List of Courses Focus on Employability/ Entrepreneurship/ Skill Development

Department : *Electronics and Communication Engineering*

Programme Name : *B.Tech.*

Academic Year : 2021-22

List of Courses Focus on Employability/ Entrepreneurship/Skill Development

Sr. No.	Course Code	Name of the Course
01.	MA201TBS01	Mathematics-I
02.	PH201TBS02	Physics
03.	EC201TES01	Basic Electrical & Electronics Engineering
04.	IT201TES02	Introduction to Information Technologies
05.	EN201THS01	English Communication
06.	PH201PBS01	Physics Lab
07.	ME201PES01	Engineering Graphics
08.	ME201PES02	Workshop Technology & Practices
09.	EC201PES03	Basic Electrical Engineering Lab
10.	MA202TBS03	Mathematics-II
11	CY202TBS04	Chemistry
12	CE202TES03	Engineering Mechanics
13	CS202TES04	Computer Programming
14	CM202TES05	Basic Civil & Mechanical Engineering
15	CY202PBS02	Chemistry Lab
16	CE202PES04	Engineering Mechanics Lab
17	CS202PES05	Computer Programming Lab
18	EC203TPC01	Electronic Devices
19	EC203TPC02	Digital Logic Design
20	EC203TPC03	Network Theory
21	EC203TPC04	Signals and Systems
22	EC203TBS05	Mathematics-III
23	EC203THS02	Engineering Economics
24	EC203PPC01	Electronics Devices Lab
25	EC203PPC02	Digital Logic Design Lab
26	EC204TPC05	Analog Circuits

27	EC204TPC06	Analog Communication
28	EC204TPC07	Control System
29	EC204TES05	Data Structure with C++
30	EC204TBS06	Numerical Methods
31	EC204TMC02	Environmental Sciences
32	EC204PPC05	Analog Circuits Lab
33	EC204PES05	Data Structure with C++ Lab
34	EC205TPC08	LIC & its Application
35	EC205TPC09	Digital Communication
36	EC205TPC10	Digital Signal Processing
37	EC205TES06	Electromagnetic Waves
38	EC205THS03	Probability Theory & Random Process
39	EC205THS04	Effective Technical Communication
40	EC205PPC06	LIC Lab
41	EC205PPC07	Analog and Digital Communication Lab
42	EC205PPC08	Digital Signal Processing Lab
43	EC206TPC11	CMOS Digital VLSI Design
44	EC206TPC12	Data Communication & Computer Networks
45	EC206TPC13	Microprocessor & Microcontroller
46	EC206TES07	Electronic Measurements and Sensors
47	EC206TPE01	Information Theory & Coding
48	EC206TPE02	Advance Signal Processing
49	EC206TPE03	Renewable Energy Sources
50	EC206TPE04	Introduction to MEMS
51	EC206PPC09	CMOS Digital VLSI Design Lab
52	EC206PPC10	Data Communication & Computer Networks Lab
53	EC206PES06	Electronic Measurement and Sensors Lab
54	EC07TPC14	Fiber Optics Communication
55	EC07TPC15	Embedded Systems
56	EC07TPC16	Mobile Communication & Network
57	EC07TPE09	Digital Image Processing
58	EC07TPE10	Analog & Digital VLSI Design
59	EC07TPE11	Estimation and Detection Theory
60	EC07TPE12	Advanced Power Electronics
61	EC07TPE13	Microwave Theory & Techniques

62	EC07TPE14	Radar & Satellite Comm
63	EC07TPE15	Machine Learning
64	EC07PPC12	Fiber Optics Communication Lab
65	EC07PPC13	Design and Simulation Lab
66	EC07PPS01	Seminar on Industrial Training
67	EC07PPS02	Project - I
68	EC08TPC17	VLSI Fabrication Technology
69	EC08TPE16	Millimeter Wave Technology
70	EC08TPE17	Video Processing
71	EC08TPE18	Biomedical Electronics
72	EC08TPE19	Neural Network & Fuzzy logic
73	EC08TPE20	Next Gen. Comm. Technology
74	EC08TPE21	Wireless Sensor Networks
75	EC08TOE05	Intellectual Property Rights
76	EC08TOE06	Principles of Management
77	EC08TOE07	Introduction to IOT
78	EC08PPS03	Project - II
79	EC08PPS04	Comprehensive viva
80	ECPATT1	Linear Algebra
81	ECPATT2	Wireless Communication & Network
82	ECPATT3	Optoelectronic Devices
83	ECPATP1	ction to Signal Processing
84	ECPATP2	Introduction to Embedded & IOT System
85	ECPATP3	Microstrip Antenna
86	ECPATP4	Estimation & Detection Theory
87	ECPATP5	Digital Image Processing
88	ECPATP6	Network Security & Cryptography
89	ECPATP7	Modern Digital Communication
90	ECPATP8	Antenna for Modern wireless Communication
91	ECPBTT1	Advanced VLSI Fabrication
92	ECPBTT2	Millimeter Wave Technology
93	ECPBTP1	Machine Learning
94	ECPBTP2	Optical Communication System
95	ECPBTP3	Next Generation Communication Technologies
96	ECPBTP4	Advanced Digital Signal Processing

97	ECPBTP5	Computer Vision
98	ECPBTP6	Digital Communication Receiver
99	ECPBTP7	Optical Instrumentation
100	ECPBTP8	Satellite Communication
101	ECPCPT1	Dissertation Stage–I
102	ECPDPT1	Dissertation Stage–II

विभागाध्यक्ष (इलें. एव संचार अभियाँत्रिकी)
H.O.D. (Elect. & Comm. Engineering)
प्रौद्योगिकी संस्थान
Institute of Technology
गु. घा. वि., बिलासपुर (छ.ग.)
G. G. V. Bilaspur (C.G.)

Scheme and Syllabus

SCHOOL OF STUDIES OF ENGINEERING & TECHNOLOGY
GURU GHASIDAS VISHWAVIDYALAYA(A CENTRAL UNIVERSITY)
CBCS-NEW, STUDY & EVALUATION SCHEME
PROPOSED W.E.F. SESSION 2020-2021
B.Tech. I Year (SEMESTER I)
(Common for CSE, ECE and IT)

SN	Course No.	SUBJECT	PERIODS			EVALUATION SCHEME			CREDITS
			L	T	P	IA	ESE	SUB-TOTAL	
1.	MA201TBS01	MATHEMATICS-I	3	1	-	30	70	100	4
2.	PH201TBS02	PHYSICS	3	1	-	30	70	100	4
3.	EC201TES01	BASIC ELECTRICAL & ELECTRONICS ENGINEERING	3	1	-	30	70	100	4
4.	IT201TES02	INTRODUCTION TO INFORMATION TECHNOLOGIES	2	0	0	30	70	100	2
5.	EN201THS01	ENGLISH COMMUNICATION	3	0	-	30	70	100	3
		Total	**14**	**3**	**0**	**150**	**350**	**500**	**17**
PRACTICALS									
1.	PH201PBS01	PHYSICS LAB	-	-	2	30	20	50	1
2.	ME201PES01	ENGINEERING GRAPHICS	1	-	3	30	20	50	3
3.	ME201PES02	WORKSHOP TECHNOLOGY & PRACTICES	1	-	2	30	20	50	1
4.	EC201PES03	BASIC ELECTRICAL ENGINEERING LAB	-	-	2	30	20	50	1
		Total	**2**	**-**	**9**	**120**	**80**	**200**	**7**
GRAND TOTAL			**16**	**3**	**9**	**270**	**430**	**700**	**24**

Total Credits : **24**
Total Contact Hour : **28**
Total Marks : **700**

*INTERNAL ASSESSMENT- Two Class Test of 15 Marks each will be conducted.
L-LECTURE, T-TUTORIAL, P-PRACTICAL, ESE –END SEMESTER EXAMINATION

SCHOOL OF STUDIES OF ENGINEERING & TECHNOLOGY
GURU GHASIDAS VISHWAVIDYALAYA(A CENTRAL UNIVERSITY)
CBCS-NEW, STUDY & EVALUATION SCHEME
PROPOSED W.E.F. SESSION 2020-2021
B.Tech. I Year (SEMESTER II)
(Common for CSE, ECE and IT)

SN	Course No.	SUBJECT	PERIODS			EVALUATION SCHEME			CREDITS
			L	T	P	IA	ESE	SUB-TOTAL	
1.	MA202TBS03	MATHEMATICS-II	3	1	-	30	70	100	4
2.	CY202TBS04	CHEMISTRY	3	1	-	30	70	100	4
3.	CE202TES03	ENGINEERING MECHANICS	3	1	-	30	70	100	4
4.	CS202TES04	COMPUTER PROGRAMMING	3	0	-	30	70	100	3
5.	CM202TES05	BASIC CIVIL & MECHANICAL ENGINEERING	3	0	0	30	70	100	3
6.	LW202TMC01	INDIAN CONSTITUTION	2	0	0	-	-	-	-
		Total	**17**	**3**	**0**	**150**	**350**	**500**	**18**
PRACTICALS									
1.	CY202PBS02	CHEMISTRY LAB	-	-	2	30	20	50	1
2.	CE202PES04	ENGINEERING MECHANICS LAB	-	-	2	30	20	50	1
3.	CS202PES05	COMPUTER PROGRAMMING LAB	-	-	2	30	20	50	1
		Total	**-**	**-**	**6**	**90**	**60**	**150**	**3**
GRAND TOTAL			**17**	**3**	**6**	**240**	**410**	**650**	**21**

Total Credits : **21**
Total Contact Hour : **26**
Total Marks : **650**

*INTERNAL ASSESSMENT- Two Class Test of 15 Marks each will be conducted.
L-LECTURE,T-TUTORIAL,P-PRACTICAL, ESE –END SEMESTER EXAMINATION

SCHOOL OF STUDIES OF ENGINEERING & TECHNOLOGY
GURU GHASIDAS VISHWAVIDYALAYA, BILASPUR (C.G.)
(A CENTRAL UNIVERSITY)

CBCS-NEW, EVALUATION SCHEME

PROPOSED (W.E.F. SESSION 2020-21)

B. TECH. SECOND YEAR (SEMESTER- III)

(Electronics and Communication Engineering)

S.No.	COURSE No.	SUBJECT	PERIODS			EVALUATION SCHEME			CREDITS
			L	T	P	IA	ESE	SUB-TOTAL	
THEORY									
1.	EC203TPC01	Electronic Devices	3	-	-	30	70	100	3
2.	EC203TPC02	Digital Logic Design	3	-	-	30	70	100	3
3.	EC203TPC03	Network Theory	3	1	-	30	70	100	4
4.	EC203TPC04	Signals & Systems	3	1	-	30	70	100	4
5.	EC203TBS05	Mathematics - III	3	1	-	30	70	100	4
6.	EC203THS02	Engineering Economics	3	-	-	30	70	100	3
		TOTAL	**18**	**3**	-	**180**	**420**	**600**	**21**
PRACTICALS									
1.	EC203PPC01	Electronics Devices Lab	-	-	2	30	20	50	1
2.	EC203PPC02	Digital Logic Design Lab	-	-	2	30	20	50	1
		TOTAL	-	-	**4**	**60**	**40**	**100**	**2**
		GRAND TOTAL	**18**	**3**	**4**	**240**	**460**	**700**	**23**

Total Credits: **23** Total Contact Hours: **25** Total Marks: **700**

L: LECTURE, T: TUTORIAL, P: PRACTICAL, IA: INTERNAL ASSESSMENT, ESE: END SEMESTER EXAMINATION
*INTERNAL ASSESSMENT- Two Class Test of 15 Marks each will be conducted.

SCHOOL OF STUDIES OF ENGINEERING & TECHNOLOGY
GURU GHASIDAS VISHWAVIDYALAYA, BILASPUR (C.G.)
(A CENTRAL UNIVERSITY)

CBCS-NEW, EVALUATION SCHEME

PROPOSED (W.E.F. SESSION 2020-21)

B. TECH. SECOND YEAR (SEMESTER- IV)

(Electronics and Communication Engineering)

S. No.	COURSE No.	SUBJECT	PERIODS			EVALUATION SCHEME			CREDITS
			L	T	P	IA	ESE	SUB-TOTAL	
THEORY									
1.	EC204TPC05	Analog Circuits	3	1	-	30	70	100	4
2.	EC204TPC06	Analog Communication	3	1	-	30	70	100	4
3.	EC204TPC07	Control System	3	1	-	30	70	100	4
4.	EC204TES05	Data Structure with C++	3	-	-	30	70	100	3
5.	EC204TBS06	Numerical Methods	3	1	-	30	70	100	4
6.	EC204TMC02	Enviromental Sciences	2	-	-	-	-	-	-
		TOTAL	**17**	**4**	**-**	**150**	**350**	**500**	**19**
PRACTICALS									
1.	EC204PPC05	Analog Circuits Lab	-	-	2	30	20	50	1
2.	EC204PES05	Data Structure with C++ Lab	-	-	2	30	20	50	1
		TOTAL	**-**	**-**	**4**	**60**	**40**	**100**	**2**
		GRAND TOTAL	**17**	**4**	**4**	**210**	**390**	**600**	**21**

Total Credits: **21** Total Contact Hours: **25** Total Marks: **600**

L: LECTURE, T: TUTORIAL, P: PRACTICAL, IA: INTERNAL ASSESSMENT, ESE: END SEMESTER EXAMINATION
*INTERNAL ASSESSMENT- Two Class Test of 15 Marks each will be conducted.

SCHOOL OF STUDIES OF ENGINEERING & TECHNOLOGY
GURU GHASIDAS VISHWAVIDYALAYA, BILASPUR (C.G.)
(A CENTRAL UNIVERSITY)

CBCS-NEW, EVALUATION SCHEME

PROPOSED (W.E.F. SESSION 2022-23)

B. TECH. THIRD YEAR (SEMESTER- V)

(Electronics and Communication Engineering)

S.No.	COURSE No.	SUBJECT	PERIODS			EVALUATION SCHEME			CREDITS
			L	T	P	IA	ESE	SUB-TOTAL	
THEORY									
1.	EC205TPC08	LIC & its Application	3	1	-	30	70	100	4
2.	EC205TPC09	Digital Communication	3	1	-	30	70	100	4
3.	EC205TPC10	Digital Signal Processing	3	1	-	30	70	100	4
4.	EC205TES06	Electromagnetic Waves	3	-	-	30	70	100	3
5.	EC205THS03	Probability Theory & Random Process	3	-	-	30	70	100	3
6.	EC205THS04	Effective Technical Communication	2	-	-	-	-	-	-
		TOTAL	**17**	**3**	**-**	**150**	**350**	**500**	**18**
PRACTICALS									
1	EC205PPC06	LIC Lab	-	-	2	30	20	50	1
2.	EC205PPC07	Analog and Digital Communication Lab	-	-	2	30	20	50	1
3.	EC205PPC08	Digital Signal Processing Lab	-	-	2	30	20	50	1
		TOTAL	**-**	**-**	**6**	**90**	**60**	**150**	**3**
		GRAND TOTAL	**17**	**3**	**6**	**240**	**410**	**650**	**21**

Total Credits: **21** Total Contact Hours: **26** Total Marks: **650**

L:LECTURE, T:TUTORIAL, P:PRACTICAL, IA: INTERNAL ASSESSMENT, ESE:END SEMESTER EXAMINATION
*INTERNAL ASSESSMENT- Two Class Test of 15 Marks each will be conducted.

SCHOOL OF STUDIES OF ENGINEERING & TECHNOLOGY
GURU GHASIDAS VISHWAVIDYALAYA, BILASPUR (C.G.)
(A CENTRAL UNIVERSITY)

CBCS-NEW, EVALUATION SCHEME

PROPOSED (W.E.F. SESSION 2022-23)

B. TECH. THIRDYEAR (SEMESTER- VI)

(Electronics and Communication Engineering)

S. No.	COURSE No.	SUBJECT	PERIODS			EVALUATION SCHEME			CREDITS
			L	T	P	IA	ESE	SUB-TOTAL	
THEORY									
1.	EC206TPC11	CMOS Digital VLSI Design	3	1	-	30	70	100	4
2.	EC206TPC12	Data Communication & Computer Networks	3	-	-	30	70	100	3
3.	EC206TPC13	Microprocessor & Microcontroller	3	-	-	30	70	100	3
4.	EC206TES07	Electronic Measurements and Sensors	3	-	-	30	70	100	3
5.	EC206TPE0X	**Program Elective-1**	3	-	-	30	70	100	3
6.		**Open Elective-1**	1	1	-	-	-	-	-
		TOTAL	**16**	**2**	**-**	**150**	**350**	**500**	**16**
PRACTICALS									
1.	EC206PPC09	CMOS Digital VLSI Design Lab	-	-	2	30	20	50	1
2.	EC206PPC10	Data Communication & Computer Networks Lab	-	-	2	30	20	50	1
3.	EC206PES06	Electronic Measurement and Sensors Lab	-	-	2	30	20	50	1
		TOTAL	**-**	**-**	**6**	**90**	**60**	**150**	**3**
		GRAND TOTAL	**16**	**2**	**6**	**240**	**410**	**650**	**19**

Total Credits: **19** Total Contact Hours: **24** Total Marks: **650**

L:LECTURE, T:TUTORIAL, P:PRACTICAL, IA: INTERNAL ASSESSMENT, ESE:END SEMESTER EXAMINATION
*INTERNAL ASSESSMENT- Two Class Test of 15 Marks each will be conducted.

SCHEME OF EXAMINATION
B.TECH. (FOUR YEAR) DEGREE COURSE
FINAL YEAR, ELECTRONICS & COMMUNICATION ENGINEERING
SCHOOL OF STUDIES IN ENGINEERING & TECHNOLOGY, GGVV BILASPUR (CG)
EFFECTIVE FROM SESSION 2021-22
SEMESTER VII (FINAL YEAR)

Sr. No.	Course Code	Course Title	L	T	P	Periods/ week	Evaluation Scheme			Credit
							IA	ESE	Total	
Theory										
1	EC07TPC14	Fiber Optics Communication	3	1	0	4	30	70	100	3
2	EC07TPC15	Embedded Systems	3	1	0	4	30	70	100	3
3	EC07TPC16	Mobile Communication & Network	3	1	0	4	30	70	100	3
4	EC07TPE09 EC07TPE10 EC07TPE11 EC07TPE12	**Program Elective - 3** • Digital Image Processing • Analog & Digital VLSI Design • Estimation and Detection Theory • Advanced Power Electronics	3	1	0	4	30	70	100	3
5	EC07TPE13 EC07TPE14 EC07TPE15	**Program Elective - 4** • Microwave Theory & Techniques • Radar & Satellite Comm. • Machine Learning	3	1	0	4	30	70	100	3
Practical										
1	EC07PPC12	Fiber Optics Communication Lab	0	0	2	2	30	20	50	1
2	EC07PPC13	Design and Simulation Lab	0	0	2	2	30	20	50	1
3	EC07PPS01	Seminar on Industrial Training	0	0	0	0	30	20	50	1
4	EC07PPS02	Project - I	0	0	10	10	60	40	100	5
									Total Credits	23

SEMESTER VIII (FINAL YEAR)

Sr. No.	Course Code	Course Title	L	T	P	Periods/ week	Evaluation Scheme			Credit
							IA	ESE	Total	
Theory										
1	EC08TPC17	VLSI Fabrication Technology	3	1	0	4	30	70	100	3
2	EC08TPE16 EC08TPE17 EC08TPE18	**Program Elective - 5** • Millimeter Wave Technology • Video Processing • Biomedical Electronics	3	1	0	4	30	70	100	3
3	EC08TPE19 EC08TPE20 EC08TPE21	**Program Elective - 6** • Neural Network & Fuzzy logic • Next Gen. Comm. Technology • Wireless Sensor Networks	3	1	0	4	30	70	100	3
4	EC08TOE05 EC08TOE06 EC08TOE07	**Open Elective - 3** • Intellectual Property Rights • Principles of Management • Introduction to IOT	3	1	0	4	30	70	100	3
Practical										
1	EC08PPS03	Project - II	0	0	18	18	120	80	200	9
2	EC08PPS04	Comprehensive viva	0	0	0	0	30	20	50	1
									Total Credits	22

L: LECTURE T: TUTORIAL P: PRACTICALIA: INTERNAL ASSESSMENT ESE: END SEMESTER EXAM

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING
SCHOOL OF ENGINEERING & TECHNOLOGY, GGV, BILASPUR, C.G. (INDIA)

SCHEME OF EXAMINATION

M.TECH.ELECTRONICS & COMMUNICATION ENGINEERING

MTech. I-Semester

Sl.	Course Type/Code	Subjects	Periods/Week			Evaluation			Credits
			L	T	P	IA	ESE	Total	
1.	ECPATT1	Linear Algebra	3	0	0	40	60	100	3
2.	ECPATT2	Wireless Communication & Network	3	0	0	40	60	100	3
3.	ECPATT3	Optoelectronic Devices	3	0	0	40	60	100	3
4.	ECPATP1 to ECPATP4	Elective-I	3	0	0	40	60	100	3
5	ECPATP5to ECPATP8	Elective-II	3	0	0	40	60	100	3
6.	IPPATC1	Research Methodology & IPR	3	0	0	40	60	100	3
7.	ECPALT1	Optoelectronic Device Laboratory	0	0	4	30	20	50	2
Total			18	0	4	270	380	650	20

List of Electives approved for Semester – I

Elective-I	Elective-II
ECPATP1: Introduction to Signal Processing	**ECPATP5:** Digital Image Processing
ECPATP2: Introduction to Embedded & IOT System	**ECPATP6:** Network Security & Cryptography
ECPATP3: Microstrip Antenna	**ECPATP7:**Modern Digital Communication
ECPATP4: Estimation & Detection Theory	**ECPATP8:** Antenna for Modern wireless Communication

M.Tech. II-Semester

Sl.	Course Type/Code	Subjects	Periods/Week			Evaluation			Credits
			L	T	P	IA	ESE	Total	
1.	ECPBTT1	Advanced VLSI Fabrication	3	0	0	40	60	100	3
2.	ECPBTT2	Millimeter Wave Technology	3	0	0	40	60	100	3
3.	ECPBTP1 to ECPBTP4	Elective-III	3	0	0	40	60	100	3
4.	ECPBTP5 to ECPBTP8	Elective-IV	3	0	0	40	60	100	3
5	MSPBTO1, IPPBTO2, IPPBTO3, CEPBTO4, MEPBTO5, CHPBTO6, ECPBTO7, MCPBTO8	Open Elective	3	0	0	40	60	100	3
6.	ELPBTX1, PEPBTX2, CEPBTX3, LAPBTX4	Audit Course/ Value Added Course	2	0	0	40	60	100	2
7.	ECPBLT1	Wireless Communication laboratory	0	0	4	30	20	50	2
8.	ECPBLT2	RF & Microwave Component Design Laboratory	0	0	4	30	20	50	2
Total			17	0	08	300	400	700	21

List of Electives approved for the semester –II

Elective-III	Elective-IV	Open Elective	Audit Course
ECPBTP1: Machine Learning	**ECPBTP5:** Computer Vision	**MSPBTO1:** Business Analysis	**ELPBTX1:** English for Research Paper Writing
ECPBTP2: Optical Communication System	**ECPBTP6:**Digital Communication Receiver	**IPPBTO2:** Industrial Safety	**PEPBTX2:** Stress Management by Yoga
ECPBTP3: Next Generation Communication Technologies	**ECPBTP7:**Optical Instrumentation	**IPPBTO3:** Operations Research	**CEPBTX3:** Disaster Management
ECPBTP4: Advanced Digital Signal Processing	**ECPBTP8:**Satellite Communication	**CEPBTO4:** Cost Management of Engineering Projects	**LAPBTX4:** Constitution of India
		MEPBTO5: Composite Materials	
		CHPBTO6: Waste to Energy	
		ECPBTO7: Internet of Things	
		MCPBTO8: MOOCs	

Note: Under MOOCs, the students have to opt any subject other than ELECTRONICS & COMMUNICATION ENGINEERING from NPTEL/UGC SWAYAM

M.Tech. III-Semester

Sl.	Course Type/ Code	Subjects	Periods/Week			Evaluation			Credits
			L	T	P	IA	ESE	Total	
1.	ECPCPT1	Dissertation Stage–I	0	0	28	100	100	200	14
Total			0	0	28	100	100	200	14

M.Tech. IV-Semester

Sl.	Course Type/ Code	Subjects	Periods/Week			Evaluation			Credits
			L	T	P	IA	ESE	Total	
1.	ECPDPT1	Dissertation Stage–II	0	0	32	100	200	300	16
Total			0	0	32	100	200	300	16

Total Credits for the Program = 20 + 21 +14 +16 = 71

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING,
SCHOOL OF STUDIES IN ENGINEERING AND TECHNOLOGY,
GURU GHASIDAS VISHWAVIDYALAYA, BILASPUR (C.G.)

SCHEME OF Pre-PhD, COURSE WORK
EFFECTIVE FROM 2021-22

S.N.	NAME OF SUBJECT	SUBJECT CODE	PERIODS / WEEK L - T - P	ESE DURATION	ESE MARKS		CREDIT
					MAX	MIN	
1.	Research Methodology in Engineering	ECDATT1	3 - 1 - 0	3 Hrs	100	40	4
2.	Elective-I		3 - 1 - 0	3 Hrs	100	40	4
3.	Elective-II		3 - 1 - 0	3 Hrs	100	40	4
4.	Seminar	ECDASC1	-	-	Qualified/Not qualified		-
Total			9 - 3 - 0	9 Hrs	300	165*	12

LIST OF ELECTIVES

S.N.	NAME OF SUBJECT	SUBJECT CODE	S.N.	NAME OF SUBJECT	SUBJECT CODE
1.	Vacuum Technology	ECDATP1	12.	Digital Image Processing	ECDATP12
2.	Sensors Measurement Science & Technology	ECDATP2	13.	Network Security & Cryptography	ECDATP13
3.	Artificial Intelligence	ECDATP3	14	Modern Digital Communication	ECDATP14
4.	Optimization Techniques	ECDATP4	15.	Machine Learning	ECDATP15
5.	Antenna For Modern Wireless Communication	ECDATP5	16.	Optical Communication System	ECDATP16
6.	Wireless Communication & Network	ECDATP6	17.	Next Generation Network	ECDATP17
7.	Finite Element Method	ECDATP7	18.	Advanced Digital Signal Processing	ECDATP18
8.	Introduction to Signal Processing	ECDATP8	19.	Computer Vision	ECDATP19
9.	Introduction to Embedded & IOT System	ECDATP9	20.	Digital Communication Receiver	ECDATP20
10.	Microstrip Antenna	ECDATP10	21.	Optical Instrumentation	ECDATP21
11.	Estimation & Detection Theory	ECDATP11	22.	Satellite Communication	ECDATP22

ESE: End Semester Examination, **L**: Lecture, **T**: Theory, **P**: Practical
Max: Maximum Marks in ESE
Min: Minimum Pass Marks in each subject as 40%

- Duration of the semester will be 6 months.
- *Candidate has to score minimum 55% of aggregate marks to qualify in ESE.
- Two subjects as Electives (4 credits each) can be taken from the list of Electives

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SYLLABUS	(SEMESTER-I)	Periods/ Week			Internal Assessment (IA)			ESE	Grand Total	Credits
Subject Code:	MA201TBS01	L	T	P	CT-1	CT-II	TOTAL	70	100	04
Subject:	MATHEMATICS-I	3	1	-	15	15	30			

Course Content

Calculus (Single Variable)

Unit 1: *Calculus:*

Evolutes and involutes; Evaluation of definite and improper integrals; Beta and Gamma functions and their properties; Applications of definite integrals to evaluate surface areas and volumes of revolutions. Asymptotes: definition, properties andproblems.
Rolle's Theorem, Mean value theorems, Taylor's and Maclaurin theorems with remainders; Indeterminate forms and L'Hospital's rule; Maxima and minima.

Unit 2:*Sequences and series:*

Convergence of sequence and series, tests for convergence, power series, and Taylor's series.Series for exponential, trigonometric and logarithmic functions; Fourier series: Half range sine and cosine series, Parseval's theorem.

Unit-3: (A):*Multivariable Calculus (Differentiation):* Limit, continuity and partial derivatives, directional Derivatives, total Derivative; Tangent plane and normal line; Maxima, minima and saddle points; Methodof Lagrange multipliers; Gradient, curl and divergence.

(B): *Multivariable Calculus (Integration)*

Multiple Integration: double and triple integrals (Cartesian and polar), change of order of integration in double integrals, Change of variables (Cartesian to polar), Applications: areas and volumes by (double integration) Center of mass and Gravity (constant and variable densities). Theorems of Green, Gauss and Stokes, orthogonal curvilinear coordinates, Simpleapplications involving cubes, sphere and rectangular parallelepipeds.

Unit – 4 (A): *Matrices (in case vector spaces is not to be taught)*

Algebra of matrices, Inverse and rank of a matrix, rank-nullity theorem; System of linear equations;Symmetric, skew-symmetric and orthogonal matrices; Determinants; Eigenvalues and eigenvectors;Diagonalization of matrices; Cayley-Hamilton Theorem, Orthogonal transformation and quadratic to canonical forms.

(B) Matrices (in case vector spaces is to be taught)

Matrices, vectors: addition and scalar multiplication, matrix multiplication; linear systems ofEquations, linear Independence, rank of a matrix, determinants, Cramer's Rule, inverse of a matrix, Gauss elimination and Gauss-Jordan elimination.

Unit-5 (A): *Vector spaces*

Vector Space, linear dependence of vectors, basis, dimension; Linear transformations (maps), range and kernel of a linear map, rank and nullity, Inverse of a linear transformation, rank nullity theorem, composition of linear maps, Matrix associated with a linearmap.

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SYLLABUS	(SEMESTER-II)	Periods/ Week			Internal Assessment (IA)			ESE	Grand Total	Credits
Subject Code:	PH201TBS02 / PH202TBS04	L	T	P	CT-1	CT-II	TOTAL	70	100	04
Subject:	PHYSICS	3	1	-	15	15	30			

Course Learning Objectives:

- To know the basic principles, effects and applications such as physical, optical parameters used for engineeringapplications.
- To learn about various laws and applications of electromagnetictheory.
- To know the basic structure, working principles and applications of lasers and optical fibre communication.
- To know the basics of semiconductor physics, semiconductor materials and devices and its characterization for advance technologicalapplications
- To familiarize the basis of quantum theory and to make students to solve the physical problems for advancement of thetechnology.

Course Content:

Unit1: Optics: Interference and Diffraction
Introduction, Young's experiment theory of interference, Coherent and non-coherent sources, Fresnel's Bi- prism and Newton's ring experiment.
Diffraction of light, Fresnel and Fraunhofer's diffraction, diffraction due to plane diffraction grating.

Unit2 Electromagnetic Theory
Coulomb's law electrostatics field and potential, electric flux, Gauss' law, Poisson's and Laplace's equation. Equation of continuity for charge conservation, Ampere's and Faraday's laws, Maxwell's Electromagnetic equations.

Unit3 Laser and Fiber optics
Introduction, elementary idea of spontaneous and stimulated emission, active medium population inversion, Einstein's coefficients, Types of lasers and important applications of lasers.
Introduction to optical fibers, basic principles of optical fiber, critical angle numerical aperture, maximum acceptance angle, classification of optical fiber.

Unit4 Semiconductor physics and Devices
Formation of energy in solids, Energy band gap of metals, insulators and semiconductors, classification of semiconductor: Intrinsic and Extrinsic semiconductors, Fermi levels in intrinsic and extrinsic semiconductors, Electrical conductivity in conductors and semiconductors, working of P-N junction diodes and bipolar junction transistor.

Unit5 Introduction to Quantum Mechanics
Introduction to QuantumMechanics, photoelectric effect, Compton effect, wave-particle duality, uncertainty principle, wave function, De-Broglie waves, phase and Group velocity, Davisson and Germer experiment, Schrodinger wave equation, particle in a box (I-Dimensional)

Textbooks/References:

SYLLABUS	(SEMESTER-II)	Periods/ Week			Internal Assessment (IA)			ESE	Grand Total	Credits
Subject Code:	EC201TES01 / EC202TES04	L	T	P	CT-1	CT-II	TOTAL	70	100	04
Subject:	BASIC ELCETRICAL ENGINEERING	3	1	-	15	15	30			

Basic Electrical and Electronics Engineering

Course Learning Objectives:

- To impart a basic knowledge of electrical quantities such as current, voltage, power, energy and.To provide working knowledge for the analysis of basic DC circuits used in electrical and electronicdevices.
- To provide working knowledge for the analysis of basic AC circuits used in electrical and electronicdevices and measuring instruments
- To explain the working principle, construction, applications of Transformer, DC machines and AC machines.
- To make students understand basics of Diodes and Transistors.
- To impart knowledge about basics of Digital Electronics

Unit-I: DC CIRCUITS (8 hours)

Electrical circuit elements (R, L and C), voltage and current sources, Ohm's Law, Kirchoff's current and voltage laws, analysis of simple circuits with dc excitation. Superposition, Thevenin andNorton Theorems. Time-domain analysis of first-order RL and RC circuits. Mesh & nodal analysis, Star- Delta transformation and circuits.

Unit-II: AC CIRCUITS (8 hours)

Representation of sinusoidal waveforms, average and rms values, phasor representation, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), resonance. Three-phase balanced circuits, voltage and current relations in star and delta connections. Three-phase power measurement- Two- Wattmeter method.
Construction and working principle of single-phase wattmeter and energy meter. Introduction to Sensors and Transducers.

UNIT-III: ELECTRICAL MACHINES (8 hours)

Construction, classification, ideal and practical transformer, equivalent circuit, losses in transformers, tests, voltage regulation and efficiency.
Construction, Working Principle, losses and efficiency of DC Machines and three phase Induction Machine, DC motor.

Unit-IV: SEMICONDUCTOR DEVICES AND APPLICATION (8 hours)

Characteristics of PN Junction Diode – Zener Effect – Zener Diode and its Characteristics – Half wave and Full wave Rectifiers – Voltage Regulation. Bipolar Junction Transistor – CB, CE, CC Configurations and Characteristics.

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SYLLAUS	(SEMESTER-II)	Periods/ Week			Internal Assessment (IA)			ESE	Grand Total	Credits
Subject Code:	IT201TES02/ IT202TES05	L	T	P	CT-1	CT-II	TOTAL	70	100	02
Subject:	INTRODUCTION TOINFORMATION TECHNOLOGIES	2	0	-	15	15	30			

Course Objective

1. To illustrate the concepts of cyber security and familiar and aware with various cybercrimes attack and their prevention.
2. To describe the different services model of Cloud Computing and understand Understanding of different evaluating computer model of cloud computing.
3. To relate theoretical concepts with problem solving approach in IoT and assess the comparative advantages and disadvantages of Virtualization technology.
4. To provides the basic knowledge of use appropriate storage and access structures. the student must be able to analyse familiar with the machine learning algorithms and applications of various data science.
5. To integrate classroom learning into an everyday communicative activity in distributed system. Familiar with various web services activity.

Unit 1: -Cyber Security Fundamentals Security Concepts: Authentication, Authorization, Non-repudiation, Confidentiality, Integrity, availability. Cyber Crimes and Criminals: Definition of cyber-crime, types of cyber-crimes and types of cyber-criminals.

Unit 2: **-Cloud Computing Fundamentals**: Motivation for Cloud Computing, The Need for Cloud Computing, Defining Cloud Computing, Definition of Cloud computing, Cloud Computing Is a Service, Cloud Computing Is a Platform, Principles of Cloud computing, Five Essential Characteristics, Four Cloud Deployment Models.

Unit 3: -Internet of Things–Definition and Characteristics of IoT, Physical Design of IoT – IoT Protocols, IoT communication models, IOT Communication APIs IoT enabled Technologies – Wireless Sensor Networks, Cloud Computing, Big data analytics, Communication protocols, Embedded Systems, IoT Levels and Templates Domain Specific IoTs – Home, City, Environment, Energy, Retail, Logistics, Agriculture, Industry, health and Lifestyle.

Unit 4. Data Science: -Introduction and Importance of Data Science, Statistics, Information Visualisation, Data Mining, Data Structures, and Data Manipulation, Algorithms used in Machine Learning, Data Scientist Roles and Responsibilities. Data Acquisition and Data Science Life Cycle.

Unit 5: -Evaluation and Emergence of Web Services – Evaluation of Distributed Computing, Core Distributed Technologies, Challenges in Distributed System, and Introduction to web services, Web Services Architecture, Basic steps of implementing web services

Textbooks/References:

1. Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Nina Godbole and Sunil Belapure, Wiley INDIA.
2. Introduction to Cyber Security, Chwan-Hwa(john) Wu,J.Davidlrwin.CRC Press T&F Group
3. Cloud Computing Principles and Paradigm by RajashekarBuyya, James Broberg, Andhrz M. Wiley 2011.

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SYLLAUS	(SEMESTER-II)	Periods/ Week			Internal Assessment (IA)			ESE	Grand Total	Credits
Subject Code:	EN202THS01	L	T	P	CT-1	CT-II	TOTAL	70	100	03
Subject:	ENGLISHCOMMUNICATION	3	0	-	15	15	30			

Course Learning Objectives

- To build up word power, to brush up the knowledge of English grammar, to develop good writing and speaking skills in thestudents

Course Content:

Unit 1: -VocabularyBuilding
The concept of Word Formation, Root words from foreign languages and their use in English, Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives. Synonyms, antonyms, and standard abbreviations.

Unit 2: -Basic WritingSkills
Sentence Structures, Use of phrases and clauses in sentences, Importance of proper punctuation, Creating coherence, Organizing principles of paragraphs in documents, Techniques for writing precisely

Unit 3: -Identifying Common Errors inWriting
Subject-verb agreement, Noun-pronoun agreement, Misplaced modifiers, Articles, Prepositions, Redundancies,Clichés

Unit 4: -Nature and Style of sensibleWriting
Describing, Defining, Classifying, Providing examples or evidence, Writing introduction and conclusion.

Unit 5: -WritingPractices
Comprehension, Précis Writing, Essay Writing.

Oral Communication (This unit involves interactive practice sessions in LanguageLab)
ListeningComprehension
Pronunciation, Intonation, Stress andRhythm
Common Everyday Situations: Conversations andDialogues
Communication atWorkplace
Interviews
Formal Presentations

Textbooks/References:

1. Practical English Usage. Michael Swan. OUP.1995.
2. Remedial English Grammar. F.T. Wood. Macmillan.2007 (iii)On Writing Well. William Zinsser. Harper Resource Book.2001
3. Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press.2006.
4. Communication Skills. Sanjay Kumar and PushpLata. Oxford University Press.2011.
5. Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford UniversityPress

Course Outcome:

At the end of the course students will be ablelearn a lot of new words. They also learnt the particularities and peculiarities of English grammar. As a result, they could speak and write English with theleast possible error

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SYLLABUS	(SEMESTER-II)	Periods/ Week			INTERNAL ASSESSMENT (IA)			ESE	Grand total	Credits
Subject Code:	PH201PBS01/ PH202PBS02	L	T	P	IA	MSE	TOTAL	20	50	01
Subject:	PHYSICS LAB	-	-	2	30	--	30			

Course Learning Objectives:

- To learn and perform the various practical related to optical components characterization, semiconductor material and devices characterization and know their applications in advance areas such as communication, industries, defence, navigationetc.

Course Content:

LIST OF PRACTICALS:

1. 1. To determine the wavelength of sodium light with help of Fresnel'sBi-prism.
2. To determine the refractive index and dispersive power of the material of prism with the help of spectrometer.
3. To determine the sodium light by Newton's ringmethod.
4. To determine the wavelength of sodium light by plane diffraction grating usingspectrometer.
5. To demonstrate the diffraction pattern and determine the wavelength of different colours of mercury (white) light using plane diffraction grating andspectrometer.
6. To determine the wavelength and number of line per cm on a diffraction grating using semiconductor laserdiode.
7. To determine the specific rotation of sugar solution with the help ofpolarimeter.
8. Determine the width of the single slit and diameter of circular aperture using Fraunhofer diffraction pattern produced by semiconductor laserdiode.
9. To determine the energy band gap (E_g) of a semiconductor material using P-N junctiondiode.
10. To determine the e/m ratio by the Thomson'smethod.
11. To study the P-N junction diode characteristics, in forwarded and reverse biasconditions.
12. To study the Zener diodecharacteristics.
13. To study the characteristics and gain of Transistor in C-B and C-Emode.
14. Determine the Planck'sconstant.

Course Outcomes: On completion of the course, the students would be able to:

- Know about basic optical facts and phenomenon, characterization of optical components anddevices
- To know the basic semiconductor materials and devices and theirapplications
- To know how the performance of semiconductor devices can beimproves.

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SYLLABUS	(SEMESTER-II)	Periods/ Week			INTERNAL ASSESSMENT (IA)			ESE	Grand total	Credits
Subject Code:	ME201PES01/ ME202PES03	L	T	P	IA	MSE	TOTAL	20	50	3
Subject:	ENGINEERING GRAPHICS	1	0	3	30	--	30			

Course Learning Objectives:

- To learn the basic of Engineering Drawing and OrthographicProjections
- To learn the Sections and Sectional Views of Right AngularSolids
- To learn the Isometric Projections covering and overview of ComputerGraphics

UNIT 1:Introduction Engineering Graphics and Engineering Curves: Principles of engineering graphics and their significance – drawing instruments and their use – conventions in drawing – lettering – BIS conventions. Dimensioning rules, geometrical construction. Engineering Curves - Conic Sections, Special Curves-Cycloids, Epicycloids, Hypocycloids, Involutes and trochoid.
UNIT 2:Projection of Points, Straight lines and Planes: Principles of orthographic projections – conventions – first and third angle projections. Projections of points and lines inclined to both the planes. Projections of regular planes, inclined to both planes
UNIT 3:Projections Solids: Introduction, Type of solid, Projections of solids in simple position, Projection of solids with axes inclined to one of the reference planes and parallel to the other, Projections of solids with axes inclined to both H.P. and the V.P.
UNIT 4: Section of Solids and Development of Surfaces: Sectioning of regular solids - Section planes perpendicular to one plane and parallel or inclined to other plane - Development of surfaces of right, regular solids – development of prisms, cylinders, pyramids, cones and their parts.
UNIT 5: Isometric Projections and Orthographic Views: Principles of Isometric Projections-Isometric Scale- Isometric Views Conventions-Plane Figures, Simple and Compound Solids. Conversion of isometric views to orthographic views. Conversion of orthographic views to isometric projections, vice-versa. Introduction to perspective projection.

Computer Aided Drafting: Introduction to computer aided drafting package to make 2-D drawings. Demonstration purpose only - not to be included in examinations.

Textbooks/References:

1. Bhatt N.D., Panchal V.M. & Ingle P.R., (2014), Engineering Drawing, Charotar Publishing House
2. Shah, M.B. & Rana B.C. (2008), Engineering Drawing and Computer Graphics, PearsonEducation
3. Agrawal B. & Agrawal C. M. (2012), Engineering Graphics, TMH Publication
4. Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech Publishers
5. CAD Software Theory and User Manuals

Course Outcomes:

1. At the end of the course, the student shall be able to
2. Draw engineering curves, orthographic projections of lines, planes and solids.
3. Draw sections of solids including cylinders, cones, prisms and pyramids.
4. Make development of surfaces, Orthographic and Isometric projections
5. Overview of Computer Graphics.

SYLLABUS	(SEMESTER-II)	Periods/ Week			INTERNAL ASSESSMENT (IA)			ESE	Grand total	Credits
Subject Code:	ME201PES02 / ME202PES04	L	T	P	IA	MSE	TOTAL	20	50	2
Subject:	WORKSHOP TECHNOLOGY & PRACTICES	1	0	2	30	--	30			

Course objectives:

- To impart student knowledge on various hand tools for usage in engineeringapplications.
- Be able to use analytical skills for the production ofcomponents.
- Design and model different prototypes using carpentry, sheet metal andwelding.
- Make electrical connections for dailyapplications.
- To make student aware of safety rules in workingenvironments.

Course Content:
Lectures & videos:
1. Manufacturing Methods- casting, forming, machining, joining, advanced manufacturing methods (3lectures)
2. CNC machining, Additive manufacturing
3. Fitting operations & power tools
4. Electrical &Electronics
5. Carpentry
6. Plastic moulding, glass cutting
7. Metal casting
8. Welding (arc welding & gas welding), brazing

Textbooks/References:

1. Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K., "Elements of WorkshopTechnology", Vol. I 2008 and Vol. II 2010, Media promoters and publishersprivate limited,Mumbai.
2. Kalpakjian S. And Steven S. Schmid, "Manufacturing Engineering and Technology", 4th edition, Pearson Education India Edition,2002.
3. Gowri P. Hariharan and A. Suresh Babu, "Manufacturing Technology – I" Pearson Education, 2008. (iv)Roy A. Lindberg, "Processes and Materials of Manufacture", 4thedition, PrenticeHallIndia, 1998.
4. Rao P.N., "Manufacturing Technology", Vol. I and Vol. II, Tata Mc-Graw Hill House,2017.

Course Outcomes: At the end of the course students will be able to:

- Make half lap joint, Dovetail joint and Mortise &Tenonjoint
- Produce Lap joint, Tee joint and Butt joint using Gaswelding
- Prepare trapezoidal tray, Funnel and T-joint using sheet metaltools
- Make connections for controlling one lamp by a single switch, controlling two lamps by a singleswitch and stair casewiring

SYLLABUS	(SEMESTER-II)	Periods/ Week			INTERNAL ASSESSMENT (IA)			ESE	Grand total	Credits
Subject Code:	EC201PES03/ EC202PES05	L	T	P	IA	MSE	TOTAL	20	50	1
Subjects Subject:	BASIC ELECTRICAL ENGINEERING LAB	-	-	2	30	--	30			

Course Learning Objectives:

1. To understand basic electrical wiring, measurements,errors and method.
2. To practically provide the concept of different theorems.
3. To have actually hands-on on machines like transformers, DC and AC machines to get better understanding.
4. To get experimental knowledge of Diodes and Transistors
5. To make students learn Digital logic design.

Course Content:

List of experiments/demonstrations:

- Basic safety precautions. Introduction and use of measuring instruments – voltmeter, ammeter, multi-meter, oscilloscope. Real-life resistors, capacitors and inductors.
- Measuring the steady-state and transient time-response of R-L, R-C, and R-L-C circuits to a step change in voltage (transient may be observed on a storage oscilloscope).
- Sinusoidal steady state response of R-L, and R-C circuits – impedance calculation and Verification. Observation of phase differences between current and voltage. Resonance in R-L-C circuits.
- Transformers: Polarity test, OC & SC tests. Loading of a transformer: measurement of primary and secondary voltages and currents and power.
- Demonstration of cut-out sections of machines: dc machine (commutator-brush arrangement), induction machine (squirrel cage rotor), and single-phase induction machine.
- Study of Diodes and transistors characteristics
- Study of full-wave and half-wave rectifier
- Verification of De Morgan's theorems.
- Study of Logic gates
- Study of half and full adder

Course Outcomes: At the end of the course students will be able to:

- Acquire knowledge about different types of meters and take readings and Construct circuits and measure different electrical quantities.
- Analyze Single Phase and Three phase AC Circuits, the representation of alternating quantities and determining the power in these circuits
- Work on machines like transformers

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SYLLABUS	Periods/	Periods/ Week			Internal Assessment (IA)			ESE	Grand Total	Credits
Subject Code:	MA202TBS03	L	T	P	CT-I	CT-II	TOTAL	70	100	4
Subject:	MATHEMATICS-II	3	1	-	15	15	30			

Course Content:

Unit 1: First order ordinary differential equations: Exact, linear and Bernoulli's equations, Euler's equations, Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut'stype.

Unit 2: Ordinary differential equations of higher orders (Prerequisite 2c, 4a) second order linear differential equations with variable coefficients, method of variation of parameters, Cauchy-Euler equation; Power series solutions; Legendre polynomials, Bessel functions of the first kind and their properties.

Unit 3: Partial Differential Equations – First order (Prerequisite 5a-b): First order partial differential equations, solutions of first order linear and non-linear PDEs.

Unit 4: Partial Differential Equations– Higher order(Prerequisite 5b-c) Solution to homogenous and non-homogenous linear partial differential equations second and higher order by complimentary function and particular integral method. Flows, vibrations and diffusions, second-order linear equations and their classification, Initial and boundary conditions (with an informal description of well-posed problems).

Unit 5:D'Alembert's solution of the wave equation; Duhamel's principle for one dimensional wave equation. Separation of variables method to simple problems in Cartesian coordinates. The Laplacian in plane, cylindrical and spherical polar coordinates, solutions with Bessel functions and Legendre functions. One dimensional diffusion equation and its solution by separation of variables. Boundary-value problems: Solution of boundary- value problems for various linear PDEs in variousgeometries.

Textbooks/References:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley &Sons,2006.
2. W. E. Boyce and R. C. DiPrima, Elementary Differential Equations and Boundary Value Problems, 9th Edition, Wiley India,2009.
3. S. L. Ross, Differential Equations, 3rd Ed., Wiley India,1984.
4. E. A. Coddington, An Introduction to Ordinary Differential Equations, Prentice Hall India,1995.
5. E. L. Ince, Ordinary Differential Equations, Dover Publications,1958.
6. G.F. Simmons and S.G. Krantz, Differential Equations, Tata McGraw Hill,2007.
7. S. J. Farlow, Partial Differential Equations for Scientists and Engineers, Dover Publications,1993.
8. R. Haberman, Elementary Applied Partial Differential equations with Fourier Series and Boundary Value Problem, 4th Ed., Prentice Hall,1998.
9. Ian Sneddon, Elements of Partial Differential Equations, McGraw Hill,1964.
10. Manish Goyal and N.P. Bali, Transforms and Partial Differential Equations, University Science Press, Second Edition,2010
11. Denianmurry,defferential equations ,oxfordpublications

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SYLLABUS	(SEMESTER-I)	Periods/ Week			Internal Assessment (IA)			ESE	Grand Total	Credits
Subject Code:	CY201TBS02/ CY202TBS04	L	T	P	CT-1	CT-II	TOTAL	70	100	04
Subject:	CHEMISTRY	3	1	-	15	15	30			

Course Learning Objectives:

The objective of this Course is to:

- To make aware and enrich the the students about the basic concept and understanding of chemical concepts of basic Chemistry and spectroscopictechniques.

Course Content:

UNIT-1: I Concept of Quantum Energy and Spectroscopy: Quantization of Energy, Regions of spectrum. Electronic Spectroscopy: Electronic Transition, Woodward Fieser rules for calculating λ_{max} of conjugated dienes & α, β-unsaturated carbonyl compound, various shifts in λ_{max} and intensities. Infra-Red Spectroscopy: Conditions for Infra-Red Spectroscopy, Molecular vibrations & factors affecting Infra-Red frequencies.

UNIT-2: Chemical Bonding in Molecules: Introduction of chemical bonding, VSEPER Theory, V.B.Theory and Molecular Orbital Theory. Energy level diagrams of diatomic molecules and ions.

UNIT-3: Concept of Chirality, Enantiomers, Diastereomers,Meso-compounds and Racemic mixtures. Conformation of Acyclic hydrocarbons (Ethane, Propane & n-Butane) and cyclic hydrocarbon (Cyclohexane), Plane of symmetry, Centre of symmetry, Absolute and Relative Configuration (R &S, D & L and E & Z).

UNIT -4: Reactivity of Organic Molecules, Factors influencing acidity, basicity and nucleophilicity of molecules, kinetic vs thermodynamic control of reactions.

UNIT -5: Strategy for Synthesis of Organic Compounds: Reaction intermediates: Stability of Free Radicle, Carbocation and Carbanion. Introduction to reaction involving Addition, Elimination, Substitution and Ring opening and Cyclization.

Textbooks/References:

1. Engineering Chemistry by Jain and Jain; Dhanpat Rai PublicationCo.
2. Engineering Chemistry by Shikha Agarwal; Cambridge University Press, 2015edition.
3. Engineering Chemistry of Wiley India Pvt. Ltd., Vairam and others, 2014 edition(second).
4. Engineering Chemistry by Prasanth Rath, Cengage Learning, 2015edition.
5. A textbook of Engineering Chemistry by S. S. Dara; S. Chand & Co Ltd., LatestEdition
6. Applied Chemistry by H.D. Gesser, SpringerPublishers
7. Textbook of Nano-science and nanotechnology by B.S. Murthy, P. Shankar and others, University Press,IIM
8. B. Siva Shankar, "Engineering Chemistry", Tata Mc Graw Hill Publishing Limited, 3rd Edition, 2015.
9. S. S. Dara, Mukkanti, "Text of Engineering Chemistry", S. Chand & Co, New Delhi, 12th Edition, 2006.
10. C. V. Agarwal, C. P. Murthy, A. Naidu, "Chemistry of Engineering Materials", Wiley India, 5th Edition, 2013.

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SYLLABUS	(SEMESTER-I)	Periods/ Week			Internal Assessment (IA)			ESE	Grand Total	Credits
Subject Code:	CE201TES01 / CE202TES03	L	T	P	CT-1	CT-II	TOTAL	70	100	04
Subject:	ENGINEERING MECHANICS	3	1	-	15	15	30			

Course Learning Objectives:

To learn about

- The concepts Force systems, free body diagrams, resultant of forces and equations of equilibrium, Supports and support reactions and calculation ofCentroid
- The Concept of moment of inertia of plane figures, Laws and applications offriction
- The Analysis of the truss and determination of axial forces by Method ofJoints
- Motion of a body and their relationships and application of D Alembert's principle in rectilinear and curvilinearmotions

Course Content:

UNIT- 1: Introduction to Engineering Mechanics covering, Force Systems Basic concepts, Particle equilibrium in 2-D & 3-D; Rigid Body equilibrium; System of Forces, Coplanar Concurrent Forces, Components in Space – Resultant- Moment of Forces and its Application; Couples and Resultant of Force System, Equilibrium of System of Forces, Free body diagrams, Equations of Equilibrium of Coplanar Systems and Spatial Systems

UNIT-2: Friction covering, Types of friction, Limiting friction, Laws of Friction, Static and Dynamic Friction; Motion ofBodies.
Basic Structural Analysis covering, Equilibrium in three dimensions; Method of Sections; Method of Joints; Simple Trusses; Zero force members.

UNIT 3: Centroid and Centre of Gravity covering, Centroid of simple figures from first principle, centroid of composite sections; Centre of Gravity and its implications; Area moment of inertia- Definition, Moment of inertia of plane sections from first principles, Theorems of moment of inertia, Moment of inertia of standard sections and composite sections.

UNIT-4: Virtual Work and Energy Method-Virtual displacements, principle of virtual work for particle and ideal system of rigid bodies, degrees of freedom. Active force diagram, systems with friction, mechanical efficiency.
Review of particle dynamics- Rectilinear motion; Newton's 2nd law (rectangular, path, and polar coordinates). Work-kinetic energy, power, potential energy. Impulse-momentum (linear, angular); Impact (Direct andoblique).

UNIT-5: Introduction to Kinetics of Rigid Bodies covering, Basic terms, general principles in dynamics; Types of motion, Instantaneous centre of rotation in plane motion and simple problems; D'Alembert's principle and its applications in plane motion and connected bodies; Work energy principle and its application in plane motion of connected bodies; Kinetics of rigid body rotation;

SYLLABUS	(SEMESTER-I)	Periods/ Week			Internal Assessment (IA)			ESE	Grand Total	Credits
Subject Code:	CS201TES02 / CS202TES04	L	T	P	CT-1	CT-II	TOTAL	70	100	03
Subject:	COMPUTER PROGRAMMING	3	0	-	15	15	30			

Course Learning Objectives:

- To understand the basic of Idea ofAlgorithm.
- To understand the programing concept of Arithmetic expressions and BasicAlgorithms
- To learn the Functions and Structure ofarray.

Course Content:

UNIT-1: Introduction to Programming
Introduction to components of a computer system (disks, memory, processor, where a program is stored and executed, operating system, compilers etc.) -
Idea of Algorithm:steps to solve logical and numerical problems. Representation of Algorithm: Flowchart/Pseudo code with examples.From algorithms to programs; source code, variables (with data types) variables and memory locations,Syntax and Logical Errors in compilation, object and executablecode.

UNIT-2: **Arithmetic expressions and precedence**
Conditional Branching and Loops, Writing and evaluation of conditionals and consequent branching Iteration and loops, **Arrays** (1-D, 2-D), Character arrays and strings

UNIT-3: Basic Algorithms
Searching,concept of binary search etc, Basic Sorting Algorithms Bubble sort etc,Finding roots of equations, introduction of Algorithm complexity

UNIT-4: Function
Functions (including using built in libraries), Parameter passing in functions, call by value, passing arrays to functions: idea of call by reference binary search etc.
Recursion functions Recursion, as a different way of solving problems. Example programs, such as, Finding Factorial, Fibonacci series, etc.

UNIT -5: Structure
Structures, Defining structures and Array of Structures
Pointers Idea of pointers, defining pointers, Use of Pointers in self-referential structures, notion of linked list (no implementation)

Textbooks/References:

1. Byron Gottfried, Schaum's Outline of Programming with C,McGraw-Hill
2. E. Balaguruswamy, Programming in ANSI C, TataMcGraw-Hill

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B. TECH. FIRST YEAR SYLLABUS (W.E.F SESSION 2020-21)

SYLLABUS	(SEMESTER-I)	Periods/ Week			Internal Assessment (IA)			ESE	Grand Total	Credits
Subject Code:	CM201TES03 / CM202TES05	L	T	P	CT-1	CT-II	TOTAL	70	100	03
Subject:	BASIC CIVIL & MECHANICAL ENGINEERING	3	0	-	15	15	30			

Course Learning Objectives:

- To studythe properties and uses ofbasic civil engineering materials.
- To study the importance of NBC, IS Codes (materials), types of buildings and foundations, basic requirements of foundations.
- To study the basic types of surveys, linear and angular measurements, and GPS measurements
- To familiarize with the fundamentals of heat and work interactions, heat transfer mechanisms and energy conversion processes.
- To provide exposure to various engineering materials and processes of manufacturing.
- To impart basic knowledge of the interdisciplinary nature of engineering systems.

UNIT 1: Civil Engineering Materials: Properties &Uses of Stones, Bricks, Cement, Aggregates, Steel,Concrete-quality of good concrete, strength, curing and grade of concrete, standard tests on concrete.IS Codes and classification

UNIT 2: National Building Code (NBC), Salient features, Classification of Building as per NBC(India), Site selection for buildings - Components of building, Foundations-Introduction, Types of Foundations & its Suitability, Basic requirements and purpose of foundation on different soils.
Brief description about: Brick & stone masonry, Plastering, Lintels; Doors &Windows, Beams &columns, Formwork, Roofs.

UNIT 3: Surveying: Objects, uses, Basic principle, Classification, Plans&Maps, Scales, Units of measurement, Conventional symbols, Different survey equipment.
Measurements– Linear &Angular, levelling, Determination of Area & Volume, Introduction to Triangulation and GPS

UNIT 4: Materials and Manufacturing
Introduction to engineering materials – metals, alloys, composites, smart materials, phase-change materials; Introduction to various processes of manufacturing – conventional machine tools – lathe and its types, shaping, milling and related operations – turning, threading, knurling, etc., unconventional methods.

UNIT 5: Automobile and Refrigeration and Air conditioning
Theoretical thermodynamic cycles and working principle of Petrol and Diesel Engines – Hybrid and Electric Vehicle - Turbines, Pumps, Compressors. Principle of vapour compression and absorption refrigeration system– Layout of typical domestic refrigerator–Window and Split type room Air conditioner. Introduction to renewable energy utilization and technology.

Textbooks/References:

1. Punmia, B.C, Ashok Kumar Jain, Arun Kumar Jain, Basic Civil Engineering, Lakshmi Publishers, 2012.
2. SatheeshGopi, Basic Civil Engineering, Pearson Publishers, 2009.
3. Rangwala, S.C, Building materials, Charotar Publishing House, Pvt. Limited, Edition 27, 2009.
4. Palanichamy, M.S, Basic Civil Engineering, Tata McGraw Hill, 2000.
5. Elements of Workshop Technology Vol. 1 – S.K. HajraChoudhary, A.K. HajraChoudhary – Media promoters & Publishers Pvt. Ltd.

SYLLABUS	(SEMESTER-I)	Periods/ Week			INTERNAL ASSESSMENT (IA)			ESE	Grand total	Credits
Subject Code:	CY201PBS01 / CY202PBS02	L	T	P	IA	MSE	TOTAL	20	50	01
Subject:	CHEMISTRY LAB	0	0	2	30	-	30			

Course Learning Objectives:

The Lab sessions would help in learning:

- Application of iodometrically& titration inlab.
- Recognition of different chemicalreaction.
- Advanced lab methods like Spectrophotometry andchromatography

Course Content:

Group – A:

1. Standardization of sodium thiosulphate solution by standard potassium dichromatesolution.
2. To determine the Normality and Strength (g/L) of given Ferrous Ammonium Sulphate solution 'A' using standard Ferrous Ammonium Sulphate (N/30) solution 'B' taking KMnO4 solution as anintermediate.
3. To determine the concentration of hypo solution ($Na_2S_2O_3.5H_2O$) iodometrically with given Iodine (N/50)solution.
4. Find out the Temporary hardness of given water sample using 0.01M EDTA solution,buffer solution (pH-10) and EBT as anindicator.
5. To determine chloride ion in a given water sample by Argentometric method (Mohr'smethod)

Group – B:

6. Preparation of Urea Formaldehyderesin.
7. Acetylation of Primary Amine: Preparation ofAcetanilide.
8. Base Catalyzed Aldol Condensation: Synthesis ofdibenzalpropanone.
9. [4+2] Cycloaddition Reaction: Diels-Alderreaction.
10. Preparation of aspirin and calculate itsyield.

Group – C:

11. To calculate the λ_{max} of a given compound using UV-visiblespectrophotometer.
12. To separate the metallic ions by paperchromatography.
13. To determine the surface tension of a liquid bystalagmometer.
14. To determine the percentage composition of the given mixture consisting of two liquids A and B (non- interacting system) by viscositymethod.
15. To determine the relative viscosity of given liquids by Ostwald'sviscometer.

Note: At least two Experiments from each group must be performed.

Course Outcomes- On completion of the course, the students will be able to handle the chemicals of synthesis as well as titration that will ultimately make them efficient and develop their future chemistry laboratoryskills

SYLLABUS	(SEMESTER-I)	Periods/ Week			INTERNAL ASSESSMENT (IA)			ESE	Grand total	Credits
Subject Code:	CE2011ES01/ CE202PES04	L	T	P	IA	MSE	TOTAL	20	50	1
Subject:	ENGG MECHANICS LAB	-	-	2	30	--	30			

Course objectives:

- To perform the practical giving basic understanding to fundamental principles of mechanics like parallelogram of forces, triangle of forces and polygon of forces by universal forcetable
- To perform the practical giving basic understanding to fundamental application of mechanics like screw jack, winch crab and simple wheel andaxle

Course Content:

List of Experiments

1. Verification of law of parallelogram offorces.
2. Verification of law of triangle offorces.
3. Verification of law of polygon of forces by universal forcetable.
4. Verification of law of moment by parallel forcesapparatus.
5. Practical verification of forces in the member of jibcrane.
6. Practical verification of forces in the member of thetruss.
7. Determination of coefficient of friction between two given surfaces by inclined planemethod.
8. Determination of efficiency of simple screwjack.
9. Determination of efficiency of single purchase winchcrab.
10. Determination of efficiency of double purchase winchcrab.
11. Determination of efficiency of simple wheel andaxle.

Course Outcome: At the end of the course students will be able to:

- Verify the fundamental principles of mechanics like parallelogram of forces, triangle of forces and polygon of forces by universal forcetable
- Analyze the friction coefficient between twosurfaces
- Calculate the efficiency of screw jack, winch crab and wheel andaxle

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SYLLABUS	(SEMESTER-I)	Periods/ Week			INTERNAL ASSESSMENT (IA)			ESE	Grand total	Credits
Subject Code:	CS201PES02 / CS202PES05	L	T	P	IA	MSE	TOTAL	20	50	01
Subject:	COMPUTER PROGRAMMING LAB	-	-	2	30	--	30			

Course Learning Objectives:

- To learn the Branching and logical expressions andLoops
- To learn the Arrays andFunction
- To understand the Numerical methods andRecursion

Course Content:
The laboratory should be preceded or followed by a tutorial to explain the approach or Algorithm to be implemented for the problem given.]

Tutorial 1: Problem solving using computers:
Lab1: Familiarization with programming environment

Tutorial 2: Variable types and type conversions:
Lab 2: Simple computational problems using arithmetic expressions

Tutorial 3: Branching and logical expressions:
Lab 3: Problems involving if-then-else structures

Tutorial 4: Loops, while and for loops:
Lab 4: Iterative problems e.g., sum of series

Tutorial 5: 1D Arrays: searching, sorting:
Lab 5: 1D Array manipulation

Tutorial 6: 2D arrays and Strings
Lab 6: Matrix problems, String operations

Tutorial 7: Functions, call by value:
Lab 7: Simple functions

Tutorial 8 &9: Numerical methods (Root finding, numerical differentiation, numerical Integration):
Lab 8 and 9: Programming for solving Numerical methods problems

Tutorial 10: Recursion, structure of recursive calls
Lab 10: Recursive functions

Tutorial 11: Pointers, structures and dynamic memory allocation
Lab 11: Pointers and structures

Course Outcomes- At the end of the course students will be able to

- Utilization of Branching and logical expressions and Loops, Arrays and Function and Numerical methods and Recursion for writing the programmes for various engineeringapplications

Sub Code	L	T	P	Duration	IA	ESE	Total	Credits
EC203TPC01	3	0	-	3 hours	30	70	100	3

ELECTRONIC DEVICES

Course Objectives:

1. To develop basic concept of semiconductor materials and physics.
2. To introduce different methods of DC analysis and AC models of semiconductor devices.
3. To develop the concept and analysis of transistor characteristics, biasing and thermal stabilization.
4. To help students develop various designs of Amplifiers and its applications
5. To Analyze and perform the theoretical concepts through laboratory and simulation experiments.

Syllabus Content:

UNIT-I: Semiconductor concept: Metals, Insulators and Semiconductors, Electrical properties of Ge and Si, Conductivity Equation, Mobility and Conductivity, Electron and holes in intrinsic and extrinsic semiconductors, Donor and Acceptor Impurities,

Electrons in periodic Lattices, E-k diagrams. Energy bands in intrinsic and extrinsic silicon, Transport Phenomena of semiconductor, Generation and recombination of carriers, Charge density in Semiconductor, Hall Effect, Injected minority charge carriers, Potential variation within graded semiconductor.

Junction Diode Characteristics: Properties of P-N junction, Open circuited P-N junction, V-I characteristics, Temperature dependence of V-I characteristics, Diode resistance, Current component of PN diode: Space charge capacitance, Charge control description of a diode, Diffusion capacitance, Junction diode switching times, Breakdown mechanism.

UNIT-II: Diode Circuits: Load line concepts, Graphical analysis, Clipper circuit, Clamper, Comparator, Rectifier, Full wave circuits, Filter circuits: Inductor filter, Capacitor filter, LC filter, Multiple LC filter, CLC or □ filter, Zener diode regulator circuit.

Other Diodes: Negative conductance in semiconductors- Tunnel diode, Photo diode - Photo voltaic effect, Solar cells, Schottky Diode, Varactor Diode, Avalanche diode, PIN diode, LED, LASER.

UNIT-III: Transistor Characteristics: Junction Transistor, Transistor current components, Transistor as an amplifier, Transistor construction, Transistor circuit configuration (CB, CE, CC)- Analytical Expression for transistor characteristics and Operation, Early Effect, Ebers-Moll Model, □-re model, Transistor as a switch.

Transistor Biasing and Thermal Stabilization: The operating point, Bias stability, Stability factor- Stabilization against variation in I_{CO}, V_{BE} and □, Emitter bias, Collector – to – base bias, Voltage divider bias with emitter bias, Emitter bypass capacitor. Bias compensation.

UNIT-IV: Field Effect Transistor (FET): JFET Construction, Operation, V-I characteristics, Transfer characteristics, Drain characteristics. Metal Oxide Semiconductor Field Effect Transistor (MOSFET)- Construction, Operation and characteristics, Depletion MOSFET, Enhancement MOSFET,

Sub Code	L	T	P	Duration	IA	ESE	Total	Credits
EC203TPC02	3	0	-	3 hours	30	70	100	3

DIGITAL LOGIC DESIGN

Course Objectives:

1. To understand number representation and conversion between different representation in digital electronic circuits.
2. To analyze logic processes and implement logical operations using combinational logic circuits.
3. To understand characteristics of memory and their classification.
4. To understand concepts of sequential circuits and to analyze sequential systems in terms of state machines.
5. To understand concept of Programmable Devices, PLA, PAL.

Syllabus Content:

UNIT – I **CODES: Binary codes:** Introduction & usefulness, Weighted & non-weighted codes, Sequential codes, Self complementing codes, Cyclic codes, 8-4-2-1 BCD code, Excess-3 code, Grey code: Binary to Grey and Grey to Binary code conversion, Error detecting code, Error correcting code, 7-bit Hamming code, ASCII code, EBCDIC code.

Realization of Boolean Expressions: Reduction of Boolean Expressions using Laws, Theorems and Axioms of Boolean Algebra, Boolean expressions and logic diagram, Converting AND/OR/Invert logic to NAND/NOR logic, SOP and POS Forms and their Realization.

UNIT – II **MINIMIZATION TECHNIQUES: Binary codes:** Expansion of a Boolean expression to SOP form, Expansion of a Boolean expression to POS form, 2,3 & 4 variable K-map: Mapping and minimization of SOP and POS expressions. Completely and Incompletely Specified Function-Concept of Don't Care Terms.

UNIT – III **COMBINATIONAL CIRCUITS:** Adder & Subtractor: Half-adder, Full-adder, Half-subtractor, Full subtractor, Parallel binary adder, Look Ahead carry adder, Serial adder, BCD adder, Code converter, Parity bit generator/checker, Comparator. Decoder: 3-line to 8-line decoder, 8-4-2-1 BCD to Decimal decoder, BCD to 7 segment decoder. Encoder: Octal to Binary and Decimal to BCD encoder. Multiplexer: 2-input multiplexer, 4-input multiplexer, 16-input multiplexer. Demultiplexer: 1-line to 4-line & 1-line to 8-line demultiplexer, Multiplexer as Universal Logic Function Generator, Programmed Array Logic (PAL), PLA and PLD.

UNIT – IV **SEQUENTIAL CIRCUITS:** Flip-Flop & Timing Circuits: S-R Latch, Gated S-R Latch, D Latch, J-K Flip-Flop, T Flip-Flop, Edge-triggered S-R, D, J-K, T Flip-Flops, Master-Slave Flip-Flop, Direct Preset and Clear Inputs, Shift Registers: PIPO, SIPO, PISO, SISO, Bi-directional Shift Registers, Universal Shift Registers, Counter: Asynchronous Counter: Ripple Counter, Design of Asynchronous Counter, Effect of propagation delay in Ripple Counter, Synchronous Counter: 4-bit Synchronous Up Counter, 4-bit Synchronous Down Counter, Design of Synchronous Counter, Ring Counter, Jhonson Counter, Pulse Train generators using Counter, Design of Sequence generator.