VIGNAN'S
Foundation for Science, Technology & Research
(Deemed to be University)
Estd. u/s 3 of UGC Act 1956

DEPARTMENT OF MECHANICAL ENGINEERING

Date: 25.06.2022

Minutes of Board of Studies Meeting

Board of Studies (BoS) meeting of B.Tech., Robotics and Automation Engineering programme was conducted on 25.06.2022 in blended mode from 9.30 am to 1.00 pm. The venue of the meeting is AGF-06, Seminar Hall, Department of Mechanical Engineering, U-Block, VFSTR, Vadlamudi.

The ZOOM online link for the meeting is https://us02web.zoom.us/j/85379839604?pwd=R_3nE1FNgPLXnw7jztAc-9HMfRKsEq.1.

Agenda of the BoS Meeting:

1. To Discuss and finalize the curriculum structure and detailed syllabus of B.Tech., Robotics and Automation Engineering Programme for the regulation 2022.
2. To approve the R22 curriculum and syllabus of B.Tech., Robotics and Automation Engineering Programme and recommend to the Academic council.
3. Any other points with the permission of Chairperson.

The following members were present either through offline or online.

S.No	Name and Designation of the members	Position	Signature
1	Dr. L S Raju, Professor and Head of the Department	Chairperson	
2	Mr. Suroju Ramakrishna, Principal Consultant, Tech Mahindra, Pune	External Member (Industry)	Attended in online mode
3	Dr. Jayabal K, Associate Professor, Department of Mechanical Engineering, IIITDM, Kancheepuram	External Member (Academic)	Attended in online mode
4	Dr. M Ramakrishna, Professor	Member	
5	Dr. K Venkat Rao, Professor and Dean R&D Nominee	Member	
6	Dr. D Satyanarayana, Professor	Member	
7	Dr. B Nageswara Rao, Professor	Member	
8	Dr. K Balamurugan, Professor	Member	
9	Dr. G Suresh, Associate Professor	Member	
10	Dr. D Vinay Kumar, Associate Professor	Member	
11	Mr. T Ch Anil Kumar, Assistant Professor	Member	
12	Dr. Sk Farooq, Assistant Professor, School Dean Nominee	Member	
13	Mr. N B Prakash T, Assistant Professor, HoD Nominee	Member Secretary	

The following members have taken leave of absence:

1. Dr. D Benny Karunakar, Associate Professor, Department of Mechanical and Industrial Engineering, IIT Roorkee - External Member (Academic)
2. Mr. Subrata Karmakar, President-Head, Robotics and Discrete Automation Business, ABB India Ltd., Bengaluru, Karnataka - External Member (Industry)

Chairperson Dr. L S Raju, Professor and Head, department of Robotics and Automation Engineering, VFSTR opened the meeting by welcoming and introducing the external members, invitees to the internal members. Chairperson presented about the *NEP 2020 Compliant Regulation - R22* which emphasis on creating *learning centric* (continuous learning and continuous assessment model), offering B.Tech., B.Tech. with Honours/ Research Honours/ Minor/ Add-on Diploma, *Dual degree* (B.Tech. + M.Tech./MBA, or M.Tech. + Ph.D.), providing multiple entry and multiple exits.

The following points were discussed in the BoS meeting:

1. Regulation R22.
2. Curriculum structure with credits, credits distribution.
3. 2 Modules instead of 5 units.
4. Assessment methods (Formative & Summative).
5. Grading Schemes.
6. Department pool of Electives.
7. Minor / Honor courses.
8. Open Electives.

The following resolutions made after the discussion:

1. BoS Members approved the revised regulations, curriculum structure, syllabus of B.Tech., Robotics and Automation Engineering programme and it follows based on the NEP 2020. Curriculum structure is provided in Appendix-I.
2. Major restructuring has taken place in the curriculum which is oriented towards continuous learning and assessment based on Module structure.
3. Major reformation has taken place in the curriculum by offering Honours/Specialization degree or Minor degree thorough 20 more credits with additional courses.
4. The curriculum is encompassing the courses that enable employability or entrepreneurship or skill development, provided in Appendix- II.
5. The significant changes are made in the content of all courses and hence the courses are considered as new courses provided in Appendix- III.
6. Total average percentage of syllabus revised was 69.26% compared to previous curriculum

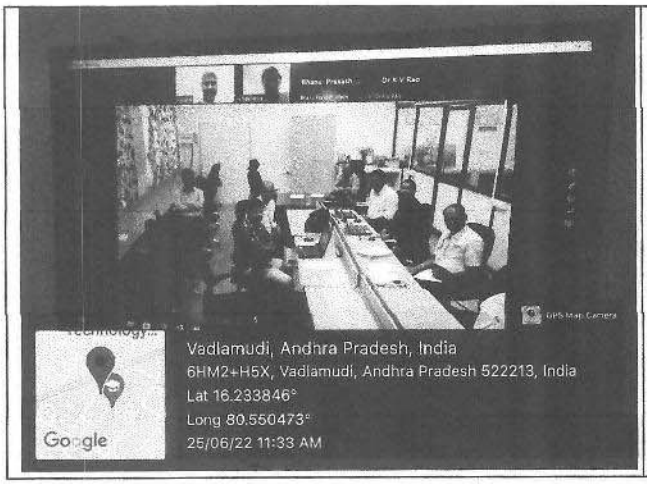
Based on the suggestions given by the members, the Chairperson of BoS told that, those fruitful suggestions would be incorporated appropriately in the curriculum and syllabi of the regulation R22 and this will be recommended to the Academic Council of VFSTR for the approval.

There being no further points for discussion, the Chairperson thanks all the external, internal, invited members and announced that the meeting was adjourned.

Member Secretary

Dr. L.S. Raju., Ph.D.
Professor & Head
Dept. of Mechanical Engineering
VFSTR (Deemed to be University)
Vadlamudi, Guntur
Andhra Pradesh-522 213.

Chairperson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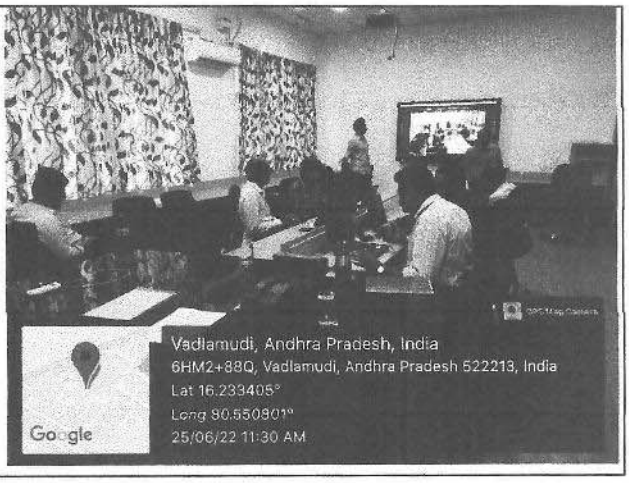
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DEPARTMENT OF MECHANICAL ENGINEERING

APPENDIX I

B. Tech in Robotics and Automation Engineering Programme: Curriculum Structure

I Year I Semester

Sl. No.	Course Title	L	T	P	C	Remarks	Offered by Dept. of
1.	Linear Algebra and Ordinary Differential Equations	3	2	-	4	Basic Sciences	Mathematics
2.	Engineering Physics	2	-	2	3	Basic Sciences	Physics
3.	Basic of Electrical and Electronics Engineering	2	-	2	3	Basic Engineering	EEE
4.	IT Workshop and Robotic Engineering Products	1	-	4	3	Basic Engineering	MECH
5.	Programming in C	2	-	4	4	Basic Engineering	T&P
6.	English Proficiency and Communication Skills	-	-	2	1	Humanities	English
7.	Physical Fitness, Sports & Games – I	-	-	3	1	Binary grade	Physical Education
8.	Constitution of India	-	2	-	1	Binary grade	T&P
	Total	**10**	**4**	**17**	**20**		
		31 hr					

I Year II Semester

Sl. No.	Course Title	L	T	P	C	Remarks	Offered by Dept. of
1.	Partial Differential equations and Vector Calculus	3	2	-	4	Basic Sciences	Mathematics
2.	Engineering Chemistry	2	-	2	3	Basic science	Chemistry
3.	Engineering Graphics	2	-	2	3	Basic Engineering	MECH
4.	Coding Competency (Basic)	-	1	3	2	Basic Engineering	T&P
5.	Technical English Communication	2	-	2	3	Humanities	English
6.	Engineering Mechanics	3	2	-	4	Professional core	MECH
7.	Physical Fitness, Sports & Games – II	-	-	3	1	Binary grade	Physical Education
8.	**Orientation Session**	-	-	6	**3**	Binary grade	
	Total	12	5	18	**23**		
		35					

Department Subject is extension of Basic sciences

II Year I Semester

Sl. No.	Course Title	L	T	P	C	Remarks	Offered by Dept. of
1.	Probability and Statistics	3	2	-	4	Basic Sciences	Mathematics
2.	Environmental Studies	1	1	-	1	Basic Sciences	Chemistry
3.	Data Structures	2	2	2	4	Basic Engineering	T&P
4.	Management Science	2	2	-	3	Humanities	Management Studies
5.	Fundamentals of Robotics	2	2	2	4	Professional core	MECH
6.	Electric Motors for Robotics	2	2	2	4	Professional core	EEE
7.	Electronics for Automation	2	2		3	Professional core	ECE/AE
	Life Skills	-	-	2	1	Binary grade	
	Total	14	13	8	**24**		
	NCC/ NSS/ SAC/ E-cell/ Student Mentoring/ Social activities/ Publication with good impact factor (Only 2 students can claim 1 paper /patent). These credits maybe earned on or before the end of IV semester				**1**	Floating credits Binary grade	
	Total		**35**		**25**		

II Year II Semester

Sl. No.	Course Title	L	T	P	C	Remarks	Offered by Dept. of
1.	Coding Competency (Advanced)	-	-	2	1	Basic Engineering	T&P
2.	Professional Communication	-	-	2	1	Humanities	T&P
3.	Mobile Robotics	2	2	2	4	Professional core	MECH
4.	Robot Mechanisms	2	2	2	4	Professional core	MECH
5.	ROS Programming	1	2	2	3	Professional core	MECH
6.	Department Elective – 1	2	2		3	Department Elective	MECH
7.	Open Elective – 1	2	2		3	Open Elective	
8.	Life Skills	-	-	2	1	Binary grade	
	Total	**9**	**10**	**12**	**20**		
9.	**Minor / Honors – 1**	3	2		**4**		
	Total	**35**			**24**		

III Year I Semester

Sl. No.	Course Title	L	T	P	C	Remarks	Offered by Dept. of
1.	Soft Skills Lab	-	-	2	1	Humanities	T&P
2.	Planning and Navigation	2	2	2	4	Professional core	MECH
3.	Power Electronics	3		2	4	Professional core	EEE
4.	Automation in Manufacturing	2	2	2	4	Professional core	MECH
5.	Department Elective – 2	2	2		3	Department Elective	MECH
6.	Open Elective – 2	2	2		3	Open Elective	
7.	Industry interface course (Modular course)	1			1	Binary Grades	INDUSTRY
	Inter-Departmental Project / Course	-	-	2	-	Project	MECH
	Total	12	8	10	**20**		
	NCC/ NSS/ SAC/ E-cell/ Student Mentoring/ Social activities/ Publication with good impact factor (Only 2 students can claim 1 paper /patent). These credits maybe earned on or before the end of VI semester				**1**	Floating credits Binary grade	
8.	**Minor / Honors – 2**	3	2		**4**		
			35		**25**		

III Year II Semester

Sl. No.	Course Title	L	T	P	C	Remarks	Offered by Dept. of
1.	Quantitative aptitude and Logical reasoning	1	2	-	2	Humanities	T&P
2.	Data Science for Engineers	2	2	2	4	Professional core	MECH
3.	Robot perception	2	2		3	Professional core	MECH
4.	Department Elective – 3	2	2		3	Department Elective	MECH
5.	Department Elective – 4	2	2		3	Department Elective	MECH
6.	Open Elective – 3	2	2		3	Open Elective	OTHERS
7.	Inter-Departmental Project/Course	-	-	2	2	Project	
	Total	**11**	**12**	**4**	**20**		
8.	**Minor / Honors – 3**	3	2		**4**		
	Total	14	14	4	**24**		
		32					

IV Year I Semester

Sl. No.	Course Title	L	T	P	C	Remarks	Offered by Dept. of
1.	Artificial Intelligence for Robotics	2	2	2	4	Professional core	MECH
2.	Industry 5.0	3	2		4	Professional core	MECH
3.	Department Elective – 5	2	2		3	Department Elective	MECH
4.	Department Elective – 6	2	2		3	Department Elective	MECH
5.	Department Elective – 7	2	2		3	Department Elective	MECH
6.	Department Elective – 8	2	2		3	Department Elective	MECH
	Total	13	12	2	**20**		
7.	**Minor / Honors – 4**	3	2		**4**		
	Total	16	14	4	**24**		
		34					

IV Year II Semester

Sl. No.	Course Title	L	T	P	C	Remarks	Offered by Dept. of
1.	Internship / Project Work		2#	22	12	Project	MECH
	Total				**12**		
2.	**Minor / Honors – 5**	3	2		**4**	**Theory course may be also offered**	
	Total	3	4	22	**16**		
		29					

for interaction between Guide and students

List of Department Elective Courses

Basket Name	Name of the course
Course-1	Failure Analysis
Course-2	Biomechanics
Course-3	Tribology
Course-4	Design and Fabrication of Composite Materials
Course-5	Computational Multibody Dynamics
Course-6	Value Engineering
Course-7	Asset Management
Course-8	Design of Smart Actuators
Course-9	3D Printing
Course-10	Automation and Advanced Manufacturing Processes
Course-11	Special Casting and Welding Technologies
Course-12	Digital Manufacturing
Course-13	IOT and Smart Manufacturing
Course-14	Modelling and Simulation of Manufacturing Systems
Course-15	Metrology and Surface Engineering
Course-16	Product Design for Manufacturing
Course-17	Industrial Engineering and Estimating & Costing
Course-18	Industrial Engineering and Production Management
Course-19	Industrial Economics
Course-20	Composite Materials
Course-21	Ceramics, Polymers and Smart Materials
Course-22	Nano material synthesis and Characterization Techniques
Course-23	Environmental Degradation and Bio Materials
Course-24	Electronics and Aerospace Materials
Course-25	Flexible Manufacturing Systems
Course-26	Legged Robots
Course-27	RPA in Industry

List of Open Elective Courses

Basket Name	Stream-1 (Name of the stream)
Course-1	Robotics for Engineers
Course-2	Autonomous Aerial Vehicles
Course-3	Condition Monitoring of Engineering Systems

List of Honour/Specialization Courses

Basket Name	Product Design
Course-1	Mechanics of Materials
Course-2	Design of Machine Members
Course-3	Computer Aided Design and Manufacturing
Course-4	Finite Element Methods
Course-5	Product Life Cycle Management

List of Minor Courses

Basket Name	AI & MI for Industry	Robotics Engineering
Course-1	Mathematics for Machine Learning	Fundamentals of Robotics
Course-2	Soft Computing Techniques for AI	Mobile Robotics
Course-3	Data Analytics Using MI	Planning and Navigation
Course-4	Artificial Intelligence in Industry	ROS Programming
Course-5	Industry 5.0	Robotic Process Automation

Chairperson

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APPENDIX II

List of Courses that Enables Employability or Entrepreneurship or Skill Development

S. No.	Year and Semester	Course Title	Employability / Entrepreneurship / Skill development
1.	I Year I Semester	Linear Algebra and Ordinary Differential Equations	Skill development
2.	I Year I Semester	Engineering Physics	Skill development
3.	I Year I Semester	Basics of Electrical and Electronics Engineering	Skill development
4.	I Year I Semester	IT Workshop and Robotics Engineering Products	Skill development
5.	I Year I Semester	Programming in C	Employability
6.	I Year I Semester	English Proficiency and Communication Skills	Skill development
7.	I Year I Semester	Physical Fitness, Sports & Games – I	Skill development
8.	I Year I Semester	Constitution of India	Employability
9.	I Year II Semester	Partial Differential Equations and Vector Calculus	Skill development
10.	I Year II Semester	Engineering Chemistry	Skill development
11.	I Year II Semester	Engineering Graphics	Employability
12.	I Year II Semester	Coding Competency (Basic)	Employability
13.	I Year II Semester	Technical English Communication	Skill development
14.	I Year II Semester	Engineering Mechanics	Skill development
15.	I Year II Semester	Physical Fitness, Sports & Games – II	Skill development
16.	I Year II Semester	**Orientation Session**	Skill development
17.	II Year I Semester	Probability and Statistics	Skill development
18.	II Year I Semester	Environmental Studies	Skill development
19.	II Year I Semester	Data Structures	Employability
20.	II Year I Semester	Management Science	Entrepreneurship
21.	II Year I Semester	Fundamentals of Robotics	Employability
22.	II Year I Semester	Electric Motors for Robotics	Skill development
23.	II Year I Semester	Electronics for Automation	Skill development
24.	II Year I Semester	Life Skills	Skill development
25.	II Year I Semester	NCC/ NSS/ SAC/ E-cell/ Student Mentoring/ Social activities/ Publication	Skill development
26.	II Year II Semester	Coding Competency (Advanced)	Employability
27.	II Year II Semester	Professional Communication	Employability
28.	II Year II Semester	Mobile Robotics	Entrepreneurship

29.	II Year II Semester	Robot Mechanisms	Skill development
30.	II Year II Semester	ROS Programming	Skill development
31.	II Year II Semester	Life Skills	Skill development
32.	III Year I Semester	Soft Skills Lab	Skill development
33.	III Year I Semester	Planning and Navigation	Skill development
34.	III Year I Semester	Power Electronics	Skill development
35.	III Year I Semester	Automation in Manufacturing	Skill development
36.	III Year I Semester	Industry interface course (Modular course)	Employability
37.	III Year I Semester	Inter-Departmental Project	Skill development
38.	III Year I Semester	NCC/ NSS/ SAC/ E-cell/ Student Mentoring/ Social activities/ Publication	Skill development
39.	III Year II Semester	Quantitative aptitude & Logical reasoning	Employability
40.	III Year II Semester	Data Science for Engineers	Employability
41.	III Year II Semester	Robot perception	Employability
42.	III Year II Semester	Inter-Departmental Project/Course	Employability
43.	IV Year I Semester	Artificial Intelligence for Robotics	Skill development
44.	IV Year I Semester	Industry 5.0	Skill development
45.	IV Year II Semester	Internship / Project Work	Employability
46.		Failure Analysis	Skill development
47.		Biomechanics	Skill development
48.		Tribology	Employability
49.		Design and Fabrication of Composite Materials	Skill development
50.		Computational Multibody Dynamics	Employability
51.		Value Engineering	Employability
52.		Asset Management	Employability
53.		Design of Smart Actuators	Skill development
54.		3D Printing	Employability
55.		Automation and Advanced Manufacturing Processes	Skill development
56.		Special Casting and Welding Technologies	Skill development
57.		Digital Manufacturing	Skill development
58.		IOT and Smart Manufacturing	Skill development
59.		Modelling and Simulation of Manufacturing Systems	Skill development
60.		Metrology and Surface Engineering	Skill development
61.		Product Design for Manufacturing	Skill development
62.		Industrial Engineering and Estimating & Costing	Skill development
63.		Industrial Engineering and Production Management	Skill development
64.		Industrial Economics	Skill development
65.		Composite Materials	Skill development

66.		Ceramics, Polymers and Smart Materials	Skill development
67.		Nano material synthesis and Characterization Techniques	Skill development
68.		Environmental Degradation and Bio Materials	Skill development
69.		Electronics and Aerospace Materials	Skill development
70.		Legged Robots	Entrepreneurship
71.		RPA in Industry	Employability
72.		Robotics for Engineers	Skill development
73.		Autonomous Aerial Vehicles	Skill development
74.		Condition Monitoring of Engineering Systems	Employability
75.		Mechanics of Materials	Skill development
76.		Design of Machine Members	Skill development
77.		Computer Aided Design and Manufacturing	Employability
78.		Finite Element Methods	Employability
79.		Product Life Cycle Management	Skill development
80.		Mathematics for Machine Learning	Skill development
81.		Soft Computing Techniques for AI	Employability
82.		Data Analytics Using ML	Employability
83.		Artificial Intelligence in Industry	Skill development
84.		ROS Programming	Employability
85.		Robotic Process Automation	Employability

Chairperson

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DEPARTMENT OF MECHANICAL ENGINEERING

APPENDIX III

List of New Courses in the R22 Curriculum

S. No.	Year and Semester	Course Title	Employability / Entrepreneurship / Skill development
1.	I Year I Semester	Linear Algebra and Ordinary Differential Equations	Skill development
2.	I Year I Semester	Engineering Physics	Skill development
3.	I Year I Semester	Basics of Electrical and Electronics Engineering	Skill development
4.	I Year I Semester	IT Workshop and Robotics Engineering Products	Skill development
5.	I Year I Semester	Programming in C	Employability
6.	I Year I Semester	English Proficiency and Communication Skills	Skill development
7.	I Year I Semester	Physical Fitness, Sports & Games – I	Skill development
8.	I Year I Semester	Constitution of India	Employability
9.	I Year II Semester	Partial Differential Equations and Vector Calculus	Skill development
10.	I Year II Semester	Engineering Chemistry	Skill development
11.	I Year II Semester	Engineering Graphics	Employability
12.	I Year II Semester	Coding Competency (Basic)	Employability
13.	I Year II Semester	Technical English Communication	Skill development
14.	I Year II Semester	Engineering Mechanics	Skill development
15.	I Year II Semester	Physical Fitness, Sports & Games – II	Skill development
16.	I Year II Semester	**Orientation Session**	Skill development
17.	II Year I Semester	Probability and Statistics	Skill development
18.	II Year I Semester	Environmental Studies	Skill development
19.	II Year I Semester	Data Structures	Employability
20.	II Year I Semester	Management Science	Entrepreneurship
21.	II Year I Semester	Fundamentals of Robotics	Employability
22.	II Year I Semester	Electric Motors for Robotics	Skill development
23.	II Year I Semester	Electronics for Automation	Skill development
24.	II Year I Semester	Life Skills	Skill development
25.	II Year I Semester	NCC/ NSS/ SAC/ E-cell/ Student Mentoring/ Social activities/ Publication	Skill development
26.	II Year II Semester	Coding Competency (Advanced)	Employability
27.	II Year II Semester	Professional Communication	Employability
28.	II Year II Semester	Mobile Robotics	Entrepreneurship

29.	II Year II Semester	Robot Mechanisms	Skill development
30.	II Year II Semester	ROS Programming	Skill development
31.	II Year II Semester	Life Skills	Skill development
32.	III Year I Semester	Soft Skills Lab	Skill development
33.	III Year I Semester	Planning and Navigation	Skill development
34.	III Year I Semester	Power Electronics	Skill development
35.	III Year I Semester	Automation in Manufacturing	Skill development
36.	III Year I Semester	Industry interface course (Modular course)	Employability
37.	III Year I Semester	Inter-Departmental Project	Skill development
38.	III Year I Semester	NCC/ NSS/ SAC/ E-cell/ Student Mentoring/ Social activities/ Publication	Skill development
39.	III Year II Semester	Quantitative aptitude & Logical reasoning	Employability
40.	III Year II Semester	Data Science for Engineers	Employability
41.	III Year II Semester	Robot perception	Employability
42.	III Year II Semester	Inter-Departmental Project/Course	Employability
43.	IV Year I Semester	Artificial Intelligence for Robotics	Skill development
44.	IV Year I Semester	Industry 5.0	Skill development
45.	IV Year II Semester	Internship / Project Work	Employability
46.		Failure Analysis	Skill development
47.		Biomechanics	Skill development
48.		Tribology	Employability
49.		Design and Fabrication of Composite Materials	Skill development
50.		Computational Multibody Dynamics	Employability
51.		Value Engineering	Employability
52.		Asset Management	Employability
53.		Design of Smart Actuators	Skill development
54.		3D Printing	Employability
55.		Automation and Advanced Manufacturing Processes	Skill development
56.		Special Casting and Welding Technologies	Skill development
57.		Digital Manufacturing	Skill development
58.		IOT and Smart Manufacturing	Skill development
59.		Modelling and Simulation of Manufacturing Systems	Skill development
60.		Metrology and Surface Engineering	Skill development
61.		Product Design for Manufacturing	Skill development
62.		Industrial Engineering and Estimating & Costing	Skill development
63.		Industrial Engineering and Production Management	Skill development
64.		Industrial Economics	Skill development
65.		Composite Materials	Skill development

66.		Ceramics, Polymers and Smart Materials	Skill development
67.		Nano material synthesis and Characterization Techniques	Skill development
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70.		Legged Robots	Entrepreneurship
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75.		Mechanics of Materials	Skill development
76.		Design of Machine Members	Skill development
77.		Computer Aided Design and Manufacturing	Employability
78.		Finite Element Methods	Employability
79.		Product Life Cycle Management	Skill development
80.		Mathematics for Machine Learning	Skill development
81.		Soft Computing Techniques for AI	Employability
82.		Data Analytics Using ML	Employability
83.		Artificial Intelligence in Industry	Skill development
84.		ROS Programming	Employability
85.		Robotic Process Automation	Employability

Chairperson