



SRI MANAKULA VINAYAGAR ENGINEERING COLLEGE

(An Autonomous Institution)

(Approved by AICTE, New Delhi & Affiliated to Pondicherry University)
(Accredited by NBA-AICTE, New Delhi, ISO 9001:2000 Certified Institution &
Accredited by NAAC with "A" Grade)



Madagadipet, Puducherry - 605 107

Department of Mechatronics

Minutes of Sixth BoS Meeting

Venue

R&D Lab,
Mechanical Block
Sri Manakula Vinayagar Engineering College

Date & Time

19th July 2023
11:00 A.M.

2.A.8.1

THE UNIVERSITY OF CHICAGO
DEPARTMENT OF CHEMISTRY
5708 SOUTH CAMPUS DRIVE
CHICAGO, ILLINOIS 60637

RECEIVED

APR 10 1982

NAME

ADDRESS

CITY

STATE AND ZIP CODE

PHONE

TELETYPE

FAX

Q. A. 8. 2



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Department of Mechatronics

Minutes of Sixth Board of Studies Meeting

The Sixth Board of Studies meeting of Mechatronics Department was held on 19th July 2023 at 11:00 A.M in the R&D Lab, Sri Manakula Vinayagar Engineering College, with the Head of the Department in the Chair.

The following members were present for the BoS meeting

Sl.No	Name of the Member with Designation and official Address	Members as per UGC Norms
1	Dr. G. Balamuruga Mohan Raj Professor and Head Department of Mechatronics, SMVEC	Chairman
2	Dr.Shankar Krishnapillai, Professor, Indian Institute of Technology, Chennai – 600 036.	Subject Expert (University Nominee)
3	Dr.D.Dinakaran, Senior Technical Manager, Medical Division (Engg & Research), HCL, Sholinganallur	Subject Expert (Academic Council Nominee)
4	Dr.R.Parameshwaran, Professor, Kongu Engineering College, Erode – 638 606	Subject Expert (Academic Council Nominee)
5	Mr.P.Ramesh Managing Director, Switching Technologies Gunther Ltd., Tambaran, Chennai – 600045	Representative from Industry
6	Dr. A.G.Ganesh Kumar, M.E., Ph.D Professor/Mechanical	Internal Member
7	Prof. P. Ramesh Kumar, M.E, Assistant Professor/Mechatronics	Internal Member
8	Dr. R. Kurinjimalar, M.E., Ph.D., Associate Professor/ECE	Internal Member
9	Prof. Pushaparaj, M.E. Assistant Professor/ECE	Internal Member
10	Prof. N. Vijayan Assistant Professor / Mathematics	Internal Member

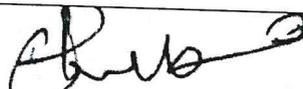
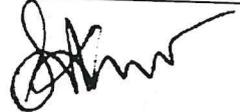
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11	Dr. A. Rajappa Associate Professor / Chemistry	Internal Member
12	Dr. M. A. Ishrath Jahan Associate Professor / English	Internal Member
13	Dr. T. Sivaranjani Associate Professor / Physics	Internal Member

AGENDA OF THE MEETING

Item No. : BOS / 2023/MCT/UG /6.1	
	Consideration of the confirmation of minutes of the previous meeting held on September 24 th 2022
Item No. : BOS / 2023/MCT/UG /6.2	
	Consideration of Regulations 2023 for the students to be admitted in the academic year 2023–24
Item No. : BOS / 2023/MCT/UG /6.3	
	Consideration of the review of feedback received from various stakeholders like Academic Expert, industry Experts, Alumni, and NGO, etc.,
Item No. : BOS / 2023/MCT/UG /6.4	
	Consideration of the revision of curriculum and syllabus of B.Tech. Mechatronics to be offered under Regulations 2023 to the students to be admitted for the academic year 2023–24
Item No. : BOS / 2023/MCT/UG /6.5	
	Consideration of the offering of Professional and Open electives for the curriculum and syllabus of B.Tech. Mechatronics to be offered under Regulations 2023
Item No. : BOS / 2023/MCT/UG /6.6	
	Consideration of revision of the list of panel of question paper setters and Examiners for the examinations of UG programs for the academic year 2023–24
Item No. : BOS / 2023/MCT/UG /6.7	
	To consider the various professional bodies, club activities, and department committees to monitor the Academic Activities
Item No. : BOS / 2023/MCT/UG /6.8	
	Any other item with the permission of the chair

2. A. 8.4

Sl.No	Name of the Member with Designation and official Address	Responsibility in the BoS	Signature
1	Dr. G. Balamuruga Mohan Raj Professor and Head Department of Mechatronics Engineering, SMVEC	Chairman	
External Members			
2	Dr.Shankar Krishnapillai, Professor, Indian Institute of Technology, Chennai – 600 036.	Pondicherry University Nominee	
3	Dr.D.Dinakaran, Professor, Hindustan Institute of Tech. & Science, Chennai – 103	Subject Expert	
4	Dr.R.Parameshwaran, Professor, Kongu Engineering College, Erode – 638 606	Subject Expert	
5	Mr.P.Ramesh Managing Director, Switching Technologies Gunther Ltd., Tambaran, Chennai – 600045	Industry Expert	
Internal Members			
6	Dr. A.G.Ganesh Kumar, M.E., Ph.D Professor	Member	
7	Prof. P. Ramesh Kumar, M.E, Assistant Professor	Member	
8	Dr. R. Kurinjimalar, M.E., Ph.D., Associate Professor	Member	

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Minutes of the Meeting

Dr. G. Balamuruga Mohan Raj, Chairman, BoS opened the meeting by welcoming the external members, the internal members and the meeting thereafter deliberated on agenda items that had been approved by the Chairman.

BOS/2023/MCT/UG/6.1: Chairman appraised the minutes of fifth Board of Study, its implementation and then it is confirmed with the approval for the incorporation.

BOS/2023/MCT/UG/6.2: Recommended to the Academic Council with the suggestion of CAT- III may be conducted for fourth and fifth unit of all courses in Regulations 2023 for the students to be admitted in the academic year 2023–24

BOS/2023/MCT/UG/6.3: Feedback received from various stakeholders like Academic Expert, industry Experts and Alumni, in Curriculum Advisory Committee was discussed.

BOS/2023/MCT/UG/6.4: The revision of First Year curriculum and syllabus of B.Tech. Mechatronics to be offered under Regulations 2023 to the students to be admitted for the academic year 2023–24 is discussed with following suggestions and it was given in Annexures – I, II, III and IV - *Approved and Recommended to the AC.*

Sl. No.	Regulations	Semester	Subject Name with Code	Unit	Particulars
1	R2023	II	Thermodynamics and Heat Transfer	V	Thermal Electronics may be added
2	R2023	II	All Courses	V	Application oriented Teaching needed

BOS/2023/MCT/UG/6.5: Professional and Open electives for the curriculum of B.Tech. Mechatronics to be offered under Regulations 2023 was discussed and Operations Research may be transferred to Professional Electives

BOS/2023/MCT/UG/6.6: The BoS Members Considered the panel of question paper setters and Examiners for the examinations of UG programs for the academic year 2023–24 in their respective department

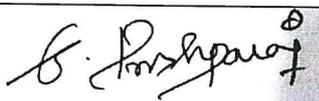
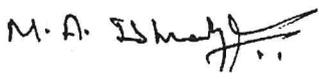
BOS/2023/MCT/UG/6.7: Appreciated the various professional bodies, club activities, and department committees to monitor the Academic Activities (3D Printing Machine made by our students)

The meeting was concluded with vote of thanks by Dr. G. Balamuruga Mohan Raj, Chairman, Board of Studies, Department of Mechatronics, Sri Manakula Vinayagar Engineering College.



Board Chairman
Dr. G. Balamuruga Mohan Raj
Professor and Head
Department of Mechatronics Engineering,

2.A.8.6

9	Prof. Pushaparaj, M.E. Assistant Professor	Member	
Co-opted Members			
10	Prof. N. Vijayan Assistant Professor / Mathematics	Member	
11	Dr. A. Rajappa Associate Professor / Chemistry	Member	
12	Dr. M. A. Ishrath Jahan Associate Professor / English	Member	
13	Dr. T. Sivaranjani Associate Professor / Physics	Member	

2.A.8.7

2.A.8.8



SRI MANAKULA VINAYAGAR
ENGINEERING COLLEGE
(An Autonomous Institution)

Puducherry

B.TECH. - MECHATRONICS

ACADEMIC REGULATIONS 2023
(R-2023)

CURRICULUM AND SYLLABI
Volume – I



2, A.8, 9

2.A.8.10

COLLEGE VISION AND MISSION

VISION

To be globally recognized for excellence in quality education, innovation and research for the transformation of lives to serve the society.

Mission

M1: Quality Education:

To provide comprehensive academic system that amalgamates the cutting edge technologies with best practices.

M2: Research and Innovation:

To foster value-based research and innovation in collaboration with industries and institutions globally for creating intellectuals with new avenues.

M3: Employability and Entrepreneurship:

To inculcate the employability and entrepreneurial skills through value and skill based training.

M4: Ethical Values:

To instill deep sense of human values by blending societal righteousness with academic professionalism for the growth of society.

DEPARTMENT VISION AND MISSION

VISION

To be a department with outstanding competencies in education and research in interdisciplinary field of Mechatronics Engineering for the prosperity of students and society.

MISSION

M1 - Quality Integration: To uphold excellence in education by integrating the teaching learning process with hands- on trainings in updated technologies.

M2 - Research Exploration: To maintain a dynamic balance between learning and research by encompassing activities related to Research, Industrial projects and Innovation Contests.

M3 – Personality Development: To enrich the team spirit and entrepreneurship skills through training programmes on personality development for career prospects.

M4 – Social Ethics: To enhance the principle of highest ethical values by inculcating code of conduct for the betterment of the Society.

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PROGRAMME OUTCOMES (POs)**PO1: Engineering knowledge:**

Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Problem analysis:

Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: 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 the public health and safety, and the cultural, societal, and environmental considerations.

PO4: 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.

PO5: Modern tool usage:

Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6: 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.

PO7: 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.

PO8: Ethics:

Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and team work:

Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communication:

Communicate effectively on complex engineering activities with the engineering community and with 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.

PO11: 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.

PO12: 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.

2. A. 8. 12

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)**PEO1: Strong Knowledge**

To provide comprehensive knowledge on Science, Mathematics & multiple Engineering disciplines, along-with the ability to apply the gained knowledge.

PEO2: Technical Competency

To produce graduates who can demonstrate technical competence in the field of **Mechatronics Engineering and develop solutions to the complex problems.**

PEO3: Task Orientation

To produce graduates who function effectively in a multi-disciplinary environment, individually and within a society towards accomplishing tasks.

PEO4: Team Work

To produce graduates who would be able to take individual responsibility and work as a part of a team towards the fulfillment of both individual and organizational goals.

PEO5: Professional Competency

To produce graduates with professional competence by life-long learning on advanced studies, professional skills and other professional activities related to Mechatronics Engineering society.

PROGRAM SPECIFIC OUTCOMES (PSOs)**PSO1: Understanding the Concepts**

To comprehend the concepts of Mechatronics and their applications in the field of Automated Manufacturing Systems, Robotics, Automobile Technology, Aerial vehicles and other relevant areas.

PSO2: Application of Knowledge

To apply technical knowledge in modern hardware and software tools related to Mechatronics for solving real world problems.

PSO3: Solution Development

To develop the ability to analyze, comprehend and design mechatronics subsystems for a variety of engineering applications for the benefits of society.

2. A. 8. 13

STRUCTURE FOR UNDERGRADUATE ENGINEERING PROGRAM

S.No	Course Category	Breakdown of Credits
1	Humanities Social Science and Management courses (HS)	15
2	Basic Sciences (BS)	20
3	Engineering Sciences (ES)	24
4	Professional Core (PC)	69
5	Professional Electives (PE)	18
6	Open Electives (OE)	09
7	Professional Activities (PA)	14
8	Ability Enhancement Courses (AEC*)	-
9	Mandatory courses (MC*)	-
Total		169

SCHEME OF CREDIT DISTRIBUTION – SUMMARY

Sl. No	Course Category	Credits per Semester								Total Credits
		I	II	III	IV	V	VI	VII	VIII	
1	Humanities Social Sciences and Management courses (HS)	3	5	1	1	2	-	-	3	15
2	Basic Sciences(BS)	7	4	5	4	-	-	-	-	20
3	Engineering Sciences (ES)	12	4	4	4	-	-	-	-	24
4	Professional Core (PC)	-	8	13	14	12	15	7	-	69
5	Professional Electives (PE)	-	-	-	-	3	3	6	6	18
6	Open Electives (OE)	-	-	-	-	3	3	3	-	09
7	Professional Activities (PA)	-	-	-	-	1	2	2	8	13
8	Professional Activities for Internship (PA)	-	-	-	-	-	-	1	-	1
8	Ability Enhancement Courses (AEC*)	-	-	-	-	-	-	-	-	-
10	Mandatory courses (MC*)	-	-	-	-	-	-	-	-	-
Total		22	21	23	23	21	23	19	17	169

* AEC and MC are not included for CGPA calculation

2.A.8.14

Sl. No.	Name of the Course	Credits	Prerequisites
1	Engineering Mathematics - I	4	None
2	Engineering Physics - I	4	None
3	Engineering Chemistry - I	4	None
4	Engineering Graphics	4	None
5	Engineering Mathematics - II	4	Engineering Mathematics - I
6	Engineering Physics - II	4	Engineering Physics - I
7	Engineering Chemistry - II	4	Engineering Chemistry - I
8	Engineering Mechanics	4	Engineering Mathematics - I
9	Engineering Materials	4	Engineering Chemistry - II
10	Engineering Computer Graphics	4	Engineering Graphics
11	Engineering Mathematics - III	4	Engineering Mathematics - II
12	Engineering Physics - III	4	Engineering Physics - II
13	Engineering Chemistry - III	4	Engineering Chemistry - II
14	Engineering Mechanics - II	4	Engineering Mechanics
15	Engineering Materials - II	4	Engineering Materials
16	Engineering Computer Graphics - II	4	Engineering Computer Graphics
17	Engineering Mathematics - IV	4	Engineering Mathematics - III
18	Engineering Physics - IV	4	Engineering Physics - III
19	Engineering Chemistry - IV	4	Engineering Chemistry - III
20	Engineering Mechanics - III	4	Engineering Mechanics - II
21	Engineering Materials - III	4	Engineering Materials - II
22	Engineering Computer Graphics - III	4	Engineering Computer Graphics - II
23	Engineering Mathematics - V	4	Engineering Mathematics - IV
24	Engineering Physics - V	4	Engineering Physics - IV
25	Engineering Chemistry - V	4	Engineering Chemistry - IV
26	Engineering Mechanics - IV	4	Engineering Mechanics - III
27	Engineering Materials - IV	4	Engineering Materials - III
28	Engineering Computer Graphics - IV	4	Engineering Computer Graphics - III
29	Engineering Mathematics - VI	4	Engineering Mathematics - V
30	Engineering Physics - VI	4	Engineering Physics - V
31	Engineering Chemistry - VI	4	Engineering Chemistry - V
32	Engineering Mechanics - V	4	Engineering Mechanics - IV
33	Engineering Materials - V	4	Engineering Materials - IV
34	Engineering Computer Graphics - V	4	Engineering Computer Graphics - IV
35	Engineering Mathematics - VII	4	Engineering Mathematics - VI
36	Engineering Physics - VII	4	Engineering Physics - VI
37	Engineering Chemistry - VII	4	Engineering Chemistry - VI
38	Engineering Mechanics - VI	4	Engineering Mechanics - V
39	Engineering Materials - VI	4	Engineering Materials - V
40	Engineering Computer Graphics - VI	4	Engineering Computer Graphics - V

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B.Tech. Mechatronics

11.8.A.6

ANNEXURE I

SEMESTER – I										
Sl. No.	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	U23MATC01	Engineering Mathematics - I	BS	3	1	0	4	25	75	100
2	U23BSTC01	Physical Science for Engineers	BS	3	0	0	3	25	75	100
3	U23CSTC01	Programming in C	ES	3	0	0	3	25	75	100
4	U23ESTC01	Basics of Civil and Mechanical Engineering	ES	3	0	0	3	25	75	100
5	U23ESTC02	Engineering Mechanics	ES	2	1	0	3	25	75	100
Theory cum Practical										
6	U23ENBC01	Communicative English - I	HS	2	0	2	3	50	50	100
Practical										
7	U23ESPC03	Engineering Graphics using AutoCAD	ES	0	0	2	1	50	50	100
8	U23CSPC01	Programming in C Laboratory	ES	0	0	2	1	50	50	100
9	U23ESPC02	Design Thinking and IDEA Lab	ES	0	0	2	1	50	50	100
Ability Enhancement Course										
10	U23MCC1XX	Certification Course - I**	AEC	0	0	4	-	100	-	100
Mandatory Course										
11	U23MCM101	Induction Programme	MC	2 Weeks			-	-	-	-
TOTAL							22	435	575	1000

SEMESTER – II										
Sl. No.	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	U23MATC02	Mathematics – II	BS	3	1	0	4	25	75	100
2	U23ESTC03	Basics of Electrical and Electronics Engineering	ES	3	0	0	3	25	75	100
3	U23MCT201	Manufacturing Technology	PC	3	0	0	3	25	75	100
4	U23MCT202	Thermodynamics and Heat Transfer	PC	3	0	0	3	25	75	100
5	U23HSTC01	Universal Human Values-II	HS	2	0	0	2	25	75	100
Theory cum Practical										
6	U23ENBC02	Communicative English - II	HS	2	0	2	3	50	50	100
Practical										
7	U23ESPC01	Basic Electrical and Electronics Engineering Laboratory	ES	0	0	2	1	50	50	100
8	U23MCP201	Thermal Engineering Laboratory	PC	0	0	2	1	50	50	100
9	U23MCP202	Manufacturing Technology Laboratory	PC	0	0	2	1	50	50	100
Ability Enhancement Course										
10	U23MCC2XX	Certification Course – II**	AEC	0	0	4	-	100	-	100
Mandatory Course										
11	U23MCM202	Sports, Yoga and NSS	MC	2	0	0	-	100	-	100
TOTAL							21	575	575	1100

Professional Electives are to be selected from the list given in Annexure I

\$ Open electives are to be selected from the list Annexure III

** Certification courses are to be selected from the list given in Annexure II

SEMESTER – III										
Sl. No.	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	U23MATC03	Probability and Statistics	BS	3	1	0	4	25	75	100
2	U23ADTC01	Programming in Python	ES	3	0	0	3	25	75	100
3	U23MCT303	Analog and Digital Electronics	PC	3	0	0	3	25	75	100
4	U23MCT304	Fluid Mechanics and Machinery	PC	3	0	0	3	25	75	100
5	U23MCT305	Sensors, Transducers and Measurement systems	PC	3	0	0	3	25	75	100
Theory cum Practical										
6	U23MCB306	Mechanics of Solids	PC	2	0	2	3	50	50	100
Practical										
7	U23MAPC01	Engineering Mathematics Laboratory	BS	0	0	2	1	50	50	100
8	U23ENPC01	General Proficiency - I	HS	0	0	2	1	50	50	100
9	U23ADTP01	Programming in Python Laboratory	ES	0	0	2	1	50	50	100
10	U23MCP303	Analog and Digital Electronics Laboratory	PC	0	0	2	1	50	50	100
Ability Enhancement Course										
11	U23MCC3XX	Certification Course – III**	AEC	0	0	4	-	100	-	100
12	U23MCS301	Skill Enhancement Course- I	SEC	0	0	2	-	100	-	100
Mandatory Course										
13	U23MCM303	Climate change	MC	2	0	0	-	100	-	100
TOTAL							23	675	695	1300

SEMESTER – IV										
Sl. No.	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	U23MATC04	Numerical Methods and Optimization	BS	3	1	0	4	25	75	100
2	U23CSTC03	Data Structures	ES	3	0	0	3	25	75	100
3	U23MCT407	Power Electronics and Drives	PC	3	0	0	3	25	75	100
4	U23MCT408	Microprocessors and controllers for Mechatronics Systems	PC	3	0	0	3	25	75	100
5	U23MCT409	Theory of Machines	PC	3	0	0	3	25	75	100
Theory cum Practical										
6	U23MCB410	IoT for Mechatronics	PC	2	0	2	3	50	50	100
Practical										
7	U23ENPC02	General Proficiency - II	HS	0	0	2	1	50	50	100
8	U23CSPC02	Data Structures Laboratory	ES	0	0	2	1	50	50	100
9	U23MCP404	Power Electronics and Drives Laboratory	PC	0	0	2	1	50	50	100
10	U23MCP405	Microprocessors and Controllers Laboratory	PC	0	0	2	1	50	50	100
Ability Enhancement Course										
11	U23MCC4XX	Certification Course – IV**	AEC	0	0	4	-	100	-	100

12	U23MCS402	Skill Enhancement Course- II	SEC	0	0	2	-	100	-	100
Mandatory Course										
13	U23MCM404	Right to Information and Good Governance	MC	2	0	0	-	100	-	100
TOTAL							23	675	695	1200

* Skill Enhancement Courses (I and II) are to be selected from the list given in Annexure III

SEMESTER – V										
Sl. No.	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	U23HSTC02	Research Methodology	HS	0	0	0	2	25	75	100
2	U23MCT511	PLC and Industrial Automation Systems	PC	3	0	0	3	25	75	100
3	U23MCT512	Fluid Power System	PC	3	0	0	3	25	75	100
4	U23MCT513	Control Systems for Mechatronics Systems	PC	3	0	0	3	25	75	100
5	U23MCE5XX	Professional Elective – I [#]	PE	3	0	0	3	25	75	100
6	U23MCO5XX	Open Elective - I ^{\$}	OE	3	0	0	3	25	75	100
Practical										
7	U23MCP506	Industrial Automation Laboratory	PC	0	0	2	1	50	50	100
8	U23MCP507	Virtual Instrumentation Laboratory	PC	0	0	2	1	50	50	100
9	U23MCP508	Fluid Power System Laboratory	PC	0	0	2	1	50	50	100
Project Work										
10	U23MCW501	Micro Project	PA	0	0	2	1	100	-	100
Ability Enhancement Course										
11	U23MCC5XX	Certification Course – V**	AEC	0	0	4	-	100	-	100
Mandatory Course										
13	U23MCM505	Essence of Indian Traditional Knowledge	MC	2	0	0	-	100	-	100
TOTAL							21	600	600	1200

SEMESTER – VI										
Sl. No.	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	U23MCT614	Computer Aided Manufacturing	PC	3	0	0	3	25	75	100
2	U23MCT615	Embedded System Design	PC	3	0	0	3	25	75	100
3	U23MCT616	Design of Mechanical Elements	PC	3	0	0	3	25	75	100
4	U23MCT617	Industrial Robotics	PC	3	0	0	3	25	75	100
5	U23MCE6XX	Professional Elective – II [#]	PE	3	0	0	3	25	75	100
6	U23MCO6XX	Open Elective - II ^{\$}	OE	3	0	0	3	25	75	100
Practical										
7	U23MCP609	Embedded System Design Laboratory	PC	0	0	2	1	50	50	100
8	U23MCP610	Computer Aided Manufacturing Laboratory	PC	0	0	2	1	50	50	100
9	U23MCP611	Industrial Robotics Laboratory	PC	0	0	2	1	50	50	100
Project Work										
10	U23MCW602	Mini Project	PA	0	0	2	1	100	-	100

Ability Enhancement Course										
11	U23MCC6XX	Certification Course – VI**	AEC	0	0	4	-	100	-	100
Mandatory Course										
12	U23MCM606	Gender Equality	MC	0	0	2	-	100		100
TOTAL							22	600	600	1200

SEMESTER – VII										
Sl. No.	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	U23MCT718	Automation in Manufacturing Systems	PC	3	0	0	3	25	75	100
2	U23MCT719	Design of Mechatronics System	PC	3	0	0	3	25	75	100
3	U23MCE7XX	Professional Elective - III [#]	PE	3	0	0	3	25	75	100
4	U23MCE7XX	Professional Elective - IV [#]	PE	3	0	0	3	25	75	100
5	U23MCO7XX	Open Elective - III ^{\$}	OE	3	0	0	3	25	75	100
Practical										
6	U23MCP712	Seminar	PC	0	0	2	1	100	-	100
Project Work										
7	U23MCW703	Project Phase – I	PA	0	0	4	2	50	50	100
8	U23MCW704	Internship / Inplant Training	PA	-	-	2	1	100	-	100
TOTAL							19	375	425	800

SEMESTER – VIII										
Sl. No.	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	U23HSTC03	Entrepreneurship and Business Management	HS	3	0	0	3	25	75	100
2	U23MCE8XX	Professional Elective – V [#]	PE	3	0	0	3	25	75	100
3	U23MCE8XX	Professional Elective – VI [#]	PE	3	0	0	3	25	75	100
Project Work										
4	U23MCW805	Project Phase – II	PA	0	0	16	8	50	100	150
Total							17	125	325	450

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B.Tech. Mechatronics

ANNEXURE II
PROFESSIONAL ELECTIVE AND OPEN ELECTIVE COURSES

Professional Elective – I (Offered in Semester V)		
Sl. No.	Course Code	Course Title
1	U23MCE501	Computer Integrated Manufacturing
2	U23MCE502	Image Processing and Computer Vision
3	U23MCE503	Computer Network and Cyber Security
4	U23MCE504	Autonomous Mobile Robots
5	U23ICEC01	Virtual Instrumentation
Professional Elective – II (Offered in Semester VI)		
Sl. No.	Course Code	Course Title
1	U23MCE606	Heating Ventilation and Air-Conditioning
2	U23ECEC02	Consumer Electronics
3	U23MCE608	Introduction to Data Science
4	U23MCE609	Robot Process Automation
5	U23MCE610	Computer Vision using Python
Professional Elective – III (Offered in Semester VII)		
Sl. No.	Course Code	Course Title
1	U23MCE711	Sustainable Manufacturing
2	U23ECEC04	Automotive Electronics Systems
3	U23MCE713	Data Communication and Network Systems
4	U23MCE714	Drone Technologies
5	U23MCE715	Artificial Intelligence and Machine Learning
Professional Elective – IV (Offered in Semester VII)		
Sl. No.	Course Code	Course Title
1	U23MCE716	Operations Research
2	U23MCE717	Product Lifecycle Management
3	U23MCE718	Data Security and Privacy
4	U23MCE719	Underwater Robots
5	U23MCE720	Product Design and Development
Professional Elective – V (Offered in Semester VIII)		
Sl. No.	Course Code	Course Title
1	U23MCE821	Unconventional Machining processes
2	U23MCE822	Automation Techniques & Tools – DevOps
3	U23MCE823	Database Management Systems
4	U23ECEC02	Wireless Sensor Networks
5	U23ITEC05	Virtual Reality and Augmented Reality
Professional Elective – VI (Offered in Semester VIII)		
Sl. No.	Course Code	Course Title
1	U23MCE826	Non Destructive Testing
2	U23MCE827	Supply Chain Management
3	U23MCE828	Building Automation
4	U23MCE829	Robots and Systems in Smart Manufacturing
5	U23MCE830	Introduction to NLP

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Open Electives		
1	U23MCO501	Computer Integrated Manufacturing
2	U23MCO502	Automation in Manufacturing
3	U23MCO603	Non-Destructive Testing
4	U23MCO604	Building Automation
5	U23MCO705	Robots and Systems in Smart Manufacturing
6	U23MCO706	Unconventional Machining processes

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U23MCO501	Computer Integrated Manufacturing	3
U23MCO502	Automation in Manufacturing	3
U23MCO603	Non-Destructive Testing	3
U23MCO604	Building Automation	3
U23MCO705	Robots and Systems in Smart Manufacturing	3
U23MCO706	Unconventional Machining processes	3

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Annexure – III

EMPLOYABILITY ENHANCEMENT COURSES – (A) CERTIFICATION COURSES

Sl. No.	Course Code	Course Title
1	U23MCCX01	3ds Max
2	U23MCCX02	Advance Structural Analysis of Building using ETABS
3	U23MCCX03	Advanced Java Programming
4	U23MCCX04	Advanced Python Programming
5	U20MCCX05	Analog System Lab Kit
6	U23MCCX06	Android Medical App Development
7	U23MCCX07	Android Programming
8	U23MCCX08	ANSYS -Multiphysics
9	U23MCCX09	Artificial Intelligence
10	U23MCCX10	Artificial Intelligence and Edge Computing
11	U23MCCX11	Artificial Intelligence in Medicines
12	U23MCCX12	AutoCAD for Architecture
13	U20MCCX13	AutoCAD for Civil
14	U23MCCX14	AutoCAD for Electrical
15	U23MCCX15	AutoCAD for Mechanical
16	U23MCCX16	Azure DevOps
17	U23MCCX17	Basic Course on ePLAN
18	U23MCCX18	Basic Electro Pneumatics
19	U23MCCX19	Basic Hydraulics
20	U23MCCX20	Bio Signal and Image Processing Development System
21	U23MCCX21	Blockchain
22	U23MCCX22	Bridge Analysis
23	U20MCCX23	Building Analysis and Construction Management
24	U23MCCX24	Building Design and Analysis Using AECO Sim Building Designer
25	U23MCCX25	CATIA
26	U23MCCX26	CCNA (Routing and Switching)
27	U23MCCX27	CCNA (Wireless)
28	U23MCCX28	Cloud Computing
29	U23MCCX29	Computer Programming for Medical Equipments
30	U23MCCX30	Corel Draw
31	U23MCCX31	Creo (Modeling and Simulation)
32	U23MCCX32	Cyber Security
33	U23MCCX33	Data Science and Data Analytics
34	U23MCCX34	Data Science using Python
35	U23MCCX35	Data Science using R
36	U23MCCX36	Deep Learning
37	U23MCCX37	Design and Documentation using ePLAN Electric P8
38	U23MCCX38	Design of Biomedical Devices and Systems

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39	U23MCCX39	Digital Marketing
40	U23MCCX40	Digital Signal Processing Development System
41	U23MCCX41	DigSILENT Power Factory
42	U23MCCX42	Electro Hydraulic Automation with PLC
43	U23MCCX43	Embedded System using Arduino
44	U23MCCX44	Embedded System using C
45	U23MCCX45	Embedded System with IoT
46	U23MCCX46	ePLAN Data Portal
47	U23MCCX47	ePLAN Electric P8
48	U23MCCX48	ePLAN Fluid
49	U23MCCX49	ePLAN PPE
50	U23MCCX50	Fusion 360
51	U23MCCX51	Fuzzy Logic and Neural Networks
52	U23MCCX52	Google Analytics
53	U23MCCX53	Hydraulic Automation
54	U23MCCX54	Industrial Automation
55	U23MCCX55	Industry 4.0
56	U23MCCX56	Internet of Things
57	U23MCCX57	Introduction to C Programming
58	U23MCCX58	Introduction to C++ Programming
59	U23MCCX59	IoT using Python
60	U23MCCX60	Java Programming
61	U23MCCX61	Machine Learning
62	U23MCCX62	Machine Learning and Deep Learning
63	U23MCCX63	Machine Learning for Medical Diagnosis
64	U23MCCX64	Mechatronics
65	U23MCCX65	Medical Robotics
66	U23MCCX66	Microsoft Dynamics 365 ERP for HR , Marketing and Finance
67	U23MCCX67	Mobile Edge Computing
68	U23MCCX68	Modeling and Visualization using Micro station
69	U23MCCX69	MX Road
70	U23MCCX70	Photoshop
71	U23MCCX71	PLC
72	U23MCCX72	Pneumatics Automation
73	U23MCCX73	Project Management
74	U23MCCX74	Python Programming
75	U23MCCX75	Revit Architecture
76	U23MCCX76	Revit Inventor
77	U23MCCX77	Revit MEP
78	U23MCCX78	Robotics
79	U23MCCX79	Search Engine Optimization
80	U23MCCX80	Software Testing

MANUFACTURING TECHNOLOGY

L	T	P	C	Hrs
3	0	0	3	45

Course Objectives:

- To impart knowledge on casting technology and foundry shop
- To familiarize with various metal joining processes
- To discuss the mechanical deformation processes
- To impart knowledge on various non-metallic processes
- To learn about the various methods for processing plastic materials.

Course Outcomes

On successful completion of this course, the student will be able to

- CO1 Identify the suitable casting process as required. (K3)
- CO2 Select the required metal joining process. (K3)
- CO3 Understand the differences among various metal deformation processes. (K3)
- CO4 Choose the suitable metal removal process as per the requirement. (K3)
- CO5 Identify the best method for processing plastics. (K3)

UNIT I CASTING PROCESSES

(9 Hrs)

Introduction to Moulding and Moulding sand: Types, properties, preparation of dry and green sand molding. Pattern making: Pattern materials, types and allowances. Core making: Types of core, core materials, making of cores. Casting methods: Die casting, Centrifugal Castings, Investment Casting and Shell mold Casting.

Unit II JOINING PROCESSES

(9 Hrs)

Fusion welding processes - Types of Welding, Oxy-Acetylene Welding Equipment - Flame characteristics - Electric-Arc Welding, Electrodes, manual metal arc welding, Carbon Arc Welding, Inert-Gas Shielded Arc Welding, Tungsten Inert-Gas Welding (TIG), Gas Metal-Arc Welding (GMAW), Submerged Arc-Welding (SAW), Resistance Welding and its types - welding of dissimilar metals and applications-Welding Defects.

Unit III METAL FORMING PROCESSES

(9 Hrs)

Cold and Hot working: Rolling – Forging – Extrusion – Drawing – Sheet metal forming processes – High Energy Rate Forming Processes: Explosive Forming – Electro Hydraulic Forming – Electro Magnetic Forming.

Unit IV METAL MECHINING PROCESSES

(9 Hrs)

Mechanics of machinery–Chip formation–types of chips, orthogonal & oblique cutting–Tool wear–Tool life – Nomenclature of single point cutting tool & Twist drill bit – Effect of cutting fluids.

Unit V PROCESSING OF PLASTICS

(9 Hrs)

Types of Plastics – Types of Molding: Injection molding – Blow molding – Compression molding – Transfer molding – Thermoforming – Reinforced plastics.

Text Books:

1. Rao P N, 'Manufacturing Technology', Volume I & II, Tata McGraw Hill Publishing Company, New Delhi, Fifth Edition, 2018.
2. Sharma P C, 'A Text Book of Manufacturing – I', S Chand & Company Pvt Ltd, 2008.
3. Rajput R K, 'A Text Book of Manufacturing Technology', Laxmi Publications, New Delhi, 2nd edition, 2017.

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Reference Books:

1. Kaushish J P, 'Manufacturing Processes', Second Edition, PHI Learning Pvt. Ltd, 2013.
2. Kalpakjian S, Schmid R, 'Manufacturing Engineering and Technology', Seventh Edition, Pearson Education India Edition, 2013.
3. Adithan M, Gupta A B, 'Manufacturing Technology', New Age, Fifth Edition, 2012.
4. B S Nagendra Parashar, R K Mittal, 'Elements of Manufacturing Processes', Prentice Hall India Pvt. Ltd, 2003.
5. S K Hajra Choudry, 'Workshop Technology', Vol – I & II, Media Promoters and Publishers Pvt. Ltd, 2009.

Web References:

1. <https://nptel.ac.in/courses/112/107/112107219>
2. <https://nptel.ac.in/courses/112/105/112105127/>
3. <https://www.coursera.org/courses?query=manufacturing>
4. <https://www.udemy.com/topic/manufacturing/>
5. <https://www.linkedin.com/company/manufacturing-technology-inc>

Cos Mapping with POs and PSOs

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	3	2	3	-	1	-	-	-	-	3	3	3	3
2	3	3	3	2	3	-	1	-	-	-	-	3	3	3	3
3	3	3	3	2	3	-	1	-	-	-	-	3	3	3	3
4	3	3	3	2	3	-	1	-	-	-	-	3	3	3	3
5	3	3	3	2	3	-	1	-	-	-	-	3	3	3	3

Correlation Level: 1-Low, 2-Medium, 3- High

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THERMODYNAMICS AND HEAT TRANSFER

L	T	P	C	Hours
2	1	0	3	60

Objectives:

- To discuss first law of thermodynamics with respect to closed and open systems
- To impart the knowledge on second law of thermodynamics and entropy
- To teach the students to understand various modes of heat transfer in steady and transient condition.
- To discuss convective heat transfer in various systems.
- To describe radiation heat transfer for various geometries.

Course Outcomes

On successful completion of this course, the student will be able to

- CO1 Understand the basic concepts associated with the first law of thermodynamics.(K2)
- CO2 Understand the basic concepts associated with the second law of thermodynamics.(K2)
- CO3 Analyze steady state and transient heat conduction problems of real life Thermal systems.(K4)
- CO4 Understand the convective heat transfer problems in various thermal systems.(K2)
- CO5 Analyze radiation heat transfer problems in various thermal systems.(K4)

UNIT I –BASIC CONCEPTS AND FIRST LAW OF THERMODYNAMICS

Thermodynamic systems, concepts of continuum, basic definitions, heat and work, zeroth law, First law, SFEE, First Law for closed and open systems. (12 Hrs)

UNIT II - SECOND LAW OF THERMODYNAMICS

Second law of thermodynamics Statements, reversibility, causes of irreversibility, Carnot cycle, reversed Carnot cycles. Thermodynamic Temperature Scale, entropy, Clausius inequality (12 Hrs)

UNIT III - CONDUCTION

Introduction of heat transfer – conduction - convection and radiation – Laws – General equation of heat conduction – Derivation in Cartesian - cylindrical and spherical coordinates – One dimensional steady state heat conduction in simple geometries – plane wall - cylinder and sphere – Heat transfer composite walls - composite cylinders and composite spheres –Conduction with Internal Heat Generation – Extended Surfaces. (12 Hrs)

UNIT IV - CONVECTION

Boundary layer theory – Hydrodynamic and Thermal Boundary Layer- Dimensional Analysis-Flow over a flat– Flow over cylinders -spheres - tube bank – Internal flow through pipes in forced heat transfer – Natural convection in vertical - inclined and horizontal surfaces. (12 Hrs)

UNIT V - RADIATION

Radiation heat transfer –Thermal radiation – Laws of radiation – Black body concept – Gray body radiation - Emissive power – Radiation shape factor-radiation heat exchange between surfaces –Radiation Shields. (12 Hrs)

Text book:

1. Nag P. K., Engineering Thermodynamics, McGraw Hill Education India Pvt. Ltd, 2017.
2. Sachdeva R. C., Fundamentals of Heat and Mass Transfer, New Age International Publishers, 2017.
3. Rajput R K "A text book of Engineering Thermodynamics", S. Chand publishers, 2016

Reference books:

1. Moran and Shapairo, Principles of Engineering Thermodynamics, 8th Edition, Wiley, 2015
2. Yunus A. Cengel, Heat and Mass Transfer: Fundamentals and Applications, McGraw Hill Education, 2016.
3. Frank P. Incropera and David P. Dewitt, Incropera's principles of Heat and Mass Transfer, Wiley India Edition, 2018.
4. C. P. Kothandaraman and S. Subramanyan, Heat and Mass Transfer Data Book, Fifth Edition, New Age

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International Publishers, 2018.

5. Arora C.P, "Thermodynamics", 25th Reprint, McGraw-Hill, New Delhi, 2013.

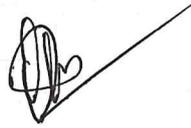
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1. <https://nptel.ac.in/courses/112105266/>
2. <https://nptel.ac.in/courses/112108148/>
3. <https://nptel.ac.in/courses/112/103/112103275/>
4. <https://www.linkedin.com/company/heat-transfer-and-process-design-htpd>
5. <https://www.udemy.com/course/an-introduction-to-heat-transfer/>

Cos Mapping with POs and PSOs

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	2	2	2	-	-	-	-	-	-	3	2	2	1
2	3	2	2	2	2	-	-	-	-	-	-	3	2	2	1
3	3	2	3	3	2	-	-	-	-	-	-	3	2	2	1
4	3	2	3	3	-	-	-	-	-	-	-	3	2	2	1
5	3	2	3	3	-	-	-	-	-	-	-	3	2	2	1

Correlation Level: 1-Low, 2-Medium, 3- High



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