Department of Mechatronics

Minutes of Eighth BoS Meeting

Venue

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

Date & Time

09th September 2024 10:00 A.M.



SRI MANAKULA VINAYAGAR



Department of Mechatronics

Minutes of Eighth Board of Studies Meeting

The Eighth Board of Studies meeting of Mechatronics Department was held on 09th September 2024 at 10:00 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

SI. No.	Name of the Member
1. Head	of the Department concerned (Chairperson)
	Dr. G.Balamuruga Mohan Raj, M.Tech., Ph.D., Professor and Head
	Specialization: Manufacturing
1	Years of Experience: 20
	Sri Manakula Vinayagar Engineering College
	hodmechatronics@smvec.ac.in
	9600989508
2. All fa	culty members of the Department
	Mr. S.Saravanan
2	Asst. Professor
	Specialization: Energy Technology
	Mr.P.Ramesh Kumar,
3	Asst. Professor
	Specialization: Manufacturing
4	Mr.S.Prakash,
4	Asst. Professor
	Specialization: Manufacturing
5	Mr.S.Jagan. Asst. Professor
5	Specialization: Energy Technology
77	Mr.S.Pushparaj
6	Asst. Professor
	Specialization: VLSI Design
	Mrs.S.Kalaimani
7	Asst. Professor
	Specialization: Embedded system Technologies
	Ms.M.Subitha
8	Asst.Professor
	Specialization: wireless communication
	Dr.T.Poovaragavan,
9	Assistant Professor
	Dept. of Mathematics

	Dr.Samuvel.K
10	Assistant Professor
10	
	Dept. of Physics,
11	Dr. Balamurugan.A
1.1	Assistant Professor
	Dept. of Chemistry,
3. Two	subject experts from outside the Parent University are nominated by the mic Council.
	Dr.B.Meenakshipriya
	Professor/ Mechatronics
W 100	
12	Kongu Engineering College,
	Perundurai, Erode – 638060
	E-Mail Id: bmp@kongu.ac.in; b.meenakshipriya@gmail.com
	Contact No: +91-9842799990, +91-9942699990
	Dr.RM.Kuppan Chetty,
	Professor/School of Mechanical Engineering
40	SASTRA Deemed to be University
13	Thanjavur. Tamil Nadu, 613 401.
	E-Mail Id: kuppanchetty@mech.sastra.edu; rmkuppan@gmail.com
	Contact No: 9444030759
	Specialization: Robotics
1 One	
4. One recomn	expert is nominated by the Vice-Chancellor from a panel of six nended by the Autonomous College Principal as a University Nominee.
4. One recomn	Dr.V.Sugumaran,
4. One recomn	Dr.V.Sugumaran, Professor,
recomn	Dr.V.Sugumaran, Professor, School of Mechanical Engg. & Building Sciences,
4. One recomn	Dr.V.Sugumaran, Professor, School of Mechanical Engg. & Building Sciences, VIT University – Chennai.
recomn	Dr.V.Sugumaran, Professor, School of Mechanical Engg. & Building Sciences, VIT University – Chennai. E-Mail Id: v_sugu@yahoo.com
recomn	Dr.V.Sugumaran, Professor, School of Mechanical Engg. & Building Sciences, VIT University – Chennai. E-Mail Id: v_sugu@yahoo.com Contact No: 9789923926
14	Dr.V.Sugumaran, Professor, School of Mechanical Engg. & Building Sciences, VIT University – Chennai. E-Mail Id: v_sugu@yahoo.com Contact No: 9789923926 Specialization: Production Engineering
14 5. One r	Dr.V.Sugumaran, Professor, School of Mechanical Engg. & Building Sciences, VIT University – Chennai. E-Mail Id: v_sugu@yahoo.com Contact No: 9789923926
14 5. One r	Dr.V.Sugumaran, Professor, School of Mechanical Engg. & Building Sciences, VIT University – Chennai. E-Mail Id: v_sugu@yahoo.com Contact No: 9789923926 Specialization: Production Engineering
14 5. One r	Dr.V.Sugumaran, Professor, School of Mechanical Engg. & Building Sciences, VIT University – Chennai. E-Mail Id: v_sugu@yahoo.com Contact No: 9789923926 Specialization: Production Engineering representative from industry/corporate sector/allied areas is nominated by cipal as a Industry Nominee Dr.D.Dinakaran, Senior Technical Manager
14 5. One r	Dr.V.Sugumaran, Professor, School of Mechanical Engg. & Building Sciences, VIT University – Chennai. E-Mail Id: v_sugu@yahoo.com Contact No: 9789923926 Specialization: Production Engineering representative from industry/corporate sector/allied areas is nominated by cipal as a Industry Nominee Dr.D.Dinakaran, Senior Technical Manager Medical Division (Engg & Research)
14 5. One r	Dr.V.Sugumaran, Professor, School of Mechanical Engg. & Building Sciences, VIT University – Chennai. E-Mail Id: v_sugu@yahoo.com Contact No: 9789923926 Specialization: Production Engineering representative from industry/corporate sector/allied areas is nominated by cipal as a Industry Nominee Dr.D.Dinakaran, Senior Technical Manager Medical Division (Engg & Research) HCL, Sholinganallur
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14 5. One r he Prin	Dr.V.Sugumaran, Professor, School of Mechanical Engg. & Building Sciences, VIT University – Chennai. E-Mail Id: v_sugu@yahoo.com Contact No: 9789923926 Specialization: Production Engineering epresentative from industry/corporate sector/allied areas is nominated by cipal as a Industry Nominee Dr.D.Dinakaran, Senior Technical Manager Medical Division (Engg & Research) HCL, Sholinganallur E-Mail Id: dinakaran@hindustanuniv.ac.in Contact No: 9443124007 Specialization:Tool Wear & neuro Fuzzy Modelling
14 5. One r he Prin	Dr.V.Sugumaran, Professor, School of Mechanical Engg. & Building Sciences, VIT University – Chennai. E-Mail Id: v_sugu@yahoo.com Contact No: 9789923926 Specialization: Production Engineering epresentative from industry/corporate sector/allied areas is nominated by cipal as a Industry Nominee Dr.D.Dinakaran, Senior Technical Manager Medical Division (Engg & Research) HCL, Sholinganallur E-Mail Id: dinakaran@hindustanuniv.ac.in Contact No: 9443124007 Specialization:Tool Wear & neuro Fuzzy Modelling member of the College alumni is nominated by the Principal.
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14 5. One r he Prin	Dr.V.Sugumaran, Professor, School of Mechanical Engg. & Building Sciences, VIT University – Chennai. E-Mail Id: v_sugu@yahoo.com Contact No: 9789923926 Specialization: Production Engineering representative from industry/corporate sector/allied areas is nominated by cipal as a Industry Nominee Dr.D.Dinakaran, Senior Technical Manager Medical Division (Engg & Research) HCL, Sholinganallur E-Mail Id: dinakaran@hindustanuniv.ac.in Contact No: 9443124007 Specialization:Tool Wear & neuro Fuzzy Modelling member of the College alumni is nominated by the Principal. A.Baranidharan Associate System Engineer,
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14 5. One rhe Prin 15	Dr.V.Sugumaran, Professor, School of Mechanical Engg. & Building Sciences, VIT University – Chennai. E-Mail Id: v_sugu@yahoo.com Contact No: 9789923926 Specialization: Production Engineering epresentative from industry/corporate sector/allied areas is nominated by cipal as a Industry Nominee Dr.D.Dinakaran, Senior Technical Manager Medical Division (Engg & Research) HCL, Sholinganallur E-Mail Id: dinakaran@hindustanuniv.ac.in Contact No: 9443124007 Specialization:Tool Wear & neuro Fuzzy Modelling nember of the College alumni is nominated by the Principal. A.Baranidharan Associate System Engineer, TCS Bangalore, Contact No:9087965798 E-Mail Id:: vtc1516003@gmail.com, Specialization:B.Tech Mechatronics Its from outside the Autonomous College, whenever special courses of
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14 5. One rihe Prin	Dr.V.Sugumaran, Professor, School of Mechanical Engg. & Building Sciences, VIT University – Chennai. E-Mail Id: v_sugu@yahoo.com Contact No: 9789923926 Specialization: Production Engineering epresentative from industry/corporate sector/allied areas is nominated by cipal as a Industry Nominee Dr.D.Dinakaran, Senior Technical Manager Medical Division (Engg & Research) HCL, Sholinganallur E-Mail Id: dinakaran@hindustanuniv.ac.in Contact No: 9443124007 Specialization:Tool Wear & neuro Fuzzy Modelling nember of the College alumni is nominated by the Principal. A.Baranidharan Associate System Engineer, TCS Bangalore, Contact No:9087965798 E-Mail Id:: vtc1516003@gmail.com, Specialization:B.Tech Mechatronics Its from outside the Autonomous College, whenever special courses of

Department of Mechatronics, School of Mechanical Sciences,

VIT University - Chennai

E-Mail Id: jegadeeshwaran.r@vit.ac.in

Contact: 9865338366

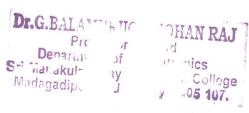
Specialization: Neuro Fuzzy Modelling & Fault Diagnosis

Jul 6

AGENDA OF THE MEETING

	About College infrastructure facilities, Achievements, Awards and recognitions.
Item I	No. : BOS / 2024/MCT/UG /8.2
	Consideration of the confirmation of minutes of the previous meeting held or 27 th February 2024
Item I	lo. : BOS / 2024/MCT/UG /8.3
	Consideration of the revision of curriculum and syllabus of 5 th and 6 th semester of
	the B.Tech. Mechatronics and under Regulations 2023 to the students admitted
	from the academic year 2023–24
Item N	lo.: BOS / 2024/MCT/UG /8.4
	Consideration of Professional and Open electives of B.Tech. Mechatronics to be offered under Regulations 2023
ltem N	Consideration of Professional and Open electives of B.Tech. Mechatronics to be offered under Regulations 2023 o.: BOS / 2024/MCT/UG /8.5
ltem N	offered under Regulations 2023 o.: BOS / 2024/MCT/UG /8.5
	offered under Regulations 2023 o.: BOS / 2024/MCT/UG /8.5 Consideration of the various professional bodies, club activities. Skill
	o.: BOS / 2024/MCT/UG /8.5 Consideration of the various professional bodies, club activities, Skill Development Courses of the Academic Activities o.: BOS / 2024/MCT/UG /8.6
	o.: BOS / 2024/MCT/UG /8.5 Consideration of the various professional bodies, club activities, Skill Development Courses of the Academic Activities
ltem N	o.: BOS / 2024/MCT/UG /8.5 Consideration of the various professional bodies, club activities, Skill Development Courses of the Academic Activities o.: BOS / 2024/MCT/UG /8.6 Consideration of revision of the list of panel of question paper setters and





Minutes of the Meeting

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

BOS/2022/MCT/UG/8.2: Chairman, BoS, apprised the minutes of Seventh BoS, its implementation is confirmed.

SI. No.	Regulations	Semester	Subject Name with Code	Particulars	Action Taken
1	R2023	Ш	Fluid Mechanics and Machinery U23MCT304	Few topics are modified(Unit-	Implemented
2	R2023	Ш	Analog and digital Electronics U23MCT305	Modified in theory	Implemented
3	R2023	Ш	Sensors, Transducers and measurement system U23MCB306	Modified in theory cum laboratory	Implemented
4	R2023	IV	Microprocessors and controllers for Mechatronics system U23MCT408	All the units topics are updated	Implemented
5	R2023	IV	Microprocessors and controllers laboratory U23MCP405	All the experiments are updated instead of 8085 Microprocessor replaced by 8086 Microprocessor	Implemented

SI. No.	Regulations	Semester	Subject Name with Code	Particulars	Action Taken
1	R2023	III	Fluid Mechanics and Machinery U23MCT304	Same Course title with Civil Engineering	subject tittle is modified as Applied Fluid Mechanics and Machinery U23MCT304

The above corrections are incorporated and the Syllabi (Given in Annexure-I) are approved by the BoS members

BOS/2022/MCT/UG/8.3: Recommended to the Academic Council with following suggestions in the Curriculum and Syllabi of Regulation 2023.

		= = =				
SI. No.	Regulations	Semester	Subject Name with Code	Unit	Particulars	
1	R2023	V	PLC and Industrial Automation Systems U23MCT511	٧	Case studies included	

	T	T			
2	R2023	V	Fluid Power Systems U23MCT512	V	Case studies included
3	R2023	7~	Industrial Automation Laboratory U23MCP506	_	Experiment Tittle updated
4	R2023	VI	Industrial Robotics U23MCT617	, ,& ∨	Syllabus are rearranged and Modified
5	R2023	∫ VI	Computer Aided Manufacturing Laboratory U23MCP610		Simulation base Experiment are included

The above corrections are incorporated and the Syllabi of the professional core courses of V and VI semesters are given in Annexure-II and approved by the BoS members

BOS/2022/MCT/UG/8.4: Recommended to the Academic Council with following suggestions in the Professional and open electives of Regulation 2023.

SI. No.	Regulations	Semester	Subject Name with Code	Particulars		
1	R2023	V	Robot operating System U23MCE502	Subject included Instead of Autonomous Mobile Robots		
2	R2023	VI	Mobile Robotics U23MCE605	Subject included Instead of Consumer Electronics		

The above corrections are incorporated and the Syllabi of the Professional and open electives of V and VI semesters are given in Annexure-III and approved by the BoS members

BOS/2022/MCT/UG/8.5: Recommended to the Academic Council, the Professional and open elective courses are offered under R-2020 and also various professional bodies, club activities, Skill Development Courses was discussed

The Lists of Professional and open elective courses offered under R-2020 are Given in Annexure-IV

BOS/2022/MCT/UG/8.6: The list of panels of question paper setters and Examiners for the End Semester Examinations of the academic year 2024–25 is discussed and recommended to the Academic Council and is given in Annexure - V.

BOS / 2024/MCT/UG /8.7

Any other item with the permission of the chair-Nil

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

SI. No.	Name of the Member	Signature			
1. He	ad of the Department concerned (Chairperson)				
1	Dr. G.Balamuruga Mohan Raj, M.Tech., Ph.D., Professor and Head Specialization: Manufacturing Years of Experience: 20 Sri Manakula Vinayagar Engineering College hodmechatronics@smvec.ac.in 9600989508	De la companya della companya della companya de la companya della			
2. All	faculty members of the Department				
2	Mr. S.Saravanan Asst. Professor Specialization:Energy Technology	Soul			
3	Mr.P.Ramesh Kumar, Asst. Professor Specialization:Manufacturing	Elisa			
4	Mr.S.Prakash, Asst. Professor Specialization: Manufacturing	Bli			
5	Mr.S.Jagan. Asst. Professor Specialization: Energy Technology	g. ga			
6	Mr.S.Pushparaj Asst. Professor Specialization: VLSI Design	6: Amparox			
7	Mrs.S.Kalaimani Asst. Professor Specialization: Embedded system Technologies	SI			
8	Ms.M.Subitha Asst.Professor Specialization: wireless communication	H Suf			
9	Dr.T.Poovaragavan, Assistant Professor Dept. of Mathematics	2. Pupej			
	Dr.Samuvel.K Assistant Professor Dept. of Physics,	K. Sanvary.			
11	Dr. Balamurugan.A Assistant Professor Dept. of Chemistry,				
3. Two : Council	subject experts from outside the Parent Universit	ty are nominated by the Academic			

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1	Dr.B.Meenakshipriya	
	Professor/ Mechatronics	6
>==	Kongu Engineering College,	al le
12	Perundurai, Erode – 638060	1.09
	E-Mail Id: bmp@kongu.ac.in;	Mr.
	b.meenakshipriya@gmail.com	
	Contact No: +91-9842799990, +91-9942699990	
	Dr.RM.Kuppan Chetty,	Charles and Charle
	Professor/School of Mechanical Engineering	1
	SASTRA Deemed to be University	by kuppan eletry
13	Thanjavur. Tamil Nadu, 613 401.	In Europan Lawy
13	E-Mail Id:kuppanchetty@mech.sastra.edu;	N7 V /-1.
	rmkuppan@gmail.com	- Alexandra de Ale
	Contact No: 9444030759	, , , , , ,
	Specialization: Robotics	, *n howers To P. C. (42)
4. One	e expert is nominated by the Vice-Chancellor from	m a panel of six recommended by the
Auton	omous College Principal as a University Nominee	e in the second of the second
	Dr.V.Sugumaran,	lib & Icano s character
	Professor,	
	School of Mechanical Engg. & Building Sciences,	10 1
14	VIT University – Chennai.	1 Singumarain
	E-Mail Id: v_sugu@yahoo.com	
	Contact No: 9789923926	
	Specialization: Production Engineering	Local J. St. et J.
5. On	e representative from industry/corporate sector	or/allied areas is nominated by the
Princi	pal as a Industry Nominee.	
	Dr.D.Dinakaran,	Alexa Table
	Senior Technical Manager	the VTI
	Medical Division (Engg & Research)	
15	HCL, Sholinganallur	
	E-Mail Id: dinakaran@hindustanuniv.ac.in	
	Contact No: 9443124007	
	Specialization:Tool Wear & neuro Fuzzy	,
0.0	Modelling	
6. One	e member of the College alumni is nominated by the	ne Principal.
	A.Baranidharan	
	Associate System Engineer,	9
	TCS Bangalore,	
16	7	ABSENT
16	Contact No:9087965798	ABSENT
16	Contact No:9087965798 E-Mail Id:: vtc1516003@gmail.com,	ABSENT
	Contact No:9087965798 E-Mail Id:: vtc1516003@gmail.com, Specialization:B.Tech Mechatronics	ging 10 moths
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7. Exp	Contact No:9087965798 E-Mail Id:: vtc1516003@gmail.com, Specialization:B.Tech Mechatronics erts from outside the Autonomous College, when mulated, to be nominated by the Principal.	giner mand
7. Exp	Contact No:9087965798 E-Mail Id:: vtc1516003@gmail.com, Specialization:B.Tech Mechatronics erts from outside the Autonomous College, when mulated, to be nominated by the Principal. Dr. Jegadeeshwaran.R	giner mand
7. Exp	Contact No:9087965798 E-Mail Id:: vtc1516003@gmail.com, Specialization:B.Tech Mechatronics erts from outside the Autonomous College, when mulated, to be nominated by the Principal. Dr. Jegadeeshwaran.R Professor and Head,	giner mand
7. Exp	Contact No:9087965798 E-Mail Id:: vtc1516003@gmail.com, Specialization:B.Tech Mechatronics erts from outside the Autonomous College, when mulated, to be nominated by the Principal. Dr. Jegadeeshwaran.R Professor and Head, Department of Mechatronics,	giner min
7. Exp	Contact No:9087965798 E-Mail Id:: vtc1516003@gmail.com, Specialization:B.Tech Mechatronics erts from outside the Autonomous College, when mulated, to be nominated by the Principal. Dr. Jegadeeshwaran.R Professor and Head, Department of Mechatronics, School of Mechanical Sciences,	giner min
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7. Exp	Contact No:9087965798 E-Mail Id:: vtc1516003@gmail.com, Specialization:B.Tech Mechatronics erts from outside the Autonomous College, when mulated, to be nominated by the Principal. Dr. Jegadeeshwaran.R Professor and Head, Department of Mechatronics, School of Mechanical Sciences, VIT University – Chennai E-Mail Id: jegadeeshwaran.r@vit.ac.in Contact: 9865338366	ging 10 moths
7. Exp	Contact No:9087965798 E-Mail Id:: vtc1516003@gmail.com, Specialization:B.Tech Mechatronics erts from outside the Autonomous College, when mulated, to be nominated by the Principal. Dr. Jegadeeshwaran.R Professor and Head, Department of Mechatronics, School of Mechanical Sciences, VIT University – Chennai E-Mail Id: jegadeeshwaran.r@vit.ac.in	ging 10 moths

ANNEXURE - I

	Mechatron	ics	Progra	mme : B.	Tech.		Programme : B.Tech.							
Semester	III		Course Category: PC End S						Semester Exam Type: T					
Course Code	U23MCT30	<i>A</i>	Periods/Week Credit					Maximum Marks						
004100 0040	023WC 130		L			С	416	CAM	ESE	ТМ				
Course Name	APPLIED MACHINE	FLUID MECHANICS AND ERY	3	0	0	3		25	75	100				
Prerequisite	Basic Conc	epts of Fluids					Į.	×						
	On complet	ion of the course, the studer	nts will be	able to					BT Map (Highes					
	CO1 Under	rstand the basic fluid Propertie	s and Flow	Character	ristics					2				
		ate the fluid flow in flow through								3				
Course		olete knowledge in Dimensiona			•					.3 .3				
Outcome		ulate the force, Power and effic								.3 [4				
		rstand the working of Centrifu	•		procatir	a nur	nns		K					
UNIT – I	1000		·		produit	g pui								
		erties And Flow Characteris operties of fluids- mass density		weight s	enecific	volum	o cno		riods:09	1				
		vapor pressure, surface tension	5 15 5		(8)			_	avity,	CO1				
UNIT – II	Flow Throu	ugh Pipes and Impact of Jet	S				***************************************	Pe	riods:09					
Moving Plate	es– Unit and	inery: Fluid Machines – Classi d Specific Quantities.	fication –	Impact of	f Fluid J	et on	Station							
UNIT – III		al and Model Analysis	oity Mothy	ada af di					riods:09	i T				
Bucking of	л-Theorem-m	antities-dimensional Homogen nodel analysis-simulated types	of similar	ities	nensior	iai an	aiysis-	Rayleig	in's method	CO3				
UNIT – IV	Hydraulics							Pe	riods:09					
Classification			- 1' T		•									
Tube The		Turbine – Pelton Wheel – Rea y Triangle – Estimation of force dy – Governing of Turbine – C	e, Power a	and efficie	ency – (•			CO4				
Tube The Turbine – S	Similarity Stud	y Triangle – Estimation of force dy – Governing of Turbine – C	e, Power a	and efficie	ency – (•	racteris	stics of	CO4				
Tube The Turbine – \$ UNIT – V Classificatio characteristi	Similarity Stud Hydraulics on - Centrifuga ics - Similarit	y Triangle – Estimation of force dy – Governing of Turbine – C	e, Power a avitation in Estimation - Recipr	and efficient Turbine on of Poverocating	ency – 0 e. wer Red Ideal a	Gener uired nd Ad	al Cha and e	racteris Per fficience	riods:09 y – Genera					
Tube The Turbine – \$ UNIT – V Classificatio characteristi	Similarity Stud Hydraulics on - Centrifugatics - Similarity of Power Requ	y Triangle – Estimation of force dy – Governing of Turbine – C Pumps al Pump – Velocity Triangle – ty study – Cavitation in Pump	e, Power a avitation in Estimation Recipr iciency – (and efficient Turbine on of Poverocating	ency – 0 e. wer Red Ideal a	Gener uired nd Ad	al Cha and e	Perfficience and catoriump.	riods:09 y – Genera	CO5				
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Tube The Turbine – S UNIT – V Classificatio characteristi Estimation of Lecture Period Text Books 1. Streeter, V 2. Kumar, K.I	Similarity Students Hydraulics on - Centrifugatics - Similarity of Power Requests Ods: 45 '.L., and Wylie L., "Engineeri	y Triangle – Estimation of force dy – Governing of Turbine – C Pumps al Pump – Velocity Triangle – ty study – Cavitation in Pump uired, percentage Slip and Eff Tutorial Periods: e, E.B., "Fluid Mechanics", Moing Fluid Mechanics", Schandfing Fluid Mechanics (Schandfing Fluid Mechanics)	e, Power a avitation in - Estimation — Recipriciency — (Practica Graw-Hill, Publication	and efficient Turbine on of Power Cocating—Cavitation I Periods 2010.	wer Recolled Ideal and in Recolled Ideal and in Recolled Ideal Ide	uired nd Adiproca	and ectual Ir	Perfficience and catoriump.	riods:09 y – Genera Diagram	CO5				
Tube The Turbine – S UNIT – V Classificatio characteristi Estimation of Lecture Period Text Books 1. Streeter, V 2. Kumar, K.I	Similarity Students Hydraulics on - Centrifugatics - Similarity of Power Requests Ods: 45 '.L., and Wylie L., "Engineeri	y Triangle – Estimation of force dy – Governing of Turbine – C Pumps al Pump – Velocity Triangle – ty study – Cavitation in Pump uired, percentage Slip and Eff Tutorial Periods: e, E.B., "Fluid Mechanics", Mo	e, Power a avitation in - Estimation — Recipriciency — (Practica Graw-Hill, Publication	and efficient Turbine on of Power Cocating—Cavitation I Periods 2010.	wer Recolled Ideal and in Recolled Ideal and in Recolled Ideal Ide	uired nd Adiproca	and ectual Ir	Perfficience and catoriump.	riods:09 y – Genera Diagram	CO5				
Tube The Turbine - S UNIT - V Classificatio characteristi Estimation of Lecture Period Text Books 1. Streeter, V 2. Kumar, K.I 3. Rajput.R.K	Hydraulics on - Centrifugatics - Similarity of Power Requods: 45 '.L., and Wylie L., "Engineeri C "Fluid Mechalooks	y Triangle – Estimation of force dy – Governing of Turbine – C Pumps al Pump – Velocity Triangle – ty study – Cavitation in Pump uired, percentage Slip and Eff Tutorial Periods: e, E.B., "Fluid Mechanics", Moing Fluid Mechanics", Schandfing Fluid Mechanics (Schandfing Fluid Mechanics)	e, Power a avitation in Estimatic - Estimatic - Recipriciency - 0 Practica Graw-Hill, Publication s", S. Cha	and efficient Turbine on of Pove ocating—Cavitation I Periods 2010. 18 (P) Ltd and Limite	wer Record Ideal and in Records:	uired nd Adiproca	and ectual Ir	Perfficience andicator ump. Total	riods:09 y - Genera Diagram tal Periods	CO5				
Tube The Turbine – S UNIT – V Classificatio characteristi Estimation of Lecture Period Text Books 1. Streeter, V 2. Kumar, K.I 3. Rajput.R.k Reference Books 1.Bansal, R.k 2010.	Similarity Students Hydraulics on - Centrifugatics - Similarity of Power Requested C.L., and Wylie L., "Engineeri C "Fluid Mechalooks K., "Fluid Mec	y Triangle – Estimation of force dy – Governing of Turbine – C Pumps al Pump – Velocity Triangle – ty study – Cavitation in Pump uired, percentage Slip and Eff Tutorial Periods: e, E.B., "Fluid Mechanics", Mc ing Fluid Mechanics", Schandf anics and Hydraulics Machine	e, Power a avitation in Estimation — Recipriciency — Certical Graw-Hill, Publications", S. Chames", (5th e	and efficient Turbine on of Povocating—Cavitation of Periods 2010. In (P) Ltd and Limite edition), Ledition), Ledition	wer Recorded Ideal and in Recorded Ideal and in Recorded II., New Recorded II., New Recorded III., New Recorded III.	uired nd Adiproca	and ectual Ir	Perfficience andicator ump. Total	riods:09 y - Genera Diagram tal Periods	CO5				
Tube The Turbine – S UNIT – V Classificatio characteristi Estimation of Lecture Period Text Books 1. Streeter, V 2. Kumar, K.I 3. Rajput.R.K Reference Books 1. Bansal, R.K 2010. 2. White, F.M	Similarity Stude Hydraulics on - Centrifugatics - Similarity of Power Requested L., and Wylie L., "Engineeri ("Fluid Mechalooks L., "Fluid Mechalooks	y Triangle – Estimation of force dy – Governing of Turbine – C Pumps al Pump – Velocity Triangle – ty study – Cavitation in Pump uired, percentage Slip and Eff Tutorial Periods: e, E.B., "Fluid Mechanics", Mc ing Fluid Mechanics", Schandf anics and Hydraulics Machine	e, Power a avitation in Estimation — Recipriciency — (Practical Graw-Hill, Publications", S. Chames", (5th etallion, N	and efficient Turbine on of Povocating—Cavitation 1 Periods 2010. The control of Povocating Periods 1 Per	wer Record Ideal and in Record In	uired nd Ad iproca	and e etual Ir ating p	Perfficience adjusted in the second s	riods:09 y - Genera Diagram tal Periods 2009 New Delhi	: 45				
Tube The Turbine - S UNIT - V Classificatio characteristi Estimation of Lecture Period Text Books 1. Streeter, V 2. Kumar, K.I 3. Rajput.R.K Reference Books 1.Bansal, R.R. 2010. 2.White, F.M 3.Som, S.K.,	Hydraulics on - Centrifugatics - Similarity of Power Requotes: 45 Y.L., and Wylie L., "Engineeri K "Fluid Mechalooks K., "Fluid Mechalooks and Biswas,	y Triangle – Estimation of force dy – Governing of Turbine – C Pumps al Pump – Velocity Triangle – ty study – Cavitation in Pump uired, percentage Slip and Eff Tutorial Periods: e, E.B., "Fluid Mechanics", Moding Fluid Mechanics", Schandfanics and Hydraulics Machine chanics and Hydraulics Machine chanics and Hydraulics Machine	e, Power a avitation in Estimatic Practica Graw-Hill, Publication s", S. Chames", (5th e Edition, Nanics and	and efficient Turbine on of Povocating—Cavitation I Periods 2010. Ins (P) Ltd Limited Limited Limited Limited Limited I Rew Delhi I I I I I I I I I I I I I I I I I I I	wer Recorded in Re	uired nd Ad iproca	and e etual Ir ating p	Perfficience adjusted in the second s	riods:09 y - Genera Diagram tal Periods 2009 New Delhi	: 45				
Tube The Turbine – S UNIT – V Classification characteristic Estimation of Lecture Period Text Books 1. Streeter, V 2. Kumar, K.I 3. Rajput.R.K Reference Books 1. Bansal, R.K 2010. 2. White, F.M 3. Som, S.K., 4.K. Subram	Similarity Stude Hydraulics on - Centrifugatics - Similarity of Power Requested C.L., and Wylie L., "Engineeric "Fluid Mechalooks C., "Fluid Mechalooks I., "Fluid Mechalooks and Biswas, lanya "Hydrau	y Triangle – Estimation of force dy – Governing of Turbine – Comps al Pumps al Pump – Velocity Triangle – by study – Cavitation in Pumpuired, percentage Slip and Eff Tutorial Periods: e, E.B., "Fluid Mechanics", Moding Fluid Mechanics", Schandranics and Hydraulics Machine chanics and Hydraulics Machine chanics", Tata McGraw-Hill, 5th G., "Introduction to fluid mech	e, Power a avitation in Estimatic Practica Graw-Hill, Publications", S. Chames", (5th earlies and fill Educations	and efficient Turbine on of Power Cocating—Cavitation of Periods 2010. 2010. 11 Periods of Period	wer Record Ideal and in Record Ideal and in Record Ideal and in Record Ideal and in Record Ideal	uired nd Ad iproca	and ectual Irrating p	Per fficience ndicator ump. Total lition), :	riods:09 y - Genera Diagram tal Periods 2009 New Delhi 2nd edition	: 45				

Academic Curriculum R-2023

- 2.https://nptel.ac.in/courses/112104117
- 3.http://fm-nitk.vlabs.ac.in
- 4.https://www.coursera.org/courses?query=fluid%20mechanics
- 5.https://www.virtulearn.in/course/fluid-mechanics-and-hydraulic-machines-online-classes

COs/POs/PSOs Mapping

COs	Program Outcomes (POs) PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12								Program Specific Outcomes (PSOs)						
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	2	2	-	-	-	-	1	_	-	1	2		4
2	3	2	2	2	-	-	_	_	1		7 117.7	1		_	1
3	3	2	2	2	_				-		-	1	2	-	1
1	3 -				-	-	-	-	1	-	-	1	2	-	1
	S -	2	2	2	-	-	-	-	1	-	-	1	2	-	1
5	3	2	2	2	-	-	-	-	1	-	-	2	2	-	1

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

Evaluation Methods

Accocom = ==4		Conti	End Semester				
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Examination (ESE) Marks	Total Marks
Marks	5	5	5	5	5	75	100



		SEN	MESTER - I	-19					Keraja Karaja J	
SI. No.	Course Code	Course Title	Category		Per	iods	Credits		Max. Ma	arks
The	orv		J .,	L	T	Р	Greats	CAM	ESM	Total
	·									
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
The	ry cum Practio	al							13	100
3	U23ENBC01	Communicative English - I	HS	2	0	2	3	50	50	100
Prac	tical							- 30	30	100
	U23ESPC03	Engineering Graphics using AutoCAD	ES	0	0	2	1	50	50	100
3	U23CSPC01	Programming in C Laboratory	ES	0	0	2	1	50	50	100
)	U23ESPC02	Design Thinking and IDEA Lab	ES	0	0	2	1	50	50	100
Abilit	y Enhanceme	nt Course								
	J23MCC1XX	Certification Course - I**	AEC	0	0	4	- 1	100	724	100
Mano	latory Course				Ĭ.			.50		100
	J23MCM101	Induction Programme	MC	21	Nee	ks	_		- 12 - 12 - 13	
OTAL	<u>.</u>						22			400-
							22	425	575	1000

		SEM	ESTER - II							
SI. No.	Course Code	Course Title	Category		Per	iods	Credits		Max. Ma	arks
The	orv	No. of the last of		L	T	Р		CAM	ESM	Total
1	U23MATC02	Engineering Mathewarting II	20	1	-	_		1.77		Tribar
	020WA1002	Engineering 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
The	ory cum Practica	ıl .							1.0	100
3	U23ENBC02	Communicative English - II	HS	2	0	2	3	50	50	100
Prac	tical		1							1.00
7	U23ESPC01	Basic Electrical and Electronics Engineering Laboratory	ES	0	0	2	1	50	50	100
3	U23MCP201	Thermal Engineering Laboratory	PC	0	0	2	1	50	50	100
	U23MCP202	Laboratory	PC	0	0	2	1	50	50	100
Abilit	ty Enhancement	Course					/			
0	U23MCC2XX	Certification Course – II**	AEC	0	0	4	-	100		100
	latory Course				-					100
	U23MCM202	Sports, Yoga and NSS	MC	2	0	0	- 01	100	_	100
OTAL	-		V				21	525	575	1100

18-7		SEIVI-	STER - III		_			Τ		
SI.	0 - 1	Carres Title	Catagory	Pe	rio		Credits		lax. Mar	
No.	Course Code	Course Title	Category	L	T	P	Credits	CAM	ESM	Total
Thec	pry	1 11 11 11 11 11 11 11 11 11 11 11 11 1			- 1			1		
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	Applied Fluid Mechanics and Machinery	PC	3	0	0	3	25	75	100
5	U23MCT305	Mechanics of Solids	PC	3	0	0	3	25	75	100
Thec	ry cum Practica	l ·								Т
6	U23MCB306	Sensors, Transducers and Measurement systems	PC	2	0	2	3	50	50	100
Prac	tical								T	
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	U23ADPC01	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
Abili	ty Enhancemen	t Course	_						1	
11	U23MCC3XX	Certification Course – III**	AEC	0	0	4	-	100	<u> </u>	100
12	U23MCS301	Skill Enhancement Course- I	AEC	0	0	2	-	100		100
Man	datory Course				-			1		100
13	U23MCM303	Climate Change	MC	2	0	0	-	100	-	100
OTA	L					rguest (see	23	675	625	1300
		SEME	STER - IV							
SI.	Course	Course Title	Catagory	Pe	erio		Credits		lax. Ma	
No.	Code	Course Title	Category	L	T	Р	Oreurs	CAM	ESM	Total
The	ory			1					1	T
1	U23MATC04	Numerical Methods and	BS	3	1	0	4	25	75	100
		Optimization Data Structures	ES	3	0	0	3	25	75	100
2	U23CSTC03	Data Structures Power Electronics and Drives	PC	3	0	0	3	25	75	100
3	U23EETC02	Microprocessors and controllers for Mechatronics	FC	3		0				
4	U23MCT407	Systems	PC	3	0	0	3	25	75	100
5	U23MCT408	Theory of Machines	PC	3	0	0	3	25	75	100
		_ I						T 50	50	100
The	ory cum Practica			Τ,		_				100
The	U23MCB409	loT for Mechatronics	PC	2	0	2	3	50	30	
The 6 Prac	U23MCB409	IoT for Mechatronics								100
6 Prac	U23MCB409 ctical U23ENPC02	IoT for Mechatronics General Proficiency - II	HS	0	0	2	1	50	50	_
The 6 Prac	U23MCB409	IoT for Mechatronics General Proficiency - II Data Structures Laboratory								
6 Prac	U23MCB409 ctical U23ENPC02	General Proficiency - II Data Structures Laboratory Power Electronics and Drives Laboratory	HS	0	0	2	1	50	50	100
7 8 9	U23MCB409 tical	General Proficiency - II Data Structures Laboratory Power Electronics and Drives Laboratory Microprocessors and Controllers Laboratory	HS ES	0	0	2 2	1 1	50 50	50	100
7 8 9 10 Abil	U23MCB409 tical U23ENPC02 U23CSPC02 U23EEPC02 U23MCP404 ity Enhancemer	General Proficiency - II Data Structures Laboratory Power Electronics and Drives Laboratory Microprocessors and Controllers Laboratory	HS ES PC PC	0 0 0	0 0 0	2 2 2	1 1 1	50 50 50	50 50 50 50	100 100 100
7 8 9 10 Abil 10	U23MCB409 ctical U23ENPC02 U23CSPC02 U23EEPC02 U23MCP404 ity Enhancemer U23MCC4XX	General Proficiency - II Data Structures Laboratory Power Electronics and Drives Laboratory Microprocessors and Controllers Laboratory Mt Course Certification Course – IV**	HS ES PC PC AEC	0 0 0	0 0 0	2 2 2 2	1 1 1 -	50 50 50 50	50 50 50 50	100 100 100
7 8 9 10 Abil 10 11	U23MCB409 etical U23ENPC02 U23CSPC02 U23EEPC02 U23MCP404 ity Enhancemer U23MCC4XX U23MCS402	General Proficiency - II Data Structures Laboratory Power Electronics and Drives Laboratory Microprocessors and Controllers Laboratory	HS ES PC PC	0 0 0	0 0 0	2 2 2	1 1 1	50 50 50	50 50 50 50	100 100 100
7 8 9 10 Abil 10 11	U23MCB409 ctical U23ENPC02 U23CSPC02 U23EEPC02 U23MCP404 ity Enhancemer U23MCC4XX	General Proficiency - II Data Structures Laboratory Power Electronics and Drives Laboratory Microprocessors and Controllers Laboratory Mt Course Certification Course – IV**	HS ES PC PC AEC	0 0 0	0 0 0	2 2 2 2	1 1 1 -	50 50 50 50	50 50 50 50	100 100 100

		SEMI	ESTER - V								
SI.	Course	Course Title	Category	P	eric	ds	Credits	Max. Marks			
No.	Code	Course ride	Category	L	Т	Р	Orcaio	CAM	ESM	Total	
Theo	ry			il-re				5.73	_		
1	U23HSTC02	Research Methodology	HS	2	0	0	2	25	75	100	
2	U23MCT510	PLC and Industrial Automation Systems	PC	3	0	0	3	25	75	100	
3	U23MCT511	Fluid Power Systems	PC	3	0	0	3	25	75	100	
4	U23ICTC03	Linear Control Systems	PC	2	1	0	3	25	75	100	
5	U23MCE5XX	Professional Elective – I#	PE	3	0	0	3	25	75	100	
6	U23XXOCXX	Open Elective - I\$	OE	3	0	0	3	25	75	100	
Practi	cal										
7	U23MCP505	Industrial Automation Laboratory	PC	0	0	2	1	50	50	100	
8	U23MCP506	Simulation of Instrumentation Laboratory	PC	0	0	2	1	50	50	100	
9	U23MCP507	Fluid Power Systems Laboratory	PC	0	0	2	1	50	50	100	
Projec	ct Work						•				
10	U23MCW501	Micro Project	PA	0	0	2	1	100	-	100	
Ability	Enhancement C	ourse									
11	U23MCC5XX	Certification Course – V**	AEC	0	0	4	7	100	-	100	
Mand	atory Course		-the state of the				ě.			y with	
12	U23MCM505	Essence of Indian Traditional Knowledge	MC	2	0	0	-	100	-	100	
TOTA	L				L/V	100	21	700	600	1200	

		SEME	STER - VI							
SI.	Course	Course Title	Category	P	erio	ds	Credits		Max. Ma	ırks
No.	Code	Course Title	Category	L	Т	Р	Credits	CAM	ESM	Total
Theor	У									141
1	U23MCT612	Computer Aided Manufacturing	PC	3	0	0	3	25	75	100
2	U23MCT613	Embedded System for Mechatronics	PC	3	0	0	3	25	75	100
3	U23MCT614	Design of Mechanical Elements	PC	3	0	0	3	25	75	100
4	U23MCT615	Industrial Robotics	PC	3	0	0	3	25	75	100
5	U23MCE6XX	Professional Elective – II#	PE	3	0	0	3	25	75	100
6	U23XXOCXX	Open Elective - II\$	OE	3	0	0	3	25	75	100
Practi	cal									ě.
7	U23MCP608	Embedded System Laboratory	PC	0	0	2	1	50	50	100
8	U23MCP609	Computer Aided Manufacturing Laboratory	PC	0	0	2	1	50	50	100
9	U23MCP610	Industrial Robotics Laboratory	PC	0	0	2	1	50	50	100
Projec	ct Work									
10	U23MCW602	Mini Project	PA	0	0	2	1	100	-	100
Ability	Enhancement C	ourse								
11	U23MCC6XX	Certification Course – VI**	AEC	0	0	4		100	-	100
Mand	atory Course									
12	U23MCM606	Gender Equality	MC	2	0	0	-	100		100
TOTA	\L			_			- 22	600	600	1200

		SEME	STER - VI				111			
SI. Course Code		Course Title	Category	1	Peri	ods	Credits	Max. Marks		
No.	334133 3343	er er of	100	L	Т	P	19 D	CAM	ESM	Total
The	ory	A THE						N .		
1-11	U23MCDC01	Automation in Manufacturing Systems	PC	3	0	0	3	25	75	100
2	U23MCT716	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	U23XXOCXX	Open Elective - III\$	OE	3	0	0	3	25	75	100
Prac	tical							- 1954	A. Salah	PE Y
6	U23MCP711	Seminar	PC	0	0	2	1	100	-	100
Proj	ect Work					Billion			- Indiana	
7	U23MCW703	Project Phase – I	PA	0	0	4	2	50	50	100
8	U23MCW704	Internship / Inplant Training	PA	-	-	2	1	100	-	100
TOTA	Ĺ	. 0.0			7		19	375	425	800

		SEME	STER - VI	1						
SI. Course		Course Title	Category	Periods			Credits	Max. Marks		
No.	Code	oodise ride	Category	L	T	Р	Orcans	CAM	ESM	Total
The	ory	- 5 :							Sariah	
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 – V I #	PE	3	0	0	3	25	75	100
Pro	ject Work									
1	U23MCW805	Project Phase – II	PA	0	0	16	8	50	100	150
Tota	A Major I AND						17	125	325	450

PROFESSIONAL ELECTIVE COURSES

	sional Elective – I (Off	
SI. No.	Course Code	Course Title
1	U23MCE501	Computer Integrated Manufacturing
2	U23 ECEC01	Digital Image processing
3	U23ADDC01	Computer Network and Security
4	U23MCE502	Robot Operating Systems
5	U23ICECO1	Virtual Instrumentation
	ional Elective – II (Of	
SI. No.	Course Code	Course Title
1	U23MCE603	Heating Ventilation and Air-Conditioning
2	U23CSEC02	Introduction to Industry 4.0
3	U23MCE604	Digital Manufacturing
4	U23MCE605	Mobile Robotics
5	U23MEDC02	Product Design and Development
Profess	ional Elective - III (Of	ffered in Semester VII)
SI. No.	Course Code	Course Title
1	U23MCE706	Sustainable Manufacturing
2	U23MCE707	Automotive Mechatronics
3	U23MEDC01	Production Planning and Cost Estimation
4	U23MCE708	Smart Mobility and Intelligent Vehicles
5	U23ADDC02	Principle of Artificial Intelligence and Machine Learning
Profess	ional Elective – IV (Of	ffered in Semester VII)
SI. No.	Course Code	Course Title
1	U23MCE709	Operations Research for Mechatronics
2	U23MCE710	Product Lifecycle Management
3	U23MCDC02	Building Automation
4	U23MCE711	Robots Navigation and Obstacle Avoidance
5	U23MCE712	Aircraft Mechatronics
Profess	ional Elective – V (Off	fered in Semester VIII)
SI. No.	Course Code	Course Title
1	U23MCE813	Unconventional Machining processes
2	U23MCE814	Mechatronics Systems Applications
3	U23MCE815	Smart Manufacturing
4	U23MCE816	Unmanned Aerial Vehicle
5	U23MCDC05	Simulation Modeling of Manufacturing System
Professi	ional Elective – VI (Of	fered in Semester VIII)
SI. No.	Course Code	Course Title
1	U23MCDC03	Non Destructive Testing
2	U23MEDC03	Supply Chain Management
3	U23MCE817	Reliability and Maintenance Engineering
4	U23MCDC04	Robots and Systems in Smart Manufacturing
5	U23MCE818	Intelligent Control Systems

Open El	lectives		
1	U23MCDC01	Automation in Manufacturing systems	-
2	U23MCDC02	Building Automation	
3	U23MCDC03	Non Destructive Testing	
4	U23MCDC04	Robots and Systems in Smart Manufacturing	

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OPEN ELECTIVE COURSES

S. No.	Course Code	Course Title	Offering Department	Permitted Departments
011101		Open Elective – I (Offe	· ·	(VI)
1	U23EEDC01	Electrical Safety Engineering	EEE	ECE, ICE, MECH, CIVIL, MCTR, CCE, BME, IT, CSE, FT, AI&DS,CSBS
2	U23EEOC02	Solar Photovoltaic Fundamental and Applications	EEE	ECE, ICE, MECH, CIVIL, MCTR, CCE, BME, IT, CSE, FT, AI&DS,CSBS
3	U23ECOC01	Engineering Computation with MATLAB	ECE	EEE, ICE, MECH, CIVIL, CCE, BME, AI&DS, Mechatronics
4	U23ECOC02	Consumer Electronics	ECE	EEE, ICE, CSE, MECH, IT, CIVIL, CCE, BME, Mechatronics, FT
5	U23CSOC01	Structured Query Language	CSE	ECE, EEE, ICE, MECH, CIVIL, BME and MECHTRONICS
6	U23CSOC02	Computer Peripherals and Networking	CSE	Offered to all Branches
7	U23ITOC01	Database System: Design & Development	IT .	EEE, ECE, ICE, BME,MECH,CIVIL, MECHATRONICS
8	U23ITOC02	Computer Hardware and Troubleshooting	IT	EEE, ECE, ICE, CCE, BME, MECH, MECHATRONICS
9	U23MEOC01	Rapid Prototyping	MECH	EEE, ECE, ICE, CIVIL, BME, FT
10	U23MEOC02	Material Handling System	MECH	EEE, ICE, CIVIL, Mechatronics
11	U23CEOC01	Energy and Environment	CIVIL	EEE, ECE, MECH, BME, IT, Mechatronics
12	U23CEOC02	Global Warming and Climate Change	CIVIL	EEE, ECE, CSE, IT, ICE, MECH, BME, CCE, AI&DS
13	U23ICOC01	Sensors and Transducers	ICE	EEE, ECE, CSE, IT, MECH, CIVIL, CCE, CSBS, AI&DS
14	U23ICOC02	Instrumentation for Industry 4.0	ICE	EEE, ECE, CSE, IT, MECH, CIVIL, CCE, CSBS, AI&DS, Mechatronics
15	U23BMOC01	Medical Electronics	BME	EEE, ECE, CSE, IT, ICE, CCE, MECH, Mechatronics, AI&DS
16	U23BMOC02	Telemedicine	BME	EEE, ECE, CSE, IT, ICE, CCE, AI&DS
17	U23CCOC01	Introduction to Communication Technologies	CCE	EEE, MECH, CSE, IT, CIVIL, ICE, Mechatronics, BME, AIDS
18	U23CCOC02	Introduction to Computer Networks	CCE	EEE, MECH, CIVIL, ICE, Mechatronics, BME, AIDS
19	U23CBOC01	Business Applications of Game Theory	CSBS	EEE, ECE, MECH, CIVIL, ICE, Mechatronics, BME, CCE

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20	U23CBOC02	Cryptology and Analysis	CSBS	EEE, MECH, CIVIL, ICE, Mechatronics, BME
21	U23ADDC01	Principles of Artificial Intelligence and Machine Learning	AI&DS	EEE, ECE, CSE, IT, ICE, MECH, CIVIL, CCE, BME, Mechatronics
22	U23ADOCO2	Introduction to Data Science	AI&DS	EEE, ECE, CSE, IT, ICE, MECH, CIVIL, CCE, BME, Mechatronics,
23	U23MCDC01	Automation in Manufacturing systems	MCTR	EEE,MECH&ICE
24	U23MCDC02	Building Automation	MCTR	MECH,EEE,ECE&ICE
25	U23FTOC01	Textile Arts and Crafts	FT	EEE, ECE, CSE, IT, ICE, MECH, CIVIL, CCE, BME, Mechatronics, AI&DS
26	U23FTOC02	Garment Manufacturing Technology	FT	EEE, ECE, CSE, IT, ICE, MECH, CIVIL, CCE, BME, Mechatronics, AI&DS
	» n	Open Elective – II (Offe	ered in Semester V	(II)
1	U23EEOC03	Electric and Hybrid Vehicles	EEE	ECE, ICE, MECH, MCTR, CCE, BME, AI&DS
2	U23EEOC04	Energy Conservation and Management	EEE	ECE, ICE, MECH, CIVIL, MCTR, CCE, BME, IT, CSE, AI&DS
3	U23ECOC03	IoT and its Applications	ECE	EEE, ICE, CSE, MECH, IT, CIVIL, CCE, FT
4	U23ECOC04	RFID System Design and Testing	ECE	EEE, ICE, CSE, MECH, IT, CIVIL, CCE, BME, Mechatronics
5	U23CSOC03	Web Programming	CSE	ECE, EEE, ICE, MECH, CIVIL, BME AND MECHTRONICS
6	U23CSOC04	Cloud Technology	CSE	ECE, EEE, ICE, MECH, CIVIL, BME and MECHTRONICS
7	U23ITOC03	Essentials of Data Science	IT	EEE, ECE, ICE, CSE, MECH, CIVIL, CCE, BME, MECHATRONICS
8	U23ITOC04	Big Data Technologies	IT	EEE, ICE, MECH, CIVIL, CCE, BME
9	U23MEOC03	Creativity Innovation and New Product Development	MECH	EEE, ECE, ICE, CIVIL, BME, Mechatronics
10	U23MEOC04	Supply Chain Management	MECH	EEE, ECE, CIVIL, Mechatronics
11	U23CEOC03	Disaster Management	CIVIL	EEE, ECE, CSE, IT, ICE, MECH, BME, CCE, AI&DS
12	U23CEOC04	Air Pollution and Solid Waste Management	CIVIL	EEE, ECE, CSE, IT, ICE, MECH, BME, CCE, AI&DS
13	U23ICOC03	Fuzzy Logic and Neural Networks	ICE	CSE, IT, MECH, CSBS, AI&DS, Mechatronics
14	U23ICOC04	Industrial Automation	ICE	ECE, CSE, IT, MECH, CCE, CSBS, AI&DS

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15	U23BMOC03	Medical Robotics	ВМЕ	EEE, ECE, CSE, IT, ICE, CCE, MECH, Mechatronics, AI&DS
16	U23BMOC04	Telehealth Technology	ВМЕ	EEE, ECE, ICE, CCE
17	U23CCOC03	Web App Development	CCE	EEE, ECE, MECH, CSE, IT, CIVIL, ICE, Mechatronics, BME, AIDS
18	U23CCOC04	Network Essentials and Security	CCE	EEE, MECH, CSE, IT, CIVIL, ICE, Mechatronics, BME, AIDS
19	U23CBOC03	Engineering Economics	CSBS	EEE, ECE, CSE, IT, MECH, CIVIL, ICE, Mechatronics, BME, AIDS, CCE, FT
20	U23CBOC04	Conversational Al	CSBS	EEE, ECE, MECH, CIVIL, ICE, Mechatronics, BME
21	U23ADOC03	Data science Application of Vision	AI&DS	EEE, ECE, CSE, IT, ICE, MECH, CIVIL, CCE
22	U23ADOC04	Artificial Intelligence Applications	AI&DS	EEE, ECE, CSE, IT, ICE, MECH, CIVIL, CCE, BME, Mechatronics
23	U23MCDC03	Non-Destructive Testing	MCTR	MECH,EEE,ECE&ICE
24	U23MCOC04	Robots and Systems in Smart Manufacturing	MCTR	MECH,EEE,ECE&ICE
25	U23FTOC03	Fundamentals of Fashion Design	FT	EEE, ECE, CSE, IT, ICE, MECH, CIVIL, CCE, BME, Mechatronics, AI&DS
26	U23FTOC04	Pattern Making	FT	EEE, ECE, CSE, IT, ICE, MECH, CIVIL, CCE, BME, Mechatronics, AI&DS

Open Elective - I / Open Elective - II/ offered in Semester V/VI

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S.No	Course Code	Course Title	Offering Department	Permitted Departments
1	U23HSOC01	Intellectual Property Rights	-	(Offered in Semester) / for
2	U23HSOC02	New Product Development		(Offered in Semester V for EEE, ECE, ICE, CIVIL,BME, CCE, FT)
3	U23HSOC03	Finance for Engineers		
4	U23HSOC04	Economics for Engineers	MBA	(Offered in Semester VI for
5	U23HSOC05	Marketing Management	IVIDA	CSE, IT, MECH, Mechatronics, AI&DS)

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Annexure - III

EMPLOYABILITY ENHANCEMENT COURSES - (A) CERTIFICATION COURSES

SI. 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
.5	U23MCCX25	CATIA
6	U23MCCX26	CCNA (Routing and Switching)
7	U23MCCX27	CCNA (Wireless)
8	U23MCCX28	Cloud Computing
9	U23MCCX29	Computer Programming for Medical Equipments
0	U23MCCX30	Corel Draw
1	U23MCCX31	Creo (Modeling and Simulation)
2	U23MCCX32	Cyber Security
3	U23MCCX33	Data Science and Data Analytics
4	U23MCCX34	Data Science using Python
5	U23MCCX35	Data Science using R
3	U23MCCX36	Deep Learning
7	U23MCCX37	Design and Documentation using ePLAN Electric P8
3	U23MCCX38	Design of Biomedical Devices and Systems

 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	loT 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
81	U23MCCX81	Solar and Smart Energy System with IoT
82	U23MCCX82	Solid Works

83	U23MCCX83	Solid Works with Electrical Schematics
84	U23MCCX84	Speech Processing
85	U23MCCX85	STAAD PRO V8i
86	U23MCCX86	Structural Design and Analysis using Bentley
87	U23MCCX87	Total Station
88	U23MCCX88	Video and Image Processing Development System
89	U23MCCX89	VLSI Design
90	U23MCCX90	Web Programming - I
91	U23MCCX91	Web Programming - II

Annexure – IV

ABILITY ENHANCEMENT COURSES

SI. No.	Course Code	Course Title
1	Skill Enhanceme	ent Course I
	U23MCS301	3D Printing
	Skill Enhancem	ent Course II:
2	U23MCS402	Training on Arduino / Power Transmission Systems / Non-Destructive Testing



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ANNEXURE - II

		SEN	IESTER - V							
SI. No.	Course Code	Course Title	Category			ods	Credits	Max. Marks		
Theo	rv			L	T	Р		CAM	ESM	Total
1	U23HSTC02	Research Methodology	HS	2	0	0	2	25	75	100
2	U23MCT510	PLC and Industrial Automation Systems	PC	3	0	0	3	25	75	100
3	U23MCT511	Fluid Power Systems	PC	3	0	0	3	25	75	100
4	U23ICTC03	Linear Control Systems	PC	2	1	0	3	25	75	100
5	U23MCE5XX	Professional Elective – I#	PE	3	0	0	3	25	75	100
6	U23XXOCXX	Open Elective - I\$	OE	3	0	0	3	25	75	1 2 200
Praction		2	1200				J	25	/5	100
7	U23MCP505	Industrial Automation Laboratory	PC	0	0	2	1	50	50	100
8	U23MCP506	Simulation of Instrumentation Laboratory	PC	0	0	2	1	50	50	100
9	U23MCP507	Fluid Power Systems Laboratory	PC	0	0	2	1	50	50	100
	t Work	· · · · · · · · · · · · · · · · · · ·	1							
10	U23MCW501	Micro Project	PA	0	0	2	1	100	_	100
Ability	Enhancement Co	ourse					'	100	_	100
11	U23MCC5XX	Certification Course – V**	AEC	0	0	4	_	100		100
Manda	tory Course			10000				100	_	100
2	U23MCM505	Essence of Indian Traditional Knowledge	MC	2	0	0	-	100	-	100
TOTAL	•	_					21	700	600	1200

SI. Course No. Code		Course Title	Category	Periods			Credits	Max. Marks			
Theo		1		L	T	Р	Greats	CAM	ESM	Total	
1	U23MCT612	Computer Aided Manufacturing	PC	3	0	0	3	25	75	100	
2	U23MCT613	Embedded System for Mechatronics	PC	3	0	0	3	25	75	100	
3	U23MCT614	Design of Mechanical Elements	PC	3	0	0	3	25	75	100	
4	U23MCT615	Industrial Robotics	PC	3	0	0	3	25	75	100	
5	U23MCE6XX	Professional Elective – II#	PE	3	0	0	3	25	75	100	
6	U23XXOCXX	Open Elective - II\$	OE	3	0	0	3	25	75	100	
Praction	cal				155	-		20	/ / /	100	
7	U23MCP608	Embedded System Laboratory	PC	0	0	2	1	50	50	100	
3	U23MCP609	Computer Aided Manufacturing Laboratory	PC	0	0	2	1	50	50	100	
9	U23MCP610	Industrial Robotics Laboratory	PC	0	0	2	1	50	50	100	
	t Work	•						- 30	50	100	
10	U23MCW602	Mini Project	PA	0	0	2	1	100		100	
Ability	Enhancement Co	ourse					•	100		100	
11	U23MCC6XX	Certification Course - VI**	AEC	0	0	4	- 1	100		100	
	tory Course									100	
2	U23MCM606	Gender Equality	MC	2	0	0		100	1	100	
OTAL	- 7						22	600	600	1200	

Department	MBA	Programme			,							
Semester	V ** * * * * * * * * * * * * * * * * *	Course Cat	Poblon are					xam Typ				
Course Code		F	Periods/W	eek	(Credit	Maximu	ım Mark	KS.			
Jourse Code	U23HSTC02	L	T	P		С	CAM	ESE	TM			
Course Name	RESEARCH METHODOLOGY	2	0	0		2	25	75	100			
		to ALL Branch	es									
Prerequisite	Nil							Ţ	<i></i>			
	On completion of the course, the	m Edward - ow	na edit		- e T	i i i i		(Hig Lev	ping hest			
	CO1	CO1 Interpret the different types of research and explain how research methods can be used to address engineering problems.										
Course	CO2 Discuss the research problem utilize tools and services for effective controls.	ective information	retrieval.					K	2			
Outcomes	CO3 Apply appropriate methods to results using both numerical and	d graphical techn	iques.					K	(3			
	Analyze and apply ethical guidelines to structure and write research papers and dissertations, ensuring academic integrity and avoiding plagiarism.											
	Examine the fundamentals of them, with emphasis on their rengineering.							1	(3			
JNIT-I	Introduction to Research					Pei	riods: 6	<u> </u>				
	nportance of Research, Types of Res					and D	evelop	mental				
Research, Ove Research Object Research: Qua UNIT-II Identifying and I	erview of the Research Process, Definitives and Research Questions, Introductives and Research Questions, Introduction and Literature Problem Formulation and Literature Formulating Research Problems, conductives.	ning a Research ction to Research e Review ucting a Literatur	n Problem n Design: I	: Key Basic (: Esse	Cons	and Esidera epts, A Per Steps	Develop ations, S Approac riods: 6	mental Setting ches to	CO2			
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Research, Over Research Object Research: Quality Object Research; Quali	erview of the Research Process, Definitives and Research Questions, Introductives and Research Questions, Introductive vs. Qualitative. Problem Formulation and Literature Formulating Research Problems, conductives assist Techniques. Sources of Interesting Research Problems.	ning a Research ction to Research Review ucting a Literatur formation: Overvisis	n Problem n Design: I re Review iew of Lib	: Key Basic (: Esse raries a	Conscionate of the control of the co	epts, / Per Steps Online Per Collect	Developations, S Approactiods: 6 Refer Databation Me	mental Setting ches to encing ses.	CO2			
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COs/POs/PSOs Mapping

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	Program S Outcomes		cific (Os)
(COs)						-	Page 1	2 14 "	1 1		1011	1012	PSO1	PSO2	PS
CO1	3	3	2	2	2	1 2 1	2	7-		2		-			O3
CO2	3	_					-				2	3	2	2	3
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004		Parati			-	¥ .				2	2	1 Wal	1	2	3
CO4	-	-	1	2	-	-	2	3	2	2		2	1	2	2
CO5	2	2	2	2	_	_			-						3
Correl			. 2	2	2	2	3	3	2	2	3	2	1	1	2

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

Evaluation Method

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CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (FSF) Marks	Total Marks
5	5	5	5	5		100
	CAT 1		CAT CAT Model Exam	CAT CAT Model 1 2 Exam Assignment*	1 2 Exam Assignment* Attendance	CAT CAT Model 1 2 Model Exam Assignment* Attendance Examination (ESE) Marks



Course Name PLC AND INDUSTRIAL AUTOMATION SYSTEMS 3 0 0 0 3 25 75 100	Department	Mech	atroni	cs		Progr	amme :	B.Tech.					
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Course Name PLC AND INDUSTRIAL AUTOMATION SYSTEMS 3 0 0 3 25 75 10	220 200 000000000 1000	11231	ICT51	n		Pe	riods/W	eek					
Prerequisite Concept Content	Code					L	Т	P	C	CAM	ESE	TM	
Por completion of the course, the students will be able to	Course Name							0	3	25	75	100	
On completion of the course, the students will be able to COI Identify the main components of PLC architecture and list the specifications that define PLC capabilities. CO2 Apply arithmetic functions in a PLC program to calculate the total production output based on individual item counts and production rates. CO3 Apply arithmetic functions in a PLC program to calculate the total production output based on individual item counts and production rates. CO3 Apply arithmetic functions in a PLC program to calculate the total production output based on individual item counts and production rates. CO3 Creating examples that demonstrate their application in an industrial automation scenario. CO4 Interpret the design and functionality of a single-channel data acquisition system. K3	Prerequisite	Know	vledae	about analog and digita		tronic	S						
Course Outcomes			omple	tion of the course, the	students						(Hi	ghest	
Course Outcomes Diliustrate the different types of sequencer instructions in PLC programming by Co3 creating examples that demonstrate their application in an industrial automation scenario. Co4		define PLC capabilities.											
Illustrate the different types of sequencer instructions in PLC programming by considerating examples that demonstrate their application in an industrial automation scenario. Co3 Interpret the design and functionality of a single-channel data acquisition system discussing its advantages and limitations in specific applications K3	Course	CO2	based	on individual item coun	its and pr	oduction	on rates	i.		1		<3	
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Need for computer in a control system-Functional block diagram of a computer control system-Data loggers-Supervisory computer control- Direct digital control – SCADA. Introduction to networked control systems- Plant wide control - Internet of Things- Cloud based Automation - Safety PLC. Lecture Periods: 45 Tutorial Periods: Practical Periods: - Total Periods: 45 Frank. D. Petrezuella, Programmable logic controllers, McGrewhill, Third edition, 2010. Dilip Patel, 'Introduction Practical PLC (Programmable Logic Controller) Programming', GRIN Verlag, February 2018. Keith Stouffer, Victoria Pillitteri, Suzanne Lightman, Marshall D. Abrams, Adam Lee Hahn, 'Guide to Industrial Controllers' (ICS) Security' U.S. Department of Commerce, National Institute of Standards and Technology, 2015. Reference Books William Bolton, "Programmable Logic Controllers", Elsevier Science, April 2011. Maurizio Di Paolo Emilio," Data Acquisition Systems from Fundamentals to Applied Design", Springer New York March 2013. John w.Webb & Ronald A.Reis., "Programmable logic controllers- principles and applications", 5th Edition – Pillitteri (Programmable Logic Controllers- principles and applications", 5th Edition – Pillitteri (Programmable Logic Controllers- principles and applications).	and digitizing –	- Data	Acquis	ition System Block Diag	gram – Si	ngle C	hannel	Data Acc	l impleme uisition S	entation of system - Mi	sampling ultiplexed	CO4	
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Frank. D. Petrezuella, Programmable logic controllers, McGrewhill, Third edition, 2010. Dilip Patel, 'Introduction Practical PLC (Programmable Logic Controller) Programming', GRIN Verlag, February 2018. Keith Stouffer, Victoria Pillitteri, Suzanne Lightman, Marshall D. Abrams, Adam Lee Hahn, 'Guide to Industrial Controllers', Systems (ICS) Security' U.S. Department of Commerce, National Institute of Standards and Technology, 2015. Reference Books William Bolton, "Programmable Logic Controllers", Elsevier Science, April 2011. Maurizio Di Paolo Emilio," Data Acquisition Systems from Fundamentals to Applied Design", Springer New York March 2013. John w.Webb & Ronald A.Reis., "Programmable logic controllers- principles and applications", 5th Edition – Pt	Lecture Perio	ds: 4	5	Tutorial Periods:	Pra	actical	Period	s: -		Tota	l Periods	: 45	
Dilip Patel, 'Introduction Practical PLC (Programmable Logic Controller) Programming', GRIN Verlag, February 2018 Keith Stouffer, Victoria Pillitteri, Suzanne Lightman, Marshall D. Abrams, Adam Lee Hahn, 'Guide to Industrial Controllers', Systems (ICS) Security' U.S. Department of Commerce, National Institute of Standards and Technology, 2015. Reference Books William Bolton, "Programmable Logic Controllers", Elsevier Science, April 2011. Maurizio Di Paolo Emilio," Data Acquisition Systems from Fundamentals to Applied Design", Springer New York March 2013. John w.Webb & Ronald A.Reis., "Programmable logic controllers- principles and applications", 5th Edition — Pt	ext Books				1								
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Reference Books William Bolton, "Programmable Logic Controllers", Elsevier Science, April 2011. Maurizio Di Paolo Emilio," Data Acquisition Systems from Fundamentals to Applied Design", Springer New York March 2013. John w.Webb & Ronald A.Reis., "Programmable logic controllers- principles and applications", 5th Edition – Pt	Keith Stouffe Systems (ICS	er, Vict S) Sec	oria Pil	litteri, Suzanne Lightma	n, Marsh	all D. /	Abrams	. Adam L	ee Hahn.	'Guide to	Industrial	Contro	
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March 2013. John w.Webb & Ronald A.Reis., "Programmable logic controllers- principles and applications", 5th Edition – Pt	William Bolto	n, "Pro	ogramr	mable Logic Controllers"	', Elsevie	r Scier	ice, Apr	il 2011.					
John w.vvepb & Ronald A.Reis., "Programmable logic controllers- principles and applications", 5th Edition - Pl	March 2013.												
Learning Pvt. LTd, New Delhi -2010	John w.Web	אַמּ אַמּ	onald	A.Reis., "Programmable	e logic c	ontroll	ers- pri	nciples a	nd applic	cations", 5	th Edition	– PH	

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5.	Nathan Clark, "PLC Programming Using RSLogix 500", Amazon Digital Services LLC - Kdp, October 2018.
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2.	https://www.nielit.gov.in/calicut/content/online-course-industrial-automation-plc-scada
3.	https://onlinecourses.nptel.ac.in/noc20_me39/preview
1	https://pptel.ac.in/courses/108/105/108105062/

COs/POs/PSOs Mapping

https://kanchiuniv.ac.in/coursematerials/PLC_K_Saraswathi.pdf

COs	Program Outcomes (POs)											Program Specific Outcomes (PSOs)			
	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	1	-	-	-	=	*	-		2	1	3	2	3
2	3	2	1	-	-	-	-	- 1	-	1 7	2	2	3	2	3
3	3	- 2	1	-	-	-	-	-	-	=	2	3	3	2	3
4	3	2	1	-	1	1	-	-	-	-	2	1	3	2	3
5	3	2	1	-	-	-	-	F-/	-	-	2	1	3	2	3

Evaluation Method

ii			End	e i I ha i			
Assessment	CAT 1	CAT 1 CAT 2 Mode Exam		Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	5	5	5	5	5	75	100



Department	Mech	atroni	cs		Progra	amme :	B.Tech.				
Semester	V				Cours	e Categ	ory: PC	End S	emester E	xam Typ	e: TE
Course	11225/	1CT511				iods/We		Credit	···· <u>T</u>	ım Mark	
Code	UZSIV	10131			L	Т	Р	С	CAM	ESE	TM
Course Name	FLUII	D POW	ER SYSTEM	I S	3	0	0	3	25	75	100
	,				/lechatroni	cs					
Prerequisite	Know	ledge (of Fluid Mech	nanics and Mac	hinery						
	On co	omplet	ion of the c	ourse, the stud	dents will b	e able	to			4	lapping st Level)
	CO1			amentals of hyd					ncurred in		K2
Course				nd Identify the h					1 17/19		112
Outcomes	CO2			ne suitable pum		ators for	particula	ar application	on.		K3
	CO3			us hydraulic va							K3
	CO4	Analy	ze various fu	ındamentals of	pneumatic	systems	3.				K4
	CO5	Apply	hydraulic ar	id pneumatic ci	rcuits for si	nple ap	plication				K3
UNIT - I	Introd			wer Systems	. 1744_11.1.10				Perio	ds: 09	
Introduction t	o fluid	power	- History -	Pascal's law –	Componen	ts - Adv	vantages	– Drawba	cks – App	lications.	
Hydraulic fluid	ds: Fun	ctions,	Properties.	Frictional Losse	es in pipes-	valves a	and fitting	gs – Fluid p	ower sym	ools	CO1
UNIT - II			umps And A							ds: 09	<u>I</u>
Positive and	Non-po	ositive	displacemer	nt pumps – Pu	mping thec	rv – Pı	ımp clas	sification -	- Construc	tion and	
working princ	iple of	Gear, '	Vane and Pi	ston pumps. Pu	ump perforn	nance –	· Pump p	erformance	curves F	lvdraulic	CO2
cylinder (doub	ole acti	ng) – C	Construction	& Working princ	ciple – Doul	ole rod	cylinder -	- Telescopi	c cylinder.	ry ar a ano	
UNIT - III		ulic V			,		11			ds: 09	
Directional co	ntrol v	alves:	Check valve	– Pilot operat	ed check v	alve – :	3/2 valve	es – 4/2 va			
valve actuation	on – S	huttle	valve. Press	sure control va	lves: Press	ure reli	ef valves	s - Pressu	re reducin	n valve	
Unloading val	ves, Co	ounter	balance valv	es - Flow contr	ol valves- S	ervo va	lves: Me	chanical tvi	ne	g valve,	CO3
UNIT - IV			Systems							ds: 09	
Introduction -	- Prope	erties o	f air – gas l	aws - Compre	ssors: Pisto	n comr	ressor !	Screw com			
compressor. I	Fluid co	onditio	ners: Air filte	rs, Air pressure	e regulators	Air luk	oricators	Pneumation	silencers	and Air	CO4
dryers. Pneur	natic a	ctuator	s: Pneumatio	cylinders, Rota	ary air moto	rs – Pei	rformanc	e curves	0110110010	ana / iii	
UNIT - V				l Pneumatic Ci					Perio	ds: 09	
Sequential ci	ircuit c	design cvlinde	for simple	applications:	Drilling, Pu	nching,	Step c	counter me	I		CO5
Lecture Peri			Tutorial Pe		Practical				Total	Periods	: 45
Text Books		***************************************							L		
1.S. R. Majumd	ar, Oil	Hydrau	ulics, Tata Mo	Graw Hill Publ	ishing Com	pany Py	/t Ltd. Ne	ew Delhi. 20	014		***************************************
				Power, Delmai							
				American Tecl				ted, 2014			
Reference Boo							•	,			
. Anthony Esp	oosito,	Fluid P	ower with Ap	plications, Pea	rson Educa	tion Ne	w Delhi,	2015.			***************************************
. Md Faiyaz <i>A</i>	hmed	"Fluid I	Power Contro	ol Systems"Lulu	ı.com. – 20	16.			,		
. R.Srinivasaı	n, Hydr	aulic a	nd Pneumati	c Controls, Sec	ond Edition	, Vijay N	Vicole Im	prints PVT	, 2006.		
				Theory and Its						worth-	
Heinemann-	- 2019										
		lic Pun	nps & Motors	and their Appl	ications" D	og Ear l	Publishin	g. 2018			
Neb Reference											
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https://nptel.	ac.in/c	OUTSES		1050001							
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	,	/ - 1 1 p = -	100		Progr	ram O	utcom	es (PC	Os)				Program Specific Outcomes (PSOs)			
COs	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	
1	3	2	2	3	_	-	-		-	-	-	2	2	2	3	
2	3	2	2	3	_	_	-	-	-	-	_	2	2	2	3	
2	3	2	2	3	-	_	_	-	-	-	y	2	2	2	3	
3	3	2	3	3	_	_	-			-	-	2	2	2	3	
4	+	2	3	3			_	_	-	-		2	2	2	3	
5	3	2	2	3			kry T						10.00			

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

		End				
CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Examination (ESE) Marks	Total Marks
	-	-	5	5	75	100
•	CAT 1	CAT 1 CAT 2	Model	Model Assignment*	Accignment* Attendance	CAT 1 CAT 2 Model Exam Assignment* Attendance Semester Examination (ESE) Marks



Department		mentadon and control eering	Pro	gram	me: B.	Tech.			
Semester	V			irse egory	: PC	End S	emester	Exam Type:	TE
					Week	Credi	t	Maximum	Marks
Course Code	U23IC	TC03	L	Т	Р	С	CA M	ESE	TM
Course Name	LINEA	R CONTROL SYSTEMS	2	1	0	3	25	75	100
		(Common to IC	CE ar	nd Me	chatr	onics)	· .	···	
Prerequisite	Basic I	Mathematics, Physics					la constant		
	On co	mpletion of the course, t	the s	tudeı	nts wil	l be able	to	BT Mapp (Highest L	oing .evel)
Course	CO1	Understand the basic co systems.	ncep	ts on	the mo	odelling o	f control		K2
Outcomes	CO2	Determine the time response	onse	analy	sis of	systems.			K4
	CO3	Perform the frequency resystems.	espor	ise ai	nalysis	of contro	ol		K 4
	CO4	Analyze the stability of th	ne sv	stem		•••••••••••••••••••••••••••••••••••••••			<2
	CO5	Design the compensation							<u>-</u>
UNIT – I	Mathe	matical Modeling of Syst				Periods:	09		
Electrical Analogy of Motor - Block Diagra	of Mecha m Redu	op Systems, Closed Loop anical and thermal syster action Techniques - Signal	ms -	Γrans	fer fur	Elements nction - D	in Contro).C and	ol System - A.C Servo	O1
UNIT – II	lime F	Response Analysis				Periods:	09		
Specifications - Ge Constants.	nais - i ii eneralize	me Response of First and Error Series - Steady	and S y Sta	Secor ate E	nd Ord irror -	der Syste Static a	em, Time and Dyna	e Domain- amic Error	O2
UNIT – III	Freque	ency Response Analysis			<u>-</u>	Periods:	nα		
Bode Plots - Polar p Adjustment using po UNIT - IV	lots - De lar plots	struction of Bode Plots - Determination of Phase Mai	eterm rgin a	nination of the control of the contr	ain ma	Sain and argin from	n Polar p	largin from C lots – Gain	O3
		ocation of Roots in S Pla	nno f	or St				N.:4:	
Root Locus Analysis UNIT – V	- Effect	of PoleZero Additions on lensator and State Space	Root	Locu	s - Nyo	quist Stab Periods:0	ility Crite	rion.	04
		ion networks - Lag, Le						Effort of	
providing Lag, Lea	d and L	ag-Lead compensation on ate Variable and state mod	syst	em p	erform	ance and	design (ısina bode Co	O5
Lecture Periods: 4		Tutorial Daviada.			Period		otal Per	***************************************	
2. Ogata K, —Mod	lern Con	I, Control System Enginee	-Hall	of Inc	lia Pvt	ternation	al Pvt Lto	I, Sixth Editic	on, 2017 2015.
Reference Books		matic Control Systems II, F							
 Norman S Nise, SmarajithGhosh 2015 	Control , —Cont	System Engineering , Joh trol Systems Theory and A	n Wil Applic	ey ar ation	id sons sll, Pe	s, inc., Se arson Edu	venth Education, S	lition, 2015 Singapore, S	ixth Edition
			ol Sv	stems	sll Pea	rson Edu	action T		
	Robert I	H Bishop, —Modern Contr	or Oy.	oco i i i	, , oc	Laa	Callon, 1	welfth Editior	ո, 2017.
 Richard C. Dorf, Gopal, M., "Cor 2012. 	ntrol Sys	H Bishop, —Modern Contro tems, Principles and Des	ign",	Tata	McGr	aw-Hill P	ub. Co.,	4 th Edition,	
 Richard C. Dorf, Gopal, M., "Cor 2012. 	ntrol Sys		ign",	Tata	McGr	aw-Hill P	ub. Co.,	4 th Edition,	

- 2. https://www.smartzworld.com/notes/control-systems-pdf-notes-cs.
- 3. https://easyengineering.net/control-systems-engineering-by-nagoor-kani/
- 4. https://civildatas.com/download/control-systems-engineering-by-i-j-nagrath
- 5. https://www3.nd.edu/~pantsakl/Publications/348A-EEHandbook05.pdf.

COs		Si .			Prog Outo	ram Spe	cific SOs)								
	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	2	2		.		- ,	_	-	_	_	3	1	1
2	3	2	2	2	-	-	-	_	_	_	_		3	1	1
3	3	2	2	2	_	_	_	_	_			-		1	1
4	3	_	1	2	_	_				-	-	-	3	1	1
5	3	2	1	2		-				-	-	-	3	1	1
3	3		1	2	-	-	-	-	-	-	-	-	3	1	1

Assessment			Continuou	s Assessment N	larks (CAM)	End	
,	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examinatio n (ESE) Marks	Total Marks
Marks	5	5	5	5	5	75	100



Department	Mecl	natronics	Prog	ramme	: B.Te	ch.				
Semester	v		Cour PC	se Cat	egory:	End S	emester	r Exam Type: LE		
Course	11228	MCP505	Pe	eriods/\	Week	Credit	Maximu	um Marks		
Code	0231	WCF303	L	Т	Р	С	CAM	ESE	TM	
Course Name		JSTRIAL AUTOMATION ORATORY	1	50	50	100				
		Mechatronics								
Prerequisite	Knov	vledge of control system and Se	ensors a	and Tra	ansduc	ers		,		
	On	completion of the course, the	studer	nts will	be ab	le to			/lapping est Level)	
	CO1	Identify the different types of F and their specifications, s processing speed, and memor	uch a	s inpu					K1	
	CO2	Describe the differences be Structured Text (ST) in te applications in industrial auton	rms of						K2	
Course Outcomes	CO3	Apply Functional Block Diagra controlling a motor or light s blocks like logic gates and time	witch						K3	
	CO4	Analyze the flow control loop sensor input data and adjust stable flow rate, addressing ar	s the	actuato	or's out	put to m			K4	
	CO5	Examine the security measu analyzing vulnerabilities and paystem from unauthorized acc	roposir	ng enh	anceme	ents to pr			K4	

L List of Experiments

- 1. Study of different PLCs and their specification
- 2. Study of installations and troubleshooting of PLC.
- 3. Development of Ladder Diagram (LD) and Structured Text (ST) programming in PLC for simple applications.
- 4. Development of an application by using timer and counter of PLC.
- 5. Solving simple problems using Functional Block Diagram (FBD) programming in PLC
- 6. Interfacing between PLC and Process loop (temperature)
- 7. Interfacing between PLC and Process loop (level)
- 8. Interfacing between PLC and Process loop (flow)
- 9. Verification and testing of PID controller in a process loop.
- 10. Develop one application using SCADA system.
- 11. Motor speed control using PLC and VFD

Lecture Periods: - Tutorial Periods: -	Practical Periods: 30	Total Periods: 30
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- 1. Frank D Petruzella, "Programmable Logic Controllers", McGraw Hill, New York, 2016
- 2. Process Control Instrumentation Technology By. C.D. Johnson, PHI, Eighth Edition, 2014.
- 3. Hugh Jack, "Automating Manufacturing Systems with PLCs", Lulu.com, 2010, eBook
- 4. Frank D Petruzella, "Programmable Logic Controllers", McGraw Hill, New York, 2016
- Popovic Bhatkar and Vijay P. Bhatkar, "Distributed Computer control for Industrial Automation", Imprint-Routledge, New York, 2017

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- 2. http://iotmumbai.bharatividyapeeth.edu/media/pdf/lab_manuals/Manual_EE5I_EIA_2252 6.pdf
- 3. https://pdfcoffee.com/automation-lab-manual-5-pdf-free.html
- 4. https://doi.org/10.1201/9781315141404.
- 5. https://support.industry.siemens.com/cs/ww/en/view/63314183

COs	d	To the second		Pi	rogran	n Outc	Program Specific Outcomes (PSOs)								
	P01	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	-	-	u -			3	1	2	1	3	2	-
CO2	3	2	1		-	-	-	-	3	2	2	2	3	3	-
CO3	3	2	1	-	- 1	-	-	-	3	1	2	3	3	2	-
CO4	3	2	1	-	-	-	-	-	3	2	2	1	3	3	-
CO5	3	2	1	-	-	-	-	-	3	2	2	3	3	2	-

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

	Co	End					
Assessment	Performan cla	ce in pract isses	ical	Model Practical	Attendance	Semester Examination	Total Marks
	Conduction of practical	Record work	viva	Examination	Attendance	(ESE) Marks	war KS
Marks	15	5	5	15	10	50	100



Semester	v		Programme : B.Tech.								
Course			Cours	e Cateo	gory: PC	En	d Semester	Exam	Tyne: Li		
Code	U23M	CP506	Per	iods/W	····	Credit	Maximu				
Course	SIMUI	ATION OF INSTRUMENTATION	_ L	T	P	С	CAM	ESE	TM		
Name	LABO	RATORY	0	0	2	1	50	50	100		
rerequisite	Knov	Mec wledge of Sensors and Transducers	hatronics	5	I						
	On c	ompletion of the course, the students v	will be ab	le to				(Hi	apping ghest		
	CO1	Explain how shift registers and fe illustrating their importance in control	iling data	flow an	nd state re	atantian in	1	ŀ	vel) <2		
Course	CO2	Discuss the role of sequence structusks within a GSD program, empha execution.	turee in	anguri	- 1 - dt			ŀ	(2		
Outcomes	CO3	Demonstrate the process of creating configure the properties and settings	to effective	vely visi	Halize res	al time det	_	k	(3		
	CO4	Analyze the performance implication comparing the efficiency of one-dim specific tasks.	is of ligin	a diffor	cont arms.			K	4		
	CO5	Contrast buffered versus unbuffered approach affects the efficiency of data	d file I/O	opera	itions, di	scussing	how each	K	<i>A</i>		

- 1. GSD using For loops, while loops with shift registers / feedback nodes
- 2. GSD using Local variables and Global variables

Structures

- 3.GSD using Case structures and Sequence structures
- 4.GSD using Timed structures, Formula nodes and Event structures Plotting data:
- 5. GSD using Waveform graph, Waveform chart, XY graph Strings:
- 6. GSD using string functions, editing, formatting and parsing string Arrays and clusters:
- 7. GSD using arrays functions and multi-dimensional arrays
- 8. GSD using clusters operations: assembling clusters and disassembling clusters Modular Programming:
- 9. Creating sub VIs from section of a VI
- 10. File Input / File Output function Read / Write a file.

Data Acquisition system (DAQ or My Rio):

- 11. GSD for real time measurement using Thermistor / Piezo-electric sensor
- 12. GSD for real time monitoring using Seven-Segment LED Display/ Motor/ Bu

- CO Ioi real time	riformoring using Seven-Seg	ment LED Display/ Motor/ Buzzer/ Sp	eaker
Lecture Periods: -	Tutorial Periods: -	Practical Periods: 30	Total Periods: 30
Reference Books			onous, ou

Reference Books

- Seborg, Dale E., Duncan A. Mellichamp, Thomas F. Edgar, and Francis J. Doyle, "Process dynamics and control", 4th edition, John Wiley & Sons, 2016.
- 2. Stephanopoulos, George, "Chemical Process Control: An Introduction to Theory and Practice", Pearson India.
- 3. LabVIEW. Basics Course Manual, National Instruments Corp., USA, 2010.
- 4. Popovic Bhatkar and Vijay P. Bhatkar, "Distributed Computer control for Industrial Automation", Imprint- Routledge, 5.
- Education Services, 2015 LabView Tutorial Manual, National InstrumentsCorp., 2010 (www.ni.com).

Web References

- https://www.unibo.it/en/teaching/course-unit-catalogue/course-unit/2013/376395
- https://jecassam.ac.in/wp-content/uploads/2018/10/12Virtual-Instrumentation-lab_.pdf 2.
- https://www.bits-pilani.ac.in/uploads/Pilani_Upload/EEE/VIRTUAL%20INSTRUMENTATION.pdf 3.
- 4. http://www.plasma.uaic.ro/ro/downloads/cat_view/59-instrumentatie-virtuala
- https://doi.org/10.1201/9781315141404.

Cos Mapping with POs and PSOs

											-				
COs							Progr	am Ou	tcome	s (POs))		Program Specin Outcomes (PSC		
	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	2	1	3	-	-	-	3	-	-	1	2	2	3
2	3	2	2	1	3	-	-) = (3		-	1	2	2	3
3	3	2	2	1	3	-	-	-	3	-	-	1	2	2	3
4	3	2	2	1	3	٦_	-	_	3	-	-	1	2	2	3
5	3	2	2	1	3	-	-	_	3	-	-	1	2	2	3
	0	-1-4						1						_	3

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

	Co	ntinuous /						
Assessment	Performan cla	ce in pract asses	ical	Model	A44	End Semester Examination	Total	
ŧ	Conduction of practical	Record work	viva	Practical Examination	Attendance	(ESE) Marks	Marks	
Marks	15	5	5	15	10	50	100	



Department	Mec	hatronics	Progra	mme : E	3.Tech						
Semester	V			Catego			End	Somoot	or Even	T	
Course Code	1123	WCP507	Periods/Week Cre					End Semeste			
	ļ		L	Т	Р	С		CAM	ESE	ТМ	
Course Name		ID POWER SYSTEMS ORATORY	0	0	2		1	50	50	100	
			Mechatronics	······································							
Prerequisite	Bas	ic Knowledge of Valves and Pum	OS .								
	On	(H	lapping ighest evel)								
	CO1	Understand the actuators and va	lves for the des	sign of f	luid pov	ver circ	cuits.		K2		
Course Outcomes	CO2	Describe the operation and main simulate the fluid power circuits u	tenance of con	nmon flu	iid pow	er com	pone	nts and		K2	
Outcomes	CO3	Apply the fluid power circuits usir	ng suitable actu	ators a	nd valv					1/2	
	CO4	Analyze the design and simulate		K3							
	CO5	Discriminate the fluid power circu)	K4							
	CO5	applications	l	K4							

Pneumatics

List of Experiments

Cycle-I

- 1. Study experiment on pneumatic components and their symbolic representation.
- 2. Experiment on actuation of single acting cylinder by 3/2 D.C. valve.
- 3. Experiment on actuation of double acting cylinder by 5/2 D.C. valve.
- 4. Experiment on direct control of double acting cylinder by 5/2 D.C. Valve
- 5. Indirect actuation of double acting cylinder using 5/2 way double pilot operated valve.
- 6. Experiment on speed control of single acting cylinder using one way flow control valve.
- 7. Experiment on speed control of double acting cylinder using one way flow control valve
- 8. Experiment on Speed control of double acting cylinder using Quick exhaust valve.
- 9. Experiment on Pneumatic circuits double acting cylinder operating with logic controls AND valve and OR valve.
- 10. Experiment on Actuation of single acting cylinder by using solenoid operated valve.
- 11. Design and testing of Electro Pneumatic sequential circuit with limit switches.

Hydraulics

- 12. Experiment on use of pressure relief valve with double acting cylinder.
- 13. Experiment on use of 2- way flow control valve with double acting cylinder.

Design assignments and simulation

14. Simulation of basic hydraulic, pneumatic and electrical circuits using Automation studio/Fluid SIM software.

Le	ecture Periods: -	Tutorial Periods: -	Practical Periods: 30	The second secon
-		raconari enous	Practical Periods: 30	Total Periods: 30
Ke	ference Books			
1.	Bireswar Maiumdar "Flu	uid Mechanica with Labora	tory Manual" PHI Learning Pvt. Ltd	
	=	nd Mechanics with Labora	tory Manual" PHI Learning Pvt. Ltd	- 2016
2.	R. V. Raikar "Laborator	y Manual Hydraulics And H	Hydraulic Machines " PHI Learning	Did 144 0040
3.	Cameron Tropea Alexa	andori Vorin I-b- F F	ss "Springer Handbook of Experime	PVI. Ltd – 2012
٠.	ouncion Tropea, Alexa	inder L. Yarın, John F. Fos	s "Springer Handbook of Experime	ental Fluid
	Mechanics" Springer So	cience & Business Media -	2007	Train Fidia
4	71 71 71 71			

- Zh. Zhang "Hydraulic Transients and Computations "Springer International Publishing, 2020
- Sposito Anthony, "Fluid Power with Applications", 7th Edition, Pearson Higher Education, New York, 2015

Web References

- 1. http://fmc-nitk.vlabs.ac.in/
- 2. http://vlabs.iitb.ac.in/vlabs-dev/labs/nitk_labs/fluid-machinarylab/index.html
- https://archive.nptel.ac.in/courses/112/106/112106175/https://autocadtutorials.com

COs		Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	РОЗ	PO4	PO5	P06	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	
1	3	2	2	3	2	-	-	4	3	-	-	2	2	2	3	
2	3	2	2	3	2	-	-	-	3	-	-	2	2	2	3	
3	3	2	2	3	2	-	-	-	3	-	-	2	2	2	3	
4	3	2	3	3	2	-	-	-	3	-	=	2	2	2	3	
5	3	2	2	3	2	-	-	-	3		-	2	2	2	3	

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

	Co	ntinuous A	ssess	ment Marks (CA	M)	End	
Assessment	Performano cla	ce in pract isses	ical	Model Practical	Attendance	Semester Examination	Total Marks
	Conduction of practical	Record work	viva	Examination		(ESE) Marks	
Marks	15	5	5	15	10	50	100



Department	Mecha	echatronics Programme: B. Tech.										
Semester	V		Cour	se Cate	gory Co	de: PA	*End Se	emeste	ster Exam Type: -			
Course			Periods / Week Credit M						ximum Marks			
Code	U23MC	CW501	L	Т	Р	С	CAM	ESE	TM			
Course Name	MICRO	MICRO PROJECT 0 0 2 1 100										
	,	Mecl	natron	ics								
Prerequisite	Electrical Engineering, Electronics											
	On co	completion of the course, the students will be able to										
Course Course Identify the problem statement for the micro project work through the literature K2									K2			
Outcomes	CO2	Choose the proper components as per the requirements of the design/ system.										
	CO3	Apply the acquainted skills to deve		K3								

There shall be a Micro Project, which the student shall pursue as a team consists of maximum 4 students during the third year, fifth semester. The aim of the micro project is that the student has to understand the real time hardware / software applications. The student should gain a thorough knowledge in the problem he/she has selected and in the hardware / software he/she using in the Project. The Micro-project is an application that should be formally initiated and should be developed and also to be implemented by the respective team.

The Micro Project shall be submitted in a report form along with the hardware model / software developed, duly approved by the department internal evaluation committee. It shall be evaluated for 100 marks as Continuous Assessment. The department internal evaluation committee shall consist of faculty coordinator, supervisor of the project and a senior faculty member of the department. There shall be two reviews that will be considered for assessing a Micro Project work with weightage as indicated evaluation Methods.

Lecture Periods: -	Tutorial Periods: -	Practical Periods: 30	Total Periods: 30

COs/POs/PSOs Mapping

COs		Program Outcomes (POs)											Program Specific Outcomes (PSOs)		
003	P01	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
1	3	2	2	2	-	-		-	3	3	-	1	1	1	1
2	3	3	3	2	2	2	2	2	3	3	3	1	2	2	2
3	3	2	2	1	-	2	-	-	3	3	3	1	3	3	3

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

		Review 1	× .		Review 2						
Assessment	Novelty	Presentation	Viva	Presentation	Demonstration	Viva	Report	Total Marks			
Marks	10	20	10	20	20	10	10	100			



Department	Mechatronics	Progr							
Semester	V	Course Category: AEC End Semester Exam Ty							
Course Code	U23MCC5XX	Pe	eriods/W	eek	Credit	edit Maxim		num Marks	
Course Code	023IVICC9AA	L	T.	Р	С	CAM	ESE	TM	
Course Name	CERTIFICATION COURSE - V	0	0	4	_	100	-	100	

Students shall choose an International / Reputed organization certification course of 40-50 hours duration specified in the curriculum (It is mandatory to do a minimum of six courses) which will be offered through the Centre of Excellence. These courses have no credit and will not be considered for CGPA calculation.

- (i) Certification Courses are required to be completed to fulfil the degree requirements. All Certification courses are assessed internally for 100 marks.
- (ii) The Course coordinator handling the course will assess the student through attendance and MCQ test, and declare the student as "pass" on satisfactory completion. A letter grade "P" is awarded to declare pass.
- (iii) The marks scored in these courses will not be taken into consideration for the SGPA / CGPA calculations in the grade sheet.

Evaluation Methods

Assessment	Continuous Assessm	ent Marks (CAM)	Total Manks		
Assessment	Attendance	MCQ Test	Total Marks		
Marks	10	90	100		

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Department	Mec	hatronics	Progran	nme: B	.Tech.				
Semester	V		Course	Catego	ry Code	e: MC *En	d Semeste	r Exam T	/pe: -
0	11231	/ICM505		ds/We		Credit		ximum Ma	
Course Code	0201		L	Т	Р	С	CAM	ESE	TN
Course Name		ENCE OF INDIAN TRADITIONAL WLEDGE	2	0	0	-	100	-	100
Prerequisite	_	Common	to ALL Bra	nches					L
1	On c	ompletion of the course, the stude	ante will b	a abla	t-a			BT Ma	ppina
	CO1	Familiarize with the philosophy of India		- abic				(Highes	t Level
Course	CO2							K	2
Outcomes	CO3	Distinguish the Indian languages and li						K	2
	CO4	Describe the philosophy of ancient, me			India			K	2
		Illustrate the information about the fine						K	2
	CO5	Describe the contribution of scientists of	of different e	ras				K	2
UNIT- I		duction To Culture					Perio	ds:06	
Sulture, civilization Sulture, Ancient I	on, cultu ndia. M	ure and heritage, general characteristic edieval India, Modern India	s of culture	, import	ance of	culture in hu	man literatu	ıre, Indian	CO1
UNIT- II		in Languages, Culture and Literature					Dovide	J00	
Indian Language	s and L	iterature - I: the role of Sanskrit signification	ance of scrir	otures to	Current	society India	Period	ioo othor	T
ouriorate iterature	, ilicial	ure or south mala malan Languages and	Literature-I	I: North	ern India	in languages	& literature	iles, other	CO2
UNIT-III	Relig	Jion and Philosophy					Dovis	ds:06	.4
ndia (selected m	osophy ovemer	in ancient India, Religion and Philosop nts only)	hy in Medie	val India	a, Religio	ous Reform M	lovements i	n Modern	СОЗ
UNIT- IV	Fine	Arts in India (Art, Technology and En	gineering)				Perio	ds:06	<u> </u>
Indian Painting, I Architecture (anc and modern India	icit, ili	andicrafts, Music, divisions of Indian cla edieval and modern), Science and Tech	ssical music nology in Ir	c, mode ndia, de	rn Indiar velopme	n music, Dance ent of science			CO4
UNIT-V	Educ	ation System in India					Period	le·N6	<u> </u>
ducation in anci-	ent, me	dieval and modern India, aims of educ	ation, subje	cts, lanç	guages,	Science and	Scientists of	of Ancient	
-ecture Periods:	OCICITO	ists of Medieval India, Scientists of Mode Tutorial Periods: -	Practical			*			CO5
Reference Books		ruconarrenous	Practical	Perioas	S: -	То	tal Periods	:30	
 Kapil Kapoor "Science in S NCERT, "Pos S. Narain, "E M. Hiriyanna 	, "Text a Samskrit sition pa xamina	and Interpretation: The India Tradition", I t", Samskrita Bharti Publisher, ISBN 13: aper on Arts, Music, Dance and Theatre" tions in ancient India", Arya Book Depot, ntials of Indian Philosophy", Motilal Bana	978-818727 , ISBN 81-7	6333, 2 450 494	007 I-X, 200	· 978 - 81208	10990 201	4	
CD INCICICIONES					.0011 10	. 070 - 01200	10990, 201	4	
. https://nptel.ac	.in/cour .in/cour	ses/109/104/109104102/ ses/101/104/101104065/							
https://nptel.ac	.in/cours	ses/109/108/109108158/							
https://nptel.ac.	.in/cours	ses/109/106/109106059/							
nttps://nptel.ac	in/noc/	courses/noc17/SEM1/noc17-ae01/							
Os/POs/PSOs N	napping								

COs	201					gram O	utcome	s (POs)				Prog Outc	ram Spe omes (P	cific SOs)
	P01	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	1	-	-	-	-	-	-	-	-	3	-	1	1		1
2	1	-	-	-	-	_	-	_	_	3	Carry Carry	1	1		
3	1	-	-	_	-	_		_		3	-	1	1	-	1
4	1									. 3		1	1	-	1
				-	-	-	-	-	Ξ.	3		1	1	-	1
5	1	-	-	-	-	-	. •	-	-	3	:	1	1	-	1

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

Continu	ous Assessment	Marks (CAM)	
Attendance	MCQ Test	Presentation / Activity / Assignment	Total Marks
10	30	60	100
	Attendance	Attendance MCQ Test	Assignment Assignment



Department	Mech	natronics	Progra	amme :	B.Tech.				
Semester	VI		Cours	e Categ	ory: PC	End S	Semeste	r Exam Typ	e: TE
Course				iods/W		Credit	····· Y ·····	num Marks	4
Code	U23N	MCT612	L	Т	Р	С	CAM	•••••	TM
Course Name	COM	PUTER AIDED MANUFACTURING	3	0	0	3	25	75	100
9	. 	Mec	hatronic	3					
Prerequisite	Manu	ıfacturing Technology					***************************************	***************************************	
	On c	ompletion of the course, the stude	nts will b	e able	to				apping st Level)
	CO1	Understand the basic concepts of	САМ арр	lication	and unde	erstand CII	M wheel		K2
Course	CO2	Describe the CNC programs for ma and lathe machines	anufacturi	ng of di	ifferent ge	eometries	on millin	9	K2
Outcomes	CO3	Differentiate the components using	different t	echniq	ues of gro	oup techno	logy.		K3
	CO4	Explain the layouts of FMS and AG	V for indu	ıstrial a	nnlication	18			K3
	CO5	Apply the concept of PPC, JIT, MR					ΔΝΛ		
UNIT - I		duction of CAM	1 1, 1011 (1	ii, and	Lapert	ysterii to o		riods: 9	K3
		tives & scope, Nature & Type of mar	ufacturin	a syster	m. Evolut	ion. Benef			T
		Concepts of Computer Integrated Ma							
manufacturing e	nginee	rs, CIM Wheel to understand basic fu	unctions.			and the same that the			CO1
UNIT - II		NC Machine Tools			1			riods: 9	
		nology: Types, Classification, Spec							
		s of Part programming, Types of for	mat, lathe	e and n	nilling ma	chine ope	rations,	subroutines	cO2
	***************************************	les, parametric subroutines					7 -		
UNIT - III		p Technology and CAPP		. ODIT	7 DEA	FFA 0-11		riods: 9	1
		nilies, part classification and coding part concepts, Benefits of group t							
		ation and benefits.	ecililolog _.	y. Appi	Uaciles i	o Flocess	Platiti	ig, Dillerer	CO3
UNIT - IV	,	ble Manufacturing System					Pe	riods: 9	
Introduction & C		ent of FMS, Needs of FMS, genera	I FMS co	nsidera	tion, Obje	ectives, Ty			d
		nd advantages. Automated material							
		System, Automated Guided Vehicles,		manufa	cturing.				
		ated Production Management Syst						riods: 9	
		amentals, Problems with PPC, MRP		l, Just i	in Time p	hilosophy,	Conce	ots of Exper	
System in Manu	facturir	ng and Management Information Syst	tem.						CO5
Lecture Perio	ods: 45	Tutorial Periods:	Practica	Period	ds: -		То	tal Periods	: 45
Text Books		<u>i</u>				······································	1	***************************************	
1. CAD/CAM, I	Principl	es and Applications –P N Rao, McGr	aw Hill, T	hird Ed	lition, July	/ 2017.			
		, " Computer Numerical Control ", Ne							
		gy and Flexible Automation, by S R [Deb, S De	b, McG	Fraw Hill	Education	Private	_imited, 201	0
Reference Bool									
		anufacturing- Rao, Tewari, Kundra, N						***************************************	
Education, Ja	anuary				- •			son	
·		ring Cells and Systems, Prentice Hall					91		
		and Practice, Ibrahim Zied, McGraw			·	109			
Web Reference		nufacturing S. Vishal-S. K. Kataria &	Sons-De	ini, 200	14				
		urses/112104188							
		irses/112104031							
ļ		ac.in/courses/112/102/112102101/							
		ac.in/courses/112/102/112102103/			***************************************				
L		ac.in/courses/112/104/112104289/	Ø .			***************************************			
L	<u>.</u>								

COs	Progi	ram O	utcom	es (PC	Os)			- "		El El				Specific es (PSOs)	
	PO1	PO2	PO3	PO4	PO5	P06	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	2	-11	1	2	1	-	1	-	1	-	-	1	2	1	1
2	2	-	2	2	1	-	-	-	1	0-0		1	2	.1.	1
3	2	2	1	1	-	-		1 =1	7, 1 ,	n Right		1	2	1	1
4	2	. 2	1	2	-	-	-	=	1	1_	-	1	2	1.	1
5	2	2	1	2	1	1	-	_	. 1	-	1	1	2	1	1

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

Assessment			Continuou	s Assessment N	larks (CAM)	End	
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	5	5	5	5	5	75	100



Department	Mechatro	nics	Prog	gramm	ne : B.T e	ech.			
Semester	VI .		Cou PC	rse Ca	ategory:	End Se	emester	Exam	Гуре: ТЕ
Course				eriods	/Week	Credit	Ma	ximum N	Vlarks
Code	U23MCT6	13	L	T	Р	С	CAM	ESE	TM
Course Name	Embedde Mechatro	d System For nics	3	0	0	_ 11 3 110	25	75	100
		N	lechatro	nics			LL.	<u>l</u>	
Prerequisite	Basic Con	cepts of Programmin	g and Mid	ro Coi	ntrollers	1	171	2 33	
	On comple	tion of the course,	the stud	ents v	vill be a	ble to		1	T Mapping ghest Level
	the pro	e the key componer ocessor, hardware ι	ınits, and	embe	dded so	oftware.			K1
Course Outcomes	Explai	n the working of unication between	bus arbi	tration	and h	ow it ta			K2
	CO3 counte	nstrate the configuer in an embedded n	nicrocont	roller f	or time-	related to	asks.		K3
	CO4 Analyz	ze the performand tion and fragmentati	ce implic on in rea	ations I-time	of dy systems	namic i s.	nemory		K4
	CO5 trace	ine the relationship how system behaved from the concept	viors, dat	a flov	v, and i	interaction	ons are	1	K4
UNIT – I	INTROD	UCTION TO EMBE	DDED SY	STEN			Per	iods:09	
embedded syster FSM, Petri nets], I	m, Embedded Layers of Emb	hardware unit, software unit, softwa	Embedo	ded Sy	ystem n		[flow	graphs,	CO1
UNIT – II		SOR AND MEMORY				ot Arabit		iods:09	***************************************
CISC], Basic Emb	edded Proces re [cache, virt	ices and their Chara ssor/Microcontroller ual, MMU and addre ng.	Architect	ure [80)51, ARI	M, DSP,	PIC], m	nemory	CO2
UNIT – III	I/O DEVIC	ES AND NETWORI	KS				Peri	iods:09	
Displays, Keyboar FIREWIRE, USB,	rds, Infrared d IRDA], Netwo	Interrupt Controllers evices], Memory Intorks for Embedded s letooth, ZigBee, Evo	erfacing, systems (I/O De CAN, I	evice Into 2C, SPI	erfacing I, USB, F	[GPIB, RS485, F		СОЗ
UNIT – IV	OPERATI	NG SYSTEMS					Peri	iods:09	
system, multi rate ault tolerant sch orocess stack m	e system], Pro neduling], Inte nanagement,	g System, Kernel Focesses and Thread or process Commu dynamic allocation ers], RTOS [VxWor	ls, Conte nication, n], I/O[sy	xt Swi real nchroi	tching, S Time m nous ar	Scheduli nemory i	ng[RM <i>A</i> manage	A, EDF, ement [CO4
UNIT – V	EMBEDDE	ED SYSTEM DEVEL	LOPMEN	Т		8	Peri	iods:09	
Modeling],Design	Examples[Te	s Design tool, UML l lephone PBX, Inkjet ques, Reliability Eva	t Printer,	PDA,	Elevato				CO5
Lecture Periods	s: 45	Tutorial Periods:	Pract	ical Pe	eriods:		Tota	al Perio	ds: 45
Text Books	- L			••••••					
2. M. A. Mazidi, S Pearson, 2015	S. Naimi, S. N 5.	m-Architecture, Prog aimi, The AVR Micro stems-An Integrated	ocontrolle	r and	Embedo	ded Syst			embly and C
Reference Bool									
		led Systems Building	g Blocks:	Comp	lete and	d Ready-	To-Use	Module	s in C", The

2. Elicia White, Making Embedded Systems, O Reilly Series, SPD,2011.

- 3. Wayne Wolf, "Computers as Components: Principles of Embedded Computing System Design (The Morgan Kaufmann Series in Computer Architecture and Design)", 5th Edition, 2022.
- 4. Manuel Jiménez Rogelio, Palomeral sidoro Couvertier "Introduction to Embedded Systems Using Microcontrollers and the MSP430" Springer Publications, 2014.
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- 4. https://digital-library.theiet.org/content/books/ce/pbce109e
- 5. https://onlinecourses.nptel.ac.in/noc24_cs25/preview

COs/POs/PSOs Mapping

COs	DOA	200				ram O	utcom	es (PC)s)				Progra Outco	am Spec mes (PS	cific SOs)
_	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	2	2	2	3		457				411	111		1	2	1 000
2	2	2	1	3	12.7	1.1711	1.00	744	70.7				1		3
2	2	2	2	-					_	-	-	2	3	-	-
3			2	-			-	- 1	-	-		2	_	2	3
4	2	3	1	2	2	2	_	1	1	1					<u> </u>
5	2	2	2	2	-				deal of a		: 1	1	2	2	-
3		3		2	1	-	a = 1	1		1	-	2	-	2	

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

Assessment			Continuou	s Assessment I	Marks (CAM)	End	
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examinatio n (ESE) Marks	Total Marks
Marks	5	5	5	5	5	75	100



Department	Mecha	atronics	3	Progra	amme :	B.Tech.				
Semester	VI			Cours	e Categ	jory: PC	End S		er Exam Type:	TE
		1800		Pe	riods/W	eek	Credit	Maxi	mum Marks	
Course Code	U23M	CT614		L	ТТ	Р	C	CAM	ESE	ТМ
Course Name	DESIG	N OF I	MECHANICAL ELEMENTS	3	0	0	3	25	75	100
	L			hatronic						
Prerequisite	Knowl	edge of	Engineering Mechanics and	Mechan	ics of s	olids				
	On co	mpleti	on of the course, the stude	nts will	be able	to			BT Ma (Highest	
	CO1	List th	e various step involved in the	design	process				K	1
	CO2	Explai	n the components under stati	ic loadin	g condit	ions.			K	2
Course	CO3		stand and apply principles of				helical gea	ars.	K	(1
Outcomes	CO4	Analy	ze and demonstrate the desig	an proce	dures fo	or Brakes	and Clutc	hes	K	(4
	CO4		iment an expertise in design							······································
	CO5		iment an expertise in design t ations.	oi jouina	Dearii	g and sp	illigo ili illo	laothai	K	(4
UNIT - I	INTRO	i	ION OF MACHINE DESIGN					F	Periods: 9	
ntroduction: N	Machine	desig	n, classification of machir	ne desi	gn, de	sign cor	nsideration	, Facto	or of Safety,	
esign procedu oncentration F	re for s actor a	imple a and its	and combined stresses (No Neffects (theory only). Introdust Theory, Distortion Energy 1	Numerica uction to	al). Intro	duction	to Stress (Concen	itration, Stress	
UNIT - II			SHAFTS, KEYS AND COUP						Periods: 9	L
Ordin - II	e. Desir	n for st	rength and Rigidity with Stea	dv loadir	na. Desi	ign of Ke	ys: Types o	of keys,	, Design of	со
esign of Shart evs. Design of	Couplin	nas: Fla	nge coupling, Bush and Pin t	ype cou	oling.	3			-	- 60
UNIT - III			SPUR AND HELICAL GEAR			1 , 1 .			Periods: 9	***************************************
Design of Spi	ır Gears	: Bean	strength of spur gear, Stre	sses in	gear tee	eth (Lewi	s equation), dyna	mic tooth load	
and design for	wear. cal gear		n strength of helical gear, Str							
UNIT - IV		GN OF	BRAKES AND CLUTCHES						Periods: 9	7
Brakes – Type blate – Multi pla			tem in automobiles , Design outch	of drum	and Ba	and brake	es , Design	of clut	ches – Single	со
			BEARINGS AND SPRINGS						Periods: 9	
Design of Journ hickness, Hea	nal Bear	inas: T	ypes of bearings, bearing cha eat dissipated, Bearing Mate	racterist erials. De	ic numb esign of	er, coeff Springs	icient of fric - Design o	ction, m	ninimum oil film al spring, Lea	f co
spring.	• • • • • • •	-	Tutorial Periods:	Dractic	al Peri	ode			Total Periods	: 45
Lecture Per	10as: 4		Tutorial Periods.	riacue	arr cri			<u> </u>		
Text Books				¥ II						
1. Bhandar.V.	B., Des	ign of N	lachine Elements,4th edition,	McGra	w Hill E	ducation	India ,2017	7		
2.Ganesh Bal	ou K., K	. Srithar	, Design Of Machine Elemen	ts,1st Ed	lition, N	IcGraw H	lill,2009	······		
3. Spotts M.F.	, Shoup	T.E., F	ornberger L.E., Design of Ma	achine E	lements	: 8th edit	ion, Pears	on /Pre	ntice Hall,2003	3
Reference Bo	oks									
1. Hamrock B.	J., Fund	damenta	als of Machine Elements, 2nd	edition,	McGra	w Hill,200)4		. 2011	
2. Juvinall R.C	. ,K.M.	Marshe	k, Fundamentals of machine	compon	ent des	ign: 6th e	aition, Jon	n vviiey	7.2011	
3. Ansel C. U	gural, M	echanio	cal Design of Machine Compo	onents,	Si versi	on CRC	Press, 20	10.		
4. Wei Jiang,	Analys	sis and l	Design of Machine Elements.	vviley, 2	bine E	emente	IK Interna	tional F	Publishing Hou	se Pvt
Vijay Kuma Limited, 2010		n, Sures	h Verma, Analysis and Desig	ii oi ivia	JIIIIE EI	ements,	i.rv. iiiteiila	adonai r		JJ 1 VL
Web Referen	ces								1	
1. https://	ces /mech.ii	tm.ac.ir	n/meiitm/course/design-of-ma	chine-ele	ements/	1				
1. https:// 2. https://	ces /mech.ii /nptel.ac	c.in/cou	n/meiitm/course/design-of-ma rses/112/105/112105125/ s.in/2012/12/design-of-machi							

COs	Prog	ram C	utcor	nes (F	POs)		L.							n Specific les (PSOs	
.1	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
. 1	3	2	2	3	-11	-	-	-	-	16	11-11	2	2	2	3
2	3	2	2	3		-	-	lia i	11 <u>-</u> 11 h	_		2	2	2	3
3	3	2	2	3	-	-	-	-	-	-	-	. 2	2	2	3
4	3	2	3	3	-	-	-	-	-	-	-	2	2	2	3
5	3	2	2	3	-	-	:=:	-	-	-	-	2	2	2	3

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

Assessment		11	Continuou	s Assessment M	/larks (CAM)	End Semester	
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Examination (ESE) Marks	Total Marks
Marks	5	5	5	5	5	75	100



	Mech	atronics		Pi	rogramm	e : E	3.Tech.	*	tablete.	_ = _ =	6 "
Semester	VI			Co	ourse Ca	itego	ory: PC	End 9	Semester	Exam Typ	e: TE
Course		2_		1-27- 7-2	Periods	/We	ek	Credit	Maxim	um Marks	O.
Code	U23M	CT615			L T		Р	С	CAM	ESE	TM
Course Name	INDUS	STRIAL	ROBOTICS		3 (0	0	3	25	75	100
	T			Mechatr							
Prerequisite	Knowle	edge of I	Kinematics and Dynam	nics of Mad	chinery						
	On co	mpletio	n of the course, the	students v	will be al	ole t	0				lapping st Level)
	CO1	Unders	stand the components	and param	neters of	indu	ıstrial ro	bots			K2
Course	CO2		s forward kinematics, i I robots	inverse kin	nematics	and	Jacobia	n for seria	al and	3	K2
Outcomes	CO3	Apply 1	the classification of end	d effectors	3					İ	K3
	CO4	Exami	ne the kinematic calcul	lations to t	he indust	trial ı	robots				K4
	CO5	Compa	re the trajectory plann	ing to the r	robots						K4
UNIT - I	ļl	DUCTI		9 10 1116 1	35013				Per	iods: 9	117
	1		aws of Robotics - Ba	sic compo	nents of	rob	ot - cor	cent of w			of
			Accuracy - Repeatal							_	ot
			c arrangement.								CO1
UNIT - II	END E	FFECT	ORS		id are		*		Per	iods: 9	
Jnilateral Vs Mu	ıltilatera	l end eff	ectors - mechanical gr	ippers: gri	pping for	се е	stimatio	n with pay	load unde	er	
			tic - air operated grippe								CO
UNIT - III	KINEI	MATICS	OF ROBOT MANIPU	LATOR					Per	iods: 9	······
Representing	oosition	and rot	ation - rotation in plar	ne - rotatio	! 41		imancia	- D-1-1			
Rotation with r				io rotatio	on in thre	ee a	1111611510	n - Rotati	onal trans	sformation	-
			current frame and fixe	d frame -	Rule for	con	npositio	n of rotati	onal trans	formation	-
Parameterizati	on of r	otation -	current frame and fixe Euler angle, Roll, P	d frame -	Rule for	con	npositio	n of rotati	onal trans	formation	-
Parameterization Homogeneous	on of re transfo	otation - rmation.	Euler angle, Roll, P	d frame - litch, Yaw	Rule for angles	con	npositio	n of rotati	onal trans ation - rig	formation id motion	-
Parameterization Homogeneous UNIT - IV	on of retransfo	otation - rmation. OT DYNA	Euler angle, Roll, P	d frame - itch, Yaw TORY PLA	Rule for angles	Con	npositio	n of rotation	onal trans ation - rig	formation id motion iods: 9	-
Parameterization Homogeneous UNIT - IV Euler Lagrange colanning for poin	on of retransfor ROBC equation	otation - rmation. OT DYNA n, kinetion - Cu	Euler angle, Roll, P AMICS AND TRAJEC c and potential energy, bic polynomial - Quint	d frame - itch, Yaw TORY PLA Equation ic polynom	Rule for angles ANNING of motion and traject	Axis	nposition /angle i	n of rotati representa uler formu	onal trans tion - rig Per lation - Tr	iformation id motion iods: 9 ajectory	- cos
Parameterization Homogeneous UNIT - IV Euler Lagrange Dlanning for poir LSPB) minimur	on of retransform ROBC equation to mo	otation - rmation. OT DYN/ n, kinetion tion - Cu rajectory	Euler angle, Roll, P AMICS AND TRAJEC and potential energy, bic polynomial - Quint - trajectory for path sp	d frame - itch, Yaw TORY PLA Equation ic polynom	Rule for angles ANNING of motion and traject	Axis	nposition /angle i	n of rotati representa uler formu	onal trans tion - rig Per lation - Tr with paral	sformation id motion riods: 9 ajectory bolic bend	- cos
Parameterization Homogeneous UNIT - IV Euler Lagrange Dianning for poin LSPB) minimum UNIT - V	transfo ROBO equatio nt to mo time to	otation - rmation. OT DYNA n, kinetion tion - Cu rajectory OT APPL	Euler angle, Roll, P AMICS AND TRAJEC c and potential energy, bic polynomial - Quint c - trajectory for path sp ICATIONS	d frame - litch, Yaw TORY PLA Equation ic polynom becified by	Rule for angles ANNING of motion in trajection via point	Axis	nposition /angle in ewton E - Linear	n of rotati representa uler formu segment	onal trans ation - rig Per lation - Tr with paral	eformation id motion riods: 9 ajectory poolic bend riods: 9	- CO3
Parameterization Homogeneous UNIT - IV Euler Lagrange Dianning for point LSPB) minimum UNIT - V Industrial robots	transformation of retransformation ROBC ROBC ROBC	otation - rmation. OT DYNA n, kinetic tion - Cu rajectory OT APPL elding, p	AMICS AND TRAJECT c and potential energy, bic polynomial - Quint c trajectory for path sp LICATIONS ainting and assembly	d frame - litch, Yaw TORY PLA Equation ic polynomoecified by r, remote (Rule for angles and angles angles angles and angle of motion and traject via point angle Controlle	Axis, n, Nectory	nposition/ /angle in ewton E - Linear	n of rotati representa uler formu segment obots for	onal trans tion - rig Per lation - Tr. with paral Per nuclear t	eformation id motion riods: 9 ajectory bolic bend riods: 9 hermal ar	- CO3
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Parameterization Homogeneous UNIT - IV Euler Lagrange Idanning for point LSPB) minimum UNIT - V Industrial robots Indust	on of retransfo ROBC equation to mon time to mon time to mon time to mon time to mon time to mon time to mon time to mode: 45 roover, tions", Mosal, Research mode mode mode mode mode mode mode mode	otation - rmation. DT DYN/ n, kinetic tion - Cu rajectory DT APPL elding, p rial autor Mitchell McGraw obotics: tion to R Analysis garajan " Mihelj, J e and En dustrial F purses/1 .in/nd1_i	AMICS AND TRAJECT and potential energy, bic polynomial - Quinting rapidity and assembly mation, typical example Tutorial Periods: Weiss, Roger N. Nag Hill Book Company, 20 Fundamental Concept obotics: Mechanics and some mation of States and the Mechanics of States and the Mechanic	d frame - litch, Yaw TORY PLA Equation ic polynom becified by r, remote (e of automa Prac el, Nichola 112 Is and Ana id Control, Serial and ial Robotic Stanovnik, 112	Rule for angles. ANNING of motion ial trajective point. Controlle ated inductical Peas G. Od alysis, Ox Prentice Parallel as Pears Marko I	con Axis. n, Ne tory t. d ro ustrie riod Irey, ford Hall Mar	mposition/angle in/angle in/an	n of rotation of representation of representation of version of ve	Per lation - Tr with paral ruclear trisual insp Tot 2008	sformation id motion riods: 9 ajectory poolic bend riods: 9 hermal ar ection. al Periods pology, Pro	CO2 CO2 CO2 CO2 Grammin

COs	DO	Program Outcomes (POs) PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12											Outc	ecific (SOs)	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	2	3	W_	- (-	Τ_	-	-	-	2	2	2	
2	3	2	2	2					-					. 2	3
	3		2	3	- 1	-	Tape		to Tree			2	2	2	3
3	3	2	2	3	_										
						C Link	c in l	Low relate		i ii L	111176	2	2	2	3
4	3	2	3	3	-	-		-	-	_	-	2	2	2	3
5	3	2	2	3			-					n Guad	_		<u>ي</u>
	rrelatio				of- 1	17	- 1				-	2	2	2	3

Assessment	JON 1 1	1	Continuou	s Assessment I	Marks (CAM)	End	
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examinatio n (ESE) Marks	Total Marks
Marks	5	5	5	5	5	75	100



Department	Mech	atronics	Progra	mme : E	3.Tech	•			
Semester	VI		Course	Catego	ory: PC	Enc	l Semester	Exam T	ype: LE
			Per	ods/We	ek	Credit	Maximu	n Marks)
Course Code	U23M	CP608	L L	Т	Р	С	CAM	ESE	ТМ
Course Name	ЕМВЕ	DDED SYSTEM LABORATORY	0	0	2	1	50	50	100
		Me	chatronic	8					
Prerequisite	Basi	Concepts of Programming and Micro	Controller	S					
	On c	Describe the working principle of voltmeters.				d their app	olication in	(H L	lapping ighest evel) K2
Course	CO2	Explain the working principle of so MCS 51 microcontroller for real-tim			and the	ir integratio	n with the		K2
Outcomes	CO3	Demonstrate how to configure tim signals in a digital clock system.			ontrolle	r for gener	ating clock		K3
	CO4	Modify the data transfer protocol terrors in the FM link between the tw				efficiency a	ind reduce		K3
	CO5	Analyze the control system's respondesired temperature under varying				g and main	taining the		K4

List of Experiments

- 1. Voltage Measurement with display
- 2. Designing a voltmeter to measure voltage from 0 to 5volts and displaying the measured value using 7segment displays
- 3. Design of Real Time Clock using MCS 51 using segment Displays.
- 4. Design of Water Pump Controller to sense the water level in a tank
- 5. Digital Clock with LCD display a. Temperature Measurement with 7 segment display
- 6. Design of Single Channel Data Acquisition System
- 7. Interfacing the microcontroller to a PC through RS232 interface and displaying the messages sent by the microcontroller on the PC using Visual Basic program running in PC
- 8. Remote Control through FM Link
- 9. Establishing an FM link between two microcontrollers for data transfers.
- 10. Hot Chamber Controller to maintain the temperature at the set point.
- 11. Obstacle Detector using ultrasonic transmitter-receiver
- 12. Moisture sensor and sprinkler controller design

Lect	ture Periods: -	Tutorial Periods: -	Practical Periods: 30	Total Periods: 30
	ence Books			
		e Action-with Arduino and Ra		
			ed Embedded Systems" Tata McGr	
3.	Perry Xiao "Desigr Sons- 2018	ning Embedded Systems an	d the Internet of Things (IoT) with	the ARM mbed" John Wiley 8
4.		no "Embedded Systems: Inte	roduction to Robotics" Independent	ly Published, 2019
			emporary Design Tool" John Wiley	

Web References

- 1. https://nptel.ac.in/courses/106/105/106105159/
- 2. https://www.youtube.com/watch?v=9Q-3c0gQcok
- 3. https://www.youtube.com/watch?v=G9_pQzt1sts
- 4. http://www1.cs.columbia.edu/~sedwards/classes/2004/4840/
- 5. https://nptel.ac.in/courses/106/105/106105148/

E & 8 . A 6

COs		-				ram O	utcom	es (PO	s)				Prog	ram Spe omes (P	ecific
4	PO1	-	100	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12			100 100 100
1	3	2	2	3	2	-	_	_	3				F301	PSO2	PSO3
2	3	2	2	3	2	•	100		3	_	-	2	2	2	3
2	•			J	2	=			3	-		2	2	2	3
3	3	2	2	3	2	-	_		3				_		<u> </u>
4	3	2	2	3	2				3	-	-	2	2	2	3
-				3	2	- 1	(# III)		3	0 4 H	-	2	2	2	
5	3	2	2	3	2		-		2				4	2	3
			1				_	-	3	-	- 1	2	2	2	3

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

	Co	ntinuous A	10 10 10				
Assessment	Performan cla			Model Practical		End Semester	Total
3	Conduction of practical	Record work	viva	Examination	Attendance	Examination (ESE) Marks	Marks
Marks	15	5	5	45			
	1.0	3	5	15	10	50	100



Department	Mechatronics	Progra	amme ·	B.Tech.				
Semester	VI			ory: PC	······	d Semeste	r Evom 7	
Course Code	U23MCP609		iods/We		Credit		ım Marks	
	COMPUTER AIDED MANUFACTURING	L	Т	Р	C	CAM	ESE	TM
Name	LABORATORY	0	0	2	1	50	50	100

Basic	Knowledge of CNC Programming							
CO1	Understand the features and specifications of CNC machines	Level) K2						
CO2	Describe the process planning sheets and tool layouts							
CO3		K2						
CO4	Analyze the CAM software and propers CNO and	K3						
	Catagorize the made and prepare CNC part programs.	K4						
	diawing.	K4						
	On c CO1 CO2 CO3 CO4 CO5	On completion of the course, the students will be able to CO1 Understand the features and specifications of CNC machines. CO2 Describe the process planning sheets and tool layouts. CO3 Illustrate the CAM software and its programming. CO4 Analyze the CAM software and prepare CNC part programs. CO5 Categorize the part program and machine the component as per the production.						

- 1. Study of Manual part programming and Computer aided part programming
- 2. Study of G codes and M codes for machining centre and turning centre
- 3. Manual part programming for step turning operation in CNC turning center
- 4. Manual part programming for Turning and Facing using CNC turning centre
- 5. Simulating and Machining of Turning and Facing for given component using CNC turning centre
- 6. Manual part programming for Step turning using CNC turning centre
- 7. Simulating and Machining of Step turning for given component using CNC turning centre
- 8. Manual part programming for turning, Chamfering and fillet using CNC turning centre
- 9. Simulating and Machining of turning, Chamfering and fillet for given component using CNC turning centre
- 10. Manual part programming of Milling using VMC
- 11. Simulating and Machining of Milling for given component using VMC
- 12. Manual part programming of Drilling and Reaming using VMC
- 13. Simulating and Machining of Drilling and Reaming for given component using VMC

Looture Devised	- X	is given component using VIVIC	
Lecture Periods: -	Tutorial Periods: -	Drootical David Loo	
	ratoriari crious	Practical Periods: 30	Total Dariada, 20
Reference Books			Total Periods: 30

- 1. Peter Smid "CNC Control Setup for Milling and Turning: Mastering CNC Control Systems"Industrial Press Inc 2010
- 2. Dennis A. Keeling "How to Use a Cnc Router: A Practical Guide for Beginners "Create Space Independent Publishing Platform, 2017
- 3. James A. Harvey" CNC Trade Secrets: A Guide to CNC Machine Shop Practices" Industrial Press, Incorporated, 2014

Web References

- 1. https://www.youtube.com/watch?v=pPwyYFvRLts
- 2. https://www.youtube.com/watch?v=HpIEeBtJupY
- 3. https://mech.iitd.ac.in/content/cnc-lab

Cos Mapping with POs and PSOs

COs	16.5	PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12													Program Specific Outcomes (PSOs)			
35	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3			
1	3	2	2	1	3	-	924	7.4 <u>.</u> 700	3	-	-	1	2	2	3			
2	3	2	2	1	3	-	-	-	3	-	_	1	2	2	3			
3	3	2	2	1	3) 940 G	mk Pi	N (<u>S</u>) e	3	6 12 11	aria je da	1	2	2	3			
4	3	2	2	1	3	-	-	-	3	-	-	1	2	2	3			
5	3	2	2	1	3	-		in the res	3	ing =	<u> </u>	1	2	2	3			

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

	Co		estable in the second				
Assessment	Performan cla	ce in pract isses	ical	Model Practical	Attondones	End Semester Examination	Total
	Conduction of practical	Record work	viva	Examination	Attendance	(ESE) Marks	Marks
Marks	15	5	5	15	10	50	100



Department	Mech	natronics	Progra	mme : I	B.Tech.								
Semester	VI			e Catego		······	nd Semeste	r Exam 1	Type: I F				
Course Code	U23M	CP610		iods/We	ek	Credit	Maximu	Maximum Marks					
Course	<u> </u>		<u> </u>	T	Р	C	CAM	ESE	TM				
Name	INDU	STRIAL ROBOTICS LABORATORY	0	0	2	1	50	50	100				
			atronic	<u>-</u>			LL	-					
Prerequisite	Basic	Knowledge of Theory of Machines			***************************************								
		On completion of the course, the students will be able to											
	CO1	Identify the key features of robotic simulation and programming software used in industrial robotics applications.											
Course	CO2	Explain the fundamental PSS											
Outcomes	CO3	Describe the role of synchronization during material handling or sorting op	betweer erations	n the rol	oot and	the conv	eyor system	1	K2				
	CO4	Demonstrate how to program an in operation, such as moving objects be	idustrial tween p	robot for	or a ba	sic mate	rial handling		K3				
	CO5	Analyza the nortement of the selection of											

- 1. Study of the major components of the robot.
- 2. Study of the robotic simulation/ programming software.
- 3. Study of forward and reverse kinematics, to program the sequence of motion of a robot.
- 4. Programming an industrial robot for performing various applications involving Point-to-point motion of the manipulator arm.
- 5. Programming an industrial robot for performing various applications involving continuous path motion of the manipulator arm.
- 6. Interfacing an industrial robot with a belt conveyor.
- 7. Developing program for an industrial robot to perform pick and place operation.
- 8. Programming of Industrial Robot for material handling application
- 9. Programming of industrial robot for processing application
- 10. Simulation of various Robot work cells (SOFT WARE).

11. Programming an industrial robot for a sorting operation using a sensing system.

Lecture Periods: -Tutorial Periods: -Practical Periods: 30 Total Periods: 30 Reference Books

- 1. Rex Miller, Mark R. Miller "Robots and Robotics: Principles, Systems, and Industrial Applications "McGraw Hill Professional, 2017
- 2. Bruno Siciliano, OussamaKhatib "Springer Handbook of Robotics" Springer. 2016
- 3. Kevin M. Lynch, Frank C. Park "Modern Robotics" Cambridge University Press 2017
- 4. Thomas R. Kurfess "Robotics and Automation Handbook" CRC Press. 2018
- 5. Mark W. Spong, Seth Hutchinson, M. Vidyasagar "Robot Modeling and Control" John Wiley & Sons. 2020

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- 1. https://nptel.ac.in/courses/112/105/112105249/
- 2. https://swayam.gov.in/nd1_noc20_me03/preview
- 3. https://www.youtube.com/watch?v=xrwz9lxpMJg
- 4. http://dx.doi.org/10.1108/eum0000000004148
- 5. http://dx.doi.org/10.1109/23.57398.

COs					Prog									gram Spe omes (P	
	P01	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P 11	012	PSO1	PSO2	PSO3
1	3	2	2	3	2		-	· -	3	-		2	2	2	3
2	3	2	2	3	2	-	-		3	-	-	2	2	2	3
3	3	2	2	3	2	-	-	-	3	-	-	2	2	2	3
4	3	2	3	3	2	-	-	-	3	-	-	2	2	2	3
5	3	2	2	3	2	-	-	-	3	_	_	2	2	2	3

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

	Co	ntinuous A	Assess	ment Marks (CA	AM)		
Assessment	Performane cla	ce in pract isses	ical	Model Practical	Attondones	End Semester Examination	Total Marks
	Conduction of practical	Record work	viva	Examination	Attendance	(ESE) Marks	IVIATKS
Marks	15	5	5	15	10	50	100



Department	Mecha	tronics	Prog	ramme:	B. Tec	h.			
Semester	VI		Cour	se Cate	gory Co	de: PA	*End Se	emester	Exam Type: -
Course		NI/000	Pe	Periods / Week Credit					ım Marks
Code	U23IVI	CW602	L	Т	Р	С	CAM	ESE	TM
Course Name	MINIF	ROJECT	0	0	2	1	, 100	-	100
		Me	chatron	ics					
Prerequisite	Elect	rical Engineering, Electronics, C Pr	ogramm	ing					
14	On c	ompletion of the course, the stud	lents wi	ll be abl	e to				BT Mapping (Highest Level)
Course	CO1	Identify the problem statement for survey				_			K2
Outcomes	CO2	Choose the proper component system.	s as pe	r the r	equiren	nents of	the des	ign/	K2
	CO3	Apply the acquainted skills to dev	elop fina	l model/	system				K3

There shall be a Mini Project, which the student shall pursue as a team consists of maximum 4 students during the third year, fifth semester. The aim of the mini project is that the student has to understand the real time hardware / software applications. The student should gain a thorough knowledge in the problem he/she has selected and in the hardware / software he/she using in the Project. The Mini-project is an application that should be formally initiated and should be developed and also to be implemented by the respective team.

The Mini Project shall be submitted in a report form along with the hardware model / software developed, duly approved by the department internal evaluation committee. It shall be evaluated for 100 marks as Continuous Assessment. The department internal evaluation committee shall consist of faculty coordinator, supervisor of the project and a senior faculty member of the department. There shall be two reviews that will be considered for assessing a Mini Project work with weightage as indicated evaluation Methods.

		······································	
Lecture Periods: -	Tutorial Periods: -	Practical Periods: 30	Total Periods: 30

COs/POs/PSOs Mapping

COs				200	Prog	ram O	utcom	es (PO	s)					ram Spe omes (P	
	PO1	PO2	PO3	PO4	PO5	P06	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	2	2	-	_	-	-	3	3	-	1	1	1	1
2	3	3	3	2	2	2	2	2	3	3	3	1	2	2	2
3	3	2	2	1	-	2	-	-	3	3	3	1	2	2	2

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

Evaluation Method

		Review 1			Review 2			Total
Assessment	Novelty	Presentation	Viva	Presentation	Demonstration	Viva	Report	Marks
Marks	10	20	10	20	20	10	10	100

Dr.G. A. A. B. 6.2

Dr.G. ALAMURUGA MOHAN RAJ

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Madagadipet, Puducherny, 605, 405

Dr.C.B.16. 63

Provided Stranger of College Co rad itronics Ig. College

Department	Mechatronics	Progr	ramme:	B. Tech.				•••••
Semester	VI	Cours	e Catego	ry: AEC	End Se	mester E	Exam Tvi	oe: -
Course Code	U23MCC6XX	Pe	eriods/W	/eek	Credit		imum Ma	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
		L	Т	Р	С	CAM	ESE	TM
Course Name	CERTIFICATION COURSE - VI	0	0	4	-	100	-	100
	Med	chatronics	.1	.1				
Prerequisite	-							

Students shall choose an International / Reputed organization certification course of 40-50 hours duration specified in the curriculum (It is mandatory to do a minimum of six courses) which will be offered through the Centre of Excellence. These courses have no credit and will not be considered for CGPA calculation.

- (i) Certification Courses are required to be completed to fulfil the degree requirements. All Certification courses are assessed internally for 100 marks.
- (ii) The Course coordinator handling the course will assess the student through attendance and MCQ test, and declare the student as "pass" on satisfactory completion. A letter grade "P" is awarded to declare pass.
- (iii) The marks scored in these courses will not be taken into consideration for the SGPA / CGPA calculations in the grade sheet.

Evaluation Method

Assessment	Continuous Assess	ment Marks (CAM)	
, accessment	Attendance	MCQ Test	Total Marks
Marks	10	90	100

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24.2.48

Dr. G. BALAMURUGA MOHAN RAJ Professor & Head Department of Mechatronics. Manakula Vinayagar Engg, College Ligadipet, Pudurchers 205, 105

2.A.B.85

Department	ł	atronics	Progra	mme: E	. Tech.					
Semester	VI		Course	e Catego	ory: MC	End	Sem	ester Ex	am Tyr	e : TE
Course Code	U23M	CM606	Pe	riods/W	eek	Cre			imum N	***************************************
			L	Т	Р	С		CAM	ESE	TM
Course Name	GENE	PER EQUALITY	2	0	0	_		100		100
Prerequisite	-									
,	On co	mpletion of the course, the st	tudents will be	able to				····	ВТ	Mapping
	·	Describe the general identity, social				••••••	••••••		(High	est Leve
Course	CO2	Illustrate the causes and issues of	gender discrimin	ation in I	ndian soc	ietv.				K2
Outcomes		Describe the workplace discrimina					ure.			K2
	CO4	Familiarize with international and Ir	ndian frameworks	on geno	ler equalit	tv.				K2
	COE	Illustrate the current challenges in of technology.	gender equality,	including	the glas	s ceilin	ng and	d the role		K2
UNIT – I	Introd	uction to Gender Equality				Peri	iods:	:06	<u>l</u>	114
Gender equality norms, historical p	explorperspect	ing gender identity and expression ives on gender roles, Analyzing ke	n, Understanding y milestones in th	the soc	ial constr			eneral role	es and	CO1
UNIT – II		r Inequality and Its Manifesta				Perio		06		
and health, violen		Indian society – causes of gender d custom – Issues of gender discrir exploitation in workplace.		narriage	atriarchal , child doi	.t			eness, ucation	CO2
UNIT – III	Gende		tment of Mech	***************************************		Perio	ods:	06		<u>L</u>
Workplace discrin promoting gender	nination, equality	Media influences on gender and cand cultural understanding.	culture, Gender a	nd powe	er dynami				ies for	CO3
UNIT – IV	Promo	ting Gender Equality				Perio	nde:(16		
Gender Equality a ndian Constitutior contexts.	and Hum n – Polic	an Rights – International framewor ies and initiatives for gender mainst	rks and Conventi treaming – Strate	ons on (Gender Ed				er the arious	CO4
JNIT – V	Conten	porary Challenges and Futur	e Directions			Perio	ods:0	16		
Current challenges	s and en	nerging issues in gender equality – ng possibilities for transformative cl	Closs seilise	ole of tec	hnology i				nging	CO5
ecture Periods	: 30	Tutorial Periods: -	Practical Pe	riods: -			Tota	al Period	s: 30	
. "The Second inequality." "Women and	Sex" by Gender feminist	by Raewyn Connell – This book pro of gender. Simone de Beauvoir – A historic in the Indian Society" by Neera I movements in India.	al and philosophi	ical exar	nination o	of wom	er role	es, power	dynami on and	gender
Woman in ear A social and C A social and C	ly Indian ultural h	societies, New Delhi: Manohar Pul istory, Volume1. Connecticut: Oxfor istory, Volume2. Connecticut: Oxfor n Feminism: Class, Gender and Ide	d: Praeger. Sita F	Raman (2009).	otion P	Press	lffikhar G	2 (2012	· · · · · · · · · · · · · · · · · · ·
leb References									(2012	.).
https://www.un https://ncw.nic.	women.d in co.org/th	nemes/gender-equality								

	13031	парріп	9		Prog	gram O	utcome	s (POs)				Prog Outc	ram Spe omes (P	CITIC SOs)
COs	PO1	PO2	PO3	PO4	PO5	P06	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1 (Ed)	PUI	FUZ	100	1 04				_	-	3	-	1	1	SP, EU	1
1	1			-			-	207		2		1	1	-	1
2	1	-	-	-	-	-	-	- "	-	3				-	1
2	1			_	-	_	-	-	-	3	-	1	1	-	1
3	- 1							242	_	3	-	1	1	-	1
4	1	-	-	-	-			-		-		1	1		1
5	1	-	-	-	-	-	-	-	-	3	_	1			

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

tion Wethods	Continu	n =0 8/1/2 a		
Assessment	Attendance	MCQ Test	Presentation / Activity / Assignment	Total Marks
Marks	10	30	60	100



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ANNEXURE - III

PROFESSIONAL ELECTIVE COURSES

il. No.	sional Elective – I (Off Course Code	Course Title
1	U23MCE501	Computer Integrated Manufacturing
2	U23ECEC01	Digital Image processing
3	U23ADDC01	Computer Network and Security
4	U23MCE502	Robot Operating System
5	U23ICECO1	Virtual Instrument C
Profess	ional Elective – II (Off	ered in Semester VI)
SI. No.	Course Code	Course Title
1	U23MCE603	Heating Ventilation and Air-Conditioning
2	U23CSEC02	Introduction to Industry 4.0
3	U23MCE604	Digital Manufacturing
4	U23MCE605	Mobile Robotics
5	U23MEDC02	Product Design and Development

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Department	Mech	atronics	Progra	amme : E	3.Tech.				
Semester	v		Cours	e Catego	ory: PE	End S	Semester E	xam Type:	TE
Course	1 7 7			riods/We		Credit	Maximur	n Marks	
Code	U23N	ICE501	L	Т	Р	С	CAM	ESE	TM
Course Name	1	PUTER INTEGRATED UFACTURING	3	0	0	3	25	75	100
			lechatronic						
Prerequisite	Know	rledge of Computer aided design a	ind Aided M	anufactu	ıring				
	On c	ompletion of the course, the stu	dents will l	oe able t	ю.			BT Ma (Highest	
	CO1	Describe the knowledge of comprommunication.							2
Course	CO2	Identify the required DBMS arc systems.						K	2
Outcomes	CO3	Apply the knowledge of Condmanufacturing planning.						K	
	CO4	Demonstrate the methods for Au as required.						K	3
		Analyze the additive manufacturing			ybrid co	mmunicati			<u>4</u>
UNIT - I		ODUCTION TO CIM AND COMM			, .			ods: 9	***************************************
		volution, Benefits, Computers in M							
		e.Fundamentals of Communicatio on Lines, Network Architectures ar			i data, t	Jouing, 11	ansmission	, iviediditi,	CO1
UNIT - II	.,	ABASE MANAGEMENT SYSTEM			ESIGN		Perio	ods: 9	
		on, Manufacturing data, Data base				ment Dat			
shop floor cont	rol (Fu	ndamentals only) Product Design	n: Desian P	rocess.	CAD -	areas of	Application	Benefits,	CO2
Fundamentals o							1114.015	1 1 1 1 1 dg	
UNIT - III		CURRENT ENGINEERING AND F	PROCESS	PLANNII	NG		Perio	ods: 9	
		neous engineering: Introduction, D				d assemb	ly, and oth	er product	
design objecti	ves. A	dvanced Manufacturing Planning.	Introduction	n to Re	verse E	ngineering	g. Process	Planning:	CO3
		Generative Model.							COS
UNIT - IV	DAT	A COLLECTION AND QUALITY I	NSPECTIO	N			Perio	ods: 9	
		ection – Bar Codes, OCR, Image							
		ice Technology. CAQC, Contac		ntact ty	pe insp	ection, In	troduction	to CMM,	CO4
Application of V		Techniques and Equipments in ins			7				
UNIT - V		TIVE MANUFACTURING SYSTEM						ods: 9	
		dditive manufacturing, slicing C							
		manufacturing processes: Photo							
		I sintering techniques, sheet lamir manufacturing, Hybrid manufacturir		t energy	deposi	tion techn	iques, appi	ications of	000
Lecture Peri			T	al Perioc	ls: -		Tota	l Periods:	45
Text Books								***************************************	
		, 'Automation, Production Systems	and compu	iter integ	rated m	anufacturii	ng'. Prentic	e Hall of Ir	dia,
		ı , S. Subramanyan, V. Raju, 'CAD						Delhi, 2000	
		son & Wolfe, 'Computer Integrated					Hill.		
		n, 'Flexible Manufacturing Cells an							
5. Rao. P, N T	ewari a	& T. K. Kundra, "Computer Aided N	/lanufacturii	ng", Tata	McGra	w Hill Publ	ishing Com	pany, 200	0
Reference Boo		-							
		Principles of Computer Integrated		ing', Prei	ntice Ha	II of India,	2003.		
		/I Handbook', McGraw Hill publishii							
		omputer Intergrated Manufacturing							
4. Gideon Hale	evi and	Roland Weill, "Principles of Proces	ss Planning	– A Log	ical App	roach"			
		. W. Kraebber, "Computer Integrate	ed Manufac	turing, 2'	edition	n, Pearson	⊏ducation		
Web Reference									
1. www.cimlear	ninazo	ne.co.uk/							

- 2. http://nptel.ac.in/courses/112102101/
- 3. http://nptel.ac.in/courses/112102103/
- 4. http://elearning.vtu.ac.in/06ME72.html
- 5. https://ocw.mit.edu/courses/mechanical-engineering/2-008-design-and-manufacturing-ii-spring-2004/lecture-notes/

COs	Prog	ram O	utcor	nes (F	POs)		7		. J No.				_	n Specific les (PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	2	1	2	-	1	2	-	1	-	1	3	3	2
2	3	3	3	1	1	-	2	2	-,	-	-	1	2	3	2
3	3	2	2	1	2	-	1	1	-	-		1	3	2	2
4	3	3	2	1	1	-	2	2	-	s — s	T	1	3	3	3
5	3	3	2	1	1	-	2	2	-	-	-	1	2	1	2

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

			Continuou	s Assessment N	Marks (CAM)	End	
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examinatio n (ESE) Marks	Total Marks
Marks	5	5	5	5	5	75	100



	Engin	onics and Communication eering	Progra	ımme: B	Tech.				***************************************
Semester	Profes	ssional Elective–V	Course	e Catego	ry:PE	En	d Semest	er Exan	n:TE
Course Code	U23E0	CFC01		riods/We	7	Credit	Maxin	num Ma	arks
Course Name		Image Processing	L'	Т	Р	С	CAM	ESE	TM
	Digita		3	0	0	3	25	75	100
Prerequisite	Stude	ents should have an introduc	chatroni	cs ignal pr	ococcin	~ ~ ~ ~ ~		- 17/1111	
	On co	mpletion of the course, the stud	lente will	he able	to	y or an e	equivalen		
	CO1	Understand fundamentals, vis	ual nerce	ention a	nd nivel	malatia		BT Ma	appin
	CO2	Correlate the various image	nrococ	sing tool	na pixei	relations	nips.	K	2
Course	CO2	mathematical preliminaries					1.5	К	3
Outcome	CO3	Apply different types of image in various applications						K	3
	CO4	Illustrate the significance of	Colour	Image	Proces	sing and	d Image	<u> </u>	
	CO5	ocginentation techniques						K	4
		explore image compression recognition based on matching	techniqu 3.	es, codii	ng meth	iods, an	d pattern	K	4
UNIT-I	DIGITA	AL IMAGE FUNDAMENTALS						T	
ntroduction -								Perio	ds:09
etween pixels.,	Hage O	- Steps in Digital Image Pro ensing and Acquisition – Ima image formation model, Brighti	ao Comi	alina an	1 0		and the second second	200 200	co
UNIT-II	IMAGE	TRANSFORM				,	on bana c	Perio	40.00
Mo-dimonala-									
wo-unnensions	al Fouri	er Transform- Properties - F	ast Fou	rier Tran	eform	lnvara	·	T	40.00
	D D 1,	er Transform- Properties – F 2D DFT, Discrete Cosine t m, Slant transform, KL transfor	ranetorm	Dicoro	to Cin-	A	more to the state of	T	
ansform, Haar	transfor	m, Slant transform, KL transfor ENHANCEMENTAND IMAGE	m, SVD t	ransform	te Sine 1, Wavel	transfoi et transf	m, Hada orm.	mage mard	СО
ansform, Haar UNIT-III Datial Domain:	transfor IMAGE Gray	m, Slant transform, KL transfor ENHANCEMENTAND IMAGE evel transformations — History	m, SVD t	RATION	te Sine n, Wavel	transfoi let transf	rm, Hada	mage mard Period	СО
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unit-ill catial Domain: moothing and second and codels – Mean otch Filters – Ounit-iv colour fundaments and dilaterated segunitary codels – Mean otch Filters – Ounit-iv colour fundaments and dilaterated segunitary coded for compression and dilaterated segunitary coded for compression and coding – Wavelescriptor, Regions and dilaterated segunitary coded for compressions – Wavelescriptor, Regions – Wavelesc	transfor IMAGE Gray Sharper Sharper Filters - ptimum COLOL ntals - nd Bour ion. Segmentati IMAGE ssion - Variab let - J pnal De d on ma ods: 45	m, Slant transform, KL transform, Slant transform, KL transform ENHANCEMENTAND IMAGE evel transformations — Histograms Spatial Filtering — Frequenting frequency domain filters — Order Statistics — Adaptive fill Notch Filtering — Inverse Filter IN IMAGE PROCESSING AND Colour models — HIS to RGB andary detection — Region base algorithm COMPRESSION AND RECOGNOTION COMPRESSION COMPRESSION COMPRESSION COMPRESSION AND RECOGNOTION COMPRESSION COMPRE	ransform m, SVD i RESTO gram pro ncy Doma - Ideal, E ters – Ba ing – Wie and RGI sed seg atershed rel Redur ding – Ar epresenta e, Textu	RATION Cessing ain: Intro Butterwore and rejected Filter SEGME To HIS mentation To His ment	te Sine n, Wavel n, Wavel n Basic duction th and ct Filters ing. NTATIO n Detect on Morp c concep Psycho coding - oundary tterns a iods: -	transformer transf	atial Filter atial Filter r Transfo n filters. N pass Filte iscontinuit al process n construct Redundance ding – Hy tion, Fou	Period ies- ising- stion Period ies- brid urier s - ods: 45	CO: ds:09 CO: ds:09 CO: ds:09 CO:
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- 2. Willliam K Pratt, "Digital Image Processing", John Willey, 2002.
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- 5. https://www.csie.nuk.edu.tw/

COs/POs/PSOs Mapping

COs			.1	A	Prog (POs		utcome	es					Progr Outco	ram Spec omes (PS	ific Os)
	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	2	2	-	-	-	-	-		-		2	2	-
2	3	2	2	2	-	-	-	-	-	-	-	-	2	2	
3	3	2	2	2	-	-	-	-	-	-	_	_	2	2	_
4	3	2	2	2	-	-	-	-		-		-	2	2	-
5	3	2	2	2	-	-	-	-	-	_	-	_	2	2	_

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

Assassment		Con	tinuous Asses	sment Marks (C	AM)	End	1,11
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Examination (ESE) Marks	Total Marks
Marks	5	5	5	5	5	75	100



^{*} TE – Theory Exam, LE – Lab Exam

Department	Artific	ial Intelligence and Data Science	Prog	ramme: E	3.Tech				
Semester	IV.		Cour	se Categ	ory Co	de: ES *En	d Semes	ter Exam	Type: TE
Course Code			P	eriods / W	/eek	Credit	Ma	ximum Ma	arks
	U23A	ADDC01	L	Т	Р	С	CAM	ES E	TM
Course Name	Com	puter Networks and Security	3	0	0	3	25	75	100
		(Common to A	& DS	, Mechat	ronics	5)	L	<u> </u>	L
Prerequisite	Digita	l System Design and Programming Lo	gic						
	On c	ompletion of the course, the stud							apping st Level)
0	CO1	Analyze and evaluate the cyber se	ecurity	needs of	an org	janization		K2	
Course Outcomes	CO2	Analyze the security issues in ne infrastructure.	tworks	and com	outer s	systems to sec	cure an	K2	7
	CO3	Design operational cyber security						КЗ	
	CO4	Apply critical thinking and proble attacks on an organization's compu	m-solvi ter syst	ng skills tems and i	to det	ect current ai	nd future	K3	
	CO5	Examine the various network secu					***************************************	K3	
UNIT-I	Intro	duction to Computer Networks	M m	eg ary na	FITCH	Periods: 9			
opologies: bus, protocol suite-N	star, ri etwork	er networks-Basics of data commur ng, mesh-Network architectures: cl addressing and subnetting	nicatior ient-se	n-Types o rver, peer	f netwo	orks: LAN, WA er-OSI model	AN, MAN overviev	-Network v-TCP/IP	CO1
UNIT-II		ork Security Fundamentals				Periods: 9			
/ulnerability ass encryption, de	sessme cryptior	ed for network security-Common ent and risk management-Security n, hashing-Types of encryptior ital signatures and certificates	policies	and bes	t pract	ices-Principle	s of cryp	tography:	
UNIT-III	Auth	entication and Access Control		= , \ 1	1	Periods: 9		<u>.</u>	
Role-based accommanagement sy ederation	ess cor	s: passwords, tokens, biometrics-Sintrol (RBAC) and discretionary accessecure authentication protocols: Ke	ess con	trol (DAC)-Acce	ess control list	s (ACLs)	-Identity	CO3
UNIT-IV		vork Defense Techniques				Periods: 9		Į.	
ntrusion- Preve Private Network Psec-Endpoint	ention s (VPN securit	stateful, stateless, next-generati Systems (IPS)-Network segmenta s): site-to-site, remote access-Secu y measures: antivirus, anti-malwal d event management (SIEM) syste	ation a ure con re, enc	nd DMZ nmunicati	(Dem on pro	ilitarized Zon tocols: SSL/T	e)-Virtua LS, SSH	l 2.	CO4
UNIT-V	····	less Network Security	1115			Periods: 9		<u>l</u>	
	L	standards: Wi-Fi, Bluetooth, Zigh	100_\//i	reless so	Curity	.1	/ED \^/F	٥٨ - ١	
WPA2, WPA3- rogue access Intrusion Preve	Wireles points, ntion S	ss encryption techniques: TKIP, A evil twin attacks-Wireless Intrus systems (WIPS)-Mobile device secu	AES-Se ion De irity co	ecurity chetection S	allenge Systemens	es in wireless s (WIDS) an	s networ	ks:	CO5
Lecture Period	ds: 45	Tutorial Periods:	Pract	ical Perio	ods: -	То	tal Perio	ds: 45	
Text Books		A.I.							
		er Networks, Pearson Education, 5 a and computer communications. F			on Indi	ia, 2013.			
Reference Boo	oks								
.Perlman, R., K ducation India.	aufmaı	n, C., and Speciner, M. (2016). Net er, B., and Rudoff, A. M. (2018). UI							Pearsor
		Ci, D., and Mudoli, A. IVI. (2016). UI	41V 146	LWOIK PIO	yrann	mig volume	i. 3 V 1-8	DIVIU.	
Web Reference		.nptel.ac.in/noc22_cs19/preview							
		rgeeks.org/computer-network-tutor	ials/						
		rgeeks.org/what-is-computer-netwo							

COs	1		4		Prog	ram O	utcom	es (PO	s)				Prog Outce	ram Spe omes (P	ecific
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	2	1	2	th <u>u</u> tiri	nn' <u>a</u> l	0.81	k In	112-12	-	-	3	2	2
2	3	2	2	1	2	-	-	-					2	2	2
3	3	3	3	2	3								3		2
-			3		3	-	-	-	-	-	- 1	-	-3	2	3
4	3	2	2	1	3		-	4 2-4	- 1	1 _ 6		T _{ee}	3	2	
5	3	3	2	2	2								3		3
			3		3	-	-	-	-	-		- 1	3	2	3

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

	7.00	Continu	ous Asse	ssment Marks (C	AM)	End Semester	7 7
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Examination (ESE) Marks	Total Marks
Marks	5	5	5	5	5	75	100



	Mech	atronics	Prog	ramm	e : B.Te d	ch.				
Semester	ν		Cour	se Ca	tegory: F	PE TE	nd Sem	nester	Exam T	vne: TF
Course	HOOM	ICE602			/Week	Credit			num Ma	
Code	UZSIV	ICE502	L	Т	Р	С	CA		ESE	TM
Course Name	Robo	t Operating Systems	3	0	0	3		25	75	100
	T		Mechatronic	s		-	1	L		
Prerequisite	Basic	s of Robotic system								
		mpletion of the course, the s	students will b	e able	to				BT Map (Highes	
	CO1	Recall the key milestones in	n the history of	ROS	and its d	evelopment			K	
Course Outcomes	CO2	Explain the significance of and their relationship to file	process comr	nands	in man	aging syste	m reso	urces	K	2
	CO3	Describe the process of tr motion planning.			n and its	significand	e in sn	nooth	K	2
	CO4	Use inverse dynamics cont trajectory and implement thi	rol to calculate	the r	equired	joint torque	s for a	given	K	3
	CO5	Apply differential drive ste through an obstacle course.	eering algorith		progra	m a robot	to nav	/igate	K	3
UNIT – I		uction to ROS						Period	ds:9	
difference fro	- ROS m other	file system level - ROS con meta-operating systems– ser	nmunity level - rvices - ROS fra	-The amew	ROS Ed ork – ope	quation - Hi	story -	dietril	hutions	- CO1
UNIT – II	File Sy	ystem Security					F	Period	ds:9	_L
catkin worksp	ace – w	- Changing access rights– pro File system - packages – sta /orking with ROS navigation a	cks – message	S - SE	ervices –	, building ar catkin work	space -	ng co – worl	mmands king with	CO2
UNIT – III	Trajec			ianus	•			U.A.	504	
L		tory Planning			•		F	Period	ls:9	JOOL
Trajectory Pla	nning: l		int space traiec	tories	nath an	ud traiectory	Flannin	Period	ls:9	CO3
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- 3. https://accelerationrobotics.com/ros.php
- 4. https://www.geeksforgeeks.org/introduction-to-ros-robot-operating-system/
- 5. https://www.edx.org/course/robotics-kin ... nnx-robo1x

		Program Outcomes (POs)													cific SOs)
COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	2	1	1	-			-	Т. Т	1	1	2	3	-
2	3	3	2	2	-	2	1	1	1	1 1	2	2	3	-	
3	2	2	3	1	-	1	2	-		2	1			2	3
4	1	1	3	-	3	2	1	2	-	1	-	1	3	2	-
5	1	1	3	-	-	1 -	-	2	1	1	-	1	3	3	-

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

L 1		Conti	nuous Asse	essment Marks (C	AM)	End Semester	T-4-1
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Examination (ESE) Marks	Total Marks
Marks	5	5	5	5	5	75	100



Department	Mechatronics			: B.Te				
Semester	VI	Cours PE	e Cat	egory	Code: *E	nd Semes	ster Exam	Туре:ТЕ
Course Code	U23ICEC01	Pe	riods/	Week	Cred	it Ma:	ximum Ma	rks
	023ICEC01	L	The	Р	С	CAM	ESE	TM
Course Name	VIRTUAL INSTRUMENTATION	3	0	0	3	25	75	100
	(Common to ICE and Mechatron	ics)		*······				
Prerequisite	Nil		34	40-1	ic e, lu		10 ,110	1
	On completion of the course, t			1	e able to)	BT Ma	pping (Highes Level)
0	CO1 Explain the concepts of vi	rtual ins	strume	ents				K3
Course Outcomes	CO2 Apply the Programming co						-	K3
Outcomes	CO3 Familiarize in the concepts	s of ins	trume	nt inte	facing b	y VI tools		K3
	CO4 Acquaint the various instru	ıment d	ontro	I interfa	aces.			K3
1	CO5 Elucidate the concepts of	VI in re	al tim	e appli	cations.			K3
UNIT – I	INTRODUCTION			- 40 .40	Periods	:09		
Evolution of LabVIE	EW - Block diagram and archite	ecture	of a	virtual	instrum	nent – G	raphical	••••••••••••••••••••••••••••••
programming and c	omparison with conventional prog	grammi	ng -	Contro	ls and i	ndicators-	Labels	
and Text –Shape, si	ze and color – Data type, Format,	Precisi	ion an	nd repr	esentatio	on – Data	types -	CO1
Data flow programm	ing-Editing – Debugging and Runn	ing a ∖	/irtual	Instru	ment.			
UNIT – II	PROGRAMMING STRUCTURE				Periods	: 09		
ront panel - Block	diagram - VIS and sub-VIS, E	Display	types	s – Di	igital –	Analog –	Chart -	
Oscilloscopic types,	Loops: For Loops, While Loops, a	arrays,	cluste	ers, Ch	arts and	l graphs,	case and	CO2
	s, formula nodes, local and glob	al vari	iables	, strin	g and fi	le I/O, Ir	nstrument	COZ
	neasurement data in the web.							
	DATA ACQUISITION	,			Periods			
ntroduction to data	acquisition on PC, Sampling funda	amenta	ls, Inp	out/out _l	put techi	niques an	d buses.	
	O, counters and timers, DMA, So	ftware	and h	nardwa	re instal	lation, Ca	libration,	CO3
	uisition interface requirements.							
UNIT – IV	INSTRUMENT CONTROL				Periods	: 09		
common instrumen	Interfaces: Current loop, RS 2	232C/	RS48	5, GP	IB. Bus	Interface	s: USB,	
PCIVICIA, VXI, SCSI,	PCI, PXI, Firewire. PXI system co	ontrolle	rs, Eth	nernet	control c	of PXI. Ne	tworking	CO4
······································	Industrial applications, VISA and I	VI.						
UNIT – V	APPLICATIONS				Periods	: 09		
nstrument Control, L	Development of process database	mana	gemei	nt syst	em, Sim	ulation of	systems	
rocessing, Motion c	nent of Control system, Industr	ial Co	mmur	nication	n, Image	e acquisi	tion and	CO5
	The state of the s							
Lecture Periods:45	Tutorial Periods:	Praction	cal Pe	eriods:	- T	otal Perio	ods:45	
ext Books	I							
Gupta , Virtual Jovitha Jerome	Instrumentation Using Lab view 2r	na Editi	on, la	ata Mc	Graw-Hi	II Education	on, 2010	
Reference Books	e, Virtual Instrumentation using Lab	ovi⊨vv,	PHIL	_earnır	ig Pvt. L	td., 2010		
	Lobyiou Craphical Drawnian	F						
 Gary Jonson, " Gupta.S., Gup 	Labview Graphical Programming",	Fourtn	Editio	on, Mc	Graw Hil	I, New Yo	ork, 2012	
Society of Ame	ta.J.P., "PC interfacing for Data A	-cquisii	ion a	na Pro	cess Co	ontroi", Se	econd Edit	ion, instrume
	concepts of Labview 4", Prentice I	Jall Inc	Nov	v Jeres	w 2012			
Veb References	Consopie of Labview 4 , Frender	ian IIIC	., 1467	v 06186	y 2013.			
1. https://www.ni.c	om/			•••••••••••				
	tube.com/user/Labview/playlists							

COs					0		es (PC	(gayy)	r i r January	1 i	a i Legal	Local March	Spe	gram cific comes Os)	T T
	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	1	1	27.10	Mga a	6 m <u>1</u> 4 ()	111	- Friend	Program	- Johnson	PART IN	1	1	1
2	3	2	1	1	-	-	-	_ 1	4 4 2	-	l second		1	1	1
3	2	2	-	-	-	1		-					1	1	1
4	3	2	1	1	_	1	1 -1		- 12- 1		-124		1	1	
5	3	2	1	1	-	1			-	-	_		1	1	1

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

A = = = = = = = = = = = = = = = = = = =		C	ontinuous Ass	essment Marks (0	CAM)	End	in the second
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendanc e	Semester Examination (ESE) Marks	Total Marks
Marks	5	5	5	5	5	75	100



Department	Mechatronics			: B.Te				
Semester	VI	Cour:	se Cat	egory (Code: *Er	nd Semes	ter Exam	Type: T I
Course Code	U23MCE603	Pe	riods/\	Veek	Credit	Max	ximum Ma	arks
	023M0E003	L	Т	Р	С	CAM	ESE	TN
Course Name	HEATING VENTILATION AND AIR CONDITIONING	3	0	0	3	25	75	100
	Mechatro			<u> </u>				<u> </u>
Prerequisite	Thermodynamics and Heat Transf	fer	***************************************		, , , , , , , , , , , , , , , , , , ,			
	On completion of the course, the							Mapping est Leve
Course	CO1 Apply the law of thermodyna							K3
Outcomes	CO2 Solve problems using refrige charts	erant ta	ble / cł	narts a	nd psychro	ometric		К3
1611/11 11.51	CO3 Recognizing various compo	nents n	eeded	for HV	AC syster	ns		K2
	CO4 Able to estimate the heating units	and co	oling l	oads to	design H	VAC	1	K3
	Op Developing control systems	for con	trollina	the ne	rformance	of		
IIIII I	TVAC units			шо ро	- Torritanice	. 01		K3
UNIT – I	Introduction				Periods:0)9		
unuamentais hermodynamic	of Thermodynamics - Conserv	ation o	of Ma	iss, L	aws of	Thermod	ynamics,	
adiation H\/A(Cycles, Fundamentals of Heat	t Irans	ster, C	onduc	tion, Con	vection,	Thermal	CO1
JNIT – II	C - Scope of HVAC, Air-Conditioning Psychrometry	g Proce	sses, E				omfort.	
	Ideal Gas Approximation, Fundan	nontal E	Oromo	<u> </u>	Periods:	09		
egree of Satu	uration, Wet Bulb Temperature,	Dartial	Drace	re of	equation o	f State, F	lumidity,	
emperature, Sa	aturation, Enthalpy, Thermodynamic	: Wet B	ulh Te	mnerat	vvalei v	apor, De	Moiot Air	CO2
sychrometric C	hart, simple exercises using psychr	ometry	alb i ci	прста	.ure, Frope	erties or iv	noist Air,	
JNIT – III 🔛 🗚	ir Conditioning Processes and V	entilati	on	T	Periods: (19	1	
troduction, Ba	sic processes - Heating and Co	olina P	rocess	. Coo	ling with	Dehumid	ification	
eating with Hur	midification, Adiabatic Mixing of Two	o Air Str	eams.	Evano	rative Cod	olina Hea	ting and	
Conditioning	System Cycles. Basic air-condition	ning sys	stem a	nd zon	ed air-cor	ditioning	system	1
door air quality	y and ventilation - Indoor Air Qual	lity, Ver	ntilation	Proce	edure Co	ncentratio	n of Air	CO3
JNIT – IV	r Air Quality Procedure, Filters – Ty	pes, Oz	one, L	Iltravio	let Light		es es 13 F 1 da	E ·
	Heating and Cooling Load Calcul	ations			Periods: 0)9		
onductivities of	Materials, Heat Transfer Coeffi Materials, Thermal Resistances	icient, of Moto	Coeffic	ent c	of Transn	nission,	Thermal	
roduction, Ba	sic Concepts and Terminologies	or Made	inais, t	Julado	or Air Loa	d Compo	nents –	
alculating Design	gn Heating Loads. Cooling load ca	lculation	ns - Ba	sic De	finitions	Intro Franctor F	duction,	CO4
ethod (TFM), F	leat Sources and heat gains, CLT	D / SCI	L / CLI	F Calc	ulation Pr	ocedure	Cooling	
ad by CLTD/So	CL/CLF Method				4.4.6.1.1.1	oocuurc,	Cooming	
NIT – V	Digital Controls For HVAC Systen	ns		F	Periods: 0	9		
roduction, cont	trol types, Basic Control – open ar	nd close	d loop	contro	ols Typica	al Control	Loops.	
ect Digital Co	ntrol – Introduction, control schem	nes. Dir	ect Die	nital C	ontrol of	an Air-Ha	ndler -	CO5
roduction, Sche	emes, Architecture and Advantages	of Dire	ct Digit	tal Con	itrols.			
ecture Periods	s:45 Tutorial Periods:	Practic	al Peri	ods:-	Tot	al Period	ls:45	•••••••••••••••••••••••••••••••••••••••
xt Books . R.K.Raiput.	"A Toy Book Of East							
l. R.N.Rajput, 2. Joseph Wa	"A Text Book Of Engineering There	modyna	mics ",	Fifth E	dition,201	7.		
Bartlett I ea	agner, Kirk VanGelder "Automotive rning, 2018.	e neati	ng, Ve	entilatio	on, and A	ur Condit	tioning" J	ones 8
	z, S. Kumar, M. Hussain, "Heating	n Venti	lation :	and A:	r Conditie	oine II	-II 1 W ·	
Press Inc.,	2006	y, vend	iauUII a	anu All	Conditio	ung Hand	abook", Ir	ndustria
ference Books								
	careers "Heating, Ventilation, and	Air O	onditio	nina	(Η\/ΔC\ "C	`restaSna	oo lada	200d1
Publishing F	Platform, 2018– 2018	•	Julio	9	(IIVAO) C	n cateopa	ice mae	Jenaeni
	ider, "Handbook of Heating, Venti	lation a	and Air	Cond	litionina"	Toulor 0		

- 2. Jan F. Kreider, "Handbook of Heating, Ventilation, and Air Conditioning", Taylor & Francis Limited,
- 3. Amrutha Rao MALLI, "A Practical Approach on Heating Ventilation and Air Conditioning Technology", Independently Published, 2017.
- 4. Russell E. Smith, "Electricity for Refrigeration, Heating, and Air Conditioning", Cengage Learning- 2018

5. David W. Bearg, "Indoor Air Quality and HVAC Systems", Routledge, 2019.

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- 2. https://swayam.gov.in/nd1_noc19_me58/preview
- 3. https://drive.google.com/open?id=0B7JWdKw_4Q07VWNrLVNkRXpyUmM
- 4. https://www.google.com/url?sa=t&source=web&rct=j&url=https://ocw.mit.edu/courses/architecture/4-401-environmental-technologies-in-buildings-fall-2018/lecture-slides-lec17.pdf&ved=&usg=AOvVaw3XYdn
- 5. https://www.epa.gov/iaq-schools/heating-ventilation-and-air-conditioning-systems-part-indoor-air-quality-design-tools

COs/POs/PSOs Mapping

COs	Prog	ram C	utcor	nes (F	POs)									n Specific es (PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	2	3	3	1	2	2	1	1	2	3	3	2	2
2	3	3	3	3	3	2	2	1	1	2	2	3	3	3	3
3	3	3	3	3	3	1	1	1	2	1	1	3	3	3	3
4	3	3	3	3	3	2	2	2	3	2	2	3	3	3	3
5	3	3	2	3	3	,2	2	2	3	2	2	3	3	3	3

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

		C	ontinuous Ass	essment Marks (0	CAM)	End	
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	5	5	5	5	5	75	100



Department Semester	Mechatronics		amme:		-	d Seme	ster Exam	n Type: TE
Semester	VI	PE						
Course Code	U23CSEC02	Pe	riods/V T	Veek P	Credit C	CAM	ximum M ESE	arks TM
Course Name	Introduction to Industry 4.0	3	0	0	3	25	75	100
Prerequisite	Nil	25	H	141111				
Prerequisite	On completion of the course, the	ne stude	ents w	ill be a	able to		BT	Mapping
of many	CO1 Understand key Industry 4.0						(High	est Level) K1
Course								K2
Outcomes	CO2 Explore advanced technolog							
	CO3 Comprehend the working of	Cloud C	omput	ing Te	chnologi	es		K3
	CO4 Learn how AR/VR improves	Industria	al Auto	matior	and Sa	fety.		K2
	Apply design thinking and ex CO5 security.	plore IIC	OT Use	Case	s and Cy	/ber	1	K3
UNIT – I	Foundations of Industry 4.0 and	d Smart	Syste	ms	Periods:	09		
	Industry 4.0 - The Fourth Industry							
	roduction Systems - Smart and							
	ns (CPS) - Introduction to Sensing gs) - FDM Machine and 3D Printi							CO1
internet or rinin i.0.	gs) - PDW Wachine and 3D Fillin	ng Den	ioristra	tion -	Case Si	uules III	iridusii y	
UNIT – II	Key Technologies And Advance	ed Anal	ysis in		Periods:	09		
levt-Generation	Industry 4.0 Sensors - Collaborative Platform	s and P	roduct	Lifecv	cle Man	agement	(PLM)	
	ence (AI) in Industry 4.0 - Big Da							
	duction to UAVs (Drones) - Energy							CO2
	cial Intelligence and Data Analytics				enance.			
IIAHT III	Cloud Computing Technologies Applications	and Ind	ustrial		Periods:	09		
	Cloud Technologies - Top Clou	d Servi	ce Pro	oviders	s - Clou	d Comp	uting in	
ndustry 4.0 -A	zure IoT Hub and Cloud Services	- Edge	and F	og C	omputing	g - Hybri	d Cloud	CO3
-	d-Based Big Data Platforms - Clou						t Cities.	
UNIT – IV	Augmented Reality (AR), Virtua And Industrial Automation	I Reality	/ (VR),		Periods:	09		
ntroduction to	AR and VR in Industry 4.0 - Indu	istrial U	se Cas	ses of	AR and	VR - A	R/VR in	
	nd Inspection - Mixed Reality (MF		_				ols and	CO4
	for Industrial Safety and Training							
UNIT – V	Design Thinking, IIOT, and Case Design Thinking - Design Think			<u>l</u>	Periods:		oian for	
	ations - Basics of Industrial IoT (_					-	
	n Industry 4.0 - Real-time Use C							CO5
Regulations and	l Safety Standards - Future of Indu	stry 4.0.				,		
Lecture Perio	ds:45 Tutorial Periods:	Practi	cal Pe	riods:	- T	otal Peri	ods:45	
Text Books	t Hama Curuna "Industry 10: Con	aanta l	7		al Custo	" CD(N 2	000
	t, Hema Gurung, "Industry 4.0: Cor Gilchrist, "Industry 4.0: The Industri				•		> Press,∠	023.
	rikcan, Alp Ustundag, "Industry 4.0			_	220 J. T.		n", Sprnig	er,2017.
Reference Boo								
2. Abhinav S	Das, "Industry 4.0 with SAP", Rheir Sharma, Arpit Jain, Paawan Sharn .0", River Publishers,2023.			Roy, "	Recent 7	Γrends a	nd Best I	Practices
3. Anand N	layyar, Mohd Naved, Rudra Ra	meshwa	ar, New	v Hor	izons fo	or Indus	try 4.0	in Mode
	Springer,2023.				O. 45	Tax Ob all		nnortuniti
	 Matt, Vladimír Modrák, Helmut Z irements, Palgrave Macmilla 2020 		, Indus	stry 4.0	for Sivie	es: Chair	enges, O	pportuniti
and Requ 5. Bruno S.	 Matt, Vladimír Modrák, Helmut Z irements, Palgrave Macmilla,2020 Sergi, Elena G. Popkova, Aleks O: Al, the Internet of Things, and t 	sei V. I	Bogovi	z, Tati	ana N.	Litvinova	a, "Unde	rstanding

- i. https://orinirecourses.nptel.ac.in/noc20_cs69/preview
- 2. https://www.oracle.com/in/industrial-manufacturing/industry-4-components/
- 3. https://aws.amazon.com/blogs/iot/tag/industry-4-0/

COs						ram Sp omes (F									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	2	3	3	2	2	2	-	-	2	-	-	2	2	2	2
2	2	3	3	3	2	3	-	-	2	-	-	2	2	2	2
3	3	3	2	3	2	3	-	-	2	-	-	2	3	2	3
4	2	2	2	3	2	3	-	-	2	2	-	2	2	2	2
5	2	2	3	3	2	2	-	-	2	2	-	2	2	3	3

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

•		C	ontinuous As	ssessment Marks (CAM)	End	
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	5	5	5	5	5	75	100



Department	Mechatro		Prog	ramme :	B.Tech.				
Semester	VI		Cour	se Categ	ory: PE	End S	Semester I	Exam Typ	e: TE
Course Code	U23MCE6	04	Pe	eriods/W	eek	Credit		ım Marks	
Course Name	DICITAL		L	Т	Р	С	CAM	ESE	ТМ
Course Name	DIGITAL	MANUFACTURING	3	0	0	3	25	75	100
Prerequisite	Knowledge	of Manufacturing and Ic	Mechatroni	CS					1
		etion of the course, the						Z1 11 1	apping st Level
ū	10010	e key concepts related used in digital manufact	uring.					n	K1
Course	CITVII	ribe the functions and onments.							K2
Outcome	asing	onstrate the use of real loT devices and cloud s	services.						 <3
	implic	ze the role of reverse eations for manufacturing	process mode	ina					<4
IINIT I	CO5 Exam	ine the relationship b ying potential bottlenech	etween canaci	ty plann	ing and	material efficiency	planning	, ,	<4
UNIT - I	muouucuo	n a salah da kacamatan kacamatan kacamatan kacamatan kacamatan kacamatan kacamatan kacamatan kacamatan kacamat						ds: 9	
Digital design an	gitalization of	manufacturing process	s – Concepts a	and com	mon tool	s for digit	al manufa	cturina –]
UNIT - II		and modeling and	analysis tools		u u				CO1
The state of the s	application	gn and fabrication					Perio	ds: 9	L
Mass Customiza	ation - Sma	s – Digital process twins	s in manufactur	ing - Agi	le (Additi	ve) Manut	acturing S	Systems -	
autonomy) – Sen	sor networks	rt Machine Tools - Ro	profice and Af	itomation	(percep	tion, mar	nipulation,	mobility,	CO
		and Devices							
UNIT - III	IoT and clo	ud based manufacturir							
UNIT - III Architecture of Id	IoT and close oT based Ma	ud based manufacturir	ng		eal time		Perio		
UNIT - III Architecture of lot-MS - Conce	IoT and closed Ma oT based Ma ept of cloud	ud based manufacturir nufacturing system - Int manufacturing - Real-ti	ng		eal-time		Perio		
UNIT - III Architecture of Id IoT-MS - Concesservice selection	IoT and closed Mased Masept of cloud Maser	ud based manufacturir anufacturing system - Int manufacturing - Real-ti chine model	ng egration framev me production		eal-time on perce		Perio		
UNIT - III Architecture of Iolor-MS - Conceservice selection UNIT - IV	IoT and close oT based Mase opt of cloud on - Cloud Mase Virtual Mans	ud based manufacturing anufacturing system - Into manufacturing - Real-tichine model suffacturing and Simulater	ng egration framev me production	ork of R	on perce	manufactu ption and	Period ring - Wor capturing	k logic of - Cloud	
Architecture of lot IoT-MS - Conceservice selection UNIT - IV	IoT and close oT based Masept of cloud man Virtual Manufacturing - 3	ud based manufacturing unufacturing system - Into manufacturing - Real-tichine model ufacturing and Simulat BD printing - Laser enging und between the control of the contr	ng egration framev me production ions	ork of Rinformati	on perce	manufactu ption and	Period ring - Wor capturing	k logic of - Cloud	
Architecture of IdloT-MS - Concesservice selection UNIT - IV Direct digital manipodelling, simulation	IoT and closed Materials of cloud of cloud Materials Manufacturing - 3 tion and analysis	ud based manufacturing system - International State of International	ng egration framev me production ions	ork of Rinformati	on perce	manufactu ption and	Period ring - Wor capturing	k logic of - Cloud	CO3
Architecture of lot lot-MS - Conceservice selection UNIT - IV Direct digital manuadelling, simulat	IoT and close oT based Magept of cloud Mage Virtual Manufacturing - 3 tion and analanufacturing	ud based manufacturing system - International System - International System - International System - International System - International Systems - Assembly planning support systems	ng egration framewome production cions eered shaping - g and Validation	vork of Rinformati	engineer	manufactu ption and ing – man	Period ring - Wor capturing Period ufacturing	k logic of - Cloud ds: 9 process	CO3
Architecture of lot loT-MS - Conceservice selection UNIT - IV Direct digital manipodelling, simulation unit - V eal-time informa	IoT and closed Magept of cloud magept of cloud Mage Virtual Manufacturing - 3 tion and analytion based settion based settion based settion	ud based manufacturing unufacturing system - International	egration framewome production ions eered shaping - g and Validation	vork of Rinformati	engineer	manufactu ption and ing – man	Period ring - Wor capturing Period ufacturing	k logic of - Cloud ds: 9 process	CO3
Architecture of IdloT-MS - Concesservice selection UNIT - IV Direct digital manual modelling, simulate UNIT - V Meal-time informate chniques with sr	IoT and closed Magept of cloud Magept of cloud Mage Virtual Manufacturing - 3 tion and analytion based smart sensors	ud based manufacturing unufacturing system - International	ng egration framev me production ions eered shaping - g and Validatior anning - materia	vork of Rinformati reverse	engineer g - Real	manufactu ption and ing – man	Period ring - Wor capturing Period ufacturing	k logic of - Cloud ds: 9 process	CO3
Architecture of IdloT-MS - Conceservice selection UNIT - IV Direct digital manuadelling, simulated UNIT - V eal-time informatic chniques with selecture Period	IoT and closed Magept of cloud Magept of cloud Mage Virtual Manufacturing - 3 tion and analytion based smart sensors	ud based manufacturing unufacturing system - International	egration framewome production ions eered shaping - g and Validation	vork of Rinformati reverse	engineer g - Real	manufactu ption and ing – man	Period capturing Period ufacturing Period duction merestive pro	k logic of - Cloud ds: 9 process	CO3
Architecture of IdloT-MS - Concesservice selection UNIT - IV Direct digital manual modelling, simulated the control of the con	IoT and closed Magept of cloud Magept of cloud Maged M	ud based manufacturing unufacturing system - International	regration framewome production cions eered shaping - g and Validation anning - materia t shop floor - tra	vork of Rinformati reverse Il planninceability Periods:	engineer eng - Real	manufactu ption and ing – man itime prod	Period capturing Period ufacturing Period duction meretive pro	k logic of Cloud ds: 9 process ds: 9 onitoring ducts Periods: 4	CO3 CO4 CO5
Architecture of IdloT-MS - Concesservice selection UNIT - IV Direct digital manual modelling, simulation UNIT - V eal-time informate the chniques with sr Lecture Period Ext Books 1. Mikell P. Granner New Delhi, 2	IoT and closed Magept of cloud Magept of cloud Mage Virtual Manufacturing - 3 tion and analytion based semant sensors Is: 45	ud based manufacturing unufacturing system - International	egration framewome production ions eered shaping - g and Validation anning - material t shop floor - tra Practical tems, and Con	vork of Rinformati reverse Il planninceability Periods:	engineer eng - Real	manufactu ption and ing – man itime prod	Period capturing Period ufacturing Period duction meretive pro	k logic of Cloud ds: 9 process ds: 9 onitoring ducts Periods: 4	CO3 CO4 CO5
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COs	Prog	ram C	utcor	nes (F	POs)	Y ************************************	ę.ł						Program Outcom	n Specific les (PSOs	; s)
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	2	1	2		1	2	-	1	-	1	3	3	2
2	3	3	3	1	1	-	2	2	-	-	-	1	2	3	2
3	3	2	2	1	2	-	1	1	_	-	-	1	3	2	2
4	3	3	2	1	1	-	2	2	-	-	_	1	3	3	3
5	3	3	2	1	1	-	2	2	_		_	1	2	3	2

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

A00000mout		C	CAM)	End			
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	5	5	5	5	5	75	100



Department	Mec	hatro	nics	Progr	amme :	B.Tech.				
Semester	VI			Cours	e Categ	ory: PE	End	Semeste	er Exam Ty	pe: TE
Course	U23	MCE6	0.5	Pe	riods/We	eek	Credit	7	rimum Mar	
Code				L	T	Р	C	CAM	ESE	TM
Course Name	MOE	SILE F	ROBOTICS	3	0	0	3	25	75	100
Prerequisite	Know	Moda		<i>l</i> lechatronic	S					
Frerequisite	KIIO	wieuge	e of Robotics				\		DT M	
	On co	omple	tion of the course, the st	udents will	oe able	to			BT Mapp (Highest	
	CO1	Und	erstand mobile robot funda	amentals, tvr	es. and	autonom			(Highest	
Course	CO2		ign and build mobile robots						K	
Outcomes	CO3		ly kinematic models for rob						K	
	CO4		sensors and localization to				<u> </u>		K	
	CO5		inguish path planning and							-
UNIT – I	Intro		on to Mobile Robots		or algori		lavigation.	Pori	ods:9	+
robotics, terres	r Robo strial a	ots, Condition	bots – Laws of Robots - ompanion Robots – Spac rial locomotion.	- Robot Andere Robots -	atomy – Defens	- Basic M e Robots	Mechanics s. Introduct	of Robotion to au	ts – Basio utonomous	CO1
UNIT – II	· 		f Mobile Robots						ods:9	
Building of var Mechanical Ac Actuators – Gr	tuator	s and	f mobile robots – Use of va drive trains, Electric Actua or drives.	arious Sensir ators - DC M	g metho lotors –	ods. Actu Servo m	ation mech otor, stepp	anism for er motor	robots – – Linear	CO2
UNIT – III	Kine	matic	S	-				Perio	ods:9	
Kinematic Mod	dels ar	nd Co	nstraints: Robot Position	- Forward a	nd Inve	rse Kiner	matic Mode			CO3
kinematic mod	els, ma	aneuv	erability, workspace, and k	inematic cor	trol.					003
UNIT – IV			n and Localization						ods:9	<u></u>
Sensors for Localization, E Tracking.	mobile KF Lo	robo caliza	ots-Representing uncertain uncertain tion Algorithm , EKF Local	nty-Feature lization with	extractio Unknow	n-Mobile n Corres	robot loc pondences	alization- Multi-Hy	Markov pothesis	CO4
UNIT – V	Plani	ning a	nd Motion Control					Perio	ds:9	
path planning	- Cell	decon	overview - Global path pl nposition path planning-Po l for lateral movement, Sta	otential field	path pla	anning –	Obstacle a	nina - Ro	ad man	CO5
Lecture Period	s: 45		Tutorial Periods: 15	Practical	Period	s: -		Total	Periods:	45
Text Books								L		
2. Ulrich Nehm	tuate, i zow. (2 gwart,	05A, 2 2003). Illah	Mobile Robots - A practical R. Nourbakhsh, and Dav	introduction,	Springe	r.				
Reference Book	S					i i				
1. S.R. DEB, S	. DEB.	(201	1). Robotics Technology ar	nd Flexible A	utomatio	on, McGr	aw-Hill.			
Ulrich Nehm	zow, (2012).	Mobile Robotics: A Practic	cal Introducti	on Seco	nd Editic	n. Springer	•		
			trol Fundamental Algorithm							
5. Riadh Siaer	"The	ssama	a Khatib , "Springer Hand B of Humanoid Robots- Rese	sook of Robo	ics", Spi	ringer, 20	08.	- 0040		
Veb References	,c	acuic	or ramanola Robots- Rese	Jaion and ap	JIICALION	s , milech	rublication	s, 2012.		
			/specializations/modernrobo							
			com/doi/full/10.1177/172988	31419839596	3					
3. https://accele	eration	obotic	s.com/ros.php				-			

COs	PO1 PO2 PO2 PO4 PO5 PO6													am Spec mes (PS	cific (Os)
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	2	2	2	- 6	- 7	-	-	-	1	1	2		1 000
2	3	1	3	3	2	_	1	1	1		-	-		3	-
2	2	2	4					2001		-	1	2	2	3	=
3			1		-	3	1	-	-	2	1	- 1	1 12	1	2
4	1	1	3	3	-	1	_	2	_	1		1	_	2	
5	1	1	3	3		TE CONTR	_						3	- 3	-
		_ ' _	3	3	-	-	3	1	1	1	-	1	3	3	-

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

1721		Contin	uous Asse	essment Marks (C	AM)	End Semester	
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Examination (ESE) Marks	Total Marks
Marks	5 5		5	5	5	and the state of t	100
				3	0	75	

Department			Cours	e Cate	gory: PE	End	Semesie	r Exam T	ypc. 12
Semester	VI			riods/W		Credit		aximum V	TM
Course	U23MEDC02		L	Т	P	С	CAM	ESE	
Code Course		I AND DEVELOPMENT	3	0	0	3	25	75	100
Name	PRODUCT DESIGN	(Common to Mech	nanical	& Mecl	natronics)			
	Computer Aided D		lamou						
Prerequisite	e Computer Alded B	Coigii						BTI	Mapping
	On completion O	f the course, the studen	nts will	be able	e to			(High	hest Level)
									K2
	CO1 Explain con	nceptual product design te	ecnniqu	es.	ifications.				K2
Course	CO2 Identify Cus	stomer needs and produc nt systematic concept ger	noration	techni	aues in pr	oduct desig	gn.		К3
Outcomes	co3 Use differen	nt systematic concept gei diment design principles ii	n latest	manufa	acturing m	ethods.			K3
	CO4 Use emboo	diment design principles in the concepts relating to sin	nulating	produc	t performa	ance and			K3
	CO5 Illustrate to	ring processes	1101009		•			eriods: 09	<u> </u>
IINIT_I						-f - Coo	Desig	n Produ	uct
Design ve	ersus Scientific met	hod, Need for new de	esigns,	Consider	derations Fechnolog	ical Innov	ation and	d Busine	ess CO1
Developm	ent process cycles,	hod, Need for new de Organizations for Proc velopment and design the	duct De	esign, Desian	morpholo	gy- pionee	r design	phases a	nd CO1
	Madern Droduct de	ring and redesign method	conce,	Dooilg.		,			
								eriods: 0	
UNIT-I			ideas	for nev	w product	s, Kano D	iagram,	Establish	ign CO2
Engineerii	ng Characteristics, C	customer needs, locating Quality Function Deploym	ent (QF	FD), Pro	oduct Des	ign Specifi	cation (P	D3) Des	igii 002
informatio	on and sources.							eriods: 0	
UNIT -	III Concept Genera								
	III Concept Genera	ation		an dro	wing Syst	ematic met	hods: Te	ar down a	and
Freud's m	nodel, Creative thinki	ing- brain storming, prima	ary desig	gn, drav	ving, Syst	ematic met	hods: Te	ar down a ving (TR	and IZ), CO3
Freud's m	nodel, Creative thinki ntation, Function str	ing- brain storming, prima ructure, Morphological m	athods	Comp	arison ba	sed on abs	solute cri	ar down a ving (TR teria, Pug	and IZ), gh's CO3
Freud's m	nodel, Creative thinki ntation, Function str	ing- brain storming, prima ructure, Morphological m	athods	Comp	arison ba	sed on abs	solute cri	teria, Pug	gh's
Freud's mexperiment Axiomatic concept,	nodel, Creative thinki ntation, Function str Design (AD) Decisi Measurement scales	ing- brain storming, prima ructure, Morphological m on Theory, Evaluation m , Weighted decision Matri	nethods ix, Anal	, Comp ytic Hie	arison bar rarchy pro	sed on abs	solute crit). F	teria, Pug Periods: 0	gh's
Freud's mexperiment Axiomatic concept,	nodel, Creative thinkintation, Function street Design (AD) Decision Measurement scales IV Embodiment Decision Embodiment Embodiment Decision Embodiment Embod	ing- brain storming, prima ructure, Morphological m on Theory, Evaluation m , Weighted decision Matri esign	nethods ix, Anal	, Comp ytic Hie	arison bar	sed on abs	solute crit). F design,	teria, Pug Periods: 0	oph's 09
Freud's m experime Axiomatic concept, UNIT -	nodel, Creative thinkintation, Function streed Design (AD) Decising Measurement scales IV Embodiment Decision Portfolios and Architecture	ing- brain storming, prima ructure, Morphological m on Theory, Evaluation m , Weighted decision Matri esign nitecture, Configuration	and P	ytic Hie	arison bar rarchy pro ric design	sed on abs cess (AHP n, detailed	solute crit). F design, - Need a	Periods: 0 Design and proce	op's open of the control of the control open open of the control open open open open open open open open
Freud's m experime Axiomatic concept, UNIT - Product Environm Robust D	nodel, Creative thinkintation, Function struction controlled the c	ing- brain storming, prima ructure, Morphological m on Theory, Evaluation m , Weighted decision Matri esign nitecture, Configuration Simulation, Material sele of design, quality assessn	and P	ytic Hie	arison bar rarchy pro ric design	sed on abs cess (AHP n, detailed	solute crit). F design, - Need a	Periods: 0 Design and proce	op's open of the control of the control open open of the control open open open open open open open open
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Correlation Level: 1 - Low, 2 - Medium, 3 - High

Acconomt		Cont	inuous Assess	ment Marks (CA	M)	End	
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Prerequisite	Nil									
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Course	Pane	cribe the current philos ling automation							K2	
Outcome	CO2 Com	pare the different fire s	tandards, FAS C	ompon	ents, FA	S loops A	rchitectures	-	140	
	CO3 Appl	y hardware and softwa	are for HVAC sys	tem		. с тооро, 7 т	romediares		K2	
-	CO4 Dem	onstrate energy manag	gement system						K3	
	CO5 Anal	yze the new concepts r	naterials of build	na auto	mation			K3		
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- 2. Albert Ting-Pat So, WaiLok Chan, Kluwer "Intelligent Building Systems" Academicpublisher, 3rd ed., 2012.
- 3. James Sinopoli "Advanced Technology for Smart Buildings" Artech House. 2016
- 4. Sibanjan Das, Umit Mert Cakmak "Hands-On Automated Machine Learning: A beginner's guide to building" Packt Publishing Ltd. – 2018
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COs/POs/PSOs Mapping

COs		,			rogra	m Oı	utcor	nes (POs))				gram Spe comes (P	
	P01	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	1	1	2	2	1	1	2	2	3	2	3	2	3
2	3	2	1	2	2	1	1	2	2	1	3	2	3	2	3
3	3	2	1	1	1	1	2	1	1	1	3	2	3	1 1	3
4	3	2	1	2	2	2	3	2	2	2	3	2	3	2	3
5	3	2	1	2	2	2	3	2	2	2	3	2	3	2	3

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

Evaluation Method

		Inte	rnal Asse	ssment Marks (I	AM)	End	Lan e
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Semester Examination (ESE) Marks	Total Marks
Marks	5	5	5	5	5	75	100

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OPEN ELECTIVE - II

Department	MBA								
Semester	V/VI			ramme :					
Course	<u> </u>		1	se Categ				er Exam T	
Code	U23H	ISOC01	P	eriods/We		Credit	T	imum Ma	rks
Course Name	INTE	LLECTUAL PROPERTY RIGH	TS 3	T 0	P 0	C 3	CAM	ESE	TM
			mon to ALL E		U	3	25	75	100
Prerequisite	-		MONTO ALL L	ranches)					
	On co	mpletion of the course, the st	udents will b	e able to)			BT Ma	
	CO1	Describe the Concept and Im	portance of I	ntellectua	I Proper	ty Rights (IE)P)	(Highes	
	CO2	Describe the procedures for premedies for infringement.	patent registra	ation, incl	uding re	cognizing le	gal	K	
Course Outcome	CO3	Apply copyright laws to hypot plagiarism.					T t	K	3
	CO4	Infer the different types of trac and infringement issues.						K	4
	CO5	Explain the legalities surround and their protection mechanis	ding industria ms.	designs,	geogra	phical indica	itions,	K	2
UNIT - I	Overv	iew of Intellectual Property					Peri	ods: 9	
conventions and	d agree	ed for intellectual property right (IPI nical Indication, Plant Varieties and ments: WTO/TRIPS Agreement, vention, Madrid Agreement, Nice Ag	Paris Conven	– Internation	onal prote	action of IDD			CO1
UNIT - II		f Patents					Perio	ods: 9	
Meaning and Na	ture of F	Patent - Subject matter of Patent - F	Registration Pr	ocedure, F	Patentable	e and Non-pa	44-1-1-1		<u> </u>
i roccos and p	TOUUCL I	Patent, Legal Requirements for Patent rights - Infringement of Patents	itents – Patent	documen	t. Chaoifi	oction and C	laims - G	ranting of	CO2
UNIT - III	Law o	f Copyrights	and Nemedie	s - Evergre	ening of	Patents			
Meaning and Na	ture of (Copyright - Subject matter of copyri	ight - Law of C	opyrights	- Authors	hin and Own		ds: 9	T
. togioti ation i i to	ocuule,	Assignment and Licensing of conv	right - Intringe	ment of C	onwrighte	and Dame - I'			
with special refer	giilo - 11	cialed rights. Celebrity Rights. Ac	cademic Integr	ty or Plag	iarism: A	n Intellectual	Theft - C	opyrights	CO3
		Trademarks							
	ature of	Trademarks - Different kinds of	Trademarks	Pogietro	hla and	Na- D	Perio	ds: 9	
togiculation of 1	raucilla	ins - Giodinas for refusal of Regist	ration. Absolu	Ground	and Dal	otive Consumal	Λ		
and the state	Ciliains	- miningement, Remedies and Pe	naities - Offer	ses relatir	ng to Tra	demarks - Pa	assing off	action -	CO4
Docopave Sirinai	ity - Dei	enses - Emerging New trends in tra	ademarks	sniV slux	ri Mana				
		Forms of IPR dustrial Design - Subject Motter - F		diber kn	Madaga		Perio	ds: 9	
Remedies for Infr	ingeme	dustrial Design - Subject Matter - F nt - Trade secret Law-Determinatio	n of Trade Sec	egistration	- Infringe	ement of Copy	rights in	designs -	
Jeoreta i Totectio	JII 101 50	- noting ston- trade secret litigation -	Meaning and I	Vature of (Gengranh	nical Indicatio	opriations n (GI) - Pi	of Irade	CO5
or registration - I	mingen	nent of Geographical indication - Re	emedies for Inf	ringement.			(-,	ooddarc	
_ecture Period	ls: 45	Tutorial Periods: -	Practical	Periods	: -		Total	Periods:	45
ext Books									
Limited, 2013	,	Intellectual Property Rights: Prote						ng India P	rivate
. Neeraj, P., ar eference Bool	na Knus	deep, D. Intellectual Property Right	s, 2 ^{na} edition, F	PHI Learni	ng Private	e Limited, 20	18.		
		ating to Intellectual Property Rights,	Oud						
. Bouchoux. D	eborah	E. Intellectual Property: The Law	, 2 edition, Le	exis Nexis,	2017.				
oongage Lea	ming, Z	013.							
. Ganguli P. Int	ellectua	l Property Rights: Unleashing the K	nowledge Eco	nomy. Tat	a McGrav	w-Hill Publish	ina Comp	anv: 2022	
Jyoti Kattan. I	ntellecti	ual Property Rights, 2''' edition, Bha	arat Law House	2024				, LUZZ.	
Surendra Mal	ik and S	udeep Malik, Supreme Court on Int	tellectual Prop	erty, Easte	rn Book (Company, 20	22.		
leb References https://www.w		bout in/on/							
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- 3. https://www.wto.org/english/tratop_e/trips_e/trips_e.htm
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COs	Program Outcomes (POs)											Program Specific Outcomes (PSOs)			
A for the	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12		PSO2	PSO3
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5	1	2	nig ar	III 2910	1020	3	3	2	-	2	1	1	3	2	3

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

Evaluation Methods

•		Conti	End Semester				
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Examination (ESE) Marks	Total Marks
Marks	5	5	5	5	5	75	100

^{*} Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

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Semester V.VI — Course Category: OE Periods/Veek Credit Maximum Marks* Course Name NEW PRODUCT DEVELOPMENT 3 0 0 0 3 25 75 100 (Common to ALL Branches) On completion of the course, the students will be able to CDR Explain the stages and importance of new product development (NPD) in modern business contexts. CO2 Popply market research to identify customer needs and translate them into K2 Course Outcome CO3 Illustrate the product concepts using screening and scoring techniques to select the most viable option. CO3 Illustrate the product concepts using screening and scoring techniques to select the most viable option. CO4 Examine product prototype that incorporates principles of product architecture and design for manufacturing. CO5 Analyze a business plan and market strategy for the successful launch of a new product. Introduction to New Product Development (NPD) - Product Development on NPD - Business Models for NPD - Introduction to New Product Development (NPD) - Product Development on NPD - Business Models for New Product Specifications - Establishing and Refining Product Specifications - Establishing and Refining Product Specifications - Establishing and Refining Product Specifications - Establishing and Refining Product Specifications - Establishing and Refining Product Specifications - Establishing and Refining Product Development (NPD) - Translating Customer Needs into Product Specifications - Establishing and Refining Product Specifications - Establishing and Refining Product Specifications - Establishing and Refining Product Specifications - Establishing and Refining Product Specifications - Establishing for New Product Concepts - Connectly Evaluation and Specifications - Establishing and Refining Product Development Product Development Product Development Product Concepts - Connectly Evaluation and Specifications - Establishing For New Product Concepts - Connectly Evaluation and Specifications - Configuration of Concepts - Screening and Scoring Product Concepts - Connectly Evaluation and Speci	Department	MBA		Progr	amme :	B.Tech.						
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Course Name NEW PRODUCT DEVELOPMENT 3 0 0 3 25 75 100	Course	110011	0000	- I								
Course Name NEW PRODUCT DEVELOPMENT 3 0 0 3 25 75 100	Code	U23H	SOC02		T		•			T		
Prerequisite On completion of the course, the students will be able to Explain the stages and importance of new product development (NPD) in M2 Apply market research to identify customer needs and translate them into product specifications. Course Outcome Cottome Cot	Course Name	NEW	PRODUCT DEVELOPMENT									
On completion of the course, the students will be able to CO1		7	(Commo	n to ALL Br	anches)					1		
CO1 Explain the stages and importance of new product development (NPD) in modern business contexts. CO2 Apply market research to identify customer needs and translate them into product specifications. CO3 Illustrate the product concepts using screening and scoring techniques to select the most viable option. CO3 Illustrate the product concepts using screening and scoring techniques to select the most viable option. CO4 Examine product prototype that incorporates principles of product architecture and design for manufacturing. CO5 Analyze a business plan and market strategy for the successful launch of a new product. Introduction to New Product Development Periods: 9 Introduction to New Product Development (NPD) - Product Development in NPD - Usuniess Models for New Product Selection and Creativity in NPD - Reverse Engineering and its Application in NPD - Business Models for New Product Development - Sustainability and Ethical Considerations in NPD - WINT - II Market Research and Customer Needs Identifying Market Opportunities for New Product Development - Sustainability and Ethical Considerations in NPD - Werlods: 9 Identifying Market Opportunities for New Product Section Product Section - Sustainability and Ethical Considerations in NPD - Werlods: 9 Identifying Market Opportunities for New Product Section - Sustainability and Ethical Considerations - Sustainability on NPD - Reverse Engineering and its Application in NPD - Werlods: 9 Identifying Market Opportunities for New Product Section - Sustainability on Sustainability on NPD - Reverse Engineering and Section Product Section Plan - Sustainability on Sustainability on NPD - Introduct Development - Sustainability on NPD - Reverse Indication - Sustainability on NPD - Reverse Indication - Sustainability - Sustainability - Sustainability - Sustainability - Sustainability - Sustainability - Sustainability - Sustainability - Sustainability - Sustainability - Sustainability - Sustainability - Sustainability - Sustainability - Sustainability - Sustainabi	Prerequisite	-										
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- 3. https://www.mindtools.com/pages/article/newSTR_66.htm
- 4. https://www.interaction-design.org/literature/article/design-thinking-getting-started-with-empathy
- b. https://www.productplan.com/glossary/product-architecture/
- 6. https://hbr.org/2019/09/why-design-thinking-works
- 7. https://www.smartsheet.com/new-product-development.
- 8. https://www.ptc.com/en/blogs/cad/best-practices-for-developing-new-products

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

Evaluation Methods

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Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Examination (ESE) Marks	Total Marks	
Marks	5	5	5	5	routev 5 instruct	75	100	

* Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

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Madagadinal TV - 605 10

Department	MBA		P	rogra	amme :	B.Tec	h.						
Semester	V/ VI		C	ours	e Categ	jory: O	E	End	Semeste	r Exam T	ype: Tl		
Course	U23H	SOC03		Pe	riods/W	eek	C	redit	Max	imum Ma	rks		
Code				L	Т	P		С	CAM	ESE	TM		
Course Name	FINAL	NCE FOR ENGINEERS		3	0	0		3	25	75	100		
	· · · · · · · · · · · · · · · · · · ·	(Con	mmon to AL	L Br	anches))							
Prerequisite													
	On completion of the course, the students will be able to												
	CO1	Explain the objectives, scop and differentiate between pr								(Highes			
	CO2	decision-making.											
Course Outcome	СОЗ	Demonstrate the steps in the capital budgeting process and apply techniques like cost-benefit and sensitivity analysis for evaluating engineering projects.											
	CO4	Analyze financial statements, including balance sheets and income statements,											
,	CO5	decision-making.											
UNIT - I	Introd	uction to Financial Manager	ment						Peri	ods: 9			
Overview of Fi	nancial N	lanagement: Objectives, Scope,	and Role in	n Eng	ineering	- Fina	ncial Pl	anning	and Strate	av: Short-	1		
Term and Lor	ng-Term	Planning - Basic Concepts: Pr	ofit Maximiz	ation	vs We	alth Ma	aximiza	tion - F	Role of E	ngineering	CO1		
		ecision - Making, Relationship be			nd Othe	Engin	eering [Disciplin	es.		<u> </u>		
UNIT - II		/alue of Money and Investm								ods: 9			
Calculations -	Investme	Concept, Importance and Appl nt Appraisal Techniques: Paybac ability Index (PI) - Risk Analysis ir	ck Period, N	let Pr	esent V	alue (N	Prese	nt Value ternal F	e and Fut Rate of Re	ure Value turn (IRR)	CO2		
UNIT - III	1	I Budgeting for Engineering							Perio	ods: 9			
Capital Budget	ting Proc	ess: Steps and Key considerat	tions, Techr	niques	for Ev	aluatin	g Engir	neering	Project. 0	Cash-Flow	1		
Estimation for Evaluation.	Project, (Cost - Benefit Analysis in Engine			ensitivity	6.70	sis, and	Decision	on Trees f	or Project	CO3		
UNIT - IV		cial Statements and Ratio A			4				Perio	ods: 9	4		
Introduction to	Financia	l Statements: Balance Sheet, I	Income Stat	emer	it, and a	an Eng	ineerin	g Persp	ective on	Financial	1		
Evaluation - Lin	nitations o	- Financial Ratios: Liquidity, P of Ratio Analysis in Engineering F	Projects.			Case	Studies	on Fin	ancial Pe	formance	CO4		
UNIT - V		stimation and Engineering							Perio	ods: 9			
Analysis in Eng	gineering	imation in Engineering - Types of Projects, Break-Even Analysis lacement Analysis.	of Costs: Fi and Its App	xed, ' lication	Variable on in En	, Margi gineeri	nal, and ng Dec	d Sunk ision Ma	Costs, Co aking - Er	st-Benefit gineering	CO5		
Lecture Perio	ods: 45	Tutorial Periods: -	Prac	tical	Period	ls: -			Total	Periods	: 45		
Text Books									1 - 0.00	1.545			
		EM, Koelling CP. Engineering Ed											
		C, Allen F. Principles of Corpora											
3. Brigham El	F, Housto	n JF. Fundamentals of Financial	Managemer	ıt. 15 ^t	ⁿ edition	. Cenga	ge Lea	rning; 2	019.				
Reference Bo													
		a KK. Financial Management for							2018.				
		e for Engineers: Evaluation and F	unding of C	apital	Projects	s. Sprin	ger; 20	17.					
Web Reference													
		com/portal/resource/articles/finar											
2. https://www	ivestop	edia.com/ask/answers/033015/w	/riy-time-valu	ie-mo	ney-tvm	-ımport	ant-con	cept-inv	estors.asp)			

- 3. https://omnicard.in/blogs/capital-budgeting-24042024
- 4. https://www.linkedin.com/pulse/role-capital-budgeting-process-engineering-studies-ashraf
- 5. https://corporatefinanceinstitute.com/resources/accounting/financial-ratios/
- 6. https://www.dau.edu/acquipedia-article/engineering-cost-estimation-method

COs		Program Outcomes (POs)											Prog Outco	ram Spo omes (F	ecific (SOs)
	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12			PSO3
1	1	2	-	-	-	1	1	1	-	2	1	1	3	2	3
2	1	2	1	-	1	2	1	2	_	3	1	•	3	2	2
3	-	3	3	_	1	3	1	2	_	3	1	-	2	2	<u> </u>
4	1	2	-	2	1	1	2	4		2	1	1	3	2	3
5		_	-			HSUL V	2	1	1	2	1	-	3	3	3
5	-	3	-	-	2	3	2	2	1	2	2	3	3	2	3

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

Evaluation Methods

	Conti	nuous Asse	essment Marks (CA	M)	Fnd Semester	
CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Examination (ESE) Marks	Total Marks
5	5	5	5	5	75	100
	CAT 1 5		CAT 1 CAT 2 Model	CAT 1 CAT 2 Model Assignment*	CALL Accionments	CAT 1 CAT 2 Model Assignment* A44

* Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Dr.G.BALAMURUGA MOHAN RAJ

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Sri Manakula Vinayagar Engg. College
Madagadipet, Puducherry - 605 107

Department Semester	MADA		T						
	MBA V/VI			ramme :					
Course	V/ VI			se Categ		<u> </u> En	d Semeste	r Exam T	уре:
Code	U23H	SOC04	Pe	riods/We		Credit	Maxi	imum Ma	rks
Course Name	ECOI	NOMICS FOR ENGINEERS	3	T 0	P	С	CAM	ESE	TM
		(Common	<u>L</u>	1	0	3	25	75	100
Prerequisite	L-,	(Common	I to ALL BI	anches)					
	On cor	mpletion of the course, the stude	nts will be	e able to				BT Ma	apping
	CO1	Interpret principles of manageria	al econom	nics to re		scenario	s, utilizing	(Highes	
	CO2	demand analysis and forecasting Discuss production functions an managerial decision-making and	nd cost str	ructures	to evalu	ate their	impact on	K	
Course Outcome	СОЗ	Examine various market structureffects on market behavior and co	res and n	ricina str	ategies,	synthesi	zing their	K3	
	CO4	Apply macroeconomic policies investment decisions, and econon	and their	r implica	tions or	busines	s cycles,	K3	
,	CO5	Analyze recent economic trends income inequality.			ological a	advancem	ents and	K4	
UNIT - I	Introd	uction to Managerial Economics							
Managerial Eco	nomics:	Meaning Scope and Importance Fun	nctions of a	Manager	ial Econor	niet - Dem	Perio		T
	ment ald	emand, Law of Supply, Elasticity of sup ong with the curve - Demand Forecast							co
UNIT - II	Produc	ction Function and Cost Concept	·e						
Production Fund	tion: Me	aning, Types Applications in Manager	rial Dagiaia	n Making	- Law of	variable n	Period		T
								average	CO2
		The Concepts. Total Nevenue (TR) - IVI	larginal Rev	venue (MF	R) and Av	erage Reve	enue (AR).	arolago	002
	Perfect	Structure Competition Managery Managery III					Period	ds: 9	••••••
		Competition, Monopoly, Monopolistic Based Pricing, Competition - Based Price Discrimination, Premium Pricing of				uopoly - Pi	icing policie	s: Cost-	
Pricing Rundle	Pricing, P	rice Discrimination, Premium Pricing ar	nd practices	chological s.	Pricing, (eographic	al Pricing, [Dynamic	CO3
g, Dandie F									
JNIT - IV	Macroe	economics UAN MARIUMAN	1.2 1.2 2.1 1.3 21 0.0	- 100 T			Dovind	I 0	
JNIT - IV Blobalization and	Macroe Econor	economics mic Policies - National Income Concor	sto: Metherd		suring nat	ional incor	Period		
JNIT - IV Blobalization and	Macroe Econor ry policy	economics mic Policies - National Income Concep and Fiscal Policy - Business Cycles	sto: Metherd		suring nat	ional incor			CO4
JNIT - IV Globalization and ncome - Monetanvestment (FDI)	Macroed Econor ry policy - Foreign	economics mic Policies - National Income Concep and Fiscal Policy - Business Cycles In Institutional Investment (FII).	sto: Metherd	s of meas	deflation	ional incor and its typ			CO4
JNIT - IV Globalization and ncome - Moneta nvestment (FDI) JNIT - V	Macroe d Econor ry policy - Foreign Recent	economics mic Policies - National Income Concep y and Fiscal Policy - Business Cycles n Institutional Investment (FII). Trends in Economics	ots: Method concepts -	ls of meas	deflation	and its typ	ne - circular es - Foreigi	flow of Direct	CO4
JNIT - IV Globalization and acome - Moneta envestment (FDI) JNIT - V Digital Economy automation in Economies - Inco	Macroe d Econor ry policy - Foreign Recent : E-com conomic me In - e	economics mic Policies - National Income Concep and Fiscal Policy - Business Cycles In Institutional Investment (FII).	ots: Method concepts -	Is of meas Inflation,	deflation	and its typ	ne - circular es - Foreign	flow of n Direct	CO4
JNIT - IV Globalization and acome - Moneta envestment (FDI) JNIT - V Digital Economy automation in Economies - Incometure Period	Macroe d Econor ry policy - Foreign Recent : E-com conomic me In - e	mic Policies - National Income Concept and Fiscal Policy - Business Cycles in Institutional Investment (FII). Trends in Economics merce, Fintech, and Online Services - Decision-Making - Gig Economy : Grequality : Causes, Effects, and Socio - percentage.	ots: Method concepts - - Role of Towth of Frontical Imp	s of meas Inflation, nation plants Fechnologies along a act	y: Big D	and its typ	ne - circular es - Foreigi Period ial Intelligen Impact on	s: 9 Ice and Global	CO5
JNIT - IV Globalization and neome - Moneta nvestment (FDI) JNIT - V Digital Economy nutomation in Economies - Inconecture Period ext Books	Macroed Econoring policy - Foreign Recent: E-component in - 6	mic Policies - National Income Concept and Fiscal Policy - Business Cycles in Institutional Investment (FII). Trends in Economics merce, Fintech, and Online Services Decision-Making - Gig Economy: Grequality: Causes, Effects, and Socio - p	ots: Method concepts - - Role of Towth of Frolitical Imp	Is of mea: Inflation,	y : Big D	and its typ	Period ial Intelligen Impact on	s: 9 Indeed and Global	CO5
JNIT - IV Globalization and neome - Moneta nvestment (FDI) JNIT - V Digital Economy automation in Economies - Inconcecture Period ext Books Samuelson, V 2020.	Macroed Econoring policy - Foreign Recent: E-commic onomic me In - 6	mic Policies - National Income Concept and Fiscal Policy - Business Cycles in Institutional Investment (FII). Trends in Economics merce, Fintech, and Online Services - Decision-Making - Gig Economy : Grequality : Causes, Effects, and Socio - p Tutorial Periods: -	ots: Method concepts Role of Trowth of Frolitical Imp	S of meas Inflation, not specification, rechnolog eelance a act Periods:	y: Big Dand Contr	and its typ	Period ial Intelligen Impact on	s: 9 Indeed and Global	CO5
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JNIT - IV Blobalization and acome - Moneta avestment (FDI) INIT - V igital Economy utomation in Economies - Inco ecture Period ext Books Samuelson, V 2020. Ahuja, H. L. F Mithani, D. M. Eference Book Varian, Hal R. Brickley, Jame edition., McGr Samuelson, P	Macroed Econoring policy - Foreign Recent : E-com conomic me In - e s: 45 William F Principles Manage ss Interme es A., Sr aw-Hill E aul, and	mic Policies - National Income Concept of and Fiscal Policy - Business Cycles on Institutional Investment (FII). Trends in Economics merce, Fintech, and Online Services Decision-Making - Gig Economy : Grequality : Causes, Effects, and Socio - percursional Periods: - Tutorial Periods: - F., and Marks, Stephen G. Managerial	- Role of Towth of Frobilitical Imp Practical I I Economic Tata McGra Publishing I Dach, 9 th ederold L. Ma	Fechnolog eelance a act Periods: Theory The	y: Big Dand Contr	and its typ ata, Artific act Work ions, and & Compar s and Orga	Period ial Intelligen Impact on Total P Cases, 10 th	s: 9 Ice and Global Periods: 4	CO5 45 Viley,
JNIT - IV Globalization and noome - Monetan vestment (FDI) JNIT - V Digital Economy automation in Economies - Incomecture Period ext Books Samuelson, V 2020. Ahuja, H. L. F. Mithani, D. M. Eference Book Varian, Hal R. Brickley, Jame edition., McGr. Samuelson, P. Schiff, Peter, a	Macroed Econoring policy - Foreign Recent : E-com conomic me In - 6 S: 45 William F Principles Manage s Interme es A., Sr aw-Hill E aul, and and Sche der Foreign Acroed	mic Policies - National Income Concept of and Fiscal Policy - Business Cycles of Institutional Investment (FII). Trends in Economics merce, Fintech, and Online Services - Decision-Making - Gig Economy : Grequality : Causes, Effects, and Socio - percursional Periods: - Tutorial Periods: - F., and Marks, Stephen G. Managerial conomics, 7 th edition, 1 th edition, 1 th edited Microeconomics: A Modern Appropriate Microeconomics: A Modern Appropriate Microeconomics: A Modern Appropriate Microeconomics, 20 th editor, 2016. Nordhaus, William. Economics, 20 th editor, 20 th editor, Andrew J. Introduction to Microeconomics,	- Role of Towth of Frobilitical Imp Practical I Economic Tata McGra Publishing I Dach, 9 th ederold L. Ma	Fechnologeelance aact Periods: Theory Sittion., W.V. Transperial I	y: Big Dand Control Application N. Norton Conomic ducation,	and its typ ata, Artific act Work ions, and & Compar s and Orga	Period ial Intelligen Impact on Total P Cases, 10 th	s: 9 Ice and Global Periods: 4	CO5 45 Viley,
JNIT - IV Globalization and noome - Monetan vestment (FDI) JNIT - V Digital Economy automation in Economies - Incomecture Period ext Books Samuelson, V 2020. Ahuja, H. L. F. Mithani, D. M. Eference Book Varian, Hal R. Brickley, Jame edition., McGr. Samuelson, P. Schiff, Peter, a	Macroed Econoring policy - Foreign Recent : E-com conomic me In - 6 s: 45 William F Principles Manage s Interme es A., Sr eaw-Hill E aul, and and Scho c C. Ecor	mic Policies - National Income Concept of and Fiscal Policy - Business Cycles on Institutional Investment (FII). Trends in Economics merce, Fintech, and Online Services Decision-Making - Gig Economy : Grequality : Causes, Effects, and Socio - percursional Periods: - Tutorial Periods: - F., and Marks, Stephen G. Managerial	- Role of Towth of Frobilitical Imp Practical I Economic Tata McGra Publishing I Dach, 9 th ederold L. Ma	Fechnologeelance aact Periods: Theory Sittion., W.V. Transperial I	y: Big Dand Control Application N. Norton Conomic ducation,	and its typ ata, Artific act Work ions, and & Compar s and Orga	Period ial Intelligen Impact on Total P Cases, 10 th	s: 9 Ice and Global Periods: 4	CO5 45 Viley,

- 2. https://psu.pb.unizin.org/introductiontomicroeconomics/chapter/chapter-6-costs-and-production/
- 3. https://corporatefinanceinstitute.com/resources/economics/market-structure.
- 4. https://www.britannica.com/money/macroeconomics
- 5. https://www2.deloitte.com/us/en/insights/economy/global-economic-outlook/weekly-update.html

COs/POs/PSOs Mapping

COs		Program Outcomes (POs)									Program Specific Outcomes (PSOs)				
(Table	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011	PO12		PSO2	
1	1	1	1	-	1	1		- ·	15. 1	2	2	TOTAL T	2	2	2
2	1	1	1	2	2	2	2	rii l o sari	ne t ra	3	3	3	2	2	3
3	1	1	1	2	dic o n i	2	2		a. And	3	15.15.50	3	2	2	3
4	1	1	-	2	2	2	2	2	trip (r	3	3	3	2	2	3
5	1	1	1	2	2	gride og	2	2	. T <u>. 1</u> . j	3	3	3	2	2	3

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

Evaluation Methods

		Conti	End Semester	1			
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Examination (ESE) Marks	Total Marks
Marks	5	5	5	5	5	75	100

* Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Dr.G.BALAMURUGA MOHAN RAJ Professor & Head

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Department	MBA			Progr	amme :	B.Tech.				
Semester	V/VI			Cours	se Cateo	ory: OE	End	l Semeste	r Exam 1	vpe: 7
Course	U23H	soc	05	Pe	riods/W	eek	Credit		imum Ma	
Code				L	T	Р	С	CAM	ESE	ТМ
Course Name	MAR	KEI	ING MANAGEMENT	3	0	0	3	25	75	100
Prerequisite	T -		(Com	mon to ALL B	ranches)	<u> </u>				
	On co	nple	tion of the course, the st	udents will b	e able to	0				apping
	CO1	Ex se	plain the importance of m lling.	narketing and	differen	tiate bet	ween mark	eting and	(Highes	
Course	CO2	inc	ply the consumer decis lustrial and consumer buyir	ng behavior.					K	3
Outcome	CO3	involved in new product development.								
	CO4	ais	strate the role of distribution strategy for both o	consumer and	industria	al goods.			K	3
	CO5	IVIa	alyze emerging trends nagement and experiential	in marketing, I marketing str	includ ategies.	ng Cus	tomer Rel	ationship	K	1
JNIT - I	Introd	uctio	on to Marketing					Perio	ds: 9	
Macro and Mi	portano	ce of	Marketing - Difference be	tween Market	ing and	Selling -	Marketing	Environm	ent: The	
ntroduction, N	eed. Fr	ame	ment factors, Importance work of Strategic planning	or environme	ent anal	ysis – S	Strategic Ma	arketing p	lanning:	co
Responsibility (of Mark	eting	y - 4 Ps of Marketing	process and s	steps in	strategic	planning -	Ethical an	d Social	
7			Behaviour and Marketing	g Strategy						
Role of buyer -	- Types	s of	Buying behavior - Factors	influencing b	uvina de	cisions	- Consuma	Perio r decision	ma alvia a	T
nocess. Ivieal	illig ar	iu S	teps in Consumer decisi	on making P	rocess	- Organ	nizational h	uning be	h	
Jassincation o	or organ	ıızatı	onal markets, Characterist	tics. Difference	e hetwe	en Indus	trial and C	onoumor		СО
nainet Segine	entation	- 1	Needs, Classification and	Significance	– Targ	geting, F	Positioning	and Con	petitive	
mategies.										
	Produc	ct an	d Pricing Mix	<u> </u>				Perio	ds: 9	
roduct Impor	tance a	and	roduct Life cycle - Strateg	lies for manag	ging Pro	duct Life	cycle – C	ategories	of New	
ualities of par	ckagino	ı. kir	Steps in New Product Donds of packaging and ad	evelopment – vantages of a	Packag	ging: Ne	ed for pac	kaging, E	ssential	CO
abelling, advan	tages a	and c	lisadvantages of labelling -	- Pricing object	tives – F	ig – Lai Pricing et	rategies	ictions, I	ypes of	
NIT - IV	Place a	and I	Promotion Mix	U TO LOSSOLOT		rioling 3i	rategies	Doring	J 0	<u> </u>
istribution Cha	annel a	nd P	hysical distribution: Meanir	ng and Import	ance of	distributio	on channel	Period	doolaa	I
ecisions - Cr	nanneis	OT	distribution for consumer	and industria	al good	- Phy	sical Dietri	hution: M	conina	
bjectives and	comp	oner	its of physical distributio	n - Promotic	n: Obie	ctives	Types of	cales nro	motion:	CO4
onsumer, Sale	sperso	n an	d Dealer sales promotion -	- Introduction	to Integr	ated Ma	rketing Com	nmunicatio	n	
			larketing					Period	ls: 9	•••••••••••••••••••••••••••••••••••••••
merging trends	s in Ma	rketi	ng - Customer Relationship	Managemen	t: Defini	tion, feat	ures, Types	s and impo	ortance	••••••
arketing - Digi	tal Mər	ıy. IV ketir	leaning, strategies and be	enetits - Mobil	e Marke	ting: De	finition and	types of	mobile	
nd difference b	etweer	inb	g: Meaning, types of digita ound and outbound marke	eting - Marketi	na Apali	u market	ıng: Meanir	ng, fundan	nentals	CO5
marketing and	alytics -	- An	overview of Sustainable M	arketing	ny Analy	riics. IVIE	ariiriy, impo	ліапсе, т	etrices	
ecture Period			Tutorial Periods: -	Practical	Periode	: -		Total	Periods:	ΛF
xt Books					-2.543	-	·····	1 Otal F	enous:	40
Keller, Philip	and K	evin	Lane Kotler "Marketing Ma	nagement" 16	th Editio	n. Pears	on Education	on Limited	2022	
v.S.Ramasv	vamy, S	S.Na	makumari, 6th Edition, Sag	e Publications	India P	vt Ltd. 20	018	Limiteu	, 2022.	••••••
ference Book	S									
Prachi Gupta	a, Ashit	a Ag	garwal, et al. "Marketing M	anagement: Ir	ndian Ca	ses" Pe	arson Educ	ation Limit	ed, 2024	
Arunkumar,	Meena	kshi.	N, "Marketing Managemen	t" 3rd Edition,	Vikas P	ublishing	House, 20	16		

Rajan Saxena, "Marketing Management" 5th Edition, MacGraw Web References	Tim Fabrications, 2017
1. https://www.ama.org/	
2. https://www.marketingprofs.com/	
B. https://indianjournalofmarketing.com/	
. http://www.publishingindia.com/ijamm/	
5. https://onlinecourses.swayam2.ac.in/imb20_mg36/preview	

COs/POs/PSOs Mapping

COs		Program Outcomes (POs)									Program Specific Outcomes (PSOs)				
	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1		PSO3
1	1	2	-	-	-	2	1	1	-	2	1	1	2	2	1 303
2	1	2	1	-	1	2	1	2	- 25	2	- 1	1	2	2	3
3	1	2	3	_	1	2	1	2			1-			2	3
4	1	4	-		-	2		2	rate of the	2	1	1	3	2	3
-	- t,	1	3	-	2	1	2	1	1	2	2	1	2	2	3
5	1	3	2	2	2	3	2	2	1	2	2	3	3	3	3

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

Evaluation Methods

Assossment		Conti	End Semester				
Assessment	CAT 1	CAT 2	Model Exam	Assignment*	Attendance	Examination (ESE) Marks	Total Marks
Marks	5	5	5	5	5	75	100

^{*} Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Dr.G.BALAMURUGA MOHAN RAJ
Professor & Head
Department of Mechatronics
Sri Manakula Vinayagar Engg. College
Madagadipet, Puducherry - 605 107.

ANNEXURE-IV

Batch : 2022 - 2026

Name of the Open Elective:|| Conventional and Non-Conventional Energy Sources
Subject Code: U20EEO503

Name list

		Кед.Ио.	E.R.No.	ON'S
es .	Name	22UMT001	221784	L
A	S D HZAJIBA	SOUTMUSS	796177	7
A	A A A A A A A A A A A A A A A A A A A	S20VMUSS	721127	3
A	ALWINE CANDIDA R	\$20MT004	221523	Þ
A	ARAVINDAN K	S2VMT005	746022	9
A	A HZANIVA	S2UMT006	221645	9
A	СНАИДВЕЗН КОМАЯ ВАЛ Ј	700TMUSS	220825	7
A	DEEPAK M	800TMUSS	220529	8
A	DHILIPKUMAR T	600TMUSS	221314	6
A	DHINESH BYBU E	OLOTMUSS	220463	01
A	DHYANESHWAR H	LIOTMUSS	221379	11
A	GANESHKUMAR S	S10TMUSS	221446	12
A	KAILASANATHAN D	22UMT013	221711	13
A	KAVYA M	\$10TMUSS	222034	71
A	M NAINANAN	SIOTMUSS	220383	91
A	L JIZA	22UMT016	220854	91
A	MOHAMED RIYAS M	710TMUSS	221701	21
A	MONISHKUMAR N	810TMUSS	55022	81
A	2 AHQIMAN	22UMT019		61
A	NARESH M	0S0TMUSS		20
A	NITHISH KUMAR E	120TMUSS		77
Α	Т ИАНДИАВАЯА	S20TMUS2		
A	В НТІНОЯ	220TMUS2		23
A	V AVH2IV IA2	₽S0TMUS2		24
Α	A H2OHTNA2	2S0TMUSS	222033	
A	A NAHTAN A	9S0TMUS	2 9/9022	97
A	SREE VARSHAN S	720TMUS	721997	72
Α	2 NASAAHTUS	8S0TMUS:		28
	A HTANIMAWS	620TMUS	220837	30
A	THANESH T	0E0TMUS	2 070222	30
<u>A</u>	Z NADURUMURIHT	1E0TMUS		33
Α	NIGNESH 2	SEOTMUS		35
A .	2 AYIHTIHDA ® YAUV	EE0TMU2		33
A	A PANALA YANIN	₽£0TMU2		34
	Q (AAAYHTIHQA	F001TM		98 98
	V VAHƏAЯ HZUNA	SMTL002		75
A	ВНАВАИЕЕОНАВАИ К	E00JTM		88
	HARISH SEN S V	MTL004		68
	KABILAN I	MTL005		0t
	хАГІМОТНО С	MTL006		L1
A	VARESH B	1 700JTM		71
A	SAJKUMAR B	NTL008		- 5
A	SITHICK ROSAN A	MTL009		<i>†</i>
	INRYA K	NTL010	Z30038 Z2N	g





DEPARTMENT OF MECHATRONICS

ODD SEMESTER - JULY 2024 to NOVEMBER- 2024

Batch: 2022-2026

Year/Sem: III / V

97		Total no of students	
97	U20EEO503	Conventional and Non-Conventional Energy Sources	l
To oV stnabuts batqo	Sourse Gode	Name of the OPEN Elective Courses	ON'S

don

(Dr.G.BalaMuruga MohanRaj)

Programme Academic Coordinator (Mr.S.Jagan)

Class Advisor (Mr.S.Pushparaj)

Dean Academic (Dr.S.Anbumalar)



Year/Sem: III / V





DEPARTMENT OF MECHATRONICS

DETAILS OF PROFESSIONAL ELECTIVE COURSE

Subject Code: U20MCE508 Name of the Professional Elective: II Automotive Electronics Batch: 2022 - 2026

795	AmeN	.оИ.вэЯ	E.R.No.	ON.S
pag	ABILASH G S	S2UMT001	221784	<u> </u>
A	8 AYTIHDA	200TMUSS	751962	7
A		S2UMT003	721127	3
A	ALWINE CANDIDA R	22UMT004	721223	Þ
A	ARAVINDAN K AVINASH R	S2UMT005	720947	S
A		S2UMT006	551645	9
A	СНАИДВЕЗН КОМАВ ВАЛ	Z2UMT007	220825	L
A	DEEPAK M	800TMUSS	57027	8
A	DHILIPKUMART	SSUMT009	221314	6
A	DHINESH BYBN E	O10TMUSS	220463	10
A	DHYANESHWAR H	110TMUSS	521379	11
A	GANESHKUMAR S	SIOTMUSS	221446	15
A	KAILASANATHAN D	SIOTMUSS	221711	13
A	KAVYA M	\$10TMUSS	222034	Þ١
A	M NALNARADOL	22UMT015	220383	12
A	L JIZAT DAMAHOM	22UMT016	220854	91
A	MOHAMED RIYAS M	TIOTMUSS	221701	۷ ۱
A	MONISHKUMAR N	SPOTMUSS	22075	18
A	2 AHDIMAN	22UMT019	222058	61
A	NARESH M	22UMT020	721467	50
A	NITHISH KNMAR E	120TMUS2	221106	21
A	Т ИАНДИАЯАЯЧ	S2UMT022	221746	22
A	В НТІНОЯ	22UMT023	220834	23
A	V AVH2IV IA2	22UMT024	222134	24
A	A H2OHTNA2	22UMT025	222033	52
A	SENTHIL NATHAN A	22UMT026	929077	56
A	SREE VARSHAN S	720TMUS2	721997	72
A	2 NA2AAHTU2	S20TMUS2	220555	28
A	A HTANIMAW2	S2UMT029	720837	56
A	THANESH T	22UMT030	222070	30
A	Z NADURUMURIHT	150TMUSS	55772	31
A	AIGNEZH 2	22UMT032	220402	32
A	2 AYIHTIHDA @ YAUV	S2UMT033	222012	33
Α	A A A A A A A A A A A A A A A A A A A	PE0TMUSS	996077	34
Α	Q (ARAYHTIHQA	22MTL001	230460	38
Α	V VAHÐAЯ H2UNA	ZSMTL002	230043	98
A	ВНАКАИЕЕДНАКАИ К	S2MTL003	737438	38 38
Α	HARISH SEN S V	22MTL004	530065	39
A	KABILAN I	S2MTL005	231152	07
Α	КАГІМОТНО С	SZMTL006	820022	14
Α	и В В В В В В В В В В В В В В В В В В В	ZSMTL007	780085	45
A	RAJKUMAR B	S2MTL008	980082	£†
Α	ВІТНІСК ВОЅРИ Р	SZMTL009	230038	77
A	SURYA K	SZMTL010	230038	





DEPARTMENT OF MECHATRONICS

DETAILS OF PROFESSIONAL ELECTIVE COURSES

ODD SEMESTER - JULY 2024 to NOVEMBER- 2024

Year/Sem: III / V

Batch: 2022-2026

94		stnebuts to on latoT	
97	N50WCE208	Automotive Electronics	L
No of students	Course	Name of the Professional Elective Courses	ON'S

HOD (Dr.G.BalaMuruga MohanRaj)

Programme Academic Coordinator (Mr.S.Jagan)

Člass Advisor (Mr.S.Pushparaj)

Dean Academic (Dr.S.Anbumalar)



SRI MANAKULA VINAYAGAR

ENGINEERING COLLEGE (AN AUTONOMOUS INSTITUTION)





Department of Mechatronics

NPTEL NAME LIST

Batch: 2022 - 2026

Year / Sem / Sec : III / V / A

S.No.	Enroll No	Reg. No.	Name of the Student	Name of the Course	D
1.	221784	22UMT001	ABILASH.G.S		Duration
2.	220825	22UMT007	CHANDRU.R	Power Plant Engineering Product Design and Development	8 Weeks
3.	221314	22UMT009	DHILIPKUMAR.T	Python for Data Science	4.10/2-1
4.	221446	22UMT012	GANESHKUMAR.S	Power Plant Engineering	4 Weeks
5.	220854	22UMT016	MOHAMAD FAZIL.J	Power Plant Engineering	8 Weeks
6.	221701	22UMT017	MOHAMED RIYAS.M	Power Plant Engineering	8 Weeks
7.	220834	22UMT023	ROHITH.B	Product Design and Development	8 Weeks
8.	222134	22UMT024	SAI VISHVA.V	Power Plant Engineering	8 Weeks
9.	222033	22UMT025	SANTHOSH.A	Introduction to Machine Learning	8 Weeks
10.	220676	22UMT026	SENTHIL NATHAN.A	Robotics	8 Weeks
11.	220837	22UMT029	SWAMINATH.R	Robotics	8 Weeks
12.	220402	22UMT032	VIGNESH.S	Power Plant Engineering	8 Weeks
13.	222012	22UMT033	VIJAY @ ADHITHIYA.S	Energy Conversion and Technologies	8 Weeks
14.	230460	22MTL001	ADHITHYARAJ.O	Product Design and Development	4 Weeks
15.	230043	22MTL002	ANUSH RAGHAV.V	Robotics	8 Weeks
16.	231438	22MTL003	BHARANEEDHARAN.K	Robotics	8 Weeks
17.	230028	22MTL006	KALIMUTHU.C	Robotics	8 Weeks
18.	230037	22MTL007	NARESH.B	Robotics	8 Weeks
19.	230036	22MTL008	RAJKUMAR.B	Robotics	8 Weeks
20.	230039	22MTL009	RITHICH ROSAN.A	Robotics	8 Weeks
21.	230038	22MTL010	SURYA.K	Robotics	8 Weeks
22.	230785	22MTL011	VIGNESH.M	Robotics	8 Weeks

Head of the Department

Dean Academics



DEPARTMENT OF MECHATRONICS NPTEL STUDENTS LIST

Year/Semester: IV/VII

Batch: 2021 - 2025

S.No Name of the Student		Roll no.	Name of the course studied	No. of weeks	
1.	Adhavan P	21UMT002	Manufacturing Processes Casting and Joining	4	
2.	Amarnaath S	21UMT003	Manufacturing Processes Casting and Joining	4	
3.	Anuja K	21UMT004	Manufacturing Processes Casting and Joining	4	
4.	Arjun T	21UMT005	Manufacturing Processes Casting and Joining	4	
5.	Arun Prakash N A	21UMT006	Manufacturing Processes Casting and Joining	4	
6.	Balajishree T	21UMT009	Manufacturing Processes Casting and Joining	4	
7.	Bruno Anto E	21UMT011	Manufacturing Processes Casting and Joining	4	
8.	Deepak Alex Thomas	21UMT013	Manufacturing Processes Casting and Joining	4	
9.	Gokul M S	21UMT015	Product Design and Development	4	
10.	Gokulavasan B	21UMT016	Manufacturing Processes Casting and Joining	4	
11.	Gunaseelan N	21UMT017	Manufacturing Processes Casting and Joining	4	
12.	Hariharan N	21UMT018	Manufacturing Processes Casting and Joining	4	
13.	Harishwar B	21UMT019	Manufacturing Processes Casting and Joining	4	
14.	Harishwaran S	21UMT020	Manufacturing Processes Casting and Joining	4	
15.	Jeevabaskar A	21UMT023	Manufacturing Processes Casting and Joining	4	
16.	Krishnakanth A	21UMT025	Manufacturing Processes Casting and Joining	4	
17.	Maria Jeffrey S	21UMT026	Product Design and Development	4	
18.	Mathews Talma A	21UMT027	Manufacturing Processes Casting and Joining	4	

19.	Navin Kumar A	21UMT028	Manufacturing Processes Casting and Joining	4	
20.	Puzaghendi A	21UMT030	Manufacturing Processes Casting and Joining	4	
21.	Ruthresh A	21UMT032	Introduction to IOT	8	
22.	Sathiya S	21UMT033	Manufacturing Processes Casting and Joining	4	
23.	Shakthivelu D	21UMT034	Manufacturing Processes Casting and Joining	4	
24.	Sneha S	21UMT035	Manufacturing Processes Casting and Joining	4	
25.	Vimalraj V	21UMT037	Manufacturing Processes Casting and Joining	4	
26.	Yuvaraj Sellappa V	21UMT038	Manufacturing Processes Casting and Joining	4	
27.	Chandru M	21MTL002	Product Design and Development	4	
28.	Padmesh @ Bharatwaaj	21UMT004	Manufacturing Processes Casting and Joining	4	

Class Advisor

Head of the Department

Dean Academics

ANNEXURE-V







EXAMINER DETAILS DEPARTMENT OF MECHATRONICS

DEPARTMENT OF MECHATRONICS					
S.NO	NAME	DESIGNATION COLLEGE		CONTACT DETAILS	
1	Dr. A. Murugan	Professor	Rajiv Gandhi Colleg of Engineering and Technology, Puducherry,	e Email: a_murugaa@rediffmail.co Cell No: 9865522519.	
2	Mr.D.George Oliver	Assistant Professor	CK College of Engineering and Technology,	Phone Number:9944026635 Email: dgoame@gmail.com	
3	Dr.P.Lakshmikanthan	Assistant Professor	University College of Engineering Panruti		
4	Dr.Krishnamoorthy Ramalingam	Assistant Professor	C.K College of Engineering &Technology	E-mail ID : kskrishnamech@gmail.com Mobile number : 9698922334	
5	Dr.J. Prakash	Associate Professor,	Suriya Group of Institutions	Email ID:prakashphdjuly2014@gmail.com Mobile Number: 9789878126	
6	Dr. G. Paramaguru	Associate Professor	Surya Group of Institutions,Villupuram	Email ID:	
7	Dr.G.Mohan	Assistant Professor	University college of Engineering Villupuram.	Email ID: mohang3004@gmail.com Contact No: 9486076394	
8	Dr. K.Rajmohan	Assistant Professor	University college of Engineering Panruti	Email ID: rajnvl74@gmail.com Contact No: 9894102756	
9	Dr.D.Mala	Assistant Professor	University college of Engineering Panruti	E-Mail ID: mala_lingam@yahoo.com Contact No: 8903804130	
10	Dr.M.Loganathan	Professor	Annamalai University Chidambaram	Email ID: marimuthuloganathan@gmail.com Contact No: 9444049896	
11	Dr.M.Purusothaman	Associate Professor	Sathyabama Institute of Science and Technology, Chennai	Email ID: purusothmani@gmail.com Contact No: 9042220783.	
12	Dr.S.Muthukumaran	Assistant Professor	University college of Engineering Panruti	mkumaran.auttpc@gmail.com Contact No: 9486830689	
13	Dr.K.Arun	Assistant Professor	University College of Engg, Villupuram	E-mail ID : arun.piping@gmail.com Mobile number : 9500641297	
14	Mr.V.Karthikeyan	Assistant Professor	Sri venkateshwaraa College of Engineering & Technology, Ariyur, Pondicherry	Mail id: mail2karthikeyan.v@gmail.com Mobile: 9790578103	
15	Dr.C.Subramaniyan	Associate Professor	V.R.S College of Engineering and Technology	E-mail ID : subuarchume2001@gamil.com Mobile number: 9443539356	
16	Dr.P.Prakash	Assistant Professor	Enga Villunuram	Email ID: prakashtmk2002@gmail.com Mobile Number: 9788042104	

HOD/MCTR

&. A. 8.119



SRI MANAKULA VINAYAGAR



DEPARTMENT OF MECHATRONICS

MECHATRONICS OFFERING COMMON COURSES

S.No	Offering	Course code	Course Name	Sem	Department
1	MCTR	U23MCDC01	Automation in Manufacturing	VII	MCTR
			Systems	V	MECH
		4		VII	MCTR
2	MCTR	U23MCDC02	Building Automation	V	ICE
				VI	MECH
3	MCTR	U23MCDC03	Non Destructive Testing	VIII	MCTR.
				VII	EEE,ECE,ICE&MECH
4	MCTR	U23MCDC04	Robots and Systems in Smart Manufacturing	VIII	MCTR
		02011102001		VII	MECH
5	MCTR	CTR U23MCDC05	Simulation and Modeling of manufacturing system	VIII	MCTR
				VII	MECH



HoD/MCTR