



## Koneru Lakshmaiah Education Foundation

(Category -1, Deemed to be University estd. u/s 3 of the UGC Act, 1956)

Accredited by NAAC as 'A++' Approved by AICTE ISO 9001:2015 Certified

Campus: Green Fields, Vaddeswaram - 522 302, Guntur District, Andhra Pradesh, INDIA

Phone No. 08645 - 350200 www.klef.ac.in; www.klef.edu.in; www.kluuniversity.in

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### XXXV Academic Council - Annexure 2.10

Date: 23/05/2022

### Department of Electronics and Communication Engineering


### Minutes of 22<sup>nd</sup> Board of Studies Meeting

The Department BOS Meeting held on May 23<sup>rd</sup> 2022 through Online Mode from  
11.00 AM onwards.

#### Following members are present

1. Dr. M. Suman, Professor & HoD, BoS Chair
2. Dr. Vinay Kumar Mittal, Professor and Dept. Chair, Member
3. Dr. L. Koteswara Rao, Professor & Principal, KLH, Member
4. Dr. M. Goutham, Assoc. Professor, HOD-ECE, KLH, Member
5. Dr. Habibullah Khan, Professor & Dean Student Affairs, Member
6. Dr. V Rajesh, Professor & Dean P & D, Member
7. Dr. K.Sarat Kumar, Professor, Member
8. Dr. A.S.C.S.Sastry, Professor & COE, Member
9. Dr. K.Ch.Sri Kavya, Professor, Member
10. Dr. M Venkata Narayana, Professor & DHOD, Member
11. Dr. Madhukar Deshmukh, Professor & DHOD, Member
12. Dr. Lakshman Pappula, Assoc. Professor & DHOD, Member
13. Dr. I.Govardhani, Professor & RPAC, Member
14. Dr. M.Siva Ganga Prasad, Professor & HOD ECM, Member
15. Dr. P. Satya Srinivas Babu, Professor, Member
16. Dr. P Satyanarayana, Professor, Member
17. Dr. PVV Kishore, Professor, Member
18. Dr. M Sridhar, Professor, HOD-BES, Member
19. Dr. S Koteswara rao, Professor, Member
20. Dr. G V Subbarao, Professor & RPAC, Member
21. Dr. M Venugopal Rao Professor & Assoc. Dean IQAC, Member
22. Dr. BTP Madhav, Professor & Assoc. Dean R&D, Member
23. Dr. D Venkat Ratnam, Professor, Member
24. Dr. K Srinivas Rao, Professor, Member
25. Dr. K Kumar Naik, Professor, Member
26. Dr. V. S. V. Prabhakar, Professor & Director IC, Member
27. Dr. K.S.Ramesh, Professor, Member
28. Dr. K.Hari Kishore, Professor & Assoc. Dean, Member
29. Dr. Md.Z Rehman, Professor, Member
30. Dr. P.Pardhasaradhi, Professor, Member
31. Dr. B.Polaiah, Professor, Member
32. Dr. Fazal Noorbasha, Assoc. Professor & Assoc. Dean, Member
33. Dr. Arun Metha, Assoc. Professor, Member
34. Dr. M. Ravi Kumar, Asst. Professor, Member

#### Following member is absent

  
**Dr. M. SUMAN**  
Professor & Head  
Department of ECE  
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Nil

### AGENDA and RESOLUTIONS

#### AGENDA ITEM - 1

<b>Approval of DAC minutes of meeting</b>	Resolution Passed
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The minutes of the DAC meeting held on 21-05-2022 were discussed among the members. The minutes were approved.

[Annexure I]

#### AGENDA ITEM - 2

<b>Discussion on feedback analysis and action taken report.</b>	Resolution Passed
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BOS Members discussed the recommendations from the DAC minutes and the status is given in the Annexure II.

[Annexure II]

#### AGENDA ITEM - 3

<b>Approval of Course and Semester Structure for Y22 Regulation</b>	Resolution Passed
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- All the BoS members approved the Y22 course and semester structure, as per the AICTE guidelines and it is forwarded to Dean Academics for further approval.
- The members approved the list of Flexi core courses, professional electives

[Annexure III & IV]

#### AGENDA ITEM - 4

<b>Approval of Y22 Advanced (Honors) and Minor Courses for Y22 Regulation</b>	Resolution Passed
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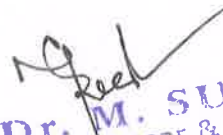
- All the BoS members approved the Y22 Honors and Minor course structure, as per the university guidelines and it is forwarded to Dean Academics for further approval.
- The members approved the list of honor and minor courses.
- Introduced two new minor courses on space technologies and electronics and communication. All the BoS members approved the newly introduced minor courses.

[Annexure III]

#### AGENDA ITEM - 5

<b>Approval on renaming the title of specialization "Signal Processing" as "Machine Learning and Digital Media Processing" in Y20 and Y21</b>	Resolution Passed
---	-------------------

All the BoS members approved the renaming of the title of specialization "Signal Processing" as "Machine Learning and Digital Media Processing" in Y20 and Y21 and it is forwarded to Dean Academics for further approval.

  
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### AGENDA ITEM - 6

Approval on Y22 Employability, Entrepreneurship, Skill Development Courses	Resolution Passed
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Employability, Entrepreneurship, Skill (EES) Development based Y22 regulations courses are presented to BoS members and all the BoS members approved the ESS based Y22 structure

[Annexure III]

### AGENDA ITEM - 7

Approval Work-in lieu courses proposal	Resolution Passed
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- All the BoS members approved the work-in lieu proposal for the fast learners, and it is forwarded to Dean Academics for further approval.

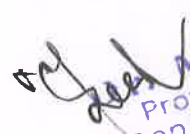
Course Code	Course Name	Name of the Industry
21EC3063	VLSI Subsystem Design and Design for Testability	Tessolve Semiconductor Pvt. Ltd.,
21EC3064	ASIC & FPGA Chip Design	Tessolve Semiconductor Pvt. Ltd.,
21EC3062	Analog VLSI Design	Entuple Technologies Pvt. Ltd.,
21EC3052	Embedded Systems for IoT	Tessolve Semiconductor Pvt. Ltd., C-DAC, Bangalore
21EC3053	Embedded and Real-time systems	C-DAC, Bangalore

### AGENDA ITEM - 8

To revise the syllabus for the courses of B. Tech ECE 2020-21 admitted batch based on the stakeholder feedback.	Resolution Passed
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Resolved to approve the modifications of syllabus for the B.Tech. ECE elective course offered in AY 2020-21 odd and Even semester for 3<sup>rd</sup> year student.

- Based on the feedback received from Mr. Raghu Agira, Pike Corporation, specialization elective courses "20EC4051: Information Theory & Coding" is revised for B.Tech. (ECE) with added the topic "Transmission of Random variable through LTI System, Miscellaneous: Error Types, Burst/Random Error". Information theory and coding are closely tied to advancements in communication systems, data storage, and information processing technologies. Updating the syllabus ensures that students are exposed to the latest algorithms, coding techniques, and protocols relevant to modern communication systems.
- Based on the feedback received from Dr. V. Rajesh, Professor, KLEF, specialization elective courses "20EC4065: IP Multimedia Sub-System & Emerging Technologies" is revised for B.Tech (ECE) with added the topic "Next Generation Networks, Trends of IPM based Mobile Phones- Personal Digital Assistants (PDAS)": The field of IP Multimedia Sub-System and emerging technologies is dynamic, with rapid advancements occurring in areas such as telecommunications, networking, and

  
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- multimedia. Updating the syllabus allows for the inclusion of the latest technologies, protocols, and standards to reflect the current state of the industry.
- Based on the feedback received from Dr. Anil Vuppala, Asst. Prof., IIIT Hyderabad specialization elective courses **"20EC3081: Speech Signal Processing"** is revised for B.Tech. (ECE) with added the topic "CNN for Automatic speech and speaker recognition". The field of speech signal processing is continuously evolving, with ongoing advancements in signal processing algorithms, machine learning techniques, and hardware. Updating the syllabus ensures that students are exposed to the latest technologies and methodologies, preparing them for contemporary challenges in the field.
  - Based on the feedback received from Dr. Sakthivel Kogularasu, Assistant professor, National Cheng Kung University, Taiwan, specialization elective courses **"20EC4064: Cloud-Computing & Network Security"** is revised for B.Tech. (ECE) with added the topic "Web-DNS Security: Overview of DNS, Fundamentals of DNS, DNS Transactions". The field of cloud computing is continuously evolving with the introduction of new technologies, services, and deployment models. Modifying the syllabus allows for the inclusion of the latest advancements, ensuring that students are exposed to cutting-edge tools and practices in cloud computing.
  - Based on the feedback received from Dr. Anil Vuppala, Asst. Prof., IIIT Hyderabad, specialization elective courses **"20EC4082: Natural Language Processing & Applications"** is revised for B.Tech. (ECE) with added the topic "Sequence-to-sequence models and attention. Text Classification Application pipeline building." Natural Language Processing (NLP) is a rapidly evolving field, with continuous advancements in machine learning, deep learning, and natural language understanding. Updating the syllabus allows students to be exposed to the latest techniques, models, and tools used in NLP, ensuring that they are well-prepared for the current state of the industry.
  - Based on the feedback received from Dr. Anil Vuppala, Asst. Prof., IIIT Hyderabad, specialization elective courses **"20EC4062: VOIP and Broadband Networks"** is revised for B.Tech. (ECE) with added the topic "Trends in Broadband Services, Optical Broadband services, Fiber to neighbourhood (FTTX) Architecture". Telecommunications and networking technologies are rapidly evolving. Updates to the syllabus can ensure that students are exposed to the latest developments in Voice over Internet Protocol (VOIP) and broadband networks, including new protocols, standards, and emerging technologies such as 5G.
  - Based on the feedback received from Mr. N. Venkateswara Rao, Director, Vazhraa Nirmaan Prathik, Hyderabad, Telangana open elective courses **"OEEC0011: Image Processing"** is revised for B.Tech. (ECE) with added the topic "The Haar Transform, and Slant Transform, Sharpening Frequency Domain Filters". The applications of image processing are expanding into new areas such as healthcare, autonomous vehicles, augmented reality, and more. Modifying the syllabus enables the inclusion of topics related to these emerging applications, providing students with a broader and more relevant skill set.

S. No.	Course Code	Course Title	% of syllabus revised	Year of offering
1.	20EC3081	SPEECH SIGNAL PROCESSING	50	3 <sup>rd</sup> (II Sem)
2.	20EC4051	INFORMATION THEORY & CODING	25	3 <sup>rd</sup> (II Sem)
3.	20EC4062	VOIP SYSTEMS & BROADBAND NETWORKS	25	3 <sup>rd</sup> (II Sem)
4.	20EC4064	CLOUD-COMPUTING & NETWORK SECURITY	25	3 <sup>rd</sup> (II Sem)
5.	20EC4065	IP MULTIMEDIA SUB-SYSTEM & EMERGING TECHNOLOGIES	25	4 <sup>th</sup> (1 <sup>st</sup> Sem)

  
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6.	20EC4082	NATURAL LANGUAGE PROCESSING & APPLICATIONS	25	3 <sup>rd</sup> (I Sem)
7.	OEEC0011	IMAGE PROCESSING	25	4 <sup>th</sup> (1 <sup>st</sup> Sem)

The detailed syllabus is shown in Annexure V.

[Annexure-V]

### AGENDA ITEM - 9

Approval of Value-Added Courses.	Resolution Passed
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Resolved to approve the value-added courses

[Annexure VI]

### AGENDA ITEM - 10

Recommendation to approve BOS minutes in Academic Council.	Resolution Passed
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The members had a brainstorming discussion and interaction among themselves. Based on the suggestions given by the members, BoS resolved to recommend the following to the Academic Council for further approval.

### AGENDA ITEM - 11

Any other matter	Resolution Passed
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1. Dr. Anil Kumar, suggested to introduce more skill-based courses in M. Tech VLSI specialization.
2. Suggested to offered Block Chain and Cyber Security under ESS8 and ESS6.
3. Suggested M. Tech. course structure: five courses with two laboratories.

  
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### Annexure I DAC Minutes

### Annexure II

#### Stakeholder Feedback Analysis

Sl.No.	Name of the resource person	Designation & Affiliation	Recommendation on Curriculum during DAC meeting	Approval by BOS committee	Remarks
<b>Student</b>					
1.	Mr. Jammula Eswar	190040621, Student, KLEF, Vijayawada	suggested to include some more topics of Image Processing for Bio Medical Applications in the course IMAGE PROCESSING	Approved	
<b>Alumni</b>					
2.	Mr. Raghu Agira,	Pike Corporation, Director of Information Technology, 4721 Hargrove Road, Raleigh, NC	recommended to do some modifications in the syllabus of INFORMATION THEORY & CODING by adding coding projects and applications	Approved	
3.	Mr. N. Venkateswarao,	Director, Vazhraa Nirmaan Prathik, Hyderabad, Telangana	recommended to add applications on Speech Signal Processing in the course- SPEECH SIGNAL PROCESSING	Approved	
<b>Industry Personal</b>					
4.	Mr. R Nagesh,	Associate Director, CDAC, Bengaluru	suggested to include a course on CLOUD ARCHITECTURE IN IOT which covers the basics of cloud computing	Approved	
5.	Dr. Sakthivel Kogularasu,	Research Assistant professor, National Cheng	recommended to add CLOUD-COMPUTING & NETWORK	Approved	

*Red*  
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		Kung University, Taiwan	SECURITY in the curriculum		
<b>Academic Peers</b>					
6.	Dr. Anil Vuppala,	Asst. Prof., IIIT Hyderabad	recommended to include a course on NATURAL LANGUAGE PROCESSING & APPLICATIONS	Approved	
7.	Dr. Anil Vuppala,	Asst. Prof., IIIT Hyderabad	recommended to include a course on VOIP SYSTEMS & BROAD BAND NETWORKS in the curriculum	Approved	
<b>Faculty</b>					
8.	Dr. V. Rajesh	Professor, Emp ID: 2979, KLEF, Vijayawada	Recommended to add syllabus new technology and mobile network in IP MULTIMEDIA SUB-SYSTEM & EMERGING TECHNOLOGIES	Approved	

*Handwritten signature*  
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### Annexure III

### Y22 Course structure of B. Tech.

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING													
Y22 REGULATION B. TECH COURSE STRUCTURE													
Sl No	Course Code	Course Title	L	T	P	S	Cr	Pre-Req.	Activities / Content with direct bearing on Employability / Entrepreneurship/ Skill development	Course Category	New Course (Yes/No)	Remarks	
<b>BASIC SCIENCES</b>													
1	22MT1101	MATHEMATICS FOR COMPUTING	2	2	0	2	4.5	NIL	EMPLOYABILITY / SKILL DEVELOPMENT	Practice based learning, Problem Solving	No		
2	22UC1203	DESIGN THINKING AND INNOVATION	1	0	0	4	2	NIL	EMPLOYABILITY / SKILL DEVELOPMENT	Practice based learning, Problem Solving	No		
3	22PH1008	SCIENCE ELECTIVE -1 (PHYSICS FOR ELECTRONIC ENGINEERS)	3	0	2	0	4	NIL	EMPLOYABILITY	Practice based learning	No		
4	22MT2007	RANDOM VARIABLES AND STOCHASTIC PROCESSES	2	2	0	0	4	RELEVANT COURSE	EMPLOYABILITY	Practice based learning	No		

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5	22MT2006	OPTIMIZATION IN ENGINEERING	2	2	0	0	4	NIL	EMPLOYABILITY / SKILL DEVELOPMENT	Practice based learning, Problem Solving	No	
6	22CY1001	SCIENCE ELECTIVE-2 (ENGINEERING CHEMISTRY)	3	0	2	0	4	NIL	EMPLOYABILITY	Practice based learning	No	
7	22MT2202	MATHEMATICS FOR ENGINEERS	2	1	0	0	3	NIL	EMPLOYABILITY	Practice based learning	No	
<b>ENGINEERING SCIENCES</b>												
8	22SC1101	COMPUTATIONAL THINKING FOR STRUCTURE DESIGN	3	0	2	6	5.5	NIL	EMPLOYABILITY / SKILL DEVELOPMENT	Practice based learning, Problem Solving	No	
9	22ME1103	DESIGN TOOLS WORKSHOP	0	0	4	0	2	NIL	EMPLOYABILITY / SKILL DEVELOPMENT	Practice based learning, Problem Solving	No	
10	22EC1101	DIGITAL-LOGIC AND PROCESSORS	3	0	2	0	4	NIL	EMPLOYABILITY / SKILL DEVELOPMENT	Practice based learning, Problem Solving	No	
11	22SC1209	IOT WORKSHOP	0	0	4	0	2	NIL	EMPLOYABILITY / SKILL DEVELOPMENT	Practice based learning, Problem Solving	No	
12	22SC1202	DATA STRUCTURES	3	0	2	4	5	CTSD	EMPLOYABILITY / SKILL	Practice based	No	

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									DEVELOPMENT	learning, Problem Solving		
13	22EC1202	COMPUTER ORGANIZATION AND ARCHITECTURE	2	0	0	0	2	NIL	EMPLOYABILITY	Practice based learning	No	
14	22UC3108	PROBLEM SOLVING AND REASONING SKILLS - 1	0	0	0	4	1	NIL	EMPLOYABILITY / SKILL DEVELOPMENT	Practice based learning, Problem Solving	No	
15	22UC3209	PROBLEM SOLVING AND REASONING SKILLS - 2	0	0	0	4	1	NIL	EMPLOYABILITY / SKILL DEVELOPMENT	Practice based learning, Problem Solving	No	
16	22EC1203	DESIGN OF BASIC ELECTRONIC CIRCUITS	3	0	0	0	3	NIL	EMPLOYABILITY	Practice based learning	No	
<b>HUMANITIES &amp; SOCIAL SCIENCES</b>												
17	22UC1101	INTEGRATED PROFESSIONAL ENGLISH	0	0	4	0	2	NIL	ENTREPRENEURSHIP	Case Studies based learning	No	
18	22UC1202	ENGLISH PROFICIENCY	0	0	4	0	2	NIL	ENTREPRENEURSHIP	Case Studies based learning	No	
19	22UC2103	ESSENTIALS SKILLS FOR EMPLOYABILITY	0	0	4	0	2	NIL	ENTREPRENEURSHIP	Case Studies based learning	No	
20	22UC2204	CORPORATE READINESS SKILLS	0	0	4	0	2	NIL	ENTREPRENEURSHIP	Case Studies	No	

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											based learning		
28		INNOVATION MANAGEMENT	0	0	4	0	2	NIL	ENTREPRENEURSHIP	Case Studies based learning	No		
29	22UC0010	UNIVERSAL HUMAN VALUES AND PROFESSIONAL ETHICS	2	0	0	0	2	NIL	ENTREPRENEURSHIP	Case Studies based learning	No		
<b>PROFESSIONAL CORE COURSES</b>													
30	22EC2104	ANALOG ELECTRONIC CIRCUIT DESIGN	3	0	2	2	4.5	BEEC	EMPLOYABILITY / SKILL DEVELOPMENT	Practice based learning, Problem Solving	No		
31	22EC2105	SIGNALS AND COMMUNICATION SYSTEMS	3	0	0	0	3	RELEVANT COURSE	EMPLOYABILITY	Practice based learning	No		
32	22EC2106	PROCESSORS AND CONTROLLERS	3	0	2	2	4.5	DDCA	EMPLOYABILITY / SKILL DEVELOPMENT	Practice based learning, Problem Solving	No		
33	22AD2001	DATA DRIVEN ARTIFICIAL INTELLIGENT SYSTEMS	2	0	2	0	3	CTSD	EMPLOYABILITY	Practice based learning	No		
34	22EC2209	ELECTROMAGNETIC WAVES AND TRANSMISSION LINES	3	0	0	0	3	RELEVANT COURSE	EMPLOYABILITY	Practice based learning	No		

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35	22EC2208	DIGITAL COMMUNICATION	3	0	2	2	4.5	SCS	EMPLOYABILITY / SKILL DEVELOPMENT	Practice based learning, Problem Solving	No	
36	22EC2210	NETWORK PROTOCOLS AND SECURITY	3	0	2	0	4	DDCA	EMPLOYABILITY	Practice based learning	No	
37	22EC2211	VLSI DESIGN	3	0	2	2	4.5	AECD	EMPLOYABILITY / SKILL DEVELOPMENT	Practice based learning, Problem Solving	No	
38	22EC3107	OBJECT ORIENTED PROGRAMMING	3	0	2	0	4	CTSD	EMPLOYABILITY	Practice based learning	No	
39	22EC3112	DISCRETE TIME SIGNAL PROCESSING	3	0	2	0	4	DC	EMPLOYABILITY	Practice based learning	No	
<b>FLEXI-CORE</b>												
40		FLEXI CORE-1	2	0	2	0	3	RELEVENT COURSE	EMPLOYABILITY	Practice based learning	No	
41		FLEXI CORE-2	2	0	2	0	3	RELEVENT COURSE	EMPLOYABILITY	Practice based learning	No	
42		FLEXI CORE-3	2	0	2	0	3	RELEVENT COURSE	EMPLOYABILITY	Practice based learning	No	
43	22EE3107	CONTROL SYSTEMS	3	0	0	0	3	BEEC	EMPLOYABILITY	Practice based learning	No	

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 Professor & Head  
 Department of ECE  
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#### PROFESSIONAL ELECTIVES

44		PROFESSIONAL ELECTIVE-1	2	0	2	4	4	RELEVENT COURSE	EMPLOYABIL ITY / SKILL DEVELOPME NT	Practice based learning, Problem Solving	No	
45		PROFESSIONAL ELECTIVE-2	2	0	2	0	3	RELEVENT COURSE	EMPLOYABIL ITY	Practice based learning	Yes (Highlight ed)	
46		PROFESSIONAL ELECTIVE-3	2	0	2	4	4	RELEVENT COURSE	EMPLOYABIL ITY / SKILL DEVELOPME NT	Practice based learning, Problem Solving	Yes (Highlight ed)	
47		PROFESSIONAL ELECTIVE-4 (M)	3	0	0	0	3	RELEVENT COURSE	EMPLOYABIL ITY	Practice based learning	Yes (Highlight ed)	
48		PROFESSIONAL ELECTIVE-5 (SPEC/HONR)	2	0	2	0		RELEVENT COURSE	EMPLOYABIL ITY	Practice based learning	No	
<b>TERM PAPER &amp; PROJECT</b>												
49	22IE3041	TECHNICAL INTERNSHIP	0	0	0	8	0	NIL	EMPLOYABIL ITY / SKILL DEVELOPME NT	Practice based learning, Problem Solving	No	
50	22IE2040	SOCIAL INTERNSHIP	0	0	0	4	0	NIL	EMPLOYABIL ITY / SKILL DEVELOPME NT	Practice based learning,	No	

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											Problem Solving			
51	22IE4042	INDUSTRY INTERNSHIP	0	0	0	4	0	NIL	EMPLOYABILITY / SKILL DEVELOPMENT	Practice based learning, Problem Solving	No			
52	22IE3043	TERM PAPER	0	0	2	4	2	NIL	EMPLOYABILITY / SKILL DEVELOPMENT	Practice based learning, Problem Solving	No			
53	22IE4048	CAPSTONE PROJECT-1	0	0	0	24	6	NIL	EMPLOYABILITY / SKILL DEVELOPMENT	Practice based learning, Problem Solving	No			
54	22IE4150/ 22IE4051	PRACTICE SCHOOL/INTERNSHIP-I	0	0	0			NIL	EMPLOYABILITY / SKILL DEVELOPMENT	Practice based learning, Problem Solving	No			
55	22IE4049	CAPSTONE PROJECT-2	0	0	0	24	6	NIL	EMPLOYABILITY / SKILL DEVELOPMENT	Practice based learning, Problem Solving	No			
56	22IE4150/22 IE4052	PRACTICE SCHOOL/INTERNSHIP-II	0	0	0			NIL	EMPLOYABILITY / SKILL DEVELOPMENT	Practice based learning, Problem Solving	No			
<b>SKILLING COURSES</b>														

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57	22SDEC01	SKILL DEVELOPMENT PROJECT - 1 (ELECTRONIC SYSTEM DESIGN WORKSHOP)	0	0	2	4	2	NIL	EMPLOYABILITY / SKILL DEVELOPMENT	Practice based learning, Problem Solving	No	
58	22SDEC02	SKILL DEVELOPMENT PROJECT - 2 (Electronic System Automation)	0	0	2	4	2	NIL	EMPLOYABILITY / SKILL DEVELOPMENT	Practice based learning, Problem Solving	No	
59	22SDEC03	SKILL DEVELOPMENT PROJECT - 3 (SPECIALIZATION ORIENTED SKILLING)	0	0	2	4	2	NIL	EMPLOYABILITY / SKILL DEVELOPMENT	Practice based learning, Problem Solving	No	
60	22SDEC04	SKILL DEVELOPMENT PROJECT - 4 (SPECIALIZATION ORIENTED SKILLING)	0	0	2	4		NIL	EMPLOYABILITY / SKILL DEVELOPMENT	Practice based learning, Problem Solving	No	
61	22TBEC01	TOOL BASED LEARNING -1	0	0	0	4	0	NIL	EMPLOYABILITY / SKILL DEVELOPMENT	Practice based learning, Problem Solving	No	
62	22TBEC02	TOOL BASED LEARNING -2	0	0	0	4	0	NIL	EMPLOYABILITY / SKILL DEVELOPMENT	Practice based learning, Problem Solving	No	
<b>VALUE ADDED COURSES</b>												
63		VALUE ADDED COURSE -1	0	0	0	8	0	NIL	EMPLOYABILITY / SKILL	Practice based learning,	No	

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									DEVELOPME NT	Problem Solving		
64		VALUE ADDED COURSE -2	0	0	0	8	0	NIL	EMPLOYABIL ITY / SKILL DEVELOPME NT	Practice based learning, Problem Solving	No	
65		VALUE ADDED COURSE -3	0	0	0	8	0	NIL	EMPLOYABIL ITY / SKILL DEVELOPME NT	Practice based learning, Problem Solving	No	
66		VALUE ADDED COURSE - 4 (HONOR)	0	0	0	8	0	NIL	EMPLOYABIL ITY / SKILL DEVELOPME NT	Practice based learning, Problem Solving	No	
67		SPORTS / YOGA CERTIFICATION	0	0	0	8	0	NIL	EMPLOYABIL ITY / SKILL DEVELOPME NT	Practice based learning, Problem Solving	No	
<b>OPEN ELECTIVES</b>												
68		OPEN ELECTIVE-1	3	0	0	0	3	NIL	EMPLOYABIL ITY	Practice based learning	No	
69		OPEN ELECTIVE-2	3	0	0	0	3	NIL	EMPLOYABIL ITY	Practice based learning	No	
70		OPEN ELECTIVE-3	3	0	0	0	3	NIL	EMPLOYABIL ITY	Practice based learning	No	
<b>AUDIT COURSES</b>												

  
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71	22UC0009	AUDIT COURSE - 1(GENDER and SOCIAL EQUALITY)	2	0	0	0	0	NIL	ENTREPRENEURSHIP	Case Studies based learning	No	
72	22UC0006	AUDIT COURSE - 2(ESSENCE OF INDIAN KNOWLDGE TRADITION)	2	0	0	0	0	NIL	ENTREPRENEURSHIP	Case Studies based learning	No	
73	22UC0008	AUDIT COURSE - 3 (INDIAN CONSTITUTION)	2	0	0	0	0	NIL	ENTREPRENEURSHIP	Case Studies based learning	No	
74	22UC0007	AUDIT COURSE - 4 (ECOLOGY and ENVIRONMENT)	2	0	0	0	0	NIL	ENTREPRENEURSHIP	Case Studies based learning	No	
75	22UC0020	AUDIT COURSE - 5 (INDIAN KNOWLEDGE SYSTEMS - ENGINEERING ELECTIVE)	2	0	0	0	0	NIL	ENTREPRENEURSHIP	Case Studies based learning	No	
<b>Total Credits</b>			<b>101</b>	<b>7</b>	<b>78</b>	<b>192</b>	<b>166</b>					

Specialisation wise Courses for Y22 Regulation			
SPECIALIZATIONS	B. Tech Honors with Spec.	B. Tech Spec.	B. Tech Honors, Minors, B.Tech Regular, Honors with Minor
<b>EMBEDDED SYSTEMS &amp; IoT</b>			

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SI No	Category- PC, FC, PE	Course Code	Course Title	Mode	L	T	P	S	Cr	L	T	P	S	Cr	L	T	P	S	Cr
1	FC - 1	22EC2015	Embedded System Design	R/P	2	0	2	0	3	2	0	2	0	3	2	0	2	0	3
2	FC	22EC3015	Wireless Sensor Networks	R/P	2	0	2	0	3	2	0	2	0	3	2	0	2	0	3
3	FC PE-1	22EC3051	Advanced Embedded Systems	R	3	0	4	4	6	2	0	2	4	4	2	0	2	4	4
4	PE-2	22EC3052	Embedded Systems for IoT	R	2	0	2	0	3	2	0	2	0	3	2	0	2	0	3
5	PE-3	22EC3053	Embedded and Real-time systems	R	3	0	4	4	6	2	0	2	4	4	2	0	2	4	4
6	PE-4	22EC3054	Cloud Architecture in IoT	M	4	0	0	0	4	3	0	0	0	3	3	0	0	0	3
7	PE-5	22EC3055	Edge Computing & Data Analytics in IoT	R	2	0	2	0	3	2	0	2	0	3					
<b>VLSI</b>																			
SI No	Category- PC, FC, PE	Course Code	Course Title	Mode	L	T	P	S	Cr	L	T	P	S	Cr	L	T	P	S	Cr
1	FC - 1	22EC2016	Digital VLSI Design	R/P	2	0	2	0	3	2	0	2	0	3	2	0	2	0	3
2	FC	22EC3016	Low Power VLSI Circuits	R	2	0	2	0	3	2	0	2	0	3	2	0	2	0	3
3	FC	22EC3017	ASIC and FPGA Design	R	2	0	2	0	3	2	0	2	0	3	2	0	2	0	3
4	PE-1	22EC3063	Analog VLSI Design	R	3	0	4	4	6	2	0	2	4	4	2	0	2	4	4
5	PE-2	22EC3064	Testing and Verification of VLSI Circuits	R	2	0	2	0	3	2	0	2	0	3	2	0	2	0	3
6	PE-3	22EC3066	VLSI Physical Design Automation	M	3	0	4	4	6	2	0	2	4	4	2	0	2	4	4
7	PE-4	22EC3065	System-on-Chip	R	4	0	0	0	4	3	0	0	0	3	3	0	0	0	3
8	PE-5	22EC3067	Mixed Signal IC Design	R	2	0	2	0	3	2	0	2	0	3					
<b>ROBOTICS &amp; AUTOMATION</b>																			
SI No	Category- PC, FC, PE	Course Code	Course Title	Mode	L	T	P	S	Cr	L	T	P	S	Cr	L	T	P	S	Cr

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1	FC-1	22EC2017	Introduction to Robotics	R/P	2	0	2	0	3	2	0	2	0	3	2	0	2	0	3
2	FC	22EC3018	Electronics Instruments & Automation	R	2	0	2	0	3	2	0	2	0	3	2	0	2	0	3
3	FC	22EC3026	Control Systems	R	2	0	2	0	3	2	0	2	0	3	2	0	2	0	3
4	PE-1	22EC3071	Autonomous mobile Robot systems	R	3	0	4	4	6	2	0	2	4	4	2	0	2	4	4
5	PE-2	22EC3072	Autonomous Vehicles & Automotive Electronics	R	2	0	2	0	3	2	0	2	0	3	2	0	2	0	3
6	PE-3	22EC3073	Advanced Robotics	M	3	0	4	4	6	2	0	2	4	4	2	0	2	4	4
7	PE-4	22EC3074	Human Machine Interface & Brain Machine Interface	R	4	0	0	0	4	3	0	0	0	3	3	0	0	0	3
8	PE-5	22EC3075	Computer Vision & Applications	R	2	0	2	0	3	2	0	2	0	3					
<b>INTELLIGENT MULTI MEDIA PROCESSING</b>																			
SI No	Category- PC, FC, PE	Course Code	Course Title	Mode	L	T	P	S	Cr	L	T	P	S	Cr	L	T	P	S	Cr
1	FC-1	22EC2018	Deep Network Architectures	R/P	2	0	2	0	3	2	0	2	0	3	2	0	2	0	3
2	FC	22EC3019	Deep learning for computer vision applications	R/P	2	0	2	0	3	2	0	2	0	3	2	0	2	0	3
3	PE-1	22EC3081	Natural Language Processing & Applications	R	3	0	4	4	6	2	0	2	4	4	2	0	2	4	4
4	PE-2	22EC3082	Data Engineering	R	2	0	2	0	3	2	0	2	0	3	2	0	2	0	3
5	PE-3	22EC3083	Bio medical Signal and Image Analysis	R	3	0	4	4	6	2	0	2	4	4	2	0	2	4	4
6	PE-4	22EC3084	Data Visualization	M	4	0	0	0	4	3	0	0	0	3	3	0	0	0	3
7	PE-5	22EC3085	Multimedia processing	R	2	0	2	0	3	2	0	2	0	3	2	0	2	0	3
		22EC3086	Introduction to quantum computing												2	0	2	0	3
		22EC3087	Full Stack Development												2	0	2	0	3
<b>RF &amp; MICROWAVE</b>																			

  
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1	FC-1	22EC2019	Radiating Systems & Wave Propagation	R/P	2	0	2	0	3	2	0	2	0	3	2	0	2	0	3
2	FC	22EC3018	RF System Design	R	2	0	2	0	3	2	0	2	0	3	2	0	2	0	3
3	PE-1	22EC3091	Microwave Engineering	R	3	0	4	4	6	2	0	2	4	4	2	0	2	4	4
4	PE-2	22EC3092	Advanced Antenna Design for wireless and 5G applications	R	2	0	2	0	3	2	0	2	0	3	2	0	2	0	3
5	PE-3	22EC3093	Modern Radar systems & Navigational Aids	R	3	0	4	4	6	2	0	2	4	4	2	0	2	4	4
6	PE-4	22EC3094	RF and millimeter-Wave Circuit Design	M	4	0	0	0	4	3	0	0	0	3	3	0	0	0	3
7	PE-5	22EC3095	Satellite Design	R	2	0	2	0	3	2	0	2	0	3					
<b>DATA COMMUNICATIONS</b>																			
SI No	Category- PC, FC, PE	Course Code	Course Title	Mode	L	T	P	S	Cr	L	T	P	S	Cr	L	T	P	S	Cr
1	FC-1	22EC2020	Wireless Communications	R/P	2	0	2	0	3	2	0	2	0	3	2	0	2	0	3
2	FC-2	22EC3021	Radio Wave Propagation	R	2	0	2	0	3	2	0	2	0	3	2	0	2	0	3
3	RE-1	22EC4051	4G Wireless Technologies and Cellular Communication	R	3	0	4	4	6	2	0	2	4	4	2	0	2	4	4
4	PE-2	22EC4052	Modern Satellite Communication Systems	R	2	0	2	0	3	2	0	2	0	3	2	0	2	0	3
5	PE-3	22EC4053	5G Wireless Technologies	R	3	0	4	4	6	2	0	2	4	4	2	0	2	4	4
6	PE-4	22EC4054	Optical Wireless Communications	M	4	0	0	0	4	3	0	0	0	3	3	0	0	0	3
7	PE-5	22EC4055	Machine Learning for Wireless Communication	R	2	0	2	0	3	2	0	2	0	3	2	0	2	0	3
<b>COMPUTER COMMUNICATION &amp; 5G TECHNOLOGIES</b>																			

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Sl No	Category- PC, FC, PE	Course Code	Course Title	Mode	L	T	P	S	Cr	L	T	P	S	Cr	L	T	P	S	Cr
1	FC-1	22EC2021	Communication Networks	R/P	2	0	2	0	3	2	0	2	0	3	2	0	2	0	3
2	FC-2	22EC3022	Network Security	R	2	0	2	0	3	2	0	2	0	3	2	0	2	0	3
3	FC-2	22EC3023	Peer to Peer Networks	R	2	0	2	0	3	2	0	2	0	3	2	0	2	0	3
4	FC-2	22EC3024	WLAN's	R	2	0	2	0	3	2	0	2	0	3	2	0	2	0	3
5	PE-1	22EC4061	TCP/IP & Other Protocol Suite	R	3	0	4	4	6	2	0	2	4	4	2	0	2	4	4
6	PE-2	22EC4062	Cloud Computing and Networks Security	R	2	0	2	0	3	2	0	2	0	3	2	0	2	0	3
7	PE-3	22EC4063	VoIP and Broadband Networks	R	3	0	4	4	6	2	0	2	4	4	2	0	2	4	4
8	PE-4	22EC4064	5G Mobile and IEEE standards	M	4	0	0	0	4	3	0	0	0	3	3	0	0	0	3
9	PE-5	22EC4065	IP Multimedia Sub-System & Emerging Technologies	R	2	0	2	0	3	2	0	2	0	3					
10	PE-5	22EC4066	IT Security: Defense against the digital dark arts																
<b>BIO-MEDICAL INSTRUMENTATION</b>																			
Sl No	Category- PC, FC, PE	Course Code	Course Title	Mode	L	T	P	S	Cr	L	T	P	S	Cr	L	T	P	S	Cr
1	FC-1	22EC2022	Biomedical Electronics & IOT for Healthcare	R/P	2	0	2	0	3	2	0	2	0	3	2	0	2	0	3
2	FC-2	22EC3025	Electronic Circuits for Medical Instrumentation	R	2	0	2	0	3	2	0	2	0	3	2	0	2	0	3
3	PE-1	22EC4072	Biomedical Signal and Image Processing	R	3	0	4	4	6	2	0	2	4	4	2	0	2	4	4
4	PE-2	22EC4073	Advanced Biomedical signal processing	R	2	0	2	0	3	2	0	2	0	3	2	0	2	0	3
5	PE-3	22EC4074	Materials for Bio-Medical Applications	R	3	0	4	4	6	2	0	2	4	4	2	0	2	4	4
6	PE-4	22EC4075	Nanotechnology and Nanosensors	M	4	0	0	0	4	3	0	0	0	3	3	0	0	0	3
7	PE-5	22EC4076	Biosensing and Bioelectronics	R	2	0	2	0	3	2	0	2	0	3	2	0	2	0	3

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Percentage of Syllabus Revision =  $(8/75) * 100 = 10.67 \%$

Percentage of Courses focusing on Employability =  $(62/75) * 100 = 82.67 \%$

Percentage of Courses focusing on Entrepreneurship =  $(13/75) * 100 = 17.33 \%$

Percentage of Courses focusing on Skill Development =  $(40/75) * 100 = 53.33 \%$

  
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#### Annexure IV

#### Y22 Course structure of M. Tech.

DEPARTMENT OF E. C. E.										
Name of the program: M. Tech -VLSI for A.Y. :22-24										
Course Code	Course Title	L	T	P	S	Cr	Activities / Content with direct bearing on Employability / Entrepreneurship/ Skill development	Course Category	New Course (Yes/No)	Remarks
<b>Professional Core (PC)</b>										
22EC5128	MOS CIRCUIT DESIGN	3	1	2	0	5	EMPLOYABILITY / SKILL DEVELOPMENT	Practice based learning, Problem Solving	No	
22EC5129	DIGITAL VLSI DESIGN	3	0	2	0	4	EMPLOYABILITY / SKILL DEVELOPMENT	Practice based learning, Problem Solving	No	
22EC5130	LOW POWER VLSI SYSTEM DESIGN	3	1	0	0	4	EMPLOYABILITY	Practice based learning	No	
22EC5104	ARTIFICIAL INTELLIGENCE & MACHINE LEARNING	3	0	2	0	4	EMPLOYABILITY / SKILL DEVELOPMENT	Practice based learning, Problem Solving	No	
22EC5232	ANALOG IC DESIGN	3	1	2	0	5	EMPLOYABILITY / SKILL DEVELOPMENT	Practice based learning, Problem Solving	No	
22EC5233	TESTING OF VLSI CIRCUITS	3	1	2	0	5	EMPLOYABILITY / SKILL DEVELOPMENT	Practice based learning, Problem Solving	No	

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22EC5234	ALGORITHMS FOR VLSI DESIGN AUTOMATION	3	0	2	0	4	EMPLOYABILITY	Practice based learning	No	
22EC5235	ASIC AND FPGA DESIGN	3	0	0	0	3	EMPLOYABILITY	Practice based learning	No	
<b>Professional Elective (PE)</b>										
22EC51Q2	SYSTEM ON CHIP DESIGN	3	0	0	0	3	EMPLOYABILITY	Practice based learning	No	
22EC51R2	INTERNET OF THINGS ARCHITECTURE AND PROTOCOLS	3	0	0	0	3	EMPLOYABILITY	Practice based learning	No	
22EC51S4	MEMORY DESIGN AND TESTING	3	0	0	0	3	EMPLOYABILITY	Practice based learning	No	
22EC51T3	MEMS SYSTEM DESIGN	3	0	0	0	3	EMPLOYABILITY	Practice based learning	No	
<b>Skill Development Courses (SDC)</b>										
22TS51V1	TECHNICAL SKILLING-I	0	0	0	8	2	EMPLOYABILITY / SKILL DEVELOPMENT	Practice based learning, Problem Solving	No	
22TS52V2	TECHNICAL SKILLING-II	0	0	0	8	2	EMPLOYABILITY / SKILL DEVELOPMENT	Practice based learning, Problem Solving	No	
<b>Project Courses (PR)</b>										
22IE5149	SEMINAR	0	0	4	0	2	EMPLOYABILITY / SKILL DEVELOPMENT	Practice based learning, Problem Solving	No	
22IE5250	TERM PAPER	0	0	4	0	2	EMPLOYABILITY / SKILL DEVELOPMENT	Practice based learning, Problem Solving	No	
22IE6050	PROJECT DISSERTATION-PART-1 AND PART-2	0	0	72	0	36	EMPLOYABILITY / SKILL DEVELOPMENT	Practice based learning, Problem Solving	No	

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Total Credits		36	4	92	16	90				
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Percentage of Syllabus Revision =  $(0/17) * 100 = 0 \%$

Percentage of Courses focusing on Employability =  $(17/17) * 100 = 100 \%$

Percentage of Courses focusing on Entrepreneurship =  $(0/17) * 100 = 0 \%$

Percentage of Courses focusing on Skill Development =  $(10/17) * 100 = 58.82 \%$

  
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DEPARTMENT OF E. C. E.										
Name of the program: M. Tech-IOT for A.Y. :22-24										
Course Code	Course Title	L	T	P	S	Cr	Activities / Content with direct bearing on Employability / Entrepreneurship/ Skill development	Course Category	New Course (Yes/No)	Remarks
<b>Professional Core (PC)</b>										
22EC51R2	INTERNET OF THINGS ARCHITECTURE AND PROTOCOLS	3	0	0	0	3	EMPLOYABILITY	Practice based learning	No	
22IN5101	EMBEDDED CONTROLLERS & SOCS	3	1	2	0	5	EMPLOYABILITY / SKILL DEVELOPMENT	Practice based learning, Problem Solving	No	
22EC5101	WIRELESS COMMUNICATION AND DATA NETWORKS	3	1	2	0	5	EMPLOYABILITY / SKILL DEVELOPMENT	Practice based learning, Problem Solving	No	
22EC5104	ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING	3	0	2	0	4	EMPLOYABILITY	Practice based learning	No	
22IN5202	WIRELESS SENSOR NETWORK AND SECURITY	3	1	2	0	5	EMPLOYABILITY / SKILL DEVELOPMENT	Practice based learning, Problem Solving	No	
22IN5203	IOT CLOUD COMPUTING	3	0	2	0	4	EMPLOYABILITY	Practice based learning	No	
22IN5204	BIG DATA ANALYTICS FOR IOT	3	0	0	0	3	EMPLOYABILITY	Practice based learning	No	
22IN5205	IOT SYSTEM DESIGN TECHNIQUES	3	1	2	0	5	EMPLOYABILITY	Practice based learning	No	

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Professional Elective (PE)										
22IN51A2	ENERGY HARVESTING TECHNOLOGIES FOR IOT	3	0	0	0	3	EMPLOYABILITY	Practice based learning	No	
22EC51B3	COMPUTER VISION & APPLICATIONS	3	0	0	0	3	EMPLOYABILITY	Practice based learning	No	
22IN51C2	5G NR - NEXT GENERATION WIRELESS TECHNOLOGIES	3	0	0	0	3	EMPLOYABILITY	Practice based learning	No	
22EC51D4	BLOCKCHAIN & CYBER SECURITY	3	0	0	0	3	EMPLOYABILITY	Practice based learning	No	
Skill Development Courses (SDC)										
22TS51H1	TECHNICAL SKILLING-I	0	0	0	8	2	EMPLOYABILITY / SKILL DEVELOPMENT	Practice based learning, Problem Solving	No	
22TS52I2	TECHNICAL SKILLING-II	0	0	0	8	2	EMPLOYABILITY / SKILL DEVELOPMENT	Practice based learning, Problem Solving	No	
Project Courses (PR)										
22IE5149	SEMINAR	0	0	4	0	2	EMPLOYABILITY / SKILL DEVELOPMENT	Practice based learning, Problem Solving	No	
22IE5250	TERM PAPER	0	0	4	0	2	EMPLOYABILITY / SKILL DEVELOPMENT	Practice based learning, Problem Solving	No	
22IE6050	PROJECT DISSERTATION-PART-1 AND PART-2	0	0	72	0	36	EMPLOYABILITY / SKILL DEVELOPMENT	Practice based learning, Problem Solving	No	

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Total Credits		36	4	92	16	90				
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Percentage of Syllabus Revision =  $(0/17) * 100 = 0 \%$

Percentage of Courses focusing on Employability =  $(17/17) * 100 = 100 \%$

Percentage of Courses focusing on Entrepreneurship =  $(0/17) * 100 = 0 \%$

Percentage of Courses focusing on Skill Development =  $(8/17) * 100 = 47.06 \%$

  
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DEPARTMENT OF E. C. E										
Name of the program: M. Tech. - Robotics & Automation for A.Y. :22-24										
Course Code	Course Title	L	T	P	S	Cr	Activities / Content with direct bearing on Employability / Entrepreneurship/ Skill development	Course Category	New Course (Yes/No)	Remarks
<b>Professional Core (PC)</b>										
22RA5141	NON-LINEAR SYSTEMS AND CONTROL OPTIMIZATION FOR ROBOTICS	3	1	2	0	5	EMPLOYABILITY / SKILL DEVELOPMENT	Practice based learning, Problem Solving	No	
22RA5142	ROBOTICS: CYBER PHYSICAL SYSTEMS	3	0	2	0	4	EMPLOYABILITY	Practice based learning	No	
22RA5143	IIOT 4.0 FOR AUTOMATION AND ROBOTIC SYSTEMS	3	0	2	0	4	EMPLOYABILITY	Practice based learning	No	
22EC5104	ARTIFICIAL INTELLIGENCE & MACHINE LEARNING	3	0	2	0	4	EMPLOYABILITY	Practice based learning	No	
22RA5244	ADVANCED ROBOTIC WIRELESS SENSOR NETWORKS	3	1	2	0	5	EMPLOYABILITY / SKILL DEVELOPMENT	Practice based learning, Problem Solving	No	
22RA5245	AUTONOMOUS MOBILE ROBOTS AND AUTOMOTIVE ELECTRONICS	3	1	2	0	5	EMPLOYABILITY / SKILL DEVELOPMENT	Practice based learning,	No	

  
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									Problem Solving		
22RA5246	MICROELECTROMECHANICAL SENSORS AND ACTUATORS FOR ROBOTICS	3	0	2	0	4	EMPLOYABILITY	Practice based learning	No		
22RA5247	ALGORITHMS FOR ROBOTICS SENSOR FUSION	3	0	0	0	3	EMPLOYABILITY	Practice based learning	No		
<b>Professional Elective (PE)</b>											
22RA51A1	ROBOTICS: DESIGN OF SENSORS, DRIVES AND ACTUATORS	3	0	0	0	3	EMPLOYABILITY	Practice based learning	No		
22EC51B1	LIDAR & RADAR SYSTEM CONTROL	3	0	0	0	3	EMPLOYABILITY	Practice based learning	No		
22RA51C3	SIGNAL PROCESSING FOR ROBOTICS	3	0	0	0	3	EMPLOYABILITY	Practice based learning	No		
22RA51D1	OPTIMIZATION ALGORITHMS FOR AUTONOMOUS SYSTEMS	3	0	0	0	3	EMPLOYABILITY	Practice based learning	No		
<b>Skill Development Courses (SDC)</b>											
22TS51A1	TECHNICAL SKILLING-I	0	0	0	8	2	EMPLOYABILITY / SKILL DEVELOPMENT	Practice based learning, Problem Solving	No		
22TS52A2	TECHNICAL SKILLING-II	0	0	0	8	2	EMPLOYABILITY / SKILL DEVELOPMENT	Practice based learning, Problem Solving	No		
<b>Project courses (PR)</b>											

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22IE5149	SEMINAR	0	0	4	0	2	EMPLOYABILITY / SKILL DEVELOPMENT	Practice based learning, Problem Solving	No	
22IE5250	TERM PAPER	0	0	4	0	2	EMPLOYABILITY / SKILL DEVELOPMENT	Practice based learning, Problem Solving	No	
22IE6050	PROJECT DISSERTATION-PART-1 AND PART-2	0	0	72	0	36	EMPLOYABILITY / SKILL DEVELOPMENT	Practice based learning, Problem Solving	No	
<b>Total Credits</b>		<b>36</b>	<b>3</b>	<b>94</b>	<b>16</b>	<b>90</b>				

Percentage of Syllabus Revision =  $(0/17) * 100 = 0\%$

Percentage of Courses focusing on Employability =  $(17/17) * 100 = 100\%$

Percentage of Courses focusing on Entrepreneurship =  $(0/17) * 100 = 0\%$

Percentage of Courses focusing on Skill Development =  $(8/17) * 100 = 47.06\%$

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### Annexure V

#### Revised and New Courses

##### I. Program structure (with all Courses) containing the following categorization

Course Code	Course Name	Course Category	L	T	P	S	CR	Pre-Requisite	New / Revised / Retained	Stakeholder Category	Justification for considering the feedback
20EC4064	CLOUD-COMPUTING & NETWORK SECURITY	Project Based Learning	3	0	0	0	3	Nil	Revised	Dr. Sakthivel Kogularasu, Research Assistant professor, National Cheng Kung University, Taiwan	The field of cloud computing is continuously evolving with the introduction of new technologies, services, and deployment models. Modifying the syllabus allows for the inclusion of the latest advancements, ensuring that students are exposed to cutting-edge tools and practices in cloud computing.
OEEC0011	IMAGE PROCESSING	Project Based Learning	3	0	0	0	3	Nil	Revised	Mr. N. Venkateswara Rao, Director, Vazhraa Nirmaan Prathik, Hyderabad, Telangana	The applications of image processing are expanding into new areas such as healthcare, autonomous vehicles, augmented reality, and more. Modifying the syllabus enables the inclusion of topics related to these emerging applications, providing students with a broader and more relevant skill set.
20EC4051	INFORMATION THEORY & CODING	Practice based learning	3	0	0	0	3	NIL	Revised	Mr. Raghu Agira, Pike Corporation	Information theory and coding are closely tied to advancements in communication systems, data storage, and information processing technologies. Updating the syllabus ensures that students are exposed to the latest algorithms, coding techniques, and protocols relevant to modern communication systems.

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20EC4065	IP MULTIMEDIA SUB-SYSTEM & EMERGING TECHNOLOGIES	Practice based learning	3	0	0	0	0	3	Nil	Revised	Dr. V. Rajesh, Emp ID: 2979, Professor, KLEF, Vijayawada	The field of IP Multimedia Sub-System and emerging technologies is dynamic, with rapid advancements occurring in areas such as telecommunications, networking, and multimedia. Updating the syllabus allows for the inclusion of the latest technologies, protocols, and standards to reflect the current state of the industry.
20EC4082	NATURAL LANGUAGE PROCESSING & APPLICATIONS	Practice based learning	3	0	4	4	6	Nil	Revised	Dr. Anil Vuppala, Asst. Prof., IIT Hyderabad	Natural Language Processing (NLP) is a rapidly evolving field, with continuous advancements in machine learning, deep learning, and natural language understanding. Updating the syllabus allows students to be exposed to the latest techniques, models, and tools used in NLP, ensuring that they are well-prepared for the current state of the industry.	
20EC3081	SPEECH SIGNAL PROCESSING	Practice based learning	3	0	0	0	3	Nil	Revised	Mr. Venkateswara Rao, Vazhraa Nirmaan Pvt Ltd	The field of speech signal processing is continuously evolving, with ongoing advancements in signal processing algorithms, machine learning techniques, and hardware. Updating the syllabus ensures that students are exposed to the latest technologies and methodologies, preparing them for contemporary challenges in the field.	
20EC4062	VOIP AND BROADBAND NETWORKS	Practice based learning	3	0	0	0	3	Nil	Revised	Dr. Anil Vuppala, Asst. Prof., IIT Hyderabad	Telecommunications and networking technologies are rapidly evolving. Updates to the syllabus can ensure that students are exposed to the latest developments in Voice over Internet Protocol (VOIP) and broadband networks, including new protocols, standards, and emerging technologies such as 5G.	

Course wise Syllabus revision of approved structure as mentioned in point 1(Program structure (with all Courses) containing following categorization).

  
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Course Code	Course Name	Course Category	Existing Syllabus	New Syllabus	Topics Added / Removed / Replaced	Change in Outcome	Justification for the Modification	*Overall Revision Percentage
OEEC0011	IMAGE PROCESSING	Practice based learning	CO-1: Introduction: Origin of Digital Image Processing, Fields that uses Digital Image Processing, Fundamental steps in Digital Image Processing, Components of an Image Processing System. Digital Image Fundamentals: Elements of Visual perception, Image sampling and Quantization, Basic relationships between Pixels, Linear and Non-linear operations. Image Transforms – The Discrete Fourier Transform, The FFT, Walsh, Hadamard, Discrete Cosine Transform. CO-2: Image Enhancement in Spatial Domain: Some basic Gray transformations, histogram processing, enhancement using Arithmetic/Logic operations, Smoothing Spatial Filters, Sharpening	CO-1: Introduction: Origin of Digital Image Processing, Fields that uses Digital Image Processing, Fundamental steps in Digital Image Processing, Components of an Image Processing System. Digital Image Fundamentals: Elements of Visual perception, Image sampling and Quantization, Basic relationships between Pixels, Linear and Non-linear operations. Image Transforms – The Discrete Fourier Transform, The FFT, Walsh, Hadamard, Discrete Cosine Transform, The Haar Transform, and Slant Transform. CO-2: Image Enhancement in Spatial Domain: Some basic Gray transformations, histogram processing, enhancement using Arithmetic/Logic	CO1: The Haar Transform, and Slant Transform CO2: Sharpening Frequency Domain Filters CO4: Image Representations and Description: Representation schemes, Boundary Descriptors, Regional Descriptors	CO4: Comprehend image segmentation, representations, and description	Open elective course helps better employment	25%

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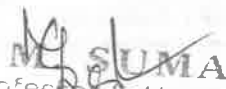
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		<p>Spatial Filters. Image Enhancement in Frequency Domain: Introduction to Fourier Transform and the Frequency Domain, Smoothing Frequency Domain Filters. CO-3: Image Restoration: Noise models, Restoration in the presence of Noise, only Spatial Filtering, Periodic Noise reduction by Frequency Domain Filtering, Linear, Position-Invariant Degradations, Inverse Filtering, Wiener Filtering, least mean square Filtering. Image Compression: Fundamentals – Image Compression models – Error-Free Compression, Lossy Compression. CO-4: Image Segmentation: Detection of discontinuities, Thresholding, Edge-based Segmentation, and Region-based Segmentation.</p>	<p>operations, Smoothing Spatial Filters, Sharpening Spatial Filters. Image Enhancement in Frequency Domain: Introduction on Fourier Transform and the Frequency Domain, Smoothing Frequency Domain Filters, Sharpening Frequency Domain Filters. CO-3: Image Restoration: Noise models, Restoration in the presence of Noise, only Spatial Filtering, Periodic Noise reduction by Frequency Domain Filtering, Linear, Position-Invariant Degradation, Inverse Filtering, Wiener Filtering, least mean square Filtering. Image Compression: Fundamentals – Image Compression models – Error-Free Compression, Lossy Compression. CO-4: Image Segmentation: Detection of discontinuities,</p>				
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**Dr. M. SUMAN**  
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 Guntur Dist., A.P. PIN- 522 302



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				Thresholding, Edge-based Segmentation, and Region-based Segmentation. Image Representations and Description: Representation schemes, Boundary Descriptors, Regional Descriptors				
20EC4051	INFORMATION THEORY & CODING	Practice based learning	Introduction: Information theory, measure, entropy, mark-off, statistical model, Shannon's Theorem: Introduction to Random Variables, Stationary Process, Mean, Correlation and Covariance Functions, Ergodic Process, Power Spectral Density, Gaussian Process, Noise, Narrowband noise and its Representation, Fundamental limits in Information theory: Uncertainty, Information and Entropy, Source coding theorem, Data compression, Mutual information, Channel Coding theorem, Differential entropy and	Introduction: Information theory, measure, entropy, mark-off, statistical model, Shannon's Theorem: Introduction to Random Variables, Stationary Process, Mean, Correlation and Covariance Functions, Ergodic Process, Transmission of Random variable through LTI System, Power Spectral Density, Gaussian Process, Noise, Narrowband noise and its Representation, Fundamental limits in Information theory: Uncertainty, Information and Entropy, Source coding theorem, Data compression, Mutual	CO1: Transmission of Random variable through LTI System CO4: Miscellaneous: Error Types, Burst/Random Error	CO4: Interpreting circuit implementation by using cyclic codes and convolution codes.	Professional elective course helps better employment	25%

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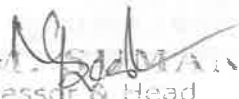
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		<p>Mutual Information for Continuous ensembles, Information Capacity theorem and its implications, Information capacity theorem of colored noise, Rate distribution theory. Measure of Information, Mark-off Statistical Model for Information Sources, and Shannon-theorem. Encoding: Shannon Algorithms, Channels, Source/Huffman coding, Error Detection &amp; Correction: Shannon's Noiseless Coding Theorem, Fano Coding, Huffman Coding, Arithmetic coding, Basics of Error detection &amp; Corrections, Channels: Symmetric Lossless, Deterministic, Useless, Binary Symmetric (BSE), Binary Erase (BEC), Cascade and non-symmetric channels Error Detection and Correction Types, Linear/Block codes,</p>	<p>information, Channel Coding theorem, Differential entropy and Mutual Information for Continuous ensembles, Information Capacity theorem and its implications, Information capacity theorem of colored noise, Rate distribution theory. Measure of Information, Mark-off Statistical Model for Information Sources, and Shannon-theorem. Encoding: Shannon Algorithms, Channels, Source/Huffman coding, Error Detection &amp; Correction: Shannon's Noiseless Coding Theorem, Fano Coding, Huffman Coding, Arithmetic coding, Basics of Error detection &amp; Corrections, Channels: Symmetric Lossless, Deterministic, Useless, Binary Symmetric (BSE), Binary Erase (BEC), Cascade and non-</p>				
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 KLEF

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		<p>Matrix, Array, Table Look-up, Cyclic Code, BCH, RS, Olav: Introduction, Linear Block Codes, Binary cyclic Codes, Burst Error Correcting Codes, Convolution Codes, Performance of Block Codes-Error Correction and Error Detection, Hamming Code. Codes, Convolution Codes, Impulse Response, Trellis, time-domain/Transform approach, Tree representation., State representation, State-diagrams: Error Correcting Codes, Cycle Codes, Burst Correction Codes, Convolution Codes, Trellis, time-domain/Transform approach, Tree representation., State representation, State-diagrams</p>	<p>symmetric channels. Error Detection and Correction Types, Linear/Block codes, Matrix, Array, Table Look-up, Cyclic Code, BCH, RS, Golay : Introduction, Linear Block Codes, Binary cyclic Codes, Burst Error Correcting Codes, Convolution Codes, Performance of Block Codes-Error Correction and Error Detection, Hamming Code Miscellaneous: Error Types, Burst/Random Error corr. Codes, Convolution Codes, Impulse Response, Trellis, time-domain/Transform approach, Tree representation., State representation, State-diagrams: Error Correcting Codes, Cycle Codes, Burst Correction Codes, Convolution Codes, Trellis, time-domain/Transform approach, Tree</p>				
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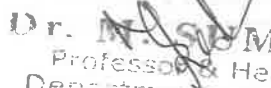
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		<p>RTCP, IMS service path. IMS Layer mapping. IMS and the DNS, IMS session setup, IMS registration, IMS call flow examples, IMS to IMS call, IMS Charging, IMS Security, IMS Scenarios, Role of application servers, Examples. IMS-PSTN, IMS Services: Comparison of GSM, IMS, PSTN, Web-Msg, Voice Video, VoLTE, RCS: Interoperability between PSTN and IMS, Comparison of PSTN, GSM and IMS networks, Establishing a call with the PSTN. Layer 2 and 3 Messages for call flow. Web Messaging-Voice-Video-VoLTE-Rich Communication Services (RCS) Access Network: Fixed Access Mobile access Wireless access Emerging Tech. of IMS &amp; Applications: Cloud, IoT Applications, NFV, SDN,</p>	<p>Protocol, DIAMETER and H.248/Megaco, RTP and RTCP, IMS service path. IMS Layer mapping. IMS and the DNS, IMS session setup, IMS registration, IMS call flow examples, IMS to IMS call, IMS Charging, IMS Security, IMS Scenarios, Role of application servers, Examples. IMS-PSTN, IMS Services: Comparison of GSM, IMS, PSTN, Web-Msg, Voice Video, VoLTE, RCS: Interoperability between PSTN and IMS, Comparison of PSTN, GSM and IMS networks, Establishing a call with the PSTN. Layer 2 and 3 Messages for call flow. Web Messaging-Voice-Video-VoLTE-Rich Communication Services (RCS) Access Network: Fixed Access Mobile access Wireless access Emerging Tech. of IMS &amp; Applications: Cloud, IoT</p>			
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			PDAS, DSL, Cable-Set-Top Box	Applications, NFV, SDN, PDAS, DSL, Cable-Set-Top Box: Trends of IPM based Mobile Phones-Personal Digital Assistants (PDAS)-Desktops/Laptops Digital Subscriber Line (DSL)-Cable Set-Top Box				
20EC3081	SPEECH SIGNAL PROCESSING	Practice based learning	SPEECH FUNDAMENTALS: Production and Classification of Speech Sounds; Acoustic Phonetics – Vowels, diphthongs, fricatives etc., Speech parameters-Speech production, Labelling. TRANSFORMATIONS FOR SPEECH SIGNAL PROCESSING: Fourier Transformation, Design of Filters- Wide band and Narrow Band- Hilbert transform- Auto correlation and Hilbert huang transforms for pitch estimation-STFT- STFT representation of speech- Z transform and Pole Zero concepts, LTI, Modelling of speech: Inverse filtering,	SPEECH FUNDAMENTALS: Production and Classification of Speech Sounds; Acoustic Phonetics – Vowels, diphthongs, fricatives etc., Speech parameters-Speech production, Labelling. TRANSFORMATIONS FOR SPEECH SIGNAL PROCESSING: Fourier Transformation, Design of Filters Wide band and Narrow Band- Hilbert transform- Auto correlation and Hilbert huang transforms for pitch estimation- STFT- STFT representation of speech - Z transform and Pole Zero concepts, LTI, Modelling of speech: Inverse	CO4: CNN for Automatic speech and speaker recognition	Nil	Professional elective course helps better employment	0%

  
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		<p>Pole zero, Z transform ANALYSIS AND SYNTHESIS OF SPEECH: Speech Analysis: Time domain: Analysis and Synthesis of Pole-Zero Speech Models; Aliasing, Spectral: Short Time Fourier analysis - filter bank design - speech coding – sub-band coding of speech - transform coding - channel vocoder - vector quantizer coder. introduction to LPC. Speech synthesis - Pitch extraction algorithms, MFCC- autocorrelation pitch trackers - voice/unvoiced detection - homomorphic speech processing - homomorphic systems for convolution - complex cepstrum - pitch extraction using homomorphic speech processing. Introduction to vowel synthesis Advanced Topics and applications of ANN, AL and ML Introduction to Hidden</p>	<p>filtering, Pole zero, Z transform ANALYSIS AND SYNTHESIS OF SPEECH: Speech Analysis: Time domain: Analysis and Synthesis of Pole-Zero Speech Models; Aliasing, Spectral: Short Time Fourier analysis - filter bank design - speech coding – sub-band coding of speech - transform coding - channel vocoder - vector quantizer coder. introduction to LPC. Speech synthesis - Pitch extraction algorithms, MFCC- autocorrelation pitch trackers - voice/unvoiced detection - homo morphic speech processing - homomorphic systems for convolution - complex cepstrum - pitch extraction using homomorphic speech processing. Introduction to vowel synthesis. ADVANCED TOPICS and APPLICATIONS OF ANN, AI and ML.</p>				
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			<p>Markov Modelling- Application of HMM: making a digit recognition system-Automatic segmentation and labelling of speech based on HMM-speaker verification systems – speaker identification Systems - ANN, CNN, ANN and Introduction to Text to speech and Speech to text, Introduction of AI and ML based applications in speech domain</p>	<p>Introduction to Hidden Markov Modelling- Application of HMM: making a digit recognition system -Automatic segmentation and labelling of speech based on HMM-speaker verification systems –speaker identification Systems - ANN, CNN, ANN and CNN for Automatic speech and speaker recognition- Introduction to Text to speech and Speech to text, Introduction of AI and ML based applications in speech domain.</p>				
20EC4064	<p>CLOUD-COMPUTING &amp; NETWORK SECURITY</p>	Practice based learning	<p>Introduction to Cloud Networking: Basics of Computer Networking and Cloud Networking; Characteristics of Cloud Networking :Ethernet usage, Virtualization, Convergence, Scalability, Software; Data Center Evolution and Mainframes to the Cloud: Enterprise data center networks,</p>	<p>Introduction to Cloud Networking: Basics of Computer Networking and Cloud Networking; Characteristics of Cloud Networking :Ethernet usage, Virtualization, Convergence, Scalability, Software; Data Center Evolution and Mainframes to the Cloud: Enterprise data center networks,</p>	<p>Web-DNS Security: Overview of DNS, Fundamentals of DNS, DNS Transactions, Threats to the DNS, DNSSEC [RFC 2535], Security aware DNS Servers, Security Aware Clients, Intrusion Detection, DHT Security</p>	CO4: Analysis of various Network Security issues	Professional elective course helps for better employment	25 %

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		<p>Cloud data center networks; Cloud types, Public cloud services, Cloud Data Center</p> <p>Networking Topologies: Data Center Network Switch Types, Flat Data Center Networks, Rack Scale Architectures; Virtualization and Networking: VMware, Edge Virtual Bridging, VM Migration; Network Virtualization: Traditional Network Tunneling Protocols, Virtual Extensible LAN (VXLAN), Network Virtualization using Generic Routing Encapsulation (NVGRE). Cloud based Big-Data Computing: Big Data and Cloud Computing Relationship Model: Infrastructure as a Service (IAAS), Platform as a Service (PAAS), Software as a Service (SAAS), Cloud Computing Role for Big Data: IAAS in Public</p>	<p>Cloud data center networks; Cloud types, Public cloud services, Cloud Data Center</p> <p>Networking Topologies: Data Center Network Switch Types, Flat Data Center Networks, Rack Scale Architectures; Virtualization and Networking: VMware, Edge Virtual Bridging, VM Migration; Network Virtualization: Traditional Network Tunneling Protocols, Virtual Extensible LAN (VXLAN), Network Virtualization using Generic Routing Encapsulation (NVGRE). Cloud based Big-Data Computing: Big Data and Cloud Computing Relationship Model: Infrastructure as a Service (IAAS), Platform as a Service (PAAS), Software as a Service (SAAS), Cloud Computing Role for Big Data: IAAS in Public</p>				
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		<p>Cloud, PAAS in Private Cloud, SAAS in Hybrid Cloud.(4hours)Software Fabric Architecture: Data Fabric Architecture Fundamentals, basic of Fabric computing, Topology and Key characteristics of Fabric computing, Laying the Foundation for a Data Fabric, Building Data Fabric Capabilities Up and Out, Ecosystem Integration Layer Cloud Data Center Networks and Standards: Cloud Data Center Network (CDCNs) Architectures, standards of Data Center Network, Blueprint components of CDCNs, Performance Analysis of CDCNs, Structural robustness and Connectivity of DCNs, Energy efficiency of DCNs, Throughput and average packet delay, Cloud data center reference design. Data Center security: Physical Security</p>	<p>Cloud, PAAS in Private Cloud, SAAS in Hybrid Cloud.(4hours)Software Fabric Architecture: Data Fabric Architecture Fundamentals, basic of Fabric computing, Topology and Key characteristics of Fabric computing, Laying the Foundation for a Data Fabric, Building Data Fabric Capabilities Up and Out, Ecosystem Integration Layer Cloud Data Center Networks and Standards: Cloud Data Center Network (CDCNs) Architectures, standards of Data Center Network, Blueprint components of CDCNs, Performance Analysis of CDCNs, Structural robustness and Connectivity of DCNs, Energy efficiency of DCNs, Throughput and average packet delay, Cloud data center reference design. Data Center security: Physical</p>			
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		<p>of DC, Restricting Access Applications of Cloud-Computing (ACC): Applications of Cloud Computing: Infrastructure as a service (IaaS) and platform as a service (PaaS), Private cloud and hybrid cloud, Test and development, Big data analytics, File storage, Disaster recovery, Backup. Cloud Computing Security (CCS): Security issues; CCS Controls; Dimensions &amp; Privacy; Cloud Vulnerability and Penetration Testing; Encryption Algorithm: Attribute-based encryption (ABE), Ciphertext-policy ABE (CP-ABE), Key-policy ABE (KP-ABE), Legal and contractual issues. Network Virtualization (NV): Components, External &amp; Internal Virtualization, Performance of Wireless Network Virtualization (WNV) Network Security;</p>	<p>Security of DC, Restricting Access Applications of Cloud-Computing (ACC): Applications of Cloud Computing: Infrastructure as a service (IaaS) and platform as a service (PaaS), Private cloud and hybrid cloud, Test and development, Big data analytics, File storage, Disaster recovery, Backup. Cloud Computing Security (CCS): Security issues; CCS Controls; Dimensions &amp; Privacy; Cloud Vulnerability and Penetration Testing; Encryption Algorithm: Attribute-based encryption (ABE), Ciphertext-policy ABE (CP-ABE), Key-policy ABE (KP-ABE), Legal and contractual issues. Network Virtualization (NV): Components, External &amp; Internal Virtualization, Performance of Wireless Network Virtualization</p>				
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			<p>Risks and Threats of Wireless, Analysis, Spoofing, Denial of service, Malicious Code, Social Engineering, Rouge Access Points, Cell Phone Security, Wireless Hacking and Hackers, RFID, QoS: QoS Overview and Background, QoS schemes at the Data Link Layer, QoS Schemes at the Network Layer, QoS Routing Schemes</p>	<p>(WNV)Network Security: Risks and Threats of Wireless, Analysis, Spoofing, Denial of service, Malicious Code, Social Engineering, Rouge Access Points, Cell Phone Security, Wireless Hacking and Hackers, RFID, QoS: QoS Overview and Background, QoS schemes at the Data Link Layer, QoS Schemes at the Network Layer, QoS Routing Schemes, Web-DNS Security: Overview of DNS, Fundamentals of DNS, DNS Transactions, Threats to the DNS, DNSSEC[RFC 2535], Security aware DNS Servers, Security Aware Clients, Intrusion Detection, DHT Security</p>				
20EC4082	NATURAL LANGUAGE PROCESSING & APPLICATIONS	Practice based learning	<p>NLP: Overview and Motivation. Human Language from computers View point and language building blocks. Words, text and speech models. A</p>	<p>NLP: Overview and Motivation. Human Language from computers View point and language building blocks. Words, text and speech models. A</p>	<p>Sequence-to-sequence models and attention. Text Classification Application pipeline building.</p>	<p>CO4: Apply machine learning models for finding solutions for problems in NLP and judge</p>	<p>Professional elective course helps better employment</p>	25

  
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		<p>Chat bot NLP pipeline. Word tokenization, Building vocabulary with tokenizer and sentiment. Challenges in NLP. Approaches in NLP. NLP Pipeline: Data Acquisition, Text Extraction and Cleanup, Pre-Processing, Feature Engineering, Modeling. Evaluation, Post-Modeling Phases. TF-IDF vectors, Bag of words, Bag of N-Grams, One-Hot Encoding, Vectorizing, Zipf's Law, Topic modeling. Word Embeddings Finding meaning in word counts (semantic analysis): From word counts to topic scores, Latent semantic analysis, Singular value decomposition, Principal component analysis, Latent Dirichlet allocation (LDiA), Distance and similarity, Steering with feedback, Topic vector power. Deeper learning (neural networks):</p>	<p>Chat bot NLP pipeline. Word tokenization, Building vocabulary with tokenizer and sentiment. Challenges in NLP. Approaches in NLP. NLP Pipeline: Data Acquisition, Text Extraction and Cleanup, Pre-Processing, Feature Engineering, Modeling. Evaluation, Post-Modeling Phases. TF-IDF vectors, Bag of words, Bag of N-Grams, One-Hot Encoding, Vectorizing, Zipf's Law, Topic modeling. Word Embeddings Finding meaning in word counts (semantic analysis): From word counts to topic scores, Latent semantic analysis, Singular value decomposition, Principal component analysis, Latent Dirichlet allocation (LDiA), Distance and similarity, Steering with feedback, Topic vector power. Deeper learning</p>		<p>their performance.</p>		
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			Semantic queries and analogies, Word vectors, Learning meaning, Convolutional neural nets, RNNs, LSTMs, Transformers Models for Text and speech processing.	(neural networks): Semantic queries and analogies, Word vectors, Learning meaning, Convolutional neural nets, RNNs, LSTMs, Transformers Models for Text and speech processing. Sequence-to-sequence models and attention. Text Classification Application pipeline building.				
			Classical Telephony: Line Side/Trunk Side switching, Isochronous Transport, PSTN Signalling, PCM, digital channel & bandwidth constraints, SS7, Services. IP Networking Review (simple): Protocol layering, encapsulation, Ethernet, QoS at layer 2, IP, UDP, TCP, IP Addressing (network, subnet, NAT), IP Routing (RIP, OSPF). Overview of VoIP Architectures and Protocols: Peer protocols (SIP, H323): signalling,	Classical Telephony: Line Side/Trunk Side switching, Isochronous Transport, PSTN Signalling, PCM, digital channel & bandwidth constraints, SS7, Services. IP Networking Review (simple): Protocol layering, encapsulation, Ethernet, QoS at layer 2, IP, UDP, TCP, IP Addressing (network, subnet, NAT), IP Routing (RIP, OSPF). Overview of VoIP Architectures and Protocols: Peer protocols (SIP, H323): signalling,	Trends in Broadband Services, Optical Broad band services, Fiber to neighbourhood (FTTX) Architecture, ITU-T PON standards, PON Technology background.	CO4: Apply NAT techniques and the quality of service for networks with SIP protocol	Professional elective course helps better employment	25
	20EC4062	VOIP SYSTEMS & BROAD BAND NETWORKS	Practice based learning					

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		<p>call routing, Master-slave protocols (MGCP/Megaco et.al.): signalling, call routing, SS7 Transport (SIP-T), RTP and Codecs, RTP and RTCP: real time traffic over ip (rfc 1789), Codecs (compression, bandwidth, quality), Waveform codecs (G711, G726), CLEP codecs (G729, G723, etc.), Bandwidth control (VAD, dynamic packing, etc.). SIP: Signalling Protocol Components (RFC 3261), SIP language elements, call flows. Broadband Access Technologies: An Overview of Broadband Services and Emerging Technologies, Broadband Passive Optical Networks: PON Architectures-PON Standards History and Deployment-Broadband PON- Ethernet PON- next-generation broadband optical Access networks. Fiber-to-the-Home (FTTH), Satellite</p>	<p>call routing, Master-slave protocols (MGCP/Megaco et.al.): signalling, call routing, SS7 Transport (SIP-T), RTP and Codecs, RTP and RTCP: real time traffic over ip (rfc 1789), Codecs (compression, bandwidth, quality), Waveform codecs (G711, G726), CLEP codecs (G729, G723, etc.), Bandwidth control (VAD, dynamic packing, etc.). SIP: Signalling Protocol Components (RFC 3261), SIP language elements, call flows. Broadband Access Technologies: An Overview of Broadband Services and Emerging Technologies, Broadband Passive Optical Networks: PON Architectures-PON Standards History and Deployment-Broadband PON- Ethernet PON- next-generation broadband optical Access networks. Fiber-to-the-Home (FTTH), Satellite</p>				
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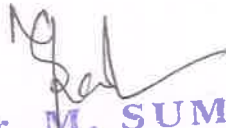
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			Broadband, Hybrid Fiber-Coaxial (HFC) Networks. Broadband Optical NwS and Broadband and Multimedia: Broadband optical Access Introduction, Evolution of optical technology.	Broadband, Hybrid Fiber-Coaxial (HFC) Networks. Broadband Optical NwS and Broadband and Multimedia: Broadband optical Access Introduction, Evolution of optical technology, Trends in Broadband Services, Optical Broad band services, Fiber to neighbourhood (FTTX) Architecture, ITU-T PON standards, PON Technology background.				
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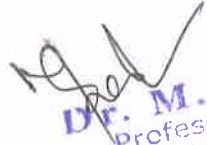
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### Annexure VI

#### List of Value-Added Course

Name of the value-added courses offered (with 30 or more contact hours)	Year of offering	No. of times offered during the same year
NI CLAD	II	1
ARC ROBOTICS	III	1
CDAC - IoT Technologies;	III	1
Embedded System Application & IOT Programming	III	1
Embedded System Applications & IOT Concepts	III	1
FUNDAMENTALS OF UVM (UNIVERSAL VERIFICATION METHODOLOGY)	III	1
Huawei Certified ICT Associate Artificial Intelligence (HCIA-AI)	III	1
INDUSTRIAL ROBOTICS & AUTOMATION	III	1
IOT & INDUSTRIAL AUTOMATION	III	1
IOT ANALYTICS AND DATA SCIENCE	III	1
IOT AND DATA SCIENCE FOR SMART GRID	III	1
Medical Equipment	III	1
PHYSICAL DESIGN & VERIFICATION	III	1
Synthesis and Timing analysis	III	1
Tessolve - Embedded System Applications & IoT	III	1
Verification using system verilog	III	1
VLSI Design and Verification	III	1
ADVANCED IOT ANALYTICS WITH MACHINE LEARNING	IV	1
Huawei Certified ICT Associate Routing and Switching (HCIA-R&S)	IV	1
HUAWEI CERTIFIED ICT CLOUD COMPUTING	IV	1
PEGA	IV	1
SERVICE NOW;	IV	1
VLSI-ADVANCED DESIGN & VERIFICATION-SYSTEM VERILOG AND UVM	IV	1
MICROSOFT - AZURE AI FUNDAMENTALS	IV	1
MICROSOFT AZURE	IV	1
Microsoft Azure Data Fundamentals	IV	1
Microsoft Azure Data Fundamentals - 19CC3321	IV	1
Microsoft Certified: Azure - AI -Fundamentals;	IV	1
MICROSOFT CERTIFIED: AZURE AI FUNDAMENTALS	IV	1
Microsoft certified: Azure Fundamentals	IV	1
Microsoft Certified: Azure-Fundamentals;	IV	1

  
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PC CET: Palo Alto Networks Certified Cybersecurity Entry-level Technician;	IV	1
WTN	IV	1

  
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