Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)
(Accredited 'A++' Grade by NAAC with a score of 3.25)
Hingna Road, Wanadongri, Nagpur - 441 110

Bachelor of Technology
SoE & Syllabus 2022
1st to 8th Semester

(Department of Computer Technology)
B. Tech in CSE (IoT)

Nagar Yuwak Shikshan Sanstha's
Yeshwantrao Chavan College of Engineering
(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)
B.TECH SCHEME OF EXAMINATION 2022
(Scheme of Examination w.e.f. 2022-23 onward)
(Department of Electronics Engineering)
B. Tech in CSE (IOT)

**SoE No.
22CSIoT-101**

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
					FIRST SEMESTER										
1	1	BS	GE/MTH	22IOT101	Calculus	T	3	1	0	3	4	30	20	50	3 Hours
2	1	BS	GE/PHY	22IOT102	Semiconductor Physics	T	3	0	0	3	3	30	20	50	3 Hours
3	1	BS	GE/PHY	22IOT103	**Lab.:** Semiconductor Physics	P	0	0	2	2	1		60	40	
4	1	HS	GE/HUM	22IOT104	Social Science	T	3	0	0	3	3	30	20	50	3 Hours
5	1	BES	EE/EE	22IOT105	Basic Electronics Engineering	T	3	0	0	3	3	30	20	50	3 Hours
6	1	BES	EL/EL	22IOT106	Basic Electrical Engineering	T	3	0	0	3	3	30	20	50	3 Hours
7	1	BES	EL/EL	22IOT107	**Lab.:** Basic Electrical Engineering	P	0	0	2	2	1		60	40	
8	1	PC	EE/EE	22IOT108	Programming for problem solving	T	3	0	0	3	3	30	20	50	3 Hours
9	1	PC	EE/EE	22IOT109	**Lab.:** Programming for problem solving	P	0	0	2	2	1		60	40	
					TOTAL FIRST SEM		18	1	6	24	22				

List of Mandatory Learning Course (MLC)

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	L	T	P	Hrs	Credits				
1	1	BES	GE/CHE	GE2132	Environmental Science	A	2	0	0	2	0				
2	1	HS	GE/T&P	MLC2121	YCAP1-Get Set Go	A	2	0	0	2	0				

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
					SECOND SEMESTER		L	T	P	Hrs		MSEs	TA	ESE	
1	2	BS	GE/MTH	22IOT201	Linear Algebra	T	3	1	0	3	4	30	20	50	3 Hours
2	2	BS	GE/CHE	22IOT202	Engineering Chemistry	T	3	0	0	3	3	30	20	50	3 Hours
3	2	BS	GE/CHE	22IOT203	**Lab.:** Engineering Chemistry	P	0	0	2	2	1		60	40	
4	2	HS	GE/HUM	22IOT204	Professional Communication	T	3	0	0	3	3	30	20	50	3 Hours
5	2	BES	ME/ME	22IOT205	Engineering Graphics	T	1	0	0	1	1	30	20	50	3 Hours
6	2	BES	ME/ME	22IOT206	**Lab.:** Engineering Graphics	P	0	0	4	4	2		60	40	
7	2	PC	ME/ME	22IOT207	Fundamentals of Manufacturing Process	T	3	0	0	3	3	30	20	50	3 Hours
8	2	PC	ME/ME	22IOT208	**Lab.:** Fundamentals of Manufacturing Process	P	0	0	2	2	1		60	40	
9	2	PC	EE/EE	22IOT209	**Lab.:** Python Programming	P	0	0	2	2	1		60	40	
					TOTAL SECOND SEM		13	1	10	23	19				

List of Mandatory Learning Course (MLC)

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	L	T	P	Hrs	Credits				
1	2	HS	GE/T&P	MLC2122	YCAP2 -Functional English	A	2	0	0	2	0				
2	2	HS	GE/HUM	GE2131	Universal Human Value	A	2	0	0	2	0				

MSEs* = Two MSEs of 15 Marks each will conducted and marks of these 2 MSEs will be considered for Continuous Assessment

TA ** = for Theory : TA1-5 marks on Proctored Online Exam, TA2-12 marks on activitied decided by course teacher, TA3 - 3 marks on class attendance

TA = for Practical : MSPA will be 15 marks each**

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B.TECH SCHEME OF EXAMINATION 2022
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(Department of Computer Technology
B. Tech in CSE (IOT)

SoE No.
22CSIoT-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	L	T	P	Hrs	Credits	MSEs*	TA**	ESE	ESE Duration Hours
					Third Semester										
1	3	BS	GE/GE	22IoT301	Probability Theory and Sampling Theory	T	3	0	0	3	3	30	20	50	3 Hours
2	3	HS	GE/HUM	22IoT302	Fundamentals of Management and Economics	T	3	0	0	3	3	30	20	50	3 Hours
3	3	PC	EE/EE	22IoT303	Digital Logic Design	T	3	0	0	3	3	30	20	50	3 Hours
4	3	PC	EE/EE	22IoT304	**Lab. :** Digital Logic Design	P	0	0	2	2	1		60	40	
5	3	PC	EE/EE	22IoT305	Analog Circuits	T	3	0	0	3	3	30	20	50	3 Hours
6	3	PC	EE/EE	22IoT306	**Lab.:** Analog Circuits	P	0	0	2	2	1		60	40	
7	3	PC	EE/EE	22IoT307	Data Structures	T	3	0	0	3	3	30	20	50	3 Hours
8	3	PC	EE/EE	22IoT308	**Lab.:** Data Structures	P	0	0	2	2	1		60	40	
9	3	PC	EE/EE	22IoT309	Sensor and actuators	T	3	1	0	3	3	30	20	50	3 Hours
					TOTAL THIRD SEM		**18**	**1**	**6**	**24**	**21**				

				List of Mandatory Learning Course (MLC)											
1	3	HS	T&P	MLC2123	YCCE Communication Aptitude Preparation (YCAP3)	A	3	0	0	3	0				
2	3	BES	IoT	MLC117	Arduino Programming	A	2	0	0	2	0				

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	L	T	P	Hrs	Credits	MSEs*	TA**	ESE	ESE Duration Hours
					Fourth Semester										
1	4	PC	EE/CT	22IoT401	Database Management System	T	3	0	0	3	3	30	20	50	3 Hours
2	4	PC	EE/CT	22IoT402	**Lab.:** Database Management System	P	0	0	2	2	1		60	40	
3	4	PC	EE/CT	22IoT403	Object Oriented Programming using JAVA	T	3	0	0	3	3	30	20	50	3 Hours
4	4	PC	EE/CT	22IoT404	**Lab.:** Object Oriented Programming using JAVA	P	0	0	2	2	1		60	40	
5	4	PC	EE/ME	22IoT405	Mechatronics	T	3	0	0	3	3	30	20	50	3 Hours
6	4	PC	EE/ME	22IoT406	**Lab.:** Mechatronics	P	0	0	2	2	1		60	40	
7	4	PC	EE/EE	22IoT407	Microcontroller & its Applications	T	3	0	0	3	3	30	20	50	3 Hours
8	4	PC	EE/EE	22IoT408	**Lab.:** Microcontroller & its Applications	P	0	0	2	2	1		60	40	
9	4	PC	EE/EE	22IoT409	Computer Architecture Organization	T	3	0	0	3	3	30	20	50	3 Hours
10	4	PC	EE/EE	22IoT410	**Lab.:** Electronics Workshop	P	0	0	2	2	1		60	40	
11	4	PC	CV/EE	22IoT411	Environmental Sustainability, Pollution and Management	T	3	0	0	3	3	30	20	50	3 Hrs
					TOTAL FOURTH SEM		**18**	**0**	**10**	**28**	**23**				

				List of Mandatory Learning Course (MLC)											
1	4	HS	T&P	MLC2124	YCCE Communication Aptitude Preparation (YCAP4)	A	3	0	0	3	0				
2	4	BES	IoT	MLC118	Matlab Programming	A	2	0	0	2	0				

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TA** = for Practical : MSPA will be 15 marks each

		June 2022	1.00	Applicable for AY 2022-23 Onwards
Chairperson	**Dean (Acad. Matters)**	**Date of Release**	**Version**	

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Fifth Semester

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	L	T	P	Hrs	Credits	MSEs*	TA**	ESE	ESE Duration Hours
1	5	PC	EE	22IoT501	Introduction to IoT	T	3	0	0	3	3	30	20	50	3 Hours
2	5	PC	EE	22IoT502	**Lab.:** Introduction to IoT	P	0	0	2	2	1		60	40	
3	5	PC	CT	22IoT503	Computer Communication Network	T	3	0	0	3	3	30	20	50	3 Hours
4	5	PC	CT	22IoT504	**Lab. :** Computer Communication Network	P	0	0	2	2	1		60	40	
5	5	PC	CT	22IoT505	Design & Analysis of Algorithms	T	3	0	0	3	3	30	20	50	3 Hours
6	5	PC	CT	22IoT506	**Lab.:** Design & Analysis of Algorithms	P	0	0	2	2	1		60	40	
7	5	PE			**Professional Elective-I ***	T	3	0	0	3	3	30	20	50	3 Hours
8	5	STR	EE	22IoT510	Industrial Training, Seminar & Report	P	0	0	0	0	1		60	40	
9	5	OE	CT		**Open Elective - I**	T	3	0	0	3	3	30	20	50	3 Hours
10	5	OE	CT		**Open Elective - II**	T	3	0	0	3	3	30	20	50	3 Hours
					TOTAL FOURTH SEM		18	0	6	24	22				

List of Professional Electives-I *

1	5	PE-I	EE/EE	22IoT511	PE-I: Pattern Recognization
2	5	PE-I	EE/CT	22IoT512	PE-I: CMOS Subsystem Design
3	5	PE-I	EE/EL	22IoT513	PE-I: Power Electronics
4	5	PE-I	EE/ME	22IoT514	PE-I: Supply chain management

Open Elective-I

1	5	OE-I	CT	22CT531	OE-I : Introduction to DBMS
2	5	OE-I	CT	22CT532	OE-I : Essentials of IT
3	5	OE-I	CT	22CT533	OE-I : Operating System Concepts
4	5	OE-I	CT	22CT534	OE-I : Introduction to Salesforce

Open Elective-II

1	5	OE-II	CT	22CT551	OE-II : Software Testing
2	5	OE-II	CT	22CT552	OE-II : Internet Technology
3	5	OE-II	CT	22CT553	OE-II : Multimedia and Animation
4	5	OE-II	CT	22CT554	OE-II : Current Trends and Technologies

List of Mandatory Learning Course (MLC)

1	5	HS	T&P	MLC2125	YCAP5: YCCE Communication Aptitude Preparation	A	3	0	0	3	0
2	5	HS	R&D	MLC125	Design thinking	A	2	0	0	2	0

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TA** = for Practical : MSPA will be 15 marks each

		June 2022	1.00	**Applicable for AY 2022-23 Onwards**
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SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
					Sixth Semester										
1	6	PC	EE	22IoT601	Embedded System Design	T	3	0	0	3	3	30	20	50	3 Hours
2	6	PC	EE	22IoT602	**Lab.:** Embedded System Design	P	0	0	2	2	1		60	40	
3	6	PC	EE	22IoT603	Data Acquisition & Signal Conditioning	T	3	0	0	3	3	30	20	50	3 Hours
4	6	PC	CT	22IoT604	AI and Machine Learning	T	3	0	0	3	3	30	20	50	3 Hours
5	6	PC	CT	22IoT605	**Lab**:AI and Machine Learning	P	0	0	2	2	1		60	40	
6	6	PC	EE	22IoT606	**Project Phase-I**	P	0	0	2	4	2		60	40	
7	6	PE			**Professional Elective-II**	T	3	0	0	3	3	30	20	50	3 Hours
8	6	PE			**Lab: Professional Elective-II**	P	0	0	2	2	1		60	40	
9	6	OE			**Open Elective - III**	T	3	0	0	3	3	30	20	50	3 Hours
10	6	OE			**Open Elective - IV**	T	3	0	0	3	3	30	20	50	3 Hours
					TOTAL SIXTH SEM		18	0	8	28	23				

List of Professional Electives- II

Professional Electives-II

1	6	PE-II	EE/EE	22IoT651	PE-II : Digital Image processing
	6	PE-II	EE/EE	22IoT652	PE-II: **Lab.:** Digital Image processing
2	6	PE-II	EE/ME	22IoT653	PE-II Flexible Manufacturing System
	6	PE-II	EE/ME	22IoT654	PE-II: **Lab: :** Flexible Manufacturing System
3	6	PE-II	EE/EL	22IoT655	PE-II: Electrical Drives
	6	PE-II	EE/EL	22IoT656	PE-II **: Lab:** Electrical Drives
4	6	PE-II	CT	22IoT657	PE-II: Introduction to GIS
	6	PE-II	CT	22IoT658	PE-II: **Lab.:** Introduction to GIS

Open Elective-III					
1	6	OE-III	CT	22CT631	OE-III : Introduction to DBMS
2	6	OE-III	CT	22CT632	OE-III : Essentials of IT
3	6	OE-III	CT	22CT633	OE-III : Operating System Concepts
4	6	OE-III	CT	22CT634	OE-III : Introduction to Salesforce

Open Elective-IV					
1	6	OE-IV	CT	22CT651	OE-II : Software Testing
2	6	OE-IV	CT	22CT652	OE-II : Internet Technology
3	6	OE-IV	CT	22CT653	OE-II : Multimedia and Animation
4	6	OE-IV	CT	22CT654	OE-II : Current Trends and Technologies

List of Mandatory Learning Course (MLC)											
1	6	HS	T&P	MLC2126	YCAP6 :	A	3	0	0	3	0

MSEs* = Two MSEs of 15 Marks each will conducted and marks of of these 2 MSEs will be considered for Continuous Assessment

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TA** = for Practical : MSPA will be 15 marks each

			June 2022	1.00	**Applicable for AY 2022-23 Onwards**
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B.TECH SCHEME OF EXAMINATION 2022
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SoE No.
22CSIoT-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	L	T	P	Hrs	Credits	MSEs*	TA**	ESE	ESE Duration Hours
							Contact Hours					% Weightage			
Seventh Semester															
1	7	PC	CT	22IOT701	Software Engineering	T	3	0	0	3	3	30	20	50	3 Hours
2	7	PC	CT	22IOT702	**Lab.: Software Engineering**	P	0	0	2	2	1		60	40	
3	7	PC	CT	22IOT703	IoT Design Principals	T	3	0	0	3	3	30	20	50	3 Hours
3	7	PC	CT	22IOT704	Cloud computing	T	3	0	0	3	3	30	20	50	3 Hours
4	7	PC	CT	22IOT705	**Lab.: Cloud computing**	P	0	0	2	2	1		60	40	
5	7	PE			**Professional Elective-III**	T	3	0	0	3	3	30	20	50	3 Hours
5	7	PE			**Lab. : Professional Elective-III**	P	0	0	2	2	1		60	40	
6	7	PE			**Professional Elective-IV**	T	3	0	0	3	3	30	20	50	3 Hours
8	7	PE			**Professional Elective-V**	T	3	0	0	3	3	30	20	50	3 Hours
9	7	STR	CT	22IOT707	Project Phase-II	P	0	0	10	10	5		60	40	
10	7	STR	CT	22IOT708	Campus Recruitment Training (CRT)	P	0	0	0	0	2		100		
					TOTAL SEVENTH SEM		18	0	16	34	28				

List of Professional Electives-III,IV & V
Professional Electives -III

1	7	PE-III	CT	22IOT721	PE-III : IoT Sensors and devices
2	7	PE-III	CT	22IOT722	PE-III : Lab: IoT Sensors and devices
3	7	PE-III	CT	22IOT723	PE-III : Fog and Edge computing
4	7	PE-III	CT	22IOT724	PE-III :**Lab:** Fog and Edge computing
5	7	PE-III	CT	22IOT725	PE-III: Business Intelligence and Applications
6	7	PE-III	CT	22IOT726	PE-III: **Lab:** Business Intelligence and Applications

Professional Electives -IV

1	7	PE-IV	CT	22IOT741	PE IV: Security and Privacy in IoT
2	7	PE-IV	CT	22IOT742	PE IV: Data Analytics for IoT
3	7	PE-IV	CT	22IOT743	PE IV:Cryptography
4	7	PE-IV	CT	22IOT744	PE IV: Software Testing

Professional Electives -V

1	7	PE-V	CT	22IOT761	PE-V: Data Mining
2	7	PE-V	CT	22IOT762	PE-V: Operating System Concepts
3	7	PE-V	CT	22IOT763	PE-V: Electric Vehicle
4	7	PE-V	CT	22IOT764	PE-V: Wireless Communication

					Eighth Semester										
1	8	STR		22IOT801	**Industrial Internship**	P	0	0	12	12	3		60	40	
2	8	STR		22IOT802	**Extra Curricular Activity Evaluation**	P	0	0	0	0	2		100		
					TOTAL EIGHTH SEM		0	0	12	12	5				
					GRAND TOTAL		121	3	76	199	163				

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Chairperson	**Dean (Acad. Matters)**	June 2022 **Date of Release**	1.00 **Version**	**Applicable for AY 2022-23 Onwards**

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Bachelor of Technology

SoE & Syllabus 2022

1st Semester

(Department of Computer Technology)

B. Tech in CSE (IoT)

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FIRST SEMESTER

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	L	T	P	Hrs	Credits	MSEs*	TA**	ESE	ESE Duration Hours
1	1	BS	GE/MTH	22IOT101	Calculus	T	3	1	0	3	4	30	20	50	3 Hours
2	1	BS	GE/PHY	22IOT102	Semiconductor Physics	T	3	0	0	3	3	30	20	50	3 Hours
3	1	BS	GE/PHY	22IOT103	**Lab.:** Semiconductor Physics	P	0	0	2	2	1		60	40	
4	1	HS	GE/HUM	22IOT104	Social Science	T	3	0	0	3	3	30	20	50	3 Hours
5	1	BES	EE/EE	22IOT105	Basic Electronics Engineering	T	3	0	0	3	3	30	20	50	3 Hours
6	1	BES	EL/EL	22IOT106	Basic Electrical Engineering	T	3	0	0	3	3	30	20	50	3 Hours
7	1	BES	EL/EL	22IOT107	**Lab.:** Basic Electrical Engineering	P	0	0	2	2	1		60	40	
8	1	PC	EE/EE	22IOT108	Programming for problem solving	T	3	0	0	3	3	30	20	50	3 Hours
9	1	PC	EE/EE	22IOT109	**Lab.:** Programming for problem solving	P	0	0	2	2	1		60	40	
					TOTAL FIRST SEM		18	1	6	24	22				

List of Mandetory Learning Course (MLC)

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	L	T	P	Hrs	Credits	MSEs*	TA**	ESE	ESE Duration Hours
1	1	BES	GE/CHE	GE2132	Environmental Science	A	2	0	0	2	0				
2	1	HS	GE/T&P	MLC2121	YCAP1-Get Set Go	A	2	0	0	2	0				

SECOND SEMESTER

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	L	T	P	Hrs	Credits	MSEs*	TA**	ESE	ESE Duration Hours
1	2	BS	GE/MTH	22IOT201	Linear Algebra	T	3	1	0	3	4	30	20	50	3 Hours
2	2	BS	GE/CHE	22IOT202	Engineering Chemistry	T	3	0	0	3	3	30	20	50	3 Hours
3	2	BS	GE/CHE	22IOT203	**Lab.:** Engineering Chemistry	P	0	0	2	2	1		60	40	
4	2	HS	GE/HUM	22IOT204	Professional Communication	T	3	0	0	3	3	30	20	50	3 Hours
5	2	BES	ME/ME	22IOT205	Engineering Graphics	T	1	0	0	1	1	30	20	50	3 Hours
6	2	BES	ME/ME	22IOT206	**Lab.:** Engineering Graphics	P	0	0	4	4	2		60	40	
7	2	PC	ME/ME	22IOT207	Fundamentals of Manufacturing Process	T	3	0	0	3	3	30	20	50	3 Hours
8	2	PC	ME/ME	22IOT208	**Lab.:** Fundamentals of Manufacturing Process	P	0	0	2	2	1		60	40	
9	2	PC	EE/EE	22IOT209	**Lab.:** Python Programming	P	0	0	2	2	1		60	40	
					TOTAL SECOND SEM		13	1	10	23	19				

List of Mandetory Learning Course (MLC)

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	L	T	P	Hrs	Credits	MSEs*	TA**	ESE	ESE Duration Hours
1	2	HS	GE/T&P	MLC2122	YCAP2 -Functional English	A	2	0	0	2	0				
2	2	HS	GE/HUM	GE2131	Universal Human Value	A	2	0	0	2	0				

MSEs* = Two MSEs of 15 Marks each will conducted and marks of these 2 MSEs will be considered for Continuous Assessment

TA ** = for Theory : TA1-5 marks on Proctored Online Exam, TA2-12 marks on activitied decided by course teacher, TA3 - 3 marks on class attendance

TA** = for Practical : MSPA will be 15 marks each

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B. Tech in CSE (IoT)

I SEMESTER
22IOT101: Calculus

Course Outcomes:
Upon successful completion of the course the students will be able to
1. Apply the knowledge of differentiation, sequence and series to solve engineering problems.
2. Determine the expansion and derivatives of functions of several variables and use it to find extreme values of functions.
3. Evaluate the improper integrals, multiple integrals and apply it to compute the area and volume of various structures.
Solve higher order differential equations and its applications.

Unit:1	Differential Calculus	7 Hours
Successive differentiation; Leibnitz theorem, Taylor's and Maclaurin's series for one variable. **(Contemporary Issues related to Topic)**		

Unit:2	Limits and Continuity	6 Hours
Functions of several variables, Limit of function of two variables, theorem of limit, simultaneous limits by changing to polar coordinates. Continuity of function of two variables. **(Contemporary Issues related to Topic)**		

Unit:3	Partial Differentiation	7 Hours
First and higher order derivatives of Functions of several variables, Euler's theorem, Chain Rule, Jacobians, Maxima and minima and saddle point of functions of two variables. **(Contemporary Issues related to Topic)**		

Unit:4	Curve Tracing and Improper Integrals	6 Hours
Tracing of curves, Beta, Gamma functions and its applications. **(Contemporary Issues related to Topic)**		

Unit:5	Multiple integrals and their Applications	7 Hours
Elementary double integrals, Change of variables (simple transformations), Coordinate Transformation, Change of order of integration (Cartesian and polar), Elementary triple integrals and Applications to find area, volume. **(Contemporary Issues related to Topic)**		
Unit :6	Differential Equations	6 Hours
Higher order differential equations with constant coefficients. Cauchy's and Legendre's homogeneous differential equations, Applications of differential equations. **(Contemporary Issues related to Topic)**		
	Total Lecture Hours	**39 Hours**

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Textbooks:
1.	Erwin Kreyzig, Advance Engineering Mathematics, 6th Edition, John Wiley and Sons, INC.
2.	H.K. Dass, Engineering Mathematics, 11th revised edition, S. Chand, Delhi.
3.	H.K. Dass, Advanced Engineering Mathematics, 8th revised edition, S. Chand, Delhi.
4.	Dr. B.S. Grewal, Higher Engineering Mathematics, 42th edition, Khanna Publishers.
5.	P.N.Wartikar and J.N.Wartikar, Applied Mathematics, 4th Edition, Vidyarthi GrihaPrakashan.

Reference Books:
1.	G B Thomas and R L Finney, Calculus and Analytical Geometry, 9th edition, Addison-Wesley, 1999.
2.	Michael Spivak and Tom Apostol, Calculus, VolI & Vol II 2nd edition, Wiley.
3.	N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, 10th edition, Laxmi Prakashan.

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Applied%20Sciences%20&%20Humanities/Mathematics%20and%20Humanities/

MOOCs Links and additional reading, learning, video material
1.	https://nptel.ac.in/courses/111/106/111106146/
2.	https://nitkkr.ac.in/docs/5-Multiple%20Integrals%20and%20their%20Applications.pdf

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I SEMESTER

22IOT102: Semiconductor Physics

Course Outcomes :
Upon successful completion of the course the students will be able to
1. Correlate fundamentals of quantum mechanics to solve problems dealing with quantum particle. 2. Justify the characteristics of semiconductor materials in terms of crystal structures, charge carrier and energy band. 3. Identify the requirements of sensor material for technological application 4. Illustrate optical interactions associated with semiconductor materials for their use in the devices. 5. Analyze the electron motion in electric and magnetic field contributing to electronic display devices

Unit:1 Quantum Physics	**(6 Hrs.)**
Wave-particle duality, Electron Diffraction, Wave packet, Heisenberg uncertainty principle, thought experiment, Significance, Applications. **(Contemporary Issues related to Topic)**	
Unit II: Physics of Quantum Computing	**(7 Hrs.)**
Introduction of complex numbers, operators, eigen values, eigen functions. Wave function and its probability interpretation, Schrodinger Equation, Particle in infinite and finite potential well, quantum tunneling, Introduction to Bits and Qubits. **(Contemporary Issues related to Topic)**	
Unit III: Basics of Semiconductors	**(7 Hrs.)**
Formation of energy bands in solids, valence and conduction band, Classification, pure and doped semiconductors, law of mass action, Conduction mechanism, Direct & indirect bandgap semiconductors, Hall effect. **(Contemporary Issues related to Topic)**	
Unit IV: Sensors	**(6 Hrs.)**
Introduction, classification of sensors, performance characteristics, selection criteria,Requirement of sensor material, Role of sensors in industry, Examples: thermal, optical, pressure and acoustic sensors. **(Contemporary Issues related to Topic)**	
Unit V: Optical Interactions In Semiconductors	**(7 Hrs.)**
Introduction to optical transitions, metastable state and pumping, optical amplification, Density of states for photon, semiconductor laser, photovoltaic cell, LED. **(Contemporary Issues related to Topic)**	
Unit VI: Elements of Electronic Display	**(7 Hrs.)**
Electron motion in uniform electric and magnetic field, electron refraction, electron lens and Cathode Ray Oscilloscope. **(Contemporary Issues related to Topic)**	
	Total Lecture 40 Hours

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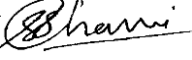
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22IoT-101

B. Tech in CSE (IoT)

Text books	
1	M. N. Avadhanulu, P. G. Kshirsagar, A Textbook of Engineering Physics, Revised 14th Edition, S. Chand & Company, 2014
2.	Hitendra K Malik , A K Singh , Engineering Physics, 2nd Edition, Tata McGraw Hill Education Private Limited, 2015

Reference Books	
1	Sanjay D Jain, Girish G Sahasrabudhe, Engineering Physics, 2nd Edition, Universities Press, 2015
2	P K Palanisamy, Engineering Physics, Revised Edition, SCITECH, 2015
3	David Halliday, Robert Resnick and Jerle Walker, Fundamentals of Physics, 10th edition, John-Wiley India, 2013
4.	Arthur Beiser, Concept of Modern Physics, 6th edition , Tata McGraw - Hill Education, 2002
5.	Subramanyam, Brijla, M N Avadhanulu, Text Book of Optics, S. Chand & Company, 2006
6.	S O Pillai, Solid State Physics, 9th edition, New Edge International Publishers, 2021
7.	M N Avadhanulu, An Introduction to Lasers: Theory & Applications, First Edition 2001, S. Chand & Company Pvt. Ltd, 2017
8.	Ajoy Ghatak, Introduction to Modern optics, 4th Edition, Tata McGraw Hill Education pvt.ltd., 2009
9	R.S.Rangan, Instrumentation Devices and systems , 2nd edition, , Tata McGraw-Hill, 1998
10.	Albert D.Helfrick and William D. Cooper , Modern Electronic Instrumentation and Measurement Techniques, 2nd edition, Prentice Hall of India, 2007

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Applied%20Sciences%20&%20Humanities/Physics/Eisberg%20&%20Resnick%20-%20Quantum%20Physics.pdf
2	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Applied%20Sciences%20&%20Humanities/Physics/2016_Book_ThePhysicsOfSemiconductors.pdf
3	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Applied%20Sciences%20&%20Humanities/Physics/Dekker%20-%20Solid%20State%20Physics.pdf

MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/112/103/112103280/
2	https://nptel.ac.in/courses/106/106/106106179/
3	https://nptel.ac.in/courses/127/105/127105007/

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I SEMESTER

22IOT103: Lab.: Semiconductor Physics

Course Outcomes
Upon successful completion of the course the students will be able to

1. Co-relate fundamentals of quantum mechanics to solve problems dealing with quantum particle.
2. Justify the characteristics of semiconductor materials in terms of crystal structures, charge carriers and energy bands.
3. Identify the requirements of sensor material for technological application.
4. Illustrate optical interactions associated with semiconductor materials for their use in the devices.
5. Analyze the electron motion in electric and magnetic field contributing to electronic display devices.

Minimum Eight Practical's to be performed from the list as below

SN	Experiments based on
1.	Determination of Hall coefficient and density of charge carriers using Hall effect
2.	Dependence of Hall coefficient on temperature.
3.	The study V-I characteristics of a semiconductor diode (germanium and silicon) in forward and reverse bias mode.
4.	Determination of Band gap in a semiconductor by four probe method.
5.	Determination of Band gap in a semiconductor using reverse biased p-n diode .
6.	Study of V-I characteristics of Zener diode.
7.	Determination of the velocity of Ultrasonic waves in a non –electrolytic liquid by ultrasonic interferometer.
8.	Determination of wavelength of laser using diffraction grating.
9.	Study of V-I characteristics of LED.
10.	Determination of divergence of laser beam.
11.	Determination of amplitude and frequency of sinusoidal signal using C.R.O.
12.	To measure the phase shift introduced by a phase shift network using Dual beam CRO.

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I SEMESTER
22IOT104: Social Science

Course Outcomes
Upon successful completion of the course the students will be able to
1. Explain the basic concepts of the Constitution of India.
2. Describe the various Fundamental rights
3. Analyze the Impact of federalism on the State
4. Explain Industrial Law and Judiciary.

Unit I: Origin and Meaning	**(6 Hrs.)**
Origin of history of Constitution, Meaning of the constitution law and constitutionalism, Kingship and Republic States in Ancient India **(Contemporary Issues related to Topic)**	

Unit II: Concept of the Constitution of India	**(6 Hrs.)**
Preamble, The union and its territory, Citizenship **(Contemporary Issues related to Topic)**	

Unit III: Federalism	**(6 Hrs.)**
Salient features of Federalism, Structures and features of Indian Federalism, Panchayat Raj System **(Contemporary Issues related to Topic)**	

Unit IV:Fundamental Rights	**(7 Hrs.)**
Scheme of the Fundamental rights, duties, Scheme of the Fundamental Right to Equality, The scheme of the Fundamental Duties and its legal status **(Contemporary Issues related to Topic)**	

Unit V: Legislative Power	**(7 Hrs.)**
Federal structure and distribution of legislative, Financial power between the Union and the States, Parliamentary Form of Government in India – The constitution power and status of the President of India **(Contemporary Issues related to Topic)**	

Unit VI: Challenges to Indian Political Systems	**(7 Hrs.)**
The Executive, Directive principles of State Policy, The Union Judiciary **(Contemporary Issues related to Topic)**	

	Total Lecture	**39 Hours**

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Textbooks:
1.	Dr. G. N. Nimbarte, Social Science, Sankalp Publications, Nagpur.

Reference Books:
1.	Constitution of India: Dr B. R. Ambedkar: Government of India, Government of India.
2.	An Introduction to the Constitution of India,24th Edition, Basu, D.D (2005), New Delhi Prentice Hall
3.	Working of a Democratic Constitution of India,2nd Edition, G. Austin (2004), New Delhi: Oxford University press
4.	State and Government in Ancient India, 7th Edition, A.S. Altekar (2016), Motilal Banarsidass Publishing House New Delhi.
5.	Understanding Contemporary India: Critical Perspectives, 1st Edition, A. Vanaik and R. Bharghava (eds) (2010), New Delhi: Orient Blackswan

MOOCs Links and additional reading, learning, video material
1.	https://mobidrive.com/sharelink/r/4I2bDsxN9YrVI03vMZaInJ5VBpojBmR9EqKv7nin9pkN
2.	https://mobidrive.com/sharelink/r/4I2bDsxN9YrVI03vMZaInJ2sUn37wK4V3CpGhemYRKnz

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B. Tech in CSE (IoT)

I SEMESTER

22IOT105: Basic Electronics Engineering

Course Outcomes:
Upon successful completion of the course the students will be able to
1. Understand, define and explain the fundamental concepts of Digital & Analog Electronic Circuits , Sensors and Measurements.
2. Apply the concepts of Digital & Analog Electronic Circuits, Sensors and Measurements to obtain the desired parameter.
3. Analyze Digital & Analog Electronic Circuits to arrive at suitable Conclusions.
4. Design simple circuits using fundamentals of digital and analog electronic circuit for given application.

Unit:1	Number Systems and Codes	7 Hours
Number System & their conversions, Codes- BCD code, Excess-3 Code, Gray Code & ASCII Code, BCD arithmetic, Binary Arithmetic operations.		
(Contemporary Issues related to Topic)		
Unit:2	Digital Principles	7 Hours
Binary Number representation- Sign-magnitude Numbers, 1's & 2's Complement, 2's Complement Arithmetic. The Basic Gates, Universal Logic Gates, Exclusive Gates, Boolean Laws & Algebras, Demorgans theorem, Sum of Product & Product of Sum.		
(Contemporary Issues related to Topic)		
Unit:3	Logic Design	7 Hours
Combinational Logic- Introduction to logic minimization using K-map (limited upto 3-variable only), Half & Full Adder, Half & Full Subtractor, Sequential Circuits – Introduction to Flip-flops.		
(Contemporary Issues related to Topic)		
Unit:4	Diode and its Applications	6 Hours
Characteristics of materials based on Energy band theory, Intrinsic and extrinsic semiconductors, P-N junction diodes, Biasing & Characteristics of diodes. Diode Circuits - Half wave rectifier, full wave rectifier, bridge rectifier		
(Contemporary Issues related to Topic)		
Unit:5	BJT & its application	7 Hours
Introduction to BJT- NPN and PNP, biasing, Modes of operation, Configuration and its Characteristics.		
(Contemporary Issues related to Topic)		
Unit :6	OPAMP and its application	7 Hours
Introduction to Op-Amp, Inverting and Non-Inverting Amplifier, Linear Applications of OP-AMP, Comparator.		
(Contemporary Issues related to Topic)		
Total LectureHours		**39 Hours**

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Textbooks	
1	Modern Digital Electronics, Fourth edition 2009, R. P. Jain ,McGraw Hill Education
2	Electronics Devices and circuits, Fourth Edition (2015), Millman Jacob, McGraw Hill Education

Reference Books	
1	OP-AMP and Linear Integrated Circuit, by Ramakant A. Gayakwad, Prentice Hall India Learnin Private Limited, Published in 2002

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://link.springer.com/openurl?genre=book&amp;isbn=978-1-4613-6193-0\
2	https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042

MOOCs Links and additional reading, learning, video material	
1	https://onlinecourses.nptel.ac.in/noc22_ee113/preview

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B. Tech in CSE (IoT)

I SEMESTER
22IOT106: Basic Electrical Engineering

Course Outcomes:
Upon successful completion of the course the students will be able to
1. Reproduce fundamentals of dc circuits.
2. Explain, construction, working and applications of various electrical machines.
3. Analyze performance of various electrical machines.

Unit:1	**D.C. Circuits**	**7 Hours**

D.C. Circuits: Basics of electrical circuits. Equivalent resistance, Kirchhoff's Laws. Current and Voltage division rule. Mesh and Nodal analysis of dc circuits. Superposition Theorem.
(Contemporary Issues related to Topic)

Unit:2	**AC Circuits**	**7 Hours**

A.C. Fundamentals: Values of alternating quantity. Concept of power factor, reactive power and apparent power with power triangle,R,L,C Series circuit and Parallel circuit,Resonance condition.
(Contemporary Issues related to Topic)

Unit:3	**Three Phase AC Circuits**	**7 Hours**

Advantages of three – phase system over single – phase system. Generation of three phase a.c. supply. Phase sequence. Interconnection of three phases.
Star or Wye (Y) connection. Phase and line voltages/currents in star connection and their relationships.
Delta or Mesh connection. Phase and line voltages/currents in delta connection and their relationships.
Concept of balanced load. Active, reactive, and apparent power in balanced three phase circuits.
(Contemporary Issues related to Topic)

Unit:4	**Single Phase Transformer**	**6 Hours**

Working principle. EMF equation. Voltage ratio and turns ratio. Step up and step down transformers. Construction of single phase transformer. Ideal transformer. Transformer on no load and equivalent circuit. Practical transformer and its equivalent circuit. Referred values. Voltage Regulation. Losses in transformer. Open circuit and Short circuit tests on transformer. Efficiency and condition for maximum efficiency.
(Contemporary Issues related to Topic)

Unit:5	**DC Motor**	**7 Hours**

Principle, Torque Equation, Characteristics and applications of various types of D.C. Motors, Starting of D.C. Motors, Speed control of Series and Shunt motors, Power flow in DC machines, Losses and Efficiency in D.C. machines.
(Contemporary Issues related to Topic)

Unit :6	**Three Phase Induction Motor**	**7 Hours**

Construction, Production of rotating magnetic field. Principle of operation. Speed and slip. Frequency of rotor voltage and current. Applications of three phase induction motor.
(Contemporary Issues related to Topic)

	Total Lecture Hours	**39 Hours**

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22IoT-101

Text books	
1	T. K. Nagsarkar and M. S. Sukhija, Basic Electrical Engineering, 1st Edition, Oxford Higher Education, 2005
2	V. N. Mittle and A. K. Mittal, Basic Electrical Engineering, 2nd Edition,2006, The McGraw Hill Companies, New Delhi
3	B.L.Theraja, Electrical Technology, S.Chand, 2005
4	T. Kenjo and S. Nugatory, Permanent Magnet and Brushless DC motors, England, Clarendon Oxford Press, 1989

Reference Books	
1	I J Nagrath and D. P.Kothari, Basic Electrical Engineering, 2nd Edition,2002, McGraw Hill, New Delhi
2	Vincent Del Toro, Electrical Engineering Fundamentals, 2nd Edition,2002, Prentice Hall India, New Delhi

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://link.springer.com/openurl?genre=book&isbn=978-3-642-25904-3
2	http://link.springer.com/openurl?genre=book&isbn=978-1-4614-0399-9

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1	https://nptel.ac.in/courses/108105155
2	https://nptel.ac.in/courses/108105155
3	https://nptel.ac.in/courses/108105155

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I SEMESTER
22IOT107: Lab: Basic Electrical Engineering

Course Outcomes:
After completion of the laboratory work, student will demonstrate the ability to
1. Perform laboratory experiments and demonstrate competency in collecting, interpreting, analyzing data, communicate and present effectively through laboratory journals.

Sr. No.	Experiments based on
1	To verify Superposition theorem.
2	To perform O.C. and S.C. tests on a single-phase transformer.
3	To find transformation ratio, regulation and efficiency of a single-phase transformer by direct loading.
4	To study R-L-C Series circuit
5	To study R-L-C Parallel circuit
6	To study speed control of dc shunt motor.
7	To perform load test on dc shunt motor.
8	To study reversal of rotation of three phase induction motor.
9	To study direct loading of a three-phase induction motor.

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I SEMESTER
22IOT108: Programming for problem solving

Course Outcomes:
Upon successful completion of the course the students will be able to
1. Understand Programing Logic
2. Write algorithm & Draw a flow chart for a given problem
3. Design & Develop programs using different control Flow Statement.
4. Design & Develop programs using basics of Arrays, functions, pointers, structures etc.

Unit:1	Introduction to Computer	7 Hours
Introduction to computer system, Algorithms, Flowcharts, Data Representation: Number systems, character representation codes, Binary , octal, hexadecimal andtheir interconversions. Binary arithmetic, floating point arithmetic, signed and unsigned numbers, Memory storage. **(Contemporary Issues related to Topic)**		

Unit:2	Basics in C	7 Hours
History of C Language, Basic structure of C program,Concept of variables, constants and data types in C, Console IO Operations, Operators and expressions: arithmetic, relational, Logical, Increment and decrement operator, Conditional, bitwise operators, Expressions. **(Contemporary Issues related to Topic)**		

Unit:3	Control Flow Statements	7 Hours
Conditional executing using if Statement, If-else Statement, switch Statement , Unconditional Branching using goto statement, while loop and do-while loop, For loop , continue and break **(Contemporary Issues related to Topic)**		

Unit:4	Functions & Pointers	6 Hours
Functions, Passing Values between Functions , Function Declaration and Prototypes ,Call by Value and Call by Reference . Pointers, arrays and pointers , Pointers as Function Parameter, Pointer Arithmetic, Recursion. **(Contemporary Issues related to Topic)**		

Unit:5	Arrays	7 Hours
Arrays Declaration and Initialization , Sample Programs using Arrays, One dimensional array 2-D arrays. **(Contemporary Issues related to Topic)**		

Unit :6	String & Structure	7 Hours
Strings Handling, Defining C structures, Giving values to members, Array of structure, Nested structure, passing strings as arguments. **(Contemporary Issues related to Topic)**		

	Total Lecture Hours	41 Hours

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Text books	
1	**A Structured Programming Approach Using C,** Third Edition, B.A.Forouzan and R.F. Gilberg, Cengage Learning
2	The C Programming Language, 2nd edition, Brian Kernighan and Dennis Ritchie, Prentice Hall

Reference Books	
1	Let Us C, 19 Edition, Yashavant kanetkar, BPB
2	Absolute beginner's guide to C, 2 Edition, Greg M. Perry, Publisher: Sams Pub., 1994
3	Computer Programming and Data Structures, 3 Edition, E Balagurusamy, Tata McGraw Hill

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/e-copies%20of%20books/7.Information%20Technology/27.c.pdf
2	http://103.152.199.179/YCCE/DTEL%20Material/7.Information%20Technology/DTEL%20PPTs/11.ITCP_E _SSG.pdf

MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/106104128
2	https://swayam.gov.in/explorer?searchText=c%20programming

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Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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B. Tech SoE and Syllabus 2022
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B. Tech in CSE (IoT)

SoE No.
22IoT-101

I SEMESTER

22IOT109: Lab: Programming for problem solving

Course Outcomes:

Upon successful completion of the course the students will be able to
1. Understand Programing Logic
2. Write algorithm & Draw a flow chart for a given problem
3. Design & Develop programs using different control Flow Statement.
4. Design & Develop programs using basics of Arrays,functions, pointers,structures etc.

S. No	Experiments based on
1	Write a C Program to print "Welcome to Internet of Thing"
2	Write a C program to add two numbers (2 and 6) and display its sum
3	Write a C program to multiply two numbers (4 and 5) and display its product.
4	Write a C Program to calculate and display the volume of a CUBE
5	Write a C program to take input of name, roll. no and marks obtained by a student in 4 subjects of 100 marks each and display the name, roll.no with percentage score secured.
6	Write a C program to swap values of two variables .
7	Write a C program to print whether a given number is even or odd.
8	Write a C program to find the largest and smallest among three entered numbers.
9	Write a C program to find whether a character is consonant or vowel
10	Write a C program to print positive integers from 1 to 10.
11	Write a C program to display the following pattern. * * * * * * * * * * * * * * *
12	Write a C program to insert 5 elements into an array and print the elements of the array.
13	Write a C program to calculate factorial of a number
14	Write a C program to find biggest among three numbers
15	Write a C program to store information of 5 students in structure and display it.

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B. Tech in CSE (IoT)

SoE No.
22IoT-101

I SEMESTER
Audit Course
GE2132: Environmental Science

Course Outcome :
Upon successful completion of the course the students will be able
1. To understand the basic concepts and problems and follow sustainable development practices
2. To enhance knowledge skills and attitude towards environment
3. To understand natural environment and its relationship with human activities.
4. To evaluate local, regional and global environmental topics related to resource use and management.

Unit I: : Introduction	**(2Hrs.)**
Definition, scope and importance; Need for public awareness – institutions in environment, people in environment.	

Unit II: : Natural Resources	**(2 Hrs.)**
Renewable and non-renewable and associated problems; Role of an individual in conservation of natural resources; Equitable use of resources for sustainable lifestyles.	

Unit III: Ecosystems	**(4 Hrs.)**
Concept of an ecosystem – understanding ecosystems, ecosystem degradation, resource utilization. Structure and functions of an ecosystem – producers, consumers and decomposers. Energy flow in the ecosystem – water, carbon, oxygen, nitrogen and energy cycles, integration of cycles in nature. Ecological succession; Food chains, food webs and ecological pyramids; Ecosystem types – characteristic features, structure and functions of forest, grassland, desert and aquatic ecosystems.	

Unit IV: Bio-diversity	**(4 Hrs.)**
Introduction – biodiversity at genetic, species and ecosystem levels Bio-geographic classification of India. Value of biodiversity – Consumptive use value, productive use value, social, ethical, moral, aesthetic and optional vlue of biodiversity. India as a mega-diversity nation; hotspots of biodiversity.Threats to bio-diversity – habitat loss, poaching of wildlife, man-wild life conflicts. Common endangered and endemic plant and animal species of India. Insitu and Exsitu conservation of biodiversity. Role of individual and institutions in prevention of pollution.Disaster management – Floods, earthquake, cyclone, landslides.	

Unit V: Pollution	**(4 Hrs.)**
Definition; Causes, effects and control measures of air, water, soil, marine, noise and thermal pollutions and nuclear hazards. Solid waste management – Causes, effects and control measures of urban and industrial waste.	

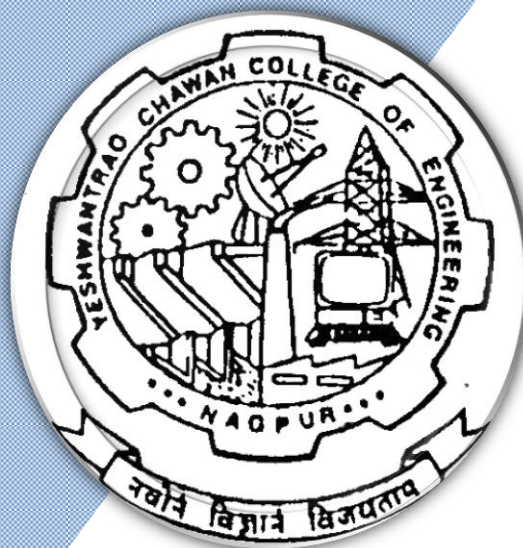|			July 2022	1.00	Applicable for
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B. Tech in CSE (IoT)

Unit VI: Social Issues and the Environment	(4 Hrs.)

Unsustainable to sustainable development; Urban problems related to energy; Water conservation, rainwater harvesting, watershed management; Problems and concerns of resettlement and rehabilitation of affected people.

Environmental ethics – issues and possible solutions – Resource consumption patterns and need for equitable utilization; Equity disparity in Western and Eastern countries; Urban and rural equity issues; need for gender equity.

Preserving resources for future generations. Te rights of animals; Ethical basis of environment education and awareness; Conservation ethics and traditional value systems of India.

Climate change, global warming, acid rain, Ozone layer depletion, nuclear accidents and holocasts.

Wasteland Reclamation; Consumerism and Waste products.

Environment legislations – The Environment (Protection) Act; The water (Prevention and Control of Pollution) Act; The Wildlife Protection Act; Forest Conservation Act; Issues involved in enforcement of environmental legislations – environment impact assessment (EIA), Citizens actions and action groups.

Public awareness – Using an environmental calendar of activities, self-initiation.

Unit VII : Human Population and the Environment	(4Hrs.)

Global population growth, variation among nations. Population explosion; Family Welfare Programmes – methods of sterilization; Urbanization.

Environment and human health – Climate and health, infectious diseases, water-related diseases, risk due to chemicals in food, Cancer and environment.

Human rights – equity, Nutrition and health rights, Intellectual property rights (IPRS), Community Biodiverstity registers (CBRs).

Value education – environmental values, valuing nature, valuing cultures, social justice, human heritage, equitable use of resources, common property resources, ecological degradation.

 HIV / AIDS; Women and Child Welfare; Information technology in environment and human health.

	Total Lecture	24 Hours

Textbooks:	
1.	Perspectives in environmental studies by A. Kaushik and C. P. Kaushik.
2.	Textbook for Environmental studies by Erach Bharucha for UGC
3.	Textbook of Environmental studies by Shanta Satyanarayan, Dr. Suresh Zade, Dr. Shashikant Sitre & Dr. Pravin Meshram.
4.	Fundamental concepts in Environmental studies by Dr. D.D. Mishra. S. Chand publications

Reference Books:	
1.	Essentials of Ecology and Environmental Science by Dr. S .V .S. Rana,PHI Learning Pvt. Ltd, Delhi
2.	Environmental Chemistry by Anil Kumar De, Wiley Eastern Limited
3.	Environmental Science by T.G. Miller, Wadsworth Publishing Co, 13th edition.
4.	Ecology and Environment by P. D. Sharma, Rastogi publications

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SoE No.
22IoT-101

B. Tech in CSE (IoT)

I SEMESTER
Audit Course
MLC2121: YCAP1-Get Set Go

Objective	Outcomes
Get Set Go program is designed to introduce students to the real world. It gives them the skills they need to reach their goals and live up to their full potential at college, home and work. The program was developed with feedback from students; it consists of interactive sessions that include real-life scenarios and role-playing. It can help young adults become more confident and better able to cope with the pressure and stress they face.	The students gain more confidence and skills required to deal with the challenges they will face in college and at home. Their interpersonal and intrapersonal skills are enhanced pushing them to think towards their future and aim for their goals.

Syllabus Subject: Communication Skills – 1st Year, No. of hours - 18

Unit No.	Topic	Duration
1	Topic: Build a foundation for success - Explain the Importance of Process of improvement, stating your Name with Impact, Recall and Use Names, Name Remembering Formula o LIRA o PACE – Individual Activity o BRAMMS o Chaining Method, Introduce "My Vision	2.5 Hours
2	Topic: Communication Fundamentals for Building Trust- Be a good listener, use conversation links, show genuine interest Hi-Five of Success ♣ Build on Memory Skills and Enhance Relationships ♣ PEG words ♣ Explain Permanent PEG Memory System, energize our Communications – Explain 3Vs of communication – Visual-Vocal-Verbal	3.5 Hours
	Practice Conversations, Activity – Pause-Part-Punch, Group Activity	

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B. Tech in CSE (IoT)

Unit No.	Topic	Duration
3	Topic: Increase Self Confidence -• Use our experiences to communicate more confidently • Communicate with clarity and conciseness • Discover how past experiences influence behavior	2.5 Hours
4	Topic: Motivate Others and Enhance Relationships-• Learning Objectives • Explain Gain Willing Cooperation Principles • Group Presentation • Explain Demonstration of Leadership Principles • Explain "Evidence" critical in establishing credibility	4 Hours
	Individual Activity – Sharing of defining moment, Skit to demonstrate Leadership Principles, Stranded on Island	

Unit No.	Topic	Duration
5	Topic: Fundamentals of Communication (Earn the right – Excite -Eagerness) ♣ Elevator Pitch ♣ Develop more Flexibility, ♣ Recap and Summarize	3.5 Hours
6	Activities - – Individual Presentation, Flexibility Drills, Individual Presentations – My Vision Assignment	2 Hours

Reference Books:
1. How to win friends & influence people – Dale Carnegie

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Yeshwantrao Chavan College of Engineering

Bachelor of Technology

SoE & Syllabus 2022

2nd Semester

(Department of Computer Technology)

B. Tech in CSE (IoT)

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Yeshwantrao Chavan College of Engineering
(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)
B.TECH SCHEME OF EXAMINATION 2022
(Scheme of Examination w.e.f. 2022-23 onward)
(Department of Electronics Engineering)
B. Tech in CSE (IOT)

SoE No.
22CSIoT-101

FIRST SEMESTER

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	L	T	P	Hrs	Credits	MSEs*	TA**	ESE	ESE Duration Hours
1	1	BS	GE/MTH	22IOT101	Calculus	T	3	1	0	3	4	30	20	50	3 Hours
2	1	BS	GE/PHY	22IOT102	Semiconductor Physics	T	3	0	0	3	3	30	20	50	3 Hours
3	1	BS	GE/PHY	22IOT103	**Lab.:** Semiconductor Physics	P	0	0	2	2	1		60	40	
4	1	HS	GE/HUM	22IOT104	Social Science	T	3	0	0	3	3	30	20	50	3 Hours
5	1	BES	EE/EE	22IOT105	Basic Electronics Engineering	T	3	0	0	3	3	30	20	50	3 Hours
6	1	BES	EL/EL	22IOT106	Basic Electrical Engineering	T	3	0	0	3	3	30	20	50	3 Hours
7	1	BES	EL/EL	22IOT107	**Lab.:** Basic Electrical Engineering	P	0	0	2	2	1		60	40	
8	1	PC	EE/EE	22IOT108	Programming for problem solving	T	3	0	0	3	3	30	20	50	3 Hours
9	1	PC	EE/EE	22IOT109	**Lab.:** Programming for problem solving	P	0	0	2	2	1		60	40	
					TOTAL FIRST SEM		18	1	6	24	22				

List of Mandetory Learning Course (MLC)

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	L	T	P	Hrs	Credits	MSEs*	TA**	ESE	ESE Duration Hours
1	1	BES	GE/CHE	GE2132	Environmental Science	A	2	0	0	2	0				
2	1	HS	GE/T&P	MLC2121	YCAP1-Get Set Go	A	2	0	0	2	0				

SECOND SEMESTER

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	L	T	P	Hrs	Credits	MSEs*	TA**	ESE	ESE Duration Hours
1	2	BS	GE/MTH	22IOT201	Linear Algebra	T	3	1	0	3	4	30	20	50	3 Hours
2	2	BS	GE/CHE	22IOT202	Engineering Chemistry	T	3	0	0	3	3	30	20	50	3 Hours
3	2	BS	GE/CHE	22IOT203	**Lab.:** Engineering Chemistry	P	0	0	2	2	1		60	40	
4	2	HS	GE/HUM	22IOT204	Professional Communication	T	3	0	0	3	3	30	20	50	3 Hours
5	2	BES	ME/ME	22IOT205	Engineering Graphics	T	1	0	0	1	1	30	20	50	3 Hours
6	2	BES	ME/ME	22IOT206	**Lab.:** Engineering Graphics	P	0	0	4	4	2		60	40	
7	2	PC	ME/ME	22IOT207	Fundamentals of Manufacturing Process	T	3	0	0	3	3	30	20	50	3 Hours
8	2	PC	ME/ME	22IOT208	**Lab.:** Fundamentals of Manufacturing Process	P	0	0	2	2	1		60	40	
9	2	PC	EE/EE	22IOT209	**Lab.:** Python Programming	P	0	0	2	2	1		60	40	
					TOTAL SECOND SEM		13	1	10	23	19				

List of Mandetory Learning Course (MLC)

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	L	T	P	Hrs	Credits	MSEs*	TA**	ESE	ESE Duration Hours
1	2	HS	GE/T&P	MLC2122	YCAP2 -Functional English	A	2	0	0	2	0				
2	2	HS	GE/HUM	GE2131	Universal Human Value	A	2	0	0	2	0				

MSEs* = Two MSEs of 15 Marks each will conducted and marks of these 2 MSEs will be considered for Continuous Assessment

TA ** = for Theory : TA1-5 marks on Proctored Online Exam, TA2-12 marks on activitied decided by course teacher, TA3 - 3 marks on class attendance

TA** = for Practical : MSPA will be 15 marks each

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B. Tech in CSE (IoT)

SoE No.
22IoT-101

II SEMESTER
22IOT201: Linear Algebra

Course Outcomes
Upon successful completion of the course the students will be able to
1. Solve systems of linear equations using rank of matrix for engineering problems.
2. Determine eigenvalues and eigenvectors and solve eigenvalue problems.
3. Explain the concepts of vector space and subspace, span and basis.
4. Apply principles of matrix algebra to linear transformations and inner product.

Unit I: Elementary matrix operations	(6 Hrs.)
Introduction to Matrices and Determinants, Solution of Linear Equations, Cramer's rule, Inverse of a Matrix. **(Contemporary Issues related to topic)**	

Unit II: Matrix Algebra	(6 Hrs.)
Rank of a matrix, Gaussian elimination, LU Decomposition (Crout's method), Solving Systems of Linear Equations using the tools of Matrices. **(Contemporary Issues related to topic)**	

Unit III: Diagonalization of matrix	(7 Hrs.)
Eigen Values and Eigen vectors, Linear dependence and independence of Eigen Vectors, Orthogonal Eigen vector, Diagonalization of matrix, Cayley-Hamilton Theorem and Sylvester's Theorem.. **(Contemporary Issues related to topic)**	

Unit IV: Vector Space	(6 Hrs.)
Vector Space, Subspace, Sum of Sub space, linear combination, Linear dependence and independence, Span and basis, Spanning sets, Generators. **(Contemporary Issues related to topic)**	

Unit V: Linear Transformation	(7 Hrs.)
Linear transformation, Ranges and Kernel (null space) of linear transformation, Inverse of linear transformation, Algebra of linear transformation, Singular and non-singular linear transformation. **(Contemporary Issues related to topic)**	

Unit VI: Inner product Spaces	(7 Hrs.)
Inner product space and Norms, orthogonal vector, the Gram Schamidt orthogonalization Process, orthogonal compliment, Adjoint of Linear operator, Normal and self-adjoint operator, Unitary and orthogonal operator, Bilinear and Quadratic form. **(Contemporary Issues related to topic)**	

	Total Lecture	**39 Hours**

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B. Tech in CSE (IoT)

SoE No.
22IoT-101

Textbooks:
1.	Erwin Kreyzig, Advance Engineering Mathematics, 6th Edition, John Wiley and Sons,INC, 1988
2.	Dr. B.S. Grewal , Higher Engineering Mathematics, 42th edition, Khanna Publishers, 2012
3.	Hoffman and Kunze , Linear Algebra, 2nd edition, prentice Hall of India, New Delhi, 1971.
4.	Glbert Strang, Linear Algebra and its Applications, Third edition, (2017)

Reference Books:
1.	Schaum outline series, Linear Algebra, 3rd edition, Seymour Lipschutz, 2017.
2.	P.G. Bhattacharya, S.K. Jain and S.R., V. Krishnamoorthy, An introduction to linear algebra, Affiliated East West Press, New Delhi
3.	K.B.Datta , Matrix and Linear Algebra, 1st edition, Prentice Hall of India.

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
1	Chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Applied%20Sciences%20&%20Humanities/Mathematics%20and%20Humanities/LINEAR%20ALGEBRA%20-JIM%20HEFFERON.pdf

MOOCs Links and additional reading, learning, video material
1.	https://nptel.ac.in/courses/111106051
2.	https://archive.nptel.ac.in/courses/111/106/111106135/

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SoE No.
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B. Tech in CSE (IoT)

II SEMESTER
22IOT202: Engineering Chemistry

Course Outcomes:

Upon successful completion of the course the students will be able to
1. Interpret different thermodynamic functions and reaction rate.
2. Describe basic concepts of electrochemistry and apply the knowledge for energy storage devices.
3. Develop better awareness about global environmental concerns.
4. Classify advanced engineering materials in technological applications.

Unit:1	Energetics	7 Hours

Introduction, Internal energy, enthalpy, Gibb's free energy, Free energy change and chemical equilibrium. Spontaneous and non-spontaneous processes. I and II law of thermodynamics. Entropy and its significance. Numericals on Internal energy and enthalpy change. Thermodynamic applications to physical and chemical equilibrium.
(Contemporary Issues related to topic)

Unit:2	Electrochemistry	6 Hours

Introduction, metallic and electrolytic conductance, resistance, specific resistance, conductance, specific conductance, equivalent and molar conductance. Variation of conductance with dilution. Electrode and electrode potentials. Nernst Equation. Faraday's laws and Numericals. Industrial applications: Electroforming, Electrowinning, Electrolytic refining.
(Contemporary Issues related to topic)

Unit:3	Energy storage devices	6 Hours

Basic concepts: Primary and secondary battery. Energy density, power density, energy efficiency, cycle life, shelf life. Secondary battery: Ni-metal hydride battery, Lithium-ion battery. H_2-O_2 Fuel cell: Principle, working, advantages, disadvantages, applications. Differences between battery and a fuel cell. Supercapacitors: Definition, types, characteristics and application.
(Contemporary Issues related to topic)

Unit:4	Chemical Kinetics	6 Hours

Introduction, Rate of reaction and factors influencing rate of reaction, order & molecularity of reaction. Kinetic equations of different orders: Zero Order, First Order, Second Order and numericals.
(Contemporary Issues related to topic)

Unit:5	Industrial pollution, its impacts on environment and control	7 Hours

Introduction: Industrial pollution and its types. Sources of pollution in electronic industries. Hazardous waste management. Battery waste management. e-waste pollution, its impact on environment , rules of regeneration of e-waste recycling and its managements as per government norms. **(Contemporary Issues related to topic)**

Unit :6	Advanced Materials	7 Hours

Nanomaterials: Definition of nanomaterials, nano scale. Carbon Nanotubes and types.
Application of Nanomaterials: Applications of nanomaterials in medicine, environment, and electronics. Nanotechnology for waste reduction and improved energy efficiency. Threats of Nanomaterials.
Silicon Chips: Introduction. Physical, chemical, electrical & mechanical properties and applications.
Polymers in electronic industries: Piezo, pyroelectric, Ferroelectric polymers.
(Contemporary Issues related to topic)

	Total Lecture Hours	39 Hours

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22IoT-101

B. Tech in CSE (IoT)

Text books	
1	S S. Dara , A Textbook of Engineering Chemistry, 11th Edition, S.Chand & Co New Delhi.
2	Jain & Jain , Engineering Chemistry , 16th Edition , Dhanpat Rai & sons New Delhi.
3	P. W. Atkins, Physical Chemistry , 08th Edition , Oxford Publications.
4	B.Sivasankar , Engineering Chemistry , Tata McGraw-Hill

Reference Books	
1	Lloyd A.Munro , Chemistry in Engineering , Prentice-hall.
2	CNR Rao , Chemistry of Advanced Materials , RSC Publications
3	William C. O'Mara, Robert B. Herring , Handbook of Semiconductor Silicon Technology , 1st Edition. NOYES PUBLICATIONS I "P I Park Ridge, New Jersey. USA.
4	B.K.Sharma , Engineering Chemistry , Krishna Prakashan media private LTD

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1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/SERIES%20WISE%20BOOKS/CHEMISTRY/

MOOCs Links and additional reading, learning, video material	
1	Silicon Chips: What are Computer Chips Made Of? https://www.intel.com/content/www/us/en/history/museum-making-silicon.html
2	What is silicon, and why are computer chips made from it? https://www.extremetech.com/extreme/208501-what-is-silicon-and-why-are-computer-chips- made-from it

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B. Tech in CSE (IoT)

SoE No.
22IoT-101

II SEMESTER

22IOT203: Lab: Engineering Chemistry

Course Outcomes
Upon successful completion of the course the students will be able to
1.Illustrate different thermodynamic functions and chemical reaction rates. (L3).
2. Apply concepts of electrochemistry for energy storage devices. (L3).
3. Develop better awareness about global environmental concerns. (L2).
4. Establish insight into engineering materials(L2).

Total 10 experiments are to be performed
(4 each from Phase I and Phase II and two demonstration experiments)

SN	Experiments based on
	List of Experiments-Phase I
1	Determination of total hardness of water sample.
2	Determination of alkalinity present in the water sample.
3	Estimation of Fe^{2+} ions by redox titration
4	Determination of copper by iodometric titration
5	Estimation of Nickel.
6	To determine the strength of a given potassium dichromate solution with N/20 sodium thiosulphate solution
7	Determination of COD of water sample.
8	Synthesis of polyaniline.
9	Determination of rate of the reaction of hydrolysis of ethyl acetate at room temperature and analysis of experimental data using Computational Software.
	List of Experiments-Phase II
1	Determination of viscosity of lubricating oil by Redwood Viscometer I or II
2	Determination of Cation exchange capacity of an ion exchange resin
3	Determination of molecular weight of a polymer.
4	Oil Testing for Flash Point / Cloud Point/Pour Point/Aniline Point
5	Proximate analysis of coal
6	Determination of surface tension of liquids using stalagmometer.
7	Determination of electrochemical equivalence of Copper using Faradays Law
8	To determine the heat of solution of potassium nitrate calorimetrically.
9	Determination of conductivity of water sample by conductivity meter.
10.	To verify Beer-Lambert law for KMnO4 and determine the concentration of the given solution of KMnO4

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	List of Demonstration Experiments
1	Determination of pH of water sample by pH meter
2	Synthesis of urea formaldehyde resin.
3	Determination of consistency of grease sample by using penetrometer
4	Determination of Drop Point of grease sample by using penetrometer

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II SEMESTER
22IOT204: Professional Communication

Course Outcomes :
Upon successful completion of the course the students will be able to
1. Apply different modes for effective communication.
2. Use competently phonology of English language.
3. Apply nuances of LSRW skills.
4. Communicate through different channels.

Unit I: Basics of Communication	(7 Hrs.)
Language as a tool of communication & characteristics of language Process of Communication, Levels of Communication, Flow of Communication, Networks of Communication, Classification of Barriers (Intrapersonal, Interpersonal, Organizational). **(Contemporary Issues related to topic)**	

Unit II: English Phonetics	(6 Hrs.)
Speech Mechanism, Organs of speech, Consonant and Vowels sounds, Word stress rules. **(Contemporary Issues related to topic)**	

Unit III: Presentation & Visual Communication	(7 Hrs.)
Presentation and audience analysis, Organizing content, Nuances of presentation, Visual Communication – Introduction & importance, Role & Psychology of color in visual communication. **(Contemporary Issues related to topic)**	

Unit IV: Verbal Skills	(7 Hrs.)
Listening Skills -definition types and traits. Group Communication- (Purpose, Different types of Group Communication, Organizational GD, GD as a part of selection process), Meeting (purposes, preparation, procedure and minutes of meeting). **(Contemporary Issues related to topic)**	

Unit V: Interview Skills	(6 Hrs.)
Purpose, expectations of employer and preparation for Interview, Types, Types of Questions & Answering Techniques, Telephonic Interviews – preparation and guidelines, Reading Techniques (Exercise based on Complex Unseen passages. **(Contemporary Issues related to topic)**	

Unit VI: Technical Written Communication	(6 Hrs.)
Memo, Email, Report -Types, Characteristics, prewriting aspects of report and preparing writing aspects of report), Types of paragraphs.. **(Contemporary Issues related to topic)**	

	Total Lecture	**39 Hours**

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Textbooks:
1.	Raman & Sharma, Technical Communication, Oxford University Press.
2.	T. Balasubramaniam, Textbook of English Phonetics for Indian Students, Macmillan India Ltd.

Reference Books:
1.	Public Speaking, Dale Carnegie, How to Develop Self – Confidence & Influence People.
2.	Asha Kaul, Communication Skills.
3.	Allen Peas, Body Language.
4.	Gerson's Gerson, Technical Communication.

MOOCs Links and additional reading, learning, video material
1.	https://dl.uswr.ac.ir/bitstream/Hannan/141245/1/9781138219120.pdf
2.	https://www.pdfdrive.com/word-power-made-easy-the-complete-handbook-for-building-a-superior-vocabulary-e157841139.html
3	https://www.pdfdrive.com/improve-your-communication-skills-present-with-confidence-write-with-style-learn-skills-of-persuasion-e156963640.html
4	https://www.pdfdrive.com/21-days-of-effective-communication-everyday-habits-and-exercises-to-improve-your-communication-skills-and-social-intelligence-e158273760.html

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B. Tech in CSE (IoT)

II SEMESTER
22IOT205: Engineering Graphics

Course Outcomes :

Upon successful completion of the course the students will be able to

1. Construct orthographic drawing and isometric drawing of a given object
2. Evaluate Projections of various One Dimensional, Two dimensional, Three dimensional objects
3. Develop the lateral surfaces of various solids, their section and intersection**.**
4. Practice the use of software tools used for Two dimensional drawings.

Unit I: Theory of Orthographic Projections:	**(3 Hrs.)**
Introduction, Quadrant system, Theory of orthographic projection, Projection method and principal planes, First and Third angle projections. **(Contemporary Issues related to Topic)**	
Unit II: Theory of Isometric Projections:	**(2 Hrs.)**
Theory of isometric projection, Method for drawing isometric views, Different problems on isometric projections. **(Contemporary Issues related to Topic)**	
Unit III: Lines:	**(2 Hrs.)**
Projection of points, Projection of lines, True lengths and inclinations, apparent lengths and inclinations, various positions of lines in different quadrants, Traces of lines, projection of line on auxiliary plane. **(Contemporary Issues related to Topic)**	
Unit IV: Planes and Solids:	**(4 Hrs.)**
Projection planes: (Polygonal Lamina, Circular Lamina), Projection of Perpendicular planes and oblique planes. Auxiliary views (Auxiliary planes) Projection of Solids :(Inclined to One Plane Only) - Polyhedra (Regular and Irregular Polyhedra), Solids of Revolution. **(Contemporary Issues related to Topic)**	
Unit V: Section of Solids and Development of Surfaces:	**(2 Hrs.)**
Types of Section planes, Sectional top view, True shape. Development of different solids using Radial line and parallel line methods. **(Contemporary Issues related to Topic)**	
Unit VI: Intersection of Surfaces of solids:	**(2 Hrs.)**
Intersection between similar solids, Intersection between dissimilar solids, Lines and Curves of Intersection. **(Contemporary Issues related to Topic)**	
Total Lecture	**15 Hours**

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Textbooks:

1.	D.M. Kulkarni, A. P. Rastogi and A. K. Sarkar , Engineering Graphics with AutoCAD PHI learning Pvt. Ltd., Revised Edition(2014),
2.	N. D. Bhatt ,Engineering Drawing Charotar Publishing House Pvt. Ltd, 53 rd Edition 2017

Reference Books:
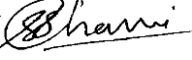
1.	D. A. Jolhe Engineering Drawing , Tata McGraw Hill Publications , 2008,
2.	K. L. Narayana & P. Kannaiah , Engineering Drawing SciTech Publication , 2010
3.	R. K. Dhawan Engineering Drawing S. Chand Publication Multicolor revised edition 2015

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]

1	Intranet on address 172.16.1.10. data/CCC/software / AutoCAD Software Setup.

MOOCs Links and additional reading, learning, video material

1.	https://youtube.com/playlist?list=PLLy_2iUCG87Bw9XPfEF3r3EW5UlAOv8iz
2.	https://nptel.ac.in/courses/112105294

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II SEMESTER
22IOT206: Lab: Engineering Graphics

Course Outcomes
Upon successful completion of the course the students will be able to
1. Construct orthographic drawing and isometric drawing of a given object
2. Evaluate Projections of various One Dimensional, Two dimensional, Three dimensional objects
3. Develop the lateral surfaces of various solids, their section and intersection**.**
4. Practice the use of software tools used for Two dimensional drawings.

Practical's to be performed from the list as below

SN	Experiments based on	No.of Practical's
1	Introduction of AutoCAD Basic Commands	02
2	Orthographic Projection	03
3	Isometric Projection	03
4	Projection of Straight Line	03
5	Projection of Planar Surface	03
6	Projection of Solid	03
7	Section and Development of Solid	04
8	Intersection of Surfaces	03
9	Drawing Sheet 1: Convention for various lines, Dimensioning and Orthographic Projection	02
10	Drawing Sheet 2: Projection of line, planar surface or solid. (Any one)	02
	Total Practical's	**28 Hours**

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B. Tech in CSE (IoT)

II SEMESTER
22IOT207: Fundamentals of Manufacturing Process

Course Outcomes:

Upon successful completion of the course the students will be able to
1. Differentiate various machining processes
2. Elaborate and classify different joining processes.
3. Illustrate the basics of moulding process and compare various casting processes
4. Discuss and analyze unconventional machining processes.

Unit:1	Introduction	8 Hours

Understanding Manufacturing, Fundamental Approaches of Manufacturing, Manufacturing Process Specific Advantages and Limitations, Materials and Manufacturing Processes, Classification of Manufacturing Processes, Selection of Manufacturing Processes, Applications of Manufacturing Processes, Effect of Manufacturing Processes on Mechanical Properties. **(Contemporary Issues related to Topic)**

Unit:2	Casting	7 Hours

Introduction and Suitability, Steps of Casting Processes, Casting: Terminology, The Pattern Allowances, Types of moulding and castings, Metal Working Processes, Sheet Metal Operations, Dies and Die sets. **(Contemporary Issues related to Topic)**

Unit:3	Joining Processes	8 Hours

Joining of metals, welding and types of welding, brazing, soldering and welding defects, weldability and welding defects. **(Contemporary Issues related to Topic)**

Unit:4	Material Removal Processes	7 Hours

Machining, types of cutting tools, Tool materials, Tool geometry, Chip Formation, Types of Chips, , tool failure and tool life, Cutting fluids. **(Contemporary Issues related to Topic)**

Unit:5	Conventional Manufacturing Machines-I	7 Hours

Construction of simple lathe, mechanism and attachments for various operations, machine specifications, basis for selection of cutting speed, feed and depth of cut, Capstan and Turret Lathe and special purpose Machines.
Shaper type, specification, types of drives in shapers
Planer: specifications, type of planner. Mechanism for planner: Driving mechanism, feeding mechanism. **(Contemporary Issues related to Topic)**

Unit :6	Conventional Manufacturing Machines-II	8 Hours

Milling specifications, types milling machine, Mechanisms and Types of milling cutters.
Grinding operations, grinding wheel, specifications & selection, Grinding operations.
Drilling machines, tools for drilling, classification of drills, twist drills, type of drilling machines. Drilling machines operations. Reaming operation, description of reamers, type of reaming operations.
Boring: types of boring machine, micro boring, boring operations.
Broaching: Introduction, type of broaches, and type of broaching machines. **(Contemporary Issues related to Topic)**

	Total Lecture Hours	45 Hours

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Textbooks	
1	Manufacturing Science , Ghosh & Malik, 2nd Edition (2010)
2	Manufacturing Technology (Foundry Forming & Welding), P N Rao, 4th Edition (2013) The McGraw-Hill Companies
3	Workshop Technology (Volume-I), Hajra Choudhary, 2nd Edition (2009),The McGraw-Hill Companies

Reference Books	
1	Manufacturing Processes, M Begman, 1st Edition, Ballinger Pub. Co
2	Processes & Materials of Manufacture, R Lindberg, 1st Edition Allyn and Bacon Technology & Engineering
3	Workshop Technology Vol. I & II, B.S. Raghuvanshi, 1st Edition, Dhanpat Rai & Sons

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6193-0
2	https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042

MOOCs Links and additional reading, learning, video material	
1	https://onlinecourses.nptel.ac.in/noc20_me67/preview
2	https://archive.nptel.ac.in/courses/112/107/112107219/
3	https://www.iare.ac.in/?q=pages/moocs-course-mech

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B. Tech in CSE (IoT)

II SEMESTER
22IOT208: Lab.: Fundamentals of Manufacturing Process

Course Outcomes:
After completion of the laboratory work, student will demonstrate the ability to

1. Differentiate various machining processes and conditions for flat surface machining
2. The student will be able to illustrate the basics of moulding practices and various casting process
3. The student will be able to Elaborate and classify different welding processes.
4. The student will be able to discuss various SMW processes

Sr. No.	Experiments based on
1	Study of Various moulding processes.
2	Study of various types of melting furnaces and cupola in detail.
3	Study of different types of wooden pattern
4	Preparation of mould making.
5	Preparation of casting job along with Study of casting processes.
6	Demonstration of working of Lathe Machine and study of its mechanism.
7	Demonstration of working of Shaper Machine and study of its mechanism
8	Demonstration of working of Milling machine and study of its mechanism.
9	Demonstration of working of Drilling machine and study of its mechanism.
10	Job making involving various operations such as MIG ,TIG welding processes etc.
11	Preparation of job on punching press
12	Report of foundry visit

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II SEMESTER
22IOT209: Lab.: Python Programming

Course Outcome: After completion of the laboratory work, student will demonstrate the ability to

Course Outcome	Statement On successful completion of this course, students should be able:	Bloom's Taxonomy Level
CO 1	To **understand** syntax and semantics of language	L1, L2
CO 2	To **understand** and **apply** the basics of the programming language	L2,L3
CO 3	To **analyse** and **apply** special language features	L3,L4
CO 4	To **evaluate** and **create** functions for any application	L5,L6

Lab Experiment List:

Expt. No.	Name of Experiments
1	Installation of IDE and write first program in Python using "variables".
2.	To understand "Data Types" of Python.
3.	To perform different operations on "Strings" in Python.
4.	To understand different "Operators" in Python.
5.	To learn and write program using "List" and "Tuple" in Python.
6.	To learn and write program using "Set" and "Dictionary" in Python.
7.	To learn and write program using Loop statements in Python.
8.	To learn "1D NumPy" of Python.
9.	To learn "2D NumPy" of Python.(Optional)
10.	To learn and write program using functions in Python.(Optional)

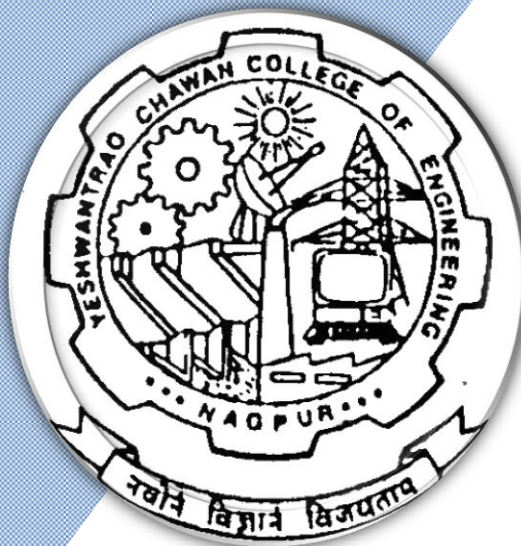|			July 2022	1.00	Applicable for
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II SEMESTER
Audit Course
MLC2122: YCAP2 -Functional English

MLC2122 YCAP-II	No of Evaluations	Result of successful completion of YCAP II shall be calculated based on the basis of evaluations.
Evaluation Scheme	EVAL-I	**To pass the exam a students must score 50% marks**
	100 marks	

Objective	Objective
The aim of this course is to get the students to a common level in spoken English. The majority of the target group is expected to know English as a foreign/official language. Thus the objective of the course is to make the students comfortable in using it as a spoken language when the situation demands	Students will heighten their awareness of correct usage of English grammar in writing and speaking.

Syllabus Subject: Functional English – 2nd Sem , No. of hours - 20

Unit No.	Topic	Duration
1	Introduction to Functional English - What is FE? And Areas of application. Basic Interactive sentences - Greetings & Replies, Asking for information, Telling people what you do, Asking somebody's opinion, Giving your opinion, Saying someone is correct, Saying that someone is wrong, Apologizing, Praising someone's work, Saying goodbye	2 hours
2	Introduction & Basics of Common Expressions – Offer, Request, Gratitude, Apology Modal Verbs - Words used often : Can- could, Will – would, Shall – should, Ought to-Must, May-might	2 hours
	Practice exercises, Practice Conversations, Script Activity	1.5 Hours
	Quiz on the above Topics, Exercises for Evaluation	0.5 Hours

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Unit No.	Topic	Duration
3	Topic: Internet & Social Media Communication Introduction & Basics to Social Networking, Texting & Instant messaging, Blogs & Discussion Board- discussion with examples, Ethics of Social media & communication	3 Hours
	Topic: Introduction to Creative Ads Why Ads, Whats in it for me?, Characteristics of ads, Assignment	
4	Topic: Tenses -1 Introduction & Basics, Simple Tense (Past, Present, Future), Continuous Tense (Past, Present, Future) – discussion with examples	4 Hours
	Assignment Presentation on Mad Ads, Quiz on Tenses and Social Media-Internet Communication	

Unit No.	Topic	Duration
5	Topic: Tenses -2 Introduction & Basics, Perfect Tense (Past, Present, Future), Perfect Continuous Tense (Past, Present, Future) – discussion with examples	3.5 Hours
	Topic: Introduction to Movie Magic Learn English with films, Film Vocabulary, Describing a film, Types of Films,	
6	Topic: Written Communciation Introduction & Basics of Writing, Five methods of communication, Mind your grammar, Commonly confusing words Letters – Format, Parts of a business letter, When does communication fail?, Things to remember, Positive language not negative language, Active voice not passive voice Effective emailing -How to make an effective e-mail, Few common e-mail habits that cause problems, Parts of an e-mail, Some other important aspects	3.5 Hours
	Assessment – Letter and Email Writing, Tenses - Quiz	

Reference Books:	
1.	Soft Skills and Professional Communication, Francis Peters SJ, Mcgraw Hill Education
2.	Bringing out the best in People, Aubrey Daniels, Mcgraw Hill

MOOCs Links and additional reading, learning, video material	
1.	https://www.youtube.com/channel/UCLsI5-B3rIr27hmKqE8hi4w
2.	https://www.youtube.com/channel/UC1Y1I4shF84scQ4HBThahcg

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II SEMESTER
Audit Course
GE2131: Universal Human Value

Course Outcomes
Upon successful completion of the course the students will be able to   1.Experiential validation through the way to verify right or wrong.   2. Practice living in harmony with natural acceptance.   3. Realize the importance of relationships**.**   4. Recognize the importance of sustainable co-existence in existence.

Unit I: Course Introduction Need, Basic Guidelines, Content and Process for Value Education	**(4 Hrs.)**
Understanding the need, basic guidelines, content and process for Value Education Self Exploration–what is it? - its content and process; 'Natural Acceptance' and Experiential Validation- as the mechanism for self-exploration Continuous Happiness and Prosperity- A look at basic Human Aspirations	
Unit II: Understanding Harmony in the Human Being - Harmony in Myself!	**(4 Hrs.)**
Understanding human being as a co-existence of the sentient 'I' and the material 'Body' Understanding the needs of Self ('I') and 'Body' Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer) Understanding the characteristics and activities of 'I' and harmony in 'I'	
Unit III: Understanding Harmony in the Family	**(4 Hrs.)**
Understanding Harmony in the family – the basic unit of human interaction Understanding values in human-human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship Understanding the meaning of Vishwas; Difference between intention and competence Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship	
Unit IV: Understanding Harmony in the Society-	**(4 Hrs.)**
Difference between intention and competence, Understanding the meaning of Samman, Difference between respect and ,differentiation; the other salient values in relationship ,Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sahasttva as comprehensive Human Goals,Visualizing a universal harmonious order in society- Undivided Society (Akhand Samaj), Universal Order (Sarvabhauma Vyavastha)- from family to world family! ,Practice Exercises and Case Studies will be taken up in Practice Sessions	

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Unit V: Understanding Harmony in the Nature -	**(4Hrs)**
Whole existence as Co-existence, Understanding the harmony in the Nature Interconnectedness and mut Practice Exercises and Case Studies will be taken up in the Practice Sessions.ual fulfillment among the four orders of nature- recyclability and self-regulation in nature, Practice Exercises and Case Studies will be taken up in the Practice Sessions.	
Unit VI :Understanding Harmony in the Existence -	**(4Hrs)**
Understanding Existence as Coexistence (Sah-astitva) of mutually interacting units in all-pervasive space, Holistic perception of harmony at all levels of existence ,Practice Exercises and Case Studies will be taken up in the Practice Sessions.	

Total Lecture	**24 Hours**

Textbooks:	
1.	**The primary resource material for teaching this course consists of text book** A foundation course in Human Values and professional Ethics, Excel books, 1st Edition 2011, R.R Gaur, R Sangal, G P Bagaria

Reference Books:	
1.	**The teacher's manual** A foundation course in Human Values and professional Ethics, Excel books,1st Edition 2011, R.R Gaur, R Sangal, G P Bagaria

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Bachelor of Technology
SoE & Syllabus 2022
3rd Semester

(Department of Computer Technology)
B. Tech in CSE (IoT)

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Yeshwantrao Chavan College of Engineering
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B.TECH SCHEME OF EXAMINATION 2022
(Scheme of Examination w.e.f. 2022-23 onward)
(Department of Electronics Engineering)
B. Tech in CSE (IOT)

SoE No.
22CSIoT-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
					Third Semester										
1	3	BS	GE/GE	22IoT301	Probability Theory and Sampling Theory	T	3	0	0	3	3	30	20	50	3 Hours
2	3	HS	GE/HUM	22IoT302	Fundamentals of Management and Economics	T	3	0	0	3	3	30	20	50	3 Hours
3	3	PC	EE/EE	22IoT303	Digital Logic Design	T	3	0	0	3	3	30	20	50	3 Hours
4	3	PC	EE/EE	22IoT304	**Lab. :** Digital Logic Design	P	0	0	2	2	1		60	40	
5	3	PC	EE/EE	22IoT305	Analog Circuits	T	3	0	0	3	3	30	20	50	3 Hours
6	3	PC	EE/EE	22IoT306	**Lab.:** Analog Circuits	P	0	0	2	2	1		60	40	
7	3	PC	EE/EE	22IoT307	Data Structures	T	3	0	0	3	3	30	20	50	3 Hours
8	3	PC	EE/EE	22IoT308	**Lab.:** Data Structures	P	0	0	2	2	1		60	40	
9	3	PC	EE/EE	22IoT309	Sensor and actuators	T	3	1	0	3	3	30	20	50	3 Hours
					TOTAL THIRD SEM		18	1	6	24	21				

List of Mandatory Learning Course (MLC)

1	3	HS	T&P	MLC2123	YCCE Communication Aptitude Preparation (YCAP3)	A	3	0	0	3	0				
2	3	BES	IoT	MLC117	Arduino Programming	A	2	0	0	2	0				

					Fourth Semester										
1	4	PC	EE/CT	22IoT401	Database Management System	T	3	0	0	3	3	30	20	50	3 Hours
2	4	PC	EE/CT	22IoT402	**Lab.:** Database Management System	P	0	0	2	2	1		60	40	
3	4	PC	EE/CT	22IoT403	Object Oriented Programming using JAVA	T	3	0	0	3	3	30	20	50	3 Hours
4	4	PC	EE/CT	22IoT404	**Lab.:** Object Oriented Programming using JAVA	P	0	0	2	2	1		60	40	
5	4	PC	EE/ME	22IoT405	Mechatronics	T	3	0	0	3	3	30	20	50	3 Hours
6	4	PC	EE/ME	22IoT406	**Lab.:** Mechatronics	P	0	0	2	2	1		60	40	
7	4	PC	EE/EE	22IoT407	Microcontroller & its Applications	T	3	0	0	3	3	30	20	50	3 Hours
8	4	PC	EE/EE	22IoT408	**Lab.:** Microcontroller & its Applications	P	0	0	2	2	1		60	40	
9	4	PC	EE/EE	22IoT409	Computer Architecture Organization	T	3	0	0	3	3	30	20	50	3 Hours
10	4	PC	EE/EE	22IoT410	**Lab.:** Electronics Workshop	P	0	0	2	2	1		60	40	
11	4	PC	CV/EE	22IoT411	Environmental Sustainability, Pollution and Management	T	3	0	0	3	3	30	20	50	3 Hrs
					TOTAL FOURTH SEM		18	0	10	28	23				

List of Mandatory Learning Course (MLC)

1	4	HS	T&P	MLC2124	YCCE Communication Aptitude Preparation (YCAP4)	A	3	0	0	3	0				
2	4	BES	IoT	MLC118	Matlab Programming	A	2	0	0	2	0				

MSEs* = Two MSEs of 15 Marks each will conducted and marks of of these 2 MSEs will be considered for Continuous Assessment
TA ** = for Theory : 12 marks on lecture quizzes, 12 marks on two TA2 activitied decided by course teacher, 2 marks on class attendance and 4 marks on TA4 activities
TA** = for Practical : MSPA will be 15 marks each

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SoE No.
22IoT-101

III SEMESTER
22IOT301: Probability Theory and Sampling Theory

Course Outcomes
Upon successful completion of the course the students will be able to
1. Identify an appropriate probability distribution for a given discrete or continuous random variable and compute probabilities.
2. Use probability distributions to solve a given problem
3. Apply concepts of sampling theory to find probabilities and estimates parameters of various problems.
4. Test the hypothesis and estimate confidence intervals at different levels.

Unit:1	Random Variables and Probability Distributions	7 Hours
Conditional probability, Baye's theorem. Discrete and Continuous random variables, Probability function and Distribution function, Joint distributions. Independent Random variables, Conditional Distribution. **(Contemporary Issues related to Topic)**		

Unit:2	Mathematical Expectation	6 Hours
Mathematical Expectation, Variance and Standard Deviation, Moments, Moment generating function, Skewness and Kurtosis. **(Contemporary Issues related to Topic)**		

Unit:3	Special Probability Distributions	7 Hours
Binomial, Geometric, Poisson, Exponential, Normal, Central Limit theorem. **(Contemporary Issues related to Topic)**		

Unit:4	Sampling Theory	7 Hours
Population and sample. Statistical inference. Sampling with and without replacement. Random samples, population parameters, sample statistics. Sampling distribution of means (known and unknown). Sampling distribution of proportions. **(Contemporary Issues related to Topic)**		

Unit:5	Estimation	6 Hours
Unbiased and efficient estimates. Point estimates and interval estimates. Confidence interval for means, Confidence interval for proportions, Confidence interval for differences and sums of mean and proportions. **(Contemporary Issues related to Topic)**		

Unit :6	Hypothesis Testing	6 Hours
Definition of hypothesis, Testing of hypothesis for large samples using normal distributions. Testing of hypothesis for small distributions (student's t-test, F-test). Goodness of fit test (Chi-square distribution). **(Contemporary Issues related to Topic)**		

	Total Lecture Hours	**39 Hours**

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Text books
1	M. R. Spiegel, The theory and problems of probability and Statistics, 3rd edition, Schaum series. (McGraw Hill)
2	Michael J. Evans and Jeffrey S. Rosenthal, Probability and Statistics, 2nd edition, W. H. Freeman publisher, 2009

Reference Books
1	S. C.Gupta and V.K.Kapoor , Fundamentals of Mathematical statistics, 10th Edition, Sultan chand and son, 2001.
2	G Balaji, Probability and Statistics, 15th edition, G Balaji publisher, 2017

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
1	https://www.springer.com/series/692
2	https://www.springer.com/series/14353

MOOCs Links and additional reading, learning, video material
1	https://nptel.ac.in/courses/117/105/117105085/
2	https://nptel.ac.in/courses/111/104/111104032/
3	https://nptel.ac.in/courses/111/105/111105043/

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III SEMESTER
22IOT302: Fundamentals of Management and Economics

Course Outcomes
Upon successful completion of the course the students will be able to
1. Explain the Functions of Management and identify tools and techniques of Marketing of goods and services
2. Analyze the role of Financial Accountancy and Management in the Organization
3. Develop perspective about economy based on logical reasoning and estimate the economic outcomes.
4. Interprets comparative advantage of resources.

Unit:1	Principles of Management	7 Hours
Evolution of Management Thought: Scientific and Administrative Theory of Management, Definition and Concept of Management, Functions of Management: Planning, Organizing, Directing, Coordinating and Controlling, Motivational Theories, Concept of Leadership **(Contemporary Issues related to Topic)**		

Unit:2	Marketing Management	7 Hours
Marketing Management - Definition & scope, Selling & Modern Concepts of Marketing, Market Research, Customer Behaviors, Product Launching, Sales Promotion, Pricing, Channels of Distribution, Advertising, Market Segmentation, Marketing Mix, Positioning, Targeting **(Contemporary Issues related to Topic)**		

Unit:3	Financial Accountancy and Management	7 Hours
Definition & Functions of Finance department, Sources of finance, Types of capital, Types of Taxes, Introduction of Accountancy and its rules, Preparation of Books of Account- Jounal, Posting of transaction into ledger and preparation of trial balance, Introduction of trading account, profit and loss account and balance sheet **(Contemporary Issues related to Topic)**		

Unit:4	Introduction to Economics and engineering Economy:	6 Hours
Economics and engineering economy, Utility analysis- Cardinal, ordinal, Law of diminishing marginal utility, Laws of demand and supply, elasticity of demand, its measurement and application. **(Contemporary Issues related to Topic)**		

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Unit:5	Engineering Production and Costs	7 Hours

Factors of Production: Land, Labour, Capital, Enterprise and their peculiarities, Concepts and types of costs, Law of Variable proportions (Law of diminishing marginal returns) and Return to Scale (Increasing, constant and decreasing), Economies and diseconomies of scale. Inflation: Meaning, types, causes and consequences, measures to control inflation, Concepts of deflation and Stagflation.
(Contemporary Issues related to Topic)

Unit :6	Market structures - equilibrium output and price	7 Hours

Forms of market structures: Perfect competition, monopolistic competition, oligopoly, duopoly and monopoly, Demand and revenue curves for firm and industry in various forms of market structure, Total, average and marginal revenue curves, equilibrium of firms and industries under various forms of market structures, Price discrimination.
(Contemporary Issues related to Topic)

Total Lecture Hours	39 Hours

Textbooks	
1.	Principle of Management, 9th edition , Harold Koontz Ramchandra, Tata McGrow hills
2.	Marketing Management: Planning, Implementation and Control, 3rd Edition, Ramaswamy V.S. and Namakumari S, Macmillian
3.	Financial Services, 19th Edition, Khan M Y, Tata McGraw Hill, 19
4.	Modern Economics, 13th Edition, H. L. Ahuja, S. Chand Publisher, 2009
5.	Modern Economic Theory, 3rd edition, K. K. Devett, S. Chand Publisher,2007
6.	Principle of Economics, 7th edition, Mankiw N. Gregory, Thomson, 2013

Reference Books	
1.	Foundations of Financial Markets and Institutions, 3rd Edition, Fabozzi, Pretice Hall
2.	Fundamentals of Financial Instruments , 2nd Edition, Parameshwaran, Wiley India
3.	Marketing Management , 3rd Edition , RajanSaxena, Tata McGraw Hill
4.	Advance Economic Theory, 17th Edition, H. L. Ahuja, S. Chand Publisher,2009
5.	International Trade, 12th edition, M. L. Zingan, Vindra Publication, 2007
6.	Macro Economics, 11th edition, M. L. Zingan, Vindra Publication, 2007
7.	Monitory Economics:, 1st Edition, M. L. Sheth, Himayalaya Publisher, 1995
8.	Economics of Development and Planning, 12th edition, S. K. Misra and V. K. Puri, Himalaya Publishing House, 2006.

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YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6193-0
2	https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042

MOOCs Links and additional reading, learning, video material	
1	https://onlinecourses.nptel.ac.in/noc22_mg104/preview
2	https://nptel.ac.in/
3	https://onlinecourses.nptel.ac.in/noc20_mg31/preview
4	https://onlinecourses.nptel.ac.in/noc21_hs52/preview
5	https://onlinecourses.nptel.ac.in/noc22_hs67/preview

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III SEMESTER
22IOT303: Digital Logic Design

Course Outcomes:
Upon successful completion of the course the students will be able to
1. Apply the laws of Boolean algebra to simplify logical equations and combination logic circuits.
2. Understand and demonstrate the various codes and illustrate their addition substraction.
3. Design and exhibit the methods to solve logical functions using K- map to implement combinational logic circuits.
4. Design and analyze Synchronous and Asynchronous sequential Circuits.

Unit:1	Number system and codes	7 Hours
Binary, Octal, hexadecimal and decimal Number systems and their inter conversion, BCD numbers (8421-2421), Gray code, excess–3 code, ASCII codes. Binary addition and subtraction, signed and unsigned binary numbers, 1's and 2's complement representation. **(Contemporary Issues related to Topic)**		
Unit:2	Boolean Algebra & Logic Gates	7 Hours
Basic logic circuits: Logic gates (AND, OR, NOT, NAND, NOR, Ex-OR, Ex-NOR and their truth tables,), Universal Gates, Laws of Boolean algebra, De- Morgan's theorem. **(Contemporary Issues related to Topic)**		
Unit:3	Minimization Techniques	7 Hours
Min term, Max term, POS, SOP, K-Map, Simplification by Boolean theorems, don't care condition. Quine Mc-Cluskey method **(Contemporary Issues related to Topic)**		
Unit:4	Combinational Logic	6 Hours
The Half adder, the full adder, subtractor circuit. Multiplxer de-multiplexer, decorder, BCD to seven segment Decorder, encoders **(Contemporary Issues related to Topic)**		
Unit:5	Sequential Circuits	7 Hours
Flip flop, set-reset laches, R-S flip-flop, D-flip flop, J-K Flip-flop, Master slave Flip flop, T flip-flop, excitation table of flip-flops. Flip-Flop to flip-flop conversion **(Contemporary Issues related to Topic)**		
Unit :6	Registers & Counters	7 Hours
Serial in/Serial out shift register, Serial in/parallel out shift register, parallel in/ parallel out shift register, parallel in/Serial out shift register, Bi-directional register, Synchronous/Asynchronous counter: Ring Counter, Ripple Counter Johnson's Counter operation, Up/down synchronous counter, application of counter. **(Contemporary Issues related to Topic)**		
	Total Lecture Hours	41 Hours

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B. Tech in CSE (IoT)

Text books	
1	Modern Digital Electronics , RP Jain, Tata McGraw Hill, 3rd Edition
2	M. Morris Mano, Digital Design, 3rd Edition, Prentice Hall of India Pvt. Ltd., 2003 Pearson Education (Singapore) Pvt. Ltd., New Delhi, 2003.
3	Donald P.Leach and Albert Paul Malvino, Digital Principles and Applications, 6thEdition, TMH, 2003.
4	Anandkumar- fundamental of digital circuit. 3rd edition. PHI

Reference Books	
1	Fundamentals of Logic Design, C.H.Roth, Public Work & Services, 3rd edition 2007.
2	Engg Approach to Digital Design, Fletcher, Prentice Hall of India 1993.
3	Digital Circuits & Microprocessors, Hebert Taub, Mc Graw Hill, 1988.

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/yccelibrary.html

MOOCs Links and additional reading, learning, video material	
1	https://www.digimat.in/nptel/courses/video/108105132/L01.html
2	https://www.digimat.in/nptel/courses/video/108105113/L01.html
3	https://www.coursera.org/learn/digital-systems

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B. Tech in CSE (IoT)

III SEMESTER
22IOT304: Lab. : Digital Logic Design

Course Outcomes:

Upon successful completion of the course the students will be able to

1. Apply the laws of Boolean algebra to simplify logical equations and combination logic circuits.
2. Understand and demonstrate the various codes and illustrate their addition subtraction.
3. Design and exhibit the methods to solve logical functions using K- map to implement combinational logic circuits.
4. Design and analyze Synchronous and Asynchronous sequential Circuits.

Sr. No.	Experiments based on
1	Basic logic circuits: Logic gates verification using kit.
2	Introduction to Bread Board and Verify Truth Tables of basic Logic gates using Bread Board.
3	Construction of half/ full adder using XOR and NAND gates and verification of its operation.
4	Verify Binary to Gray and Gray to Binary conversion using NAND gates only.
5	Implementation of 4x1 multiplexer and 1x4 demultiplexer using logic gates.
6	Verify the truth table of D-flip-flops and JK- flip-flops.
7	Design and verify the 4- Bit Synchronous Counter.
8	Introduction to SPICE Digital model and commands. Verify Truth Tables of basic Logic gates & Universal Gates using SPICE.
9	Design & verify Truth Table of Half adder & Full adder circuits Logic simulator.
10	Design & verify Truth Table of 4:1 Multiplexer & 1: 4 Demultiplexer circuits using SPICE.

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22IoT-101

III SEMESTER
22IOT305: Analog Circuits

Course Outcomes:
At the end of this course students will demonstrate the ability to

1. **Analyze** and **Design** the DC bias circuitry of BJT.
2. **Analyze** BJT amplifiers at low and high frequency.
3. A**pply** the fundamentals of different Parameters and internal circuit of operational amplifier
4. A**nalyze** the circuits based on linear and the non-linear applications of the operational amplifier
5. Use simulation tools and hardware to **implement** experiments on analog circuits

Unit:1	Transistors	7 Hours

BJT - structure, operation, characteristics and Biasing BJT structure, Symbol, Basic operation. Input and Output Characteristics in CE, CB and CC configuration, BJT biasing, Stability factor.

(Contemporary Issues related to Topic)

Unit:2	Low frequency BJT:	7 Hours

Analysis Single Stage Amplifiers BJT small signal model – Analysis of CE, CB, CC amplifiers, Miller's theorem.

(Contemporary Issues related to Topic)

Unit:3	High frequency BJT	8 Hours

The Bipolar Linear Amplifier, Graphical Analysis and ac Equivalent Circuit, Small-Signal Hybrid-π Equivalent Circuit of the Bipolar Transistor, Small-Signal Voltage Gain, Hybrid-π Equivalent Circuit, Other Small-Signal Parameters and Equivalent Circuits.

(Contemporary Issues related to Topic)

Unit:4	Differential Amplifier:	6 Hours

Configurations, DC & AC Analysis of Differential amplifier, using swamping resistor, constant current bias, DC Level Shifter

(Contemporary Issues related to Topic)

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Unit:5	Operational Amplifier Fundamentals and Linear Applications	7 Hours

Block Diagram of Op-AMP, Ideal Op-Amp, OPAMP parameters, Basic Op-Amp Configurations: Open loop, Feedback in OPAMP circuit: Inverting, Non-inverting, voltage followers Summing, difference amplifier, integrator, differentiator

(Contemporary Issues related to Topic)

Unit:6	Operational Amplifier Non Linear Applications	7 Hours

Voltage Comparators, Comparator Applications, Peak Detectors, Schmitt Triggers: Inverting & Non-inverting, Sample-and-Hold Circuits, clipper, clamper, Multivibrators, triangular wave generator

(Contemporary Issues related to Topic)

	Total Lecture Hours	**42 Hours**

Text books	
1	Millman & Halkies, "Electronic Device and Circuits", Second Edition, Tata McGraw Hill.
2	Boylestead & Nashelsky, "Electronic devices and Circuits Theory" Eighth edition, PHI
3	Linear Integrated Circuits,3rd Edition,S. Salivahanan, V. S. Bhaaskaran,Tata McGraw Hill Publication

Reference Books	
1	MillmanHalkies, "Integrated Electronics", Tata McGraw Hill.
2	David A. Bell," Electronic Device and Circuits", Fourth Edition, PHI.
3	Floyd," Electronic Devices", Seventh Edition, Pearson
4	Op-amps and Linear Integrated Circuits ,3rd Edition Ramakant A. Gayakwad, Prentice Hall Publication

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/yccelibrary.html

MOOCs Links and additional reading, learning, video material	
1	http://nptel.iitm.ac.in/video.php?subjectId=117103063
2	NPTEL Video: mod07lec29: BJT
3	https://archive.nptel.ac.in/courses/108/108/108108111/#

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III SEMESTER
22IOT306: Lab.: Analog Circuits

Course Outcomes:
At the end of this course students will demonstrate the ability to

1. **Analyze** and **Design** the DC bias circuitry of BJT.
2. **Analyze** BJT amplifiers at low and high frequency.
3. A**pply** the fundamentals of different Parameters and internal circuit of operational amplifier
4. A**nalyze** the circuits based on linear and the non-linear applications of the operational amplifier
5. Use simulation tools and hardware to **implement** experiments on analog circuits

Sr. No.	Experiments based on
1	To perform the Fixed Bias circuit of the transistor.
2	To perform the Self Bias circuit of transistor.
3	To Plot the Frequency Response of a single stage RC coupled CE amplifier at low frequency
4	To Plot the Frequency Response of a single stage RC coupled CE amplifier at high frequency
5	Simulation of Differential Amplifier configuration using LTSpice
6	IC 741 OP-AMP as a inverting amplifier / non-inverting amplifier with frequency response
7	Different OPAMP parameters: CMRR, Slew rate of OP-AMP.
8	IC 741 OP-AMP as a Integrator.
9	IC 741 OP-AMP as a Differentiator.
10	OP-AMP IC 741 as Astable Multivibrator.
11	OP-AMP IC 741 as a Monostable Multivibrator.
12	OP-AMP IC 741 as a Schmitt trigger.

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III SEMESTER
22IOT307: Data Structures

Course Outcomes:
Upon successful completion of the course the students will be able to
1. Understand the trade-offs of algorithms and programming aspects 2. Apply various operation on data Structure 3. Analyze various types of Data Structure 4. Implement various types of algorithms and analyze performance of system 5. Develop programs using data structures

Unit:1		**7 Hours**
Introduction to Algorithms, Basics of Algorithm, Sub Algorithms, Procedures and Functions, Analysis of Algorithms, Time and Space Complexity, Programming aspects with respect to structured programming, Top down and bottom-Up Approach **(Contemporary Issues related to Topic)**		

Unit:2		**7 Hours**
Arrays, Operations, Types, Representation of 1D, 2D arrays in memory, Sparse Matrices, Sorting, Quick Sort, Merge Sort, Insertion, Radix, Selection and Bubble Sort, Heap Sort, Searching, Linear, Binary Search, Hashing and collision Handling mechanism. **(Contemporary Issues related to Topic)**		

Unit:3		**7 Hours**
Stack, Fundamentals, Operations, Push , Pop , Applications of Stacks, Evaluation of Expressions, Recursion, Stack Machines and Multiple Stacks, Queues , Operations, Add , Delete, Types of Queues , Priority Queues, Circular Queue, Dequeue **(Contemporary Issues related to Topic)**		

Unit:4		**6 Hours**
Fundamentals of singly, Doubly, Circular, Linked Stacks and Queues, Examples of Linked List, Circular Linked List, Doubly Linked List and Dynamic Storage Management, Garbage Collection, Compaction and Applications of Linked List, Operations of Polynomials, Generalized Linked List. **(Contemporary Issues related to Topic)**		

Unit:5		**7 Hours**
Basic Terminology, Binary Tree Traversals, Threaded Storage Representation, Binary Search Tree, Applications of Tree, Preliminary Treatment of AVL Trees, B-Trees, B+ Trees **(Contemporary Issues related to Topic)**		

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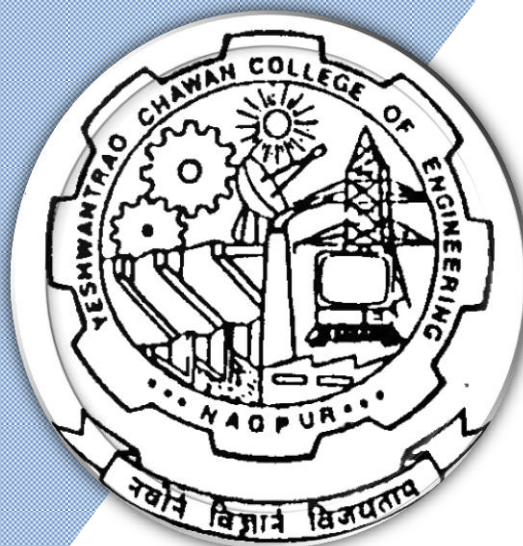(Department of Electronics Engineering)
B. Tech in CSE (IoT)

SoE No.
22IoT-101

Unit :6		7 Hours
Basic Terminology, Graph Representation, Matrix, List, Multi-List, Graph Traversals, Breath First Search, Depth First Search, Minimum Cost Spanning Trees, Shortest Path Algorithm, Topological Sort, Critical Path. **(Contemporary Issues related to Topic)**		
Total Lecture Hours		**39 Hours**

Textbooks	
1	Data Structures and Program, Design in C, Kruse, Leung and Tondo

Reference Books	
1	Data Structures, Schuam Series, Seymour Lipschutz, G.A. V. Pai
2	Fundamentals of Data Structures, Ellis Horowtiz and Sartaj Sahani, Galgotia,Publication
3	An Introduction to Data Structures with Applications, Tremblay & Sorenson, TMH

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	
2	

MOOCs Links and additional reading, learning, video material	
1	
2	
3	

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Nagar Yuwak Shikshan Sanstha's
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B. Tech in CSE (IoT)

SoE No.
22IoT-101

III SEMESTER
22IOT308: Lab.: Data Structures

Course Outcomes:

Upon successful completion of the course the students will be able to

1. Understand the trade-offs of algorithms and programming aspects
2. Apply various operation on data Structure
3. Analyze various types of Data Structure
4. Implement various types of algorithms and analyze performance of system
5. Develop programs using data structures

Sr. No.	Experiments based on
1	Write a program using control Structure & Statements
2	Write a program using If –else structure
3	Write a program using Case Statement
4	Write a program for Functions
5	Write a program for Macros
6	Write a program for Pointers
7	Write a program for Structures
8	Write a program for Linked List
9	Write a program for Doubly linked list
10	Write a program for graphs
11	Write a program for Trees
12	Write a program for Search Algorithms
13	Write a program for Stacks

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SoE No.
22IoT-101

III SEMESTER
22IOT309: Sensor and actuators

Course Outcomes:
Upon successful completion of the course the students will be able to
1. Understand and explain the concepts of Sensors and Actuators.
2. Explain the working of magnetic sensors and its applications in real time scenario
3. Acquire knowledge of Model linear actuators and differentiate various solenoids
4. Evaluate performance characteristics of different types of sensors

Unit:1	Introduction	7 Hours
Classification of Sensors and Actuators - Magnetic Sensors - Linear and Latching Solenoid Actuators - Stepper Motors - Special Magnetic Devices - Rotary and Linear Actuators - Magnetic Materials and Technology - Soft Magnetic Materials - Hard Magnetic Materials -Coating Technologies - Magnetic Materials Market and Applications **(Contemporary Issues related to Topic)**		

Unit:2	Magnetic Sensors	6 Hours
Theory of Magnetic Sensors - Magnetic Sensor Analysis - VR Sensors - Solid-State Sensors - Magnetic Sensor Applications - Magnetic Speed Sensor Requirements - Magnetic Speed Sensor Applications - Magnetic Position Sensor Applications - VR Sensor Noise **(Contemporary Issues related to Topic)**		

Unit:3	Pressure Sensor	7 Hours
Units of pressure - Manometers – Different types – Elastic type pressure gauges – Bourdon type bellows – Diaphragms – Electrical methods – Elastic elements with LVDT and strain gauges – Capacitive type pressure gauge – Piezo resistive pressure sensor – Resonator pressure sensor – Measurement of vacuum – McLeod gauge – Thermal conductivity gauges – Ionization gauge, cold cathode and hot cathode types – Testing and calibration of pressure gauges – Dead weight tester. **(Contemporary Issues related to Topic)**		

Unit:4	Position, Proximity, Flow, Level Sensor :	6 Hours
Measurement of position using Hall effect sensors. Proximity sensors: Inductive & Capacitive, Use of proximity sensor as accelerometer and vibration sensor. Flow Sensors: Ultra sonic & Laser. Level Sensors: Ultra sonic & Capacitive **(Contemporary Issues related to Topic)**		

Unit:5	Linear Actuators	8 Hours
Mathematical Model for Linear Actuators - Fast-Acting Actuators - Disk Solenoids - Plunger Solenoids - Ball Solenoids - Conical Solenoids - Applications of Solenoid Actuators - Long Stroke Solenoid Fuel Pump - Gasoline Injectors - Natural Gas Injectors - Diesel Fuel Injectors - Compressor Solenoid Valves - Transmission Solenoid **(Contemporary Issues related to Topic)**		

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B. Tech in CSE (IoT)

Unit :6	Rotary Actuators	8 Hours

Disk Rotary Actuators - Disk Rotary Actuator Analysis - Disk Rotary Actuator Design - Disk Rotary Actuator Excitation Electromagnetic Circuit - Disk Rotary Actuator Toothed Magnetic Part - Disk Rotary Actuator PM - Claw Pole Rotary Actuators - Claw Pole Rotary Actuator Analysis - Claw Pole Rotary Actuator Design -Claw Pole Rotary Actuator Excitation Electromagnetic Circuit - Claw Pole Actuator Toothed Magnetic Part - Claw Pole Actuator PM - Cylindrical Rotary Actuators - Cylindrical Rotary Actuator PM - Cylindrical Rotary Actuator Excitation Electromagnetic Circuit
(Contemporary Issues related to Topic)

	Total Lecture Hours	42 Hours

Text books	
1	Measurement Systems – Application and Design, 6 th Edition, E.O. Doebelin, Tata McGraw Hill publishing company, 2003
2	Sensors and Actuators in Mechatronics, Design and Applications, Andrzej M. Pawlak, Taylor & Francis Group 2006

Reference Books	
1	Principles of Industrial Instrumentation, 2nd Edition, D. Patranabis, Tata McGraw Hill Publishing Company Ltd, 1996
2	Mechanical and Industrial Measurements, R.K. Jain, Khanna Publishers, New Delhi,1999
3	A Course on Mechanical Measurements, Instrumentation and Control, A.K. Sawhney and P. Sawhney, DhanpathRai and Co, 2004

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	https://nptel.ac.in/courses/108/105/108105064/
2	https://nptel.ac.in/courses/108/108/108108147/
3	http://103.152.199.179/YCCE/yccelibrary.html

MOOCs Links and additional reading, learning, video material	
1	http://103.152.199.179/YCCE/yccelibrary.html

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B. Tech in CSE (IoT)

| SoE No. 22IoT-101 |

III Semester
Audit Course
MLC2123 - YCCE Communication Aptitude Preparation (YCAP3)

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SoE No.
22IoT-101

III Semester
Department Specific Audit Course
MLC117: Arduino Programming

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Bachelor of Technology

SoE & Syllabus 2022

4th Semester

(Department of Computer Technology)

B. Tech in CSE (IoT)

Nagar Yuwak Shikshan Sanstha's
Yeshwantrao Chavan College of Engineering
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B.TECH SCHEME OF EXAMINATION 2022
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(Department of Electronics Engineering)
B. Tech in CSE (IOT)

SoE No.
22CSIoT-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	L	T	P	Hrs	Credits	MSEs*	TA**	ESE	ESE Duration Hours
					Third Semester										
1	3	BS	GE/GE	22IoT301	Probability Theory and Sampling Theory	T	3	0	0	3	3	30	20	50	3 Hours
2	3	HS	GE/HUM	22IoT302	Fundamentals of Management and Economics	T	3	0	0	3	3	30	20	50	3 Hours
3	3	PC	EE/EE	22IoT303	Digital Logic Design	T	3	0	0	3	3	30	20	50	3 Hours
4	3	PC	EE/EE	22IoT304	**Lab. :** Digital Logic Design	P	0	0	2	2	1		60	40	
5	3	PC	EE/EE	22IoT305	Analog Circuits	T	3	0	0	3	3	30	20	50	3 Hours
6	3	PC	EE/EE	22IoT306	**Lab.:** Analog Circuits	P	0	0	2	2	1		60	40	
7	3	PC	EE/EE	22IoT307	Data Structures	T	3	0	0	3	3	30	20	50	3 Hours
8	3	PC	EE/EE	22IoT308	**Lab.:** Data Structures	P	0	0	2	2	1		60	40	
9	3	PC	EE/EE	22IoT309	Sensor and actuators	T	3	1	0	3	3	30	20	50	3 Hours
					TOTAL THIRD SEM		**18**	**1**	**6**	**24**	**21**				

					List of Mandatory Learning Course (MLC)										
1	3	HS	T&P	MLC2123	YCCE Communication Aptitude Preparation (YCAP3)	A	3	0	0	3	0				
2	3	BES	IoT	MLC117	Arduino Programming	A	2	0	0	2	0				

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	L	T	P	Hrs	Credits	MSEs*	TA**	ESE	ESE Duration Hours
					Fourth Semester										
1	4	PC	EE/CT	22IoT401	Database Management System	T	3	0	0	3	3	30	20	50	3 Hours
2	4	PC	EE/CT	22IoT402	**Lab.:** Database Management System	P	0	0	2	2	1		60	40	
3	4	PC	EE/CT	22IoT403	Object Oriented Programming using JAVA	T	3	0	0	3	3	30	20	50	3 Hours
4	4	PC	EE/CT	22IoT404	**Lab.:** Object Oriented Programming using JAVA	P	0	0	2	2	1		60	40	
5	4	PC	EE/ME	22IoT405	Mechatronics	T	3	0	0	3	3	30	20	50	3 Hours
6	4	PC	EE/ME	22IoT406	**Lab.:** Mechatronics	P	0	0	2	2	1		60	40	
7	4	PC	EE/EE	22IoT407	Microcontroller & its Applications	T	3	0	0	3	3	30	20	50	3 Hours
8	4	PC	EE/EE	22IoT408	**Lab.:** Microcontroller & its Applications	P	0	0	2	2	1		60	40	
9	4	PC	EE/EE	22IoT409	Computer Architecture Organization	T	3	0	0	3	3	30	20	50	3 Hours
10	4	PC	EE/EE	22IoT410	**Lab.:** Electronics Workshop	P	0	0	2	2	1		60	40	
11	4	PC	CV/EE	22IoT411	Environmental Sustainability, Pollution and Management	T	3	0	0	3	3	30	20	50	3 Hrs
					TOTAL FOURTH SEM		**18**	**0**	**10**	**28**	**23**				

					List of Mandatory Learning Course (MLC)										
1	4	HS	T&P	MLC2124	YCCE Communication Aptitude Preparation (YCAP4)	A	3	0	0	3	0				
2	4	BES	IoT	MLC118	Matlab Programming	A	2	0	0	2	0				

MSEs* = Two MSEs of 15 Marks each will conducted and marks of of these 2 MSEs will be considered for Continuous Assessment

TA ** = for Theory : 12 marks on lecture quizzes, 12 marks on two TA2 activitied decided by course teacher, 2 marks on class attendance and 4 marks on TA4 activities

TA** = for Practical : MSPA will be 15 marks each

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**SoE No.
22IoT-101**

B. Tech in CSE (IoT)

IV SEMESTER
22IOT401: Database Management System

Course Outcomes
Upon successful completion of the course the students will be able to
1. Analyze & compare different levels of abstraction & data independence 2. Design Entity Relationship Diagram for any scenario 3. Solve queries based on relational algebra & SQL 4. Identify functional dependencies & normalise the database

Unit:1	Introduction to Database Management System	7 Hours

Introduction to Database Management System: General File System and Database system Concepts and Architecture, Data Models, Schemas and Instances, Abstraction & Different Levels of Data Abstraction, Data Independence: Logical & Physical Independence. Code of ethics for database designers.
(Contemporary Issues related to Topic)

Unit:2	Entity-Relationship Model	7 Hours

Entity-Relationship Model: Entities and Entity Sets, Relationships and Relationship Sets, Attributes, Mapping Constraints, Keys, Entity Relationship Diagram, Reducing E-R Diagrams to Tables, Generalization, Aggregation, Design of an E-R Database Scheme
(Contemporary Issues related to Topic)

Unit:3	SQL	7 Hours

SQL: Data definition language (DDL), Data Manipulation Language (DML), Basic structure of SQL Queries, Set operations, Null Values, Nested subqueries, views, modification of database, transaction, Joins.
(Contemporary Issues related to Topic)

Unit:4	Advanced SQL	6 Hours

Advanced SQL: SQL data types & schemas, Integrity Constraints, Domain Constraints, Assertions, triggers, Advanced SQL Features
(Contemporary Issues related to Topic)

Unit:5	Relational Data Model	7 Hours

Relational Data Model: Structure of Relational Databases
Relational Algebra: Structure of relational databases, Fundamental Relational-Algebra Operations, Additional relational algebra operations, extended relational algebra operations, modification of the databases
(Contemporary Issues related to Topic)

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22IoT-101**

B. Tech in CSE (IoT)

Unit :6	**Relational Database Design**	**7 Hours**
Relational Database Design: Pitfalls in Relational Database Design, Functional Dependencies, Normalization using Functional Dependencies, Alternative Approaches to Database design. **(Contemporary Issues related to Topic)**		
	Total Lecture Hours	**39 Hours**

Text books	
1	Korth, Silberschatz, Database System Concepts, 6th Edition, McGraw-Hill

Reference Books	
1	Connolly, Database Systems, 4th Edition, Pearson Education

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	
2	

MOOCs Links and additional reading, learning, video material	
1	https://onlinecourses.nptel.ac.in/noc22_cs51/preview
2	https://archive.nptel.ac.in/courses/106/105/106105175/
3	https://nptel.ac.in/courses/106106220

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SoE No.
22IoT-101

B. Tech in CSE (IoT)

IV SEMESTER
22IOT402: Lab.: Database Management System

Course Outcomes:
Upon successful completion of the course the students will be able to
1. Analyze & compare different levels of abstraction & data independence
2. Design Entity Relationship Diagram for any scenario
3. Solve queries based on relational algebra & SQL
4. Identify functional dependencies & normalise the database

Sr. No.	Experiments based on
1	Designing of an ER Diagram
2	Designing of Database Schema based on ER diagram
3	Study of My-SQL
4	Implementation of different DDL commands.
5	Implementation of Constraints: Referential Constraints, Domain Constraints
6	Implementation of different DML Commands
7	Study and Implement Inner join.
8	Study and Implement Outer Join
9	Consider the schema for Movie Database:ACTOR (Act_id, Act_Name, Act_Gender)DIRECTOR (Dir_id, Dir_Name, Dir_Phone)MOVIES (Mov_id, Mov_Title, Mov_Year, Mov_Lang, Dir_id)MOVIE_CAST (Act_id, Mov_id, Role)RATING (Mov_id, Rev_Stars) **Write SQL queries to** 1. List the titles of all movies directed by 'Hitchcock'. 2. Find the movie names where one or more actors acted in two or more movies. 3. List all actors who acted in a movie before 2000 and also in a movie after2015 (use JOIN operation). 4. Find the title of movies and number of stars for each movie that has at least one rating and find the highest number of stars that movie received. Sort the result by movie title. 5. Update rating of all movies directed by 'Steven Spielberg' to 5

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B. Tech in CSE (IoT)

IV SEMESTER
22IOT403: Object Oriented Programming

Course Outcomes:

Upon successful completion of the course the students will be able to

1. Able to implement the solution using suitable reusability technique provided in OOP language.
2. Able to implement the solution using files and standard template library.
3. Able to design the error free software solution using the standard architecture patterns.
4. Able to design and implement the event driven solution for the problem.

Unit:1	**Introduction to OOP**	**7 Hours**

Introduction to object oriented programming paradigm, procedure oriented programming vs OOP, features of OOP, benefits of OOP, defining class, instantiating a class. UML diagrams to represent class, objects, and various relationships.
(Contemporary Issues related to Topic)

Unit:2	**Functions and constructors**	**7 Hours**

Functions in OOP, function overloading, friendly functions, Passing & returning Objects, pointers to members, constructors and destructors, copy constructor, operator overloading. Access specifiers and packages.
(Contemporary Issues related to Topic)

Unit:3	**Inheritance**	**7 Hours**

Inheritance, types of inheritance, virtual base classes, abstract classes, virtual function, late binding. Interface, collection interface.
(Contemporary Issues related to Topic)

Unit:4	**Streams**	**6 Hours**

Streams, stream classes, file handling, command line arguments, class templates, function templates, standard template library.
(Contemporary Issues related to Topic)

Unit:5	**Exceptions**	**7 Hours**

Basics of exception handling, exception handling mechanism, MVC architecture, Java web components and its architecture
(Contemporary Issues related to Topic)

Unit :6	**Event driven programming**	**7 Hours**

Event driven programming using AWT components and various listener interfaces.
(Contemporary Issues related to Topic)

	Total Lecture Hours	**39 Hours**

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Text books
1	Somashekara, OOP with Java, PHI

Reference Books
1	Eckel,Thinking in Java, 4 th edition, PHI

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]

MOOCs Links and additional reading, learning, video material
1	https://nptel.ac.in/courses/106105153

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B. Tech in CSE (IoT)

IV SEMESTER
22IOT404: Lab.: Object Oriented Programming

Course Outcomes:
Upon successful completion of the course the students will be able to
1. Implement the solution using suitable reusability technique provided in OOP language
2. Implement the solution using files and standard template library.
3. Design the error free software solution using the standard architecture patterns
4. Design and implement the event driven solution for the problem.

Sr. No.	Experiments based on
1	Implement the concept of Class and its data members and member functions in Java/C++
2	Implement the concept of function and operator overloading in Java/C++
3	Implement the concept of friend function
4	Implement the concept of class constructor and its type in Java/C++
5	Implement the concept of Abstraction in Java/C++
6	Implement the concept of all types of inheritance in Java/C++
7	Implement he collection listener to solve the problem in Java
8	Implement the concept of run time polymorphism in Java/C++
9	Implement the concept of Files using command line arguments in Java/C++
10	Implement the concept of function templates and class template in C++
11	Implement the concept of exception in Java/C++
12	Implement the concept of applet to prepare a web application in Java

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SoE No.
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IV SEMESTER
22IOT405: Mechatronics

Course Outcomes:
Upon successful completion of the course the students will be able to
1. Model various mechatronic systems.
2. Understand the working of various motors used in mechatronic systems
3. Analyze the characteristics and use various IC's
4. Analyze the internal hardware structure in Mechatronics Systems.

Unit:1		7 Hours
Introduction, sensors, actuators, modeling of systems. Recent trend of designing machine units along with electronic circuits for operation and supervision of mechanisms. Techniques of interfacing mechanical devices with computer hardware. **(Contemporary Issues related to Topic)**		

Unit:2		8 Hours
Basic principles ,working and specific applications of armature and field controlled D.C. Motors, Variable voltage and variable frequency control of 3 phase and single phase Induction motors, speed control of synchronous motors, Different types of stepper motors-Constriction ,working and application. Position control of stepper motors. **(Contemporary Issues related to Topic)**		

Unit:3		8 Hours
Common and commercial I.Cs used for amplification, timing and digital indication. Different types of actuators, working of synchro-transmitter and receiver set, Pressure to current (P/I) and l/P conversion. Electrical and hydraulic servomotors. Design of solenoid plungers and pressure and force amplification devices. **(Contemporary Issues related to Topic)**		

Unit:4		8 Hours
Add-on cards for sampling and actuation, 4-20 mA ports, AD-DA conversion, Peripheral interface organization, general layout of data bus and data transfer through serial and parallel modes of communication, schemes of computer networking and hierarchy in supervisory control. **(Contemporary Issues related to Topic)**		

Unit:5		7 Hours
Study of various integrated systems by using block diagrams. Study of systems used in Ink Jet Printers, Photo copying, Washing Machines, IC Engine fuel injection system etc **(Contemporary Issues related to Topic)**		

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B. Tech in CSE (IoT)

Unit :6		7 Hours
General philosophy of Artificial Neural Network simulations, Fuzzy logic for operation and control of Mechatronic systems. **(Contemporary Issues related to Topic)**		
	Total LectureHours	**45 Hours**

Textbooks	
1	Introduction to Mechatronics and Measurement Systems, 2007 edition, Michael B.Histand and David G. Alciatore, Tata McGraw-Hill Education
2	Mechatronics,2007 edition, Bradley, D.A., Dawson, D, Buru, N.C. and Loader, AJ., Chapman and Hall, 1991
3	Microprocessor Architecture, Programming and Applications, 2002 edition, Ramesh.S, Gaonkar, Prentice Hall

Reference Books	
1	Understanding Electro-Mechanical Engineering, An Introduction to Mechatronics,1996 edition, Lawrence J.Kamm, John Wiley and Sons
2	Introduction to Microprocessors for Engineers and Scientists, 2004 edition, Ghosh, P.K. and Sridhar, PHI Learning Pvt. Ltd.

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6193-0
2	https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042

MOOCs Links and additional reading, learning, video material	
1	https://onlinecourses.nptel.ac.in/noc21_me27/preview
2	https://nptel.ac.in/courses/112103174
3	https://www.classcentral.com/course/swayam-mechatronics-23047

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(Department of Electronics Engineering)
B. Tech in CSE (IoT)

SoE No.
22IoT-101

IV SEMESTER
22IOT406 : Lab. Mechatronics

Course Outcomes:

After completion of the laboratory work, student will demonstrate the ability to

1. Model various mechatronic systems.
2. Understand the working of various motors used in mechatronic systems
3. Analyze the characteristics and use various IC's
4. Analyze the internal hardware structure in Mechatronics Systems.

Sr. No.	Experiments based on
1	Identifications, study and demonstration of different sensors
2	Identifications, study and demonstration of different actuators
3	Demonstration of working of various D-A and A-D converters
4	Development of ladder diagram, programming using PLC for any of the following a) Motors start and stop using 02 different sensors b) Simulation of pedestrian traffic controller c) Simulation of four road junction traffic controller d) Lift or elevator control e) Washing machine control f) Tank level control g) Soft drink vending machine control
5	Trace, interpret and demonstrate working of electro pneumatic system
6	Trace, interpret and demonstrate working of electro hydraulic system
7	Demonstration on Flip Flops and Timers.
8	Verification of P, P+I, P+D, P+I+D control actions using MATLAB
9	Demonstration on different switches and relays.
10	Analysis of control system using software like MATLAB/SIMULINK or equivalent.

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**SoE No.
22IoT-101**

B. Tech in CSE (IoT)

IV SEMESTER
22IOT407 : Microcontroller & its Applications

Course Outcomes:
Upon successful completion of the course the students will be able to   CO1: **Describe** the architecture of 8051, its features and instructions   CO2: **Write** program for specific task   CO3: **Analyze** and Interface the peripherals to 8051 microcontroller   CO4: **Develop** application using 8051 microcontroller   CO5: **Simulate** using IDE tool like Keil uVision5

Unit:1	**8051 Architecture**	**7 Hours**
Overview of 8051 Microcontroller family, Introduction to MCS51 family, Architecture, Memory organization, Internal RAM, Flag Register, Register Banks, SFRs , Functional pin description and various resources of MCS 51,Hardware Overview, Addressing modes, Instruction set. **(Contemporary Issues related to Topic)**		

Unit:2	**8051 Programing**	**7 Hours**
Branching instructions, Bit manipulation instructions, Assembly language Programs., 8051 I/O programming, Logic operations, Data conversion programs, Lookup table access **(Contemporary Issues related to Topic)**		

Unit:3	**I/O interfacing and programing**	**7 Hours**
Delay Programs. 8051 programming in C:Data types and time delay, I/O programming, I/O Interfacing and programming for LED, switches, 7 segment display. **(Contemporary Issues related to Topic)**		

Unit:4	**Timer and Serial Mode operation**	**7 Hours**
Timer programming in assembly and C: Various timer operations. SFR related to timer operation. Serial Port programming in assembly and C: Basics of serial communication, RS 232. Serial data transfer programs. **(Contemporary Issues related to Topic)**		

Unit:5	**8051 interrupt and display interface**	**7 Hours**
Interrupts Control, Interrupts programming in assembly and C, programming timer interrupt, external interrupt, serial interrupt. Interfacing and programming for LCD. **(Contemporary Issues related to Topic)**		

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Unit :6	I/O interfacing and applications	7 Hours
Keyboard matrix programming, Interfacing of ADC, DAC, stepper motor and programming. Interfacing RTC, EEPROM using I2C Bus and programming **(Contemporary Issues related to Topic)**		
	Total Lecture Hours	**42 Hours**

Text books	
1	The 8051 Microcontroller and Embedded System, by M. A. Mazidi, Prentice Hall
2	The 8051 Microcontroller, by Kenneth J. Ayala, West Publishing Company

Reference Books	
1	"The 8051 Microcontroller Based Embedded Systems", Manish K Patel, McGraw Hill, 2014, ISBN: 978-93-329-0125-4.
2	"Microcontrollers: Architecture, Programming, Interfacing and System Design", Raj Kamal, Pearson Education, 2005.

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/yccelibrary.html

MOOCs Links and additional reading, learning, video material	
1	https://www.keil.com/dd/docs/datashts/atmel/at89c51_ds.pdf
2	https://www.electronicwings.com/
3	https://www.tutorialspoint.com/microprocessor/microcontrollers_8051_architecture.htm
4	https://nptel.ac.in/courses/108/105/108105102/

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22IoT-101

B. Tech in CSE (IoT)

IV SEMESTER
22IOT408 : Lab. Microcontroller & its Applications

Course Outcomes:

Upon successful completion of the course the students will be able to
  CO1: **Describe** the architecture of 8051, its features and instructions
  CO2: **Write** program for specific task
  CO3: **Analyze** and Interface the peripherals to 8051 microcontroller
  CO4: **Develop** application using 8051 microcontroller
  CO5: **Simulate** using IDE tool like Keil uVision5

Sr. No.	Experiments based on
1	Write program to perform arithmetic and logical operation of two nos.
2	2.a: X and Y are two 8 bit nos. present in memory location 40H and 41H. Write program to perform X + Y and store result in M. L. 50H 2.b: X and Y are two 8 bit nos. present in memory location 60H and 61H. Write program to perform X - Y and store result in M. L. 70H
3	Five 8 bit nos. are present from M. L. 40H onwards. Write program to add these nos. and store result in M. L. 50H
4	Ten 8 bit nos. are present from M. L. 40H onwards. Write program to find the greatest no. and store result in M. L. 60H
5	6.a.: Interface LED with 8051 i/o pin P1.4 and write program to blink LED (ON/ OFF duration 1 sec) 6.b: Interface 8 LED's with 8051 i/o pin P1 and write program to turn ON alternate LED.
6	Interface 8 LED's with 8051 i/o pin P1 and write program to turn ON LED one by one from P1.0 to P1.7 after a delay of 1 sec
7	Interface LED with 8051 i/o pin P1.4 and switch with P1.1. Write program to turn on LED if switch is pressed
8	Interface common cathode 7 segment display to P2 of 8051 and write program to display 0 to 9 continuously at an interval of 3 sec.
9	Write program to send "ABC" via serial port of 8051 with 9600 baud rate
10	Interface 2X16 LCD with 8051.Use 8 bit data length and write program to display "HI FRIENDS " in first line from first position. Use P2 for data pins and P0 for control pins

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SoE No.
22IoT-101

IV SEMESTER
22IOT409 : Computer Architecture Organization

Course Outcomes:

Upon successful completion of the course the students will be able to
1. Understand the basic concepts of peripherals of computer system
2. Apply the design issues in the development of computer system architecture
3. Analyze the concepts of Parallel processing and pipelining for computer architecture design
4. Evaluate parameters required for processor design

Unit:1	Register and processor Level Design	7 Hours

Register Level components, Programmable logic devices, Register level design, The Processor level components, Processor level design

Unit:2	CPU Organization	7 Hours

CPU organization, Data representation, Fixed point numbers, Floating point numbers, IEEE 754 floating point formats, Instruction sets – Instruction formats, instruction types, addressing modes

Unit:3	Datapath Design	7 Hours

Fixed point arithmetic, addition and subtractions, Multiplication, Division, Arithmetic operations on Floating point numbers

Unit:4	Control design	7 Hours

Basic Concepts, Hard-wired control-Design methods, classical method, one hot method, parallelism in microinstruction, Micro programmed control, Horizontal versus vertical, Multiplier Control Unit

Unit:5	Memory organization	7 Hours

Device characteristics, RAM, Serial access memories, virtual memory, concept of cache & associative memories.

Unit :6	System Organization	7 Hours

Local and long distance communication input-output systems, Interrupt, DMA, introduction to parallel processing.

	Total Lecture Hours	**42 Hours**

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Text books
1	Jhon.P. Hayes, Computer Architecture and organization McGraw-Hill Companies

Reference Books	
1	Carl Hammacher, Computer organization , McGraw-Hill Science
2	Andrew S. Tanenbaum, Structured computer and Organization, PHI

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/yccelibrary.html

MOOCs Links and additional reading, learning, video material	
1	http://103.152.199.179/YCCE/yccelibrary.html

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SoE No.
22IoT-101

IV SEMESTER
22IOT410 : Lab. Electronics Workshop

Course Outcomes:

After completion of the laboratory work, student will demonstrate the ability to

CO1 : **Understand** and identify Different Electronics Components.

CO2 : **Apply** the basic knowledge of Electronics Components to select the mini project.

CO3 : **Demonstrate** their practical Knowledge to do Artwork, printing, Etching & drilling of PCB for mini project.

CO4 : **Build** a mini project and **prepare** a report &small video.

Expt. No	Name of Experiment
1	Introduction to Various electronic components.
2	Study of various equipment used in electronics workshop.
3	Soldering and De-Soldering Practice of different components on PCB
4	Study of PCB and PCB design process.
5	Mini Project(Assembling electronic circuit on PCB and testing it.)
6	Simulation of electronic circuit using simulation software and Report Writing.

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SoE No.
22IoT-101

IV SEMESTER
22IOT411 : Environmental Sustainability, Pollution and Management

Course Outcomes:
Upon successful completion of the course, the students will be able to
The student will be able to
1. Gain insights into the efforts to safeguard the Earth's environment and resources.
2. Develop a critical understanding of the contemporary environmental issues of concern
3. Have an overview of pollution, climate change and national and global efforts to address adaptation and mitigation to changing environment through environmental management.
4. Learn about the major international treaties and our country's stand on and responses to the major international agreements.

Unit:1	Environment, Natural Resources and Sustainable Development	6 Hours
The man-environment interaction; Environmental Ethics and emergence of environmentalism; Overview of natural resources: Definition of resource; Classification of natural resources- biotic and abiotic, water, soil and mineral resources, renewable, and non-renewable energy resources; Introduction to sustainable development: Sustainable Development Goals (SDGs)- targets and indicators, challenges and strategies for SDGs		
Unit:2	**Environmental Issues, Conservation of Biodiversity and Ecosystems**	**6 Hours**
Environmental issues and scales: Land use and Land cover change, Global change; Biodiversity and its distribution, Ecosystems and ecosystem services, Threats to biodiversity and ecosystems, National and international policies for conservation.		
Unit:3	**Environmental Pollution and Health**	**7 Hours**
Understanding pollution: Production processes and generation of wastes, Air pollution, Water pollution, Soil pollution and solid waste, Noise pollution, Thermal and Radioactive pollution. Impact on human health		
Unit:4	**Climate Change: Impacts, Adaptation and Mitigation**	**7 Hours**
Understanding climate change, Impacts, vulnerability and adaptation to climate change, Mitigation of climate change		
Unit:5	**Environmental Management**	**7 Hours**
Environmental management system: ISO 14001, Concept of Circular Economy, Life cycle analysis; Cost-benefit analysis, Environmental audit and impact assessment; Waste Management and sustainability; Ecolabeling /Eco mark scheme		
Unit :6	**Environmental Treaties and Legislation**	**6 Hours**
Introduction to environmental laws and regulation, An overview of instruments of international cooperation, Major International Environmental Agreements, Major Indian Environmental Legislations, Major International organizations, and initiatives		
	Total Lecture	**39 Hours**

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**SoE No.
22IoT-101**

B. Tech in CSE (IoT)

Text books	
1	Chiras, D. D and Reganold, J. P. (2010). Natural Resource Conservation: Management for a Sustainable Future.10th edition, Upper Saddle River, N. J. Benjamin/Cummins/Pearson
2	Rajagopalan, R. (2011). Environmental Studies: From Crisis to Cure. India: Oxford University Press
3	Krishnamurthy, K.V. (2003) Textbook of Biodiversity, Science Publishers, Plymouth, UK
4	Jackson, A. R., & Jackson, J. M. (2000). Environmental Science: The Natural Environment and Human Impact. Pearson Education
5	Pittock, Barrie (2009) Climate Change: The Science, Impacts and Solutions. 2nd Edition. Routledge.
6	Theodore, M. K. and Theodore, Louis (2021) Introduction to Environmental Management, 2nd Edition. CRC Press
7	Kanchi Kohli and Manju Menon (2021) Development of Environment Laws in India, Cambridge University Press
Reference Books	
1	Headrick, Daniel R. (2020) Humans versus Nature- A Global Environmental History, Oxford University Press
2	Gilbert M. Masters and W. P. (2008). An Introduction to Environmental Engineering and Science, Ela Publisher (Pearson)
3	William P. Cunningham and Mary A. (2015). Cunningham Environmental Science: A global concern, Publisher (Mc-Graw Hill, USA)
4	Varghese, Anita, Oommen, Meera Anna, Paul, Mridula Mary, Nath, Snehlata (Editors) (2022) Conservation through Sustainable Use: Lessons from India. Routledge.
5	Central Pollution Control Board Web page for various pollution standards. https://cpcb.nic.in/ standards
6	Barnett, J. & S. O'Neill (2010). Maladaptation. Global Environmental Change—Human and Policy Dimensions 20: 211–213
7	Richard A. Marcantonio, Marc Lame (2022). Environmental Management: Concepts and Practical Skills. Cambridge University Press
8	Ministry of Environment, Forest and Climate Change (2019) A Handbook on International Environment Conventions & Programmes. https://moef.gov.in/wp- content/uploads/2020/02/ convention-V-16-CURVE-web.pdf

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B. Tech in CSE (IoT)

SoE No.
22IoT-101

IV Semester
Audit Course
MLC2124 - YCCE Communication Aptitude Preparation (YCAP4)

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B. Tech in CSE (IoT)

SoE No.
22IoT-101

IV Semester
Department Specific Audit Course
MLC118 : Matlab Programming

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Nagar Yuwak Shikshan Sanstha's

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Hingna Road, Wanadongri, Nagpur - 441 110
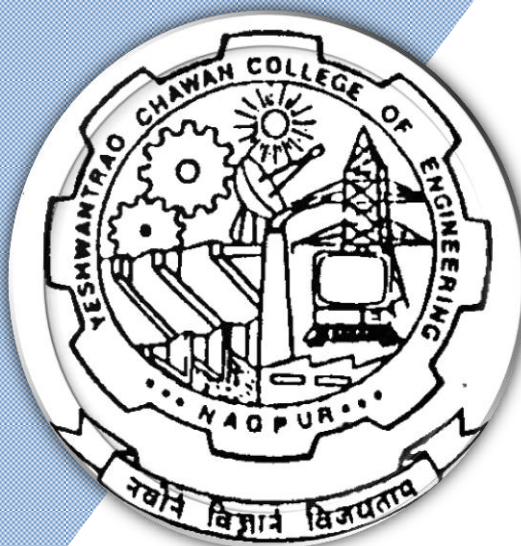
Bachelor of Technology

SoE & Syllabus 2022

5th Semester

(Department of Computer Technology)

B. Tech in CSE (IoT)

Nagar Yuwak Shikshan Sanstha's
Yeshwantrao Chavan College of Engineering
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B.TECH SCHEME OF EXAMINATION 2022
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(Department of Electronics Engineering)
B. Tech in CSE (IOT)

SoE No.
22CSIoT-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
					Fifth Semester										
1	5	PC	EE	22IoT501	Introduction to IoT	T	3	0	0	3	3	30	20	50	3 Hours
2	5	PC	EE	22IoT502	**Lab.:** Introduction to IoT	P	0	0	2	2	1		60	40	
3	5	PC	CT	22IoT503	Computer Communication Network	T	3	0	0	3	3	30	20	50	3 Hours
4	5	PC	CT	22IoT504	**Lab. :** Computer Communication Network	P	0	0	2	2	1		60	40	
5	5	PC	CT	22IoT505	Design & Analysis of Algorithms	T	3	0	0	3	3	30	20	50	3 Hours
6	5	PC	CT	22IoT506	**Lab.:** Design & Analysis of Algorithms	P	0	0	2	2	1		60	40	
7	5	PE			**Professional Elective-I ***	T	3	0	0	3	3	30	20	50	3 Hours
8	5	STR	EE	22IoT510	Industrial Training, Seminar & Report	P	0	0	0	0	1		60	40	
9	5	OE	CT		**Open Elective - I**	T	3	0	0	3	3	30	20	50	3 Hours
10	5	OE	CT		**Open Elective - II**	T	3	0	0	3	3	30	20	50	3 Hours
					TOTAL FOURTH SEM		18	0	6	24	22				

List of Professional Electives-I *

1	5	PE-I	EE/EE	22IoT511	PE-I: Pattern Recognization
2	5	PE-I	EE/CT	22IoT512	PE-I: CMOS Subsystem Design
3	5	PE-I	EE/EL	22IoT513	PE-I: Power Electronics
4	5	PE-I	EE/ME	22IoT514	PE-I: Supply chain management

Open Elective-I

1	5	OE-I	CT	22CT531	OE-I : Introduction to DBMS
2	5	OE-I	CT	22CT532	OE-I : Essentials of IT
3	5	OE-I	CT	22CT533	OE-I : Operating System Concepts
4	5	OE-I	CT	22CT534	OE-I : Introduction to Salesforce

Open Elective-II

1	5	OE-II	CT	22CT551	OE-II : Software Testing
2	5	OE-II	CT	22CT552	OE-II : Internet Technology
3	5	OE-II	CT	22CT553	OE-II : Multimedia and Animation
4	5	OE-II	CT	22CT554	OE-II : Current Trends and Technologies

List of Mandatory Learning Course (MLC)

1	5	HS	T&P	MLC2125	YCAP5: YCCE Communication Aptitude Preparation	A	3	0	0	3	0
2	5	HS	R&D	MLC125	Design thinking	A	2	0	0	2	0

MSEs* = Two MSEs of 15 Marks each will conducted and marks of of these 2 MSEs will be considered for Continuous Assessment
TA ** = for Theory : 12 marks on lecture quizzes, 12 marks on two TA2 activitied decided by course teacher, 2 marks on class attendance and 4 marks on TA4 activities
TA** = for Practical : MSPA will be 15 marks each

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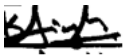(Department of Computer Technology)
B. Tech in CSE (IoT)

SoE No.
22IoT-101

V SEMESTER
22IoT501 : Introduction to IoT

Course Outcomes:
Upon successful completion of the course the students will be able to
1. Upon successful completion of the course, the student will be able to:
1. To **understand**, define and explain the fundamental concepts of Internet of things and wireless sensor networks.
2. To **apply** the knowledge of communication, networks and coding to networks
3. To **analyse** the given network parameters and arrive at suitable conclusions
4. To **implement** and demonstrate the specified mini-project using suitable communication and sensor network parameters.

Unit:1	**Introduction** Internet of Things Promises–Definition–Scope–Sensors for IoT Applications–Structure of IoT, Sensing, Actuation, Basics of Networking, IoT architecture.	**7 Hours**
Unit:2	**Connectivity Technologies in IoT** Connectivity Technologies in IoT: MQTT, COAP, XMPP, AMQP	**7 Hours**
Unit:3	**Network Layer:** IPv4, IPv6, 6LoWPAN	**6 Hours**
Unit:4	**IoT Communication protocols:** IEEE802.15.4, ZigBee, Wireless HART, Zwave, Bluetooth, NFC, RFID	**7 Hours**
Unit:5	**Wireless Sensor networks** Wireless Sensor networks: Components of sensor nodes, Node Behavior in WSNs, Applications, WSN Coverage	**7 Hours**
Unit :6	**Cloud Computing** Cloud Computing: Characteristics, Components of Cloud Computing, Service Models, Deployment Models, Service Management, Cloud Security	**7 Hours**
	Total Lecture Hours	**39 Hours**

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(Department of Computer Technology)

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22IoT-101

B. Tech in CSE (IoT)

Text books	
1	Dr. Guillaume Girardin , Antoine Bonnabel, Dr. Eric Mounier, 'Technologies & Sensors for the Internet ofThings Businesses & Market Trends 2014 -2024',Yole Développement Copyrights ,2014
	NPTEL course material on Introduction to Internet of Things
Reference Books	
1	Peter Waher, 'Learning Internet of Things', Packt Publishing, 2015
2	Editors OvidiuVermesan Peter Friess,'Internet of Things –From Research and Innovation to Market
3	Deployment', River Publishers, 20145.N. Ida, Sensors, Actuators and Their Interfaces, Scitech Publishers, 2014
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	
2	
MOOCs Links and additional reading, learning, video material	
1	
2	
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(Department of Computer Technology)

SoE No.
22IoT-101

B. Tech in CSE (IoT)

V SEMESTER
22IoT502 : Lab. Introduction to IoT

Course Outcomes:
Upon successful completion of the course, the student will be able to:

1. Understanding of IoT value chain structure (device, data cloud), application areas and technologies involved

2. Understand IoT sensors and technological challenges faced by IoT devices, with a focus on wireless, energy, power, RF and sensing modules

3. Market forecast for IoT devices with a focus on sensors

4. Explore and learn about Internet of Things with the help of preparing projects designed for Raspberry Pi

Sr. No.	Experiments based on
1	To study Arduino Uno IoT Kit with ATMega 328 Microcontroller & Design a sketch for running of LEDs
2	Design a sketch for traffic light control signal.
3	Design a sketch for blinking of LED using Node MCU.
4	Design a sketch for Web Access point using Node MCU.
5	Design a sketch for Web Server using Node MCU.
6	Design a sketch to read data from Ultrasonic Sensor and send it on serial monitor.
7	Design a sketch to read data from IR Sensor and send it on serial monitor.
8	Design a sketch to read data from DHT Sensor and send it on serial monitor. Also to log data of temperature sensor over internet (Thingspeak)
9	Advance Practical: Study and setup of ESP -32 board
10	Mini Project

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B. Tech in CSE (IoT)

SoE No.
22IoT-101

V SEMESTER
22IoT503 : Computer Communication Network

Course Outcomes:

Upon successful completion of the course the students will be able to

1. Understand fundamental underlying principles of computer networking
2. Describe and analyze a number of data link, network, and transport layer protocols.
3. Analyze and design routing algorithms.
4. Understand network security and the working of various application layer protocols
5. Design and simulate basic network concepts using modern tool

Unit	Content	Hours
Unit:1	Introduction, network and services: communication network, approaches to network design, types of network, two stage and three stage network. Uses of computer networks, LAN, MAN, WAN, design issues for layers, connection oriented and connectionless services, service primitives, Application and layered architecture, OSI reference model.	**7 Hours**
Unit:2	Physical layer and medium access layer: Guided transmission media, Unguided transmission media, multiple access protocols, IEEE standard 802 for LAN and MAN, high speed LANS, repeaters, hubs, bridges, fast Ethernet, Wireless LAN	**6 Hours**
Unit:3	Data link layer: .Data link layer design issues, Framing, error detection and correction methods, , Flow Control ,elementary data link protocols, sliding window protocols.	**7 Hours**
Unit:4	Network layer and transport layer: network layer design issues, routing, congestion, internetworking, transport layer design issues, transport service primitives, internet transport protocol, TCP/IP architecture, TCP/IP protocol, IP packets, IP addressing, TCP/IP utilities ,wireless TCP and UDP, routers and gateways	**7 Hours**
Unit:5	Application layer: Domain name system, electronic mail system, Remote Logging and File Transfer, WWW and HTTP, Multimedia.	**6 Hours**
Unit :6	Security: Cryptography, e-mail security, web security, communication security, Digital Signature Entity Authentication, FIREWALLS, SSL Services	**6 Hours**
	Total Lecture Hours	**39 Hours**

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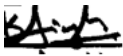
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Text books	
1	Data Communications and Networking by Behrouz a Forouzan,5th Edition
Reference Books	
1	Computer Networks by Tanenbaum,5th Edition
2	Data and Computer Communication by W. Stallings ,8th Edition
3	
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	
2	
MOOCs Links and additional reading, learning, video material	
1	https://www.tutorialspoint.com/digital_communication/digital_communication_quick_guide.htm
2	https://nptel.ac.in/courses/106/105/106105080/
3	https://nptel.ac.in/courses/106/106/106106091/

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SoE No.
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V SEMESTER
22IoT504 : Lab. Computer Communication Network

Course Outcomes:
Upon successful completion of the course the students will be able to
1. Understand fundamental underlying principles of computer networking
2. Describe and analyze a number of data link, network, and transport layer protocols.
3. Analyze and design routing algorithms.
4. Understand network security and the working of various application layer protocols
5. Design and simulate basic network concepts using modern tool

Sr. No.	Experiments based on
1	To construct and verify Simple LAN using Cisco Packet Tracer.
2	To Connect Two Local Area Networks using a Router using Cisco Packet Tracer
3	To design Star and Bus Topology using Cisco Packet Tracer.
4	To design Mesh and Ring Topology using Cisco Packet Tracer.
5	To design Static routing using 3 routers using Cisco Packet Tracer.
6	To design Wireless LAN using Cisco Packet Tracer.
7	To Connect DNS server using Packet tracer
8	To study Fabrication of UTP cables.

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V SEMESTER
22IoT505 : Design & Analysis of Algorithms

Course Outcomes :
Upon successful completion of the course the students will be able to
1. Compare different types of asymptotic notations and find the time complexity in terms of asymptotic notations
2. Solve recurrences using various techniques.
3. Implement divide and conquer strategy, greedy strategy, dynamic programming algorithms and backtracking strategy
4. Identify and differentiate between various types of complexity classes.

Unit I:	(7 Hrs.)
Mathematical foundations, summation of arithmetic and geometric series, $\sum n$, $\sum n$, bound summations using integration, analyzing control structures, worst case and average case analysis, Asymptotic notations, sorting algorithms such as selection sort, insertion sort, bubble sort, heap sort, External Sorting, lower bound proof	
Unit II:	**(8 Hrs.)**
Recursive functions and recurrence relations, solutions of recurrence relations using technique of characteristic equation and generating functions, elementary and advanced data structures with operations on them and their time complexity, Amortized analysis.	
Unit III:	**(8 Hrs.)**
Divide and conquer basic strategy, binary search, quick sort, merge sort, Fast Fourier Transform etc. Greedy method – basic strategy, application to job sequencing with deadlines problem, minimum cost spanning trees, single source shortest path etc.	
Unit IV:	**(7 Hrs.)**
Dynamic Programming basic strategy, multistage graphs, all pair shortest path, single source shortest paths, optimal binary search trees, traveling salesman problem.	
Unit V:	**(8 Hrs.)**
Basic Traversal and Search Techniques, breadth first search, connected components, Backtracking basic strategy, 8 – Queen"s problem, graph coloring, Hamiltonian cycles etc.	

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Unit VI:	**(7 Hrs.)**
NP-hard and NP-complete problems, basic concepts, non-deterministic algorithms, NP-hard and NP-complete, Cook"s Theorem, decision and optimization problems, polynomial reduction.	
Total Lecture	**45 Hours**

Text Books:
1. "Computer Algorithms", Horowitz, Sahni, Rajasekaran, Universities press
2. "Introduction to Algorithms", Cormen ,Leiserson, Rivest, Stein, Prentice Hall of India
3. "Fundamentals of Algorithms", Brassard, Bratley, Prentice Hall of India

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V SEMESTER
22IoT506 : Lab. Design & Analysis of Algorithms

Lab : Design & Analysis of Algorithms

Practical list

1	WAP to implement basic sorting algorithms.
2	WAP to implement basic sorting algorithms.
3	WAP to implement divide and conquer algorithms.
4	WAP to implement divide and conquer algorithms.
5	WAP to implement greedy algorithms.
6	WAP to implement greedy algorithms.
7	WAP to implement dynamic programming algorithms.
8	WAP to implement dynamic programming algorithms.
9	WAP to implement backtracking algorithms.
10	WAP to implement backtracking algorith

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22IoT-101

V SEMESTER
22IoT511 : PE-I: Pattern Recognization

Course Outcomes:
Upon successful completion of the course the students will be able to
1.understand basics of Bays Decision Theory
2. Describe parameter estimation and supervised learning, nonparametric technique methods
3. Apply linear discriminate functions, unsupervised learning and clustering
4. Analyze and explore advanced topics of Pattern Recognition and their applications.

Unit	Description	Hours
Unit:1	PATTERN RECOGNITION OVERVIEW:Engineering approach to PATTERN RECOGNITION, relationship of PATTERN RECOGNITION to other areas, Pattern recognition applications, pattern techniques, pattern recognition approaches (StatPR, SyntPR, NeurPR) FEATURES AND FEATURE EXTRACTIONS TECHNIQUES: Introduction, zoned features, Graph representation techniques, sequentially detected features, feature extraction, feature vector and feature space.	**7 Hours**
Unit:2	**Bays Decision Theory**: Introduction, bays decision theory continuous case, two category classification, minimum error rate classification, classifier, discriminate functions and decision surfaces (multicategory and two category case). The normal density function (Univariate and multivariate normal density function)	**7 Hours**
Unit:3	PARAMETER ESTIMATION AND SUPERVISED LEARNING:maximum likelihood estimation, Bayes classifier, general Bayesian learning, problem of dimensionally	**7 Hours**
Unit:4	NON-PARAMATRIC TECHNIQUES :Density estimation, Parzen windows, k nearest estimation, nearest neighbor rule, k- nearest neighbor rule, approximation by Series expansion, approximation for binary case, Fisher''s linear discriminant, Multiple discriminant analysis	**6 Hours**
Unit:5	LINEAR DISCRIMINATE FUNCTIONS:Linear discriminate functions and decision surface, two category and multicategory case generalized linear discriminate functions , minimizing the perception criteria functions, relaxation procedure, minimum squared error procedures	**7 Hours**
Unit :6	UNSUPERVISED LEARNING AND CLUSTERING: Mixture densities and identifiability Maximum likelihood estimates, Unsupervised Bayesian learning, Data description and clustering, similarity measures, criterion functions for clustering, iterative optimization, hierarchical clustering	**7 Hours**
	Total Lecture Hours	**39 Hours**

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Textbooks	
1	Pattern Recognition and Image Analysis, Earl Gose, Richard Johnsonbaugh, and Steve Jost; PHI Pvte. Ltd.,NewDelhi-1, 1999
Reference Books	
1	Pattern classification and scene analysis, R. O. Duda and P. E. Hart, Wiley Interscience publications
2	Pattern Recognition, Sergios Theodoridis and Konstantinos Koutroumbas, Elsevier Academic Press, Second Edition, 2003,
3	
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/yccelibrary.html
2	
MOOCs Links and additional reading, learning, video material	
1	https://onlinecourses.nptel.ac.in/noc19_ee56/preview
2	
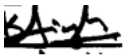
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V SEMESTER
22IoT512 : PE-I: CMOS Subsystem Design

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B. Tech in CSE (IoT)

V SEMESTER
22IoT513 : PE-I: Power Electronics

Course Outcomes:
Upon successful completion of the course the students will be able to
1.   Identify power semiconductor devices and their use in power converters
2.   Describe Power semiconductor devices with their turn on/off methods and converter circuits
3.   Determine the different parameters of commutation, protection of power devices and converter circuits
4.   Analyse the performance of converters, chopper and inverter

Unit:1	**Power Semiconductor Devices**	**7 Hours**

SCR and its characteristics, Gate characteristics, SCR turn off Methods, ratings.

Series and parallel connections of SCRs, TRIAC.

Unit:2	**Single Phase Line Commutated Converters**	**6 Hours**

Single phase line commutated converters, single pulse converter, single phase bridge converter, effect of source inductance, effect of freewheeling diode, single phase half-controlled rectifier, cycloconverter (single phase)

Unit:3	**Three Phase Line Commutated Converters**	**7 Hours**

Three phase three pulse converter, three phase bridge converter, speed control of dc motors (with single phase rectifier).

Unit:4	**Forced Commutated Semiconductor Devices and Protection**	**6 Hours**

Characteristic and working of MOSFET, Gate turn off thyristor and insulated gate bipolar transistor.

protection of SCR: gate circuit protection, over voltage and over current protection, snubber circuit design.

Unit:5	**D.C. Choppers**	**7 Hours**

Principles of step-down chopper, step up chopper classification, Control strategies, time ratio control and current limit control.Voltage and load commutated choppers, Multiphase choppers, Application of choppers.

Unit :6	**Single Phase and Three Phase Bridge Inverters**	**6 Hours**

Single phase and three phase bridge inverters, Output voltage control, Harmonics in output voltage waveforms, Harmonic attenuation by filters, Harmonic reduction by pulse width modulation techniques, analysis of single pulse width modulation, working of current source inverters, applications.

	Total Lecture Hours	**39 Hours**

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Text books:

S.N	TITLE	EDITION	AUTHOR	PUBLICATION
1	Power Electronics Circuits Devices and Applications	3rd Edition,2004	M.H.Rashid	Prentice Hall Limited
2	Power Electronics		D.Y.Shingare	Electrotech Publication Engineering Series

Reference books:

S.N	TITLE	EDITION	AUTHOR	PUBLICATION
1	Power Electronics	1981	C.W.Lander	McGraw Hill
2	Thyristors and their Applications	2nd Edition 2002	Dr.M.Ramamoorty	East West Press
3	Thyristors and their Applications		Dr.G.K.Dubey, Doralda Sinha and Joshi	New Age International
4	Power Electronics	1989	Ned Mohan, T.M.Undeland, and W.P.Robbins	John Wiley and Sons

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]

1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Electrical%20Engineering/Power%20Electronics/Muhammad%20H.%20Rashid-Power%20electronics%20_%20devices,%20circuits,%20and%20applications-Pearson%20(2014).pdf
2	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Electrical%20Engineering/Power%20Electronics/Power%20Electronics%20by%20Ps%20bimbhra.pdf

MOOCs Links and additional reading, learning, video material	
1	https://youtu.be/B-_I5bQDQLU?feature=shared
2	https://youtu.be/m-uY4fja_Jw?feature=shared

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SoE No.
22IoT-101

V SEMESTER
22IoT514 : PE-I: Supply chain management

Course Outcomes:
Upon successful completion of the course the students will be able to
1. **Analyze** and **evaluate** the problems of Supply Chain Logistics, order processing and sales channel Integration.
2. **Select** and **apply** the process of warehousing and supplier management to **estimate** the involved parameters.
3. **Analyze** the process of demand forecasting and data analytics and **applying** it for error minimization.
4. **Examine** and **evaluate** the process of freight handling, bid and spend management system, data analytics.

Unit:1	**Supply Chain Logistics** (https://www.coursera.org/learn/supply-chain-logistics) **Transportation:** The Importance of Logistics, Moving Freight over the Road, Motor Carriers, Flying Freight, Air Carriers, Containers on a Train, Express Delivery **Warehousing and Inventory Management:** need of warehouses, designing a warehouse, need of inventory, ordering the inventory **Logistics Network:** Facilities: How many and where, Factors Influencing Logistics Networks, Striving for Logistics Customer Service **(CO-1)**	8 Hours
Unit:2	**Supply Chain Management Strategy-I** (https://www.coursera.org/learn/supply-chain-management-strategy) **What is Supply Chain Strategy?** What is Supply Chain Management Strategy? , How to Save 2.3% of Revenue? **Logistics at MTC** Logistics at MTC, How much inventory do we need?, When to order inventory?, How do you build a logistics network? , Facilities: How many and where?, Factors Influencing Logistics Networks, Logistics Customer Service **Operations at MTC** Operations at MTC, Lean Operations, Why do companies need warehouses?, How should we design a warehouse?, Lean Inventory (**CO-2**)	8 Hours
Unit:3	**Supply Chain Management Strategy-II** (https://www.coursera.org/learn/supply-chain-management-strategy) **Planning at MTC** Planning at MTC, Naive Forecast, Cumulative Mean Forecast, Forecast Accuracy, Moving Average, Exponential Smoothing **Sourcing at MTC:** Sourcing at MTC, Purchasing, Procurement, Supply Management, Strategic Sourcing, Make versus Buy **The Solution:**	8 Hours

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	Solution Example **Supply Chain Operations-I** (https://www.coursera.org/learn/operations) **Lean Operations and Theory of Constraints:** What is Supply Chain Operations?, The Goals of Operations: Speed, Flexibility, Quality, and Cost, Lean Operations, Theory of Constraints **Lean Inventory:** Lean Inventory, Screencast - Economic Order Quantity, Screencast - Safety Stock Calculation, Kanban **(CO-2)**	
Unit:4	**Supply Chain Operations-II** (https://www.coursera.org/learn/operations) **Six Sigma** From "Quality is Free" to "Six Sigma", DMAIC and the Define Stage, Screencast of DMAIC and the Measure Stage, Screencast of DMAIC and the Analyze Stage, Screencast of DMAIC and the Improve Stage, Screencast of DMAIC and the Control Stage **Lean Six Sigma** The Lean Six Sigma Toolkit **Supply Chain Planning-I** (https://www.coursera.org/learn/planning) **Simple Forecasting Methods, Naive Forecast and Cumulative Mean:** What is Supply Chain Planning?, So, you want to forecast demand?, The Naive Forecast, Naive Forecast Screencast, The Cumulative Mean, Cumulative Mean Screencast **Forecast Accuracy and Moving Average:** Forecast Accuracy Measures, Forecast Accuracy Measures Screencast, Moving Average, Screencast on Moving Average **(CO-3)**	**7 Hours**
Unit:5	**Supply Chain Planning-II** (https://www.coursera.org/learn/planning) **Exponential Smoothing and Forecast Selection:** Exponential Smoothing, Exponential Smoothing Screencast, Selecting the Best Forecast **Supply Chain Planning:** Supply, Manufacturing and Distribution Planning **Supply Chain Sourcing-I** (https://www.coursera.org/learn/sourcing) **Procurement, Purchasing, Supply Management, and Strategic Sourcing:** What is Supply Chain Sourcing?, Purchasing, Procurement, Supply Management, Strategic Sourcing **(CO-3)**	**7 Hours**

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Unit :6	**Supply Chain Sourcing-I** (https://www.coursera.org/learn/sourcing) **Make versus Buy Decisions:** The Make versus Buy Decision, Why Should I Insource?, Why Should I Outsource? **Supplier Selection:** Supplier Segmentation, Single versus Multiple Sourcing **Sourcing Best Practices:** Sourcing Best Practices, Procure-to-Pay Systems **(CO-4)**	**7 Hours**
	Total Lecture Hours	**45 Hours**

Text books	
1	Logistics and Supply Chain Management by Martin Christopher Pearson Education Limited Edition 2012
2	Managing Supply Chain Operations by Lei Lei, Leonardo DeCandia, Rosa World Scientific Publishing Company Edition 2017
3	Single Point of Failure: The 10 Essential Laws of Supply Chain Risk Management by Gary S. Lynch Wiley Edition 2009
Reference Books	
1	The Forklifts Have Nothing To Do! Lessons in Supply Chain Leadership 2003 Joseph L. Walden iUniverse
2	Strategic Supply Chain Management: The Five Core Disciplines for Top Performance 2013 Shoshanah Cohen and Joseph Roussel McGraw-Hill Education
3	The Supply Chain Revolution: Innovative Sourcing and Logistics for a Fiercely Competitive World 2017 Suman Sarkar AMACOM
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	
2	
MOOCs Links and additional reading, learning, video material	
1	Unit-1 https://www.coursera.org/learn/supply-chain-logistics
2	Unit-2 https://www.coursera.org/learn/supply-chain-management-strategy
3	Unit-3 https://www.coursera.org/learn/supply-chain-management-strategy https://www.coursera.org/learn/operations
4	Unit-4 https://www.coursera.org/learn/operations https://www.coursera.org/learn/planning
5	Unit-5 https://www.coursera.org/learn/planning https://www.coursera.org/learn/sourcing
6	Unit-6 https://www.coursera.org/learn/sourcing

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V SEMESTER

22IoT510__Industrial Training, Seminar & Report
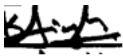
Course Outcomes :
Upon successful completion of the course the students will be able to
1. Make detailed notes and reports.
2. Compute the problems on quants
3. Illustrate the problems on logical, technical and verbal
4. Apply the field knowledge to the practical applications.
Contents :
The students are expected to visit minimum Six Different live construction project sites covering various construction methodologies.
The students shall prepare the report based on such visits. The reports should include the technical details on all aspects of the project including plant, material, machinery, HR, Quality Assurance etc. being followed at the site for construction.
The evaluation will be based on seminar and the site visit report submitted by the students.

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B. Tech in CSE (IoT)

SoE No.
22IoT-101

V SEMESTER
22CT533 : OE I: Operating System Concepts

Course Outcomes :
Upon successful completion of the course the students will be able to
1. Use LINUX operating system.
2. Write Shell scripts

Unit I:	(8 Hrs.)
Introduction: History of Linux and Unix, Linux Overview, Linux releases, open linux	
Unit II:	**(8 Hrs.)**
Linux Commands and Filters : Mkdir, CD, rmdir, pwd, ls, who, whoami, cat, more, fail, head, concept of, mv, chmod, grep,wc, comm., split, sort, diff, kill, write, wall, merge, mail, news	
Unit III:	**(8 Hrs.)**
Shell: The command line special characters and file arguments, standard input/output and redirection, pipes, redirecting and piping with standard errors, shell scripts, jobs.	
Unit IV:	**(8 Hrs.)**
Linux file Structure: Linux files, file structure, listing displaying and printing files, managing directories, file and directory operations.	
Unit V:	**(8 Hrs.)**
Vi Editor: Vi editing commands advanced Vi editing commands, line editing commands, options in Vi.	
Unit VI:	**(8 Hrs.)**
System Administration: System management, managing users, installing and managing devices, floppy disk management, file system administration, backups.	
Total Lecture	**33 Hours**

Textbooks:	
1.	Linux – The Complete Reference by Richard Peterson, Tata McGraw Hill, New Delhi
2.	Linux – Install and Configuration Black Book by Die Annleblanc and Issac Yates, IDG Books India Private Ltd., Delhi
3.	Unleashed Linux by Tech Media Publishers.

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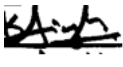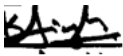
(Department of Computer Technology)

B. Tech in CSE (IoT)

SoE No.
22IoT-101

V SEMESTER
22CT534: OE I: Introduction to Salesforce

Course Outcomes :

Upon successful completion of the course the students will be able to

1. Employ the knowledge of customer-centered organization and implement the integral processes within an organization that are automated and how does the automation create predictability and efficiencies.

2. Represent a customize a CRM application for organization to suit their business needs.

3. Determine CRM strategies by understanding customers' preferences for the long-term sustainability of the Organizations.

Unit I:	(8 Hrs.)
Introduction to Cloud: Definition of Cloud Computing, Cloud Architecture, Cloud Types, Service models, Deployment models, Examining the Characteristics of Cloud Computing, Benefits of cloud computing, Disadvantages of cloud computing.	
Unit II:	(7 Hrs.)
CRM Concepts and its tools: Definition, History, Key Benefits, Service Level Agreements (SLAs), creating and managing effective SLAs. Architecture, Service Nature of Salesforce, Features, Products and its overviews, Traditional CRM vs. Salesforce CRM	
Unit III:	(7 Hrs.)
CRM Administration and Data Model Design: Lightning and classic UI and differences, Creation of org, Object Manager, App Manager, Setup, App creation, tabs, Types of Objects, Data Types, Sandboxes, Understanding Relationships and its limitations, Types of Relationship and their differences, Junction Object, formulas, Dependency picklist fields, Validation Rules.	
Unit IV:	(8 Hrs.)
Data Management with CRM Tool: Record details, List Views, Filters, Actions Page layouts, Compact Layouts, Introduction to Workflows, email templates, Limitation of workflows, approval processes, Process Builder, Lightning Flow, Community Creation, Reports and Dashboards.	
Unit V:	(7 Hrs.)
Security Model: Introduction to Profiles and Permission Set, Overview of Data Security, Control access to org, object, field, record, OWD, Role and Roles Hierarchy, Sharing Rule, Sharings Objects, Apex Sharing.	
Unit VI:	(8 Hrs.)
CRM Tool Development: Introduction to Apex, Collections, SOQL and SOSL, DML Operations. Lightning Aura Component: Introduction to Aura component, Advantages, attributes handling in aura component.	
Total Lecture	**45 Hours**

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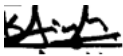**(Scheme of Examination w.e.f. 2022-23 onward)**
(Department of Computer Technology)

B. Tech in CSE (IoT)

SoE No.
22IoT-101

Textbooks:	
1.	Salesforce CRM: The Definitive Admin Handbook Paperback, 2 nd ,Paul GoodeyPackt Publishing Limited
2.	Customer Relationship Management Concept & Cases ,1 st (2013), Alok Kumar Rai Prentice Hall of India
3.	Customer Relationship Management, 1 st (2012) ,V. Kumar & Werner J. Wiley

Reference Books	
1.	CRM Tool Links (Online) http://help.salesforce.com

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Nagar Yuwak Shikshan Sanstha's

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B. Tech in CSE (IoT)

| SoE No. |
| 22IoT-101 |

V SEMESTER
22CT553: OE II: Multimedia and Animation

Course Outcomes :
Upon successful completion of the course the students will be able to
1. To understand multimedia basics - hardware and software.
2. To develop skills in design, illustration, image manipulation, graphic designing, video editing, visual effects and game designing.
3. To develop the skills in animation software

Unit I:	**(7 Hrs.)**
Multimedia definitions, CD-ROM and the multimedia highway. Applications of multimedia, introduction to making multimedia, the stages of project, requirements to make good multimedia, multimedia skills and training, the multimedia tech.	
Unit II:	**(6 Hrs.)**
Multimedia hardware, Macintosh and windows production platforms, hardware peripherals, connections, memory and storage devices, input devices output hardware, communication devices, media software, basic tools, making instant multimedia authoring tools.	
Unit III:	**(6 Hrs.)**
Multimedia building blocks –text-using text in multimedia, computers and text, font editing and design tools, Sound-the power of sound , multimedia system sound, Digital audio, preparing digital audio files, Audio file format, images-Making still Images, Color, Image file format, video-Broadcast video standard, Analog video, Digital video, optimizing video files for CDROM	
Unit IV:	**(6 Hrs.)**
What is meant by Animation, why we need Animation, History of Animation, Uses of Animation. Types of Animation, Principles of Animation, Some Techniques of Animation, and Animation on the WEB, Special Effects, and Creating Animation.	
Unit V:	**(6 Hrs.)**
Creating Animation in Adobe Animate: Introduction to Animate –Working with the Timeline and Frame-based Animation-Working with the Timeline and Tween-based Animation –Understanding Layers–Action script.	
Unit VI:	**(6 Hrs.)**
3D Animation & its Concepts, Types of 3D Animation, Skeleton & Kinetic, 3D Animation Texturing and Lighting of 3D Animation, 3D Camera Tracking, Applications & Software of 3D Animation.	
Total Lecture	**36 Hours**

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SoE No.
22IoT-101

Textbooks:

1.	Multimedia Making Work by Tay Vaughan (TMH), 3 rd Ed.
2.	Principles of Multimedia by Ranjan Parekh, 2007, TMH.
3.	Multimedia Technologies by Ashok Banerji, Ananda Mohan Ghosh, McGraw Hill Publication

Reference Books:

1.	Multimedia systems design by K. Andleigh, K. Thakkrar, Phi Pub.
2.	Multimedia: Computing, Communications & Applications by Raif Stein Metz and KiaraNahrstedt.
3.	Advanced Multimedia Programming by Steve Rimmer, McGraw Hill Pub.

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YCCE-IoT-23

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B. Tech in CSE (IoT)

SoE No.
22IoT-101

V SEMESTER
22CT554: OE II: Current Trends and Technologies

Course Outcomes :
Upon successful completion of the course the students will be able to
1. To understand multimedia basics - hardware and software.
2. To develop skills in design, illustration, image manipulation, graphic designing, video editing, visual effects and game designing.
3. To develop the skills in animation software

Unit I:	(7 Hrs.)
Fundamentals of Communications: Types of communication-Wired, wireless, mobile, Modes of transmission: Simplex, Half Duplex, Full Duplex, Multiplexing techniques, History and evolution of wireless and mobile systems, Transition and characteristics of 1G, 2G, 3G, 4G, Spectrum, regulations, and frequency allocation	

Unit II:	(6 Hrs.)
Fundamental of INTERNET: History, Internet working, Connections, Internet services, The World Wide Web, Tools for the WWW, Web servers, Web browsers, Web page makers and editors, Plug-ins and delivery vehicles.	

Unit III:	(7 Hrs.)
e-Technologies: Electronic Commerce: Framework, Media Convergence of Applications, Consumer, Applications, Organization Applications, Electronic Payment Systems: Digital Token, Smart Cards, Credit Cards, Risks in Electronic, Payment System, Designing Electronic Payment Systems, Electronic Data Interchange (EDI): Concepts, Applications, (Legal, Security and Privacy) issues, EDI and Electronic Commerce, Standardization and EDI, EDI Software, Implementation, EDI Envelope for Message Transport, Internet-Based EDI.	

Unit IV:	(6 Hrs.)
e-Learning: Definition, Introduction, Types of e-Learning: Learner-led e-Learning, Facilitated eLearning, Instructor-led e-Learning, Embedded e-Learning, Telemonitoring And e-Coaching ELearning Models: WBT, CBT, LMS, LCMS, Virtual School Systems, E-Learning Tools And Technologies: e-mail, Online Discussion, Chat and Instant Messaging, Voting, Whiteboard, Application Sharing, Conferencing, Online Meeting Tools, Case study.	

Unit V:	(6 Hrs.)
Green Computing: Introduction, Why....Green Computing? Approaches to Green ComputingVirtualization, Power Management, Power supply, Storage, Video Card, Display, IT Equipment, Recycling, Remote Conferencing & Telecommuting Strategies, Product longevity, Resource allocation, Terminal servers, Operating system support, How to Implement? Industrial implementations of Green Computing- Blackle, Fit-PC, Zonbu computer, Sunray thin client.	

Unit VI:	(7 Hrs.)
Social Networking: Definition, Overview of Social Networking Sites, Types of Social Networking Sites: General purpose, Niche. Advantages of Social Networking Sites, Drawbacks of Social Networking Sites, Features and Need of Social Networking, Security Issues with Social Networking Sites, Case Studies	

	Total Lecture	**39 Hours**

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(Department of Computer Technology)

B. Tech in CSE (IoT)

SoE No.
22IoT-101

Textbooks:

1.	. Impact of E-Business Technologies on Public and Private Organizations by OzlemBak, Nola Stair.
2.	Mobile Computing by Tomasz Imielinski , Henry F. Korth .
3.	Broadband telecommunications technology by ByeongGi Lee, Minho Kang, Jonghee Lee.

Reference Books:

1.	Introduction to broadband communication systems by Cajetan M. Akujuobi, Matthew, N. O. Sadiku.
2.	E-Learning Tools and Technologies William Hortan, Katherine Hortan,Wiley Pub
3.	Internet (Use of Search Engines Google & Yahoo etc).

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YCCE-IoT-25

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B. Tech in CSE (IoT)

SoE No.
22IoT-101

V SEMESTER
Audit Course
MLC2125 : YCAP5

			July 2024	1.00	Applicable for
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SoE No.
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V SEMESTER

Audit Course

MLC125: Design thinking

			July 2024	1.00	Applicable for
					AY 2024-25 Onwards
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Bachelor of Technology

SoE & Syllabus 2022

6th Semester

(Department of Computer Technology)

B. Tech in CSE (IoT)

Nagar Yuwak Shikshan Sanstha's
Yeshwantrao Chavan College of Engineering
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B.TECH SCHEME OF EXAMINATION 2022
(Scheme of Examination w.e.f. 2022-23 onward)
(Department of Electronics Engineering)
B. Tech in CSE (IOT)

SoE No.
22CSIoT-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
Sixth Semester															
1	6	PC	EE	22IoT601	Embedded System Design	T	3	0	0	3	3	30	20	50	3 Hours
2	6	PC	EE	22IoT602	**Lab.:** Embedded System Design	P	0	0	2	2	1		60	40	
3	6	PC	EE	22IoT603	Data Acquisition & Signal Conditioning	T	3	0	0	3	3	30	20	50	3 Hours
4	6	PC	CT	22IoT604	AI and Machine Learning	T	3	0	0	3	3	30	20	50	3 Hours
5	6	PC	CT	22IoT605	**Lab**:AI and Machine Learning	P	0	0	2	2	1		60	40	
6	6	PC	EE	22IoT606	**Project Phase-I**	P	0	0	2	4	2		60	40	
7	6	PE			**Professional Elective-II**	T	3	0	0	3	3	30	20	50	3 Hours
8	6	PE			**Lab: Professional Elective-II**	P	0	0	2	2	1		60	40	
9	6	OE			**Open Elective - III**	T	3	0	0	3	3	30	20	50	3 Hours
10	6	OE			**Open Elective - IV**	T	3	0	0	3	3	30	20	50	3 Hours
					TOTAL SIXTH SEM		18	0	8	28	23				

List of Professional Electives- II

Professional Electives-II

	6	PE-II	EE/EE	22IoT651	PE-II : Digital Image processing
1	6	PE-II	EE/EE	22IoT652	PE-II: **Lab.:** Digital Image processing
2	6	PE-II	EE/ME	22IoT653	PE-II Flexible Manufacturing System
	6	PE-II	EE/ME	22IoT654	PE-II: **Lab: :** Flexible Manufacturing System
3	6	PE-II	EE/EL	22IoT655	PE-II: Electrical Drives
	6	PE-II	EE/EL	22IoT656	PE-II **: Lab:** Electrical Drives
4	6	PE-II	CT	22IoT657	PE-II: Introduction to GIS
	6	PE-II	CT	22IoT658	PE-II: **Lab.:** Introduction to GIS

Open Elective-III					
1	6	OE-III	CT	22CT631	OE-III : Introduction to DBMS
2	6	OE-III	CT	22CT632	OE-III : Essentials of IT
3	6	OE-III	CT	22CT633	OE-III : Operating System Concepts
4	6	OE-III	CT	22CT634	OE-III : Introduction to Salesforce

Open Elective-IV					
1	6	OE-IV	CT	22CT651	OE-II : Software Testing
2	6	OE-IV	CT	22CT652	OE-II : Internet Technology
3	6	OE-IV	CT	22CT653	OE-II : Multimedia and Animation
4	6	OE-IV	CT	22CT654	OE-II : Current Trends and Technologies

List of Mandatory Learning Course (MLC)												
1	6	HS	T&P	MLC2126	YCAP6 :	A	3	0	0	3	0	

MSEs* = Two MSEs of 15 Marks each will conducted and marks of of these 2 MSEs will be considered for Continuous Assessment

TA ** = for Theory : 12 marks on lecture quizzes, 12 marks on two TA2 activitied decided by course teacher, 2 marks on class attendance and 4 marks on TA4 activities

TA** = for Practical : MSPA will be 15 marks each

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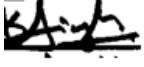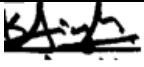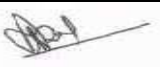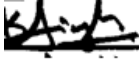
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B. Tech in CSE (IoT)

SoE No.
22IoT-101

VI SEMESTER
22IoT601: Embedded System Design

Course Outcomes:
Upon successful completion of the course the students will be able to
1. Understand & Learn concept of Architecture & organization of ARM.
2. Understand & Learn concept of RTOS Architecture.
3. Apply the concept of programming language to interface I/O Devices.
4. Establish the communication between the different Devices.

Unit	Content	Hours
Unit:1	Introduction to ARM, Advantages of architectural features of ARM Processor, Processor modes, Register organization, Exceptions and its handling, 3/5- stage pipeline ARM organization	**7 Hours**
Unit:2	ARM and THUMB instruction sets, ARM programmer's model, addressing modes, Instruction set in detail and programming, data processing instruction, data transfer instruction, Control flow instructions, simple assembly language programs.	**7 Hours**
Unit:3	ARM assembly language programs and C language programs. Code conversion programs.	**7 Hours**
Unit:4	LPC 2148 architecture block diagrams, pins and signals. GPIO, I / O Interfaces like LED and Switch and their Programs.	**6 Hours**
Unit:5	Display interfacing with LPC 2148. 7segment display interfacing. LCD interfacing and programs.	**7 Hours**
Unit :6	LPC 2148 TIMER and PWM Applications. Embedded ARM applications	**7 Hours**
	Total Lecture Hours	**39 Hours**

Text books	
1	ARM System–on-chip Architecture, 2nd edition, 2000, Steve Furber, Pearson Education Asia
2	Embedded Linux, Hardware, Software and interfacing, 2002. Craig Hallabaugh, Addison-Wesley Professional
3	ARM System Developer's Guide: Designing and Optimizing, 2005 Sloss Andrew N, Symes Dominic, Wright Chris Morgan Kaufman Publication
Reference Books	
1	Technical references on www.arm.com.
2	Web base resources for RTOS and μCOS.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://172.16.1.9/LocalGuru/listLectures.php?cid=29086f3420285fdf&bid=927d7542627865a3
MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/106105159
2	https://nptel.ac.in/courses/106105193

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B. Tech in CSE (IoT)

SoE No.
22IoT-101

VI SEMESTER
22IoT602: Lab. Embedded System Design

Course Outcomes:
Upon successful completion of the course the students will be able to
1. Understand & Learn concept of Architecture & organization of ARM.
2. Understand & Learn concept of RTOS Architecture.
3. Apply the concept of programming language to interface I/O Devices.
4. Establish the communication between the different Devices.

Sr. No.	Experiments based on
1	To swap data byte.
2	To perform addition, subtraction of 16 bit number.
3	To find larger of a two numbers.
4	To perform factorial of a given number.
5	To perform ON/OFF LED and show status of LED on LCD.
6	To display number from 0 to 9 on seven segment display.
7	To ON/OFF LED using Switch.
8	To rotate a stepper motor in clockwise & anti-clock wise direction with equal delay.
9	Perform experiment on DAC of LPC2103
10	ADC and display value on LCD.

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YCCE-IoT-2

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SoE No.
22IoT-101

B. Tech in CSE (IoT)

VI SEMESTER
22IoT603: Data Acquisition & Signal Conditioning

Course Outcomes:
Upon successful completion of the course the students will be able to
1. Understand and identify the hardware components of data acquisition system.
2. Understand the concept of transducers and their characteristics and use of signal conditioning.
3. Understand and identify hardware boards required for digital to analog signal conversion systems (DAC) and analog to digital signal conversion systems (ADC)
4. Understand the basics of peripheral interfaces wrt communication links.

Unit:1	**Introduction:** Definition of data acquisition and control, Fundamentals of data acquisition, Signal conditioning, Data acquisition and control system configuration, Computer plug-in I/O, Distributed I/O, Stand-alone or distributed loggers/controllers, Analog and digital signals: Classification of signals, Sensors and transducers, Transducer characteristics, Resistance temperature detectors (RTDs), Thermistors, Thermocouples, Strain gauges, Wheatstone bridges.	**7 Hours**
Unit:2	Signal conditioning: Types and classes, Field wiring and signal measurement, Noise and interference, Minimizing noise, Shielded and twisted-pair cable.	**7 Hours**
Unit:3	Plug-in data acquisition boards, A/D Boards, Single ended vs differential signals, Resolution, dynamic range and accuracy of A/D boards, Sampling rate and the Nyquist theorem, Sampling techniques, D/A boards,	**7 Hours**
Unit:4	Serial data communications, Transmission modes – simplex and duplex, RS-232-C interface standard, RS- 485 interface standard, Comparison of the RS-232 and RS-485 standards, Serial interface converters, Protocols, Error detection	**6 Hours**
Unit:5	IEEE 488 Standard, Introduction, Electrical and mechanical characteristics, Physical connection configurations, Device types, Bus structure, GPIB handshaking, Device communication, Requirements of IEEE 488.2 controllers, Standard commands for programmable instruments (SCPI)	**7 Hours**
Unit :6	Ethernet and field buses for data acquisition, Physical layer, Medium access control, Difference between 802.3 and Ethernet, The universal serial bus (USB), USB overall structure, Topology.	**7 Hours**
Total Lecture Hours		**41 Hours**

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(Department of Computer Technology)

B. Tech in CSE (IoT)

SoE No.
22IoT-101

Textbooks	
1	Data Acquisition for Instrumentation and Control Systems John Park and Steve Mackay
1	**Electronic Analog Digital Conversion 1st Edition H. Schmid Tata McGraw Hill**
2	Data Converters B. S. Sonde Tata McGraw Hill
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	
2	
MOOCs Links and additional reading, learning, video material	
1	https://www.youtube.com/watch?v=Bj1ldnLV1rk
2	https://www.youtube.com/watch?v=WwQSfk6SSSo
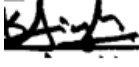
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B. Tech in CSE (IoT)

SoE No.
22IoT-101

VI SEMESTER
22IoT604: AI and Machine Learning

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SoE No.
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VI SEMESTER
22IoT605: Lab. AI and Machine Learning

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SoE No.
22IoT-101

VI SEMESTER
22IoT606: Project Phase-I

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**SoE No.
22IoT-101**

B. Tech in CSE (IoT)

VI SEMESTER
22IoT651 : PE-II : Digital Image processing

Course Outcomes:
Upon successful completion of the course the students will be able to
CO-1 : Understand the basic concepts of digital image processing and f digital image geometry.
CO-2 : Implement the image enhancement and restoration techniques in spatial and frequency domain.
CO-3 : Apply and implement image segmentation techniques using edge detection and merging.
CO-4 : Apply different Image processing algorithms.

Unit:1	Digital image fundamentals : Digital Image through scanner, digital camera, Concept of gray levels, Gray level to binary image conversion, Sampling and quantization, Relationship between pixel, Imaging Geometry.	**7 Hours**
Unit:2	Image Transforms: 2-D FFT, Properties, Walsh transform, Hadamard Transform, Discrete cosine Transform, Haar transform, Slant transform.	**7 Hours**
Unit:3	Image enhancement : Point processing, Histogram processing, Spatial filtering and its frequency domain interpretation. Enhancement in frequency domain, Image smoothing, Image sharpening.	**7 Hours**
Unit:4	Image segmentation: Detection of discontinuities. Edge linking and boundary detection, Thresholding, Region oriented segmentation.	**6 Hours**
Unit:5	Image Restoration: Degradation model, Algebraic approach to restoration, Inverse filtering, Least mean square filters, Constrained Least Squares Restoration, Interactive Restoration.	**6 Hours**
Unit :6	Image compression: Redundancies and their removal methods, Fidelity criteria, Image compression models,Source encoder and decoder, Error free compression, Lossy compression	**6 Hours**
	Total Lecture Hours	**39 Hours**

Text books	
1	Digital Image processing 2nd Edition,2002,R.C. Gonzalez & R.E. Woods,Wesley/ Pearson education
2	Fundamentals of Digital Image processing, 1989. A.K.Jain PHI
3	Digital Image Processing, 2012,S Jayaraman, Tata McGraw Hill Education Pvt.Ltd.

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Reference Books	
1	Digital Image processing using MATLAB,2004 Rafael C. Gonzalez,Richard E Woods and Steven L. Pearson education
2	Digital Image Processing 3rd Edition,2004. William K. Pratt John Wilely
3	Fundamentals of Electronic Image Processing ,SPIC/IEEE Series,1996, Arthur R. Weeks PHI
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	
2	
MOOCs Links and additional reading, learning, video material	
1	
2	
3	

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B. Tech in CSE (IoT)

SoE No.
22IoT-101

VI SEMESTER
22IoT652 : PE-II : Lab. Digital Image processing

Course Outcomes:
Upon successful completion of the course the students will be able to
CO-1 : Understand the basic concepts of digital image processing and f digital image geometry.
CO-2 : Implement the image enhancement and restoration techniques in spatial and frequency domain.
CO-3 : Apply and implement image segmentation techniques using edge detection and merging.
CO-4 : Apply different Image processing algorithms.

Sr. No.	Experiments based on

1	Image Fundamentals
	1. Read and display RGB Image
	2. Observe three different image planes of RGB image
	3. Convert RGB image to Grayscale Image
	4. Determine negative of image using
	   a) imcomplement function
	   b) Using for loop logic
	   c) Find difference of output for above two methods

2	Spatial Image Enhancement
	1. Image Thresholding
	   a. Intensities below 127 converted to 0
	   b. Intensities equal to or above 127 converted to 255
	   c. Convert image into black and white
	2. Intensity Slicing (enhance perticular range of intencities)
	3. Intensity modification using log and antilog
	4. Intensity modification using piecewise linear transformation

3	Image Transform 1. DFT : Verify the magnitude and phase interchanging effect of two images of same size 2. DCT: Reconstruction of image using fewer coeffients of DCT (Information in DCT is concentrated on left most corner)
4	Bit plane Slicing 1. Creation of 8 bit plane images and display the same. 2. Reconstruct image using B7+B6, B7+B6+B5, B7+B6+B5+B4 bit planes. 3. Reconstruct image using MSB bit planes and LSB bit planes
5	Histogram Equalization 1. Perform Image enhancement using imhist command from Matlab 2. Perform Image enhancement using program developed for histogram equalisation

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6	Spatial Filtering
	1. Perform Spatial filtering on image having noise with
	a. Averaging Filter mask (3x3,5x5,9x9,25x25)
	b. Median Filter mask
7	Edge detection
	1. Edge detection using different directional Prewitt, Sobel operators
8	Transform domain Filtering
	1. Perform Transform domain filtering on image having noise with
	a. Butterworth filter Low pass & High Pass
	b. Gaussian Filter

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B. Tech in CSE (IoT)

SoE No.
22IoT-101

VI SEMESTER
22IoT653 : PE-II Flexible Manufacturing System

Course Outcome: After completion of the course, student will demonstrate the ability to

CO 1	Develop FMS using the most appropriate technique
CO 2	Implement FMS concept in a manufacturing environment
CO 3	Explain the role of automation in manufacturing
CO 4	Classify automation equipment and assembly systems into different categories

CO – PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO 1	3	2	2	3	2	1					1	1	1	1
CO 2	3	3	2	2	2	1						1	1	1
CO 3	3	3	3	2	1						1		1	1
CO 4	3	3	3	2	2	1							1	1

Syllabus:

Unit	Content	Hours
1	FMS concept, Components of FMS, FMS Layouts, FMS planning and implementation. Tool Management systems-Tool monitoring, Work holding devices Modular fixturing, flexible fixturing, flexibility, quantitative analysis of flexibility, application and benefits of FMS	7
2	Automated material handling system, AGVs, Guidance methods, AS/RS	8
3	Group Technology, Part families, Part classification and coding, Production flow analysis, Machine cell design, Applications and Benefits of Group Technology	8
4	Structure of a Process Planning, Process Planning function, CAPP - Methods of CAPP, CAD based Process Planning, Retrieval process planning, Generative Process Planning with expert system, Inventory management: Materials requirements planning - basics of JIT	7
5	Monitoring and quality control: Types of production monitoring system, process control & strategies, direct digital control - Supervisory computer control – computer aided quality control - objectives of CAQC, QC and CIM, contact, non-contact inspection methods, CMM and Flexible, Inspection systems, Integration of CAQC with CIM.	7
6	Integrated approach of FMS system, FMS for Automotive sector, FMS integration for IoT, simulation software for FMS system integration	7

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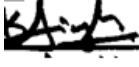(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

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Text Books:

SN	Title	Edition	Authors	Publisher
1	Computer aided Design and Manufacturing	1987	Groover M.P.,	Prentice Hall of India
2	Computer control of manufacturing system	1986	Yorem Koren	McGraw Hill,
3	CAD/CAM/CIM	2000	Radhakrishnan. P, Subramanyam. S	New Age International Publishers,

Reference Books:

SN	Title	Edition	Authors	Publisher
1	"Principles of Computer Integrating Manufacturing"	1999	Kant Vajpayee. S.	Prentice Hall of India
2	"CIM – Towards the factory of the Future"	1994	Scheer. A.W.	Springer-Verlag

Links for E books in YCCE LIBRARY

SN	Link
1	http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6193-0
2	https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042
3	

Links for online courses including SWAYAM / NPTEL/ COURSERA/ UDEMY

SN	Link
1	https://nptel.ac.in/courses/112102103
2	https://nptel.ac.in/courses/112105249
3	https://nptel.ac.in/courses/112105211

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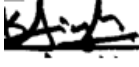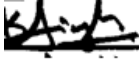(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)
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B. Tech in CSE (IoT)

SoE No.
22IoT-101

VI SEMESTER
22IoT654 : PE-II : Lab. Flexible Manufacturing System

Course Outcome: After completion of the laboratory work, student will demonstrate the ability to

CO 1	Develop FMS using the most appropriate technique
CO 2	Implement FMS concept in a manufacturing environment
CO 3	Explain the role of automation in manufacturing
CO 4	Classify automation equipment and assembly systems into different categories

Lab Experiment List:

Expt. No	Name of Experiment
1	Creation and simulation of palletizing operation
2	Creation and simulation of Pick and Place (XYZ) operation
3	Creation and simulation of production operation involving simultaneous control of machining centers
4	Creation and simulation of part separation operation on multiple conveyors
5	Creation and simulation of part separation operation on multiple conveyors
6	Creation and simulation of sorting operation based on part height and weight on multiple conveyors using a sorting station equipped with vision sensor
7	Creation and simulation of AGV path planning
8	Creation and simulation of Arc and Spot-Welding cell
9	To write and execute a robot program to perform a repetitive pick & place operation
10	To write and execute a robot program to perform a palletizing operation
11	To write and execute a robot program to perform a packaging operation
12	To write and execute a robot program to perform an assembly operation

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SoE No.
22IoT-101

VI SEMESTER
22IoT655 : PE-II: Electrical Drives

Course Outcomes:
Upon successful completion of the course the students will be able to
1. Explain the speed-torque characteristics, starting, braking and control of different motors and to select the motor drive for various applications.
2. Identify the size of motor for suitable drive application and motor torque in flywheel effect.
3. Analyze PLC Ladder programming to control Electrical drives.
4. Describe analog and digital speed controls for electrical drives.

Unit:1	Introduction to Drives and Speed Control	7 Hours
Definition of a Drive, Classification of Drives, Brief idea about drives commonly used in industries, Speed-torque characteristics of common drive motors (DC and AC), Characteristics of Drives under starting and running, Types of braking, Speed Control of AC and DC motors.		

Unit:2	Selection of motors	6 Hours
Selection of motors and bearings of motor: Power capacity for continuous and intermittent periodic duties, Flywheel effect, Duty cycles of motor, transmission, enclosure systems for drives.		

Unit:3	AC and DC contactor	6 Hours
Analyze ,Categorize AC DC Contactor,limit switch ,working,applications,Control circuit by using contactors		

Unit:4	Programmable Logic Controllers	7 Hours
Programmable Logic Controllers (PLC), programming methods, Ladder programming with few examples, Applications of PLC's in electrical drives.		

Unit:5	Traction motors	6 Hours
Traction motors: Motors use in AC/DC traction and their performance and desirable characteristics, requirement and suitability of motor for traction duty, Speed time characteristics of train, Traction motor control. Series parallel control with numerical method, Starting and braking of traction motor		

Unit :6	Digital speed control of Electric motors	7 Hours
Digital speed control of Electric motors, comparison with Analog method of speed control, Block Diagram arrangement for Microprocessor based speed control of AC/DC motor, Flowcharts and algorithms for speed control and speed reversal of motor. Digital Signal Processors (DSP's) for drive control.Variable Frequency Drive(VFD)		
Contemporary Issues related to Topic		
	Total Lecture Hours	**39 Hours**

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Text books	
1	A Course in Electrical Power,1 st -2005,Soni, Gupta, Bhatnagar,Dhanpat Rai and Company Publication
Reference Books	
1	A Electrical Technology Volume III Transmission, Distribution, Utilization ,B.L.Theraja, A.K.Theraja,2nd - 2005,S.Chand
2	Magnetic control of motors,Industrial New York 1947,Heumann,Chapman and Hall Publication
3	Modern utilization of traction motor,2003,J.B. Gupta,Dhanpat Rai and CompanyPublication
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1	http://link.springer.com/openurl?genre=book&isbn=978-3-642-25904-3
MOOCs Links and additional reading, learning, video material	
1	https://youtu.be/JZ6f_i4ao6Y
2	https://youtu.be/1AT1yuQ9awM
3	https://youtu.be/zWvcM-4aUgg
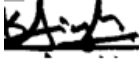
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B. Tech in CSE (IoT)

VI SEMESTER
22IoT656 : PE-II: Lab. Electrical Drives

Course Outcomes:
Upon successful completion of the course the students will be able to
1. Explain the speed-torque characteristics ,starting,braking and control of different motors and to select the motor drive for various applications.
2. Identify the size of motor for suitable drive application and motor torque in flywheel effect.
3. Analyze PLC Ladder programming to control electrical drives.
4. Categorize analog and digital speed controls for electrical drives.

Sr. No.	Experiments based on
1	To evaluate and explain the control circuit of star delta starter
2	To evaluate and explain control circuit of direct online starter (DOL)
3	To explain function of side rotary limit switch.
4	To categorize different types contactors
5	To classify and explain programming logic control (PLC) M-1200, M-1400 and LOGO PLC.
6	To make use of operating limit switch to turn ON contactor (output device)
7	To design ladder programming in PLC to control lamp
8	To design ladder programming using LOGO PLC to control lamp.
9	To explain Implementation of timer using LOGO PLC
10	To design ladder programming in PLC to Control of lamps in pre- defined sequence

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SoE No.
22IoT-101

VI SEMESTER
22IoT657 : PE-II: Introduction to GIS

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VI SEMESTER
22IoT658 : PE-II: Lab. Introduction to GIS

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SoE No.
22IoT-101

VI SEMESTER
22CT631: OE III: Introduction to DBMS

Course Outcomes :
Upon successful completion of the course the students will be able to
1.Students should be able to design database forgiven situation, write appropriate queries for accessing database

Unit I:	(6 Hrs.)
An Overview of the Database Management System: What is database? Why database? database system, database management system (DBMS), advantages of DBMS	

Unit II:	(6 Hrs.)
An Architecture of the Database system: Three levels of architecture, mappings, role of database administrator (DBA), E-R model, three approaches of DBMS relational, hierarchical and network.	

Unit III:	(5 Hrs.)
Relational Database Management System (RDBMS): Introduction, RDBMS terminology, relational model, base tables, ke	

Unit IV:	(5 Hrs.)
The SQL Language: Introduction, Characteristics of SQL, data definition command	

Unit V:	(5 Hrs.)
Data manipulation commands	

Unit VI:	(6 Hrs.)
Introduction to XML	

Total Lecture	**33Hours**

Textbooks:	
1.	Data base System Concepts Fifth Edition Silberschatz A, Korth,H.F and Sudarshan S Tata McGraw-Hill
2.	Fundamentals of Database System R. Elmasri, S. B Navathe Pearson Education

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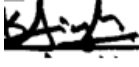(Department of Computer Technology)

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Reference Books:	
1.	Fundamentals of DBMS Leon A and Leon M Tata McGraw-Hill
2.	DBMS Gill P. S I.K. International
3	Database Management Systems Leon A and Leon M Vikas Publishing House
4	Database Systems: Concepts, Design & Applications Singh S. K Pearson Education

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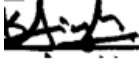(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)
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SoE No.
22IoT-101

VI SEMESTER
22CT632 : OE III: Essentials of IT

Course Outcomes :
Upon successful completion of the course the students will be able to
1. Develop algorithm and write pseudo code for a given problem statement.
2. Construct Entity-Relationship Model and design RDBMS for a given problem statement.
3. Design static and dynamic web pages using HTML and Java script and write simple programs in Java script.
4. Apply software engineering concepts in any software project implementation.

Unit I:	(8 Hrs.)
Programming fundamentals of Java: problem solving skills, Algorithm – representation using pseudo code, algorithm properties. Programming in java- programming constructs in JAVA, control structures type casting, SDLC overview and need for Object oriented approach, objectoriented concepts, introduction to UML.	
Unit II:	**(8 Hrs.)**
OO fundamentals – Java Implementation: OO fundamentals, coding standards, reference variables and objects in memory, methods, „this" reference. Data structures: data structures, linear data structures, non- linear data structures.	
Unit III:	**(8 Hrs.)**
Data base basics- data storage, need for DBMS, functions of DBMS, data perspectives in DBMS, types of data models, relational model and keys, Database Design – Database life cycle, Data requirements, logical design – ER modeling, converting ER model to relational schema, functional dependency, normalization.	
Unit IV:	**(8 Hrs.)**
SQL – need for SQL, types of SQL statements, data types in SQL, SELECT statement with various operators, single row and multi row functions, group by and having clauses.	
Unit V:	**(8 Hrs.)**
Introduction to web technologies: Computer Networks, HTML tags and CSS, Implementation of Java Scripts, Operators and control structures, function and dialog boxes, DOM element.	
Unit VI:	**(8 Hrs.)**
Software Engineering – Basics, SE models and approaches, Requirement developing activities, software design and construction, software testing, introduction to user experience, Project categories and project management phases, software quality.	
Total Lecture	**48 Hours**

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Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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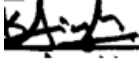
B. Tech SoE and Syllabus 2022
(Scheme of Examination w.e.f. 2022-23 onward)
(Department of Computer Technology)

B. Tech in CSE (IoT)

| SoE No. 22IoT-101 |

Textbooks:	
1.	Java: The complete reference 7th Edition Herbert Schildt. McGraw-Hill
2.	Database System Concepts 5th Edition Silberschatcz, Korth, Sudarshan McGraw-Hill Education
3.	Software Engineering: A Practitioner's Approach 6h Edition Roger Pressman McGraw Hill Higher Education

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B. Tech in CSE (IoT)

SoE No.
22IoT-101

VI SEMESTER
22CT633 : OE III: Operating System Concepts

Course Outcomes :
Upon successful completion of the course the students will be able to
1. Use LINUX operating system.
2. 2. Write Shell scripts

Unit I:	(6 Hrs.)
Introduction: History of Linux and Unix, Linux Overview, Linux releases, open linux.	

Unit II:	(5 Hrs.)
Linux Commands and Filters : Mkdir, CD, rmdir, pwd, ls, who, whoami, cat, more, fail, head, concept of, mv, chmod, grep,wc, comm., split, sort, diff, kill, write, wall, merge, mail, news	

Unit III:	(5 Hrs.)
Shell: The command line special characters and file arguments, standard input/output and redirection, pipes, redirecting and piping with standard errors, shell scripts, jobs.	

Unit IV:	(5 Hrs.)
Linux file Structure: Linux files, file structure, listing displaying and printing files, managing directories, file and directory operations.	

Unit V:	(6 Hrs.)
Vi Editor: Vi editing commands advanced Vi editing commands, line editing commands, options in Vi	

Unit VI:	(6 Hrs.)
System Administration: System management, managing users, installing and managing devices, floppy disk management, file system administration, backups.	

Total Lecture	**33 Hours**

Textbooks:	
1.	Linux – The Complete Reference Richard Peterson ,Tata McGraw Hill, New Delh
2.	Linux – Install and ConfigurationBlack BookDie Annleblanc andIssac YatesIDG Books India Private Ltd.,Delhi
3.	Unleashed Linux ,Tech Media Publishers

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B. Tech in CSE (IoT)

SoE No.
22IoT-101

VI SEMESTER
22CT634: OE III: Introduction to Salesforce

Course Outcomes :
Upon successful completion of the course the students will be able to

1. Employ the knowledge of customer-cantered organization and implement the integral processes within an organization that are automated and how does the automation create predictability and efficiencies.
2. Represent a customize a CRM application for organization to suit their business needs.
3. Determine CRM strategies by understanding customers' preferences for the long-term sustainability of the Organizations.

Unit I:	(6 Hrs.)
An Overview of the Database Management System: What is database? Why database? database system, database management system (DBMS), advantages of DBMS	

Unit II:	(6 Hrs.)
An Architecture of the Database system: Three levels of architecture, mappings, role of database administrator (DBA), E-R model, three approaches of DBMS relational, hierarchical and network.	

Unit III:	(5 Hrs.)
Relational Database Management System (RDBMS): Introduction, RDBMS terminology, relational model, base tables, ke	

Unit IV:	(5 Hrs.)
The SQL Language: Introduction, Characteristics of SQL, data definition command	

Unit V:	(5 Hrs.)
Data manipulation commands	

Unit VI:	(6 Hrs.)
Introduction to XML	

	Total Lecture	**33 Hours**

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(Department of Computer Technology)
B. Tech in CSE (IoT)

SoE No.
22IoT-101

Textbooks:

1.	Data base System Concepts Fifth Edition Silberschatz A, Korth ,H.F and Sudarshan S Tata McGraw-Hill
2.	Fundamentals of Database System R. Elmasri, S. B Navathe Pearson Education

Reference Books:

1.	Fundamentals of DBMS Leon A and Leon M Tata McGraw-Hill
2.	DBMS Gill P. S I.K. International
3	Database Management Systems Leon A and Leon M Vikas Publishing House
4	Database Systems: Concepts, Design & Applications Singh S. K Pearson Education

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B. Tech in CSE (IoT)

SoE No.
22IoT-101

VI SEMESTER
22CT651 : OE-IV : Software Testing

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B. Tech in CSE (IoT)

SoE No.
22IoT-101

VI SEMESTER
22CT652 : OE-IV : Internet Technology

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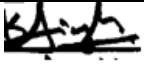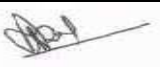(Department of Computer Technology)

B. Tech in CSE (IoT)

SoE No.
22IoT-101

VI SEMESTER
22CT653 : OE -IV: Multimedia and Animation

Course Outcomes :
Upon successful completion of the course the students will be able to
1. To understand multimedia basics - hardware and software.
2. To develop skills in design, illustration, image manipulation, graphic designing, video editing, visual effects and game designing.
3. To develop the skills in animation software.

Unit I:	(7 Hrs.)
Multimedia definitions, CD-ROM and the multimedia highway. Applications of multimedia, introduction to making multimedia, the stages of project, requirements to make good multimedia, multimedia skills and training, the multimedia tech	
Unit II:	**(6 Hrs.)**
Multimedia hardware, Macintosh and windows production platforms, hardware peripherals, connections, memory and storage devices, input devices output hardware, communication devices, media software, basic tools, making instant multimedia authoring tools.	
Unit III:	**(7 Hrs.)**
Multimedia building blocks –text-using text in multimedia, computers and text, font editing and design tools, Sound-the power of sound , multimedia system sound, Digital audio, preparing digital audio files, Audio file format, images-Making still Images, Color, Image file format, video-Broadcast video standard, Analog video, Digital video, optimizing video files for CDROM	
Unit IV:	**(6 Hrs.)**
What is meant by Animation, why we need Animation, History of Animation, Uses of Animation. Types of Animation, Principles of Animation, Some Techniques of Animation, and Animation on the WEB, Special Effects, and Creating Animation.	
Unit V:	**(6 Hrs.)**
Creating Animation in Adobe Animate: Introduction to Animate –Working with the Timeline and Frame-based Animation-Working with the Timeline and Tween-based Animation –Understanding Layers–Action script.	
Unit VI:	**(7 Hrs.)**
3D Animation & its Concepts, Types of 3D Animation, Skeleton & Kinetic, 3D Animation Texturing and Lighting of 3D Animation, 3D Camera Tracking, Applications & Software of 3D Animation.	
Total Lecture	**39 Hours**

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Nagar Yuwak Shikshan Sanstha's

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B. Tech in CSE (IoT)

SoE No.
22IoT-101

Textbooks:	
1.	Multimedia Making Work 3rd Ed. Tay Vaughan TMH
2.	Principles of Multimedia 2007 Ranjan Parekh TMH
3.	Multimedia Technologies Ashok Banerji, Ananda Mohan Ghosh McGraw Hill Publication

Reference Books:	
1.	Multimedia systems design K. Andleigh, and K. Thakkrar PHI
2.	Multimedia: Computing, Communications and Applications Raif Stein Metz and KiaraNahrstedt
3.	Advanced Multimedia Programming Steve Rimmer McGraw Hill

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Yeshwantrao Chavan College of Engineering
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B. Tech SoE and Syllabus 2022
(Scheme of Examination w.e.f. 2022-23 onward)
(Department of Computer Technology)

SoE No.
22IoT-101

B. Tech in CSE (IoT)

VI SEMESTER
22CT654 : OE- IV: Current Trends and Technologies

Course Outcomes :
Upon successful completion of the course the students will be able to
1. Use the basics of internet for deployment of various servers and recourses.
2. Design and implement technologies for e-Commerce and e-Learning.
3. Choose appropriate implementation of Green Computing.
4. Make use of Social Networking properly and securely

Unit I:	(7 Hrs.)
Fundamentals of Communications: Types of communication-Wired, wireless, mobile, Modes of transmission: Simplex, Half Duplex, Full Duplex, Multiplexing techniques, History and evolution of wireless and mobile systems, Transition and characteristics of 1G, 2G, 3G, 4G, Spectrum, regulations, and frequency allocation	

Unit II:	(6 Hrs.)
Fundamental of INTERNET: History, Internet working, Connections, Internet services, The World Wide Web, Tools for the WWW, Web servers, Web browsers, Web page makers and editors, Plug-ins and delivery vehicles.	

Unit III:	(7 Hrs.)
e-Technologies: Electronic Commerce: Framework, Media Convergence of Applications, Consumer, Applications, Organization Applications, Electronic Payment Systems: Digital Token, Smart Cards, Credit Cards, Risks in Electronic, Payment System, Designing Electronic Payment Systems, Electronic Data Interchange (EDI): Concepts, Applications, (Legal, Security and Privacy) issues, EDI and Electronic Commerce, Standardization and EDI, EDI Software, Implementation, EDI Envelope for Message Transport, Internet-Based EDI	

Unit IV:	(6 Hrs.)
e-Learning: Definition, Introduction, Types of e-Learning: Learner-led e-Learning, Facilitated eLearning, Instructor-led e-Learning, Embedded e-Learning, Telemonitoring And e-Coaching ELearning Models: WBT, CBT, LMS, LCMS, Virtual School Systems, E-Learning Tools And Technologies: e-mail, Online Discussion, Chat and Instant Messaging, Voting, Whiteboard, Application Sharing, Conferencing, Online Meeting Tools, Case study.	

Unit V:	(6 Hrs.)
Green Computing: Introduction, Why....Green Computing? Approaches to Green ComputingVirtualization, Power Management, Power supply, Storage, Video Card, Display, IT Equipment, Recycling, Remote Conferencing & Telecommuting Strategies, Product longevity, Resource allocation, Terminal servers, Operating system support, How to Implement? Industrial implementations of Green Computing- Blackle, Fit-PC, Zonbu computer, Sunray thin client	

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B. Tech SoE and Syllabus 2022
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(Department of Computer Technology)

SoE No. 22IoT-101

B. Tech in CSE (IoT)

Unit VI:	(7 Hrs.)
Social Networking: Definition, Overview of Social Networking Sites, Types of Social Networking Sites: General purpose, Niche. Advantages of Social Networking Sites, Drawbacks of Social Networking Sites, Features and Need of Social Networking, Security Issues with Social Networking Sites, Case Studies	

Total Lecture	**39 Hours**

Textbooks:	
1.	Impact of E-Business Technologies on Public and Private Organizations OzlemBak, Nola Stair
2.	Mobile Computing Tomasz Imielinski Henry F. Korth
3.	Broadband telecommunications technology ByeongGi Lee, Minho Kang, Jonghee Lee

Reference Books:	
1.	Introduction to broadband communication systems Cajetan M. Akujuobi, Matthew, N. O. Sadiku
2.	E-Learning Tools and Technologies William Hortan, Katherine Hortan Wiley

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Yeshwantrao Chavan College of Engineering
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B. Tech SoE and Syllabus 2022
(Scheme of Examination w.e.f. 2022-23 onward)
(Department of Computer Technology)
B. Tech in CSE (IoT)

SoE No.
22IoT-101

VI SEMESTER

Audit Course

MLC2126: YCAP6-YCCE Communication Aptitude Preparation

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Bachelor of Technology

SoE & Syllabus 2022

7th & 8th Semester

(Department of Computer Technology)

B. Tech in CSE (IoT)

Nagar Yuwak Shikshan Sanstha's
Yeshwantrao Chavan College of Engineering
(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)
B.TECH SCHEME OF EXAMINATION 2022
(Scheme of Examination w.e.f. 2022-23 onward)
(Department of Electronics Engineering)
B. Tech in CSE (IOT)

SoE No.
22CSIoT-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	L	T	P	Hrs	Credits	MSEs*	TA**	ESE	ESE Duration Hours
							\multicolumn{4}{c}{Contact Hours}		\multicolumn{3}{c}{% Weightage}		
**Seventh Semester**
1	7	PC	CT	22IOT701	Software Engineering	T	3	0	0	3	3	30	20	50	3 Hours
2	7	PC	CT	22IOT702	**Lab.: Software Engineering**	P	0	0	2	2	1		60	40	
3	7	PC	CT	22IOT703	IoT Design Principals	T	3	0	0	3	3	30	20	50	3 Hours
3	7	PC	CT	22IOT704	Cloud computing	T	3	0	0	3	3	30	20	50	3 Hours
4	7	PC	CT	22IOT705	**Lab.: Cloud computing**	P	0	0	2	2	1		60	40	
5	7	PE			**Professional Elective-III**	T	3	0	0	3	3	30	20	50	3 Hours
5	7	PE			**Lab. : Professional Elective-III**	P	0	0	2	2	1		60	40	
6	7	PE			**Professional Elective-IV**	T	3	0	0	3	3	30	20	50	3 Hours
8	7	PE			**Professional Elective-V**	T	3	0	0	3	3	30	20	50	3 Hours
9	7	STR	CT	22IOT707	Project Phase-II	P	0	0	10	10	5		60	40	
10	7	STR	CT	22IOT708	Campus Recruitment Training (CRT)	P	0	0	0	0	2		100		
\multicolumn{6}{r}{**TOTAL SEVENTH SEM**}		18	0	16	34	28				

List of Professional Electives-III,IV & V
Professional Electives -III

1	7	PE-III	CT	22IOT721	PE-III : IoT Sensors and devices										
2	7	PE-III	CT	22IOT722	PE-III : Lab: IoT Sensors and devices										
3	7	PE-III	CT	22IOT723	PE-III : Fog and Edge computing										
4	7	PE-III	CT	22IOT724	PE-III :**Lab:** Fog and Edge computing										
5	7	PE-III	CT	22IOT725	PE-III: Business Intelligence and Applications										
6	7	PE-III	CT	22IOT726	PE-III: **Lab:** Business Intelligence and Applications										

Professional Electives -IV

1	7	PE-IV	CT	22IOT741	PE IV: Security and Privacy in IoT	
2	7	PE-IV	CT	22IOT742	PE IV: Data Analytics for IoT	
3	7	PE-IV	CT	22IOT743	PE IV:Cryptography	
4	7	PE-IV	CT	22IOT744	PE IV: Software Testing	

Professional Electives -V

1	7	PE-V	CT	22IOT761	PE-V: Data Mining	
2	7	PE-V	CT	22IOT762	PE-V: Operating System Concepts	
3	7	PE-V	CT	22IOT763	PE-V: Electric Vehicle	
4	7	PE-V	CT	22IOT764	PE-V: Wireless Communication	

**Eighth Semester**
1	8	STR		22IOT801	**Industrial Internship**	P	0	0	12	12	3		60	40	
2	8	STR		22IOT802	**Extra Curricular Activity Evaluation**	P	0	0	0	0	2		100		
\multicolumn{6}{r}{**TOTAL EIGHTH SEM**}		0	0	12	12	5				
\multicolumn{6}{r}{**GRAND TOTAL**}		121	3	76	199	163				

MSEs* = Two MSEs of 15 Marks each will conducted and marks of of these 2 MSEs will be considered for Continuous Assessment

TA ** = for Theory : 12 marks on lecture quizzes, 12 marks on two TA2 activitied decided by course teacher, 2 marks on class attendance and 4 marks on TA4 activities
TA** = for Practical : MSPA will be 15 marks each

[signature]	*[signature]*	**June 2022**	**1.00**	**Applicable for AY 2022-23 Onwards**
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| SoE No. |
| 22IOT-101 |

B.Tech in Computer Science and Engineering (IoT)

VII SEMESTER
22IOT 701: Software Engineering

Course Outcomes :
Upon successful completion of the course the students will be able to
1. Understand software engineering process models, incorporating requirement engineering principles and software design fundamentals for a given project.
2. Apply testing principles by selecting and using appropriate testing strategies to effectively evaluate a specific application
3. Use fundamental concepts of software configuration management, version control, and change management in software development.
4. Analyze the cost estimation techniques and the severity of software risk for a given application.
5. Evaluate the effectiveness of basic operations in Subversion (SVN) for maintaining efficient software version control.

Unit I:	**6 Hrs.**
Introduction to Software Engineering, A Generic View of process, Process models: Water fall Model, RAD Model, Prototyping Model, Component Development Model, Agile Model, Requirement Engineering: Requirement Engineering Task Initialization Eliciting Requirement, Developing Use Case, Analysis Model, Negotiation, Validation	
Unit II:	**7 Hrs.**
Building the Analysis mode: Requirement Analysis, Analysis Modeling Approaches, Data Modeling Concept, Object Oriented Analysis, Types of Modeling, Design Engineering: Design Concept, Design Model	
Unit III:	**7Hrs.**
Testing Strategies: Strategic Approach, Strategic issues, Strategies for conventional Software, Strategies for Object Oriented Software, Validation Testing, Testing Tactics: White-Box Testing, Basis Path testing: Flow Graph Notation, Independent Program Paths, Control Structure Testing, Black Box Testing, Introduction to object oriented testing.	
Unit IV:	**6 Hrs.**
Configuration Management: Base lines, Software Configuration items, The SCM Process, Identification of Objects in the Software Configuration, Version Control, Change Control, Configuration Audit, Status Reporting, SCM Standards.	
Unit V:	**7 Hrs.**
Project Management, Metrics for Process and Projects, Project Estimation, Risk Management: Reactive vs. Proactive Risk Strategies, Software Risks, Risk Identification, Risk Projection.	
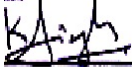
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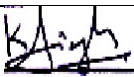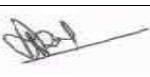(Department of Computer Technlogy)

SoE No.
22IOT-101

B.Tech in Computer Science and Engineering (IoT)

Unit VI:		6 Hrs.
Advanced Topics in Software Engineering: Re engineering Computer aided software engineering, Open source SE tools introduction, Example-Subversion: Overview, Typical subversion usage and work flow.		
	Total Lecture	**39 Hours**

Textbooks:	
1.	Software Engineering–A Practitioner's Approach (Sixth Edition) by Roger S. Pressman McGraw Hill.
2.	Object Oriented Software Engineering- Leth Bridge- Pearson Edu
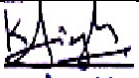
Reference Books:	
1.	
2.	

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	

MOOCs Links and additional reading, learning, video material	
1.	https://onlinecourses.nptel.ac.in/noc22_cs40/preview

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SoE No.
22IOT-101

B.Tech in Computer Science and Engineering (IoT)

VII SEMESTER
22IOT 702: Lab Software Engineering

Course Outcomes
Upon successful completion of the course the students will be able to
1. Choose appropriate software engineering process model, requirement engineering principles and software designing fundamentals for a given project.   2. Select appropriate testing strategy and apply testing principles for testing a given application.   3. Apply basics of software configuration management, version control and change control in software development.   4. Evaluate cost estimation, effort and severity of software risk for given application.   5. Perform basic operations on Sub-version for software version control.

Minimum Eight Practical's to be performed from the list as below

SN	Program based on
1	Introduction to Software Engineering fundamentals, UML and RATIONAL ROSE Interface.
2	To study and create Software Requirement Specification document for given case study
3	To study and draw UML Use Case diagram for the given case study.
4	To study and draw UML Class diagram for given Case Study.
5	To study and draw UML Activity diagram for given Case Study.
6	To study and draw UML Sequence Diagram for given Case Study.
7	To study and draw State Diagram for given Case Study.
8	Write a Program to find out the Estimation (cost and effort) by using COCOMO model.
9	To Perform Manual and Automated testing using CASE tool for given Case Study
10	To Study and execute Version Control using Subversion

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22IOT-101

B.Tech in Computer Science and Engineering (IoT)

VII SEMESTER
22IOT703 : IoT Design Principals

Course Outcomes:
Upon successful completion of the course the students will be able to

1. Understand the architectural and design principles of IoT systems.
2. Identify hardware and software components relevant to IoT applications.
3. Apply communication protocols and data formats in the design of IoT solutions.
4. Design efficient IoT solutions considering constraints like power, cost, and latency.
5. Evaluate security, interoperability, and scalability in IoT system design.

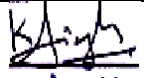| Unit I: Introduction to IoT Design	(7 Hrs.)
IoT evolution, use cases, and system characteristics, design vs implementation, IoT architecture models (three layer, five-layer), Sensor and actuator integration, Embedded processors, microcontrollers.	
Unit II: Communication and Protocols	**(7 Hrs.)**
Internet based communication, IPv4, IPv6,6LoWPAN protocol, IP Addressing in the IoT, Message communication protocols (CoAP, MQTT, XMPP, AMQP), IEEE802.15.4, ZigBee, Bluetooth, NFC, Wireless HART, ZWave.	
Unit III: Data Handling and Processing	**(6 Hrs.)**
Data acquisition and filtering, edge vs cloud processing, data formats (JSON, XML), semantic interoperability, Low-power design strategies, duty cycling, resource-aware computation, sleep modes	
Unit IV: Design Constraints	**(6 Hrs.)**
Addressing and routing in constrained networks, design constraints: power, cost, latency, memory, and reliability.	
Unit V: IoT Security	**(7 Hrs.)**
Threat models in IoT, authentication, encryption, lightweight cryptography, secure firmware updates, Vulnerabilities of IoT, Privacy, Security requirements, IoT security tomography and layered attacker model.	
Unit VI: Case Studies and Applications	**(6 Hrs.)**
Case study on Wireless Patient Monitor system, Home automation concept and case study, Surveillance applications concept and, Other IoT applications.	
Total Lecture	**39 Hours**

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Textbooks:	
1.	**Arshdeep Bahga & Vijay Madisetti**, Internet of Things – A Hands-on Approach, Universities Press, 2015.
2.	**Rajkumar Buyya et al.**, *Internet of Things: Principles and Paradigms*, Morgan Kaufmann, 2016.

Reference Books:	
1.	Dieter Uckelmann et al., Architecting the Internet of Things, Springer, 2011.
2.	Adrian McEwen & Hakim Cassimally, Designing the Internet of Things, Wiley, 2013.
3	Peter Waher, Learning Internet of Things, Packt Publishing, 2015.
4	David Hanes et al., IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things, Cisco Press, 2017.

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22IOT-101**

B.Tech in Computer Science and Engineering (IoT)

VII SEMESTER
22IOT704 : Cloud computing

Course Outcomes :
Upon successful completion of the course the students will be able to

1. Explain software and hardware support for enterprise and cloud computing.
2. Perform data modeling for enterprise and cloud knowledge bases.
3. Design enterprise and cloud software applications.
4. Implement and run distributed and cloud applications.
5. Ensure security and privacy in enterprise and cloud application while implementing cloud applications methodologies.

Unit I:	(7 Hrs.)
Introduction to Cloud Computing: Defining Cloud Computing; Cloud Types and different models-The NIST model, The Cloud Cube Model, Deployment models, Service models; Examining the Characteristics of Cloud Computing; Benefits of cloud computing; Disadvantages of cloud computing; Assessing the Role of Open Standards.	
Unit II:	**(6 Hrs.)**
Cloud Architecture, Services and Applications: Exploring the Cloud Computing Stack, Connecting to the Cloud, Infrastructure as a Service, Platform as a Service, Saas Vs. Paas, Using PaaS Application Frame works, Software as a Service, Identity as aService, Compliance as a Service.	
Unit III:	**(6 Hrs.)**
Abstraction and Virtualization: Introduction to Virtualization Technologies, Load Balancing and Virtualization, Understanding Hyper visors, Understanding Machine Imaging, Porting Applications, Virtual Machines Provisioning and Manageability Virtual Machine Migration Services, Virtual Machine Provisioning and Migration in Action, Provisioning in the Cloud Context.	
Unit IV:	**(7 Hrs.)**
Exploring Cloud Infrastructures: Managing the Cloud- Administrating the Clouds, Management responsibilities, Lifecycle management Cloud Management Products, Emerging Cloud Management Standards, Understanding Service Oriented Architecture- Introducing Service Oriented Architecture.	
Unit V:	**(7 Hrs.)**
Managing & Securing the Cloud: Administrating the Clouds, Cloud Management Products, Emerging Cloud Management Standards, Securing the Cloud, Securing Data, the security boundary, Security service boundary, Security mapping, Brokered cloud storage access, Establishing Identity and Presence	
Unit VI:	**(6 Hrs.)**

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Advance Clouds and Case Studies: Cloud Computing Cost Analysis, basic, Selecting an IaaS Provider, Capacity Planning and Disaster, Recovery in Cloud Computing, AWS Cloud architectural principles, basic/core characteristics of deploying and operating in the AWS Cloud, the key services on the AWS Platform and their common use cases, Define the billing, account management, and pricing models, Introduction to Amazon EC2. Case Studies: Microsoft Azure, Dropbox.	
Total Lecture	**39 Hours**
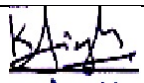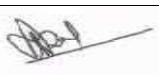
Textbooks:	
1.	Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online. Michael Miller, Springer
2.	Cloud Computing (Principles and Paradigms), Edited by Rajkumar Buyya, James Broberg, Andrzej Goscinski, John Wiley & Sons, Inc., Rajkumar Buyya, JamesBroberg, Andrzej Goscinski, A John Wiley & Sons, Inc. Publication
3.	Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online. Michael Miller, Springer

Reference Books:	
1.	Mastering cloud computing, Rajkumar buyya, Christian vecchiola, S Thamarai Selvi, Tata Mc-Graw Hill Education Private Limited
2.	Cloud Computing a Practical, Approach, Anthony T .Velte, Toby J. Velte, Robert, Elsenpeter, Tata Mc-Graw-HILL

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B.Tech in Computer Science and Engineering (IoT)

VII SEMESTER
22IOT705   : PE III LAB: Cloud computing

Course Outcomes
Upon successful completion of the course the students will be able to
1. Implement applications of stacks and queues.   2. Develop applications using linked list.   3. Demonstrate various operations of tree data structure.   4. Apply the knowledge of graph data structure for solving real life problems

Minimum Eight Practical's to be performed from the list as below

SN	Program based on
1	To study cloud architecture and cloud computing model
2	Study and implementation of Storage as a ServiceStudy
3	and implementation of identity management
4	Install Virtual Box with Linux OS on top of windows.
5	Install a C Compiler in the Virtual Machine.
6	Install Goggle app engine and create a web application using JAVA.
7	Install Google App Engine and create a simple web applications using python.
8	Simulate a cloud scenario using cloudSim and run a scheduling algorithm.
9	Copy files from one virtual machine to another.
10	Project(Cloud Service Implementation) .

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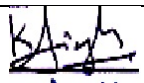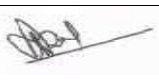## VII SEMESTER
22IOT723 PE-III: PE III Fog and Edge computing

Course Outcomes :
Upon successful completion of the course the students will be able to
1. Understand the principles, evolution, and architectural differences of Fog, Edge, and Cloud computing 2. Design and develop Fog/Edge systems for real-time IoT applications. 3. Implement communication protocols in Edge/Fog-based IoT networks. 4. Analyze and apply security mechanisms in Fog and Edge architectures. 5. Evaluate the integration of Fog/Edge with Cloud for smart applications like healthcare and Industry 4.0.

Unit I: Introduction to Fog Computing	**6 Hrs.)**
Fog Computing, Characteristics, Application Scenarios, Issues and challenges. Fog Computing Architecture: Communication and Network Model, Programming Models, Fog Computing Communication Technologies: Introduction, IEEE 802.11,4G,5G standards, WPAN, Short-Range Technologies, LPWAN and other medium and Long-Range Technologies.	

Unit II: Fundamental Concepts and Technologies of Fog and Edge Computing	**(6 Hrs.)**
Management and Orchestration of Network Slices in 5G, Fog, Edge, and Clouds: Network Slicing in Software-Defined Clouds, Network Slicing Management in Edge and Fog , Middleware for Fog and Edge Computing, Need for Fog and Edge Computing Middleware, Clusters for Lightweight Edge Clouds , IoT Integration , Security Management for Edge Cloud Architectures.	

Unit III: Fundamentals of Edge Computing	**(7 Hrs.)**
Introduction to Edge Computing Scenario's and Use cases - Edge computing purpose and definition, Edge computing use cases, Edge computing hardware architectures, Edge platforms, Edge vs Fog Computing, Communication Models - Edge, Fog and M2M.	
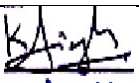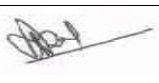
Unit IV: Edge Computing Networks	**(7 Hrs.)**
IoT and Edge Computing Definition and Use Cases: Introduction to Edge Computing Scenario's andUse cases - Edge computing purpose and definition, Edge computing use cases, Edge computinghardware architectures, Edge platforms, Edge vs Fog Computing, Communication Models - Edge, Fogand M2M.	

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Unit V: RaspberryPi	(6 Hrs.)
: Introduction to RaspberryPi, About the RaspberryPi Board: Hardware Layout and Pinouts,Operating Systems on RaspberryPi, Configuring RaspberryPi, Programming RaspberryPi, ConnectingRaspberry Pi via SSH, Remote access tools, Interfacing DHT Sensor with Pi, Pi as Webserver, PiCamera, Image & Video Processing using Pi.	
Unit VI: RaspberryPi and device Interfacing	**(7 Hrs.)**
Implementation of Microcomputer RaspberryPi and device Interfacing, Edge to Cloud ProtocolsProtocols, MQTT, MQTT publish-subscribe, MQTT architecture details, MQTT state transitions, MQTTpacket structure, MQTT data types, MQTT communication formats, MQTT 3.1.1 working example.Edge computing with RaspberryPi, Industrial and Commercial IoT and Edge, Edge computing andsolutions.	
Total Lecture	**39 Hours**

Textbooks:	
1.	Fog and Edge Computing: Principles and Paradigms by Rajkumar Buyya, Satish Narayana Srirama
2.	Fog Computing: Theory and Practice by Assad Abbas, Samee U. Khan, Albert Y. Zomaya

Reference Books:	
1.	FlavioBonomi, Rodolfo Milito, Jiang Zhu, SateeshAddepalli, ―Fog Computing and Its Role in the Internet of Things‖, MCC'12, August 17, 2012, Helsinki, Finland.
2.	Fog and Edge Computing: Principles and Paradigms (Wiley Series on Parallel and Distributed Computing) by RajkumarBuyya and Satish Narayana Srirama
3	Shanhe Yi, Cheng Li, Qun Li, ―A Survey of Fog Computing: Concepts, Applications and Issues‖, Mobidata'15, ACM 978-1-4503-3524-9/15/06, DOI: 10.1145/2757384.2757397, June 21, 2015, Hangzhou, China..
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B.Tech in Computer Science and Engineering (IoT)

VII SEMESTER
22IOT724 : PE III Lab: Fog & Edge computing

Course Outcomes
Upon successful completion of the course the students will be able to

1. Understand and simulate the architecture and protocols of Fog and Edge Computing networks
2. Develop skills in configuring and programming IoT edge devices (like Raspberry Pi) for sensor interfacing
3. Implement real-time communication using IoT protocols (MQTT/CoAP) and perform data aggregation at the edge.
4. Interpret and visualize sensor data transmitted from edge devices to cloud platforms.

Minimum Eight Practical's to be performed from the list as below

SN	
1	Study and Simulation of Fog Computing Architecture using iFogSim or Cisco Packet Tracer
2	Demonstration of Network Slicing in 5G Environment using Virtual Labs/Simulation
3	Installation and Configuration of Raspberry Pi OS and Remote Access Setup
4	Interface DHT11 Sensor with Raspberry Pi and Display Temperature & Humidity
5	Implement MQTT Publish-Subscribe Architecture using Raspberry Pi and Mosquitto
6	Real-Time Edge to Cloud Data Transfer using MQTT and Thingspeak or Adafruit IO
7	Simulate Edge Device Failure and Recovery Mechanism in Fog Network
8	Implement Edge-Based Anomaly Detection Using Sensor Data
9	Design and Simulate Fog Network for Smart Healthcare Monitoring
10	Mini Project: Develop an IoT-based Edge Computing Application (e.g., Smart Home, Smart Agriculture)

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VII SEMESTER
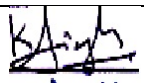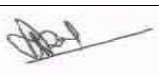## 22IOT725: PE-III : Business Intelligence and Applications

Course Outcomes :
Upon successful completion of the course the students will be able to
• Understand the basic concepts of Business Intelligence, digital data types, multidimensional modelling and its applications in different technology domain.
• Apply the ETL process to absorb the data in MDDM and statistical technique to understand data.
• Analyze the data to identify digital data types, multidimensional schema and hidden pattern from data.
• Design the MDDM and reports using the business concepts.

Unit I:	7 Hrs.
Introduction to Business Intelligence: Introduction to digital data and its types – structured, semi-structured and unstructured, BI Definitions & Concepts, BI Framework, BI Infrastructure Components – BI Process, BI Technology, BI Roles & Responsibilities, Business Applications of BI, BI best practices.	
Unit II:	**6 Hrs.**
Introduction to OLTP and OLAP (MOLAP, ROLAP, HOLAP) Introduction to Multi Dimensional Data Modeling: Introduction to data and dimension modeling, multidimensional data model, ER Modeling vs. multi-dimensional modeling, cubes, Identifying Dimension tables and fact table, attribute, hierarchies, star and snowflake schema, Data Warehousing concepts and its role in BI	
Unit III:	**6 Hrs.**
Basics of Data Integration (Extraction Transformation Loading): Concepts of data integration, needs and advantages of using data integration, introduction to common data integration approaches, Meta data – types and sources, Introduction to data quality, data profiling concepts and applications	
Unit IV:	**7 Hrs.**
Decision Making and Analytics: An Overview of Business Intelligence, Analytics, and Decision Support **Descriptive Analytics:** Introduction to Business Reporting, Visual Analytics, and Business Performance Management, **Predictive Analytics:** Introduction to Techniques for Predictive Modeling **Prescriptive Analytics:** Automated Decision Systems and Expert Systems, case study .	
Unit V:	**7 Hrs.**
Introduction to business metrics and KPIs, creating cubes using Microsoft Excel, Basics of Enterprise Reporting: A typical enterprise, Malcolm Baldrige - quality performance framework, balanced scorecard, enterprise dashboard, balanced scorecard vs. enterprise dashboard.	
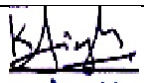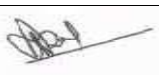
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Unit VI	6 Hrs.
Case study: Overview and use of products from open software. BI road Ahead: BI and mobility, BI and cloud computing, BI for ERP systems, Social CRM and BI.	
Total	**39 Hrs.**

Textbooks:	
1.	R. N. Prasad, Seema Acharya, Fundamentals of Business Analytics, Wiley India
2.	Sam Anahory, Dennis Murray, Data Warehousing in the real world A practical guide for building Decision Support System, PEARSON
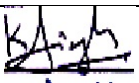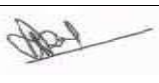
Reference Books:	
1.	Business Intelligence by David Loshin, Business Intelligence by David Loshin, Business Intelligence by David Loshin.
2.	Business intelligence for the enterprise by Mike Biere, Business intelligence for the enterprise by Mike Biere, Business intelligence for the enterprise by Mike Biere.

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MOOCs Links and additional reading, learning, video material	
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VII SEMESTER
22IOT725: PE-III: Business Intelligence and Applications

Course Outcomes
Upon successful completion of the course the students will be able to
1. Apply the ETL process to absorb the data in MDDM and statistical technique to understand data.
2. Design the MDDM and reports using the business concepts.

Minimum Eight Practical's to be performed from the list as below

SN	Experiments based on
1	By using excel, create a chart report, by considering module names on the X-axis, Various Modules on Y-axis. (Bar chart, pivot chart, pie chart, line chart, combo chart) Perform the Slice, Roll-up, Drill Down operations.
2	Perform Extract Transform Load (ETL) extracts data from data-sources, transforms it, cleans it in preparation for reports and analysis and loads it into a data warehouse.
3	Integration of SQL and Tableau.
4	To develop a dashboard that helps understand the factors impacting profit and loss, focusing on **sales trends over the past five years** and **regional variations**, you can structure the dashboard to include the following key elements:(Use Marketing and sales data, build insights from which decisions can be acted upon)
5	Develop Tableau Dashboard to analyze Netflix with OLAP system.
6	Identification of Dimension and Fact table and build star/snowflake model in Power BI by addressing the correct relationship 1:1,1:* , * : 1 and * :* etc.
7	Develop Power BI Dashboard : To provide real-time data on customer behavior and actions.

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VII SEMESTER
22IOT741 : PE-IV: Security and Privacy in IoT

Course Outcomes :
Upon successful completion of this course, students will be able to:
CO1: Explain the fundamental concepts of IoT security architecture, threat models, and privacy principles.   **CO2:** Analyze vulnerabilities, attacks, and countermeasures specific to IoT systems.   **CO3:** Apply cryptographic and authentication techniques for securing data and communication in IoT environments.   **CO4:** Evaluate the regulatory, ethical, and privacy frameworks governing IoT systems and propose mitigation strategies.

Unit I: Introduction to IoT Security and Privacy	6 Hrs.
Security and privacy fundamentals, IoT system architecture and layers, threat landscape in IoT, security requirements in IoT systems, privacy requirements and challenges, data ownership and integrity, IoT attack surfaces, general IoT vulnerabilities, role of stakeholders in IoT security, regulatory frameworks and standards.	
Unit II: Cryptography and Secure Communication in IoT	**6 Hrs.**
Basic cryptographic techniques, symmetric and asymmetric encryption, key management protocols, hash functions and digital signatures, lightweight cryptography for constrained devices, secure boot and firmware update, secure communication protocols (TLS, DTLS, MQTT-SN), end-to-end data confidentiality, integrity verification in IoT, securing data at rest and in transit.	
Unit III: Authentication and Access Control Mechanisms	**6 Hrs.**
User and device authentication in IoT, access control models (RBAC, ABAC, CapBAC), secure device provisioning, identity and trust management, multi-factor authentication, biometric and token-based authentication, OAuth and OpenID Connect for IoT, access control challenges in distributed environments, context-aware authentication, policy enforcement in IoT.	
Unit IV: IoT Threats, Attacks, and Countermeasures	**6 Hrs.**
Taxonomy of attacks on IoT, physical attacks, network-level attacks, software and firmware attacks, side-channel and denial-of-service attacks, attack detection and mitigation techniques, anomaly detection and intrusion prevention systems, honeypots and deception techniques, security testing tools for IoT, resilience against fault and compromise.	
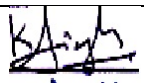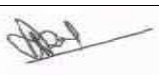
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(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B. Tech SoE and Syllabus 2022
(Scheme of Examination w.e.f. 2022-23 onward)
(Department of Computer Technlogy)

SoE No.
22IOT-101
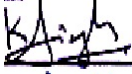
B.Tech in Computer Science and Engineering (IoT)

Unit V: Privacy Challenges and Protection Techniques in IoT	6 Hrs.
Privacy-enhancing technologies, data anonymization and pseudonymization, differential privacy in IoT data, consent and user control mechanisms, GDPR and privacy laws relevant to IoT, secure data aggregation, data minimization and purpose limitation, location and identity privacy, edge computing and privacy, trust and transparency in IoT ecosystems.	

Unit VI: Security Frameworks, Standards, and Case Studies	6 Hrs.
IoT security frameworks (IoTSF, NIST, ISO/IEC 27030), security by design principles, secure SDLC for IoT, industry best practices and guidelines, case studies on real-world IoT security breaches, sector-specific security applications (healthcare, smart grid, automotive), ethical implications of IoT security, emerging trends and research directions, future challenges and open problems.	
	Total Lecture	**36 Hours**

Textbooks:	
1.	Fei Hu, *Security and Privacy in Internet of Things (IoTs): Models, Algorithms, and Implementations*, CRC Press, 2016.
2.	Charalampos Doukas, *Building Internet of Things with the Arduino*, CreateSpace Independent Publishing, 2012 (for practical security illustrations).

Reference Books:	
1.	Honbo Zhou, *The Internet of Things in the Cloud: A Middleware Perspective*, CRC Press, 2012.
2.	Hakima Chaouchi, *The Internet of Things: Connecting Objects to the Web*, Wiley, 2010.

MOOCs Links and additional reading, learning, video material	
1.	https://nptel.ac.in/courses/106105166
2	OWASP IoT Project: https://owasp.org/www-project-internet-of-things/

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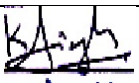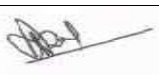(Department of Computer Technlogy)

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B.Tech in Computer Science and Engineering (IoT)

VII SEMESTER
22IOT742 : PE IV:Data Analytics for IoT

Course Outcomes :
Upon successful completion of the course the students will be able to
1. Understand the basics and challenges of IoT data analytics.
2. Apply data cleaning and preprocessing on IoT datasets.
3. Analyze statistical and ML techniques to analyze sensor data.
4. Evaluate real-time and big data tools for IoT applications.
5. Create simple analytics solutions using real IoT datasets

Unit I:	(6 Hrs.)
Introduction to Data Analytics in IoT : What is IoT data, Characteristics of IoT data (volume, variety, velocity), Why data analytics is needed in IoT, Applications in smart homes, cities, health, and industry	

Unit II:	(6 Hrs.)
Data Collection and Storage: Data acquisition from sensors and devices, Communication protocols (brief), MQTT, HTTP, **Storage options:** local, cloud, time-series databases, **Data formats:** JSON, CSV, sensor logs	

Unit III:	(6 Hrs.)
Data Cleaning and Preprocessing: Removing noise and handling missing values, Normalization and transformation, Time-stamping and syncing data, **Tools:** Python, Pandas, NumPy	

Unit IV:	(7 Hrs.)
Statistical and Machine Learning Techniques: **Basics of statistics:** mean, median, standard deviation, **Data visualization:** bar charts, line plots, histograms, **Machine learning:** classification (KNN), clustering (K-Means), regression, **Toolkits:** Scikit-learn, Matplotlib	

Unit V:	(7 Hrs.)
Real-Time and Big Data Analytics: Introduction to streaming data and real-time processing, **Tools:** Apache Kafka, Apache Spark (basic), Edge vs. Cloud analytics, **Use case:** Traffic or health monitoring	

Unit VI:	(7 Hrs.)
Applications and Mini Project: Case studies: Smart farming, health tracking, smart grid, **Platforms:**ThingsBoard, AWS IoT Analytics, Azure IoT. **Mini project:** Perform end-to-end analytics on a real dataset, Final report and presentation	

	Total Lecture	**39 Hours**

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Textbooks:	
1.	Data Analytics for IoT by Himanshu Gupta, Wiley India.
2.	Python Data Science Handbook by Jake VanderPlas, O'Reilly Media.

Reference Books:	
1.	Internet of Things: A Hands-on Approach by Arshdeep Bahga, Vijay Madisetti.
2.	Machine Learning for IoT by Yuxi Liu, Packt Publishing.
3	Apache Spark and Kafka Official Documentation.
4	Internet of Things: A Hands-on Approach by Arshdeep Bahga, Vijay Madisetti.

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B.Tech in Computer Science and Engineering (IoT)

VII SEMESTER
22IOT743 : PE IV: PE IV:Cryptography

Course Outcomes :
Upon successful completion of the course the students will be able to
1. Understand and classify the various threats to network security, associated attacks, and suggest appropriate countermeasures.
2. Solve different cryptographic algorithms using appropriate mathematical concepts
3. Apply various algorithms/ mechanisms to formulate appropriate solution.
4. Use of different security protocols at various networking layers.

Unit I:	**7 Hrs.**
Introduction: Security goals, cryptographic attacks, Services and mechanism, techniques. Mathematics of cryptography : Integer arithmetic, modular arithmetic, matrices, linear congruence. Mathematics of symmetric key cryptography: Algebraic structure, GF(2n) Fields	
Unit II:	**5 Hrs.**
Traditional symmetric key ciphers: Introduction, substitution ciphers, Transposition ciphers, stream and block ciphers. Introduction to modern symmetric-key ciphers: Modern block ciphers, modern stream ciphers.	
Unit III:	**7 Hrs.**
DES, AES, Encipherment using modern symmetric key ciphers: Use of modern block ciphers, use of stream ciphers: RC4. Mathematics of asymmetric key cryptography: Primes, primality testing, factorization, Chinese remainder theorem, Exponentiation and logarithms. Asymmetric key cryptography: RSA,	
Unit IV:	**8 Hrs.**
Message integrity and authentication: Message integrity, Random oracle model, message authentication. Cryptographic hash functions: Introduction, Description of MD hash family, Digital signature: Comparison, process, services, attacks on digital signature, Digital signature schemes. Entity authentication: Introduction, passwords, Challenge-Response, Zero knowledge, Biometric. Key management: Symmetric key distribution, Kerberos, symmetric key agreement, Public key distribution.	
Unit V:	**7 Hrs.**
Security at application layer : E-mail, PGP, S/MIME. Security at transport layer: SSL architecture, four protocols, SSL message formats, Transport layer security. Security at network layer IPSec : Two modes, two security protocols, security association, security policy, ISAKMP	
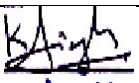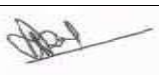
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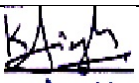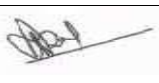**(Scheme of Examination w.e.f. 2022-23 onward)**
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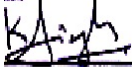
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Unit VI:	7 Hrs.
System security: Description of the system, Users, Trust and trusted systems, Buffer overflow and malicious software, malicious programs, worms, viruses, Intrusion detection systems, Firewalls: Definitions, construction and working principles	
Total Lecture	**39 Hours**

Textbooks:	
1.	Cryptography and Network Security Behrouz A. Forouzan, and Debdeep Mukhopadhyay McGraw-Hill Publication
2.	

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MOOCs Links and additional reading, learning, video material

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VII SEMESTER
22IOT744 : PE IV: Software Testing

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B.Tech in Computer Science and Engineering (IoT)

VII SEMESTER
22IOT761 : PE-V: Data Mining

Course Outcomes :

Upon successful completion of the course the students will be able to

1. Understand the concepts related to data preparation, data modeling, and knowledge extraction
2. Apply the techniques for data pre-processing and modeling for knowledge extraction.
3. Apply the supervised and unsupervised data mining techniques for knowledge extraction
4. Analyze the data to apply appropriate data modeling and mining technique

Unit I:	(7 Hrs.)
Introduction to data mining (DM) and Data Pre-processing: Introduction to data mining, KDD process. Data pre-processing, Data cleaning, Data transformation, Data reduction, Discretization and generating concept hierarchies	
Unit II:	(7 Hrs.)
Data Modelling to perform Data Mining: Data warehouse concepts, Data warehouse modelling, Data warehouse implementation, Data generalization by Attribute – Oriented Induction.	
Unit III:	(6 Hrs.)
Data mining using pattern mining algorithms: Association rules Motivation and terminology, Example, Basic idea: item sets, generating item sets and rules efficiently, Advanced Association Rule Techniques, Measuring the Quality of rules, Correlation analysis	
Unit IV:	(6 Hrs.)
Data mining using Prediction methods: Linear and nonlinear regression, Multiple regression, Logistic Regression	
Unit V:	(6 Hrs.)
Data mining using Clustering Algorithm: Fundamentals of Clustering, Partitioning Clustering -K-Means Algorithm, K-Means Additional issues, Evaluation of Clustering Algorithms	
Unit VI:	(7 Hrs.)
Outlier Detection Techniques: Outliers and outlier analysis, Outlier detection methods, Statistical approaches, Proximity based approaches, Clustering based approaches, classification based approaches	
	Total Lecture **39 Hours**
Textbooks:	
1. Data Mining: Concepts and Techniques, J. Han, M. Kamber, Morgan Kaufman 3rd Edition, 2012	
2. Statistics for Management, Richard I. Levin Davis S. Rubin, Pearson 7th Edition	

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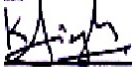**(Scheme of Examination w.e.f. 2022-23 onward)**
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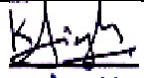## B.Tech in Computer Science and Engineering (IoT)

Reference Books:	
1.	Data Mining Techniques, Arun Pujari, 3rd Edition, Universities Press.
2.	Data Mining, Vikaram Pudi, P Radha Krishna, Oxford University Press

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B.Tech in Computer Science and Engineering (IoT)

VII SEMESTER
22IOT762 : PE-V: Operating System Concepts

Upon successful completion of the course the students will be able to

1. Understand the various services provided by operating systems at different levels.
2. Apply knowledge of different operating system algorithms to effectively solve specific problems.
3. Analyze various approaches for enhancing system performance.
4. Evaluate the performance of different disk scheduling algorithms.

Unit I:	(6 Hrs.)
Introduction, services provided by OS, functions of OS, system calls. Process management-introduction, process control block, process states, process context switch, threads: user level and kernel level.	
Unit II:	**(8 Hrs.)**
CPU scheduling, goals of scheduling, CPU scheduling algorithms: FCFS, SJF, SRTF, RR, Priority based.	
Unit III:	**(7 Hrs.)**
Inter-process communication: process cooperation and synchronization, race condition, critical section, mutual exclusion and implementation, semaphores, classical inter-process communication problems.	
Unit IV:	**(6 Hrs.)**
Deadlocks: System Model, deadlock characterization-necessary conditions, resource allocation graph (RAG), methods for handling deadlock-deadlock avoidance, deadlock detection, deadlock prevention, recovery from deadlock.	
Unit V:	**(6 Hrs.)**
Memory management techniques-contiguous and non-contiguous, paging and segmentation, translation look aside buffer (TLB) and overheads. Virtual memory and demand paging, page faults, page replacement algorithms, thrashing and working set model	
Unit VI:	**(6 Hrs.)**
File systems-introduction, disk space management and space allocation strategies, directory structures, disk caching, disk arm scheduling strategies: FCFS, SSTF, SCAN, CSACN, LOOK, CLOOK, File Organization: Sequential, Index, Index Sequential	
Total Lecture	**39 Hours**

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Textbooks:
1.	Operating system concepts, A. Silberchatz and P.Galvin , Addison Wesley Longman Inc

Reference Books:
1.	Modern operating systems, 1st , A.S. Tanenbaum , Prentice Hall of India publication
2.	Operating Systems, Crowley , Tata McGraw Hill

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
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MOOCs Links and additional reading, learning, video material
1.	https://archive.nptel.ac.in/courses/106/105/106105214/

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B.Tech in Computer Science and Engineering (IoT)

VII SEMESTER
22IOT764 : Wireless Communication

Course Outcomes :
Upon successful completion of the course the students will be able to

1. Illustrate the evolution of cellular mobile system and understand cellular concepts.

2. Use design fundamentals of cellular radio system.

3. Understand propagation mechanism and fading in mobile radio system.

4. Demonstrate concepts of various 2nd and 3rd generation cellular systems and wireless data communication networks.

Unit I:	(7 Hrs.)
Cellular Fundamentals: Evolution of Mobile Systems (1G, 2G, 3G, 4G), Cellular Concept, Cell Fundamentals, Cellular Telephone System, Timing Diagram of Call Processing in Cellular System, Channel Allocation Techniques, Hand off Strategies, Types of Hand off. [T1,T2,R1]	
Unit II:	**7 Hrs.)**
Cellular Radio System Design Fundamentals: Frequency Reuse, Co-channel Reuse Ratio, Co-channel Interference and System Capacity, Adjacent Channel Interference, Improving Coverage and Capacity in Cellular System: Cell Splitting, Sectoring, Repeater for Range Extension, Microcell Zone. [T1,T2, R1]	
Unit III:	**(7 Hrs.)**
Mobile Radio Propagation Mechanism: Basic Propagation Mechanism: Reflection, Diffraction and Scattering. Small Scale Fading and Multipath: Factors Influencing Small Scale Fading. Parameters of Mobile Multipath Channel. Types of Small Scale Fading: Fading Effect Due to Multipath Time Delay Spread, Fading Effect Due to Doppler Spread. [T1]	
Unit IV:	**(6 Hrs.)**
GSM System: GSM Network Architecture, GSM Signaling Protocol Architecture, GSM Channels, Frame Structure, Speech Coding, Authentication and Security, GSM Call Procedures, GSM Hand Off Procedures. [T3,T1]	
Unit V:	**(6 Hrs.)**
CDMA Digital Cellular Standard (IS-95): Architecture of CDMA System, CDMA Air Interface, IS-95 Forward Channel, IS-95 Reverse Channel, CDMA Call Processing, Power control in CDMA System, Hand Of in CDMA. Comparison of CDMA and GSM. WCDMAUMTS: WCDMA Air Interface, Attributes of WCDMA System, Forward WCDMA Channel, Reverse WCDMA Channel.	

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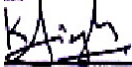**(Scheme of Examination w.e.f. 2022-23 onward)**
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Unit VI:	(6 Hrs.)
3GPP Long-Term Evolution: Frequency Bands and Spectrum Flexibility, Network Structure, Protocol Structure, PHY and MAC Layer Overview. [T4] Wireless Local Area Network: Wi-Fi, Advantages and Disadvantages, WLAN Topology, IEEE 802.11 standard. [R1,R2] Bluetooth: Overall Architecture, Protocol Stack, Physical Connection, MAC Mechanism, Frame Formats. [T2,R1]	

	Total Lecture	**39 Hours**

Textbooks:	
1.	Theodore S. Rappaport, "Wireless Communications: Principles &Practice", Second edn., Pearson Edn. 2002).
2.	K. Pahlavan and P. Krishnamurthy, "Principles of Wireless Networks", Pearson Educn. Asia publication(2002).
3	T. L. Singal, "Wireless Communication". McGraw Hill Education.
4	A. F. Molisch, "Wireless Communications", Second Edition, Wiley Publication.

Reference Books:	
1.	G. S. Rao, "Mobile Cellular Communication", Pearson Education.
2.	Upena Dalal, "Wireless communication", Oxford University Press.
3	William CY Lee, "Mobile Cellular Telecommunications", (second edition) McGraw Hill Inc.

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