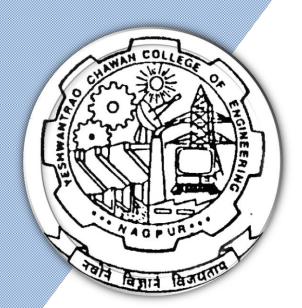
# Yeshwantrao Chavan College of Engineering (An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

(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 Electronics Engineering)

**B. Tech in Electronics Engineering** 

#### 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 Electronics Engineering

SoE No. 22EE-101

					B. Teen in Liectroni		,	3							
	_		BoS/				С	onta	ct Ho	urs		%	Weightag	je	ESE Duration
SN	Sem	Туре	Deptt	Sub. Code	Subject	T/P	L	Т	Р	Hrs	Credits	MSEs*	TA**	ESE	Duration Hours
	FIRST SEME				ESTER	1									
1	1	BS	GE/MTH	22EE101	Differential Equation, Complex Variables & Matrices	Т	3	1	0	4	4	30	20	50	3 Hrs
2	1	BS	GE/PHY	22EE102	Engineering Physics	Т	3	0	0	3	3	30	20	50	3 Hrs
3	1	BS	GE/PHY	22EE103	Lab: Engineering Physics	Р	0	0	2	2	1		60	40	
4	1	HS	GE/HUM	22EE104	Social Science	Т	3	0	0	3	3	30	20	50	3 Hrs
5	1	BES	ME/ME	22EE105	Engineering Graphics	Т	1	0	0	1	1	30	20	50	3 Hrs
6	1	BES	ME/ME	22EE106	Lab: Engineering Graphics	Р	0	0	4	4	2		60	40	
7	1	BES	CT/CT	22EE107	Elements of AIML	Т	3	0	0	3	3	30	20	50	3 Hrs
8	1	BES	EL/EL	22EE108	Electrical workshop	Р	0	0	2	2	1		60	40	
9	1	BES	EE/EE	22EE109	Digital Logic Design	Т	3	0	0	3	3	30	20	50	3 Hrs
10	1	BES	EE/EE	22EE110	Lab: Digital Logic Design	Р	0	0	2	2	1		60	40	
						TOTAL	16	1	10	27	22				
List	of Man	datory	Learning C	ourse (MLC	)										
1	1	HS	GE/T&P	MLC2121	YCAP1-Get Set Go	Α	2	0	0	2	0				
2	1	BES	GE/CHE	GE2132	Environmental Science	Α	2	0	0	2	0				
				•	•		•				•				
					SECOND SE	MESTE	R								
1	2	BS	GE/MTH	22EE201	Differential & Integral Calculus	Т	3	1	0	4	4	30	20	50	3 Hrs
2	2	BS	GE/CHE	22EE202	Engineering Chemistry	Т	3	0	0	3	3	30	20	50	3 Hrs

	SECOND						R								
1	2	BS	GE/MTH	22EE201	Differential & Integral Calculus	Т	3	1	0	4	4	30	20	50	3 Hrs
2	2	BS	GE/CHE	22EE202	Engineering Chemistry	Т	3	0	0	3	3	30	20	50	3 Hrs
3	2	BS	GE/CHE	22EE203	Lab: Engineering Chemistry	Р	0	0	2	2	1		60	40	
4	2	HS	GE/HUM	22EE204	Professional Communication	Т	3	0	0	3	3	30	20	50	3 Hrs
5	2	BES	CV/CV	22EE205	Engineering Mechanics	Т	3	0	0	3	3	30	20	50	3 Hrs
6	2	BES	CV/CV	22EE206	Lab: Engineering Mechanics	Р	0	0	2	2	1		60	40	
7	2	BES	EE/EE	22EE207	Basic Electrical and Electronics Engineering	Т	3	0	0	3	3	30	20	50	3 Hrs
8	2	BES	IT/IT	22EE208	Programming for Problem Solving	Т	3	0	0	3	3	30	20	50	3 Hrs
9	2	BES	IT/IT	22EE209	Lab: Programming for Problem Solving	Р	0	0	2	2	1		60	40	
								1	6	25	22				

List	List of Mandatory Learning Course (MLC)											
1	2	HS	GE/HUM	GE2131	Universal Human Value	Α	2	0	0	2	0	
2	2	HS	GE/T&P	MLC2122	YCAP2 -Functional English	Α	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

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

#### Yeshwantrao Chavan College of Engineering

SoE No.

22EE-101

(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 Electronics Engineering

		Sam Time BoS/ Sub-Code Subject				С	onta	ct Ho	urs		%	Weightag	је	ESE Duration	
SN	Sem	Туре	Deptt	Sub. Code	Subject	T/P	L	Т	Р	Hrs	Credits	MSEs*	TA**	ESE	Duration Hours
					Third Sem	ester	Π	ı	Π		I		I		
1	3	BS	EE/EE	22EE301	Signal and Systems	Т	3	0	0	3	3	30	20	50	3 Hrs
2	3	HS	GE/HUM	22EE302	Fundamentals of Management and Economics	Т	3	0	0	3	3	30	20	50	3 Hrs
3	3	PC	EE/EE	22EE303	Electronic Devices and Circuits	Т	3	1	0	3	3	30	20	50	3 Hrs
4	3	PC	EE/EE	22EE304	Lab:Electronic Devices and Circuits	Р	0	0	2	2	1		60	40	
5	3	PC	EE/EE	22EE305	Microprocessor and Interfacing	Т	3	0	0	3	3	30	20	50	3 Hrs
6	3	PC	EE/EE	22EE306	Lab:Microprocessor and Interfacing	Р	0	0	2	2	1		60	40	
7	3	PC	EE/EE	22EE307	Network Analysis	Т	3	0	0	2	3	30	20	50	3 Hrs
8	3	PC	EE/EE	22EE308	Lab:Network Analysis	Р	0	0	2	2	1		60	40	
9	3	PC	EE/EE	22EE309	Switching Theory and Finite Automata	Т	3	0	0	2	3	30	20	50	3 Hrs
10	3	PC	EE/EE	22EE310	Lab: Programming Language	Р	0	0	2	2	1		60	40	
					TOTAL THIR	D SEM	18	1	8	24	22				
List	of Man	datory	Learning C	ourse (MLC											
1	3	HS	T&P	MLC2123	YCCE Communication Aptitude Preparation (YCAP3)	А	3	0	0	3	0				
2	3	BES	EE	MLC107	Basics of MATLAB	Α	2	0	0	2	0				
					Fourth Sen	nester									
1	4	BS	GE/HUM	22EE401	Probability and Statistical Theory	T	3	0	0	3	3	30	20	50	3 Hrs
2	4	PC	EE/EE	22EE402	Digital System Modelling	Т	3	0	0	3	3	30	20	50	3 Hrs
3	4	PC	EE/EE	22EE403	Microcontroller and its Applications	Т	3	0	0	3	3	30	20	50	3 Hrs
4	4	PC	EE/EE	22EE404	Lab: Microcontroller and its Applications	Р	0	0	2	2	1	·	60	40	
5	4	PC	EE/EE	22EE405	Algorithm and Data Structure	Т	3	0	0	3	3	30	20	50	3 Hrs
6	4	PC	EE/EE	22EE406	Lab: Algorithm and Data Structure	Р	0	0	2	2	1		60	40	

	TOTAL FOURTH SEM						21	1	8	29	25		
List	ist of Mandatory Learning Course (MLC)												
1	4	HS	T&P	MLC2124	YCCE Communication Aptitude Preparation (YCAP4)	Α	3	0	0	3	0		
2	4	BES	EE	MLC108	Basics of Arduino Programmimg	Α	2	0	0	2	0		

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40

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3 Hrs

3 Hrs

3 Hrs

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

22EE407 Digital CMOS Circuits

Lab:Digital CMOS Circuits

Lab: Electronics Workshop

Environmental Sustainability,

Pollution and Management

Electromagnetic Fields

22EE408

22EE409

22EE410

22EE411

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

4

9 4

10 4

11 4 PC

PC

РС

PC

РС

EE/EE

EE/EE

EE/EE

EE/EE

CV/EE

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

#### 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 Electronics Engineering

SoE No.
22EE-101

			BoS/				С	onta	ct Ho	urs		%	Weightag	je	ESE
SN	Sem	Type	Deptt	Sub. Code	Subject T/F		L	т	Р	Hrs	Credits	MSEs*	TA**	ESE	Duration Hours
					Fifth Sem	ester									
1	5	PC	EE	22EE501	Analog Communication	Т	3	0	0	3	3	30	20	50	3 Hrs
2	5	PC	EE	22EE502	Lab: Analog Communication	Р	0	0	2	2	1		60	40	
3	5	PC	EE	22EE503	Embedded System	Т	3	0	0	3	3	30	20	50	3 Hrs
4	5	PC	EE	22EE504	Lab: Embedded System	Р	0	0	2	2	1		60	40	
5	5	PC	EE	22EE505	Analog Integrated Circuits & Design	Т	3	0	0	3	3	30	20	50	3 Hrs
6	5	PC	EE	22EE506	Lab: Analog Integrated Circuits & Design	Т	0	0	2	2	1	30	20	50	3 Hrs
7	5	PE	EE		Professional Elective-I	Т	3	0	0	3	3	30	20	50	3 Hrs
8	5	PE	EE		Lab.: Professional Elective-I	Р	0	0	2	2	1		60	40	
9	5	STR	EE	22EE507	Industrial training, Seminar & Report	Р	0	0	2	2	1		60	40	
10	5	OE-I	EE		Open Elective - I	Т	3	0	0	3	3	30	20	50	3 Hrs
11	5	OE-II	EE		Open Elective - II	Т	3	0	0	3	3	30	20	50	3 Hrs
					TOTAL FOURT	H SEM	18	0	10	28	23				
List o	f Profes	sional Ele	ectives-I *								•	•			•
1	5	PE-I	EE	22EE511	PE-I:Operating System										
2	5	PE-I	EE	22EE512	PE-I: Lab: Operating System									•	
3	5	PE-I	EE	22EE513 PE-I: Object Oriented Programming											

List o	f Profes	sional El	ectives-l *		
1	5	PE-I	EE	22EE511	PE-I:Operating System
2	5	PE-I	EE	22EE512	PE-I: Lab: Operating System
3	5	PE-I	EE	22EE513	PE-I: Object Oriented Programming
4	5	PE-I	EE	22EE514	PE-I: Lab: Object Oriented Programming
5	5	PE-I	EE	22EE515	PE-I: Computer Communication Networks
6	5	PE-I	EE	22EE516	PE-I: Lab: Computer Communication Networks
					DELA I MIGIE :

/	5	PE-I	EE	22EE517	PE-I: Analog VLSI Design
8	5	PE-I	EE	22EE518	PE-I: Lab: Analog VLSI Design

Op	Open Elective-i									
1		5	OE-I	EE	22EE531	OE I : Fuzzy Logic & Neural Networks				
2	: [	5	OE-I	EE	22EE532	OE I : Basics of Analog and Digital				
3		5	OE-I	EE	22EE533	OE I : Biomedical Instrumentation				
4		5	OF-I	FF	22FF534	OF L. Digital Logic Design				

Op	Open Elective-II											
	1	5	OE-II	EE	22EE551	OE II : Sensors and Actuators						
- 2	2	5	OE-II	EE	22EE552	OE II : Computer Architecture						
- ;	3	5	OE-II	EE	22EE553	OE II : Consumer Electronics						
4	4	5	OE-II	EE	22EE554	OE II : Industrial Automation						

List	List of Mandatory Learning Course (MLC)											
1	5	HS	T&P	MLC2125	YCAP5: YCCE Communication Aptitude Preparation	Α	3	0	0	3	0	
2	5	HS	R&D	MLC125	Design thinking	Α	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 TA\*\* = for Practical : MSPA will be 15 marks each

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

#### 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 Electronics Engineering

SoE No. 22EE-101

	_	_	BoS/				С	onta	ct Ho	urs		%	Weightag	ge	ESE
SN	Sem	Type	Deptt	Sub. Code	Subject	T/P	L	Т	Р	Hrs	Credits	MSEs*	TA**	ESE	Duration Hours
					Seventh Ser	mester									
1	7	PC	EE	22EE701	Digital Communication	T	3	0	0	3	3	30	20	50	3 Hrs
2	7	PC	EE	22EE702	Lab: Digital Communication	Р	0	0	2	2	1		60	40	
3	7	PC	EE	22EE703	Internet of Things	Т	3	0	0	3	3	30	20	50	3 Hrs
4	7	PC	EE	22EE704	Lab: Internet of Things	Р	0	0	2	2	1		60	40	
5	7	PE	EE		Professional Elective-IV	Т	3	0	0	3	3	30	20	50	3 Hrs
6	7	PE	EE		Professional Elective-V	T	3	0	0	3	3	30	20	50	3 Hrs
7	7	PE	EE		Professional Elective-VI	T	3	0	0	3	3	30	20	50	3 Hrs
8	7	STR	EE	22EE705	Project Phase-II	Р	0	0	10	10	5		60	40	
9	7	STR	EE	22EE706	Campus Recruitment Training (CRT)	Р	0	0	0	0	2		100		
	TOTAL SEVENTH SEM   15   0   14   29   24														
-							•		•			I.			

#### List of Professional Electives-IV,V & VI

Profess	ional	Flectives	-IV

				• •			
	1	7	PE-IV	EE	22EE721	PE IV: Introduction to remote sensing and Image Analysis	
Ī	2	2 7 PE-IV EE 22EE722 PE IV: Wireless Sensor Networks					
Ī	3	7	PE-IV	EE	22EE723	PE IV: System on Chip Design	
Ī	3	7	PE-IV	EE	22EE724	PE IV: Deep learning	

#### Professional Electives -V

1	7	PE-V	EE	22EE741	PE V: Biomedical Engineering
2	7	PE-V	EE	22EE742	PE V: Wireless Communication
3	7	PE-V	EE	22EE743	PE V: Cryptography and Network Security
4	7	PE-V	EE	22EE744	PE V: Nano Electronics
5	7	PE-V	EE	22EE745	PE V: VLSI Signal Processing

#### Professional Electives -VI

1	7	PE-VI	EE	22EE761	PE-VI: Design Verification and Test of Digital VLSI Circuits
2	7	PE-V	EE	22EE762	PE-VI: Micro Electro Mechanical Systems (MEMS)
3	7	PE-V	EE	22EE763	PE-VI: Mechatronics
4	7	PE-V	EE	22EE764	PE-VI: Computer Vision

	Eighth Semester													
1	8	STR	EE	22EE801	Industrial Internship	Р	0	0	12	12	3	60	40	
2	8	STR	EE	22EE802	Extra Curricular Activity Evaluation	Р	0	0	0	0	2	100		
	TOTAL EIGHTH SE						0	0	12	12	5			
	GRAND TOTAL							4	78	204	166			

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

Brakat	Med .	June 2022	1.00	Applicable for AY 2022-23 Onwards
Chairperson	Dean (Acad. Matters)	Date of Release	Version	7.1. 2022 20 0

#### 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 Electronics Engineering

			BoS/				C	onta	ct Ho	urs		%	Weightag	je	ESE
SN	Sem	Туре	Deptt	Sub. Code	Subject	T/P	L	т	Р	Hrs	Credits	MSEs*	TA**	ESE	Duration Hours
					Sixth Sem	ester									
1	6	PC	EE	22EE601	Control System Engineering	Т	3	0	0	3	3	30	20	50	3 Hrs
2	6	PC	EE	22EE602	Digital Signal Processing	Т	3	0	0	3	3	30	20	50	3 Hrs
3	6	PC	EE	22EE603	Lab: Digital Signal Processing	Р	0	0	2	2	1		60	40	
4	6	PC	EE	22EE604	Lab: Electronics Design Automation	Р	0	0	2	2	1		60	40	
5	6	PE	EE		Professional Elective-II	Т	0	0	2	2	3	30	20	50	3 Hrs
6	6	PE	EE		Lab.: Professional Elective-II	Р	3	0	0	3	1		60	40	
7	6 PE EE Professional Elective-III T						3	0	0	3	3	30	20	50	3 Hrs
8	6	OE-III	EE		Open Elective - III	Т	3	0	0	3	3	30	20	50	3 Hrs
9	6	OE-IV	EE		Open Elective - IV	Т	3	0	0	3	3	30	20	50	3 Hrs
10	6	PR	EE	22EE605	Project Phase -I	Р	0	0	4	4	2		60	40	
				H SEM	18	0	10	28	23						

#### List of Professional Electives- II & III

Professiona	I Electives-II
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1 1010					
1	6	PE-II	EE	22EE611	PE II:Digital Image Processing
2	6	PE-II	EE	22EE612	Lab: PE II: Digital Image Processing
3	6	PE-II	EE	22EE613	PE II:Machine Learning
4	6	PE-II	EE	22EE614	Lab: PE II: Machine Learning
5	6	PE-II	EE	22EE615	CMOS Subsystem Design
6	6	PE-II	EE	22EE616	Lab:CMOS Subsystem Design
7	6	PE-II	EE	22EE617	PE II: Soft Computing & OptimizationTechniques
8	6	PE-II	EE	22EE618	Lab:PE II: Soft Computing & Optimization Techniques
9	6	PE-II	EE	22EE619	PE II: RF and Microwave
10	6	PE-II	EE	22EE620	Lab: PE II: RF and Microwave

#### Professional Electives-III

FIUIE	SSIUIIAI	Electives	-111		
1	6	PE-III	EE	22EE631	PE III: Industrial Automation
2	6	PE-III	EE	22EE632	PE III :Power Electronics
3	6	PE-III	EE	22EE633	PE III: Optical Communication
4	6	PE-III	EE	22EE634	PE III: Computer Orgnization
5	6	PE-III	EE	22EE635	PE III:Transmission line and wave Guide

#### Open Electives-III

1	6	OE-III	EE	22EE651	OE III : Fuzzy Logic & Neural Networks
2	6	OE-III	EE	22EE652	OE III : Basics of Analog and Digital Communication
3	6	OE-III	EE	22EE653	OE III : Biomedical Instrumentation
4	6	OE-III	EE	22EE654	OE III : Digital Logic Design

#### Open Electives-IV

1	6	OE-IV	EE	22EE671	OE IV : Sensors and Actuators
2	6	OE-IV	EE	22EE672	OE IV : Computer Architecture
3	6	OE-IV	EE	22EE673	OE IV : Consumer Electronics
4	6	OE-IV	EE	22EE674	OE IV : Industrial Automation

List	of Man	datory	Learning C	ourse (MLC)								
1	6	HS		MLC2126	YCCE Communication Aptitude Preparation (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

1A — TOT THEORY . 12 Intains On recture quizzes, 12 marks on two TAZ activities decided by course reacher, 2 marks on class attenuance and 4 marks on TAZ

activities

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

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

SoE No. 22EE-101

## Yeshwantrao Chavan College of Engineering (An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

(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 Semester

(Department of Electronics Engineering)

**B. Tech in Electronics Engineering** 

SoE No. 22EE-101

Nagar Yuwak Shikshan Sahsula'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 Electronics Engineering

		_	BoS/				С	onta	ct Ho	ours		%	Weightag	je	ESE Duration
SN	Sem	Туре	Deptt	Sub. Code	Subject	T/P	L	Т	Р	Hrs	Credits	MSEs*	TA**	ESE	Duration Hours
	FIRST SEMESTER														
1	1	BS	GE/MTH	22EE101	Differential Equation, Complex Variables & Matrices	Т	3	1	0	4	4	30	20	50	3 Hrs
2	1	BS	GE/PHY	22EE102	Engineering Physics	Т	3	0	0	3	3	30	20	50	3 Hrs
3	1	BS	GE/PHY	22EE103	Lab: Engineering Physics	Р	0	0	2	2	1		60	40	
4	1	HS	GE/HUM	22EE104	Social Science	Т	3	0	0	3	3	30	20	50	3 Hrs
5	1	BES	ME/ME	22EE105	Engineering Graphics	Т	1	0	0	1	1	30	20	50	3 Hrs
6	1	BES	ME/ME	22EE106	Lab: Engineering Graphics	Р	0	0	4	4	2		60	40	
7	1	BES	CT/CT	22EE107	Elements of AIML	Т	3	0	0	3	3	30	20	50	3 Hrs
8	1	BES	EL/EL	22EE108	Electrical workshop	Р	0	0	2	2	1		60	40	
9	1	BES	EE/EE	22EE109	Digital Logic Design	Т	3	0	0	3	3	30	20	50	3 Hrs
10	1	BES	EE/EE	22EE110	Lab: Digital Logic Design	Р	0	0	2	2	1		60	40	
					7	TOTAL	16	1	10	27	22				
List	of Man	detory l	Learning	Course (ML	C)										
1	1	HS	GE/T&P	MLC2121	YCAP1-Get Set Go	Α	2	0	0	2	0				
2	1	BES	GE/CHE	GE2132	Environmental Science	Α	2	0	0	2	0				

					SECOND S	EMEST	ER								
1	2	BS	GE/MTH	22EE201	Differential & Integral Calculus	Т	3	1	0	4	4	30	20	50	3 Hrs
2	2	BS	GE/CHE	22EE202	Engineering Chemistry	Т	3	0	0	3	3	30	20	50	3 Hrs
3	2	BS	GE/CHE	22EE203	Lab: Engineering Chemistry	Р	0	0	2	2	1		60	40	
4	2	HS	GE/HUM	22EE204	Professional Communication	Т	3	0	0	3	3	30	20	50	3 Hrs
5	2	BES	CV/CV	22EE205	Engineering Mechanics	Т	3	0	0	3	3	30	20	50	3 Hrs
6	2	BES	CV/CV	22EE206	Lab: Engineering Mechanics	Р	0	0	2	2	1		60	40	
7	2	BES	EE/EE	22EE207	Basic Electrical and Electronics Engineering	Т	3	0	0	3	3	30	20	50	3 Hrs
8	2	BES	IT/IT	22EE208	Programming for Problem Solving	Т	3	0	0	3	3	30	20	50	3 Hrs
9	2	BES	IT/IT	22EE209	<b>Lab:</b> Programming for Problem Solving	Р	0	0	2	2	1		60	40	
						TOTAL	18	1	6	25	22				

List	of Man	detory l	Learning	Course (ML	C)							
1	2	HS	GE/HUM	GE2131	Universal Human Value	Α	2	0	0	2	0	
2	2	HS	GE/T&P	MLC2122	YCAP2 -Functional English	Α	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

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





(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 Electronics Engineering)

SoE No. 22EE-101

## **B.Tech in Electronics Engineering**

#### **I SEMESTER**

## 22EE101: Differential Equation, Complex Variables & Matrices

#### **Course Outcomes**

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

- 1. Use appropriate Methods to solve first order and higher order differential equations and apply it to find solutions of engineering problems.
- 2. Determine the various functions of complex numbers.
- 3. Evaluate the integration of function of complex variables.
- 4. Use Matrix method to solve system of linear equations, evaluate eigen values eigen vectors and its applications.

#### **Unit I: Differential Equations I**

(7 Hrs.)

Linear differential equations of first order and first degree, Differential equation reducible to linear form, Exact differential equations (excluding the case of integrating factor) and their applications to various fields. (Contemporary Issues related to Topic)

#### **Unit II: Differential Equations II**

(7 Hrs.)

Higher order linear differential equations with constant coefficients, Complementary functions and Particular Integral for different cases, Method of variation of parameters, Examples on application to various fields. (Contemporary Issues related to Topic)

#### **Unit III: Differential Equations III**

(6 Hrs.)

Cauchy's homogeneous linear differential equations, Legendre's linear differential equation, Applications of differential equations to various field (only up to second order). (Contemporary Issues related to Topic)

#### **Unit IV: Complex Numbers**

(6 Hrs.)

Basic concepts of complex numbers and its various forms. Separation of real and imaginary parts, De Moivre's theorem, Application of De Moivre's theorem, Exponential function of complex numbers, Circular function of complex numbers, Hyperbolic functions and their inverse, Logarithm of a complex number. (Contemporary Issues related to Topic)

#### **Unit V: Complex Variables**

(7 Hrs.)

Analytic function, Cauchy-Riemann conditions, Harmonic functions, Finding Harmonic conjugates, Taylor's and Laurent's Theorem (statement only), Examples on Taylor's and Laurent's Theorem, Evaluation integral by using Residue theorem. (Contemporary Issues related to Topic)

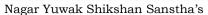
#### **Unit VI: Matrices**

(6 Hrs.)

Rank of a matrix, Consistency of system of equations using rank, Characteristics equations, Eigen values and Eigen vectors, Cayley Hamilton Theorem (without proof) statement and verification, Sylvester's theorem-statement and its application. (Contemporary Issues related to Topic)

Total Lecture 39 Hours

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# Yeshwantrao Chavan College of Engineering (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) SoE No.

(Department of Electronics Engineering)

SoE No. 22EE-101

## **B.Tech in Electronics Engineering**

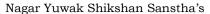
Tex	Textbooks:								
1.	Erwin Kreyzig, Advance Engineering Mathematics, 6 <sup>th</sup> Edition, John Wiley and Sons, INC.								
2.	H.K. Dass, Engineering Mathematics, 11 <sup>th</sup> revised edition, S. Chand, Delhi.								
3.	H.K. Dass, Advanced Engineering Mathematics, 8 <sup>th</sup> revised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

Ref	Reference Books:		
1.	G B Thomas and R L Finney, Calculus and Analytical Geometry, 9th edition, Addison-Wesley, 1999.		
2.	N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, 10 <sup>th</sup> edition, Laxmi Prakashan.		

Y	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/				

MC	MOOCs Links and additional reading, learning, video material	
1.	https://nptel.ac.in/courses/111103070	
2.	https://onlinecourses.nptel.ac.in/noc19_ma28/preview	
3.	https://nptel.ac.in/courses/111/106/111106100/	

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(Department of Electronics Engineering)

SoE No. 22EE-101

## **B.Tech in Electronics Engineering**

#### **I SEMESTER**

**22EE102: Engineering 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. Assess the characteristics of semiconductor materials in terms of crystal structures, charge carriers and energy
- 3. Examine the intensity variation of light due to interference, diffraction, laser and its applications.
- 4. Analyze the motion of charged particle in electric and magnetic field and its applications to electron optic devices.
- 5. Illustrate the nature and characterization of magnetic materials and superconductors for engineering applications.

#### **Unit I: Quantum Physics**

(7 Hrs.)

Wave-particle duality, de-Broglie hypothesis, Wavepacket, Heisenberg uncertainty principle: Significance, Applications. Wavefunction and its probability interpretation, Schrodinger Equation, Particle in infinite potential well, quantum tunnelling. (Contemporary Issues related to Topic)

#### **Unit II: Band Theory of Solids**

7 Hrs.)

Formation of energy bands in solids; Classification of solids, Energy band diagram of Si/Ge, Intrinsic and extrinsic semiconductors, Conductivity, Law of mass action, Fermi function, Fermi level in intrinsic and extrinsic semiconductors, Dependence of Fermi level on impurity concentration and temperature, Hall effect. (Contemporary Issues related to Topic)

#### **Unit III: Geometrical Optics**

(7 Hrs.)

Interference: Interference in thin films, Wedge shaped film, Newton's rings, Applications of interference Diffraction: Fraunhofer diffraction from a single slit. (Contemporary Issues related to Topic)

**Unit IV: Laser** (6 Hrs.)

Interaction of radiation with matter/ quantum processes, Population Inversion and Optical resonance cavity, Three and four level laser, Ruby laser, Semiconductor diode laser, Properties and engineering applications of laser.

#### (Contemporary Issues related to Topic)

#### **Unit V: Electron Ballistics**

(7 Hrs.)

Motion of a charged particle in uniform electric and magnetic field, Cross field configuration; Electron refraction, Electron lens, CRO and its applications. (Contemporary Issues related to Topic)

#### **Unit VI: Magnetic Materials & Superconductors**

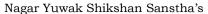
(6 Hrs.)

Introduction to magnetic materials, interpretation of Hysteresis curves, Superconductors: Type-I and Type-II, Meissner effect, Applications. (Contemporary Issues related to Topic)

**Total Lecture** 

40 Hours

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(Department of Electronics Engineering) **B.Tech in Electronics Engineering** 

SoE No. 22EE-101

#### Textbooks:

- 1. M. N. Avadhanulu, P.G.Kshirsagar, A Textbook of Engg. Physics, S.Chand and Company.
- 2. Hitendra K Malik, A K Singh, Engineering Physics, 2<sup>nd</sup> Edition, Tata McGraw Hill Education Private Limited, 2015.

#### **Reference Books:**

- 1. David Halliday, Robert Resnick and Jerle Walker, John-Wiley India, Fundamentals of Physics, 10<sup>th</sup> John Wiley & Sons Inc.
- 2. Brijlal and Subramanyam, Text Book of Optics, Revised edition, S. Chand and Company.
- 3. M.N. Avadhanulu, 2<sup>nd</sup> Edition, Laser, S.Chand and Company.
- 4. A. Beiser, Concept of Modern Physics, 6<sup>th</sup> Edition, Laser, Tata McGraw-Hill.
- 5. Thyagarajan K. and Ghatak A.K, LASERS: Theory and Applications, 2<sup>nd</sup> Edition, Macmillan Publication.
- 6. S.O.Pillai, Solid State Physics, 9<sup>th</sup> Edition, New Edge International Publishers.
- 7. Palanisamy, Solid State Physics, 8<sup>th</sup> Edition, New Edge International Publishers.
- 8. C. Kittel, Solid State Physics, 8th Edition, Willey Publication.
- 9. B. K. Pandey, S. Chaturvedi, Engineering Physics, 1st Edition, Cengage Learning.
- 10. John Allision, Electronic Engineering Materials and Devices, TMH edition, 10<sup>th</sup> reprint, Tata McGraw Hill.

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

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copies%20of%20books/Applied%20Sciences%20&%20Humanities/Physics/2016

Book ThePhysicsOfSemiconductors.pdf

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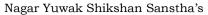
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Applied%20Sciences%20&%20Humanities/Physics/Dekker%20-%20Solid%20State%20Physics.pdf

# MOOCs Links and additional reading, learning, video material 1. https://youtu.be/jaXiOXnJd8s 2. https://youtu.be/v2zpSFEdvZo 3. https://youtu.be/tjUUU9f2Wpc

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SoE No. 22EE-101

## **B.Tech in Electronics Engineering**

#### **I SEMESTER**

**22EE103: Lab: Engineering 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. Assess the characteristics of semiconductor materials in terms of crystal structures, charge carriers and energy bands.
- 3. Examine the intensity variation of light due to interference, diffraction, laser and its applications.
- 4. Analyze the motion of charged particle in electric and magnetic field and its applications to electron optic devices.
- 5. Illustrate the nature and characterization of magnetic materials and superconductors for engineering applications.

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

SN	Experiments based on
1	Determination of Planck's constant.
2	Study of Tunnel Diode.
3	Determination of Hall coefficient and density of charge carriers using Hall effect.
4	Dependence of Hall coefficient on temperature.
5	Determination of Band gap in a semiconductor by four probe method.
6	Determination of Band gap in a semiconductor using reverse biased p-n diode.
7	Determination of radius of curvature of Plano convex lens using Newton's rings.
8	Determination of thickness of thin paper using air wedge.
9	Determination of wavelength of sodium light using diffraction grating
10	Determination of wavelength of laser using diffraction grating.
11	Determination of divergence of laser beam.
12.	Determination of amplitude and frequency of sinusoidal signal using C.R.O.
13.	To measure the phase shift introduced by a phase shift network using Dual beam CRO.

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(Department of Electronics Engineering)

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## **B.Tech in Electronics Engineering**

## **I SEMESTER** 22EE104: Social Science

#### **Course Outcomes**

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

- 1. Explain the basic concepts of social sciences.
- Describe the development of various Civilizations and their culture.
- Explain the basic idea of Constitution of India and aware about their rights & Duties.
- Analyze the Impact of Industrialization on Society and discuss the Fundamental Concepts of Society.

#### **Unit I: Social Sciences & Its Utility**

(6 Hrs.)

Meaning & Scope of Social Science, General Utility of Social Sciences to Engineers, Applied Humanities, Social Engineering, Society its types & Characteristics. (Contemporary Issues related to Topic)

#### Unit II: Human Civilization

(7 Hrs.)

Development of human civilization with specific reference to monumental studies of engineering skill, Ancient Indian Civilization: - a) Indus Valley Civilization b) Vedic Civilization, c) Indian Art & Architecture. (Contemporary Issues related to Topic)

#### **Unit III: Fundamental Concept in Social Science**

(7 Hrs.)

Social Structure and Social System, Socialization, Social Control and Social Change, Culture: Characteristics and Features. (Contemporary Issues related to Topic)

#### Unit IV: Introduction to Constitution of India

(7 Hrs.)

Significance of Preamble, Fundamental Rights and Duties, Directive principles of state policy. Federal System Concept of industrial Democracy. (Contemporary Issues related to Topic)

#### **Unit V: Industrial Organization & Society**

(6 Hrs.)

Industrialization and its impact on society, Selection, Training & Motivation of workers, Industrial Psychology, Industrial sociology, Work Organization, Power, Authority and Status system. (Contemporary Issues related to Topic)

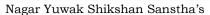
#### **Unit VI: Industrial Management**

(6 Hrs.)

Labour Union Organization, Discipline in Industry, Labour Turnover, Industrial Fatigue of workers, Health and Safety of Workers. (Contemporary Issues related to Topic)

> **Total Lecture** 39 Hours

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# Yeshwantrao Chavan College of Engineering (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) SoE No.

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SoE No. 22EE-101

## **B.Tech in Electronics Engineering**

Tex	Textbooks:				
1.	S. Shabbir & Sheikh, A New Look Into Social Sciences, S.Chand, New Delhi,1993.				
2.	C N Shankar Rao, Sociology Principles of Sociology With An Introduction To Social Thought, S. Chand,				
	New Delhi, 2010.				
3.	O P Khanna, Industrial Engineering And Management, Dhanpat Rai Publication, New Delhi, 2010.				
4.	Dr. G. N. Nimbarte, Social Science, Sankalp Publications, Nagpur.				

Ref	Reference Books:				
1.	C. N. Shankar Rao, Sociology: Principal of Sociology with an introduction to social thought, Publication: S.				
	Chand, New Delhi.				
2.	O. P. Khanna, Industrial Engineering and Management, Dhanpat Rai Publication, New Delhi.				
3.	Reader's Digest Vanished Civilizations, The Reader's Digest Association Limited, New York.				
4.	Constitution of India: Dr B. R. Ambedkar: Government of India, Government of India.				
5.	B. L. Kayastha, Recent trends in Humanities and Social Sciences, 1st Ed., Akinik Publications, New Delhi.				

M	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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(Department of Electronics Engineering)

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## **B.Tech in Electronics Engineering**

#### **I SEMESTER**

**22EE105: 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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(Department of Electronics Engineering) **B.Tech in Electronics Engineering** 

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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
- https://nptel.ac.in/courses/112105294

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SoE No. 22EE-101

## **B.Tech in Electronics Engineering**

#### **I SEMESTER**

22EE106: Lab: Engineering Graphics

#### **Course Outcomes**

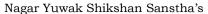
#### Upon successful completion of the course the students will be able to

- 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 Electronics Engineering**

## I SEMESTER 22EE107: Elements of AIML

#### **Course Outcomes:**

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

- 1. Develop an understanding what is involved in AIML.
- 2. Understand learning algorithms of AIML.
- 3. Understand the deep learning.
- 4. Apply the knowledge for the selection of tool and languages for problem solving
- 5. Understand the use of AIML for real world problems.

#### **Unit I: Introduction to Artificial Intelligence**

(7 Hrs.)

What Is Artificial Intelligence? History, AI and Society, Agents and Knowledge based systems, Components of AI (Contemporary Issues related to Topic)

#### **Unit II: Propositional Logic**

(7 Hrs.)

Propositional Logic, First order logic, limitations of logic, Search, Games and Problem Solving, Reasoning with Uncertainty (Contemporary Issues related to Topic)

#### **Unit III: Machine Learning**

(7 Hrs.)

Supervised learning, Unsupervised learning, Reinforcement learning: Model based learning, Regression, Decision trees, Linear Discrimination, Kernel Machines and Graphical Models (Contemporary Issues related to Topic)

#### Unit IV: Artificial Neural Networks and Deep Learning

(7 Hrs.)

Biological neural network, Artificial neural network, Hopfield network, Neural Associative memory, Linear networks, Backpropogation algorithm, Support Vector Machines, Basics of deep learning. (Contemporary Issues related to Topic)

#### Unit V: Introduction to Platforms, Tools, Frameworks and languages for AIML

(6 Hrs.)

Top AIML Softwares: Salesforce Einstein, IBM Watson, Deep Vision, Cloud Machine Learning Engine, Azure Machine Learning Studio, Nvidia Deep Learning AI, Playment; Machine learning tools: TensorFlow, Amazon Machine Learning, Accord.NET, Apache Mahout, Shogun; Programming languages: Python, R, Java, Julia, C/C++, Others: Scikit Learn, Theano, Caffe, MxNet, Keras, PyTorch, CNTK, Auto ML, OpenNN, H20: Open Source AI Platform, Google ML Kit (Contemporary Issues related to Topic)

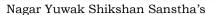
#### Unit VI: Applications of AI and ML

(6 Hrs.)

Working with software based AI Applications, Working with AI in hardware Applications, Health, Banking and Finance, Automobile, Surveillance, Social Media, Education, Space, etc. (Contemporary Issues related to Topic)

**Total Lecture | 40 Hours** 

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# Yeshwantrao Chavan College of Engineering (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 Electronics Engineering) SoE No. 22EE-10

SoE No. 22EE-101

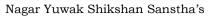
## **B.Tech in Electronics Engineering**

Tex	xtbooks:
1.	Wolfgang Ertel, "Introduction to Artificial Intelligence" 2nd Edition, UTiCS, Springer
2.	Ethem Alpaydın, "Introduction to Machine Learning" 3rd Edition, The MIT Press, Cambridge
	Massachusetts London, England.

Re	ference Books:					
1.	John Paul Mueller, Luca Massaron	John Wiley & Sons				
	,"Artificial Intelligence for Dummies"	First, 2018				
2.	Steven W. Knox, Wiley" Machine Learning A Concise Introduction"		First, 2018			

M(	MOOCs Links and additional reading, learning, video material		
1.	https://www.youtube.com/watch?v=kwSTs0QVRfU		
2.	https://www.youtube.com/watch?v=GHpchgLoDvI&list=PLp6ek2hDcoNB_YJCruBFjhF79f5ZHyBuz		
3.	https://nptel.ac.in/courses/106105077		

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# Yeshwantrao Chavan College of Engineering (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 Electronics Engineering)

SoE No. 22EE-101

## **B.Tech in Electronics Engineering**

## **I SEMESTER** 22EE108: Electrical workshop

#### **Course Outcomes:**

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

- 1. To choose the electrical and electronics components/equipment for various application
- 2. To select various sensors and measuring instruments for different applications.
- To build the various electrical wiring for different application 3.

Sr. No.	Experiments based on
1	Introduction of Tools, Electrical Materials and Electrical Drawing Symbols
2	Introduction to basic Electrical Components (R,L,C) with its number and color coding.
3	Introduction to Different types of Measuring Instruments and its demonstration.
4	One Lamp Controlled by One Switch and Distribution Board Connection
5	Staircase Wiring, Hospital Wiring and Godown Wiring
6	Master Switch Control Wiring and Intermediate Switch Wiring
7	Design of House Wiring
8	Introduction to Different sensor devices and its demonstration.
9	To Study different protection devices and Importance of Earthing.
10	To Study Circuit and Working of Home Inverter, UPS.

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(Department of Electronics Engineering)

SoE No. 22EE-101

## **B.Tech in Electronics Engineering**

### **I SEMESTER**

22EE109: Digital Logic Design

#### **Course Outcomes:**

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

- 1. Apply the laws of Boolean algebrato simplify logical equations and combination logic circuits.
- 2. Understand and demonstrate the various codes and illustrate their addition substraction.
- 3. 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 andtheir inter conversion, BCD numbers (8421-2421), Gray code, ASCII codes. Binary addition and subtraction, signed and unsigned binary numbers, 1's and 2'scomplement representation. (Contemporary Issues related to Topic)

#### **Unit:2** | Boolean Algebra

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

Minterm, Maxterm, POS, SOP, K-Map, Simplification by Boolean theorems, don't care condition. (Contemporary Issues related to Topic)

#### **Unit:4** Combinational Logic

7 Hours

Half adder, Full adder, Subtractor circuit. Multiplxer demultiplexer, decorder, BCD to seven segment Decoder, encoders, code converters. (Contemporary Issues related to Topic)

#### **Unit:5** | Sequential Circuits

7 Hours

Flipflop, set-reset laches, R-S flip-flop, D-flipflop, J-KFlip-flop, Master slave Flipflop, T flip-flop, excitation table of flip-flops. Flip-Flop to flip-flop conversion (**Contemporary Issues related to Topic**)

#### **Unit:6** Registers & Counters

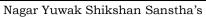
7 Hours

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/downsynchronous counter, application of counter. (Contemporary Issues related to Topic)

## Total Lecture Hours

42 Hours

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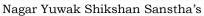
(Department of Electronics Engineering)

SoE No. 22EE-101

## **B.Tech in Electronics Engineering**

Tex	xtbooks
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
Ref	ference 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.
YC	CE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
1	http://103.152.199.179/YCCE/yccelibrary.html
MO	OOCs 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 Electronics Engineering**

#### **I SEMESTER**

22EE110: Lab: Digital Logic Design

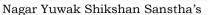
#### **Course Outcomes:**

#### 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 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.

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 BreadBoard.			
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 using SPICE.			
9	Design & verify Truth Table of Half adder & Full adder circuits <b>Logic simulator</b> .			
10	Design & verify Truth Table of 4:1 Multiplexer & 1:4 Demultiplexer circuits using SPICE.			

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## **B.Tech in Electronics Engineering**

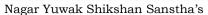
## **I SEMESTER Audit Course** MLC2121: YCAP1-Get Set Go

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

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

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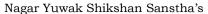
Unit No.	Topic	Duration		
3	Topic: Increase Self Confidence -• Use our experiences to communicate more confidently • Communicate with clarity and conciseness • Discover how past experiences influence behavior	2.5 Hours		
4	Topic: Motivate Others and Enhance Relationships-• Learning Objectives • Explain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

Unit	Topic	Duration
No.		
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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## **B.Tech in Electronics Engineering**

# 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.)

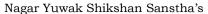
Introduction – biodiversity at genetic, species and ecosystem levels Bio-geographic classification of India. Value of biodiversity – Consumptive use value, productive use value, social, ethical, moral, aesthetic and optional vlue of biodiversity.

India as a mega-diversity nation; hotospots 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.

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## **B.Tech in Electronics Engineering**

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

Re	Reference Books:								
1.	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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## Yeshwantrao Chavan College of Engineering (An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

(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 2<sup>nd</sup> Semester

(Department of Electronics Engineering)

**B. Tech in Electronics Engineering** 

SoE No. 22EE-101

Nagar Yuwak Shikshan Sahsula'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 Electronics Engineering

		_	BoS/				С	onta	ct Ho	ours		%	Weightag	je	ESE
SN	Sem	Туре	Deptt Sub. C	Sub. Code	Subject	T/P	L	Т	Р	Hrs	Credits	MSEs*	TA**	ESE	Duration Hours
	FIRST SEMESTER														
1	1	BS	GE/MTH	22EE101	Differential Equation, Complex Variables & Matrices	Т	3	1	0	4	4	30	20	50	3 Hrs
2	1	BS	GE/PHY	22EE102	Engineering Physics	Т	3	0	0	3	3	30	20	50	3 Hrs
3	1	BS	GE/PHY	22EE103	Lab: Engineering Physics	Р	0	0	2	2	1		60	40	
4	1	HS	GE/HUM	22EE104	Social Science	Т	3	0	0	3	3	30	20	50	3 Hrs
5	1	BES	ME/ME	22EE105	Engineering Graphics	Т	1	0	0	1	1	30	20	50	3 Hrs
6	1	BES	ME/ME	22EE106	Lab: Engineering Graphics	Р	0	0	4	4	2		60	40	
7	1	BES	CT/CT	22EE107	Elements of AIML	Т	3	0	0	3	3	30	20	50	3 Hrs
8	1	BES	EL/EL	22EE108	Electrical workshop	Р	0	0	2	2	1		60	40	
9	1	BES	EE/EE	22EE109	Digital Logic Design	Т	3	0	0	3	3	30	20	50	3 Hrs
10	1	BES	EE/EE	22EE110	Lab: Digital Logic Design	Р	0	0	2	2	1		60	40	
	TOTAL 16 1 10 27 22														
List	of Man	detory l	Learning	Course (ML	C)										
1	1	HS	GE/T&P	MLC2121	YCAP1-Get Set Go	Α	2	0	0	2	0				
2	1	BES	GE/CHE	GE2132	Environmental Science	Α	2	0	0	2	0				

					SECOND S	EMEST	ER								
1	2	BS	GE/MTH	22EE201	Differential & Integral Calculus	Т	3	1	0	4	4	30	20	50	3 Hrs
2	2	BS	GE/CHE	22EE202	Engineering Chemistry	Т	3	0	0	3	3	30	20	50	3 Hrs
3	2	BS	GE/CHE	22EE203	Lab: Engineering Chemistry	Р	0	0	2	2	1		60	40	
4	2	HS	GE/HUM	22EE204	Professional Communication	Т	3	0	0	3	3	30	20	50	3 Hrs
5	2	BES	CV/CV	22EE205	Engineering Mechanics	Т	3	0	0	3	3	30	20	50	3 Hrs
6	2	BES	CV/CV	22EE206	Lab: Engineering Mechanics	Р	0	0	2	2	1		60	40	
7	2	BES	EE/EE	22EE207	Basic Electrical and Electronics Engineering	Т	3	0	0	3	3	30	20	50	3 Hrs
8	2	BES	IT/IT	22EE208	Programming for Problem Solving	Т	3	0	0	3	3	30	20	50	3 Hrs
9	2	BES	IT/IT	22EE209	<b>Lab:</b> Programming for Problem Solving	Р	0	0	2	2	1		60	40	
						TOTAL	18	1	6	25	22				

List	List of Mandetory Learning Course (MLC)											
1	2	HS	GE/HUM	GE2131	Universal Human Value	Α	2	0	0	2	0	
2	2	HS	GE/T&P	MLC2122	YCAP2 -Functional English	Α	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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SoE No. 22EE-101

## **B.Tech in Electronics Engineering**

# II SEMESTER 22EE201: Differential and Integral Calculus

#### **Course Outcomes:**

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

- 1. Apply the knowledge of differentiation to solve the Engineering problems.
- 2. Determine the derivatives of functions of several variables and develop the mathematical equation.
- 3. Apply the knowledge of Beta and Gamma functions to solve the integrals.
- 4. Evaluate the multiple integrals and apply it to compute the area and volume of various structures.

#### **Unit I: Differential Calculus I**

(6 Hrs.)

Successive differentiation, n<sup>th</sup> derivative of rational function, Trigonometrical transformations, n<sup>th</sup> derivative of the product of two functions (Leibnitz's theorem), Taylor's theorem, Use of Maclaurin's theorem for one variable, standard expansions, Examples on Taylor's Theorem. (Contemporary Issues related to Topic)

#### Unit II: Differential Calculus II

(6 Hrs.)

Definitions of Curvature, Radius of curvature for cartesian curves, Centre of curvature, Circle of curvature, Procedure for tracing the cartesian curve, Important points (singular points, Multiple points, Double points, Node, Cusp), Problems on tracing of curve. (Contemporary Issues related to Topic)

#### **Unit III: Partial Differentiation**

(7 Hrs.)

Functions of several variables, First and higher order derivatives, Homogeneous functions, Euler's theorem on homogeneous function, Chain rule and total differential coefficient of composite functions. (Contemporary Issues related to Topic)

#### **Unit IV: Integral Calculus**

(6 Hrs.)

Gamma function, Reduction formula, Transformation of Gamma function, Beta function, Properties of Beta function, Transformation of Beta function, Relation between Beta and Gamma functions, Differentiation under the integral sign. (Contemporary Issues related to Topic)

#### **Unit V: Multiple integrals**

(7 Hrs.)

Elementary double integrals and triple integrals, Change of variables (simple transformations) and Jacobian of transformations, Change of order of integration (Cartesian and polar). (Contemporary Issues related to Topic)

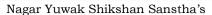
#### **Unit VI: Application of Multiple Integral**

(7 Hrs.)

Surface area, Calculation of mass, Centre of gravity of an arc and Centre of gravity of an area, Volume of solid by revolution of an area (Double integral). (Contemporary Issues related to Topic)

**Total Lecture 39 Hours** 

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## **B.Tech in Electronics Engineering**

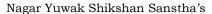
Tex	extbooks:							
1.	Erwin Kreyzig, Advance Engineering Mathematics, 6 <sup>th</sup> Edition, John Wiley and Sons, INC.							
2.	H.K. Dass, Engineering Mathematics, 11 <sup>th</sup> revised edition, S. Chand, Delhi.							
3.	H.K. Dass, Advanced Engineering Mathematics, 8th revised edition, S. Chand, Delhi.							
4.	Or. B.S. Grewal, Higher Engineering Mathematics, 43 <sup>rd</sup> edition, Khanna Publishers.							
5.	P.N.Wartikar and J.N.Wartikar, Applied Mathematics, 4 <sup>th</sup> Edition, Vidyarthi GrihaPrakashan.							

Ref	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 2 <sup>nd</sup> edition, Wiley.							
3.	N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, 10 <sup>th</sup> edition, Laxmi Prakashan.							

Y	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/							

MO	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							
3.	https://nptel.ac.in/courses/111/106/111106100/							

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SoE No. 22EE-101

## **B.Tech in Electronics Engineering**

#### **II SEMESTER**

22EE202: Engineering Chemistry

#### **Course Outcomes:**

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

- 1. Illustrate qualitative and quantitative aspects of water for industrial and domestic applications. (L2)
- 2. Apply concepts of electrochemistry for energy storage devices. (L3)
- 3. Identify corrosion and discuss its prevention. (L2)
- 4. Establish insight into engineering materials. (L3)

#### **Unit I: Water Conditioning**

(7 Hrs.)

Introduction, Hardness, Types of hardness, softening of water by lime-soda process, Zeolite process, (principle, advantages, and limitations). Numerical based on lime-soda and Zeolite process. Boiler troubles (Scale and sludge, caustic embrittlement), sequestration (carbonate, phosphate) Sterilization of drinking water by chlorination (Contemporary Issues related to Topic)

#### **Unit II: Electrochemistry**

(6 Hrs.)

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, Electrolytic refining. (Contemporary Issues related to Topic)

#### **Unit III: Energy Storage Devices Basic concepts**

(6 Hrs.)

**Unit III** Primary and secondary battery. Energy density, power density, energy efficiency, cycle life, shelf life. Secondary battery: Ni-metal hydride battery, Lithium-ion battery. H2-O2 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 IV: Corrosion (7 Hrs.)

Introduction to corrosion, electrochemical and galvanic series,

**Types of corrosion:** Chemical and electrochemical corrosion. Mechanisms of electrochemical corrosion, Factors influencing corrosion. Differential aeration theory of corrosion,

**Forms of corrosion:** Pitting corrosion, Intergranular corrosion, Stress corrosion, Waterline. **Corrosion prevention:** Design and material selection, Cathodic and anodic protection. (**Contemporary Issues related to Topic**)

Unit V: Lubricants (6 Hrs.)

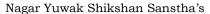
Introduction, Classification of lubricants, Mechanism of lubrication.

Liquid lubricants, Properties of liquid lubricants & significance–Viscosity and viscosity index., Flash and fire point, Cloud and pour point, Aniline point, acid value, saponification number, Steam Emulsion Number. Solid lubricant-Graphite.

Greases as Semisolid lubricants - Consistency test and drop point test. Synthetic lubricants- silicones.

Criteria for selection of lubricants: IC engines, gears, refrigeration, transformer, steam turbines, delicate instruments. (Contemporary Issues related to Topic)

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(7 Hrs.)

Nanomaterials: Definition, Carbon Nanotubes and types.

Applications of nanomaterials in electronics.

Conducting Polymers: Intrinsic and extrinsic conducting polymers, doping, factors responsible for conduction. General properties and applications of conducting polymers.

Liquid Crystal Polymers: Phases of LCP's, general properties and applications.

Polymers in electronic industries: Piezo, pyroelectric, Ferroelectric polymers.

Smart materials: Properties and applications of shape memory alloys, chromoactive, photoactive and magneto rheological materials. (Contemporary Issues related to Topic)

**Total Lecture** | 39 Hours

#### **Textbooks:**

- 1. S S. Dara, A Text book of Engineering Chemistry, S.Chand & Co New Delhi. Eleventh Edition.
- 2. P.C. Jain and Monica Jain, Engineering Chemistry, Dhanpat Rai & sons New Delhi, Sixteenth Edition.
- 3. P. W. Atkins, Physical Chemistry, Oxford Publications, Eighth edition.

#### **Reference Books:**

- 1. Eskel Nordell, Water treatment for industrial and other use Rein hold Publishing Corporation, New York.
- 2. Lloyd A.Munro, Chemistry in Engineering, Prentice-hall, Inc Nj,2nd Edition.
- 3. Robert B Leighou Mc Graw, Chemistry of Engineering Materials, Hill Book Company, Inc New York.
- 4. B.K.Sharma Krishna, Engineering Chemistry, Prakashan media private LTD. 1st Edition, 2014.
- 5. R.V.Gadag, A.Nityananda Shetty ,Engineering Chemistry ,I K International Publishing House New Delhi , First Edition.
- 6 Fred. Billmeyer Jr., A textbook of polymer science, Wiley India, Third Edition.

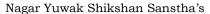
#### YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]

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

#### MOOCs Links and additional reading, learning, video material

- 1. <a href="https://www.youtube.com/watch?v=dCimAH5IRSA">https://www.youtube.com/watch?v=dCimAH5IRSA</a>
- 2. https://www.youtube.com/watch?v=XTt3gXB0a84
- 3. https://www.youtube.com/watch?v=50xdXq91TV0
- 4. https://www.youtube.com/watch?v=aoWBUhlN3-0
- 5. https://www.youtube.com/watch?v=JfJ7MlP9Dco

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## **B.Tech in Electronics Engineering**

#### **II SEMESTER**

22EE203: Lab: Engineering Chemistry

#### **Course Outcomes**

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

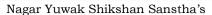
- 1. Illustrate qualitative and quantitative aspects of water for industrial and domestic applications. (L2)
- 2. Apply concepts of electrochemistry for energy storage devices. (L3)
- 3. Identify corrosion and discuss its prevention. (L2)
- 4. Establish insight into engineering materials. (L3)

#### 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 Fe2+ 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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## **B.Tech in Electronics Engineering**

	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.

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# **B.Tech in Electronics Engineering**

# II SEMESTER 22EE204 : 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)

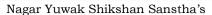
## **Unit VI: Technical Written Communication**

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

Ref	Reference Books:				
1.	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.				

M(	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 Electronics Engineering**

# **II SEMESTER**

22EE205: Engineering Mechanics

#### **Course Outcomes:**

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

- 1. Describe the fundamental concepts of statics and dynamics.
- 2. Apply the basic concepts of applied mechanics for solution of problems on planar force system.
- 3. Determine the properties of surface like centroid, moment of inertia, etc. for planar surfaces and mass moment of inertia for rigid body.
- 4. Analyze pin jointed truss frame structure and beam structure analytically and graphically.
- 5. Evaluate the dynamic variables of kinetics of particles and simple lifting machine

#### Unit I: Resultant of planar force System

(7 Hrs.)

Fundamental concepts, system of forces, laws of mechanics, principle of transmissibility of force, Moment of force, Principle of moment, Couple, Resultant of a planar force system, Equivalent force couple system. (Contemporary Issues related to Topic)

#### Unit II: Equilibrium of planar force System

(6 Hrs.)

Free body diagrams, Conditions of equilibrium, types of supports, types of beams, types of loads on beam, Equilibrium of a planar force system. (Contemporary Issues related to Topic)

#### **Unit III: Friction and Trusses**

(7 Hrs.)

Friction: Coulomb's laws of dry friction, plane friction, belt friction.

Trusses: Types of trusses, assumptions in analysis of truss, Analysis of truss by method of joint.

## (Contemporary Issues related to Topic)

#### **Unit IV: Properties of Surfaces**

(6 Hrs.)

Centroid: Introduction, First Moment of Area, Centroid of composite areas.

Moment of Inertia: Introduction, Second Moment of Area, Polar moment of Inertia, Radius of Gyration, Transfer formula for moment of Inertia, Product of Inertia, Moment of Inertia, and product of inertia for composite areas, Principal Moments of Inertia. (Contemporary Issues related to Topic)

#### Unit V: Virtual Work Method and Kinetics of Particle

(7 Hrs.)

Virtual Work Method: Introduction, Principle of virtual work, Application to beam and frame.

Kinetics of Particle: Introduction, Newton's law of motion for a Particle, D' Alembert's principle, Translation of particle and connected system. (Contemporary Issues related to Topic)

### Unit VI: Work Energy and Impulse Momentum Method

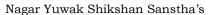
(6 Hrs.)

Work Energy Method: Introduction, Work energy equation for translation, Work energy applied to particle motion and connected system.

Impulse Momentum Method: Introduction, Linear Impulse momentum, Conservation of linear momentum, coefficient of restitution, elastic impact, Impulse momentum in plane motion. (Contemporary Issues related to Topic)

Total Lecture | 39 Hours

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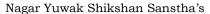
B. Tech SoE and Syllabus 2022 (Scheme of Examination w.e.f. 2022-23 onward)

(Department of Electronics Engineering)

SoE No. 22EE-101

Te	extbooks:
1.	Nelson A., Engineering Mechanics (Statics and Dynamics), ed 2009, Tata Mc. Grew Hill Education Pvt. Ltd.,
	New Delhi, 2009.
2.	Dubey N.H., Engineering Mechanics (Statics and Dynamics) first edition 2013, Tata Mc. Graw Hill
	Education Pvt. Ltd., New Delhi, 2013.
3.	Singer F.L, Engineering Mechanics (Statics and Dynamics), Harper and Rowe publication, New Delhi, 1994.
Re	eference Books:
1.	Timoshenko S, Young D.H and Rao J.V, Engineering Mechanics, Mc. Graw Hill Publication, New Delhi,
_	2007.
2.	Bhattacharyya B., Engineering Mechanics, Oxford University Press, New Delhi, 2008.
3.	Hibbeler R.C, Engineering Mechanics (Statics and Dynamics), Pearson Publication, Singapore, 2000.
4.	Shames I.H. and Rao J.V., Engineering Mechanics (Statics and Dynamics), First Edition, Pearson
	Publication, New Delhi, 2003.
5.	Beer F.P. and Johnston E.R; Vector Mechanics for Engineers, 9th edition Tata Mc. Graw Hill Publication,
	New Delhi. 2007.
Y	CCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
1	chrome-
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	ile/e-copies%20of%20books/Civil%20Engineering/78.%20Engineering-Mechanics-Statics-and-Dinamics-E-
	W-Nelson-C-L-Best-W-G-McLean-1st-Ed-1997-Schaum-Outline-McGraw-Hill%20(1).pdf
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	ile/e-copies%20of%20books/Civil%20Engineering/81.%20Engineering%20Mechanics%201.pdf
M	OOCs Links and additional reading, learning, video material
1.	https://www.youtube.com/watch?v=nGfVTNfNwnk
2.	https://www.youtube.com/watch?v=6nguX-cEsvw
3.	https://nptel.ac.in/courses/112103108

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# **B.Tech in Electronics Engineering**

# **II SEMESTER**

22EE206: Lab: Engineering Mechanics

#### **Course Outcomes**

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

- 1. Describe the fundamental concepts of statics and dynamics.
- 2. Apply the basic concepts of applied mechanics for solution of problems on planar force system.
- 3. Determine the properties of surface like centroid, moment of inertia, etc. for planar surfaces and mass moment of inertia for rigid body.
- 4. Analyze pin jointed truss frame structure and beam structure analytically and graphically.
- 5. Evaluate the dynamic variables of kinetics of particles and simple lifting machine

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

SN	Experiments based on
1	To find determine the support reactions of a Simply Supported Beam experimentally and analytically.
2	To determine the forces in the members of a Jib Crane Apparatus experimentally and graphically.
3	To determine the coefficient of friction between two surfaces of different material on Plane Friction
	Apparatus.
4	To determine the coefficient of friction of Coil Friction Apparatus.
5	To determine the forces in members of a Shear Leg Apparatus experimentally and manually.
6	To determine the mass moment of inertia of a fly wheel using Fly Wheel Apparatus
7	To determine efficiency and law of machine of Differential Axel & Wheel machine.
8	To determine efficiency and Law of machine of Single Purchase Crab machine.
9	To determine efficiency and Law of machine of Double Purchase Crab machine.
10	To verify law of polygonal of forces using Law of Polygon Apparatus.
11	To find support reactions of a simply supported beam using graphical method and hand calculation.
12.	To find the forces in the member of truss using graphical method and hand calculation.
13.	To find (1) Principle moment of inertia and (2) Moment of inertia and product of inertia about any inclined
	axis for a composite figure using Mohr's circle and hand calculation,

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# **B.Tech in Electronics Engineering**

#### **II SEMESTER**

# 22EE207: Basic Electrical and Electronics Engineering

#### **Course Outcomes:**

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

- 1. Understand the fundamental concepts of Analog Electronic and Electrical Circuits
- 2. Apply the concepts of Electrical and Electronic Circuits to obtain the desired parameter
- 3. Analyse analog Electrical Circuits for given application.
- 4. Analyze analog Electronic Circuits for given application.

#### Unit I: CIRCUIT ELEMENTS AND ENERGY SOURCES

(7 Hrs.)

Circuit Elements, Series and Parallel Combination of Resistances, Inductance and Capacitances, Energy Sources, Source Transformation, Sources with Periodic Waveforms, A.C. in Inductance and Capacitance, Star-Delta Connection. (Contemporary Issues related to Topic)

#### **Unit II: ANALYSIS OF NETWORK**

(7 Hrs.)

Kirchhof's Laws, Current Division, Voltage Division, Nodal and Mesh Analysis of Electric Circuits, Superposition Theorem, Theorem. (Contemporary Issues related to Topic)

# **Unit III: TRANSFORMER AND MOTORS**

(7 Hrs.)

Introduction to Transformer, Construction, Working principle, Types of transformers, Introduction to DC Motor, Working Principle of DC Motor, Types of Motors. (**Contemporary Issues related to Topic**)

## **Unit IV: DIODE AND TRANSISTOR**

(7 Hrs.)

Introduction to Semiconductor, P-N junction diodes, Biasing & Characteristics of diodes. Diode Circuits - Half wave rectifier, full wave rectifier, bridge rectifier. Introduction to BJT- NPN and PNP, Modes of operation, Configuration and its Characteristics. (Contemporary Issues related to Topic)

## Unit V: OPERATIONAL AMPLIFIER AND ITS APPLICATION

(7 Hrs.)

Introduction to Op-Amp, Inverting and Non-Inverting Amplifier, Linear Applications of OP-AMP like adder, Subtractor, integrator, differentiator and non-linear application using Comparator. (Contemporary Issues related to Topic)

#### Unit VI: Electronics Measurement

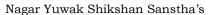
(7 Hrs.)

Introduction to Measurement System, Generalized block diagram of Measurement System, Static & dynamic characteristics of measurement system, Types of errors & their sources, Statistical analysis. (Contemporary Issues related to Topic)

Total Lecture

**42 Hours** 

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Tex	Textbooks:					
1.	Basic Electrical Engineering, T. K. Nagsarkar and M. S. Sukhija, Oxford Higher Education, First Edition					
	2005					
2.	Electronics Devices and circuits, Millman Jacob, McGraw Hill Education, Fourth Edition (2015)					
3.	Circuit Theory (Analysis and Synthesis), by A. Chakrabarti, Dhanpat Rai & Co., Reprint Edition 2014					

Ref	erence Books:					
1.	OP-AMP and Linear Integrated Circuit, by Ramakant A. Gayakwad, Prentice Hall India Learnin Private					
	Limited, Published in 2002					
2.	Electrical & Electronic measurement & Instrument, A. K. Sawhney, Dhanpat Rai & Co.,18th edition					
	2008					

Y	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			

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

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# **B.Tech in Electronics Engineering**

# II SEMESTER 22EE208: Programming for Problem Solving

#### **Course Outcomes:**

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

- 1) Describe the basics of computer system components and operation, basics of algorithms and flowcharts (L2)
- 2) Develop programs using conditional statements and loops user defined functions, and pointers.(L3)
- 3) Analyze single and multi-dimensional arrays as a data structure and its use in problem solving.(L4)
- 4) Describe the basics of Strings, Structures, Unions, and File handling and its use for problem solving.(L2)

# **Unit I: Computer System Basics:**

(6 Hrs.)

Introduction to components of a computer system (disks, memory, processor), how program is executed, understanding of concepts such as operating system, compilers, source and object programs, etc. Introduction to algorithms and flowcharts.

**Basic building blocks of C:** Character set, variables, identifiers & keywords, Data types, Operators: arithmetic, logical and relational operators, precedence of operators

(Contemporary Issues related to Topic)

Unit II: (6 Hrs.)

Expressions, sizeof() operator, constants, typedef statement, basic input/output statements and functions (scanf, printf, getch, putch, gets, puts), Introduction to library functions, writing straight line programs. Decision control statements: if, if - else and nested if-else statements, else-if ladder statement, switch-case control statement.

(Contemporary Issues related to Topic)

#### **Unit III: Loop Structures:**

(6 Hrs.)

While, do while and for loops, break and continue statement, "goto" statement, real life programming examples based on these loop structures, bitwise operators, real life programming examples.

(Contemporary Issues related to Topic)

## **Unit IV: Modular programming:**

(7 Hrs.)

Concept of functions, user defined functions, function prototypes, formal parameters, actual parameters, return types, call by value, C programs using functions, Recursive functions, comparing recursion against iteration, C programs using recursive functions, Concepts of a pointer, call by reference, types of programming errors, real life programming examples

(Contemporary Issues related to Topic)

# **Unit V: Arrays:**

(7 Hrs.)

One dimensional array, array manipulation, insertion, deletion of an element, searching techniques- Linear and binary search, sorting techniques – Bubble sort , and selection sort. Two-dimensional arrays: matrix representation, programs for basic matrix operations such as addition, multiplication and transpose, Array as function arguments. Strings: string representation and string handling functions, real life programming examples

## (Contemporary Issues related to Topic)

# **Unit VI: Structure and Union, Concepts of files:**

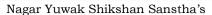
(7 Hrs.)

Types of files, file opening in various modes, file opening and closing, fseek(), reading and writing text files, concept of pre-processor directives and macros, command line arguments, real life programming examples

# (Contemporary Issues related to Topic)

**Total Lecture** | 39 Hours

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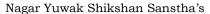
Te	Textbooks:				
1.	. Mastering C, K.R. Venugopal& S.R. Prasad, TMH,2007.				
2.	. Programming in ANSI C, E. Balaguruswamy, Mc Graw Hill Education				
3.	The C Programming Language., J.B.W.Kernighan&D.M.Ritchie, Prentice Hall				

Ref	Reference Books:					
1.	Problem Solving And Program Design In C, Jeri. R. Hanly, Elliot B. Koffman, Pearson Education					
2.	Programming with C, Byron Gottfried, Schaum;s Outline Series					
3.	How to solve it by computers, R. G. Dromey, Prentice Hall India					

Y	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					

MC	OOCs Links and additional reading, learning, video material
1.	https://archive.nptel.ac.in/courses/106/104/106104128/

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# **B.Tech in Electronics Engineering**

## **II SEMESTER**

22EE209: Lab: Programming for Problem Solving

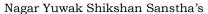
#### **Course Outcomes**

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

- 1) Describe the basics of computer system components and operation, basics of algorithms and flowcharts (L2)
- 2) Develop programs using conditional statements and loops user defined functions, and pointers.(L3)
- 3) Analyze single and multi-dimensional arrays as a data structure and its use in problem solving.(L4)
- 4) Describe the basics of Strings, Structures, Unions, and File handling and its use for problem solving.(L2)

SN	Experiments based on			
1(A)	Introduction to Linux Operating system & it's different commands.			
1(B)	Introduction to Vi editor, Compilation and Execution of a program in Linux.			
2	Practical based on Arithmetic and Conditional operators.			
3(A)	Practical based on Decision Control statements			
3(B)	Practical based on Case Control statements (switch)			
4	Practical based on Looping Statements. (for/while/do-while)			
5	Practical based on Functions and Recursion.			
6(A)	Practical based on 1-D Array. (Searching)			
6(B)	Practical based on 1-D Array. (Sorting)			
7	Practical based on 2-D Array.			
8	Practical based on Strings			
9	Practical based on Structures.			
10	Practical based on Files.			

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(4 Hrs.)

# **B.Tech in Electronics Engineering**

# 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.

# Understanding the need, basic guidelines, content and process for Value Education Self Exploration—what is it? - its content and process; 'Natural Acceptance' and Experiential Validationas 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! 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 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

Unit I: Course Introduction Need, Basic Guidelines, Content and Process for Value

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

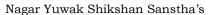
Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship

## 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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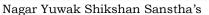
# Yeshwantrao Chavan College of Engineering (An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University) B. Tech SoE and Syllabus 2022 (Scheme of Examination w.e.f. 2022-23 onward) SoE No.

(Department of Electronics Engineering)

SoE No. 22EE-101

	it V: Understanding Harmony in the Nature -	(4Hrs)
Pra fou	nole existence as Co-existence, Understanding the harmony in the Nature Interconnectedness actice Exercises and Case Studies will be taken up in the Practice Sessions.ual fulfillment are orders of nature- recyclability and self-regulation in nature, Practice Exercises and Case Staken up in the Practice Sessions.	mong the
Un	it VI :Understanding Harmony in the Existence -	(4Hrs)
spa	derstanding Existence as Coexistence (Sah-astitva) of mutually interacting units in all- ce, Holistic perception of harmony at all levels of existence ,Practice Exercises and Case St taken up in the Practice Sessions.	-
	Total Lecture 24	Hours
Tex	ktbooks:  The primary resource material for teaching this course consists of text book A foundation course	in Human
2.	Values and professional Ethics, Excel books, 1 <sup>st</sup> Edition 2011, R.R Gaur, R Sangal, G P Bagaria	
Re	ference Books:	
1.	<b>The teacher's manual</b> A foundation course in Human Values and professional Ethics, Excel books, 2011, R.R Gaur, R Sangal, G P Bagaria	1 <sup>st</sup> Edition

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# **B.Tech in Electronics Engineering**

# **II SEMESTER Audit Course MLC2122: YCAP2 -Functional English**

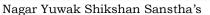
MLC2122 YCAP-II	No of Evaluations	Result of successful completion of YCAP II shall be calculated based on the basis of evaluations.
Evaluation Scheme	EVAL-I	To pass the exam a students must score 50% marks
	100 marks	

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 – $2^{nd}$ Sem , No. of hours - 20

Unit No.	Торіс	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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# **B.Tech in Electronics Engineering**

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  Topic: Introduction to Creative Ads Why Ads, Whats in it for me?, Characteristics of ads, Assignment	3 Hours
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	Topic	Duration
No.		
5	Topic: Tenses -2 Introduction & Basics, Perfect Tense (Past, Present, Future), Perfect Continuous Tense (Past, Present, Future) – discussion with examples  Topic: Introduction to Movie Magic Learn English with films, Film Vocabulary, Describing a film, Types of Films,	3.5 Hours
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  Assessment – Letter and Email Writing, Tenses - Quiz	3.5 Hours

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

M(	OOCs 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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Nagar Yuwak Shikshan Sanstha's

# Yeshwantrao Chavan College of Engineering (An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

(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 3<sup>rd</sup> Semester

(Department of Electronics Engineering)

#### Nagar Yuwak Shikshan Sanstha's

#### Yeshwantrao Chavan College of Engineering

SoE No.

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(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 Electronics Engineering

			BoS/				С	onta	ct Ho	urs		%	Weightag	је	ESE
SN	Sem	Туре	Deptt	Sub. Code	Subject	T/P	L	Т	Р	Hrs	Credits	MSEs*	TA**	ESE	Duration Hours
					Third Sem	ester	Г	ı	Π		I		I		
1	3	BS	EE/EE	22EE301	Signal and Systems	Т	3	0	0	3	3	30	20	50	3 Hrs
2	3	HS	GE/HUM	22EE302	Fundamentals of Management and Economics	Т	3	0	0	3	3	30	20	50	3 Hrs
3	3	PC	EE/EE	22EE303	Electronic Devices and Circuits	Т	3	1	0	3	3	30	20	50	3 Hrs
4	3	PC	EE/EE	22EE304	Lab:Electronic Devices and Circuits	Р	0	0	2	2	1		60	40	
5	3	PC	EE/EE	22EE305	Microprocessor and Interfacing	Т	3	0	0	3	3	30	20	50	3 Hrs
6	3	PC	EE/EE	22EE306	Lab:Microprocessor and Interfacing	Р	0	0	2	2	1		60	40	
7	3	PC	EE/EE	22EE307	Network Analysis	Т	3	0	0	2	3	30	20	50	3 Hrs
8	3	PC	EE/EE	22EE308	Lab:Network Analysis	Р	0	0	2	2	1		60	40	
9	3	PC	EE/EE	22EE309	Switching Theory and Finite Automata	Т	3	0	0	2	3	30	20	50	3 Hrs
10	3	PC	EE/EE	22EE310	Lab: Programming Language	Р	0	0	2	2	1		60	40	
					TOTAL THIR	D SEM	18	1	8	24	22				
List	of Man	datory	Learning C	ourse (MLC											
1	3	HS	T&P	MLC2123	YCCE Communication Aptitude Preparation (YCAP3)	А	3	0	0	3	0				
2	3	BES	EE	MLC107	Basics of MATLAB	Α	2	0	0	2	0				
					Fourth Sen	nester									
1	4	BS	GE/HUM	22EE401	Probability and Statistical Theory	T	3	0	0	3	3	30	20	50	3 Hrs
2	4	PC	EE/EE	22EE402	Digital System Modelling	Т	3	0	0	3	3	30	20	50	3 Hrs
3	4	PC	EE/EE	22EE403	Microcontroller and its Applications	Т	3	0	0	3	3	30	20	50	3 Hrs
4	4	PC	EE/EE	22EE404	Lab: Microcontroller and its Applications	Р	0	0	2	2	1	·	60	40	
5	4	PC	EE/EE	22EE405	Algorithm and Data Structure	Т	3	0	0	3	3	30	20	50	3 Hrs
6	4	PC	EE/EE	22EE406	Lab: Algorithm and Data Structure	Р	0	0	2	2	1		60	40	

					TOTAL FOURT	H SEM	21	1	8	29	25		
List	of Man	datory	Learning C	ourse (MLC									
1	4	HS	T&P	MLC2124	YCCE Communication Aptitude Preparation (YCAP4)	Α	3	0	0	3	0		
2	4	BES	EE	MLC108	Basics of Arduino Programmimg	Α	2	0	0	2	0		

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60

20

50

50

40

50

3 Hrs

3 Hrs

3 Hrs

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

22EE407 Digital CMOS Circuits

Lab:Digital CMOS Circuits

Lab: Electronics Workshop

Environmental Sustainability,

Pollution and Management

Electromagnetic Fields

22EE408

22EE409

22EE410

22EE411

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

4

9 4

10 4

11 4 PC

PC

РС

PC

РС

EE/EE

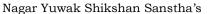
EE/EE

EE/EE

EE/EE

CV/EE

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# **B.Tech in Electronics Engineering**

# III SEMESTER 22EE301 : Signal and Systems

## **Course Outcomes:**

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

- 1. Understand and apply mathematical knowledge for Continuous & Discrete time signals
- 2. Apply mathematical knowledge for problem analysis in Continuous & discrete time systems
- 3. Apply and analyze various properties of transform techniques to solve the continuous and discrete Time Systems
- 4. Analyze various methods to categorize the LTI Systems and identify solutions and apply for mathematical representation of systems

# **Unit:1** | Continuous and Discrete time signals

7 Hours

Signal representation, Transformation of the independent variable, classification of signals, Signal Energy and Power, Periodic, Even & Odd, Real and Exponential Signals

**Contemporary Issues related to Topic** 

# **Unit:2** | Continuous and Discrete time System

7 Hours

Continuous-Time Systems, system properties: linearity: additivity and homogeneity, shift-invariance, causality, stability, convolution.

**Contemporary Issues related to Topic** 

## **Unit:3** Fourier Series Representation of Periodic Signals

7 Hours

Fourier Series Representation of Continuous-Time Periodic Signals, convergence of the Fourier Series.

**Contemporary Issues related to Topic** 

#### **Unit:4** | Fourier Transform

6 Цопте

Convergence of Fourier Transform and its Properties, Representation of A periodic Signals, The Fourier Transform for Periodic Signals. Analysis and Characterization of LTI Systems using the Fourier Transform.

**Contemporary Issues related to Topic** 

## **Unit:5** | The Laplace Transform

7 Hours

The Region of Convergence for Laplace Transforms. The Inverse Laplace Transform. Properties of the Laplace Transform. Analysis and Characterization of LTI Systems Using the Laplace Transform. The Unilateral Laplace Transform.

**Contemporary Issues related to Topic** 

#### Unit:6 | Z transform

7 Hours

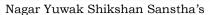
The Z Transform. The Region of Convergence for Z Transforms. The Inverse Z Transform. Properties of the Z Transform. Analysis and Characterization of LTI Systems Using the Z Transform.

**Contemporary Issues related to Topic** 

**Total Lecture Hours** 

41 Hours

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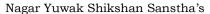
Tex	xtbooks
1	Signals and Systems Alan V. Oppenheim, Alan S. Willsky, with S. Hamid 2nd Edition, 1996 Prentice Hall
2	Digital signal processing –Principles, algorithms and applications J. G. Proakis, D. G. Manolakis 3rd Edition,
	1996 PHI

Ref	ference Books
1	Outline of Signals and Systems HweiHsu, Schaum's 1st Ed 1995 McGraw-Hill
2	Signals & Systems Simon Haykin and Van Veen 2nd Edition, 2002 Wiley

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

MC	MOOCs Links and additional reading, learning, video material	
1	https://www.digimat.in/nptel/courses/video/108104100/L52.html	
2	https://nptel.ac.in/courses/108105159	
3	https://www.youtube.com/watch?v=pAmmL9ms2iU	

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SoE No. 22EE-101

# **B.Tech in Electronics Engineering**

# **III SEMESTER**

# 22EE302: 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

6 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

6 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** 

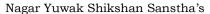
## **Unit:4** Introduction to Economics and engineering Economy:

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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7 Hours

# **B.Tech in Electronics Engineering**

Cinc.s	Engineering 1 roduction and Costs	7 110015
Factors	of Production: Land, Labour, Capital, Enterprise and their peculiarities, Concepts and	types of
costs, L	aw of Variable proportions (Law of diminishing marginal returns) and Return to Scale	e

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:5 Engineering Production and Costs

# 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.

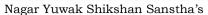
#### **Contemporary Issues related to Topic**

Total Lecture Hours	39 Hours

Text	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, 7 <sup>th</sup> edition, Mankiw N. Gregory, Thomson, 2013		

Ref	Reference Books							
1.	Foundations of Financial Markets and Institutions, 3 <sup>rd</sup> Edition, Fabozzi, Pretice Hall							
2.	Fundamentals of Financial Instruments, 2 <sup>nd</sup> Edition, Parameshwaran, Wiley India							
3.	Marketing Management, 3 <sup>rd</sup> Edition, RajanSaxena, Tata McGraw Hill							
4.	Advance Economic Theory, 17th Edition, H. L. Ahuja, S. Chand Publisher, 2009							
5.	International Trade, 12 <sup>th</sup> edition, M. L. Zingan, Vindra Publication, 2007							
6.	Macro Economics, 11 <sup>th</sup> 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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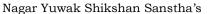
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YCO	YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]							
1	http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6193-0							
2	https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042							

MC	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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# **B.Tech in Electronics Engineering**

# III SEMESTER 22EE303: Electronic Devices and Circuits

#### **Course Outcomes:**

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

- 1. Analyze different types of semiconductor devices, their operation and characteristics.
- 2. Design and analyze the DC bias circuitry of BJT and FET.
- 3. Analyze and model BJT for small signal and high frequency.
- 4. Apply concept of feedback to improve the stability of circuits.
- 5. Design circuits using the transistors and oscillators.

# Unit:1 Transistors 8 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 JFET & MOSFET

7 Hours

**JFET:**-Symbol, Structure, operation, characteristics, Drain and Transfer Characteristics, JFET Biasing. **MOSFET:** -Structure, Symbol, Basic operation, Drain and Transfer Characteristics, MOSFET Biasing. (**Contemporary Issues related to Topic**)

## **Unit:3** | Low frequency BJT

6 Hours

Single Stage Amplifiers BJT small signal model – Analysis of CE, CB, CC amplifiers, Miller's theorem. (Contemporary Issues related to Topic)

# **Unit:4** Low frequency FET & MOSFET

6 Hours

Small signal model– Analysis of CS, CG and CD amplifiers.

(Contemporary Issues related to Topic)

## **Unit:5** | Power Amplifiers

6 Hours

Classes of power amplifiers – Class A, Class B amplifiers, Analysis of Class A, Class B, Distortions in amplifiers.

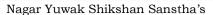
(Contemporary Issues related to Topic)

#### **Unit :6** | Feedback Amplifiers and Oscillators

8 Hours

**Feedback Amplifiers:** - Feedback Concept, Classification of amplifiers based on feedback topology, (Voltage, Current, Transconductance and Transresistance amplifiers), Effect of negative feedback on various performance parameters of an amplifier

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# **B.Tech in Electronics Engineering**

Oscillators:	-	Condition	for	oscillations,	phase	shift	_	Wien	bridge,	Hartley,	Colpitts	and	Crystal
oscillator.													
(Contempora	ry	Issues rela	ted t	o Topic)									

Total Lecture Hours 41	41 Hours
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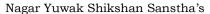
Tex	xtbooks
1	Millman&Halkies, "Electronic Device and Circuits", Second Edition, Tata McGraw Hill.
2	Boylestead&Nashelsky, "Electronic devices and Circuits Theory" Eighth edition, PHI

Ref	ference Books
1	MillmanHalkies, "Integrated Electronics", Tata McGraw Hill.
2	David A. Bell," Electronic Device and Circuits", Fourth Edition, PHI. Floyd," Electronic Devices",
	Seventh Edition, Pearson

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MO	MOOCs Links and additional reading, learning, video material						
1	http://nptel.iitm.ac.in/video.php?subjectId=117103063						
2	NPTEL Video: mod07lec29: BJT						
3	NPTEL Video: mod07lec30						

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# **B.Tech in Electronics Engineering**

# III SEMESTER 22EE304: Lab.: Electronic Devices and Circuits

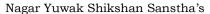
#### **Course Outcomes:**

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

- 1. Analyze different types of semiconductor devices, their operation and characteristics.
- 2. Design and analyze the DC bias circuitry of BJT and FET.
- 3. Analyze and model BJT for small signal and high frequency.
- 4. Apply concept of feedback to improve the stability of circuits.
- 5. Design circuits using the transistors and oscillators.

Sr. No.	Experiments based on
1	To plot I/P & O/P Characteristics of Common Base Transistor Configuration. Find I/P& O/P
	Resistance and Current Gain.
2	To plot I/P & O/P Characteristics of Common Emitter Transistor Configuration. Find I/P&
	O/P Resistance and Current Gain.
3	To perform the Fixed Bias circuit of the transistor.
4	To perform the Self Bias circuit of transistor.
5	To perform the Drain and Transfer characteristics of Field Effect Transistor (FET).
6	To Plot the Frequency Response of a single stage RC coupled CE amplifier.
7	N-Channel MOSFET amplifier in common source configuration with and without feedback.
8	To determine the efficiency of Class A power amplifier.
9	To determine the efficiency of Class B push pull power amplifier and to study cross over
	distortion.
10	To determine the phase shift in RC phase shift oscillator.

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# **B.Tech in Electronics Engineering**

# **III SEMESTER**

# 22EE305: Microprocessor and Interfacing

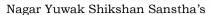
## **Course Outcomes:**

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

- 1. Describe the architecture of Microprocessor
- 2. Write Program for an assigned task.
- 3. Apply different address decoding techniques while interfacing Memory to Microprocessor
- 4. Analyze and Design interfacing of Peripheral devices to Microprocessor

Unit:1	Microprocessor organization	6 Hours
8086	etion to Microprocessor based systems, Register Organization and Architecture and Signal I	Description of
Unit:2	8086 Instruction set and Programming Concepts	7 Hours
	e Language Instruction formats for 8086, addressing modes and assembler directives, Basic p mporary Issues related to Topic)	rogramming
Unit:3	8086: Special Processor activities	7 Hours
instructi	or RESET and Initialization, HALT, TEST and synchronization with External signals ons like CALL, PUSH, POP, Programs based on instructions.  **mporary Issues related to Topic**)	s, Subroutine
Unit:4	Concepts of Memory & IO Interfacing	6 Hours
	of Memory and I/O Interfacing with 8086, Types of decoding techniques.  mporary Issues related to Topic)	
Unit:5	Interfacing of basic Peripherals	6 Hours
Interfac	nmable peripheral Interface 8255- Block Diagram, Pin functions, Different Modes of ing with 8086 mporary Issues related to Topic)	operation &
Unit :6	Special Purpose Programmable Peripheral devices and their interfacing	7 Hours
with 80	ing of Programmable Interval Timer 8253 and Programmable Communication Interface 836 mporary Issues related to Topic)	3251 USART
Total L	ecture Hours	38 Hours

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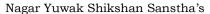


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Te	xtbooks
1	'Advanced Microprocessors and Peripherals' A K Ray, K. M. Bhurchandi, Tata McGraw Hill Publishing.
Re	ference Books
1	Microprocessors & interfacing,2'nd Edition, D. V. Hall, Tata Mc-Graw Hill
2	Microprocessor 8086: Architecture, Programming and Interfacing, Sunil Mathur, pHI publications
Mo	OOCs Links and additional reading, learning, video material
1	Nptel Video: https://www.youtube.com/watch?v=0t4LROuEVnw&list=PLwdnzlV3ogoXgNjr_oe5cWQIbf72ZY4Zf
2	https://www.youtube.com/watch?v=oRPluYsxF28&list=PLuv3GM6- gsE01L9yDO0e5UhQapkCPGnY3&index=7
3	https://www.electronicwings.com/

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# **B.Tech in Electronics Engineering**

## **III SEMESTER**

22EE306: Lab.: Microprocessor and Interfacing

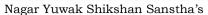
## **Course Outcomes:**

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

- 1. Describe the architecture of Microprocessor
- 2. Write Program for an assigned task.
- 3. Apply different address decoding techniques while interfacing Memory to Microprocessor
- 4. Analyze and Design interfacing of Peripheral devices to Microprocessor
- 5. Create software & Hardware solutions for complex problems

Sr. No.	Experiments based on
1	Study of Intel 8085 Microprocessor (Pin Diagram and Architecture)
2	Determine OPCODE, No. of bytes and addressing modes of 8085 instructions.
3	Arithmetic and Logical Operations Problem Statement: Write assembly language Program for Addition, Subtraction, Anding, Oring, Ex- Oring over two eight bit data. First 8-bit data present in accumulator and Second 8 bit data present in Register.
4	Addition of series of data bytes.  Problem Statement: A series of 5 data bytes is stored in memory locations, starting at CC00H. WAP to add the data bytes and store the result in memory locations C008H and C009H respectively.
5	Block Transfer from Source Memory Location to Destination Memory Location.  Problem Statement: A block of 5 data bytes is stored in memory locations, starting at C000H. WAP to transfer block of data to new memory locations staring at D000H.
6	To Count no of Positive data bytes from string Problem Statement: A series of 05 data bytes is stored in memory locations, starting at C001H. Length of block is stored at C000H. WAP to count the number of positive data bytes and transfer the count value at C008H.
7	To find Largest /Smallest data byte from string.  Problem Statement: A series of 5 data bytes is stored in memory locations, starting at C001H. Length of block is stored at C000H. WAP to find the largest/ Smallest data byte in the series and store the result at C008H.
8	Compare the data bytes from 2 strings Problem Statement: Two sets of 05 temperature readings are stored at memory locations starting at CA00 and CB00H. It is expected that readings from the first set is higher than corresponding reading from the second set. WAP to display 01H at memory location C008H, indicating that the system is OK. If any reading from the first set goes low, memory location C008 should display 00H indicating the problem arising in system

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9	Programming for interfacing through PPI 8255.  Problem Statement: For a microprocessor 8085 based trainer board (MICROFRIEND DYNA-85L), Programmable Peripheral interface 8255 has been interfaced with 8085 at an address 13H (CWR address), with A1 and A0 lines of 8255 connected to A1 and A0 address pins of 8085.  a) Write a program to place the data bytes 44H, 55H, and 66H in ports A, B and C of PPI 8255 and copy contents of ports A, B and C to memory locations CC00, 01 and 02 respectively.  b) Interface 8 LED's with 8085 through 8255 PPI at Port A. WAP to display content 55H of Memory location CC00H at Port A.
10	Square Wave Generation using PTC 8253 Problem Statement: Write a program to Generate square waveform of 2ms using Timer IC 8253
11	Data Transfer through USART 8251 Problem Statement: For the hardware interface for 8251 with 8085, set 8251 in asynchronous mode to transmit and receive 8 bit data.
12	Mini Project

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# **B.Tech in Electronics Engineering**

# III SEMESTER 22EE307: Network Analysis

#### **Course Outcomes:**

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

- 1. Apply and analyze nodal and mesh analysis on engineering circuits.
- 2. Apply network theorems, initial and final conditions to analyze electrical circuits.
- 3. Understand, apply and analyze electrical circuits in the transform domain.
- 4. Apply the concept of two port networks to find different two-port parameters.
- 5. Analyze network concepts using the EDA Tool.

# **Unit:1** | Nodal Analysis of Electric Circuits

7 Hours

Basics of electric circuits, circuit elements and their voltage – current relationship, classification of circuit elements, sources -their types and characteristics, concept of equivalent sources, source transformation and duality, concept of supernode and V– shift, nodal analysis of circuits containing resistors, inductors, capacitors, transformers, and both independent and dependent sources to determine current, voltage, power, and energy.

## (Contemporary Issues related to Topic)

# **Unit:2** Mesh Analysis of Electric Circuits

7 Hours

Concept of super mesh and I – shift, mutual inductance, coefficient of coupling, dot convention, dot marking in coupled coils, mesh analysis of circuits containing resistors, inductors, capacitors, transformers, and both independent and dependent sources to determine current, voltage, power, and energy.

## (Contemporary Issues related to Topic)

#### **Unit:3** | Network Theorem

7 Hours

Superposition Theorem, Thevenin's Theorem, Norton's Theorem, Maximum Power Transfer Theorem.

#### (Contemporary Issues related to Topic)

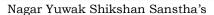
# Unit:4 Initial and Final Conditions, Impedance Functions and Circuit Analysis with Laplace Transform

**6 Hours** 

Concept of initial and final conditions, behaviour of resistor, inductor and capacitor at t=0- and at t=0+, procedure for evaluating initial and final conditions, analytical treatment. Reviews of Laplace Transform, concept of complex frequency, transform impedance and admittance, s – domain impedance and admittance models for resistor, inductor and capacitor, series and parallel combinations of elements. Transformed network on loop and mesh basis, mesh and node equations for transformed networks, time response of electrical network with and without initial conditions by Laplace transform.

## (Contemporary Issues related to Topic)

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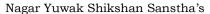
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Unit	Transforms of other Signal Waveforms, Network Functions, Poles and Zeros of network functions	7 Hours
and netw restr pole	step, ramp and impulse functions with and without time delay, their Laplace transform, waveform application to electrical networks. Terminal pairs or ports, network functions for one port a torks, definition and physical interpretation of poles and zeros, pole-zero plot for network ctions on pole and zero locations for driving point and transfer functions, time domain behavior zero plot, network synthesis using pole – zero plot.  Itemporary Issues related to Topic)	and two port k functions,
Unit	:6 Two Port Parameters	7 Hours
circu betw inter	dard reference directions for the voltages and currents of a two – port network, defining equation it impedance, transmission, inverse transmission, hybrid and inverse hybrid parameters, and the parameter sets, conditions for reciprocity and electrical symmetry in terms of two – port connections of two – port networks.  Interporary Issues related to Topic)	relationships
	Lecture Hours	41 Hours
Text	books  M.E.VanValkenburg, Network Analysis, 3 <sup>rd</sup> Edition, PHI Learning Private Limited.	
Refe	rence Books	
1	Sudhakar, A., Shyammohan, S.P., Circuits and Network, Tata McGraw-Hill New Delhi	
2	A William Hayt ,Engineering Circuit Analysis ,8th Edition, McGraw-Hill Education.	
YCO	EE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/yccelibrary.html	
	OCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/108105159	
2	https://archive.nptel.ac.in/courses/108/105/108105159/	

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# **B.Tech in Electronics Engineering**

# III SEMESTER 22EE308: Lab. : Network Analysis

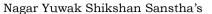
#### **Course Outcomes:**

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

- 1. Apply and analyze nodal and mesh analysis on engineering circuits.
- 2. Apply network theorems, initial and final conditions to analyze electrical circuits.
- 3. Understand, apply and analyze electrical circuits in the transform domain.
- 4. Apply the concept of two port networks to find different two-port parameters.
- 5. Analyze network concepts using the EDA Tool.

Sr. No.	Experiments based on
1	Introduction To PSPICE Software and Verification of Kirchhoff's Voltage law.
2	Perform nodal analysis on electrical circuits with dependent sources.
3	Perform nodal analysis on complex electrical circuits.
4	Verification of Kirchhoff's Current law.
5	Perform mesh analysis on electrical circuits with dependent sources.
6	Perform mesh analysis on complex electrical circuits.
7	Verification of Superposition Theorem.
8	Verification of Thevenin's Theorem
9	Verification of Norton's theorem
10	Verification of Maximum power transfer theorem

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# III SEMESTER

# 22EE309: Switching Theory and Finite Automata

#### **Course Outcomes:**

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

- 1. Design and Analyze multilevel logic Network and Threshold logic for nanotechnologies.
- 2. Analyze testing of combinational circuits, Fault Models
- 3. Design and analyze the synchronous and asynchronous sequential circuits.
- 4. Identify and test the sequential machines with experiments.

#### **Unit:1** | Minimization of switching functions

7 Hours

The map method, Minimal functions and their properties, The tabulation procedure for the determination of prime implicants, The prime implicant chart, Map-entered variables, Heuristic two-level circuit minimization, Multi-output two-level circuit minimization.

(Contemporary Issues related to Topic)

# **Unit:2** | Multi-level logic synthesis

7 Hours

Multi-level logic synthesis, Technology-independent synthesis: Factoring, Decomposition, Extraction, Substitution, and Technology mapping: steps in technology mapping.

(Contemporary Issues related to Topic)

#### **Unit:3** Testing of combinational circuits

7 Hours

Testing of combinational circuits, Fault models, Structural testing, IDDQ testing, Delay fault testing, Synthesis for testability, Testing for nanotechnologies

(Contemporary Issues related to Topic)

#### **Unit:4** | Synchronous sequential circuits

7 Hours

Synchronous sequential circuits and iterative networks, memory elements and their excitation functions, synthesis of synchronous sequential circuits, Moore and Mealy machines, finite state machine flow charts, tables

(Contemporary Issues related to Topic)

# **Unit:5** | Asynchronous sequential circuits

7 Hours

Asynchronous sequential circuits, Modes of operation, Hazards, Synthesis of SIC fundamental-mode circuits. (Contemporary Issues related to Topic)

# Unit :6 Testing of sequential circuits

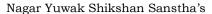
7 Hours

State-identification experiments and testing of sequential circuits, Experiments, Homing experiments, Distinguishing experiments, Checking experiments,

# (Contemporary Issues related to Topic)

Total Lecture Hours 42 Hours

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Toythoo	lzc
Textboo	KS

1 Switching & Finite Automata Theory: ZviKohavi, Niraja K. Jha, Third Edition 2010, Cambridge University Press

## **Reference Books**

- 1 Modern Switching Theory and Digital Design, Lee S.C, PHI Edition
- 2 Digital Logic and Computer Design, M.Morris Mano, PHI Edition

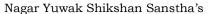
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1 http://103.152.199.179/YCCE/yccelibrary.html

# MOOCs Links and additional reading, learning, video material

- 1 NPTEL Video Link: https://youtu.be/1u\_R0d54o1o
- 2 NPTEL Video Linl: https://youtu.be/Hv4mbqm9Iwk
- 3 NPTEL Video Linl: https://youtu.be/5Zstl5d5Byc
- 4 NPTEL Video Linl: https://youtu.be/uCqTzWsZ804

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SoE No. 22EE-101

# **B.Tech in Electronics Engineering**

# III SEMESTER 22EE310: Lab: Programming Language

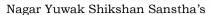
#### **Course Outcomes:**

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

- 1. To understand syntax and semantics of language
- 2. To **understand** and **apply** the basics of the programming language
- 3. To analyse and apply special language features
- 4. To **create** functions for any application

Sr. No.	Experiments based on
1	Introduction to python, variables and data types
2	To perform different operations on "Strings" in Python.
3	To learn and write a program using "List" and "Tuple" in Python.
4	To learn and write a program using "Set" and "Dictionary" in Python.
5	To learn and write a program using Loop statements in Python.
6	To learn "NumPy" in Python.
7	To learn how to create a matrix using Python and perform different operation on it.
8	To learn and write programs using functions in Python.
9	To write programs for fun games in Python.
10	Mini Project

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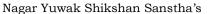
B. Tech SoE and Syllabus 2022 (Scheme of Examination w.e.f. 2022-23 onward) (Department of Electronics Engineering)

SoE No. 22EE-101

# **B.Tech in Electronics Engineering**

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

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SoE No. 22EE-101

# **B.Tech in Electronics Engineering**

# III SEMESTER MLC107: Basics of MATLAB

#### **Course Outcomes:**

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

- 1. Learn features of MATLAB as a programming tool.
- 2. Develop programming skills and techniques to solve mathematical problems.
- 3. Understand MATLAB graphic feature and its applications.
- **4.** Use MATLAB as a simulation tool.

Unit I: Introduction to MATLAB Environment	(4 Hrs.)
MATLAB Basics - Variables, Numbers, Operators, Expressions, Input and output., Vec	tors, Arrays – Matrices.
Unit II: MATLAB Functions	(4 Hrs.)
Built-in Functions, User defined Functions.	·
Unit III: Graphics with MATLAB	(4 Hrs.)
Files and File Management – Import/Export, Basic 2D, 3D plots, Graphic handling	·
Unit IV: Programming with MATLAB	(4 Hrs.)
Conditional Statements, Loops, MATLAB Programs – Programming and Debugging, Ap	pplications of MATLAB
Programming	
II.: 4 V. M41 4: -1 C4:41 MATI AD	
Unit V: Mathematical Computing with MATLAB	(4 Hrs.)
Algebraic equations, Basic Symbolic Calculus and Differential equations, Numerical T	` ,
	` ,
Algebraic equations, Basic Symbolic Calculus and Differential equations, Numerical T	` ,
Algebraic equations, Basic Symbolic Calculus and Differential equations, Numerical Transforms'	echniques and

#### **Textbooks:**

- 1. Holly Moore, Matlab For Engineers (5th Edition), Pearson Publication
- 2. MATLAB: An Introduction With Applications, (5th Edition), Wiley Publication

#### **Reference Books:**

1. William Palm, MATLAB for Engineering Applications, 4th edition, Mcgraw hill education

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

1 http://103.152.199.179/YCCE/yccelibrary.html

MO	MOOCs Links and additional reading, learning, video material				
1.	https://www.mathworks.com				
2.	https://youtu.be/IuEOMyGuuIg				
3.	https://youtu.be/v2AJblv4y88				

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Nagar Yuwak Shikshan Sanstha's

# Yeshwantrao Chavan College of Engineering (An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

(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 4th Semester

(Department of Electronics Engineering)

#### Nagar Yuwak Shikshan Sanstha's

#### Yeshwantrao Chavan College of Engineering

SoE No.

22EE-101

(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 Electronics Engineering

			BoS/				С	onta	ct Ho	urs		%	Weightag	је	ESE
SN	Sem	Туре	Deptt	Sub. Code	Subject	T/P	L	Т	Р	Hrs	Credits	MSEs*	TA**	ESE	Duration Hours
					Third Sem	ester	Г	ı	Π		I		I		
1	3	BS	EE/EE	22EE301	Signal and Systems	Т	3	0	0	3	3	30	20	50	3 Hrs
2	3	HS	GE/HUM	22EE302	Fundamentals of Management and Economics	Т	3	0	0	3	3	30	20	50	3 Hrs
3	3	PC	EE/EE	22EE303	Electronic Devices and Circuits	Т	3	1	0	3	3	30	20	50	3 Hrs
4	3	PC	EE/EE	22EE304	Lab:Electronic Devices and Circuits	Р	0	0	2	2	1		60	40	
5	3	PC	EE/EE	22EE305	Microprocessor and Interfacing	Т	3	0	0	3	3	30	20	50	3 Hrs
6	3	PC	EE/EE	22EE306	Lab:Microprocessor and Interfacing	Р	0	0	2	2	1		60	40	
7	3	PC	EE/EE	22EE307	Network Analysis	Т	3	0	0	2	3	30	20	50	3 Hrs
8	3	PC	EE/EE	22EE308	Lab:Network Analysis	Р	0	0	2	2	1		60	40	
9	3	PC	EE/EE	22EE309	Switching Theory and Finite Automata	Т	3	0	0	2	3	30	20	50	3 Hrs
10	3	PC	EE/EE	22EE310	Lab: Programming Language	Р	0	0	2	2	1		60	40	
					TOTAL THIR	D SEM	18	1	8	24	22				
List	of Man	datory	Learning C	ourse (MLC											
1	3	HS	T&P	MLC2123	YCCE Communication Aptitude Preparation (YCAP3)	А	3	0	0	3	0				
2	3	BES	EE	MLC107	Basics of MATLAB	Α	2	0	0	2	0				
					Fourth Sen	nester									
1	4	BS	GE/HUM	22EE401	Probability and Statistical Theory	T	3	0	0	3	3	30	20	50	3 Hrs
2	4	PC	EE/EE	22EE402	Digital System Modelling	Т	3	0	0	3	3	30	20	50	3 Hrs
3	4	PC	EE/EE	22EE403	Microcontroller and its Applications	Т	3	0	0	3	3	30	20	50	3 Hrs
4	4	PC	EE/EE	22EE404	Lab: Microcontroller and its Applications	Р	0	0	2	2	1	·	60	40	
5	4	PC	EE/EE	22EE405	Algorithm and Data Structure	Т	3	0	0	3	3	30	20	50	3 Hrs
6	4	PC	EE/EE	22EE406	Lab: Algorithm and Data Structure	Р	0	0	2	2	1		60	40	

					TOTAL FOURT	H SEM	21	1	8	29	25		
List	of Man	datory	Learning C	ourse (MLC									
1	4	HS	T&P	MLC2124	YCCE Communication Aptitude Preparation (YCAP4)	Α	3	0	0	3	0		
2	4	BES	EE	MLC108	Basics of Arduino Programmimg	Α	2	0	0	2	0		

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Р 0 0 2 2

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20

60

20

50

50

40

50

3 Hrs

3 Hrs

3 Hrs

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

22EE407 Digital CMOS Circuits

Lab:Digital CMOS Circuits

Lab: Electronics Workshop

Environmental Sustainability,

Pollution and Management

Electromagnetic Fields

22EE408

22EE409

22EE410

22EE411

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

4

9 4

10 4

11 4 PC

PC

РС

PC

РС

EE/EE

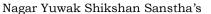
EE/EE

EE/EE

EE/EE

CV/EE

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SoE No. 22EE-101

# **B.Tech in Electronics Engineering**

# IV SEMESTER 22EE401: Probability and Statistical 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 of probability distributions to solve real life problems.
- 3. Find probabilities and estimates parameters of various problems in sampling theory.
- 4. Identify scientific data to use proper curve fitting and find correlation and regression of variables.

## Unit:1 Random Variables & Probability Distributions

7 Hours

Conditional probability, Baye's theorem. Random variables: 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

7 Hours

Mathematical Expectation, Variance & Standard Deviation, Moments, Moment generating function, Skewness and Kurtosis.

**Contemporary Issues related to Topic** 

### **Unit:3** | Special Probability Distributions

6 Hours

Binomial, Geometric, Poisson, Exponential, Normal distributions, Central Limit theorem.

**Contemporary Issues related to Topic** 

### **Unit:4** | Sampling Theory

6 Hours

Population and sample. Statistical inference. Sampling with and without replacement. Population parameters, sample statistics. Sampling distribution of means. Sampling distribution of proportions.

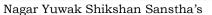
#### **Unit:5** | Estimation

7 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** 

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Unit :6	Curve Fitting	6 Hours
Fitting o	of straight line, $y = a + bx$ , a parabola $y = a + bx + cx^2$ , exponential curves and power	er curves by
method	of least squares; Lines of regression and correlation; Rank correlation.	
Contem	porary Issues related to Topic	
	Total Lecture Hours	39 Hours
	Total Lecture Hours	39 Hours
	Total Lecture Hours	39 Hours
Text boo		39 Hours

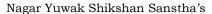
	M. R. Spiegel, The theory and problems of probability and Statistics, 5th Edition, Schaum series. Hill).	(McGraw
2	Dr. B. S. Grewal, Engineering Mathematics, 43 <sup>rd</sup> edition, Khanna Publisher	
3	Michael J. Evans and Jeffrey S. Rosenthal, Probability and Statistics, 2 <sup>nd</sup> edition.	

Ref	ference Books
1	Miller Freund and Johnson, Probability and Statistics for Engineering, 6 <sup>th</sup> edition, Richard A. Johnson
2	S. C.Gupta and V.K.Kapoor, Fundamentals of Mathematical statistics, 3 <sup>rd</sup> Edition, Sultan Chand and Sons.
3	E. K.Bowen, M. K.Star, Basic Statistics for Business and economics, 3 <sup>rd</sup> edition, McGraw Hill

YC	CE 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/

MO	OOCs Links and additional reading, learning, video material
1	https://nptel.ac.in/courses/111105041
2	https://archive.nptel.ac.in/courses/111/105/111105090/
3	https://onlinecourses.nptel.ac.in/noc21_ma74/preview

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SoE No. 22EE-101

# **B.Tech in Electronics Engineering**

# IV SEMESTER 22EE402: Digital System Modelling

#### **Course Outcomes:**

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

- 1. Understand hardware description language and able to design digital systems using different abstraction levels
- 2. Apply combinational and sequential logic circuits in designing digital system
- 3. Analyze timing issues in multiple contexts.
- 4. Evaluate building blocks in digital system
- 5. Create basic building blocks in digital system using modern tools.

#### **Unit:1** | Basic Concepts of Verilog

7 Hours

HDL Based Design flow, Requirements of HDL, Design Methodologies, Different Modelling styles, Introduction to Verilog, Elements of Verilog, Verilog Module definition, Elements of Module ,Basic Concepts in Verilog, Reserved Keywords, Syntax & Semantics, Comments, Identifiers, Number Representation, System Representation, Verilog Ports, Verilog Data Types, Wire & Variables, Constants, Parameter, Verilog Data Operators.

(Contemporary Issues related to Topic)

### **Unit:2** | **Data Flow Modeling**

7 Hours

Data Flow Modeling, Delay, Continuous Assignment, Delayed Continuous assignment Design entry in Verilog & Test bench, Combinational blocks design, Compilation and synthesis, Timing analysis resolving signal values .

#### (Contemporary Issues related to Topic)

#### **Unit:3** | Structural Modeling

7 Hours

Structural Modeling Feature, Module Instantiation, Gate level Primitives, Gate Delays, Switch Level Primitives, User Defined Primitives.

(Contemporary Issues related to Topic)

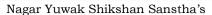
### **Unit:4** | Behavioral Modeling

7 Hours

Behavioral Modeling, Initial, Always, Procedural Assignment, Blocking and Non- Blocking assignments, Sequential & Parallel Blocks, Timing Control, Procedural Statements, Conditional Statements if case loop repeat forever etc, Zero Delay Control, Event Based Timing Control, State Machine Coding ,Moore and Mealy Machines.

(Contemporary Issues related to Topic)

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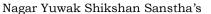


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OI.	nit:5 Combinational & sequential Circuits	7 Hours
Со	mbinational & sequential system Design examples like Shift Registers, Counters, LFSR, Latches an	d Flip Flops
Mι	ulti bit Adders examples like Ripple Carry Adder, Carry look ahead adder ,two bit and three bit Mu	ıltiplier, CPL
	sign Verification.	
(C	ontemporary Issues related to Topic)	
Un	nit :6   Pogrammable Devices	7 Hours
	roduction to programmable devices, PLA, PAL, PROM, Structure of CPLDs, Introduction	
	chitecture, CLB, IOB, Programmable Interconnect Points, Different type of programmable swit	ches used i
	Ds. ontemporary Issues related to Topic)	
()	ontemporary issues related to Topic)	
To	tal Lecture Hours	42 Hours
Te	xtbooks	
Te 1	Verilog HDL : A Guide to Digital Design and Synthesis, 2 nd Edition, Samir Palnitkar	
1		
1 Re	Verilog HDL : A Guide to Digital Design and Synthesis, 2 nd Edition, Samir Palnitkar  ference Books	
1	Verilog HDL : A Guide to Digital Design and Synthesis, 2 nd Edition, Samir Palnitkar	
1 Re	Verilog HDL : A Guide to Digital Design and Synthesis, 2 nd Edition, Samir Palnitkar  ference Books  Verilog Digital System Design Second Edition ZainalabedinNavabi Tata McGraw Hill , 2009	
Ree 1	Verilog HDL : A Guide to Digital Design and Synthesis, 2 nd Edition, Samir Palnitkar  ference Books  Verilog Digital System Design Second Edition ZainalabedinNavabi Tata McGraw Hill , 2009  CCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1 Re	Verilog HDL : A Guide to Digital Design and Synthesis, 2 nd Edition, Samir Palnitkar  ference Books  Verilog Digital System Design Second Edition ZainalabedinNavabi Tata McGraw Hill , 2009	
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1 Re 1 Y(C 1	Verilog HDL : A Guide to Digital Design and Synthesis, 2 nd Edition, Samir Palnitkar  ference Books  Verilog Digital System Design Second Edition ZainalabedinNavabi Tata McGraw Hill , 2009  CCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1 Re 1 Y(C 1	Verilog HDL : A Guide to Digital Design and Synthesis, 2 nd Edition, Samir Palnitkar  ference Books  Verilog Digital System Design Second Edition ZainalabedinNavabi Tata McGraw Hill , 2009  CCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]  http://103.152.199.179/YCCE/yccelibrary.html	
1 Re 1 Y(C 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Verilog HDL : A Guide to Digital Design and Synthesis, 2 nd Edition, Samir Palnitkar  Ference Books  Verilog Digital System Design Second Edition ZainalabedinNavabi Tata McGraw Hill , 2009  CCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]  http://103.152.199.179/YCCE/yccelibrary.html  OOCs Links and additional reading, learning, video material	
Re 1 Y(C) 1	Verilog HDL : A Guide to Digital Design and Synthesis, 2 nd Edition, Samir Palnitkar  ference Books  Verilog Digital System Design Second Edition ZainalabedinNavabi Tata McGraw Hill , 2009  CCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]  http://103.152.199.179/YCCE/yccelibrary.html  OOCs Links and additional reading, learning, video material  https://nptel.ac.in/courses/106105165	

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SoE No. 22EE-101

# **B.Tech in Electronics Engineering**

# IV SEMESTER 22EE403: Microcontroller and its Applications

#### **Course Outcomes:**

After completion of the course, student will demonstrate the ability 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 programusing IDE tool like KeiluVision

Unit:1 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 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 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 6 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.

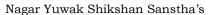
(Contemporary Issues related to Topic)

Unit:5 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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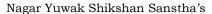


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Un	nit :6	7 Hours
Ke	yboard matrix programming, Interfacing of ADC, DAC, stepper motor and programming. Interfacing of ADC, DAC, stepper motor and programming.	erfacing RTC
	EPROM using I2C Bus and programming	
(Co	ontemporary Issues related to Topic)	
T.		20.11
10	tal Lecture Hours	39 Hours
To	xtbooks	
1	The 8051 Microcontroller and Embedded System, by M. A. Mazidi, Prentice Hall	
2	The 8051 Microcontroller, by Kenneth J. Ayala, West Publishing Company	
Re	eference Books	
1	"The 8051 Microcontroller Based Embedded Systems", Manish K Patel, McGraw Hill, 2014, I	SBN: 978-93
	329-0125-4.	
	60 Constant and the Analytic Analytic Property of Control Property	1 D
2	"Microcontrollers: Architecture, Programming, Interfacing and System Design", Raj Ka	amal, Pearsor
2	"Microcontrollers: Architecture, Programming, Interfacing and System Design", Raj Ka Education, 2005.	nmal, Pearsor
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		nmal, Pearsor
	Education, 2005.	nmal, Pearsor
YC	Education, 2005.  CCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	nmal, Pearsor
YC 1	Education, 2005.  CCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	nmal, Pearsor
YC 1	Education, 2005.  CCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]  http://103.152.199.179/YCCE/yccelibrary.html	nmal, Pearsor
YC 1	Education, 2005.  CCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]  http://103.152.199.179/YCCE/yccelibrary.html  OOCs Links and additional reading, learning, video material	nmal, Pearson
YC 1 MC	Education, 2005.  CCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]  http://103.152.199.179/YCCE/yccelibrary.html  OOCs Links and additional reading, learning, video material  https://www.keil.com/dd/docs/datashts/atmel/at89c51_ds.pdf	nmal, Pearson
YC 1 MC 1 2	Education, 2005.  CCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]  http://103.152.199.179/YCCE/yccelibrary.html  OOCs Links and additional reading, learning, video material  https://www.keil.com/dd/docs/datashts/atmel/at89c51_ds.pdf  https://www.electronicwings.com/	nmal, Pearsor

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SoE No. 22EE-101

# **B.Tech in Electronics Engineering**

### **IV SEMESTER**

# 22EE404: Lab: Microcontroller and its Applications

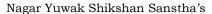
### **Course Outcomes:**

After completion of the course, student will demonstrate the ability 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 programusing IDE tool like KeiluVision.

Sr. No.	Experiments based on
1	1.a: Write program to perform addition of two nos. (X + Y) 1.b: Write program to perform subtraction of two nos. (X - Y) 1.c. Write Program for Multiplication of two nos. (X *Y) 1.d. Write Program for Multiplication of two nos. (X / Y) 1.e: Write program to perform Logical AND of two nos. (X and Y) 1.f: Write program to perform Logical OR of two nos. (X or Y) 1.g. Write Program for Logical AND of two nos. (X exor Y)
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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# **B.Tech in Electronics Engineering**

# **IV SEMESTER** 22EE405: Algorithm and Data Structure

### **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 and latest compilers

## **Unit:1** Introduction to Algorithms

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 | Arrays 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 | Stack 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** | Linked Stacks and Queues

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)

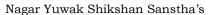
#### **Unit:5** | **Binary Tree**

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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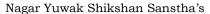


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Uni	t:6 List	7 Hours
Basi	c Terminology, Graph Representation, Matrix, List, Multi-List, Graph Traversals, Breath First So	earch, Depth
	Search, Minimum Cost Spanning Trees, Shortest Path Algorithm, Topological Sort, Critical Path	
(Co	ntemporary Issues related to Topic)	
Tota	al Lecture Hours	39 Hours
Tex	tbooks	
1	Fundamentals of Data Structures, Ellis Horowtiz and SartajSahani, Galgotia, Publication,	
Ref	erence Books	
1	Data Structures and Program, Design in C, Kruse, Leung and Tondo , PHI	
2	An Introduction to Data Structures with Applications , Tremblay & Sorenson, TMH	
3	Data Structures, Schaum Series, Seymour Lipschutz, G.A. V. Pai, TMH	
YC	CE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/yccelibrary.html	
МО	OCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/106102064	
2	https://archive.nptel.ac.in/courses/106/106/106106127/	
3	https://onlinecourses.nptel.ac.in/noc20 cs85/preview	

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# **B.Tech in Electronics Engineering**

# IV SEMESTER 22EE406: Lab.: Algorithm and Data Structure

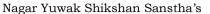
### **Course Outcomes:**

#### 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 and latest compilers

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

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# **B.Tech in Electronics Engineering**

# IV SEMESTER 22EE407: Digital CMOS Circuits

#### **Course Outcomes:**

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

- 1. Describe and interpret the basic concepts of MOS transistors,
- 2. Construct the ability to design a system, component or process as per needs and specifications.
- 3. Analyze inverter design, characteristics and applications and performance parameters of CMOS Circuits.
- 4. Evaluate circuits using different CMOS styles and measure performance of the complex logic structures.

### **Unit:1** Introduction of MOSFETs

7 Hours

Introduction of MOSFETs: CMOS Fabrication Process steps, NMOS Enhancement Transistor, MOS Transistor Operations, PMOS Enhancement Transistor, Regions of Operations, Threshold Voltage, MOS Device Equations, Small Signal Modeling of MOSFETs.

(Contemporary Issues related to Topic)

## **Unit:2** | **Logic Design With MOSFETs**

7 Hours

Logic Design With MOSFETs: Ideal Switches and Boolean Operations, MOSFETs as Switches, Basic Logic Gates in CMOS, Compound Gates in CMOS, Transmission Gate Circuits (TG), Pass Transistor.

(Contemporary Issues related to Topic)

#### **Unit:3** | MOS inverter Characteristics

7 Hours

MOS inverter Characteristics: Resistive load inverter, Inverters with n type MOSFET load, CMOS inverter, Principle of operation, DC characteristics, Tristate Inverter, Noise Margin, Introduction to Bi-CMOS Inverter.

(Contemporary Issues related to Topic)

#### **Unit:4** | Combinational circuit design

7 Hours

Combinational circuit design, static CMOS, Ratioed Logic circuits, Analysis of CMOS Logic Gates: MOS Device Capacitance, Switching Characteristics, Rise Time, Fall Time, Propagation Delay, Power Dissipation in CMOS, Charge Sharing, Fan-in, Fan-out, Complex Logic Structures, Complementary Static CMOS, Pseudo NMOS Logic, Dynamic CMOS Logic, CMOS Domino Logic, CMOS Pass Transistor Logic.

(Contemporary Issues related to Topic)

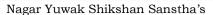
### **Unit:5** | Sequential Circuit Design

7 Hours

Sequential Circuit Design, Latches and Flip Flops. Advanced Techniques in CMOS Logic Circuits: and Flip-Flops, data path design.

(Contemporary Issues related to Topic)

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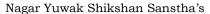


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Un	it :6 Data path VLSI System Components	7 Hours
	a path VLSI System Components: Comparators, barrel shifters, Multiplexers, Binary Deco	
	ectors and Comparators, Priority Encoders, Shift and Rotation Operations, Bit Adder Circuits, M	ultipliers.
(Co	ontemporary Issues related to Topic)	
Tot	tal Lecture Hours	42 Hours
Tex	xtbooks	
1	John P. Uyemura, Introduction to VLSI Circuits and Systems, Students Edition, Wiley Publicat	ion.
Ref	ference Books	
1	Neil H. E. WesteHarris, Principle of CMOS VLSI Design, 4th Edition, Addison Wesley VLSI	Series.
2	Sung-Mo Kang, Yusuf leblebici, CMOS VLSI Design, Third edition, 2008, TataMcGraw Hill.	
YC	CE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/yccelibrary.html	
M	OOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/108107129	
2	https://nptel.ac.in/courses/106103116	
3	https://nptel.ac.in/courses/117106092	
	<u> </u>	

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# **B.Tech in Electronics Engineering**

# IV SEMESTER 22EE408: Lab.: Digital CMOS Circuits

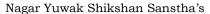
#### **Course Outcomes:**

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

- 1. Describe and interpret the basic concepts of MOS transistors.
- 2. Construct the ability to design a system, component or process as per needs and specifications.
- 3. Analyze inverter design, characteristics and applications and performance parameters of CMOS Circuits.
- 4. Evaluate circuits using different CMOS styles and measure performance of the complex logic structures.

Sr. No.	Experiments based on
1	Design of CMOS Inverter using DSCH2 Tool.
2	Gate Level Analysis of 2-Input NAND & NOR Gate.
3	Implement the Following Function using Compound Gates. F(A,B,C,D)=(ABC+CD)'
4	Design Half Adder using NAND Gates.
5	Design Full Adder using NAND Gates.
6	Design 2:1 Multiplexer using NAND Gates.
7	Design 2:4 Decoder using NAND Gates.
8	Design of 4 bit binary Adder
9	Draw Layout of CMOS Inverter Microwind/Cadence Tools
10	Draw Layout of 2-Input NAND Gate using Microwind /Cadence Tools
11	Draw Layout of Multiplexer
12	Design 4 bit adder circuits
13	Design Multiplier circuits

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# **B.Tech in Electronics Engineering**

# IV SEMESTER 22EE409: Electromagnetic Fields

#### **Course Outcomes:**

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

- 1. **Define** and **recognize** different co-ordinate systems, apply different techniques of vector calculus to understand concepts of electromagnetic field theory.
- 2. **Determine** the electromagnetic force exerted on charged particles, current elements, working principle of various electric and magnetic fields.
- 3. **Explain** fundamental laws governing electromagnetic fields and evaluate the physical quantities of electromagnetic fields in different media using the fundamental laws.
- 4. **Deduce** and justify the concepts of electromagnetic waves, means of transporting energy or information, in the form of radio waves.

## **Unit:1** Orthogonal coordinate systems

7 Hours

Orthogonal coordinate systems: Cartesian, Cylindrical, Spherical and Transformations, differential lengths, surfaces and volumes.

(Contemporary Issues related to Topic)

### **Unit:2** | **Electric field**

7 Hours

Coulomb's law, Electric field Intensity for different charge distribution: Point, Line, Surface & Volume, Electric flux, Gauss's law and Application, Divergence, Maxwell's First equation (Electrostatics), The Divergence Theorem.

(Contemporary Issues related to Topic)

### **Unit:3** | Energy & Potential

7 Hours

Energy & Potential: Energy Expended in Moving a Point charge in an Electric Field, Definition of Potential Difference and Potential, Potential field of a point charge, Potential field of a System of charges: Conservative Property, Potential Gradient, The Dipole, Poisson's and Laplace's equation, Uniqueness Of Electrostatic solution.

(Contemporary Issues related to Topic)

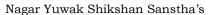
## **Unit:4** | Magnetic fields

7 Hours

Biot-Savart's law and its applications, Ampere's Circuital law and its applications, Curl, Stoke's Theorem, Magnetic flux and magnetic flux density, Faraday's law, displacement current, Maxwell's equations for static and time varying fields with physical significance.

(Contemporary Issues related to Topic)

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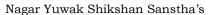
# Yeshwantrao Chavan College of Engineering (An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University) B. Tech SoE and Syllabus 2022 (Scheme of Examination w.e.f. 2022-23 onward) SoE No.

(Department of Electronics Engineering)

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Uni	t:5 Uniform plane wave	7 Hours
Uni	form plane wave, wave propagation in free space & dielectric, Poynting's Theorem and W	ave Power
•	pagation in Good Conductors: Skin Effect.	
(Co	ntemporary Issues related to Topic)	
Uni	t:6 Reflection of uniform plane waves	7 Hours
Refl	ection of uniform plane waves at Normal incidence, standing wave ratio, plane wave propagatio	n in genera
	ctions, plane wave reflection at oblique incidence angles, Brewsters angle.	
(Co	ntemporary Issues related to Topic)	
Tota	al Lecture Hours	42 Hours
Tex	tbooks	
1	William H. Hayt, Engineering Electromagnetic, 7th Edition, Tata McGraw – Hill, 2006 reprint.	
Ref	erence Books	
1	J D Kraus, Electromagnetics, 3rd edition 1984, McGraw – Hill	
2	M. N. O. Sadiku, Elements of Electromagnetics, 4th edition 2007, Oxford Press	
3	Ashutosh Pramanik, Electromagnetism: Theory and application, 2nd edition august 2009, Prentice	e Hall
YC	CE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/yccelibrary.html	
MO	OCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/108104087	
2	https://nptel.ac.in/courses/108106073	
-	https://nptel.ac.in/courses/115101005	
3		

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# **B.Tech in Electronics Engineering**

# IV SEMESTER 22EE410 : Lab: Electronics Workshop

#### **Course Outcomes:**

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

- 1. Students Will able to identify different Electronics Components.
- 2.Students Will be able to work in teamwork
- 3.Students Will be able to do Artwork, printing, etching & drilling of PCB
- 4. Students will be able to do mini projects to enhance their practical Knowledge.

Sr. No.	Experiments based on
1	Identification of Various electronic components used in electronics workshop
2	Identification of various equipment used in electronics workshop
3	Testing of various electronics components
4	Soldering and De-Soldering Practice
5	PCB Design using EDA Tools
	(Orcad Layout Plus /Allegro/ MultisimUltiboard / EasyEDA / Express PCB )
6	Etching and fabrication
7	Mini Project (Arduino / Node MCU / Raspberry Pi, etc.)
8	Report Writing

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SoE No. 22EE-101

# **B.Tech in Electronics Engineering**

#### **IV SEMESTER**

# 22EE411: 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

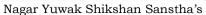
6 Hours

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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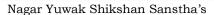


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Tex	tt books
1	Chiras, D. D and Reganold, J. P. (2010). Natural Resource Conservation: Management for a
	Sustainable Future.10th edition, Upper Saddle River, N. J. Benjamin/Cummins/Pearson
2	Rajagopalan, R. (2011). Environmental Studies: From Crisis 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
Def	University Press
$\vdash$	Gerence 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,
2	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/
<u></u>	convention-V-16-CURVE-web.pdf

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# **B.Tech in Electronics Engineering**

**IV SEMESTER Audit Course** MLC2124: YCAP4 -

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# **B.Tech in Electronics Engineering**

### **IV SEMESTER**

**MLC108**: Basics of Arduino programming

#### **Course Outcomes:**

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

- 1. Learn features of Arduino
- 2. Develop programming techniques for Arduino
- 3. Understand interfacing of Arduino with peripherals
- 4. Use of Arduino for any application

Unit I:	(4 Hrs.)
Overview of Arduino: What is Arduino, Types of Arduino, Architecture of Arduino	
Unit II:	(4 Hrs.)
Electronic components and connections, Introduction to Arduino	
Unit III:	(4 Hrs.)
Arduino components and IDE, First Arduino Program,	
Unit IV:	(4 Hrs.)
Arduino with Tricolor LED and Push button, Arduino with LCD	
Unit V:	(4 Hrs.)
Display counter using Arduino, Seven segment display,	
Unit VI:	(4 Hrs.)
Pulse Width Modulation, Analog to Digital Conversion, Wireless Connectivity to Ardu	uino
Total Lecture	24 Hours

#### Textbooks:

- 1. 50 ELECTRONIC PROJECTS, by A.K.Maini
- 2. Arduino Book for Beginners, by Mike Cheich

#### **Reference Books:**

1. Make: Getting Started With Arduino, Fourth Edition (Grayscale Indian Edition), by Massimo Banzi (Author), Michael Shiloh (Author)

### 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://spoken-tutorial.org/
- 2. https://spoken-tutorial.org/media/videos/85/Arduino-Brochure-English.pdf

Brakat	May .	Sherri	July 2022	1.00	Applicable for	
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	AY 2022-23 Onwards	

Nagar Yuwak Shikshan Sanstha's

# Yeshwantrao Chavan College of Engineering (An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

(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 5<sup>th</sup> Semester

(Department of Electronics Engineering)

#### 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 Electronics Engineering

SoE No.
22EE-101

			BoS/				С	onta	ct Ho	urs		%	Weightag	je	ESE
SN	Sem	Type	Deptt	Sub. Code	Subject	T/P	L	т	Р	Hrs	Credits	MSEs*	TA**	ESE	Duration Hours
					Fifth Sem	ester									
1	5	PC	EE	22EE501	Analog Communication	Т	3	0	0	3	3	30	20	50	3 Hrs
2	5	PC	EE	22EE502	Lab: Analog Communication	Р	0	0	2	2	1		60	40	
3	5	PC	EE	22EE503	Embedded System	Т	3	0	0	3	3	30	20	50	3 Hrs
4	5	PC	EE	22EE504	Lab: Embedded System	Р	0	0	2	2	1		60	40	
5	5	PC	EE	22EE505	Analog Integrated Circuits & Design	Т	3	0	0	3	3	30	20	50	3 Hrs
6	5	PC	EE	22EE506	Lab: Analog Integrated Circuits & Design	Т	0	0	2	2	1	30	20	50	3 Hrs
7	5	PE	EE		Professional Elective-I	Т	3	0	0	3	3	30	20	50	3 Hrs
8	5	PE	EE		Lab.: Professional Elective-I	Р	0	0	2	2	1		60	40	
9	5	STR	EE	22EE507	Industrial training, Seminar & Report	Р	0	0	2	2	1		60	40	
10	5	OE-I	EE		Open Elective - I	Т	3	0	0	3	3	30	20	50	3 Hrs
11	5	OE-II	EE		Open Elective - II	Т	3	0	0	3	3	30	20	50	3 Hrs
					TOTAL FOURT	H SEM	18	0	10	28	23				
List o	f Profes	sional Ele	ectives-I *								•	•			•
1	5	PE-I	EE	22EE511	PE-I:Operating System										
2	5	PE-I	EE	22EE512	PE-I: Lab: Operating System	,						,	,	•	
3	5	PE-I	EE	22EE513	PE-I: Object Oriented Programming										

List o	f Profes	sional El	ectives-l *		
1	5	PE-I	EE	22EE511	PE-I:Operating System
2	5	PE-I	EE	22EE512	PE-I: Lab: Operating System
3 5 PE-I EE 22EE513 PE-I: Object Oriented Programming					
4 5 PE-I EE 22EE514 PE-I: Lab: Object Oriented Programming					
5 5 PE-I EE 22EE515 PE-					PE-I: Computer Communication Networks
6	5	PE-I	EE	22EE516	PE-I: Lab: Computer Communication Networks
					DELA I MIGIE :

/	5	PE-I	EE	22EE517	PE-I: Analog VLSI Design
8	5	PE-I	EE	22EE518	PE-I: Lab: Analog VLSI Design

Op	Open Elective-I											
1		5	OE-I	EE	22EE531	OE I : Fuzzy Logic & Neural Networks						
2	: [	5	OE-I	EE	22EE532	OE I : Basics of Analog and Digital						
3 5 OE-I EE 22EE533 OE I : Biomedical Instrumentation					OE I : Biomedical Instrumentation							
4		5	OF-I	FF	22FF534	OF L. Digital Logic Design						

Op	Open Elective-II											
	1	5	OE-II	EE	22EE551	OE II : Sensors and Actuators						
- 2	2	5	OE-II	EE	22EE552	OE II : Computer Architecture						
- ;	3	5	OE-II	EE	22EE553	OE II : Consumer Electronics						
4	4	5	OE-II	EE	22EE554	OE II : Industrial Automation						

List	List of Mandatory Learning Course (MLC)											
1	5	HS	T&P	MLC2125	YCAP5: YCCE Communication Aptitude Preparation	Α	3	0	0	3	0	
2	5	HS	R&D	MLC125	Design thinking	Α	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 TA\*\* = for Practical : MSPA will be 15 marks each

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





(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 Electronics Engineering)

SoE No. 22EE-101

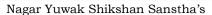
# **B.Tech in Electronics Engineering**

# V SEMESTER **22EE501: Analog Communication**

**Course Outcomes:** 

#### Upon successful completion of the course the students will be able to Demonstrate and analyze various analog modulation and demodulation techniques. 2. Understand various types of receivers & noise in communication system and investigate noise parameters. 3. Analyze various pulse modulation techniques. Apply the concept of Radiation & Propagation of waves to design communication system. 4. 5. Simulate and conduct experiments on different types of Analog communication subsystems. Amplitude Modulation: Need for modulation, mathematical Analysis, modulation index, 7 Hours Unit:1 frequency spectrum, power requirement of AM, DSB-SC, Balanced Modulator for carrier suppression, SSB, Methods of SSB Generation, Generation of AM system. Unit:2 Angle Modulation: Frequency Modulation (FM), mathematical Analysis, modulation 7 Hours index, frequency spectrum, power requirement of FM, narrowband & wideband FM, noise triangle in FM, pre-emphasis & de-emphasis techniques, phase modulation, reduction characteristics of angle modulation, FM Transmitter Unit:3 Receivers: Basic receiver (TRF), Super heterodyne receiver, performance parameters for 7 Hours receiver such as sensitivity, selectivity, fidelity, image frequency rejection etc., AM detectors, FM discriminators, double-spotting effect. Unit:4 Noise: External Noise, internal Noise, Noise Calculations, Addition of Noise due to several 7 Hours sources, Addition of Noise due to several amplifiers in cascade, Noise in reactive circuits, Definition of Noise figure, signal to noise ratio, calculation of noise figure, Noise figure from equivalent resistance, Noise Temperature. Unit:5 Pulse Modulation: Generation and demodulation of PAM, PWM, PPM, Time division 7 Hours Multiplexing, Frequency division multiplexing, Pulse code modulation. 7 Hours Unit:6 Radiation & Propagation of waves:-Fundamental of electromagnetic waves, propagation of waves- Ground wave, space wave and sky wave propagation, tropospheric scatter propagation, extraterrestrial communications. **Total Lecture Hours** 42 Hours

Brakat	100	Shami	July 2022	1.00	Applicable for  AY 2022-23 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	AT 2022-23 Offwards





# Yeshwantrao Chavan College of Engineering (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) SoE No.

(Department of Electronics Engineering)

SoE No. 22EE-101

Tex	Textbooks					
1	Electronic communication system , Fourth edition, Gorge kennedy, Tata McGraw-Hill					
Ref	erence Books					
1	G.K. Mithal, Radio Engineering, Khanna Publications					
2						
YC	YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]					
1	http://172.16.1.9/LocalGuru/listLectures.php?cid=29086f3420285fdf&bid=927d7542627865a3					
MO	MOOCs Links and additional reading, learning, video material					
1	http://nptel.iitm.ac.in/syllabus/syllabus.php?subjectId=117101055					

Brakat	May .	Sherri	July 2022	1.00	Applicable for
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	AY 2022-23 Onwards





(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 Electronics Engineering)

SoE No. 22EE-101

# **B.Tech in Electronics Engineering**

V Semester 22EE502 : Lab:- Analog Communication

#### **Course Outcomes:**

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

- 1. Demonstrate and analyze various analog modulation and demodulation techniques.
- 2. Understand various types of receivers & noise in communication system and investigate noise parameters.
- 3. Analyze various pulse modulation techniques.
- 4. Apply the concept of Radiation & Propagation of waves to design communication system.
- 5. Simulate and conduct experiments on different types of Analog communication subsystems.

Sr. No.	Experiments based on
1	To study the Generation of Amplitude Modulation using transistor. Calculate modulation index for
	value of modulating amplitude.
2	To study the Generation of Frequency Modulation and calculate the depth of modulation by varying the
	modulating voltage.
3	To perform Frequency Demodulation using Foster Seeley Detector.
4	To perform DSB-SC using Balanced Modulator.
5	To generate and observe the Single Side Band (SSB) using Filter method.
6	To study the Pulse Amplitude modulation and de-modulation and their waveforms.
7	To study the Pulse Width Modulation (PWM) and Demodulation process and record the corresponding waveforms
8	To study the Pulse Position Modulation (PPM) and demodulation process and record corresponding waveforms

Brakat	May .	Sherri	July 2022	1.00	Applicable for  AY 2022-23 Onwards
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SoE No. 22EE-101

# **B.Tech in Electronics Engineering**

V Semester 22EE503 : Embedded System

**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:1 Introduction to ARM, Advantages of architectural features of ARM Processor, Processor 7 Hours modes, Register organization, Exceptions and its handling, 3/5- stage pipeline ARM organization ARM and THUMB instruction sets, ARM programmer's model, addressing modes, 7 Hours Unit:2 Instruction set in detail and programming, data processing instruction, data transfer instruction, Control flow instructions, simple assembly language programs. Unit:3 ARM assembly language programs and C language programs. Code conversion programs. 7 Hours LPC 2148 architecture block diagrams, pins and signals. GPIO, I / O Interfaces like LED 7 Hours and Switch and their Programs. Unit:5 Display interfacing with LPC 2148. 7segment display interfacing. LCD interfacing and 7 Hours programs. 7 Hours LPC 2148 TIMER and PWM Applications. Embedded ARM applications Unit:6 **Total Lecture Hours 42 Hours**

Brakat	May	Sherri	July 2022	1.00	Applicable for  AY 2022-23 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	AT 2022-23 Offwarus





# Yeshwantrao Chavan College of Engineering (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) SoE No.

(Department of Electronics Engineering)

SoE No. 22EE-101

Tex	at 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
Ref	Perence Books
1	Technical references on www.arm.com.
2	Web base resources for RTOS and μCOS.
YC	CE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
1	http://172.16.1.9/LocalGuru/listLectures.php?cid=29086f3420285fdf&bid=927d7542627865a3
MO	OCs 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 SoE and Syllabus 2022 (Scheme of Examination w.e.f. 2022-23 onward) (Department of Electronics Engineering)

SoE No. 22EE-101

# **B.Tech in Electronics Engineering**

V Semester 22EE504 : Lab:- Embedded System

## **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.

Chairperson Dean (Acad. Matters) Dean OBE Date of Release Version	Brakat	April 1	Shami	July 2022	1.00	Applicable for AY 2022-23 Onwards
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B. Tech SoE and Syllabus 2022 (Scheme of Examination w.e.f. 2022-23 onward) (Department of Electronics Engineering)

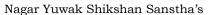
SoE No. 22EE-101

# **B.Tech in Electronics Engineering**

**V** Semester 22EE505: Analog Integrated Circuits & Design

Course Outcomes:	
Upon successful completion of the course the students will be able to	
<ul> <li>CO-1: Student will acquire knowledge of the fundamentals, the different Parameters and internal struoperational amplifier.</li> <li>CO-2: Student will analyze and design the linear applications of the operational amplifier.</li> <li>CO-3: Students will analyze and design active Butterworth filters using operational amplifier</li> <li>CO-4: Student will analyze and design the non-linear applications of the operational amplifier.</li> <li>CO-5: Student will be able to use simulation tools and hardware to conduct experiments using operational amplifier circuits</li> </ul>	acture of the
Unit:1 Differential Amplifier, configurations, DC & AC Analysis of DIBO and DIUBO, Differential amplifier using swamping resistor, constant current bias, current mirror, cascaded differential amplifier. DC Level Shifter.	7 Hours
Unit:2 OPERATIONAL AMPLIFIER FUNDAMENTALS: Block Diagram of Op-AMP, Ideal Op-Amp, OPAMP parameters, Basic Op-Amp Configurations: Open loop, Feedback in OPAMP circuit: Inverting, Non-inverting, voltage follower. Compensation of error parameters: Input Bias and Offset Current, Input Bias and Offset voltages, frequency compensation.	7 Hours
Unit:3 LINEAR APPLICATIONS: Summing, difference amplifier, integrator, differentiator, Current-to-Voltage Converter, Voltage-to-Current Converter, Instrumentation Amplifiers, Instrumentation Applications, Transducer Bridge amplifiers.Precision Rectifiers, Log/Antilog amplifiers	7 Hours
Unit:4 ACTIVE FILTERS: Transfer function, first order filter, Standard second order response, higher order filter, KRC Filters, Multiple feedback filters, second and higher order Butterworth filter design.	6 Hours
Unit:5 NONLINEAR CIRCUITS: Voltage Comparators, Comparator Applications, Peak Detectors, Schmitt Triggers: Inverting & Non-inverting, Sample-and-Hold Circuits, clipper, clamper, WAVEFORM GENERATORS: multivibrators, triangular wave generator, Sinusoidal Oscillators.	7 Hours
Unit :6 Monolithic timer IC555, D-A AND A-D CONVERTERS: Performance Specifications of D-A Converters (DACs) and A-D Converters (ADCs), D-A Conversion Techniques, A-D Conversion Techniques.	7 Hours
Total Lecture Hours	39 Hours

Brakat	Ap. 1	Chami	July 2022	1.00	Applicable for  AY 2022-23 Onwards
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# Yeshwantrao Chavan College of Engineering (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) SoE No.

(Department of Electronics Engineering)

SoE No. 22EE-101

Tex	at books
1	Op-amps and Linear Integrated Circuits, RamakantA.Gayakwad, Prentice Hall 3rd Edition
2	Linear Integrated Circuits, S. Salivahanan, V. S. Bhaaskaran, Tata McGraw Hill Publication 3rd Edition
3	Linear Integrated Circuits, D. Roy Chaudhuri, Shail Jain, New Age International 3rd Edition
Ref	Perence Books
1	Design with Operational Amplifiers and Analog Integrated Circuits, Sergio Franco, McGraw-Hill 3rd Edition
2	
3	
YC	CE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
1	http://172.16.1.9/LocalGuru/listLectures.php?cid=29086f3420285fdf&bid=927d7542627865a3
2	
MO	OCs Links and additional reading, learning, video material
1	https://onlinecourses.nptel.ac.in/noc24_ee73/preview
2	https://archive.nptel.ac.in/courses/108/108/108108111/
3	

Brakat	April 1	Sharri	July 2022	1.00	Applicable for  AY 2022-23 Onwards
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B. Tech SoE and Syllabus 2022 (Scheme of Examination w.e.f. 2022-23 onward) (Department of Electronics Engineering)

SoE No. 22EE-101

# **B.Tech in Electronics Engineering**

## V Semester 22EE506 : Lab:- Analog Integrated Circuits & Design

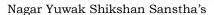
#### **Course Outcomes:**

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

- **CO-1**: Student will acquire knowledge of the fundamentals, the different Parameters and internal structure of the operational amplifier.
- **CO-2**: Student will analyze and design the linear applications of the operational amplifier.
- CO-3: Students will analyze and design active Butterworth filters using operational amplifier
- **CO-4**: Student will analyze and design the non-linear applications of the operational amplifier.
- **CO-5**: Student will be able to use simulation tools and hardware to conduct experiments using operational amplifier circuits

Sr. No.	Experiments based on
1	To determine DC operating point and verify Gain relationship of Dual input Balanced Output
	Differential amplifier. To plot input output waveforms.
2	To determine DC operating point and verify Gain relationship of Dual input Un-balanced Output
	Differential amplifier. To plot input output waveforms.
3	To verify Gain relationship of Inverting and Non-inverting amplifier. To plot frequency response of
	Non-Inverting amplifier and verify gain bandwidth relation.
4	To determine CMRR and Slew rate of OP-AMP and compare with theoretical values.
5	To verify gain relationship of Summer, Scalar and Subtractor circuits.
6	To determine cut-off frequencies fa and fb of Integrator using frequency response and verify input
	output waveforms.
7	To determine cut-off frequencies fa and fb of Differentiator using frequency response and verify input
	output waveforms.
8	To determine cut-off frequency of second order Butterworth Low pass filter using frequency response
	and verify order of filter from stop band of frequency response.
9	To determine cut-off frequency of second order Butterworth High pass filter using frequency response
	and verify order of filter from stop band of frequency response.
10	To verify VUT and VLT of Schmitt trigger using OP-AMP IC 741 and plot the hysteresis curve.

Brakat	May .	Sherri	July 2022	1.00	Applicable for - AY 2022-23 Onwards
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B. Tech SoE and Syllabus 2022 (Scheme of Examination w.e.f. 2022-23 onward) (Department of Electronics Engineering)

SoE No. 22EE-101

# **B.Tech in Electronics Engineering**

**V** Semester 22EE507: Industrial training, Seminar & Report

Brakat	Me 1	Shami	July 2022	1.00	Applicable for  AY 2022-23 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	AT 2022-23 Offwards





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

SoE No. 22EE-101

# **B.Tech in Electronics Engineering**

**V** Semester 22EE511 : PE-I: Operating System

Course Outcomes:	
Upon successful completion of the course the students will be able to	
1.Understand the concepts of operating systems and processes	
2. Learn processes, threads and memory management and storage structures	
3. Evaluate the algorithms and solutions for operating system management	
4. Analyze the security issues in operating systems	
Unit:1	7 Hours
Computer System organization, Architecture, Structure, Operations, Process Management, Memory	Management,
OS Services, User Operating System Interface, System Calls, System Programs	
Unit:2	7 Hours
Process Concept, Scheduling, Operations, Scheduling Criteria, Scheduling Algorithms, Tread	Scheduling,
Multiple Processor Scheduling	
Unit:3	7 Hours
Synchronization, Critical Section Problem, Semaphores, Deadlocks, System Models, Characterization	on, Handling
Deadlocks, Deadlock Prevention, Deadlock Avoidance	
Unit:4	6 Hours
Memory Management Strategies, Swapping, Continuous Memory Allocation, Paging, Segmenta	tion, Virtual
Memory Management, Demand Paging, Page Replacement, Trashing,	
Unit:5	7 Hours
File System Concept, Access Methods, Directory and Disk Structure, Mounting, Sharing, Mass Stora	ge Structure,
Disk Attachment, Scheduling, RAID Structure	
Unit :6	7 Hours
Protection and Security, Domain of Protection, Access Matrix, Access Control, Language based	d Protection,
Security Problem, System and Network Threats, Cryptography as Security Tool	
Total Lecture Hours	39 Hours
	l
Text books	

Operating System Concepts, Abraham Silberschatz, Peter Baer Galvin, John Wiley & Sons Publications

Brakat	May .	Sherri	July 2022	1.00	Applicable for  AY 2022-23 Onwards
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# Yeshwantrao Chavan College of Engineering (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) SoE No.

(Department of Electronics Engineering)

SoE No. 22EE-101

Ref	Perence Books
1	Modern Operating Systems, Andrew S. Tanenbaum, Prentice Hall of India Pvt. Ltd
2	Operating System, William Stallings, Prentice Hall of India
3	
YC	CE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
1	http://172.16.1.9/LocalGuru/listLectures.php?cid=29086f3420285fdf&bid=927d7542627865a3
2	
MC	OCs Links and additional reading, learning, video material
1	https://nptel.ac.in/courses/106105214
2	https://archive.nptel.ac.in/courses/106/105/106105214/
3	https://onlinecourses.nptel.ac.in/noc23_cs101/preview
4	https://nptel.ac.in/courses/106106144

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Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	AT 2022-23 Offwards		
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B. Tech SoE and Syllabus 2022 (Scheme of Examination w.e.f. 2022-23 onward) (Department of Electronics Engineering)

SoE No. 22EE-101

### **B.Tech in Electronics Engineering**

V Semester 22EE512 : PE-I: Lab: Operating System

#### **Course Outcomes:**

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

- 1.Understand the concepts of operating systems and processes
- 2. Learn processes, threads and memory management and storage structures
- 3. Evaluate the algorithms and solutions for operating system management
- 4. Analyze the security issues in operating systems

Sr. No.	Experiments based on			
1	Study of various operating systems			
2	Study of various command line programs			
3	Study of processor architectures			
4	Study of semiconductor memory types			
5	Study of synchronization problems in operating systems			
6	Study of deadlock avoidance, semaphores			
7	Study of memory management in operating systems.			
8	Study of computer viruses			
9	Study of device driver programming			
10	Study of Real time Operating Systems			

Brakas	May	Sharri	July 2022	1.00	Applicable for AY 2022-23 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	AT 2022-23 Offwards





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

SoE No. 22EE-101

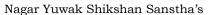
### **B.Tech in Electronics Engineering**

#### V Semester 22EE513 : PE-I: Object Oriented Programming

**Course Outcomes:** 

### Upon successful completion of the course the students will be able to 1. Understand the concept of Object Oriented Programming Analyse the concept of Inheritance, Polymorphism, overloading Choose the appropriate data structure and algorithm design method for specified application Develop and use linear and non-linear data structures 5. Create software solutions for complex problems 7 Hours Unit:1 Principles of Object Oriented Programming (OOP), Software Evaluation, OOP Paradigm, Basic Concepts of OOP, Benefits of OOP, Application of OOP Unit:2 7 Hours Introduction to C++, Tokens, Keywords, Identifiers, Variables, Operators, Manipulators, Expressions and Control Structures, Pointers, Functions, Function Prototyping Parameters Passing in Functions, Values Return by Functions, Inline Functions, Friend and Virtual Functions 7 Hours Unit:3 Classes and Objects, Constructors and Destructors, Operator overloading, Type of Constructors, Function Overloading, Inheritance, Types of Inheritance Virtual Functions and Polymorphism 7 Hours Unit:4 Definition of a data structure, Primitive and Composite data types, Asymptotic notations, Arrays, Operations of Arrays, Order lists, Stacks, Applications of Stack, Infix to Postfix Conversion, Recursion, Queues, Operations of Queues. (7 Hours) 7 Hours Unit:5 Singly linked list, Operations, Doubly linked list, Operations, Trees and Graphs: Binary tree, Tree traversal; Graph, Definition, Types of Graphs, Traversal (BFS & DFS), Dijkstra's algorithm Unit:6 7 Hours Files, classes for file stream operations, Opening, Closing and Processing files, End of file detection, File pointes, Updating a file, Error Handling during file operations, Command line arguments, Templates, Exception Handling **Total Lecture Hours** 42 Hours

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(Department of Electronics Engineering)

SoE No. 22EE-101

Tex	at books
1	Object Oriented programming with C++, E. Balagurusamy
Ref	erence Books
1	Fundamentals of Data Structures in C++, Robert Lafore
YC	CE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
1	http://172.16.1.9/LocalGuru/listLectures.php?cid=29086f3420285fdf&bid=927d7542627865a3
2	
MO	OOCs Links and additional reading, learning, video material
1	https://nptel.ac.in/courses/106105153
2	https://archive.nptel.ac.in/courses/106/105/106105153/
3	https://nptel.ac.in/courses/106105151
4	https://onlinecourses.nptel.ac.in/noc19_cs48/preview

Brakat	April 1	Shami	July 2022	1.00	Applicable for AY 2022-23 Onwards	
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SoE No. 22EE-101

#### **B.Tech in Electronics Engineering**

#### V Semester 22EE514 : PE-I: Lab: Object Oriented Programming

#### **Course Outcomes:**

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

- 1. Understand the concept of Object-Oriented Programming
- 2. Analyse the concept of Inheritance, Polymorphism, overloading.
- 3. Choose the appropriate data structure and algorithm design method for specified application.
- 4. Develop and use linear and non-linear data structures.
- 5. Create software solutions for complex problems

Sr. No.	Experiments based on
1	Implement the concept of Class and its data members and member functions in C++
2	Implement the concept of function and operator overloading in C++
3	Implement the concept of friend function
4	Implement the concept of class constructor and its type in C++
5	Implement the concept of Abstraction in C++
6	Implement the concept of all types of inheritance in C++
7	Implement the concept of run time polymorphism in C++
8	Implement the concept of Files using command line arguments in C++
9	Implement the concept of function templates and class template in C++
10	Implement the concept of exception in C++

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SoE No. 22EE-101

### **B.Tech in Electronics Engineering**

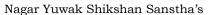
#### V Semester **22EE515 : PE-I: Computer Communication Networks**

**Course Outcomes:** 

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

	Total Lecture Hours	42 Hours
		•
	Signature Entity Authentication, FIREWALLS, SSL Services	
Unit :6	Security: Cryptography, e-mail security, web security, communication security, Digital	7 Hours
	Transport, 17 17 and TIT II, Problemoula.	
JIII ()	Transfer, WWW and HTTP, Multimedia.	, ilouis
Unit:5	Application layer: Domain name system, electronic mail system, Remote Logging and File	7 Hours
	TCP/IP utilities ,wireless TCP and UDP, routers and gateways	
	transport protocol, TCP/IP architecture, TCP/IP protocol, IP packets, IP addressing,	
	internetworking, transport layer design issues, transport service primitives, internet	
Unit:4	Network layer and transport layer: network layer design issues, routing, congestion,	7 Hours
	methods, , Flow Control ,elementary data link protocols, sliding window protocols.	
Unit:3	Data link layer: .Data link layer design issues, Framing, error detection and correction	7 Hours
	speed LANS, repeaters, hubs, bridges, fast Ethernet, Wireless LAN	
	transmission media, multiple access protocols, IEEE standard 802 for LAN and MAN, high	
Unit:2	Physical layer and medium access layer: Guided transmission media, Unguided	7 Hours
		1
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
	rstand network security and the working of various application layer protocols in and simulate basic network concepts using modern tool	
•	ze and design routing algorithms.	
2. Desci	ibe and analyze a number of data link, network, and transport layer protocols.	

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		V/C	CE EE 47		





(Department of Electronics Engineering)

SoE No. 22EE-101

Tex	t books							
1	Data Communications and Networking by Behrouz a Forouzan,5 <sup>th</sup> Edition							
Ref	Reference Books							
1	Computer Networks by Tanenbaum,5 <sup>th</sup> Edition							
2	Data and Computer Communication by W. Stallings ,8th Edition							
3								
YC	YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]							
1	http://172.16.1.9/LocalGuru/listLectures.php?cid=29086f3420285fdf&bid=927d7542627865a3							
2								
MC	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. 22EE-101

### **B.Tech in Electronics Engineering**

#### V Semester 22EE516 : PE-I: Lab: Computer Communication Networks

#### **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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SoE No. 22EE-101

### **B.Tech in Electronics Engineering**

**V** Semester 22EE517: PE-I: Analog VLSI Design

	Course Outcomes:	
Upon su	uccessful completion of the course the students will be able to	
	rstand and explain concepts related to MOSFET	
	the knowledge of circuit analysis models in analysis of analog VLSI circuit	
-	ze given analog VLSI circuit to arrive at a suitable conclusion	
_	n analog VLSI circuit for given application and specifications	
5. desig	n and conduct experiment using analog VLSI circuit for given application and specifications	
Unit:1	Basic MOS Device Physics: Basic MOS Device Physics: Threshold voltage, Derivation of I/V characteristics, second order effects, MOS device capacitance, MOS small signal models, MOS SPICE models.	7 Hours
Unit:2	Single stage amplifiers: Basic concept, common source, common source stage with	7 Hours
	resistive load, CS stage with source degeneration, source follower, common gate.	
Unit:3	Differential amplifiers: Single ended & differential operation, Basic differential pair,	7 Hours
	qualitative and quantitative analysis, Common mode response	
Unit:4	Passive and active current mirrors: Basic current mirror, Cascode current mirror, Active	6 Hours
	current mirror,common mode properties	
Unit:5	frequency response of amplifiers: Miller effect, association of poles with node, common	7 Hours
	source stage, source follower, common gate stage	
<b>T</b> I *4 6		7.11
Unit :6	Operational amplifiers: Performance parameters, one stage op amp, Two stage op amp,	7 Hours
	Gain boosting, Noise in op amp (6	
	Total Lecture Hours	41 Hours

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Tex	xt books
1	Design of Analog CMOS Integrated circuits, Ninteenth reprint 2010 ,BehzadRazavi Mc-graw-Hill
Ref	ference Books
1	CMOS circuit design, layout, and Simulation, Second edition, reprint 2009, Jacob Baker WSE
2	CMOS Analog Circuit Design second edition, 2010 P.E.Allen, D.R.Holdberg, Oxford univ. press
3	Analysis and Design of Analog Integrated Circuits fifth edition, reprint 2010 Paul B Gray, Hurst, Lewis,
	Meyer John Wiley & sons
YC	CE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
1	http://172.16.1.9/LocalGuru/listLectures.php?cid=29086f3420285fdf&bid=927d7542627865a3
2	
MO	OOCs Links and additional reading, learning, video material
1	https://onlinecourses.nptel.ac.in/noc23_ee142/preview
2	https://nptel.ac.in/courses/117101105

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SoE No. 22EE-101

### **B.Tech in Electronics Engineering**

V Semester 22EE518 : PE-I: Lab: Analog VLSI Design

#### **Course Outcomes:**

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

- 1. understand and explain concepts related to MOSFET
- 2. apply the knowledge of circuit analysis models in analysis of analog VLSI circuit
- 3. analyze given analog VLSI circuit to arrive at a suitable conclusion
- 4. **design** analog VLSI circuit for given application and specifications
- 5. design and conduct experiment using analog VLSI circuit for given application and specifications

Sr. No.	Experiments based on
1	NMOS characteristic :- VdsVs ID for various values of Vgs.
2	PMOS characteristic :- VdsVs ID for various values of Vgs.
3	Current source using current mirror :- DC analysis
4	Common Source amplifier:- AC analysis Transient analysis
5	Common Drain amplifier:- AC analysis ,Transient analysis
6	Differential Amplifier :- AC analysis Transfer curve (Vin VsVout, DC condition)
7	Op-Amp Design: AC analysis Transient analysis DC analysis
8	SPICE simulation of basic analog circuits, Analog Circuit simulation Verification of layouts.
9	Basic CMOS Comparator Design
10	Source Coupled Pair Differential Amplifier

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SoE No. 22EE-101

## **B.Tech in Electronics Engineering**

#### **V** Semester 22EE531 : OE I : Fuzzy Logic & Neural Networks

		Cours	se Outcomes:			
T7	61 14					
-	uccessful completion o Inderstand and learn			of various soft (	computing	technique
		-		or various sort c	Joinputing	technique
	lly Fuzzy logic and Arti					
CO2: A	analyze the problem s	tatements; provide er	ngineering solutions	through develop	ment of i	nembershi
function	ns / membership graphs	Learning & Recognition	ion approaches			
CO3: V	Vork on Case studies b	ased on Application a	reas of Soft Comput	ing, Design / Dev	elop and I	Demonstrat
models	for Fuzzy controllers, N	leural Networks				
<b>CO4</b> : C	Get involved in self lea	rning approach for de	eveloping models us	sing Soft computi	ng techniq	ues, Reve
	at applications of these r	0 11	, ,			
	to society and industry	_	_	_		•
	is society and madeing i	ioous, writing rooming	ar reports, presentati	<b>011</b> 01		
Unit:1	Crisp sets: An overvie	w, Fuzzy sets: Basic ty	vpes, basic concepts.	basic properties of	of α-cuts.	7 Hours
	representation of fuzz				,	. 110415
Unit:2	Operations on fuzzy	sets, Fuzzy numbers,	Arithmetic operation	ns on intervals, a	rithmetic	7 Hours
	operations on fuzzy n	umbers				
Unit:3	Fuzzy controllers: an	overview with applicat	ions, applications of	fuzzy logic		7 Hours
Unit:4	Fundamental concept	s of ANN: Basic bu	uilding blocks of a	artificial neural r	networks,	6 Hours
	network architectures.	activation functions, I	McCulloch-Pitt's neu	ıron model		
Unit:5	Brief introduction to s	ingle layer and multila	ayer perceptions, AD	OALINE and MAI	DALINE,	7 Hours
		s, back propagation ne				
		· 1 1 0				
Unit :6	Radial basis function	network, Self organiza	ing feature man and	applications of AN	JN	7 Hours
<u> </u>	Tradia ousis function	network, ben organiza		uppireutions of 71	111	
			Total I	ecture Hours		39 Hours
			Total L	ceture Hours		37 Hours
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t books	
'Fuzzy sets and Fuzzy logic', George J. Klir and Bo Yuan, Prentice Hall	
Neural Networks: A comprehensive Foundation', Simon Haykin, Pearson publications	
erence Books	
'Principles of Soft Computing', S. N. Sivanandanam, S.N.Deepa, Wiley Publication	
Fuzzy sets: Uncertainty & information, Klir and Folger, PHI	
CE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
http://172.16.1.9/LocalGuru/listLectures.php?cid=29086f3420285fdf&bid=927d7542627865a3	
OCs Links and additional reading, learning, video material	
https://onlinecourses.nptel.ac.in/noc22_ge04/preview	
https://www.udemy.com/course/fuzzylogic/	
www.digimat.in > nptel > courses >	
NPTEL Video Course: NOC:Introduction to Soft Computing	
	Neural Networks: A comprehensive Foundation', Simon Haykin, Pearson publications  Prence Books  'Principles of Soft Computing', S. N. Sivanandanam, S.N.Deepa, Wiley Publication  Fuzzy sets: Uncertainty & information, Klir and Folger, PHI  CE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]  http://172.16.1.9/LocalGuru/listLectures.php?cid=29086f3420285fdf&bid=927d7542627865a3  OCs Links and additional reading, learning, video material  https://onlinecourses.nptel.ac.in/noc22_ge04/preview  https://www.udemy.com/course/fuzzylogic/  www.digimat.in > nptel > courses >

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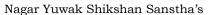
#### **B.Tech in Electronics Engineering**

# V Semester 22EE532 : OE I : Basics of Analog and Digital Communication

#### **Course Outcomes:** Upon successful completion of the course the students will be able to 1. Understand different modulation and demodulation schemes for analog communication with the concept of noise 2. Understand different pulse analog and digital modulation techniques. 3. Understand different digital modulation schemes 4. Understand the different coding techniques for communication systems. Basic block diagram of Analog communication system, Modulation techniques: Need for 7 Hours Unit:1 modulation. Basic concepts of AM, FM, PM, Transmitters Unit:2 Receivers: Basic receiver (TRF), Super heterodyne receiver, AM detectors, FM Detectors, 7 Hours Noise Types of Noise, Definition of Noise figure, signal to noise ratio, calculation of noise figure. Unit:3 Pulse Modulation: Generation and demodulation of PAM, PWM, PPM, Time division 7 Hours Multiplexing, Frequency division multiplexing, Basic digital Modulation System- PCM. Unit:4 Channel capacity, DPCM, Delta Modulation, ADM, ADPCM, Adaptive sub-band coding, 6 Hours applications. Unit:5 Digital Modulation techniques: ASK, FSK, PSK, BPSK, OPSK, MSK, DPSK, BFSK, M-7 Hours ary PSK, FSK, and OAM. Unit:6 7 Hours Source coding and channel coding, Information theory, Huffman coding, LZ coding, Basic concept of convolution code. **Total Lecture Hours** 39 Hours

Tex	at books
1	Electronic Communication System Fifth Edition, Gorge Kennedy Tata McGraw-Hill
2	Digital Communications 1999 Symon Hykin Wiley, 1988

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# **B.Tech in Electronics Engineering**

Ref	Reference Books			
1	Electronic Communication Systems Second			
	Edition, 1993 Frank R. Dungan Delmar Publishers			
2	Communication Electronics Third Edition,			
	2007 Louis Frenzel McGraw-Hill			

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

http://172.16.1.9/LocalGuru/listLectures.php?cid=29086f3420285fdf&bid=927d7542627865a3

#### MOOCs Links and additional reading, learning, video material

https://archive.nptel.ac.in/courses/117/105/117105143/

https://nptel.ac.in/courses/117101051

https://nptel.ac.in/courses/108102120

https://archive.nptel.ac.in/courses/108/102/108102096/

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# **B.Tech in Electronics Engineering**

V Semester 22EE533: OE I: Biomedical Instrumentation

**Course Outcomes:** 

Opon su	accessful completion of the course the students will be able to	
	1. Differentiate and analyse the biomedical signal sources.	
	2. Understand cardiovascular system and related measurements.	
	3. Explain the respiratory and nervous systems and related measurements	
	4. Understand non-invasive diagnostic parameters	
Unit:1	Introduction to Biomedical instrumentation, development of biomedical instrumentation,	6 Hours
	biometrics, Physiological system of body, problems encountered in measuring a living	
	system	
Unit:2	Basic transducer principle, active transducer, passive transducer, electrode theory,	7 Hours
UIIIt.2	biopotential electrodes, biochemical transducers	/ 110u15
Unit:3	The heart and cardiovascular system, characteristics of blood flow, blood pressure measurement, heart sound measurement. Principles of ultrasonic diagnosis, temperature measurement, electrocardiograph, plethysmography, pulmonary function measurement spirometry, pulmonary function analyzers, respiratory gas analyzers.	7 Hours
	sphonetry, pullionary function analyzers, respiratory gas analyzers.	
Unit:4	Generation of ionizing radiation, instrumentation for diagnostic X-ray, special technique, instrumentation for medical use of radioisotopes, radiation therapy, EMG	7 Hours
Unit:5	Patient care and monitoring, the elements of intensive care monitoring, instrumentation for	7 Hours
	monitoring patient, pacemakers, defibrillators, Electrical safety of medical equipment.	, 110415
	Physiological effects of electrical current, shock hazards from electrical equipments	
Unit :6	Computers in biomedical instrumentation, digital computer, Telemedicine concept,	6 Hours
	Telemedicine applications, video conferencing, digital communication in telemedicine	0 110015
	Teleradiology, Tele Cardiology, Telepsychiatry	
	ecture Hours	40 Hours

Text	ooks
------	------

Leaslie Cromwell, Fred Weibell, Erich A Pfeiffer, Biomedical Instrumentation & Measurement ,Prentice

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SoE No. 22EE-101

Ref	ference Books
1	R.S.Khandpur, Handbook of Biomedical Instrumentation, TMH
2	Dean A Dmane, David Michaels, Bioelectronics Measurement, Prentice hall
YC	CE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
1	http://172.16.1.9/LocalGuru/listLectures.php?cid=29086f3420285fdf&bid=927d7542627865a3
2	
M(	OOCs Links and additional reading, learning, video material
1	https://nptel.ac.in/courses/108105101
2	https://onlinecourses.swayam2.ac.in/nou23_bt05/preview
3	https://onlinecourses.nptel.ac.in/noc22_bt56/preview
4	https://onlinecourses.nptel.ac.in/noc21_ee17/preview

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**Total LectureHours** 

# Yeshwantrao Chavan College of Engineering

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39 Hours

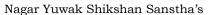
#### **B.Tech in Electronics Engineering**

V Semester 22EE534 : OE I : Digital Logic Design

#### **Course Outcomes:** Upon successful completion of the course the students will be able to 1. Simplify combination logic circuits using Boolean algebra and exhibit the methods to solve logical functions. 2. Understand and apply the concept of combinational logic circuits in various digital systems. 3. Understand and demonstrate the various codes and illustrate concept of logic family with their characteristics. 4. Understand the working of Flip-flops and its use to design Synchronous counters and Design and demonstrate finite state machines Unit:1 Number Systems and IEEE Floating point representations, Logic gates, Switching Algebra 7 Hours & simplification of Boolean expressions, Boolean algebraic theorems, DeMorgan's theorem, SOP, POS, Canonical forms of Boolean expression. Implementations of Boolean expressions using logic gates. Unit:2 7 Hours Combinational Circuits: Minimization methods: Karnaugh map(upto 4 variable), Quine McClauskey methods. Unit:3 Design of Arithmetic circuits: Half & Full adders, Half & Full Subtractions, Comparators, 7 Hours Multi-bit Application designs, Formation of switching functions from word statements, Functions & its implementation using Multiplexer, De multiplexer, Encoder, Decoder Unit:4 Combinational circuits design using MSI and LSI chips, PLA's ,Parity Checkers and 6 Hours generators, Introduction to Logic families & their characteristics such as Fan-In, Fan-out, Propagation delay, Power dissipation, Noise Margin. Sequential circuits: Latches and flip-flops: RS-FF, D-FF, JK-FF, Master-Slave JK-FF & T-7 Hours Unit:5 FF's, Excitation & Truth Table, Flip flop conversions, Shift registers, Introduction to Synchronous, Counters, Design of synchronous counter. 7 Hours Unit:6 Classification of synchronous machines, Design of synchronous sequential machines using Moore & Mealy circuits: Sequence detector

# Textbooks 1 "Digital Circuits & Microprocessors" by Hebert Taub

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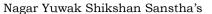


(Department of Electronics Engineering)

SoE No. 22EE-101

Ref	erence Books					
1	Modern Digital Electronics by RP Jain , 3rd Edition, Tata McGraw Hill					
2	Digital Design by M. Morris Mano, 4th edition 2008, Prentice Hall of India					
3						
YC	YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]					
1	http://172.16.1.9/LocalGuru/listLectures.php?cid=29086f3420285fdf&bid=927d7542627865a3					
2						
MC	MOOCs Links and additional reading, learning, video material					
1	https://onlinecourses.nptel.ac.in/noc21_ee39/preview					
2	https://nptel.ac.in/courses/117105080					
3	https://nptel.ac.in/courses/108106177					
4	https://archive.nptel.ac.in/courses/108/106/108106177/					

Brakat	April 1	Shami	July 2022	1.00	Applicable for  AY 2022-23 Onwards		
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	AT 2022-23 Offwards		
	VOCE EF 30						





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

SoE No. 22EE-101

#### **B.Tech in Electronics Engineering**

#### V Semester 22EE551 : OEII : 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 Sensors and Actuators

7 Hours

Classification of Sensors and Actuators - Magnetic Sensors - Special Magnetic Devices - Rotary and Linear Actuators - Magnetic Materials and Technology - Soft Magnetic Materials - Hard Magnetic Materials - Coating Technologies - Magnetic Materials Market and Applications.

#### **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.

#### **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 - Ionization gauge.

#### 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

#### **Unit:5** | **Linear Actuators**

7 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 .

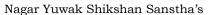
#### **Unit:6** | **Rotary Actuators**

6 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 , Cylindrical Rotary Actuators - Cylindrical Rotary Actuator PM - Cylindrical Rotary Actuator Excitation Electromagnetic Circuit.

Total Lecture Hours 39 Hours

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Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	AT 2022-23 Offwards



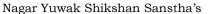


(Department of Electronics Engineering)

SoE No. 22EE-101

Tex	ktbooks						
1	Measurement Systems – Application and Design, 6th 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						
Ref	ference 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						
YC	CE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]						
1	http://103.152.199.179/YCCE/yccelibrary.html						
MC	OOCs Links and additional reading, learning, video material						
1	https://nptel.ac.in/courses/108108147						
2	https://nptel.ac.in/courses/108105064						

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(Department of Electronics Engineering)

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39 Hours

### **B.Tech in Electronics Engineering**

#### V Semester 22EE552 : OE II : Computer Architecture

#### **Course Outcomes:**

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

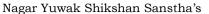
- 1. 1. Understand the basic concepts of peripherals of computer system
- 2. Apply the design issues in the development of computer system architecture
- 3. Analyze the concepts of Parallel processing and pipelining for computer architecture design
- 4. Evaluate parameters required for processor design

#### 7 Hours **Unit:1** | Register and processor Level Design Register Level components, Programmable logic devices, Register level design, The Processor level components, Processor level design **Unit:2** | **CPU Organization** 6 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 6 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 6 Hours Local and long distance communication input-output systems, Interrupt, DMA, introduction to parallel Processing

Tex	Text books								
1	Jhon.P. Hayes, Computer Architecture and organization McGraw-Hill Companies								
Ref	ference Books								
1	Carl Hammacher, Computer organization, McGraw-Hill Science								
2	Andrew S. Tanenbaum, Structured computer and Organization, PHI								
YC	CE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]								
1	http://103.152.199.179/YCCE/yccelibrary.html								
MC	OOCs Links and additional reading, learning, video material								
1	http://103.152.199.179/YCCE/vccelibrary.html								

**Total Lecture Hours** 

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**Total Lecture Hours** 

# Yeshwantrao Chavan College of Engineering

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SoE No. 22EE-101

39 Hours

#### **B.Tech in Electronics Engineering**

V Semester

22EE553 : OE II : Consumer Electronics

#### **Course Outcomes:** Upon successful completion of the course the students will be able to 1. Understand and aware of the safety aspects in the field of Electrical and Electronics products. 2. Analyze the basics of Audio and Video Systems. 3. Know about recent trends in Processors and computer peripherals, mobile and wireless technologies. 4. Understand the basics of refrigeration cycle and cooling system **Unit:1** | Standards and Safety norms 6 Hours Electronics and Electrical safety norms and standards, Electronic products covered under compulsory registration **Unit:2** | Audio Systems 7 Hours Sound Recording and reproduction, Hi-Fi Sound System, Audio Mixers, Graphics Equalizers, Public Address System. 7 Hours **Unit:3** | Video Systems Color fundamentals, Luminance and Chrominance signal, Color camera, digital television systems. **Unit:4** | Wireless Technology & Mobile phones **6 Hours** Mobile Phones, various wireless technologies, Introduction to 3G, WiFi Techhnology, GSM **Unit:5** | Air conditioner and Refrigerators 6 Hours Fundamentals, Refrigeration cycles, compressors, home automation 7 Hours **Unit:6** | Computers Recent microprocessor, Pentium family architecture and salient features, Recent Memories technologies RAM, HDD), Computer peripherals

Tex	Textbooks									
1	S.P. Bali, "Consumer Electronics", Pearson Education, First Edition									
2	B. R. Gupta, Vandana Singhal, "Consumer Electronics", S. K. Kataria & Sons, 2006									
Ref	Reference Books									
1	J.S. Chitode, "Consumer Electronics", Technical Publication,									
YC	CE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]									
1	http://103.152.199.179/YCCE/yccelibrary.html									
MO	OCs Links and additional reading, learning, video material									
1	for unit-I Electronics Standards of India www.electronicstds.gov.in									

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(Department of Electronics Engineering)

SoE No. 22EE-101

# **B.Tech in Electronics Engineering**

**V** Semester 22EE554 : OE II : Industrial Automation

		Cours	se Outcomes:								
Upon si	uccessful completion of th										
-	Remember the architecture										
2.	Understand the process co	ntrol, PLC architec	ture and interfacing								
3.	Apply PLC ladder logic fo	or industrial applica	tions								
4. Apply the function of SCADA with PLC systems.											
Unit:1	Introduction:					7 Hours					
	Automation overview, requirement of automation, systems, architecture of industrial										
	automation system, intro	oduction of PLC a	and supervisory con	ntrol and data ac	equisition						
	(SCADA). Industrial bus	systems: Modbus &	& profibus.								
Unit:2	Controllers & actuators	S:				7 Hours					
	PID controller, mechanic										
	relays and contactors, a	c motor, energy co	onservation schemes	s through vfd, do	e motors,						
	servo motor, pneumatic a	and hydraulic actuat	ors.								
	1										
Unit:3	PLC operation:					7 Hours					
	Definition, advantages a	•	•		nd block						
	diagram, types of PLC, C	CPU unit architectur	e, memory classifica	tion.							
						Z **					
Unit:4	PLC programming:		1.			6 Hours					
	Basic ladder logic functi		• • •		~ ~						
	of PLC, module address	-	input, output and	timer counter in	struction,						
	arithmetic and compariso	on function,									
Unit:5	SCADA & distributed	antual avatame				7 Hours					
UIIIt:5	SCADA & distributed of	•	SCADA factures	of SCADA MT	יוד סייוי	/ Hours					
	Introduction, block diag functions, applications										
	architecture, input and ou			oa, introduction	io DCs,						
	arcintecture, input and ot	itput modules, speci	incations of DCs.								
Unit :6	Material handling, aut	omated storage sys	stem and Identifica	tion Technologic	PC	7 Hours					
ст	The material handling f	•	·	_		7 110013					
	system performance,	• •	•	• •							
	interfacing handling ar		•	_	_						
	Barcode, RFID etc.	id storage with in	andracturing. 110du	et identification	i system.						
	Darcode, 14 1D etc.										
			Total L	ecture Hours		41 Hours					
b . 1-0 1											
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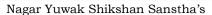


(Department of Electronics Engineering)

SoE No. 22EE-101

Tex	xt books									
1	Programmable Logic controllers and Industrial Automation Penram International Publishing India Pvt. Ltd									
	Madhuchhanda Mitra, Samarjit Sen Gupta									
Ref	ference Books									
1	Programmable Logic Controllers, Principles and Applications 2002 Prentice Hall of India Pvt. Ltd,5th									
	Edition John W. Webb, Ronold A.									
2	Industrial Instrumentation and Control 2007 S.K. Singh The McGraw Hill Companies									
YC	CE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]									
1	http://103.152.199.179/YCCE/yccelibrary.html									
2										
M(	OOCs Links and additional reading, learning, video material									
1	https://www.youtube.com/watch?v=oxMdDsud5vg									
2	https://www.youtube.com/watch?v=3N0kWzC6jmE									

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

SoE No. 22EE-101

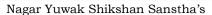
### **B.Tech in Electronics Engineering**

**V** Semester

**Audit Course** 

**MLC2125: YCAP5: YCCE Communication Aptitude Preparation** 

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(Department of Electronics Engineering)

SoE No. 22EE-101

## **B.Tech in Electronics Engineering**

**V** Semester

**Audit Course** 

**MLC125: Design thinking** 

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VCCL EE 30										

Nagar Yuwak Shikshan Sanstha's

# Yeshwantrao Chavan College of Engineering (An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

(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 6<sup>th</sup> Semester

(Department of Electronics Engineering)

#### 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)

B. Tech in Electronics Engineering

(Department of Electronics Engineering)

			BoS/				ŭ	onta	ct Ho	urs		%	Weightag	je	ESE
SN	Sem	Type	Deptt	Sub. Code	Subject	T/P	٦	Т	Р	Hrs	Credits	MSEs*	TA**	ESE	Duration Hours
	Sixth Semester														
1	6	PC	EE	22EE601	Control System Engineering	Т	3	0	0	3	3	30	20	50	3 Hrs
2	6	PC	EE	22EE602	Digital Signal Processing	Т	3	0	0	3	3	30	20	50	3 Hrs
3	6	PC	EE	22EE603	Lab: Digital Signal Processing	Р	0	0	2	2	1		60	40	
4	6	PC	EE	22EE604	Lab: Electronics Design Automation	Р	0	0	2	2	1		60	40	
5	6	PE	EE		Professional Elective-II	т	0	0	2	2	3	30	20	50	3 Hrs
6	6	PE	EE		Lab.: Professional Elective-II	Р	3	0	0	3	1		60	40	
7	6	PE	EE		Professional Elective-III	т	3	0	0	3	3	30	20	50	3 Hrs
8	6	OE-III	EE		Open Elective - III	Т	3	0	0	3	3	30	20	50	3 Hrs
9	6	OE-IV	EE		Open Elective - IV	т	3	0	0	3	3	30	20	50	3 Hrs
10	6	PR	EE	22EE605	Project Phase -I	Р	0	0	4	4	2		60	40	
					TOTAL SIXTI	H SEM	18	0	10	28	23				·

#### List of Professional Electives- II & III

Profe	rolessional Electives-II								
1	6	PE-II	EE	22EE611	PE II:Digital Image Processing				
2	6	PE-II	EE	22EE612	Lab: PE II: Digital Image Processing				
3	6	PE-II	EE	22EE613	PE II:Machine Learning				
4	6	PE-II	EE	22EE614	Lab: PE II: Machine Learning				
5	6	PE-II	EE	22EE615	CMOS Subsystem Design				
6	6	PE-II	EE	22EE616	Lab:CMOS Subsystem Design				
7	6	PE-II	EE	22EE617	PE II: Soft Computing & OptimizationTechniques				
8	6	PE-II	EE	22EE618	Lab:PE II: Soft Computing & Optimization Techniques				
9	6	PE-II	EE	22EE619	PE II: RF and Microwave				
10	6	PE-II	EE	22EE620	Lab: PE II: RF and Microwave				

#### Professional Electives-III

1	6	PE-III	EE	22EE631	PE III: Industrial Automation
2	6	PE-III	EE	22EE632	PE III :Power Electronics
3	6	PE-III	EE	22EE633	PE III: Optical Communication
4	6	PE-III	EE	22EE634	PE III: Computer Orgnization
5	6	PE-III	EE	22EE635	PE III:Transmission line and wave Guide

#### Open Electives-III

1	6	OE-III	EE	22EE651	OE III : Fuzzy Logic & Neural Networks
2	6	OE-III	EE	22EE652	OE III : Basics of Analog and Digital Communication
3	6	OE-III	EE	22EE653	OE III : Biomedical Instrumentation
4	6	OE-III	EE	22EE654	OE III : Digital Logic Design

#### Open Electives-IV

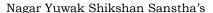
1	6	OE-IV	EE	22EE671	OE IV : Sensors and Actuators
2	6	OE-IV	EE	22EE672	OE IV : Computer Architecture
3	6	OE-IV	EE	22EE673	OE IV : Consumer Electronics
4	6	OE-IV	EE	22EE674	OE IV : Industrial Automation

List	of Man	datory	Learning C	ourse (MLC)								
1	6	HS		MLC2126	YCCE Communication Aptitude Preparation (YCAP6)	A	3	0	0	3	0	

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

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SoE No. 22EE-101

#### **B.Tech in Electronics Engineering**

## VI SEMESTER

22EE601: Control System Engineering

#### **Course Outcomes:**

- 1. Understand concepts related to linear control system
- 2. Apply the concepts of control system to obtain the system Transfer function
- 3. Analyze time domain analysis of given control system
- 4. Apply frequency domain analysis method to various linear control systems

Unit:1 7 Hours

Introduction to Control Systems: History of control system, Basic Components of Control System. Open loop control and close loop control with examples. Classification of control systems, Transfer function, block Diagram and signal flow graph:-Transfer function and gain. Order of a system. Block diagram algebra & reduction techniques Signal flow graph, its constructions and Mason's gain formula.

Unit:2 7 Hours

Mathematical modeling of physical system: Mathematical modelling of physical system such as —electrical, mechanical, electro-mechanical, thermal, hydraulic, pneumatic etc., Analogous systems, Characteristics of Feedback Control Systems: Effect of negative feedback compared to open loop system such as —sensitivity to parameter variation. sensitivity to parameter variation such gain and forward path, Speed of time response, bandwidth, and disturbance rejection., Linearizing effect, Effect of positive feedback.

Unit:3 7 Hours

Time Domain Analysis of Control Systems: Concept of transient response, Steady state response, time response, standard test signals, Time response of first order systems, Transfer function of second order system, Time response of second order system, Steady state error (ess) analysis, static error constants and system type, dominant poles. Relation between roots of characteristic equation, damping ratio and transient response.

Unit:4 6 Hours

Stability of Linear Control Systems: Concept of stability, stable, unstable and marginally stable system, Absolutely stable and conditionally stable system, Necessary conditions for stability, method to determine stability, Routh-Hurwitz stability criterion with special cases, relative stability analysis, Routh-Hurwitz stability criterion with special cases, relative stability analysis. State Variable Analysis.

Unit:5 7 Hours

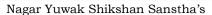
Root Locus Technique: Definition, magnitude and angle criteria, properties of root locus, construction rules, for root locus plot of negative feedback systems, determining the gain from root locus plot, effect of addition of poles and zeros of G(s) H(s).

Unit:6 7 Hours

Frequency domain analysis of control systems: Concept of frequency response and sinusoidal transfer function, resonant frequency, resonant peak, cut off frequency, bandwidth, and correlation between time and frequency response, polar plot, Bode plot, all pass and minimum, log magnitude verses phase plot. Stability in Frequency domain: Nyquist stability criteria, concept of gain margin and phase margin and its computation using polar plot and log magnitude verses phase plot. Lag, lead and lag-lead compensation

Total Lecture Hours 39 Hours

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(Department of Electronics Engineering)

SoE No. 22EE-101

Tex	Text books					
1	I.J. Nagrath. M. Gopal, Control system Engineering Sixth Edition, Prentice Hall					
Ref	Reference Books					
1	Katsuhiko Ogata, Modern Control system, Fifth Edition, Prentice Hall.					
2	Joseph J. DiStefano, Feedback and Control Systems, 2nd Edition. McGraw-Hill Education					
YC	CE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]					
1	http://103.152.199.179/YCCE/yccelibrary.html					
MC	MOOCs Links and additional reading, learning, video material					
1	https://onlinecourses.nptel.ac.in/noc22_ee31/preview					

Brakat	May .	Sherri	July 2022	1.00	Applicable for  AY 2022-23 Onwards
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SoE No. 22EE-101

### **B.Tech in Electronics Engineering**

**VI Semester** 22EE602: Digital Signal Processing

**Course Outcomes:** 

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

	derstand and Apply the Knowledge of discrete-time signals and systems for signal analysis			
	ply DFT for the analysis of digital signals and systems			
	sign various Filter structures and IIR and FIR filters, Muti-rate Systems			
4. Ap	ply Matlab Programming concept on Discrete signal and perform its software analysis			
Unit:	1 Discrete Time (DT) Signals and System, Classification of DT signals, classification of DT systems, linear Convolution, Sampling and reconstruction.	7 Hours		
Unit:	2 Discrete Time Fourier Transform, Discrete Fourier Transform, Computation of DFT, Properties of DFT, convolution of data sequences, FFT algorithms, Decimation in time,	7 Hours		
	Decimation in Frequency			
Unit:	3 Digital Filter structures: FIR digital filter structures, IIR digital filter structures, Lattice structures, Finite word length effect	7 Hours		
Unit:	4 IIR Digital filter Design, Bilinear transformation, Impulse invariant transformation, Low pass IIR digital filters, Butterworth and Chebyshev filter	6 Hours		
Unit:	5 FIR Digital Filter Design, FIR filter design using windowing techniques	7 Hours		
Unit	<b>:6</b> Multi-rate Digital Signal processing fundamentals, sampling rate alteration, multi-rate structures, Decimator and Interpolator and Multistage design.	7 Hours		
	Total Lecture Hours	39 Hours		
Text	books			
	Oppenheim A V, Willsky A S and Young I T, "Signal & Systems", Prentice			
	Hall, (1983).			
2 Michael Weeks. Digital Signal Processing Using MATLAB & Wavelets. Jones & Bartlett Publishe				
]	p.492			

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Dean OBE

Dean (Acad. Matters)

Chairperson

July 2022

Date of Release

1.00

Version

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(Department of Electronics Engineering)

SoE No. 22EE-101

Ref	Reference Books					
1	Ifeachor and Jervis, "Digital Signal Processing", Pearson Education India.					
2	DeFatta D J, Lucas J G and Hodgkiss W S, "Digital Signal Processing", J Wiley and Sons, Singapore, 1988					
3						
YC	YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]					
1	http://103.152.199.179/YCCE/yccelibrary.html					
MO	OOCs Links and additional reading, learning, video material					
1	https://nptel.ac.in/courses/117102060					
2	https://archive.nptel.ac.in/courses/108/106/108106136/					

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SoE No. 22EE-101

### **B.Tech in Electronics Engineering**

VI Semester 22EE603 : Lab:- Digital Signal Processing

#### **Course Outcomes:**

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

- 1. Apply DFT to Discrete Time sequences and learn the properties and Applications of DFT.
- 2. Apply Computationally Efficient Algorithms for DFT of Signals.
- 3. Construct and Optimize structures for the realization of Discrete Time system.
- 4. Design of Digital Filters for given specifications.
- 5. Solve Problems based on Sampling rate conversion in Multirate Signal Processing

Sr. No.	Experiments based on
1	To compute DFT and IDFT of Discrete Time Signals.
2	Calculate the DFT of the given sequence using FFT
3	Linear Convolution using FFT
4	Circular Convolution using FFT
5	Design of filter using Bilinear Transformation
6	To design FIR and IIR filter.
7	To perform Upsampling and Downsampling on discrete time signal.
8	To illustrate signal processing application

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#### **B.Tech in Electronics Engineering**

VI Semester
22EE604 : Lab:- Electronics Design Automation

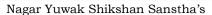
#### Course Outcomes:

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

- 1. Gain proficiency in using industry-standard EDA tools and software for electronics design.
- 2. Handle application of EDA in Real-world Design Challenges
- 3. Automate various stages of the design process using languages or automation features within EDA tools.
- 4. Understand advanced circuit simulation and analysis skills.
- 5. Demonstrate the ability to work in multidisciplinary teams.

Sr. No.	Experiments based on
1	Mini project based on SPICE modelling
2	Mini project based on Embedded System/IoT
3	Mini project based on FPGA Design (Verilog)
4	Mini project based on Complex problem-solving using programming language.

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### **B.Tech in Electronics Engineering**

**VI Semester Project Phase -I** 

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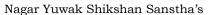
# **B.Tech in Electronics Engineering**

**VI Semester** 22EE611: PE II: Digital Image Processing

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

Tex	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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Ref	Perence 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
YC	CE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
1	http://103.152.199.179/YCCE/yccelibrary.html
2	
MO	OCs Links and additional reading, learning, video material
1	https://onlinecourses.nptel.ac.in/noc22_ee116/preview
2	https://nptel.ac.in/courses/117105135
3	https://archive.nptel.ac.in/courses/117/105/117105135/
4	https://nptel.ac.in/courses/117105079
5	https://archive.nptel.ac.in/courses/106/105/106105032/4

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### **B.Tech in Electronics Engineering**

#### VI Semester 22EE612 : Lab: PE II: Digital Image Processing

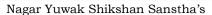
#### **Course Outcomes:**

#### 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.

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 coefficients 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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Sr. No.	Experiments based on
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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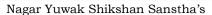
### **B.Tech in Electronics Engineering**

VI Semester
22EE613 : PE II: Machine Learning

**Course Outcomes:** 

### Upon successful completion of the course the students will be able to 1. Apply the knowledge of Mathematics and programming to build machine learning models 2. **Analyze** different use cases to evaluate the performance of the models 3. **Design and develop** application models using supervised and unsupervised learning algorithms 4. Compare different machine learning techniques and demonstrate the comprehension of the trade-offs involved in design choices. Unit:1 Regression: Supervised and Unsupervised Learning, Regression, Model and Cost 7 Hours Function, Gradient Descent, Multivariate Linear Regression, Feature Scaling, Gradient Descent for multivariable Unit:2 Classification: Classification, Hypothesis Representation, Decision Boundary, Cost 6 Hours function and Gradient Descent, Multi-classification, Regularization, Model Evaluation Supervised Learning: KNN, SVM, Decision tree, Naive Bayes Classifiers, Random 7 Hours Unit:3 Forest Unit:4 **Unsupervised learning:** K-means clustering, Hierarchical Clustering, DBSCAN 6 Hours Clustering, PCA, Anomaly Detection, Recommender System Unit:5 Artificial Neural Network: Introduction to neural network, Activation Functions, **6 Hours** Perceptron rule, Back propagation Deep Learning: Introduction to deep learning, building blocks of CNN, Computational Unit:6 7 Hours Complexity, Lenet, Alexnet, New topics to be announced time to time **Total Lecture Hours** 39 Hours

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Tex	at books
1	Shai Shalev-Shwartz and Shai Ben-David. Understanding Machine Learning. Cambridge University Press.2017 <a href="https://www.cse.huji.ac.il/~shais/UnderstandingMachineLearning/copy.html">https://www.cse.huji.ac.il/~shais/UnderstandingMachineLearning/copy.html</a>
2	Trevor Hastie, Robert Tibshirani and Jerome Friedman, The Elements of Statistical Learning. Second Edition, 2009. https://web.stanford.edu/~hastie/ElemStatLearn/
3	Christopher Bishop,Pattern Recognition and Machine Learning, Springer,2006, <a href="https://www.microsoft.com/en-us/research/people/cmbishop/downloads/">https://www.microsoft.com/en-us/research/people/cmbishop/downloads/</a>
Ref	Ference Books
1	Avrim Blum, John Hopcroft and Ravindran Kannan, Foundations of Data Science. 2017
2	Goodfellow, I., Bengio, Y., Courville, A., Deep Learning, Part II, MIT Press, 2016
3	Kevin P. Murphy , Machine Learning: A Probabilistic Perspective, MIT Press,2012
YC	CE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
1	http://103.152.199.179/YCCE/yccelibrary.html
MC	OOCs Links and additional reading, learning, video material
1	https://cognitiveclass.ai/courses/machine-learning-with-python
2	https://cognitiveclass.ai/courses/python-for-data-science
3	https://www.youtube.com/playlist?list=PLfwnwx2j1EkrcP2FiDCW2ajJZ08pWDAur
4	NPTEL: Practical Machine Learning with Tensor flow

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### **B.Tech in Electronics Engineering**

VI Semester 22EE614 : Lab: PE II: Machine Learning

#### **Course Outcomes:**

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

- 1. Apply the knowledge of Mathematics and programming to build machine learning models
- 2. Analyze different use cases to evaluate the performance of the models
- 3. **Design and develop** application models using supervised and unsupervised learning algorithms
- 4. **Compare** different machine learning techniques and **demonstrate** the comprehension of the trade-offs involved in design choices.

Sr. No.	Experiments based on
	Apply Following Techniques on different use cases. Apply, analyse, develop and demonstrate different ML models and evaluate it using Python
1	Data Pre-processing , cleaning and EDA
2	Linear Regression
3	Non Linear Regression
4	K-Nearest Neighbours
5	Decision Tree
6	Support Vector Machine
7	K-Means Clustering
8	Hierarchical Clustering
9	Content based Recommendation System
10	Collaborative filtering Recommendation System
11	Mini Project

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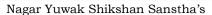
SoE No. 22EE-101

# **B.Tech in Electronics Engineering**

**VI Semester** 22EE615: PEII:CMOS Subsystem Design

	Course Outcomes:	
Upon sı	accessful completion of the course the students will be able to	
1. Analy	ze VLSI circuit timing using Logical Effort analysis.	
2. Desig	n elementary data path subsystems like adder and subtrctors.	
3. Desig	n elementary data path subsystems like Multiplier and comparators	
4.Estima	ate and compute the power consumption of a VLSI chip.	
Unit:1	Wires and Interconnect: Resistance, Capacitance, RC delay analysis, Cross-talk delay	7 Hours
	and noise effects, Repeaters, Logical Effort, Crosstalk control, reliability.	
Unit:2	Synchronizers; Arbiters; Clock Synthesis; PLLs; Clock generation; Clock distribution;	7 Hours
	Synchronous Vs Asynchronous design, introduction to pipelined system/ALU.	
Unit:3	Datapath Subsystems: Adders: Full Adder using a variety of Logics styles, bit-serial	7 Hours
	Adder, Ripple Carry Adder, Carry-skip Adder, Carry Look-ahead Adder, Brent-Kung	
	Adder, Kogge-Stone Adder, Carry-Save Adder (multi-operand addition), etc. with power	
	and speed trade-off	
Unit:4	Datapath Subsystems: Multipliers: Unsigned Array Multiplier, Booth Encoded	7 Hours
	Multiplier, Baugh-Wooley Multiplier, Wallace tree multiplier, etc., comparators, shifter-	
	registers, random number generator based on Linear Feedback Shift-Registers (LFSR).	
Unit:5	Memory Array Subsystems: Register-file, Content-addressable memory, LIFO and FIFO	7 Hours
	SRAM design, Reliability; Power dissipation in Memories	
Unit :6	Special-purpose Subsystems: Packaging; power distribution; I/O pads, Emerging topics	7 Hours
	in VLSI.	, 120419
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(Department of Electronics Engineering)

SoE No. 22EE-101

Tex	at books
1	Neil H. E. WesteHarris, Principle of CMOS VLSI Design, 4th Edition, Addison Wesley VLSI Series.
Ref	Ference Books
1	John P. Uyemura, Introduction to VLSI Circuits and Systems, Students Edition, Wiley Publication.
2	Sung-Mo Kang, Yusuf leblebici, CMOS VLSI Design, Third edition, 2008, TataMcGraw Hill.
YC	CE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
1	http://103.152.199.179/YCCE/yccelibrary.html
M	OOCs Links and additional reading, learning, video material
1	https://nptel.ac.in/courses/108107129
2	https://nptel.ac.in/courses/106103116
3	https://nptel.ac.in/courses/117106092

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### **B.Tech in Electronics Engineering**

VI Semester
22EE616: Lab: CMOS Subsystem Design

#### **Course Outcomes:**

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

- 1. Analyze VLSI circuit timing using Logical Effort analysis.
- 2. Design elementary data path subsystems like adder and subtrctors.
- 3. Design elementary data path subsystems like Multiplier and comparators
- 4. Estimate and compute the power consumption of a VLSI chip.

Sr. No.	Experiments based on
1	Design and verify the inverter circuit using transient analysis.
2	Design NAND and NOR gate perform all the analysis.
3	Design XOR gate by using NAND and NOR gate. Perform transient analysis.
4	Design half adder and verify the circuit using transient analysis
5	Design Full adder and verify the circuit using transient analysis.
6	Design a multiplexer and perform all the analysis to verify its characteristics.
7	Design half Subtractor and verify the circuit using transient analysis
8	Design Full Subtractor and verify the circuit using transient analysis.
9	Design multiplier and verify the circuit using transient analysis.
10	Mini Project

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# Yeshwantrao Chavan College of Engineering (An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

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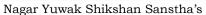
(Department of Electronics Engineering) **B.Tech in Electronics Engineering** 

SoE No. 22EE-101

# **VI Semester** 22EE617: PE II: Soft Computing & Optimization Techniques

	Course Outcomes:	
Upon s	uccessful completion of the course the students will be able to	
1. 2. 3. 4.	Describe the role of soft computing techniques in real world Apply fuzzy logic controller for engineering problem Apply different neural network controller for engineering problem Apply and compare performance of different optimization techniques for engineering problem	n
Unit:1	Concept of computing systems. "Soft" computing versus "Hard" computing, characteristics of Soft computing, Some applications of Soft computing techniques Fuzzy sets, logic operations, and relations, extension principle	7 Hours
Unit:2	Fuzzy controllers , Fuzzy decision-making; fuzzy inference systems; design steps in fuzzy logic controller; application of fuzzy logic controller	7 Hours
Unit:3	Artificial Neural Network: Fundamental concept, Evolution of Neural Networks, Basic Models, McCulloh-Pitts Neuron, Linear Separability, Hebb Network. Supervised Learning Network: Perceptron Networks, Adaptive Linear Neuron, Multiple Adaptive Linear Neurons, Backpropagation Network,	7 Hours
Unit:4	<b>Unsupervised Learning Networks:</b> Fixed weight competitive nets, Kohonen self-organizing feature maps, learning vectors quantization, counter propagation networks, adaptive resonance theory networks. Convolutional neural networks, deep learning neural networks, extreme learning machine model.	6 Hours
Unit:5	Genetic Algorithms: Concept of "Genetics" and "Evolution" and its application to probabilistic search techniques. Basic GA framework and different GA architectures GA operators: Encoding, Crossover, Selection, Mutation, etc. Evolutionary Algorithm, Simulated Annealing, Ant colony optimization. Solving single-objective optimization problems using GAs.	7 Hours
Unit :6	Multi-objective Optimization Problem Solving: Concept of multi-objective optimization problems (MOOPs) and issues of solving them. Multi-Objective Evolutionary Algorithm (MOEA). Non-Pareto approaches to solve MOOPs Pareto-based approaches to solve MOOPs Some applications with MOEAs.	7 Hours
Total L	.ectureHours	41 Hours

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Tex	xtbooks
1	George J.Klir and Bo Yuan, Fuzzy sets and Fuzzy Logic, Second Edition, PHI, 2006
2	S.N.Sivanandam, and S.N.Deepa, Principles of Soft computing, Second Edition, Wiley India Pvt. Ltd, 2013
3	D.E. Goldberg, Genetic algorithms in search, optimization, and machine learning, Addison-Wesley
Ref	erence Books
1	N.P.Padhy and S.P.Simon, Soft computing with MATLAB programming, Oxford publishers, 2015.
2	J.M.Zurada, Introduction to artificial neural systems, Jaico Publishing House, 2006
3	D.E. Goldberg, Genetic algorithms in search, optimization, and machine learning, Addison-Wesley.
4	
YC	CE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
1	http://103.152.199.179/YCCE/yccelibrary.html
MO	OCs Links and additional reading, learning, video material
1	http://nptel.ac.in/courses/106106046/41
2	https://www.coursera.org/learn/neural-networks
3	http://www.iitk.ac.in/kangal/deb.shtml

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### **B.Tech in Electronics Engineering**

# VI Semester 22EE618: Lab:PE II: Soft Computing & Optimization Techniques

#### **Course Outcomes:**

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

- 1. Define, describe and analyze uncertainty, unpredictability and vagueness using fuzzy logic concepts.
- 2. Will be able to find solution to automation problems through fuzzy logic controllers.
- 3. Will be able to introduce intelligence in conventional structure using neural networks and solve pattern recognition and classification problems.
- 4. Will be able to determine optimized solutions for some problems using concepts of Genetic algorithm.

Sr. No.	Experiments based on
1	Programs on Matrix operations to understand the basic concepts of MATLAB.
2	To print all the Continues Discrete Membership Functions by using MATLAB.
3	To perform different fuzzy operations on Membership Functions by using MATLAB
4	Design a Fuzzy controller for Air conditioning system/Washing Machine.
5	Identification of a system using Perceptron/Radial Base Function Network (RBFN).
6	Identification of a system by using Backpropagation algorithm.
7	Minimizing the objective function by using Genetic Algorithm (GA)
8	Minimizing the objective function by using Particle Swarm Optimization (PSO)
9	Minimizing the objective function by using Cuckoo Search Algorithm (CSA)
10	Minimizing the objective function by using Ant Colony Optimization (ACO)

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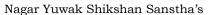
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### **B.Tech in Electronics Engineering**

**VI Semester** 22EE619: PE II: RF and Microwave

	Course Outcomes:	
Upon su	ccessful completion of the course the students will be able to	
1. U	Inderstand the causes of failure of conventional tubes at high frequency and the detail conc	ept of liner
t	beam O type tubes and linear beam M type tubes	
2. U	Jnderstand and analyze transmission characteristics of Microwave passive Devices	
3. U	Jnderstand different microwave measurement techniques	
4. U	Jnderstand Microwave solid state devices	
5. (	Conduct experiments to evaluate various RF parameters using Microwave test bench	
Unit:1	Microwave linear beam tubes (O type): High frequency limitations of conventional	7 Hours
	microwave devices, Two cavity Klystron Amplifier - Mechanism and mode of Operation,	
	Power output and Efficiency, Applegate diagram, applications, Reflex Klystron Oscillator	
	- Mechanism and mode of Operation Power output, efficiency ,mode curve, Electronic	
	Admittance, Modulation of Reflex Klystron; Applications, Helix TWT, BWO. Slow wave	
	structures.	
Unit:2	Microwave cross-field tubes (M Type): Magnetron Oscillator - Hull cut-off voltage,	7 Hours
	Mechanism of Operation, Mode separation, Phase focusing effect, Power output and	
	Efficiency, Cylindrical magnetron, parallel plate magnetron, split anodemagnetron, Types	
	of strapping, Tuning of magnetron. Applications, Numerical Problems.	
	Introduction to S-matrix and S-parameters, attenuators, tees, directional couplers,	7 Hours
	circulators, isolators, gyrators, phase shifter, cavity resonator and their S-parameters.	
Unit:4	Microwave Test Bench, measurement of VSWR, frequency, power, attenuation, insertion	6 Hours
	loss, directivity, beam width, radiation pattern and gain of various microwave antennas.	o mours
	Microwave filter by Image parameter and Insertion loss method	
	interowave inter by image parameter and insertion ross method	
Unit:5	Introduction to microstrip lines, characteristic impedance, losses, quality factor, Gunn	7 Hours
	diode as oscillator, Detector Diode, PIN diode and its application. Introduction to	, 110415
	microwave solid state devices and monolithic microwave integrated circuits.	
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Unit :6	Basics of Microwave systems: Radar, RF ID, microwave imaging, modern trends in	7 Hours
	microwave engineering, effect of microwave on human body, EMI/EMC.	
	<i>5 6,</i>	
Total Le	cture Hours	41 Hours
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SoE No. 22EE-101

Tex	ktbooks
1	R. Chatterjee , Elements of Microwave Engineering, 2 ed. Prentice Hall
2	Samuel Liao , Microwave Devices and Circuits , 1990 Pearson
Ref	erence Books
1	Annapurna Das, Sisir Das, Microwave Engineering (2nd edition), Tata Mcgraw hill
2	Edgar Hund, Microwave communications: components and circuits:; 1 ed., McGraw-Hill.
3	David M. Pozar , Microwave Engineering, Wiley India. rd
4	R.E.Collin, Foundations for Microwave Engineering , 3 ed, IEEE Press
YC	CE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
1	http://103.152.199.179/YCCE/yccelibrary.html
MC	OCs Links and additional reading, learning, video material
1	https://youtu.be/DIN_fH82VNE
2	https://youtu.be/wqDGLxEOg1o

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

SoE No. 22EE-101

### **B.Tech in Electronics Engineering**

VI Semester 22EE620 : Lab:- PEII:RF and microwave

#### **Course Outcomes:**

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

- 1. Apply concepts of Fields and Networks to study working principles of specific microwave active/passive devices, transmission lines/microwave devices.
- 2. Analyze microwave networks and components using S-parameters.
- 3. Design of microwave filters by various methods, Microwave solid state devices.
- 4. Apply concepts of instrumentation and measurements to study microwave measurement of power, frequency and VSWR, impedance for the analysis and design of circuits

Sr. No.	Experiments based on
1	To find the frequency of reflex klystron & Determine electronic and mechanical tuning range.
2	To verify power verses repeller voltage characteristics of reflexklystron.
3	To verify the performance of wave-guide tees i) E-plane tee ii) H-planetee.
4	To verify the performance of E-H plane tee (magic tee).
5	To determine coupling and isolation of a three port circulator
6	To verify the performance of directional coupler i) multi hole ii) crossdirectional coupler.
7	To find attenuation of fixed attenuator and To verify the calibration of variable attenuators.
8	To measure the small V.S.W.R. and large V.S.W.R.
9	To verify the relationship among free space wavelength, cut offwavelength, guide wavelength.
10	To verify characteristics of Gunn diode

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(Department of Electronics Engineering)

SoE No. 22EE-101

### **B.Tech in Electronics Engineering**

VI Semester
22EE631 : PEIII: Industrial Automation

**Course Outcomes:** 

Upon successful completion of the course the students will be able to
 Remember the architecture of industrial automation system.
 Understand the process control, PLC architecture and interfacing

3. Apply PLC ladder logic for industrial applications

Unit:1	Introduction:	7 Hours
	Automation overview, requirement of automation, systems, architecture of industrial	
	automation system, introduction of PLC and supervisory control and data acquisition	
	(SCADA). Industrial bus systems: Modbus & profibus.	
Unit:2	Controllers & actuators :	7 Hours
	PID controller, mechanical switches, solid-state switches, electrical actuators: Solenoids,	. 110011
	relays and contactors, ac motor, energy conservation schemes through vfd, dc motors,	
	servo motor, pneumatic and hydraulic actuators.	
Unit:3	PLC operation:	7 Hours
	Definition, advantages and importance of PLC, history of PLC, architecture and block	
	diagram, types of PLC, CPU unit architecture, memory classification.	
Unit:4	DI C programming :	6 Hours
UIIIt:4	PLC programming:  Basic ladder logic function, electrical wiring diagram, scan cycle, programming language	o Hours
	of PLC, module addressing, basic relay, input, output and timer counter instruction,	
	arithmetic and comparison function,	
	m.c.m.c.c. une companion runerion,	
Unit:5	SCADA & distributed control system:	7 Hours
	Introduction, block diagram, elements of SCADA, features of SCADA, MTU, RTU	
	functions, applications of SCADA, communications in SCADA, introduction to DCS,	
	architecture, input and output modules, specifications of DCS.	
Unit :6	Material handling, automated storage system, and Identification Technologies	7 Hours
	The material handling function, its types, analysis for Material handling systems, Storage	
	system performance, automated storage/retrieval systems, work-in-process storage,	
	interfacing handling and storage with manufacturing. Product identification system:	
	Barcode, RFID etc.	
	Total Lecture Hours	41 Hours

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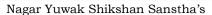


(Department of Electronics Engineering)

SoE No. 22EE-101

Tex	at books
1	Programmable Logic controllers and Industrial Automation Penram International Publishing India Pvt. Ltd
	Madhuchhanda Mitra, Samarjit Sen Gupta
Ref	erence Books
1	Programmable Logic Controllers, Principles and Applications 2002 Prentice Hall of India Pvt. Ltd,5th
	Edition John W. Webb, Ronold A.
2	Industrial Instrumentation and Control 2007 S.K. Singh The McGraw Hill Companies
YC	CE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
1	http://103.152.199.179/YCCE/yccelibrary.html
2	
MC	OCs Links and additional reading, learning, video material
1	https://www.youtube.com/watch?v=oxMdDsud5vg
2	https://www.youtube.com/watch?v=3N0kWzC6jmE

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(Department of Electronics Engineering)

SoE No. 22EE-101

## **B.Tech in Electronics Engineering**

**VI Semester** 22EE632: PEIII: Power Electronics

**Course Outcomes:** 

	Total Lecture Hours	39 Hours				
	Circuits- Protection of Devices and Circuits Snubber, reverse recovery transients, protection devices varisters, Introduction to AC and DC drives.					
Unit :6		7 Hours				
	Single phase controllers, three phasecontrollers, cyclo-converters.					
	factor improvement, AC Voltage Controllers. Principle of ON-OFF control, Phase control,					
Unit:5	Controlled Rectifiers: phase control converter, single phase, three phase converters, power	7 Hours				
	Zero voltage/current Switching resonant inverter, Multilevel Inverters.					
Unit:4	Resonant Pulse Inverters-Series, parallel, resonant inverters, Class E resonant inverter,	6 Hours				
	up, stepdown, SMPS, thyristerChoppers,design of choppers					
	commuted inverters, current source inverters, design of inverter, DC-DC Converters, Step					
Unit:3	Pulse-width Modulated Inverters: Principle, single phase, multiple phase, PWM Forced	7 Hours				
	Power Thyristors.					
Unit:2	Power Transistors, Switching characteristics of BJT, Power MOSFETs, IGBTs, limitations,	7 Hours				
	single phase, three phase rectifiers, bride rectifiers, design of rectifiers.					
Unit:1	Power Semiconductor Diodes and Circuits, control Characteristics of power devices, power modules, power diodes, reverse recovery, series, shunt connected diodes, Diode Rectifiers-	7 Hours				
	Foster ability to <b>evaluate</b> basic requirements for power electronics based design application. Foster ability to <b>understand</b> the use of power converters in commercial and industrial application.	tions				
	understand their applications					
2.	electronics. Students will able to able to analyze various single phase and three phase power converter	circuite and				
1.	Students will be able to apply knowledge about fundamental concepts and techniques us	ed in power				
Upon s	uccessful completion of the course the students will be able to					

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SoE No. 22EE-101

Tex	xt books
1	Power Electronics: Circuits, Devices and Applications 2nd edition 1993 M. Rashid PHI
Ref	ference Books
1	Power Electronics and its application 2nd Edition 2004 Alok Jain Penram International Publishing Pvt Ltd
YC	CCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
1	http://103.152.199.179/YCCE/yccelibrary.html.
M(	OOCs Links and additional reading, learning, video material
1	https://nptel.ac.in/courses/108105066
2	https://archive.nptel.ac.in/courses/108/102/108102145/

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**B.Tech in Electronics Engineering** 

(Department of Electronics Engineering)

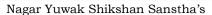
SoE No. 22EE-101

# **VI Semester**

# 22EE633: PEIII: Optical Communication

**Course Outcomes:** 

Upon s	uccess	sful completion of the	he course the stude	nts will be able to			
<ol> <li>Diff</li> <li>Des</li> <li>Und</li> </ol>	ferenti sign op derstar	e fundamental principate losses in optical otical fiber communing the operational pfile in optical fibers.	fiber link and state t cation links using ap	ransmission characte opropriate optical fib	eristics of optical pers light sources,	fiber. detectors.	
Unit:1	struc Prop	dution of fiber Opticures of various fiber eagation in fibers-Rangraded index fibers s	ers such as step ind y mode, Numerical	lex, graded index m	ode and multi mo	odefibers.	7 Hours
Unit:2	Attenuation, Absorption losses, Scattering losses, Bending Losses, Core and Cladding losses, Group Delay, Material Dispersion, Wave guide Dispersion, Signal distortion in SM fibers, Polarization Mode dispersion, Intermodal dispersion, Pulse Broadening in GI fibers, Mode Coupling					6 Hours	
Unit:3	effic cond Diod	ct and indirect Bandiency and LED pow lition, Rate equation les structures and raperature effects, Fab	ver, Modulation of ns, External Quan diation patterns, Sin	a LED, Laser Diod tum efficiency, Re	es, Modes and T sonant frequencie	Threshold es, Laser	7 Hours
Unit:4	Mul	and APD diodes, tiplication Noise, C r Sources, Receiver	omparison of Photo	detectors, Fundam	nental Receiver C		6 Hours
Unit:5	Ope	oduction of fibers of rational Principals apponents, Optical TD	of WDM, SONE	· ·		-	7 Hours
Unit :6		enuation, Time doma	•	•	•		6 Hours
Total L	ectur	eHours					39 Hours
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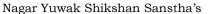


(Department of Electronics Engineering)

SoE No. 22EE-101

Tex	ktbooks
1	John Senior, Optical Communication, Principles and Practice, Prentice Hall of India, 2nd Edition, 1994
Ref	ference Books
1	J. Gower, Optical Communication System, Prentice Hall of India
YC	CE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
1	http://103.152.199.179/YCCE/yccelibrary.html
MO	OOCs Links and additional reading, learning, video material
1	https://nptel.ac.in/courses/117/104/117104127/

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(Department of Electronics Engineering)

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39 Hours

# **B.Tech in Electronics Engineering**

VI Semester 22EE634: PEIII: Computer Organization

#### **Course Outcomes:**

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

- 1. 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,
Processo	or level design	
Unit:2	CPU Organization	6 Hours
CPU org	ganization, Data representation, Fixed point numbers, Floating point numbers, IEEE 754 fl	oating point
formats,	Instruction sets – Instruction formats, instruction types, addressing modes	
Unit:3	Datapath Design	7 Hours
Fixed p	oint arithmetic, addition and subtractions, Multiplication, Division, Arithmetic operations	on Floating
point nu	mbers	
Unit:4	Control design	6 Hours
Basic C	Concepts, Hard-wired control-Design methods, classical method, one hot method, pa	rallelism in
microins	struction, Micro programmed control, Horizontal versus vertical, Multiplier Control Unit	
Unit:5	Memory organization	7 Hours
Device o	characteristics, RAM, Serial access memories, virtual memory, concept of cache & associative	memories.
Unit :6	System Organization	6 Hours
Local an	d long distance communication input-output systems, Interrupt, DMA, introduction to parallel	Processing

Tex	at books
1	Jhon.P. Hayes, Computer Architecture and organization McGraw-Hill Companies
Ref	erence Books
1	Carl Hammacher, Computer organization, McGraw-Hill Science
2	Andrew S. Tanenbaum, Structured computer and Organization, PHI
YC	CE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
1	http://103.152.199.179/YCCE/yccelibrary.html
MC	OCs Links and additional reading, learning, video material
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**Total Lecture Hours** 

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SoE No. 22EE-101

### **B.Tech in Electronics Engineering**

**VI Semester** 22EE635: PEIII: Transmission line and wave Guide

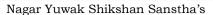
**Course Outcomes:** 

	Course Outcomes.	
Upon si	uccessful completion of the course the students will be able to	
1. Ex	plain fundamental parameters of transmission line and its constraints in high frequency transmission	nsmission of
inf	ormation.	
2. Ma	ke use of the Transmission line to develop impedance matching networks and any communica	tion system.
3. Re	late the propagation characteristics of electromagnetic waves in various wave guide structures.	•
4. An	alyze transmission line using Smith Chart and Design Impedance Matching network	
Unit:1	TRANSMISSION LINE THEORY :Different types of transmission lines , Definition of	7 Hours
	Characteristic impedance ,The transmission line as a cascade of T-Sections Definition of	
	Propagation Constant, General Solution of the transmission line, The two standard forms	
	for voltage and current of a line terminated by an impedance, physical significance of the	
	equation and the infinite line, The two standard forms for the input impedance of a	
	transmission line terminated by an impedance, meaning of reflection coefficient,	
	wavelength and velocity of propagation.	
	warrange and the frequency	
Unit:2	Waveform Distortion: Distortion less transmission line, The telephone cable, Inductance	7 Hours
	loading of telephone cables, Input impedance of lossless lines – reflection on a line not	. 110011
	terminated by Zo, Transfer impedance reflection factor and reflection loss	
Unit:3	LINE AT RADIO FREQUENCIES: Standing waves and standing wave ratio on a line,	8 Hours
	One eighth wave line, The quarter wave line and impedance matching, the half wave line,	
	The circle diagram for the dissipation less line, The Smith Chart, Application of the Smith	
	Chart, Conversion from impedance to reflection coefficient and vice versa. Impedance to	
	Admittance conversion and vice versa, Input impedance of a lossless line terminated by	
	impedance, single stub matching and double stub matching.	
	imposance, single state matering and double state matering.	
Unit:4	GUIDED WAVES: Waves between parallel planes of perfect conductors, Transverse	7 Hours
	electric and transverse magnetic waves, characteristics of TE and TM Waves, Transverse	, 110415
	Electromagnetic waves, Velocities of propagation, component uniform plane waves	
	between parallel planes.	
	octiveen parameter prantes.	
Unit:5	RECTANGULAR WAVEGUIDES: Transverse Magnetic Waves in Rectangular Wave	8 Hours
Omt.3	guides ,Transverse Electric Waves in Rectangular Waveguides ,characteristic of TE and	0 110015
	TM Waves, Cutoff wavelength and phase velocity, Dominant mode in rectangular	
	1 waves, Cuton wavelength and phase velocity, Dominant mode in fectangular	

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waveguide ,Attenuation of TE and TM modes in rectangular waveguides , Wave

impedances



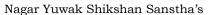


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SoE No. 22EE-101

Uni	circular Wave Guides and Resonators: Bessel functions, Solution of field equations in cylindrical coordinates, TM and TE waves in circular guides wave impedances and characteristic impedance, Dominant mode in circular waveguide, excitation of modes.	8 Hours
Tot	al Lecture Hours	45 Hours
Tex	tbooks	
1	"Networks, Lines and Fields" BY J.D.Ryder, PHI	
Ref	erence Books	
1	Electro Magnetic Waves and Radiating System "BY E.C. Jordan and K.G.Balmain	
2	"Transmission lines and wave guides" BY L.Ganesan, S.S. Sreeja Mole , PHI	
YC	CE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/yccelibrary.html	
2		
MC	OCs Links and additional reading, learning, video material	
1	https://archive.nptel.ac.in/courses/108/106/108106157/	
2	https://archive.nptel.ac.in/courses/117/101/117101056/	
3		

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

SoE No. 22EE-101

### **B.Tech in Electronics Engineering**

**VI Semester** 22EE651: OEIII: Fuzzy Logic & Neural Networks

		Course	e Outcomes:			
Upon su	ccessful completion of the	he course the stude	nts will be able to			
<b>CO1:</b> Ur	nderstand and learn the	basic concepts, w	orking principles	of various soft co	mputing	technique
especiall	y Fuzzy logic and Artific	ial Neural Networks.				
<b>CO2:</b> Ar	nalyze the problem state	ements; provide en	gineering solutions	through developn	nent of	membersh
functions	/ membership graphs, Le	earning & Recognition	on approaches			
CO3: W	ork on Case studies base	d on Application are	eas of Soft Comput	ing, Design / Deve	lop and	Demonstra
models fo	or Fuzzy controllers, Neu	ral Networks				
<b>CO4:</b> Ge	et involved in self learni	ng approach for de	veloping models us	ing Soft computing	g technic	ques, Reve
different	applications of these mod	dels to solve enginee	ering and other prob	lems and develop so	olutions f	for problen
related to	society and industry nee	ds, writing Technica	al reports, presentati	ons.		
	Crisp sets: An overview,	•	•	* *	α-cuts,	7 Hours
	representation of fuzzy s	ets, and extension pr	inciple of fuzzy sets			
Unit:2	Operations on fuzzy set	s, Fuzzy numbers, A	Arithmetic operation	ns on intervals, ari	thmetic	7 Hours
	operations on fuzzy num	bers				
Unit:3	Fuzzy controllers: an ove	erview with applicati	ons, applications of	fuzzy logic		7 Hours
Unit:4	Fundamental concepts	of ANN: Basic bu	ilding blocks of a	artificial neural ne	tworks,	6 Hours
	network architectures, ac	tivation functions, M	AcCulloch-Pitt's neu	ıron model		
•						
Unit:5	Brief introduction to sing	gle layer and multila	yer perceptions, AD	ALINE and MADA	ALINE,	7 Hours
	feed-forward networks, b	back propagation net	works and application	ons.		
Unit :6	Radial basis function ne	twork, Self organizi	ng feature map and	applications of ANI	Ŋ	7 Hours
						20.77
			Total L	ecture Hours		39 Hours
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t books
'Fuzzy sets and Fuzzy logic', George J. Klir and Bo Yuan, Prentice Hall
Neural Networks: A comprehensive Foundation', Simon Haykin, Pearson publications
erence Books
'Principles of Soft Computing', S. N. Sivanandanam, S.N.Deepa, Wiley Publication
Fuzzy sets: Uncertainty & information, Klir and Folger, PHI
CE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
http://103.152.199.179/YCCE/yccelibrary.html
OCs Links and additional reading, learning, video material
https://onlinecourses.nptel.ac.in/noc22_ge04/preview
https://www.udemy.com/course/fuzzylogic/
www.digimat.in > nptel > courses >
NPTEL Video Course: NOC:Introduction to Soft Computing

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### **B.Tech in Electronics Engineering**

# VI Semester 22EE652 : OEIII: Basics of Analog and Digital Communication

#### **Course Outcomes:** Upon successful completion of the course the students will be able to Understand different modulation and demodulation schemes for analog communication with the concept of 2. Understand different pulse analog and digital modulation techniques. 3. Understand different digital modulation schemes Understand the different coding techniques for communication systems. Basic block diagram of Analog communication system, Modulation techniques: Need for Unit:1 modulation. Basic concepts of AM, FM, PM, Transmitters Unit:2 Receivers: Basic receiver (TRF), Super heterodyne receiver, AM detectors, FM 7 Hours Detectors, Noise Types of Noise, Definition of Noise figure, signal to noise ratio, calculation of noise figure. Pulse Modulation: Generation and demodulation of PAM, PWM, PPM, Time division Unit:3 7 Hours Multiplexing, Frequency division multiplexing, Basic digital Modulation System- PCM. Unit:4 Channel capacity, DPCM, Delta Modulation, ADM, ADPCM, Adaptive sub-band coding, 6 Hours applications. Unit:5 Digital Modulation techniques: ASK, FSK, PSK, BPSK, QPSK, MSK, DPSK, BFSK, M-7 Hours ary PSK, FSK, and QAM. Unit:6 Source coding and channel coding, Information theory, Huffman coding, LZ coding, 7 Hours Basic concept of convolution code. **Total Lecture Hours** 39 Hours

Tex	Text books							
1	Electronic Communication System Fifth Edition, Gorge Kennedy Tata McGraw-Hill							
2	Digital Communications 1999 Symon Hykin Wiley, 1988							
Ref	eference Books							
1	Electronic Communication Systems Second							
	Edition, 1993 Frank R. Dungan Delmar Publishers							
2	Communication Electronics Third Edition, 2007 Louis Frenzel McGraw-Hill							

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SoE No. 22EE-101

# **B.Tech in Electronics Engineering**

**VI Semester** 22EE653: OEIII: Biomedical Instrumentation

**Course Outcomes:** 

4. Understand non-invasive diagnostic parameters.  Unit:1 Introduction to Biomedical instrumentation biometrics, Physiological system of box system  Unit:2 Basic transducer principle, active transic biopotential electrodes, biochemical transic Unit:3 The heart and cardiovascular system, measurement, heart sound measurement measurement, electrocardiograph, pleth spirometry, pulmonary function analyzers.  Unit:4 Generation of ionizing radiation, instruminstrumentation for medical use of radiois.  Unit:5 Patient care and monitoring, the elements monitoring patient, pacemakers, defibring Physiological effects of electrical currents.  Unit:6 Computers in biomedical instrumentation.	nentation for diagnostic X-ray, special technique, sotopes, radiation therapy, EMG  of intensive care monitoring, instrumentation for llators, Electrical safety of medical equipment. shock hazards from electrical equipments  ation, digital computer, Telemedicine concept, erencing, digital communication in telemedicine	7 Hours  7 Hours  6 Hours
4. Understand non-invasive diagnostic parameters.  Unit:1 Introduction to Biomedical instrumentation biometrics, Physiological system of box system  Unit:2 Basic transducer principle, active transic biopotential electrodes, biochemical transic Unit:3 The heart and cardiovascular system, measurement, heart sound measurement measurement, electrocardiograph, pleth spirometry, pulmonary function analyzers.  Unit:4 Generation of ionizing radiation, instruminstrumentation for medical use of radiois.  Unit:5 Patient care and monitoring, the elements monitoring patient, pacemakers, defibring Physiological effects of electrical currents.  Unit:6 Computers in biomedical instrumentation.	Principles of ultrasonic diagnosis, temperature ysmography, pulmonary function measurement s, respiratory gas analyzers.  Inentation for diagnostic X-ray, special technique, actopes, radiation therapy, EMG  of intensive care monitoring, instrumentation for llators, Electrical safety of medical equipment. shock hazards from electrical equipments  tion, digital computer, Telemedicine concept,	7 Hours 7 Hours
4. Understand non-invasive diagnostic parametrics.  Unit:1 Introduction to Biomedical instrumentate biometrics, Physiological system of box system  Unit:2 Basic transducer principle, active transducer biopotential electrodes, biochemical transfer biopotential electrodes, biochemical transfer measurement, heart sound measurement measurement, electrocardiograph, pleth spirometry, pulmonary function analyzers  Unit:4 Generation of ionizing radiation, instrumentation for medical use of radiois  Unit:5 Patient care and monitoring, the elements monitoring patient, pacemakers, defibring the parameters of t	Principles of ultrasonic diagnosis, temperature ysmography, pulmonary function measurement s, respiratory gas analyzers.  The entation for diagnostic X-ray, special technique, sotopes, radiation therapy, EMG  of intensive care monitoring, instrumentation for llators, Electrical safety of medical equipment.	7 Hours
4. Understand non-invasive diagnostic parametrics.  Unit:1 Introduction to Biomedical instrumentate biometrics, Physiological system of box system  Unit:2 Basic transducer principle, active transition biopotential electrodes, biochemical transition.  Unit:3 The heart and cardiovascular system, measurement, heart sound measurement measurement, electrocardiograph, pleth spirometry, pulmonary function analyzers.  Unit:4 Generation of ionizing radiation, instrumentation for medical use of radiois.  Unit:5 Patient care and monitoring, the elements.	Principles of ultrasonic diagnosis, temperature ysmography, pulmonary function measurement s, respiratory gas analyzers.  The entation for diagnostic X-ray, special technique, actopes, radiation therapy, EMG  of intensive care monitoring, instrumentation for	7 Hours
4. Understand non-invasive diagnostic parametrics.  Unit:1 Introduction to Biomedical instrumentate biometrics, Physiological system of box system  Unit:2 Basic transducer principle, active transition biopotential electrodes, biochemical transition.  Unit:3 The heart and cardiovascular system, measurement, heart sound measurement measurement, electrocardiograph, pleth spirometry, pulmonary function analyzers.  Unit:4 Generation of ionizing radiation, instrum	Principles of ultrasonic diagnosis, temperature ysmography, pulmonary function measurement s, respiratory gas analyzers.  mentation for diagnostic X-ray, special technique,	
4. Understand non-invasive diagnostic param  Unit:1 Introduction to Biomedical instrumentat biometrics, Physiological system of box system  Unit:2 Basic transducer principle, active tra biopotential electrodes, biochemical trans  Unit:3 The heart and cardiovascular system, measurement, heart sound measurement measurement, electrocardiograph, pleth	. Principles of ultrasonic diagnosis, temperature ysmography, pulmonary function measurement	7 Hours
4. Understand non-invasive diagnostic param  Unit:1 Introduction to Biomedical instrumentat biometrics, Physiological system of box system  Unit:2 Basic transducer principle, active tra biopotential electrodes, biochemical trans		
4. Understand non-invasive diagnostic param  Unit:1 Introduction to Biomedical instrumentat biometrics, Physiological system of boometrics.		7 Hours
	ion, development of biomedical instrumentation, ly, problems encountered in measuring a living	6 Hours
5. Explain the respiratory and her vous system	neters	
3. Explain the respiratory and nervous system	ns and related measurements	
2. Understand cardiovascular system and rela	ted measurements.	
1. Differentiate and analyse the biomedical si	gnal sources.	

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(Department of Electronics Engineering)

SoE No. 22EE-101

Tex	tbooks
1	Leaslie Cromwell, Fred Weibell, Erich A Pfeiffer, Biomedical Instrumentation & Measurement ,Prentice Hall
Ref	erence Books
1	R.S.Khandpur, Handbook of Biomedical Instrumentation, TMH
2	Dean A Dmane, David Michaels, Bioelectronics Measurement, Prentice hall
YC	CE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
1	http://103.152.199.179/YCCE/yccelibrary.html
2	
MC	OOCs Links and additional reading, learning, video material
1	https://nptel.ac.in/courses/108105101
2	https://onlinecourses.swayam2.ac.in/nou23_bt05/preview
3	https://onlinecourses.nptel.ac.in/noc22_bt56/preview
4	https://onlinecourses.nptel.ac.in/noc21_ee17/preview

Brakat	April 1	Shami	July 2022	1.00	Applicable for AY 2022-23 Onwards
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B. Tech SoE and Syllabus 2022 (Scheme of Examination w.e.f. 2022-23 onward) (Department of Electronics Engineering)

SoE No. 22EE-101

### **B.Tech in Electronics Engineering**

VI Semester 22EE654 : OEIII: Digital Logic Design

**Course Outcomes:** 

#### Upon successful completion of the course the students will be able to 1. Simplify combination logic circuits using Boolean algebra and exhibit the methods to solve logical functions. 2. Understand and apply the concept of combinational logic circuits in various digital systems. 3. Understand and demonstrate the various codes and illustrate concept of logic family with their characteristics. 4. Understand the working of Flip-flops and its use to design Synchronous counters and Design and demonstrate finite state machines Unit:1 Number Systems and IEEE Floating point representations, Logic gates, Switching Algebra 7 Hours & simplification of Boolean expressions, Boolean algebraic theorems, DeMorgan's theorem, SOP, POS, Canonical forms of Boolean expression. Implementations of Boolean expressions using logic gates. Unit:2 Combinational Circuits: Minimization methods: Karnaugh map(upto 4 variable), Quine 7 Hours McClauskey methods. Design of Arithmetic circuits: Half & Full adders, Half & Full Subtractions, Comparators, 7 Hours Unit:3 Multi-bit Application designs, Formation of switching functions from word statements, Functions & its implementation using Multiplexer, De multiplexer, Encoder, Decoder Unit:4 Combinational circuits design using MSI and LSI chips, PLA's ,Parity Checkers and 6 Hours generators, Introduction to Logic families & their characteristics such as Fan-In, Fan-out, Propagation delay, Power dissipation, Noise Margin. Unit:5 Sequential circuits: Latches and flip-flops: RS-FF, D-FF, JK-FF, Master-Slave JK-FF & T-7 Hours FF's, Excitation & Truth Table, Flip flop conversions, Shift registers, Introduction to Synchronous, Counters, Design of synchronous counter. Unit:6 Classification of synchronous machines, Design of synchronous sequential machines 7 Hours using Moore & Mealy circuits: Sequence detector **Total Lecture Hours** 39 Hours

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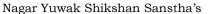


(Department of Electronics Engineering)

SoE No. 22EE-101

tbooks
"Digital Circuits & Microprocessors" by Hebert Taub
erence Books
Modern Digital Electronics by RP Jain , 3rd Edition, Tata McGraw Hill
Digital Design by M. Morris Mano, 4th edition 2008, Prentice Hall of India
CE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
http://103.152.199.179/YCCE/yccelibrary.html
OCs Links and additional reading, learning, video material
https://onlinecourses.nptel.ac.in/noc21_ee39/preview
https://nptel.ac.in/courses/117105080
https://nptel.ac.in/courses/108106177
https://archive.nptel.ac.in/courses/108/106/108106177/

	3	Sharri	July 2022	1.00	Applicable for  AY 2022-23 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	AT 2022-23 Offwards





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

SoE No. 22EE-101

### **B.Tech in Electronics Engineering**

VI Semester
22EE671 : OEIV: 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 Sensors and Actuators

7 Hours

Classification of Sensors and Actuators - Magnetic Sensors - Special Magnetic Devices - Rotary and Linear Actuators - Magnetic Materials and Technology - Soft Magnetic Materials - Hard Magnetic Materials - Coating Technologies - Magnetic Materials Market and Applications.

#### **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.

#### **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 - Ionization gauge.

#### 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

#### **Unit:5** | Linear Actuators

7 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 .

#### **Unit:6** Rotary Actuators

**6 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 , Cylindrical Rotary Actuators - Cylindrical Rotary Actuator PM - Cylindrical Rotary Actuator Excitation Electromagnetic Circuit.

#### **Total Lecture Hours**

**39 Hours** 

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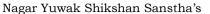


(Department of Electronics Engineering)

SoE No. 22EE-101

Tex	xtbooks
1	Measurement Systems – Application and Design, 6th 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
Ref	Ference 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
YC	CE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
1	http://103.152.199.179/YCCE/yccelibrary.html
MC	OCs Links and additional reading, learning, video material
1	https://nptel.ac.in/courses/108108147
2	https://nptel.ac.in/courses/108105064

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

SoE No. 22EE-101

39 Hours

### **B.Tech in Electronics Engineering**

VI Semester
22EE672 : OEIV: Computer Architecture

#### **Course Outcomes:**

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

- 1. 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

#### 7 Hours **Unit:1** | Register and processor Level Design Register Level components, Programmable logic devices, Register level design, The Processor level components, Processor level design **Unit:2** | **CPU Organization** 6 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 6 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 6 Hours Local and long distance communication input-output systems, Interrupt, DMA, introduction to parallel Processing

Tex	at books
1	Jhon.P. Hayes, Computer Architecture and organization McGraw-Hill Companies
Ref	erence Books
1	Carl Hammacher, Computer organization, McGraw-Hill Science
2	Andrew S. Tanenbaum, Structured computer and Organization, PHI
YC	CE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
1	http://103.152.199.179/YCCE/yccelibrary.html
MC	OCs Links and additional reading, learning, video material
1	http://103.152.199.179/YCCE/yccelibrary.html

**Total Lecture Hours** 

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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 Electronics Engineering)

SoE No. 22EE-101

## **B.Tech in Electronics Engineering**

**VI Semester 22EE673 : OEIV: Consumer Electronics** 

### **Course Outcomes:**

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

- 1. Understand and aware of the safety aspects in the field of Electrical and Electronics products.
- 2. Analyze the basics of Audio and Video Systems.
- 3. Know about recent trends in Processors and computer peripherals, mobile and wireless technologies.
- 4. Understand the basics of refrigeration cycle and cooling system

Unit:1	Standards and Safety norms	6 Hours
Electron	ics and Electrical safety norms and standards, Electronic products covered under compulsory	registration
Unit:2	Audio Systems	7 Hours
Sound I	Recording and reproduction, Hi-Fi Sound System, Audio Mixers, Graphics Equalizers, Pu	blic Address
System.		
Unit:3	Video Systems	7 Hours
Color fu	ndamentals, Luminance and Chrominance signal, Color camera, digital television systems.	
Unit:4	Wireless Technology & Mobile phones	6 Hours
Mobile	Phones, various wireless technologies, Introduction to 3G, WiFi Techhnology, GSM	
Unit:5	Air conditioner and Refrigerators	6 Hours
Fundam	entals, Refrigeration cycles, compressors, home automation	
Unit :6	Computers	7 Hours
	microprocessor, Pentium family architecture and salient features, Recent Memories HDD), Computer peripherals	technologies
Total L	ecture Hours	39 Hours

Tex	atbooks
1	S.P. Bali, "Consumer Electronics", Pearson Education, First Edition
2	B. R. Gupta, Vandana Singhal, "Consumer Electronics", S. K. Kataria & Sons, 2006
Ref	Ference Books
1	J.S. Chitode, "Consumer Electronics", Technical Publication,
YC	CE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
1	http://103.152.199.179/YCCE/yccelibrary.html
MC	OOCs Links and additional reading, learning, video material
1	for unit-I Electronics Standards of India www.electronicstds.gov.in

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# Yeshwantrao Chavan College of Engineering (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 Electronics Engineering)

SoE No. 22EE-101

# **B.Tech in Electronics Engineering**

**VI Semester** 22EE674: OEIV: Industrial Automation

**Course Outcomes:** 

Upon successful completion of the course the students will be able to 1. Remember the architecture of industrial automation system. 2. Understand the process control, PLC architecture and interfacing

Dean (Acad. Matters)

Dean OBE

Chairperson

	Apply PLC ladder logic for industrial applications	
4.	Apply the function of SCADA with PLC systems.	
Jnit:1	Introduction:	7 Hours
	Automation overview, requirement of automation, systems, architecture of industrial	
	automation system, introduction of PLC and supervisory control and data acquisition	
	(SCADA). Industrial bus systems: Modbus & profibus.	
Jnit:2	Controllers & actuators :	7 Hours
	PID controller, mechanical switches, solid-state switches, electrical actuators: Solenoids,	
	relays and contactors, ac motor, energy conservation schemes through vfd, dc motors,	
	servo motor, pneumatic and hydraulic actuators.	
Unit:3	PLC operation:	7 Hours
Omt.3	Definition, advantages and importance of PLC, history of PLC, architecture and block	/ 110u15
	diagram, types of PLC, CPU unit architecture, memory classification.	
Unit:4	PLC programming:	6 Hours
	Basic ladder logic function, electrical wiring diagram, scan cycle, programming language	
	of PLC, module addressing, basic relay, input, output and timer counter instruction,	
	arithmetic and comparison function,	
Jnit:5	SCADA & distributed control system:	7 Hours
	Introduction, block diagram, elements of SCADA, features of SCADA, MTU, RTU	
	functions, applications of SCADA, communications in SCADA, introduction to DCS,	
	architecture, input and output modules, specifications of DCS.	
Jnit :6	Material handling, automated storage system, and Identification Technologies	7 Hours
	The material handling function, its types, analysis for Material handling systems, Storage	
	system performance, automated storage/retrieval systems, work-in-process storage,	
	interfacing handling and storage with manufacturing. Product identification system:	
	Barcode, RFID etc.	
	Total Lecture Hours	41 Hours

July 2022

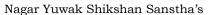
Date of Release

YCCE-EE-44

1.00

Version

Applicable for AY 2022-23 Onwards



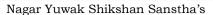


(Department of Electronics Engineering)

SoE No. 22EE-101

Tex	at books									
1	Programmable Logic controllers and Industrial Automation Penram International Publishing India Pvt. Ltd									
	Madhuchhanda Mitra, Samarjit Sen Gupta									
Ref	erence Books									
1	Programmable Logic Controllers, Principles and Applications 2002 Prentice Hall of India Pvt. Ltd,5th									
	Edition John W. Webb, Ronold A.									
2	Industrial Instrumentation and Control 2007 S.K. Singh The McGraw Hill Companies									
YC	CE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]									
1	http://103.152.199.179/YCCE/yccelibrary.html									
2										
MC	OCs Links and additional reading, learning, video material									
1	https://www.youtube.com/watch?v=oxMdDsud5vg									
2	https://www.youtube.com/watch?v=3N0kWzC6jmE									

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

SoE No. 22EE-101

## **B.Tech in Electronics Engineering**

**VI Semester Audit Course** 

**MLC2126: YCCE Communication Aptitude Preparation (YCAP6)** 

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Nagar Yuwak Shikshan Sanstha's

# Yeshwantrao Chavan College of Engineering (An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

(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 7<sup>th</sup> & 8<sup>th</sup> Semester

(Department of Electronics Engineering)

### 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 Electronics Engineering

SoE No. 22EE-101

	_	_	BoS/				С	onta	ct Ho	urs		%	Weightag	ge	ESE Duration Hours
SN	Sem	Type	Deptt	Sub. Code	Subject	T/P	L	Т	Р	Hrs	Credits	MSEs*	TA**	ESE	
	Seventh Semester														
1	7	PC	EE	22EE701	Digital Communication	T	3	0	0	3	3	30	20	50	3 Hrs
2	7	PC	EE	22EE702	Lab: Digital Communication	Р	0	0	2	2	1		60	40	
3	7	PC	EE	22EE703	Internet of Things	Т	3	0	0	3	3	30	20	50	3 Hrs
4	7	PC	EE	22EE704	Lab: Internet of Things	Р	0	0	2	2	1		60	40	
5	7	PE	EE		Professional Elective-IV	Т	3	0	0	3	3	30	20	50	3 Hrs
6	7	PE	EE		Professional Elective-V	T	3	0	0	3	3	30	20	50	3 Hrs
7	7	PE	EE		Professional Elective-VI	T	3	0	0	3	3	30	20	50	3 Hrs
8	7	STR	EE	22EE705	Project Phase-II	Р	0	0	10	10	5		60	40	
9	7	STR	EE	22EE706	Campus Recruitment Training (CRT)	Р	0	0	0	0	2		100		
					TOTAL SEVENT	H SEM	15	0	14	29	24				
-							•		•			I.			

#### List of Professional Electives-IV,V & VI

Profess	ional	Flectives	-IV

				• •				
	1	7	PE-IV	EE	22EE721	PE IV: Introduction to remote sensing and Image Analysis		
Ī	2	2 7 PE-IV EE 22EE722 PE IV: Wireless Sensor Networks						
Ī	3	7	PE-IV	EE	22EE723	PE IV: System on Chip Design		
Ī	3	7	PE-IV	EE	22EE724	PE IV: Deep learning		

#### Professional Electives -V

1	7	PE-V	EE	22EE741	PE V: Biomedical Engineering
2	7	PE-V	EE	22EE742	PE V: Wireless Communication
3	7	PE-V	EE	22EE743	PE V: Cryptography and Network Security
4	7	PE-V	EE	22EE744	PE V: Nano Electronics
5	7	PE-V	EE	22EE745	PE V: VLSI Signal Processing

#### Professional Electives -VI

1	7	PE-VI	EE	22EE761	-VI: Design Verification and Test of Digital VLSI Circuits				
2	7	PE-V	EE	22EE762	PE-VI: Micro Electro Mechanical Systems (MEMS)				
3	7	PE-V	EE	22EE763	PE-VI: Mechatronics				
4	7	PE-V	EE	EE 22EE764 PE-VI: Computer Vision					

	Eighth Semester														
1	8	STR	EE	22EE801	Industrial Internship	Р	0	0	12	12	3		60	40	
2	8	STR	EE	22EE802	Extra Curricular Activity Evaluation	Р	0	0	0	0	2		100		
	TOTAL EIGHTH SEM 0 0 12 12 5														
	GRAND TOTAL							4	78	204	166				

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

Brakat	Med .	June 2022	1.00	Applicable for AY 2022-23 Onwards
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B. Tech SoE and Syllabus 2022 (Scheme of Examination w.e.f. 2022-23 onward) (Department of Electronics Engineering)

SoE No. 22EE-101

# **B.Tech in Electronics Engineering**

### **VII Semester**

# **Digital communication**

Jpon successful completion of the course the students will be able to  . Understand basic concepts of digital communication system  . Apply the knowledge of information theory and the error control codes	
. Apply the knowledge of information theory and the error control codes	
. Apply mathematical analysis for communication systems	
. Describe and analyze the digital and spread spectrum modulation techniques	
. Simulate experiments to demonstrate design and analysis of concepts.	
Init:1 PCM, DM, ADM, DPCM, sub-band and transform coding, model based speech 7 Hour	rs
coding like LP coding, CELP coding.	
Introduction to information theory, entropy, Huffman, Prefix code, and L-Z 7 Hour	rs
encoding algorithm, Rate distortion theory for optimum quantization.	
Init:3 Gram-Schmitt procedure, Signal space representation of baseband and modulated 7 Hour	rs
signals, line coding and baseband digital transmission, Error probability and	
optimum receivers for AWGN channels, Matched filters.	
Unit:4 Digital Modulation techniques, Transmitter, Receiver and signal space 6 Hour	rs
representation of BPSK, BFSK, QPSK, Introduction to TDM, FDM, OFDM.	
Unit:5 Channel capacity Review of channel coding, Linear block codes, cyclic codes 7 Hour	rs
convolution, encoding and decoding, distance properties, Viterbi algorithm and	
Fano algorithm. Trellis coded modulation methods	
Init:6 Study of PN sequences, direct sequence methods, Frequency hop methods, digital 7 Hour	rs
spread spectrum, slow and fast frequency hop, performance analysis,	
synchronization methods for spread spectrum. Application of spread spectrum,	
CDMA.	
Total Lecture Hours 41 Hou	urs
Textbooks	

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(Department of Electronics Engineering)

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1	Digital communication by Simon Haykin , John Wiley & publication
Re	ference Books
1	Digital communication by John Prokis , Springer publication
2	Modern Communication systems (Principles and application) by Leon Couch, Pearson
3	Digital communication by Shanmugham San, John Wiley
YC	CCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
1	http://103.152.199.179/YCCE/yccelibrary.html
M	OOCs Links and additional reading, learning, video material
1	https://nptel.ac.in/courses/117105144?authuser=1
2	https://nptel.ac.in/courses/117105077?authuser=1
3	https://nptel.ac.in/courses/108101113?authuser=1

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### **B.Tech in Electronics Engineering**

### VII Semester

**Lab: Digital Communication** 

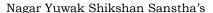
### **Course Outcomes:**

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

- 1. Understand basic concepts of digital communication system
- 2. **Apply** the knowledge of information theory and the error control codes
- 3. Apply mathematical analysis for communication systems
- 4. **Describe** and **analyze** the digital and spread spectrum modulation techniques
- 5. Simulate experiments to demonstrate design and analysis of concepts.

Sr. No.	Experiments based on
1	Study of sampling process (MATLAB & Simulink)
2	Study of Pulse Coded Modulation Technique (MATLAB & Simulink)
3	Study of Delta Modulation Technique (MATLAB & Simulink)
4	Calculation of Entropy, Efficiency, Average code word length, Variance for Huffman Code
5	Gram Schimdt orthogonalization procedure for given set of signals
6	Plot Amplitude Shift Keying, Frequency Shift Keying, Phase shift keying
7	Design of coherent Binary Phase shift keying system
8	Design of coherent Quaternary Phase shift keying system
9	Design of Encoder for Cyclic Hamming Code
10	Convolutional code generation (Time domain & Transform domain approach)
11	Pseudo random Noise sequence generation
12	Mini project based on simulink

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### **B.Tech in Electronics Engineering**

### VII Semester

### **Internet of Things**

### **Course Outcomes:**

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

#### **Text books**

1 Dr. Guillaume Girardin, Antoine Bonnabel, Dr. Eric Mounier, 'Technologies & Sensors for the

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1	Internet of Things Businesses & Market Trends 2014 -2024', Yole Développement Copyrights ,2014
1	NPTEL course material on Introduction to Internet of Things
Refe	rence Books
1 I	Peter Waher, 'Learning Internet of Things', Packt Publishing, 2015
2 I	Editors OvidiuVermesan Peter Friess, Internet of Things – From Research and Innovation to Market
3 I	Deployment', River Publishers, 20145.N. Ida, Sensors, Actuators and Their Interfaces, Scitech
I	Publishers, 2014
YCC	CE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
1 1	http://103.152.199.179/YCCE/yccelibrary.html
MOC	OCs Links and additional reading, learning, video material
1 1	https://onlinecourses.nptel.ac.in/noc22_cs53/preview
<b>2</b> 1	https://nptel.ac.in/courses/106105166

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### **B.Tech in Electronics Engineering**

### VII Semester

### **Lab: Internet of Things**

### **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 Electronics Engineering**

### VII Semester

## **PEIV: Introduction to remote sensing and Image Analysis**

**Course Outcomes:** 

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

<b>1.</b> Com	mprehend the basic and applied principles of remote sensing, RS image ch	naracteristics					
2. Unde	derstand and evaluate image spatial and spectral transforms and their effect	ct on image qu	ality and				
data inte			•				
	ply the image correction techniques and classificationalgorithms on remot	e sensing imag	ges				
	alyze high-dimensional remote sensing imagery with appropriate remote		_				
	sing methods.	C					
Unit:1	Remote Sensing Concepts		7 Hours				
	Review of Remote Sensing Concepts: spatial and	radiometric					
	characteristics – spectral and temporal characteristics, Optic	al Radiation					
	Model: The wave/ particle models - energy/matter in						
ļ	Radiometric Correction-Atmospheric Correction, Image sensor	·s					
		1					
Unit:2	Digital Image Formation and Characteristics		7 Hours				
	Digital Image Formation: point spread functions – sampling and quanti	zation					
ļ	Digital Image Characteristics: Univariate and multivariate imag	ge statistics –					
	noise models- power spectral density- co-occurrence matrix						
			7 Hours				
Unit:3							
ļ	Contrast enhancement – band rationing – principal componer						
ļ	vegetation transforms – texture transforms, Spatial Transforms: convolution						
	concept - low and high pass filtering - spatial transformations - Fourier						
	transform						
TT *4 4			<u> </u>				
Unit:4		:	6 Hours				
	Sensor geometry and empirical models for geometric corrections techniques.						
ļ	Distortion Correction, Sensor compensation, Noise reduction, Calibration	Radiometric					
	Canoration						
Unit:5	RS Image Classification		6 Hours				
Unit.3		incurervised	o mours				
	Thematic Information Extraction: review of supervised and unsupervised Image classification – Maximum Likelihood and Bayesian classification,						
ļ	Non-parametric & parametric classification	lassification,					
I	1 ton parametric & parametric classification						
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# **B.Tech in Electronics Engineering**

Uni	it :6	Hyperspectral Image Analysis	6 Hours	
		Subpixel classification: Linear mixing model, fuzzy set classification,	ļ	
		Hyperspectral Image Analysis: Feature extraction, classification		
		algorithms for hyperspectral data, Applications of Remote Sensing		
		Total Lecture Hours	39 Hours	
Tex	t boo	oks		
1	Ren	note Sensing: Models and Methods for Image Processing, 3 <sup>rd</sup> Edition, 2007, Robert A	A	
	Scho	owengerdt, Elsevier		
2	Ren	note Sensing DigitalImage Analysis, 4th Edition, 2006, John A. Richards, Xiuping Jia,	Springer	
3	Intro	oductory Digital Image Processing: A Remote Sensing Perspective, 4th Edition, 20	16, Jhon R.	
	Jens	en, Pearson Series		
Ref	eren	ce Books		
1	Phy	sical Principles of Remote Sensing, Third Edition, 2012, W.G. Rees, Cambridge Univ	ersityPress	
YC	CE e	- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]		
1	http	://103.152.199.179/YCCE/yccelibrary.html		
MC	OCs	Links and additional reading, learning, video material		
1	http	s://nptel.ac.in/courses/105108077		
2	http	s://archive.nptel.ac.in/courses/121/107/121107009/		

https://onlinecourses.nptel.ac.in/noc19 ce38/preview

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Text books

# Yeshwantrao Chavan College of Engineering

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## **B.Tech in Electronics Engineering**

### VII Semester

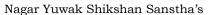
PE IV: Wireless Sensor Networks

### Course Outcomes: Upon successful completion of the course the students will be able to 1. Understand the WSN node Architecture and Network Architecture and explain the basic concepts of wireless sensor networks 2. **Describe and explain** communication protocols adopted in wireless sensor networks. 3. **Identify** the Wireless Sensor Network Platforms. 4. **Describe and explain** the hardware, software, and communication for wireless sensor network nodes Unit:1 Introduction & architecture – Motivation of Wireless Sensor Nodes, Challenges, constraints for WSN, applications, single node architecture, Hardware components, Energy consumption of sensor nodes, Operating systems and execution environments Unit:2 6 Hours Network architecture: Sensor network scenarios, Optimization goals and figures of merit, Design principles for WSNs, Service interfaces of WSNs, Gateway concepts 7 Hours Unit:3 communication protocols: Physical Layer and Transceiver Design Considerations, MAC Protocols for Wireless Sensor Networks, Low Duty Cycle Protocols And Wakeup Concepts - S-MAC, Contention based Protocols, Schedule based protocols Unit:4 6 Hours link layer Protocols: Fundamental, Error Control, Framing, Link Management, Naming And Addressing - Fundamentals, Assignment of MAC Address, Distributed assignment of locally unique addresses, Content based and geographic addressing Unit:5 7 Hours Naming and addressing, Time synchronization: Properties of Localization and positioning procedures, single hop localization, positioning in multihop environments, and impact of anchor placement. Clustering Unit:6 7 Hours Data centric and content based networking: Data centric routing, Data aggregation, Data centric storage, Topology control-controlling topology in a flat network, Hierarchical network by dominating set, Hierarchical network by clustering, transport layer and Quality of service

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**Total Lecture Hours** 

39 Hours





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1	H. Karl and A. Willig, Protocols and Architectures for Wireless Sensor Networks., June 2005, John
	Wiley & Sons
Ref	ference Books
1	Waltenegus Dargie, Christian Poellabauer, Fundamentals of wireless sensor networks: Theory and
	Practice, Wiley & Sons
2	K. Sohraby, D. Minoli, and T. Znati., Wireless Sensor Networks: Technology, Protocols, and
	Applications, John Wiley & Sons, March 2007.
YC	CE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
1	http://103.152.199.179/YCCE/yccelibrary.html
MO	OOCs Links and additional reading, learning, video material
1	https://nptel.ac.in/courses/106/105/106105163/

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### **B.Tech in Electronics Engineering**

### VII Semester

**PEIV: System on Chip Design** 

#### **Course Outcomes:**

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

- 1. Understand about SoC Design Methodology
- 2. Understand the Time, Area, Power, Reliability and Configurability of System on chip
- 3. Understand the design of different embedded memories.
- 4. Understand the Validation and Testing Concepts
- 5. Investigate new techniques for future system.

### **Unit:1** Overview of System

7 Hours

Overview of System Architecture, Components of the System, Programmability Versus Performance, Processor Architectures, Memory and Addressing, System-Level Interconnection, Bus-Based Approach, Network-on-Chip Approach, Design Iteration System Architecture and Complexity, Product Economics and Implications for SOC, Factors Affecting Product Costs, Modelling Product Economics and Technology

### Unit:2 | Chip Basics: Time, Area, Power, Reliability and Configurability

7 Hours

Design Trade-Offs, Requirements and Specifications, Cycle Time, Optimum Pipeline, Die Area and Cost, Processor Area, Processor Subunits, Ideal and Practical Scaling Area—Time—Power Trade-Offs in Processor Design, Workstation Processor, Embedded Processor, Reliability, Dealing with Physical Faults, Error Detection and Correction, Dealing with Manufacturing Faults, Memory and Function Scrubbing, Configurability

### **Unit:3** | Processors

7 Hours

processor Selection for SOC, soft Processors, Processor Core Selection, Basic Concepts in Processor Architecture, Instruction Set Conventions, Branches, Interrupts and Exceptions, Processor Microarchitecture, Basic Elements in Instruction Handling, Instruction Decoder and Interlocks, Bypassing, Execution Unit, Buffers: Minimizing Pipeline Delays, Request Rate, Branch Prediction, More Robust Processors: Vector, Very Long Instruction Word (VLIW), and Superscalar

### Unit:4 | Memory Design: System-on-Chip and Board-Based Systems

6 Hours

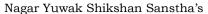
SOC External Memory: Flash, Internal Memory: Placement, Scratchpads and Cache Memory, Write Policies, Strategies for Line Replacement at Miss Time, Fetching a Line, Line Replacement, Cache Environment: Effects of System, Transactions, and Multiprogramming, Multilevel Caches, Limits on Cache Array Size, Evaluating Multilevel Caches, Logical Inclusion, Virtual-to-Real Translation, SOC (On-Die) Memory Systems, SDRAM and DDR SDRAM

### **Unit:5** | **Interconnect**

7 Hours

Interconnect Architectures, Bus: Basic Architecture, Arbitration and Protocols, Bus Bridge, Physical Bus Structure, SOC Standard Buses, AMBA, Bus Interface Units: Bus Sockets and Bus Wrappers, Analytic

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### **B.Tech in Electronics Engineering**

Bus Models, Contention and Shared Bus, Effect of Bus Transactions and Contention Time, Beyond the Bus: NOC with Switch Interconnects, Static Networks, blocking versus Nonblocking, Layered Architecture and Network Interface Unit, Evaluating Interconnect Networks, Static versus Dynamic Networks

### **Unit :6** | **Effectiveness of Customization**

7 Hours

Estimating Effectiveness of Customizations Customization, Customizing Instruction Processors, Processor Customization Approaches, Architecture Description, Identifying Custom Instructions Automatically, Reconfigurable Technologies, Reconfigurable Functional Units (FUs), Reconfigurable Interconnects, Software Configurable Processors, Mapping Designs Onto Reconfigurable Devices, Instance-Specific Design, Customizable Soft Processor, Reconfiguration Overhead Analysis, Trade-Off Analysis: Reconfigurable Parallelism

**Total Lecture Hours** 

39 Hours

### **Text books**

1 | Computer System Design: System-on-Chip, Michael J. Flynn Wayne Luk, John Wiley Publications

#### Reference Books

1 System-on-Chip Design with Arm Cortex-M Processors, Joseph You, ARM education media

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

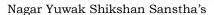
1 http://103.152.199.179/YCCE/yccelibrary.html

### MOOCs Links and additional reading, learning, video material

- 1 https://elearn.nptel.ac.in/shop/iit-workshops/completed/lab-workshop-on-arm-based-soc-design/
- 2 https://nanohub.org/courses/ECE695R/o1a/outline/unit1introductionandbackground/l15overviewofsocdesignflow?time

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## **B.Tech in Electronics Engineering**

### VII Semester

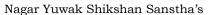
PE IV: Deen Learning

	Course Outcomes:	
Upon si	uccessful completion of the course the students will be able to	
-	y the knowledge of Mathematics and programming to build Deep learning models	
	yze different use cases to evaluate the performance of the models using Different De	ep learning
method	•	1
3. Desig	and develop application models using Different Deep learning methods	
_	pare different Deep learning techniques and demonstrate the comprehension of th	e trade-offs
	d in design choices.	
Unit:1		7 Hours
Unit:2	Stacked, Sparse, Denoising, Autoencoders and Ladder Training, Cost functions, Optimization Techniques and Learning Rules	6 Hours
Unit:3	Convolutional Neural Network Building Blocks, Simple CNN Model: LeNet, Convolutional Autoencoder and Deep CNN, AlexNet, VGGNet, Computational Complexity	7 Hours
Unit:4	Very Deep CNN for Classification (GoogLeNet, ResNet, DenseNet, Assessing the space and computational complexity of very deep CNNs, Transfer Learning	6 Hours
TI '4 F	OI: (I I' (' (DCND)) D ' D INI ( CND) IF ( CND)	C II
Unit:5	Object Localization (RCNN), Region Proposal Networks (rCNN and Faster rCNN)	6 Hours
	and Semantic Segmentation with CNN, UNet and SegNet for Semantic Segmentation	
Unit :6	Auto encoders and Latent Spaces, Principle of Generative Modelling, Adversarial Auto encoders Recurrent Neural Networks and Long Short-Term Memory	7 Hours
	Total Lecture Hours	39 Hours

### **Text books**

Goodfellow, Y, Bengio, A. Courville, "Deep Learning", MIT Press, 2016.

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(Department of Electronics Engineering)

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2	Ian Goodfellow, Yoshua Bengio, Aaron Courville. Deep Learning, MIT Press, 2015
3	S. Haykin, "Neural Networks and Learning Machines", 3e, Pearson, 2008.
Re	ference Books
1	Christopher and M. Bishop, Pattern Recognition and Machine Learning, Springer Science Business
	Media, 2006.
2	Jason Brownlee, Deep Learning with Python,ebook,2016
3	2. Kevin P. Murphy,—Machine Learning: A Probabilistic Perspective, MIT Press,2012.
YC	CE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
1	http://103.152.199.179/YCCE/yccelibrary.html
MO	OOCs Links and additional reading, learning, video material
1	https://cognitiveclass.ai/courses/machine-learning-with-python
2	https://cognitiveclass.ai/courses/python-for-data-science
3	NPTEL Course on Deep Learning for Visual Computing by IIT Kharagpur,
	https://onlinecourses.nptel.ac.in/noc20_ee74/preview

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### **B.Tech in Electronics Engineering**

### VII Semester

## **PE V: Biomedical Engineering**

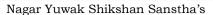
### **Course Outcomes:**

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

- 1. Understand various physiological variables and systems of human body, basic concepts of bio signals and their characteristics.
- 2. Understand and Analyse the concepts of biomedical instrumentation and principle of working of transducer/sensors
- used to measure physiological parameters.
- 3. Understand various physiological systems and Analyse the instrumentation systems used to measure physiological
- parameters and diagnostics
- 4. Describe the fundamentals of medical imaging systems.
- 5. Create broad awareness of safety measures to be practiced while using the biomedical instruments, Understand Patient care monitoring and concept of Telemedicine.

Ondersi	and Fatient care monitoring and concept of Telemedicine.	
Unit:1	Introduction to physiology and Biomedical instrumentation:	7 Hours
	Development of biomedical instrumentation, biometrics, Physiological	
	system of body, problems encountered in measuring a living system, Origin	
	of bio potentials, Cell resting potential and action potentials, characteristics	
	of bio potential	
Unit:2	Transducers used in biomedical instrumentation: Types of Transducers,	6 Hours
	selection criteria, Piezo- electric, ultrasonic transducers, Temperature,	
	measurements - Fiber optic temperature sensors.	
Unit:3	Electro - Physiological measurements: Electrodes: Limb electrodes, floating	7 Hours
	electrodes, pre-gelled disposable electrodes, Micro needle and surface electrodes,	
	Amplifiers: Preamplifiers, differential amplifiers, chopper amplifiers, Isolation	
	amplifier. ECG, EEG, EMG, ERG, Lead systems and recording methods, Typical	
	waveforms. Electrical safety in medical environment shock hazards, leakage	
	current-Instruments for checking safety parameters of biomedical equipment	
Unit:4	Non-electrical parameter measurements: Measurement of blood pressure,	7 Hours
	Cardiac output, Heart rate, Heart sound Pulmonary function measurements,	
	spirometer, Photo Plethysmography, Body Plethysmography, Blood Gas analysers	
	: pH of blood, measurement of blood pCO2, pO2, finger-tipoximeter	

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	6 Hours
Thermography, Different types of biotelemetry systems and patient monitoring	
t:6 Assisting and therapeutic equipment: Pacemakers. Defibrillators. Ventilators.	6 Hours
	o mouns
Dialyzers, Lithotripsy	
	<del></del>
al Lecture Hours	40 Hours
tbooks	
L. Cromwell, F. J. Weibell and E. A. Pfeiffer, "Biomedical Instrumentation and Meas	surements",
Prentice-Hall of India, 1995.	
erence Books	
R.S.Khandpur, 'Hand Book of Bio-Medical instrumentation', Tata McGraw Hill Publish	ing CoLtd.,
2003.	
John G Webster "Medical Instrumentation – Application and Design" 4th ed John	Wiley and
	whey and
http://103.152.199.179/YCCE/yccelibrary.html	
http://www.aami-bit.org/	
http://bio-medical.com/	
http://www.ncbi.nlm.nih.gov/pmc/articles/	
https://nptel.ac.in/courses/103/108/103108100/	
https://nptel.ac.in/courses/108/105/108105064/	
https://nptel.ac.in/courses/108/105/108105101/	
i	tomography, Mammography, MRI, MRI, Ultrasonography, Endoscopy, Thermography, Different types of biotelemetry systems and patient monitoring  it:6 Assisting and therapeutic equipment: Pacemakers, Defibrillators, Ventilators, Nerve and muscle stimulators, Diathermy, Heart Lung machine, Audio meters, Dialyzers, Lithotripsy  al Lecture Hours  it:books  L. Cromwell, F. J. Weibell and E. A. Pfeiffer, "Biomedical Instrumentation and Mease Prentice-Hall of India, 1995.  ierence Books  R.S.Khandpur, 'Hand Book of Bio-Medical instrumentation', Tata McGraw Hill Publish 2003.  John G Webster, "Medical Instrumentation — Application and Design", 4th ed., John Sons, 2007.  Interpolation of the College Campus o

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SoE No. 22EE-101

## **B.Tech in Electronics Engineering**

### **VII Semester**

### **PE V: Wireless Communication**

Upon su	ccessful completion of the course the students will be able to						
1.Unders	.Understand basic concepts of wireless communication system						
	the knowledge of Cellular concepts on wireless medium						
=	ze wireless communication using mathematical analysis						
	be the importance of various wireless networking standards along with applications a used for transmission.	nd standard					
Unit:1	The Cellular Concept: Evolution of Mobile Radio Communications, Comparison	7 Hours					
	of common wireless communication systems, Examples of wireless						
	communication system, Generations of cellular Networks, Cellular telephone						
	system, frequency reuse, channel assignment and handoff strategies, interference						
	and system capacity, Trunking & grade of service, improving capacity in cellular						
	system						
Unit:2	Mobile Radio Propagation-large scale path loss : Introduction to Radio Wave	7 Hours					
	Propagation, free space propagation model, Reflection, Diffraction, Scattering,						
	Signal Penetration into Buildings, Ray Tracing & Site Specific Modeling						
Unit:3	Small Scale fading & Multipath: Multipath Propagation, Small Scale Multipath	7 Hours					
	Measurements, Parameters of Mobile Multipath Channels, Types Of Small Scale						
	Fading, Rayleigh & Rician Distribution						
Timit 4	Equalization & Diversity Fundamentals of a section where the contract of the c	C Harrin					
	Equalization & Diversity: Fundamentals of equalization, space polarization,	6 Hours					
	frequency and time diversity techniques, space diversity, polarization diversity,						
	frequency and time diversity. RAKE Receiver						
Unit:5	Wireless Systems and Standards: GSM- global system for mobile: services and	7 Hours					

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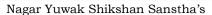
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	features, GSM system architecture, GSM radio subsystem, GSM channel types, GSM frame structure, signal processing in GSM, introduction to CDMA digital cellular standard (IS-95).	
Unit :6	Wireless Networking: Introduction to wireless networks, Differences Between Wireless & Fixed Telephone Networks, Development of wireless networks, Traffic routing in wireless networks, Wireless data services, Common channel signalling, Signalling System No. 7.An Example of SS7-Global Cellular Network Interoperability.	7 Hours
	Total Lecture Hours	39 Hours

Tex	tbooks	
1	Wireless Communication, Principles and practice 2nd edition, 2002 T S. Rappaport, Prentice Hall PTI upper saddle river, New Jersey	R,
Ref	erence Books	
1	Mobile Communications Design fundamentals, 2nd edition, 1997, William C. Y. Lee, John Willey	
2	Wireless digital communication: modulation, & spread spectrum applications 1995. Kamilo Feh Prentice Hall PTR; Har/Dis edition	er
3	Wireless and Cellular Communication 3rd Edition, 2005 W .C .Y. Lee McGraw Hill	
YC	CE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/yccelibrary.html	
MO	OCs Links and additional reading, learning, video material	
1	https://onlinecourses.nptel.ac.in/noc20_ee61/preview	
2	https://archive.nptel.ac.in/courses/117/102/117102062/	
3	https://nptel.ac.in/courses/106106167	

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# **B.Tech in Electronics Engineering**

### **VII Semester**

PE V: Cryptography and Network Security

	Course Out	comes:			
Upon sı	uccessful completion of the course the studen	ts will be ab	le to		
1. Solve	and relate mathematic concepts behind the cry	ptographic al	gorithms.		
2. Expla	ain basic concepts and algorithms of cryptograpl	hy			
3. Evalu	nate the role played by various security mechani	sms like pass	swords		
4. Unde	rstand IP security				
Unit:1	Introduction to Security: Security Goals , C Mechanisms, Techniques.	Cryptographic	e Attacks, Servi	ices and	6 Hours
Unit:2	Cryptography Mathematics: Integer Arithma Algorithm, Modulo operator, Congruence, Euclidian Algorithm.	•	•		6 Hours
Unit:3	Traditional Symmetric Key Ciphers:-Kercho (mono alphabetic ciphers, poly alphabetic cipand Block Ciphers. Modern Symmetric Permutation Box.	phers)-Trans	position Ciphers	s-Stream	6 Hours
Unit:4	Symmetric Key Block Cipher: Fiestel and N Standard (Encryption , Decryption , Key Encryption Standard (AES) (Encryption , Decr	Generation	Algorithm), A	dvanced	7 Hours
Unit:5	Public Key Cryptosystems: - Knapsack Cryptoryptosystem (Encryption, Decryption, Key G	•	SA Cryptosysten	n, Rabin	6 Hours
Unit :6	Network Layer Security: - IP Security Of Authentication Header, Encapsulating Security Exchange Algorithm ( Diffie-Hellman Key Exchange Security	ity Payload-	•	-	6 Hours
		T	otal Lecture Ho	ours	39 Hours
Text bo	ooks				
1 Cryp	otography and Network Security, Second Edition	n, Behrouz A	. Forouzan, Mcg	graw-Hill	
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Date of Release

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R	eference Books
1	Cryptography and Network Security Principles and Practices , 4'th Edition , William Stallings,
	(Pearson Edu Asia)
Y	CCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
1	http://103.152.199.179/YCCE/yccelibrary.html
M	OOCs Links and additional reading, learning, video material
1	Nptel Video: https://www.youtube.com/watch?v=Q-HugPvA7GQ&list=PL71FE85723FD414D7
2	https://www.youtube.com/watch?v=LWU11bLvXKI&list=PLJ5C_6qdAvBFAuGoLC2wFGruY_E2
	gYtev&index=36

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## **B.Tech in Electronics Engineering**

### VII Semester

### PE V: Nano Electronics

<b>Course Outcomes:</b>	
rse the students will be	able

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

- 1. Understand basic concepts of Nanoelectronics knowledge of Model.
- 2. Apply the knowledge of Nanoelectronics to basic parameters of MOS transistors.
- 3. Analyze MOS parameters using mathematical analysis.
- 4. Describe the fabrication process on MOS transistors.

### Unit:1 Introduction Nanoelectronics

7 Hours

Introduction to Nanoelectronics, CMOS Technology scaling issues, Short channel effects, sub-threshold conduction, Drain Induced Barrier Lowering, Design techniques for nanoscale transistor

### **Unit:2** | **MOS** Transistor

6 Hours

MOS Electrical Characterization, Ideal MOS C-V Characteristics, Effects on non idealities on C-V, MOS Parameter extraction, Overview of Non Classical MOSFETs and carrier transport in Nano MOSFETs, Ballistic Transport

### **Unit:3** | Silicon on Insulator (SOI) MOSFET

7 Hours

Silicon on Insulator (SOI) MOSFET, SOI technology comparison with bulk silicon CMOS Technology, Partially Depleted (PD) and Fully Depleted (FD) SOI-MOSFETs, Metal Semiconductor contacts and Metal-Source / Drain Junction MOSFETs

### **Unit:4** | Compound semiconductor

6 Hours

Germanium and Compound semiconductor Nano MOSFETs, Germanium as alternative to silicon, Compound semiconductors, GaAs MESFETs types, Introduction to Nanomaterials

### **Unit:5** | Quantum Mechanics and Quantum Statistics for nanomaterials

7 Hours

Quantum Mechanics and Quantum Statistics for considering nanomaterials, Basic principles of quantum mechanics, Energy bands in crystalline solids, Synthesis / Fabrication of Nanomaterials / structures, nanowires

### **Unit:6** Methods used in Nanotechnology

6 Hours

Chemical vapor deposition (CVD) and atomic layer deposition (ALD), Carbon nanostructures, Characterization of Nanomaterials and Nanostructures

**Total Lecture Hours** 

39 Hours

### **Textbooks**

- Y. Taur and T. Ning, Fundamentals of Modern VLSI Devices, Cambridge University Press
- E. H. Nicollian and J. R. Brews, MOS Physics and Technology, John Wiley, 1982

### Reference Books

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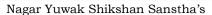


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1	Plummer, Deal , Griffin, Silicon VLSI Technology, Pearson Education India.
2	Brundle, C.Richard; Evans, Charles A. Jr.; Wilson, Shaun, Encyclopedia of Materials
	Characterization, Elsevier.
3	Donald A Neamen, Semiconductor Physics and Devices: Basic Principles, McGraw-Hill (1997)
	ISBN 0-256-24214-3
YC	CE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]
1	http://103.152.199.179/YCCE/yccelibrary.html
MO	OOCs Links and additional reading, learning, video material
1	https://classroom.google.com/
2	https://nptel.ac.in/courses/117/108/117108047/
3	http://www.digimat.in/nptel/courses/video/117108047/L29.html

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**Course Outcomes:** 

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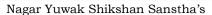
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# **B.Tech in Electronics Engineering**

### VII Semester

PE V: VLSI Signal Processing

Upon su					
-	uccessful completion o	f the course the st	tudents will be ab	le to	
1. 1	Design architectures for				
	Apply the optimization		farea speed and p	ower on DSP systems	
	Optimize DSP arithmet		r area, speed and p	ower on Dor systems.	
	•		orithms based on a	lgorithmic transformation	nn .
7. 1	Design of algorithm sur	acture for DSI arg	oritimis based on a	igoriumnic transformatic	)11 <b>.</b>
TT •. 4	D	DCD 1 1.1	D1 1 1'	ara pro pro	
Unit:1				n, SFG, DFG, DFC	
		bound and itera	ation bound, Alg	orithms for computing	5
	Iteration bound.				
Unit:2	Pinelining and Paralle	el Processing: Intro	oduction pipelinin	g of FIR Digital filters	, 7 Hours
C III2	parallel processing, Pi	_			, , , , , , ,
	paraner processing, 11	perining and paran	ter processing for it	ow power	
Unit:3	Retiming: Introduction	n, Definition and	properties, solving	system of inequalities	, 7 Hours
	retiming techniques				
Unit:4	Unfaldina, Introductio	an alaamithaa fan	un faldina Duan auti	as of unfolding Cuitias	1 7 Hours
Umt:4	_	_	umoiding, Properu	es of unfolding, Critica	1 / Hours
	path, unfolding and re	uming.			
Unit:5	Folding: Introduction	Folding Transform	nation, Register n	ninimization techniques	, 7 Hours
	Register minimization	_	_	1	
					•
		1 .' C 1 T	1 11 177	. 1 1 1.1	- T. T.
Unit :6	Fast Convolution, Int	roduction, Cook-T	oom algorithm, W	inogard algorithm.	7 Hours
Unit :6	Fast Convolution, Int	roduction, Cook-T	oom algorithm, W	inogard algorithm.	7 Hours
Unit :6	Fast Convolution, Int	roduction, Cook-T			
Unit :6	Fast Convolution, Int	roduction, Cook-T		inogard algorithm.  otal Lecture Hours	
Unit :6	Fast Convolution, Int	roduction, Cook-T			
		roduction, Cook-T			
		roduction, Cook-T			
Text bo	oks		To	otal Lecture Hours	42 Hours
Text bo	oks shab K. Parhi, "VLSI I		To		42 Hours
Text bo	oks shab K. Parhi, "VLSI I		To	otal Lecture Hours	42 Hours
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2	Kung. S.Y., H.J. While house T.Kailath, "VLSI and Modern signal processing", Prentice hall					
YC	YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]					
1	http://103.152.199.179/YCCE/yccelibrary.html					
M(	OOCs Links and additional reading, learning, video material					
1	https://archive.nptel.ac.in/courses/108/105/108105157/					
2	https://onlinecourses.nptel.ac.in/noc20_ee44/preview					

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# **Yeshwantrao Chavan College of Engineering**

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## **B.Tech in Electronics Engineering**

### **VII Semester**

### PE VI: Design Verification and Test of Digital VLSI Circuits

**Course Outcomes:** 

Understands the fundamental concepts of VLSI testing, including fault models, test generation,

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

and Desi	gn-for-Testability (DFT) techniques.	
2. A	<b>apply</b> functional and structural testing methods to verify digital circuits.	
3. A	analyze different fault models and evaluate their impact on circuit performan	ce and tes
coverage		
4. <b>E</b>	valuate the effectiveness of test methodologies by measuring fault coverage and opt	timizing test
patterns	for better defect detection.	
Unit:1	Overview Of Testing	8 Hours
Design F	Process, Verification, Faults & Their Detection, Test Pattern Generation, Fault Cove	erage, Types
Of Tests	, Test Application, Testing Economics. Defects, Failures, and Faults: Physical Defe	cts, Failures
Modes, I	Faults, Fault Equivalence and Dominance, Fault Collapsing	
Unit:2	Simulation.	8 Hours
Logic Si	mulation, Approaches to Simulation, Fault Simulation & Their Results. Testability	y Measures:
	~ 41.141 1.61 1.41	
SCOAP	Controllability and Observability	
SCOAP Unit:3	Controllability and Observability  Automatic Test Pattern Generator	8 Hours
Unit:3		
Unit:3 Binary	Automatic Test Pattern Generator	n Diagram,
Unit:3 Binary	Automatic Test Pattern Generator  Decision Diagram, Reduction rules and Algorithms, Ordered Binary Decisions, Automatic Test Pattern Generation: D-Algorithm, Critical Path Extensions to I	n Diagram,
Unit:3 Binary ROBDD	Automatic Test Pattern Generator  Decision Diagram, Reduction rules and Algorithms, Ordered Binary Decisions, Automatic Test Pattern Generation: D-Algorithm, Critical Path Extensions to I	n Diagram,
Unit:3 Binary ROBDD PODEM Unit:4	Automatic Test Pattern Generator  Decision Diagram, Reduction rules and Algorithms, Ordered Binary Decisions, Automatic Test Pattern Generation: D-Algorithm, Critical Path Extensions to I., FAN.	n Diagram, D-Algorithm  7 Hours
Unit:3 Binary DROBDD PODEM Unit:4 Ad Hoc	Automatic Test Pattern Generator  Decision Diagram, Reduction rules and Algorithms, Ordered Binary Decisions, Automatic Test Pattern Generation: D-Algorithm, Critical Path Extensions to I., FAN.  Scan Design & Boundary Scan Architecture	n Diagram D-Algorithm  7 Hours eation, Scar
Unit:3 Binary DROBDD PODEM Unit:4 Ad Hoc	Automatic Test Pattern Generator  Decision Diagram, Reduction rules and Algorithms, Ordered Binary Decisions, Automatic Test Pattern Generation: D-Algorithm, Critical Path Extensions to Instruction of	n Diagram D-Algorithm  7 Hours eation, Scar
Unit:3 Binary ROBDD PODEM Unit:4 Ad Hoc architect	Automatic Test Pattern Generator  Decision Diagram, Reduction rules and Algorithms, Ordered Binary Decisions, Automatic Test Pattern Generation: D-Algorithm, Critical Path Extensions to Instruction of	n Diagram D-Algorithm  7 Hours eation, Scar
Binary ROBDD PODEM Unit:4 Ad Hoc architect Operatio Unit:5	Automatic Test Pattern Generator  Decision Diagram, Reduction rules and Algorithms, Ordered Binary Decisions, Automatic Test Pattern Generation: D-Algorithm, Critical Path Extensions to I., FAN.  Scan Design & Boundary Scan Architecture  Techniques, Scan—Path Design, Test pattern generation, Test Pattern Applicates, multiple scan chains, Partial Scan Testing, Boundary Scans Architecture in.	7 Hours eation, Scar
Binary ROBDD PODEM Unit:4 Ad Hoc architect Operatio Unit:5	Automatic Test Pattern Generator  Decision Diagram, Reduction rules and Algorithms, Ordered Binary Decisions, Automatic Test Pattern Generation: D-Algorithm, Critical Path Extensions to Instruction, FAN.  Scan Design & Boundary Scan Architecture  Techniques, Scan—Path Design, Test pattern generation, Test Pattern Applications, multiple scan chains, Partial Scan Testing, Boundary Scans Architecture in Built In Self-Test:	7 Hours eation, Scar
Binary ROBDD PODEM Unit:4 Ad Hoc architect Operatio Unit:5 Pseudora Unit:6	Automatic Test Pattern Generator  Decision Diagram, Reduction rules and Algorithms, Ordered Binary Decisions, Automatic Test Pattern Generation: D-Algorithm, Critical Path Extensions to It, FAN.  Scan Design & Boundary Scan Architecture  Techniques, Scan—Path Design, Test pattern generation, Test Pattern Applicates, multiple scan chains, Partial Scan Testing, Boundary Scans Architecture In.  Built In Self-Test:  Indom Test Pattern Generation, Response Compaction, BIST Architectures.	7 Hours 7 Hours 7 Hours 7 Hours
Binary DROBDD PODEM Unit:4 Ad Hoc architect Operatio Unit:5 Pseudora Unit:6 Memory	Automatic Test Pattern Generator  Decision Diagram, Reduction rules and Algorithms, Ordered Binary Decisions, Automatic Test Pattern Generation: D-Algorithm, Critical Path Extensions to Inspect of I	7 Hours 7 Hours 7 Hours 7 Hours 7 Hours
Binary ROBDD PODEM Unit:4 Ad Hoc architect Operatio Unit:5 Pseudora Unit:6 Memory Micropro	Automatic Test Pattern Generator  Decision Diagram, Reduction rules and Algorithms, Ordered Binary Decisions, Automatic Test Pattern Generation: D-Algorithm, Critical Path Extensions to It, FAN.  Scan Design & Boundary Scan Architecture  Techniques, Scan—Path Design, Test pattern generation, Test Pattern Applicates, multiple scan chains, Partial Scan Testing, Boundary Scans Architecture In.  Built In Self-Test:  Indom Test Pattern Generation, Response Compaction, BIST Architectures.  Testing  Testing: Types of Memory Testing, Functional Testing Schemes, Testing	7 Hours 7 Hours 7 Hours 7 Hours 7 Hours

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Tex	Text books						
1	"Essentials of Electronic Testing for Digital, Memory, and Mixed-Signal VLSI Circuits", Michael L.						
	Bushnell and Vishwani D. Agrawal, B.S.Publications, 2000						
Ref	Perence Books						
1	"Principles of Testing Electronic Systems", 2nd edition SamihaMourad, YervantZorian						
2	"Digital Systems Testing and Testable Design" ,MironAbramovici, Melvin Breuer and Arthur						
	Friedman, IEEE press.						
3	"A Guide to VHDL" by Stanley Mazor,2nd Edition, Kluwer Academic Press, 2007						
4	"HDL Chip Design" by Douglas Smith, 3rd Edition, Doone Publications, 2008						
5	"Rapid Prototyping of Digital Systems", by J. O. Hamblen and M. Furman, Kluwer Academic						
	Publishers.2001						
YC	CE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]						
1	http://103.152.199.179/YCCE/yccelibrary.html						
MC	OOCs Links and additional reading, learning, video material						
1	https://archive.nptel.ac.in/courses/106/103/106103116/						
2	https://nptel.ac.in/courses/106103016						

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**B.Tech in Electronics Engineering** 

(Department of Electronics Engineering)

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# VII Semester

PE VI: Micro Electro Mechanical Systems (MEMS)

## Course Outcomes: Upon successful completion of the course the students will be able to 1. Understand working principles of MEMS technology. 2. Learn the basic principles and applications of Micro fabrication and micromachining processes. 3. Discuss various applications of RF MEMS. 4. Classify types of micro sensors and micro actuators used in Micro systems. Unit:1 7 Hours Introduction to MEMS: Benefits of Miniaturization, Types of MEMS: Optical MEMS, Bio- MEMS, RF-MEMS, Microfludics, Success Stories, Pressure sensor, Accelerometer, Micro-mirror TV Projector. Unit:2 7 Hours Microfabrication and Micromachining: Integrated Circuit Processes, Bulk Micromachining, Isotropic Etching and Anisotropic Etching, Wafer Bonding, High Aspect-Ratio Processes (LIGA), MEMS Device fabrication using Bulk Micromachining. Unit:3 7 Hours Surface Micromachining: One or two sacrificial layer processes, Surface micromachining requirements, Device fabrication using Surface Micromachining example, Microcantilever fabrication. Unit:4 6 Hours RF MEMS Devices: Capacitor, Inductor, Switches, and antennas, RF MEMS components in communications, space and defence applications. 6 Hours Unit:5 Physical Micro sensors: Classification of physical sensors, Integrated, Intelligent, or Smart sensors, Sensor Principles and Examples: Thermal sensors, Electrical Sensors, Mechanical Sensors, Chemical and Biosensors. Unit:6 6 Hours Classification of microactuators, Electrostatic, Electromagnetic and Microactuators: Thermal microactuation, Mechanical design of microactuators, Microactuator examples, microvalves, micropumps, micromotors.

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	Total Lecture Hours 3	9 Hours
	·	
Tes	xt books	
1	Micro and Smart Systems: Ananthasuresh, G. K., Vinoy, K. J., Gopalakrishnan, S., Bhat, K	L. N., and
	Aatre, V. K., Wiley-India, NewDelhi, 2010.	
	V. K., Wiley-India, NewDellii, 2010.	
Re	ference Books	
1	VLSI Technology, Sze S.M. (ed),McGraw Hill	
2	RF MEMS and Their Applications: Vijay Varadan, K. J. Vinoy, K. A. Jose, Wiley, 2002.	
YC	CCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/yccelibrary.html	
M(	OOCs Links and additional reading, learning, video material	
1	NPTEL Course on Introduction to MEMS & Microsystems by Prof. Santiram Kal IIT KI	haragpur.
	https://nptel.ac.in/courses/117105082	

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## **B.Tech in Electronics Engineering**

### VII Semester

**PE VI: Mechatronics** 

#### **Course Outcomes:**

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

- 1. Demonstrate the ability to employ the knowledge of mathematics, science, and engineering.
- 2. Design and conduct experiments to evaluate, analyze, interpret data and performance of a mechatronics system
- 3. Design mechatronics component, system or process to meet desired needs
- 4. Demonstrate knowledge of statics, dynamics and solid mechanics relevant to Mechatronics

Unit:1 6 Hours

Introduction: Mechatronics key elements, design processes and issues, Modeling and simulation of

physical system, electrical system, Mechanical translation- rotation system, electromechanical coupling

Unit:2 7 Hours

**Sensor and transducer:** Introduction to sensor and transducer, sensor for motion, position measurement, force, torque, tactile sensor and flow sensor, temperature sensing device, ultrasonic sensor, range sensor, active vibration control

Unit:3 7 Hours

Actuating device: Direct current motor, permanent magnet stepper motor, fluid power actuation, fluid power design element, piezoelectric actuators. Transducer signal conditioning and device for data conversion

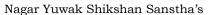
Unit:4 7 Hours

**Signal, system and controls:** Introduction to signal, system and controls, system representation, linearization of nonlinear system, time delay, measure of system, performance, root locus and bode plots, Real-time interfacing i.e. I/O cards

Unit:5 7 Hours

Closed loop controllers: Continuous and discrete process, control modes, two step mode, proportion mode, derivative control, integral control, PID controller, digital controller, control system performance, Programmable controllers.

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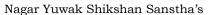
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## **B.Tech in Electronics Engineering**

Un	it :6	7 Hours
Ad	vanced application in Mechatronics: Case studies in mechatronics system design.	•
	Total Lecture Hours	39 Hours
Te	xt books	
1	Devdas Shetty and Richard A. kolk, Mechatronics system design, Thomson Asia Pv reprint, 2001	t. Ltd, second
Re	ference Books	
1	W.Bolton, Mechatronics, Pearson education Asia, third Indian reprint 2001, Additional	al Reading:
2	David G. Alciatore and Michael B.hisland, Introduction to Mechatronics and measure Tata McGraw hill, second edition, 2003.	ement system,
YC	CCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/yccelibrary.html	
M(	OOCs Links and additional reading, learning, video material	
1	https://onlinecourses.nptel.ac.in/noc21_me27/preview	
2	https://archive.nptel.ac.in/courses/112/107/112107298/	

https://nptel.ac.in/courses/112107298

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# **B.Tech in Electronics Engineering**

### VII Semester

**PE VI: Computer Vision** 

		Cours	e Outcomes:			
Upon s	uccessful completion of	of the course the s	tudents will be ab	le to		
1. Learr	fundamentals of comp	outer vision and its	applications			
<b>2.</b> Unde	rstand the basic image	processing operation	ons to enhance, seg	ment the images	<b>i.</b>	
<b>3.</b> Unde	rstand the analyzing an	d extraction of rele	evant features of the	e concerned dom	nain probl	em.
<b>4.</b> Unde	rstand and apply the mo	otion concepts and	its relevance in rea	al time application	ons	
Unit:1	Overview of comput Representation: Ima Projections, rigid and	ging geometry,	radiometry, digi		ras and	6 Hours
Unit:2	Image Processing:	n, filtering, convol	ution, Fourier trans	•	•	7 Hours
Unit:3	Feature detection: ed active contours, SIFT and Doperations					7 Hours
Unit:4	<b>Segmentation:</b> Active merging, graph-based	-	_			7 Hours
	merging, graph basea	- segmentation, met			1204 041	
Unit:5	Camera calibration: distortion; direct pa matrices; orthographic	rameter calibration	on; camera parar	meters from pr	rojection	7 Hours
Unit :6	Motion representate flow, the image techniques; feature-b Motion tracking: st	brightness consta ased techniques; re	ncy equation, af	fine flow; dif	ferential	7 Hours
Brakat	- May	8 harri	July 2022	1.00		cable for

Brakat	Ap. 1	Bharri	July 2022	1.00	Applicable for  AY 2022-23 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	AT 2022-23 Offwards



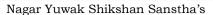


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	systems; the Kalman filter				
	Total Lecture Hours 39 Hours				
	Total Lecture Hours 37 Hours				
Т	-4.b L				
1 ex	xt books				
1	Computer Vision: Algorithms and Applications, R. Szeliski, Springer, 2011.				
2	Introductory techniques for 3D computer vision, E. Trucco and A. Verri, Prentice Hall, 1998.				
3	Computer Vision: A Modern Approach, Forsyth/Ponce, Pearson Education India;2 <sup>nd</sup> edition(2015)				
Re	ference Books				
1	Multiple View Geometry in Computer Vision, Richard Hartley and Andrew Zisserman, Second Edition, Cambridge University Press, March 2004.				
2	Image Processing, Analysis and Machine Vision · Authors: Milan Sonka, Vaclav Hlavac, Roger Boyle · Cengage Learning, 2014				
YC	CE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]				
1	http://103.152.199.179/YCCE/yccelibrary.html				
M(	OOCs Links and additional reading, learning, video material				
1	https://onlinecourses.nptel.ac.in/noc19_cs58/preview				
2	https://nptel.ac.in/courses/108103174				
3	https://onlinecourses.nptel.ac.in/noc21_cs93/preview				

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## **B.Tech in Electronics Engineering**

**VII SEMESTER** 22EE705\_\_ Project Phase-II

Brakat	April 1	Sharri	July 2022	1.00	Applicable for  AY 2022-23 Onwards
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## **B.Tech in Electronics Engineering**

# VII SEMESTER 22EE706\_\_Campus Recruitment Training

### **Course Outcomes:**

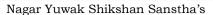
Upon successful completion of the course the students will be able to

- 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.

SN.	Contain
1	Quantitative Aptitude
2	Logical Reasoning
3	Verbal Ability
4	Technical

Student would be required to undergo a practical training for One months during the summer vacation after 6<sup>th</sup> semester. They would submit a report about the same and also make the presentation for evaluation.

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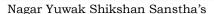
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## **B.Tech in Electronics Engineering**

**VIII SEMESTER** 22EE801\_\_Internship - training / Seminar & Report

Brakas	May	Sharri	July 2022	1.00	Applicable for AY 2022-23 Onwards
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# **B.Tech in Electronics Engineering**

**VIII SEMESTER** 22EE802\_\_Extracurricular Activity Evaluation

Blander	allow	Sharri	July 2022	1.00	Applicable for AY 2022-23 Onwards
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