fundamentals of Health Care Analytics	PCC	3	0	0	3	3
2.	PXXXXX	Professional Elective – V	PEC	3	0	0	3	3
3.	PXXXXX	Professional Elective – VI	PEC	3	0	0	3	3
4.	BA3711	Human Values and Ethics	HSMC	2	0	0	2	2
5.	OXXXXX	Open Elective *	OEC	3	0	0	3	3
6.	MXXXXX	Mandatory Course-II	MC	3	0	0	3	0
THEORY CUM PRACTICAL								
7.	EC3763	Artificial Intelligence and Machine Learning Techniques	PCC	3	0	2	5	4
PRACTICAL								
8.	MD3762	Medical Electronics System Design Laboratory	PCC	0	0	3	3	1.5
9.	MD3743	Hospital Equipment Training [#]	EEC	0	0	0	0	1
				20	0	5	25	20.5

*Open Elective (Shall be chosen from the list of open electives offered by other Programmes).

& Mandatory Course-II is a Non-credit Course (Student shall select one course from the list given under Mandatory Course-II)

[#] Hospital Training (2 weeks)

SEMESTER VIII								
S.No	Course Code	Course Title	Category	Contact Periods				C
				L	T	P	Total	
PRACTICAL								
1.	MD3841	Project Work	EEC	0	0	20	20	10
				0	0	20	20	10

TOTAL NO. OF CREDITS: 165

MANAGEMENT – ELECTIVE

S.No	Course Code	Course Title	Category	Contact Periods				C
				L	T	P	Total	
1.	MAN101	Principles of Management	HSMC	2	0	0	2	2
2.	MAN102	Total Quality Management	HSMC	2	0	0	2	2
3.	MAN103	Human Resources Management	HSMC	2	0	0	2	2
4.	MAN104	Entrepreneurship Development	HSMC	2	0	0	2	2

MANDATORY COURSES – I

S.No	Course Code	Course Title	Category	Contact Periods				C
				L	T	P	Total	
1.	MBA101	Introduction to Gender Studies	MC	3	0	0	3	0
2.	MEN101	Elements of Literature	MC	3	0	0	3	0
3.	MBA102	Patent Drafting for Beginners	MC	3	0	0	3	0
4.	MBA103	Industrial Psychology	MC	3	0	0	3	0
5.	MBA104	Indian Constitution	MC	3	0	0	3	0

MANDATORY COURSES – II

S.No	Course Code	Course Title	Category	Contact Periods				C
				L	T	P	Total	
1.	MGE201	Well Being with traditional Practices -Yoga, Ayurveda and Siddha	MC	3	0	0	3	0
2.	MGE202	History of Science and Technology in India	MC	3	0	0	3	0
3.	MCY201	Awareness of Cyber Security and Cyber Law	MC	3	0	0	3	0
4.	MME201	Industrial Safety	MC	3	0	0	3	0

PROFESSIONAL ELECTIVE COURSES - VERTICALS

Vertical I Bio Engineering	Vertical II Medical Device Innovation and Development	Vertical III Mechanics	Vertical IV Signal and Image Processing	Vertical V Communication	Verticals VI Advanced Health Care Devices
Biomaterials	Foundation Skills in integrated product Development	Biomechanics	Bio signal Processing	Communication Networks	Medical Expert Systems
Artificial Organs and Implants	Medical Device Design	Physiological Modeling	Speech Processing	Wireless Communication Techniques	Human Assist Devices
Biomedical Optics and Photonics	Patient safety, Standards and Ethics	Rehabilitation engineering	Biometrics	Wearable Devices	Critical Care Equipment
Neural Engineering	Hospital Waste Management	Assistive Technology	Bio MEMS	Medical Informatics	Advancement in Diagnostic and Therapeutic Equipment
Tissue Engineering	Medical Innovation and Entrepreneurship	Ergonomics	Brain Computer Interface and its applications	Telemedicine	Robotics in Medicine
Genetic Engineering	Rapid Prototyping	Haptics	Computer Vision	Virtual reality and Augmented Reality in Healthcare	Advancements in Healthcare Technology

Registration of Professional Elective Courses from Verticals:

Professional Elective Courses will be registered in Semesters V , VI and VII . These courses are listed in groups called verticals that represent a particular area of specialization / diversified group. Students are permitted to choose all the Professional Electives from a particular vertical or from different verticals. Further, only one Professional Elective course shall be chosen in a semester horizontally (row-wise). However, two courses are permitted from the same row, provided one course is enrolled in Semester V and another in semester VI.

The registration of courses for B.E./B.Tech (Honours) or Minor degree shall be done from Semester V to VIII. The procedure for registration of courses explained above shall be followed for the courses of B.E./B.Tech (Honours) or Minor degree also. For more details on B.E./B.Tech (Honours) or Minor degree refer to the Regulations 2023, Clause 19.

PROFESSIONAL ELECTIVE COURSES: VERTICALS

VERTICAL 1: BIO ENGINEERING								
S.No	Course Code	Course Title	Category	Contact Periods				C
				L	T	P	Total	
1.	PMD101	Biomaterials	PEC	3	0	0	3	3
2.	PMD102	Artificial Organs and Implants	PEC	3	0	0	3	3
3.	PMD103	Biomedical Optics and Photonics	PEC	3	0	0	3	3
4.	PMD104	Neural Engineering	PEC	3	0	0	3	3
5.	PMD105	Tissue Engineering	PEC	3	0	0	3	3
6.	PMD106	Genetic Engineering	PEC	3	0	0	3	3

VERTICAL 2: MEDICAL DEVICE INNOVATION AND DEVELOPMENT								
S.No	Course Code	Course Title	Category	Contact Periods				C
				L	T	P	Total	
1.	PME207	Foundation Skills in integrated Product Development	PEC	3	0	0	3	3
2.	PMD201	Medical Device Design	PEC	3	0	0	3	3
3.	PMD202	Patient safety, Standards and Ethics	PEC	3	0	0	3	3
4.	PMD203	Hospital Waste Management	PEC	3	0	0	3	3
5.	PMD204	Medical Innovation and Entrepreneurship	PEC	3	0	0	3	3
6.	PME208	Rapid Prototyping	PEC	3	0	0	3	3

VERTICAL 3: MECHANICS								
S.No	Course Code	Course Title	Category	Contact Periods				C
				L	T	P	Total	
1.	PMD301	Biomechanics	PEC	3	0	0	3	3
2.	PMD302	Physiological Modeling	PEC	3	0	0	3	3
3.	PMD303	Rehabilitation Engineering	PEC	3	0	0	3	3
4.	PMD304	Assistive Technology	PEC	3	0	0	3	3
5.	PMD305	Ergonomics	PEC	3	0	0	3	3
6.	PMD306	Haptics	PEC	3	0	0	3	3

VERTICAL 4: SIGNAL AND IMAGE PROCESSING								
S.No	Course Code	Course Title	Category	Contact Periods				C
				L	T	P	Total	
1.	PMD401	Bio signal Processing	PEC	3	0	0	3	3
2.	PEC203	Speech Processing	PEC	3	0	0	3	3
3.	PMD402	Biometrics	PEC	3	0	0	3	3
4.	PMD403	Bio MEMS	PEC	3	0	0	3	3
5.	PMD404	Brain Computer Interface and its Applications	PEC	3	0	0	3	3
6.	PCS505	Computer Vision	PEC	3	0	0	3	3

VERTICAL 5: COMMUNICATION								
S.No	Course Code	Course Title	Category	Contact Periods				C
				L	T	P	Total	
1.	PEC607	Communication Networks	PEC	3	0	0	3	3
2.	PMD501	Wireless Communication Techniques	PEC	3	0	0	3	3
3.	PMD502	Wearable devices	PEC	3	0	0	3	3
4.	PMD503	Medical Informatics	PEC	3	0	0	3	3
5.	PMD504	Telemedicine	PEC	3	0	0	3	3
6.	PMD505	Virtual Reality and Augmented Reality in Healthcare	PEC	3	0	0	3	3

VERTICAL 6: ADVANCED HEALTH CARE DEVICES								
S.No	Course Code	Course Title	Category	Contact Periods				C
				L	T	P	Total	
1.	PMD601	Medical Expert Systems	PEC	3	0	0	3	3
2.	PMD602	Human Assist Devices	PEC	3	0	0	3	3
3.	PMD603	Critical Care Equipment	PEC	3	0	0	3	3
4.	PMD604	Advancement in Diagnostic and Therapeutic Equipment	PEC	3	0	0	3	3
5.	PMD605	Robotics in Medicine	PEC	3	0	0	3	3
6.	PMD606	Advancements in Healthcare Technology	PEC	3	0	0	3	3

S. No.	Course Code	Course Title	Course Offering Department	Contact Periods				C
				L	T	P	Total	
1.	OAG101	Environment and Agricultural Engineering	Agri	3	0	0	3	3
2.	OAG102	Organic Farming for Sustainable Agricultural Production	Agri	3	0	0	3	3
3.	OAG103	Sustainable Development Through Indian Knowledge System	Agri	3	0	0	3	3
4.	OCE101	Air and Noise Pollution Control Engineering	Civil	3	0	0	3	3
5.	OCE102	Environmental Impact Assessment	Civil	3	0	0	3	3
6.	OCE103	Green Building Design	Civil	3	0	0	3	3
7.	OAD101	Foundation of Data Science	AI&DS	3	0	0	3	3
8.	OAD102	Open Source Software Tools	AI&DS	3	0	0	3	3
9.	OCS101	IoT and its Applications	CSE	3	0	0	3	3
10.	OCS102	Machine Learning with R	CSE	3	0	0	3	3
11.	OCS103	Tamil Computing	CSE	3	0	0	3	3
12.	OCY101	Cyber Forensic and Investigation	CYB	3	0	0	3	3
13.	OCY102	Social Media Security	CYB	3	0	0	3	3
14.	OEC101	Introduction to 5G Communication Networks	ECE	3	0	0	3	3
15.	OEC102	Introduction to Industrial IoT	ECE	3	0	0	3	3
16.	OEC103	Arduino Programming and its applications	ECE	3	0	0	3	3
17.	OEE101	Renewable Energy Sources	EEE	3	0	0	3	3
18.	OEE102	Energy Conservation and Management	EEE	3	0	0	3	3
19.	OEE103	Electric and Hybrid Vehicles	EEE	3	0	0	3	3
20.	OEI101	Fundamentals of Robotics	EIE	3	0	0	3	3
21.	OEI102	Sensors for Engineering Applications	EIE	3	0	0	3	3
22.	OIT101	Multimedia Technologies	IT	3	0	0	3	3
23.	OIT102	3D Printing and its Applications	IT	3	0	0	3	3
24.	OIT103	Web Frameworks	IT	3	0	0	3	3
25.	OME101	Refrigeration and Air Conditioning	MECH	3	0	0	3	3
26.	OME102	Advanced Manufacturing Processes	MECH	3	0	0	3	3
27.	OME103	Material Testing and Characterization	MECH	3	0	0	3	3
28.	OME104	Hazardous Waste Management	MECH	3	0	0	3	3

29.	OME105	Automotive Engineering	MECH	3	0	0	3	3
30.	OCH101	Nanomaterials and applications	CHE	3	0	0	3	3
31.	OPH101	Advanced Functional Materials	PHY	3	0	0	3	3

(Students shall choose the open elective courses, such that the course contents are not similar to any other course contents/title under other course categories).

SUMMARY

SL NO.	SUBJECT AREA	CREDIT AS PER SEMESTER								CREDITS TOTAL	%
		I	II	III	IV	V	VI	VII	VIII		
1.	HSMC	5	4				2	2		12	7.27%
2.	BSC	12	12	3	2	2				31	18.78%
3.	ESC	5	8	9						22	13.33%
4.	PCC			10	19	16	10.5	8.5		64	38.78%
5.	PEC					6	6	6		18	10.90%
6.	PCD		1#								
7.	OEC							3		3	1.81%
8.	EEC						3	1	10	15	9.09%
9.	Non-Credit (Mandatory)						√	√			
	TOTAL	22	24	22	21	24	21.5	20.5	10	165	100%

TOTAL NO. OF CREDITS: 165

**COURSES IN MINOR DEGREE
OFFERED BY DEPARTMENT OF MANAGEMENT STUDIES
DEPARTMENT OF AGRICULTURAL ENGINEERING
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
FOR B.E / B.TECH (HONOURS) / OPTIONAL COURSES (R2023)**

ENROLLMENT FOR B.E. / B. TECH. (HONOURS) / MINOR DEGREE (OPTIONAL)

Enrolment for B.E. / B. Tech. (Honours) / Minor degree (Optional) A student can also optionally register for additional courses (18 credits) and become eligible for the award of B.E./B.Tech. (Honours) Minor degree. For B.E. / B. Tech. (Honours), a student shall register for the additional courses (18 credits) from semester V onwards. These courses shall be from the same vertical or a combination of different verticals of the same programme of study only. For minor degree, a student shall register for the additional courses (18 credits) from semester V onwards. All these courses have to be in a particular vertical from any one of the other programmes, Moreover, for minor degree the student can register for courses from any one of the following verticals also. Complete details are available in clause 19 of Regulations 2023.

VERTICALS FOR MINOR DEGREE (In addition to all the verticals of other programmes)

VERTICAL I	VERTICAL II	VERTICAL III	VERTICAL IV	VERTICAL V
Fintech and Block Chain	Entrepreneurship	Public Administration	Business Data Analytics	Environment and Sustainability
Financial Management	Foundations of Entrepreneurship	Principles of Public Administration	Statistics for Management	Sustainable infrastructure Development
Fundamentals of Investment	Team Building and Leadership Management	Constitution of India	Data mining for Business Intelligence	Sustainable Agriculture and Environmental Management
Banking, Financial Services and Insurance	Creativity and Innovation in Entrepreneurship	Public Personnel Administration	Human Resource Analytics	Sustainable Bio Materials
Introduction to Block chain and its Applications	Principles of Marketing Management for Business	Administrative Theories	Marketing and Social Media Web Analytics	Materials for Energy Sustainability
Fintech Personal Finance and Payments	Human Resource Management for Entrepreneurs	Indian Administrative System	Operation and Supply Chain Analytics	Green Technology
Introduction to Fintech	Financing New Business Ventures	Public Policy Administration	Financial Analytics	Environmental Quality Monitoring and Analysis

VERTICAL I: FINTECH AND BLOCKCHAIN								
S.No	Course Code	Course Title	Category	Contact Periods				C
				L	T	P	Total	
1	BAM101	Financial Management	PEC	3	0	0	3	3
2	BAM102	Fundamentals of Investment	PEC	3	0	0	3	3
3	BAM103	Banking, Financial Services and Insurance	PEC	3	0	0	3	3
4	CSM101	Introduction to Blockchain and its Applications	PEC	3	0	0	3	3
5	BAM104	Fintech Personal Finance and Payments	PEC	3	0	0	3	3
6	BAM105	Introduction to Fintech	PEC	3	0	0	3	3

VERTICAL II: ENTREPRENEURSHIP								
S.No	Course Code	Course Title	Category	Contact Periods				C
				L	T	P	Total	
1	BAM201	Foundations of Entrepreneurship	PEC	3	0	0	3	3
2	BAM202	Team Building and Leadership Management for Business	PEC	3	0	0	3	3
3	BAM203	Creativity & Innovation in Entrepreneurship	PEC	3	0	0	3	3
4	BAM204	Principles of Marketing Management for Business	PEC	3	0	0	3	3
5	BAM205	Human Resource Management for Entrepreneurs	PEC	3	0	0	3	3
6	BAM206	Financing New Business Ventures	PEC	3	0	0	3	3

VERTICAL III: PUBLIC ADMINISTRATION								
S.No	Course Code	Course Title	Category	Contact Periods				C
				L	T	P	Total	
1	BAM301	Principles of Public Administration	PEC	3	0	0	3	3
2	BAM302	Constitution of India	PEC	3	0	0	3	3
3	BAM303	Public Personnel Administration	PEC	3	0	0	3	3
4	BAM304	Administrative Theories	PEC	3	0	0	3	3
5	BAM305	Indian Administrative System	PEC	3	0	0	3	3
6	BAM306	Public Policy Administration	PEC	3	0	0	3	3

VERTICAL IV: BUSINESS DATA ANALYTICS								
S.No.	Course Code	Course Title	Category	Contact Periods				C
				L	T	P	Total	
1	BAM401	Statistics For Management	PEC	3	0	0	3	3
2	BAM402	Data Mining For Business Intelligence	PEC	3	0	0	3	3
3	BAM403	Human Resource Analytics	PEC	3	0	0	3	3
4	BAM404	Marketing And Social Media Web Analytics	PEC	3	0	0	3	3
5	BAM405	Operation And Supply Chain Analytics	PEC	3	0	0	3	3
6	BAM406	Financial Analytics	PEC	3	0	0	3	3

VERTICAL V: ENVIRONMENT AND SUSTAINABILITY								
S.No.	Course Code	Course Title	Category	Contact Periods				C
				L	T	P	Total	
1	AGM501	Sustainable infrastructure Development	PEC	3	0	0	3	3
2	AGM502	Sustainable Agriculture and Environmental Management	PEC	3	0	0	3	3
3	AGM503	Sustainable Bio Materials	PEC	3	0	0	3	3
4	AGM504	Materials for Energy Sustainability	PEC	3	0	0	3	3
5	AGM505	Green Technology	PEC	3	0	0	3	3
6	AGM506	Environmental Quality Monitoring and Analysis	PEC	3	0	0	3	3