



EXCEL ENGINEERING COLLEGE

(Autonomous)

Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai
Accredited by NBA, NAAC with "A+" and Recognised by UGC (2f & 12B)
KOMARAPALAYAM – 637303

DEPARTMENT OF COMPUTER SCIENCE AND BUSINESS SYSTEMS

B.Tech Computer Science and Business Systems

REGULATION 2020

I to VIII Semesters Curriculum

I – SEMESTER									
Code No.	Course	Category	Periods /Week			C	Maximum Marks		
			L	T	P		CA	FE	Total
Theory Course(s)									
20MA103	Mathematics – I for Computer Sciences	BS	3	2	0	4	40	60	100
20CS101	Computer Hardware and Networking	ES	3	0	0	3	40	60	100
Theory with Practical Courses									
20ENEXX	Language Elective – I*	HSS	2	0	2	3	50	50	100
20PH101	Physics for Computer Sciences	BS	3	0	2	4	50	50	100
20CS102	Problem Solving using Python	ES	3	0	2	4	50	50	100
Practical Course									
20CS103	Computer Practices Laboratory	ES	0	0	2	1	50	50	100
Mandatory Course									
20MC101	Induction Programme	MC	2 Weeks			0	100	-	100
TOTAL			14	2	8	19	380	320	700

Language Electives – I									
Code No.	Course	Category	Periods /Week			C	Maximum Marks		
			L	T	P		CA	FE	Total
20ENE01	Communicative English	HSS	2	0	2	3	50	50	100
20ENE02	Advanced Communicative English	HSS	2	0	2	3	50	50	100

II- SEMESTER									
Code No.	Course	Category	Periods /Week			C	Maximum Marks		
			L	T	P		CA	FE	Total
Theory Courses									
20MA203	Mathematics – II for Computer Sciences	BS	3	2	0	4	40	60	100
20CB202	Programming and Data Structures	PC	3	0	0	3	40	60	100
Theory with Practical Courses									
20ENEXX	Language Elective – II*	HSS	2	0	2	3	50	50	100
20CH201	Chemistry for Computer Sciences	BS	3	0	2	4	50	50	100
20ME203	Engineering Graphics	ES	1	0	4	3	50	50	100
Practical Course									
20CB203	Programming and Data Structures Laboratory	PC	0	0	4	2	50	50	100
Mandatory Course									
20MC202	Interpersonal Skills	MC	0	0	2	0	100	-	100
Total			12	2	14	19	380	320	700

Language Electives – II									
Code No.	Course	Category	Periods /Week			C	Maximum Marks		
			L	T	P		CA	FE	Total
20ENE02	Advanced Communicative English	HSS	2	0	2	3	50	50	100
20ENE03	Hindi	HSS	2	0	2	3	50	50	100
20ENE04	French	HSS	2	0	2	3	50	50	100
20ENE05	German	HSS	2	0	2	3	50	50	100

III – SEMESTER									
Code No.	Course	Category	Periods / Week			C	Maximum Marks		
			L	T	P		CA	FE	Total
Theory Course(s)									
20MA303	Discrete Mathematics and Graph Theory	BS	3	2	0	4	40	60	100
20CB301	Design and Analysis of Algorithms	PC	3	0	0	3	40	60	100
20CB302	Object Oriented Programming	PC	3	0	0	3	40	60	100
20CB303	Fundamentals of Economics	PC	3	0	0	3	40	60	100
Theory with Practical Courses									
20EC306	Digital Logics and Microprocessor	ES	3	0	2	4	50	50	100
20CB304	Operating Systems	PC	3	0	2	4	50	50	100
Practical Course									
20CB305	Object Oriented Programming Laboratory	PC	0	0	4	2	50	50	100
Mandatory Course									
20MC201	Environmental Sciences	MC	2	0	0	0	100	-	100
TOTAL			20	2	8	23	410	390	800

IV – SEMESTER									
Code No.	Course	Category	Periods / Week			C	Maximum Marks		
			L	T	P		CA	FE	Total
Theory Course(s)									
20MA403	Probability and Statistics	BS	3	2	0	4	40	60	100
20CB401	Introduction to Business Systems	PC	3	0	0	3	40	60	100
20CB402	Software Engineering	PC	3	0	0	3	40	60	100
20CB403	Computational Statistics	PC	3	0	0	3	40	60	100
Theory with Practical Courses									
20CB404	Database Management Systems	PC	3	0	2	4	50	50	100
20CB405	Computer Graphics and Multimedia	PC	3	0	2	4	50	50	100
Practical Course									
20CB406	Business Communication and Value Science Laboratory	PC	0	0	4	2	50	50	100
Mandatory Course									
20MC401	Soft Skills	MC	2	0	0	0	100	-	100
TOTAL			20	2	8	23	410	390	800

V – SEMESTER									
Code No.	Course	Category	Periods / Week			C	Maximum Marks		
			L	T	P		CA	FE	Total
Theory Course(s)									
20CB501	Software Architecture	PC	3	0	0	3	40	60	100
20CB502	Software Design using UML	PC	3	0	0	3	40	60	100
20CBSXX	Professional Elective - I	PE	3	0	0	3	40	60	100
20YYOXX	Open Elective - I	OE	3	0	0	3	40	60	100
Theory with Practical Courses									
20CB503	Object Oriented Analysis and Design	PC	3	0	2	4	50	50	100
20CB504	Cloud Computing Services	PC	3	0	2	4	50	50	100
Practical Course									
20CB506	Mini Project (Software/ System Design/Architecture)	EEC	0	0	2	1	50	50	100
TOTAL			18	0	6	21	310	390	700

VI – SEMESTER									
Code No.	Course	Category	Periods / Week			C	Maximum Marks		
			L	T	P		CA	FE	Total
Theory Course(s)									
20CB601	Artificial Intelligence	PC	3	0	0	3	40	60	100
20CB602	Compiler Design	PC	3	0	0	3	40	60	100
20CB603	Fundamentals of Management	PC	3	0	0	3	40	60	100
20CBSXX	Professional Elective - II	HSS	3	0	0	3	40	60	100
20YYOXX	Open Elective - II	OE	3	0	0	3	40	60	100
Theory with Practical Courses									
20CB604	Computer Networks	PC	3	0	2	4	50	50	100
Practical Course									
20CB605	Business Analytics Laboratory	PC	0	0	2	1	50	50	100
20CB606	Artificial Intelligence Laboratory	PC	0	0	4	2	50	50	100
20CB607	Internship	EEC	2 Weeks			1	100	-	100
TOTAL			18	0	8	23	450	450	900

VII – SEMESTER									
Code No.	Course	Category	Periods / Week			C	Maximum Marks		
			L	T	P		CA	FE	Total
Theory Course(s)									
20CB701	Financial Management	PC	3	0	0	3	40	60	100
20CBSXX	Professional Elective - III	PE	3	0	0	3	40	60	100
20CBSXX	Professional Elective - IV	PE	3	0	0	3	40	60	100
20YYOXX	Open Elective - III	OE	3	0	0	3	40	60	100
Theory with Practical Courses									
20CB702	WebTechnology	PC	3	0	2	4	50	50	100
20CB703	IoT Fundamentals and Architecture	PC	3	0	2	4	50	50	100
Practical Course									
20CB704	Design Project	EEC	0	0	2	1	50	50	100
TOTAL			18	0	6	21	310	390	700

VIII – SEMESTER									
Code No.	Course	Category	Periods / Week			C	Maximum Marks		
			L	T	P		CA	FE	Total
Theory Course(s)									
20CBSXX	Professional Elective - V	PE	3	0	0	3	40	60	100
20CBSXX	Professional Elective - VI	PE	3	0	0	3	40	60	100
Practical Course									
20CB801	Major Project	EEC	0	0	20	10	50	50	100
TOTAL			6	0	20	16	130	170	300

Open Electives									
Code No.	Course	Category	Periods / Week			C	Maximum Marks		
			L	T	P		CA	FE	Total
20CBO01	Big data Tools & Analytics	OE	3	0	0	3	40	60	100
20CBO02	IOT Architecture and Protocols	OE	3	0	0	3	40	60	100
20CBO03	Programming in C	OE	3	0	0	3	40	60	100
20CBO04	GPU Architecture and Programming	OE	3	0	0	3	40	60	100
20CBO05	Software Project Management	OE	3	0	0	3	40	60	100
20CBO06	Foundations of Block chain Technology	OE	3	0	0	3	40	60	100
20CBO07	Principles of Cloud Computing	OE	3	0	0	3	40	60	100
20CBO08	Cyber Security and Ethical Hacking	OE	3	0	0	3	40	60	100
20CBO09	Multimedia and Animation	OE	3	0	0	3	40	60	100
20CSO10	Java Programming	OE	3	0	0	3	40	60	100

Stream I : Artificial Intelligence & Machine Learning									
Code No.	Course	Category	Periods / Week			C	Maximum Marks		
			L	T	P		CA	FE	Total
20CBS01	Deep Learning Techniques	PE	3	0	0	3	40	60	100
20CBS02	Neural Networks and Fuzzy Logic	PE	3	0	0	3	40	60	100
20CBS03	Robotics and Intelligent Systems	PE	3	0	0	3	40	60	100
20CBS04	Business Intelligence	PE	3	0	0	3	40	60	100
20CBS05	Computer Vision and Applications	PE	3	0	0	3	40	60	100
20CBS06	Optimization Techniques	PE	3	0	0	3	40	60	100
20CBS07	Computational Intelligence	PE	3	0	0	3	40	60	100
20CBS08	Augmented Reality & Virtual Reality	PE	3	0	0	3	40	60	100
20CBS09	Natural Language Processing	PE	3	0	0	3	40	60	100
20CBS10	Social Network Analysis	PE	3	0	0	3	40	60	100

Stream II : Cyber Security and Forensics									
Code No.	Course	Category	Periods / Week			C	Maximum Marks		
			L	T	P		CA	FE	Total
20CBS21	Cyber Law and Ethics	PE	3	0	0	3	40	60	100
20CBS22	Cyber Forensics	PE	3	0	0	3	40	60	100
20CBS23	Ethical Hacking Fundamentals	PE	3	0	0	3	40	60	100
20CBS24	Secure Cloud Computing	PE	3	0	0	3	40	60	100
20CBS25	Information Security	PE	3	0	0	3	40	60	100
20CBS26	Quantum Cryptography	PE	3	0	0	3	40	60	100
20CBS27	Blockchain and Cryptocurrency Technologies	PE	3	0	0	3	40	60	100
20CBS28	Cyber Crime and Computer Ethics	PE	3	0	0	3	40	60	100
20CBS29	Mobile Application Security	PE	3	0	0	3	40	60	100
20CBS30	Intrusion Detection and Prevention	PE	3	0	0	3	40	60	100

Stream III : Internet of Things									
Code No.	Course	Category	Periods / Week			C	Maximum Marks		
			L	T	P		CA	FE	Total
20CBS41	Principles of Sensors and Signal Conditioning	PE	3	0	0	3	40	60	100
20CBS42	Data Acquisition	PE	3	0	0	3	40	60	100
20CBS43	Wireless sensor Networks	PE	3	0	0	3	40	60	100
20CBS44	EDGE Computing Technologies	PE	3	0	0	3	40	60	100
20CBS45	Mobile Computing	PE	3	0	0	3	40	60	100
20CBS46	Wearable Computing	PE	3	0	0	3	40	60	100
20CBS47	IOT Programming	PE	3	0	0	3	40	60	100
20CBS48	IoT Security and Trust	PE	3	0	0	3	40	60	100
20CBS49	IoT Applications and Web development	PE	3	0	0	3	40	60	100
20CBS50	Industrial IoT	PE	3	0	0	3	40	60	100

ONE CREDIT COURSES									
Code No.	Course	Category	Periods / Week			C	Maximum Marks		
			L	T	P		CA	FE	Total
20CBA01	Keras Tool	EEC	0	0	2	1	100	-	100
20CBA02	ORANGE Tool	EEC	0	0	2	1	100	-	100
20CBA03	TensorFlow	EEC	0	0	2	1	100	-	100
20CBA04	RaspberryPi	EEC	0	0	2	1	100	-	100
20CBA05	R Programming	EEC	0	0	2	1	100	-	100
20CBA06	Hadoop- Map Reduce	EEC	0	0	2	1	100	-	100
20CBA07	WEKA Tool	EEC	0	0	2	1	100	-	100
20CBA08	RapidMiner Tool	EEC	0	0	2	1	100	-	100
20CBA09	Maya Tool	EEC	0	0	2	1	100	-	100
20CBA10	Eclipse	EEC	0	0	2	1	100	-	100

S. No	Category	CREDITS PER SEMESTER								Total Credit (AICTE)	Credits in %
		I	II	III	IV	V	VI	VII	VIII		
1	HSS	3	3				3			9 (10-14)	5.45%
2	BS	8	8	4	4					24 (22-28)	14.54%
3	ES	8	3	4						15 (24)	9.09%
4	PC		5	15	19	15	13	11		78 (48)	47.27%
5	PE					3	3	6	6	18 (18)	10.90%
6	OE					3	3	3		9	5.45%
7	EEC						1	1	10	12 (12-16)	7.27%
8	MC	0	0	0	0					0	0%
Total		19	19	23	23	21	23	21	16	165	100.00%

20MA103	Mathematics-I for Computing Sciences (Common to CSE, IT, AI & DS& CSBS)		L	T	P	C
			3	2	0	4
Nature of Course		Basic Sciences				
Pre requisites		Fundamentals of Basic Mathematics				

Course Objectives

The course is intended to

1. Acquire the concept of matrix algebra techniques those are needed by engineers for practical applications.
2. Acquaint the mathematical tools needed in evaluating limits, derivatives and differentiation of one variable.
3. Learn the curvature, calculate the radius of curvature, centre, evolutes, involutes and envelope of curves.
4. Acquire the knowledge of linear and simultaneous differential equations.
5. Learn the Green's theorem, Stokes' theorem and the Divergence theorem to compute integrals.

Course Outcomes

On successful completion of the course, students will be able to

CO.No	Course Outcome	Bloom's Level
CO1	Identify the eigen values, eigenvectors and apply Cayley- Hamilton theorem.	Apply
CO2	Interpret the limit definition and rules of differentiation to differentiate the functions.	Understand
CO3	Identify the circle of curvature, evolutes and envelope of the curves.	Understand
CO4	Solve the linear and simultaneous differential equations.	Apply
CO5	Interpret the Green's theorem, Stokes' theorem, or Divergence theorem to evaluate integrals.	Apply

Course Contents:**Unit- I Matrices****12**

Characteristic equation – Eigen values and Eigen vectors of a real matrix – Properties(statement only) – Cayley-Hamilton theorem and its applications – Orthogonal transformation of a symmetric matrix to diagonal form – Reduction of quadratic form to canonical form by orthogonal transformation.

Unit - II Limits and Continuity**12**

Representation of functions – Limits of a function – Continuity – Derivatives – Differentiation rules - Maxima and Minima of functions of one variable.

Unit – III Differential Calculus**12**

Curvature – Curvature in Cartesian co-ordinates - Centre and Radius of curvature- Circle of curvature- Evolutes and Involute-Envelopes.

Unit – IV Ordinary Differential Equations**12**

Linear differential equations of second and higher order with constant co-efficient - R.H.S is $\sin x$, $\cos x$, e^{ax} , x^n – Differential equations with variable co-efficients : Cauchy's and Legendre's form of linear equation – Method of variation of parameters.

Unit–V Vector Calculus**12**

Gradient, divergence and curl – Directional derivative – Irrotational and Solenoidal vector fields – Green's theorem in a plane, Gauss divergence theorem and Stoke's theorem (excluding proofs) – Verification of theorem and simple applications.

Total: 60 Periods

Text Books:

1. Grewal B.S, "Higher Engineering Mathematics", Khanna Publishers, 44th Edition, 2019.
2. Veerarajan.T, "Engineering Mathematics for Semester I and II", Tata McGraw Hill Publishers, 3rd Edition, 2014.

Reference Books:

1. Kandasamy P., Thilagavathy K., and Gunavathy K., "Engineering Mathematics", S. Chand & Co. Publishers, 3rd Edition, 2019.
2. Weir M.D. and Joel Hass, "Thomas calculus" Pearson Publishers, 12th Edition, 2016.

Additional References:

1. nptel.ac.in/courses/111/105/111105121
2. nptel.ac.in/courses/122/104/122104017

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)															
Cos	Pos												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	2										3		
CO2	3	3	2										2		
CO3	3	2	2										2		
CO4	3	3	2										3		
CO5	3	2	2										2		
	3	High				2	Medium					1	Low		

Formative assessment			
Bloom's Level	Assessment Component	Marks	Total marks
Remember	Online Quiz	5	15
Understand	Tutorial Class/ Assignment	5	
	Attendance	5	

Summative Assessment

Bloom's Category	Internal Assessment Examinations			Final Examination (60)
	IAE1 (7.5)	IAE2 (7.5)	IAE3 (10)	
Remember	10	10	10	20
Understand	10	10	10	20
Apply	30	30	30	60
Analyze				
Evaluate				
Create				

20CS101	COMPUTER HARDWARE AND NETWORKING (Common to CSE, IT, AI& CSBS)	L	T	P	C
		3	0	0	3
Nature of Course	Engineering Sciences				
Pre requisites	Fundamentals of computers				

Course Objectives

The course is intended to

1. Impart knowledge of mother board components and memory storage devices.
2. Gain knowledge of I/O devices and interfaces.
3. Learn the Maintenance and Trouble Shooting of Desktop.
4. Develop a clear understanding about network devices.
5. Explore the knowledge on network model and various network protocols

Course Outcomes

On successful completion of the course, students will be able to

CO. No.	Course Outcome	Bloom's Level
CO1.	Interpret the concepts of motherboard components and memory storage devices	Understand
CO2.	Manipulate I/O Devices and Interfaces	Apply
CO3.	Carry out experimental investigation for maintenance of Desktop and Laptop.	Apply
CO4.	Summarize computer viruses and troubleshooting mechanism.	Understand
CO5.	Determine the properties of various network devices.	Understand

Course Contents:

Unit - I Motherboard Components and Memory Storage Devices 9

Introduction: Hardware, Software and Firmware. Mother board, IO and memory expansion slots, SMPS, Drives, front panel and rear panel connectors. Processors: multi core Processor Architecture, Evolution of processors – Pentium, dual core, core i3, i5, i7 (Concepts only) - Bus Standards: PCI, AGP, and PCMCIA Primary Memory: Introduction-Main Memory, Cache memory – DDR2, DDR3 and Direct RDRAM. Secondary Storage: Hard Disk – Construction – Working Principle Specification of IDE, Ultra ATA, Serial ATA; HDD Partition - Formatting.

Unit - II I/O Devices and Interface 9

Keyboard: Signals – operations –troubleshooting; wireless Keyboard. Mouse: types, connectors, operations- troubleshooting. Printers: Introduction–Types- Dot Matrix, Inkjet Laser, Multi Function Printer and Thermal printer – Operations-Troubleshooting. I/O Ports: Serial, Parallel, USB, Game Port and HDMI. Displays: Principles of LED, LCD and TFT Displays. Graphic Cards: VGA and SVGA card. Power Supply: Servo Stabilizers, online and offline UPS - working principles; SMPS: Operation and block diagram of ATX Power supply.

Unit - III Maintenance of Desktop and Laptop 9

Bios-setup: Standard CMOS setup, Power management, advanced chipset features, PC Bios communication – upgrading BIOS, Flash BIOS -setup. POST: Definition – IPL hardware – POST Test sequence – beep codes. Laptop: Types of laptop –block diagram – working principles–configuring laptops.

Unit – IV Trouble Shooting and Computer Viruses 9

Diagnostic Software and Viruses: Computer Viruses – Precautions –Anti-virus Software – identifying

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the signature of viruses – Firewalls and latest diagnostic software. Installation and Troubleshooting: Formatting, Partitioning and Installation of OS – Trouble Shooting Hardware problems.

Unit - V Computer Network Devices

9

Data Communication: Components of a data communication. Data flow: simplex – half duplex – full duplex; Topologies: Star, Bus, Ring, Mesh, Hybrid – Advantages and Disadvantages of each topology. Networks: Definition -Types of Networks: LAN – MAN – WAN – CAN – HAN – Internet – Intranet –Extranet, Client-Server, Peer To Peer Networks. Network devices: Features and concepts of Switches – Routers (Wired and Wireless) – Gateways.

Total: 45 Periods

Text Books:

1. B.Govindrajalu, "IBM PC and Clones Hardware Troubleshooting and Maintenance", Tata McGraw hill Publishers,2016.
2. BehrouzA.Forouzan, "Data Communication and networking", Tata Mc-Graw Hill, NewDelhi.

Reference Books:

1. D.Balasubramanian, "Computer Installation and Servicing", Tata McGraw Hill
2. Michael ,Stephen J Bigelow , "Troubleshooting, Maintaining and Repairing PCs", Tata MCGraw Hill Publication.
3. AchyutGodbole," Computer Networks", TataMc-Graw Hill -New Delhi.
4. KavehPahlavan and PrashantKrishnamurty, "Principles of Wireless Networks– A unified Approach", Pearson Education, 2010.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	2									1	3	1	
CO2	3	3	2									1	3	1	
CO3	3	3	2									1	3	1	
CO4	3	3	2									1	3	1	
CO5	3	3	2									1	3	1	
	3	High				2	Medium					1	Low		
Formative assessment															
Bloom's Level	Assessment Component											Marks		Total marks	
Remember	Classroom or Online Quiz											5		15	
Understand	Class Presentation/Power point presentation											5			
	Attendance											5			
Summative Assessment															
Bloom's Category			Continuous Assessment Tests									Terminal Examination (60)			
			IAE1 (7.5)			IAE2 (7.5)			IAE3 (10)						
Remember			10			10			10			20			
Understand			20			20			20			50			
Apply			20			20			20			30			
Analyse			0			0			0			0			

Evaluate	0	0	0	0
Create	0	0	0	0

20PH101	Physics for Computing Sciences (Common to CSE, IT, AI & DS & CSBS)		L	T	P	C
			3	0	2	4
Nature of Course		Basic Sciences				
Pre requisites		Fundamentals of Basic Physics				

Course Objectives: The course is intended to

1. Impart knowledge of optics, especially laser and their applications in fiber optics.
2. Gain knowledge to learn thermal properties of materials and their applications.
3. Provide knowledge of properties of matter like elasticity and its applications.
4. Learn the electronic properties of materials like semiconductors and its applications.
5. Develop a clear understanding of optical devices like solar cell, LED etc.

Course Outcomes

On successful completion of the course, students will be able to

CO.No.	Course Outcome	Bloom's Level
CO1	Compare the working of lasers and propagation of light through optical fibers and its applications.	Understand
CO2	Demonstrate the thermal conductivity of the good and bad conductors	Understand
CO3	Explain the knowledge about elasticity	Understand
CO4	Interpret the knowledge about semiconductor materials.	Understand
CO5	Illustrate the working of optoelectronic devices.	Understand

Course Contents:

UNIT I Laser and Fiber Optics 9

Lasers: population of energy levels, Einstein's A and B coefficients derivation – resonant cavity, optical amplification (qualitative) – Semiconductor lasers: homojunction and heterojunction – Fiber optics: principle, numerical aperture and acceptance angle - types of optical fibers (material, refractive index, mode) – optical fiber communication system – fiber optic endoscope.

UNIT II Thermal Physics 9

Transfer of heat energy – thermal expansion of solids and liquids – expansion joints - bimetallic strips - thermal conductivity - Forbe's and Lee's disc method: theory and experiment - conduction through compound media (series and parallel) – thermal insulation – applications : heat exchangers in refrigerators, ovens and solar water heaters.

UNIT III Properties of Matter 9

Elasticity – Stress-strain diagram and its uses - factors affecting elastic modulus and tensile strength – torsional stress and deformations – twisting couple - torsion pendulum: theory and experiment - bending of beams - bending moment – cantilever – uniform and non-uniform bending - I-shaped girders - stress due to bending in beams.

UNIT IV Semiconductor Physics 9

Intrinsic Semiconductors – Energy band diagram – direct and indirect band gap semiconductors – Carrier concentration in intrinsic semiconductors – extrinsic semiconductors - Carrier concentration in N-type & P-type semiconductors – Variation of carrier concentration with temperature – variation of Fermi level with temperature and impurity concentration – Hall effect and its applications.

UNIT V Optical Properties of Materials 9

Classification of optical materials – carrier generation and recombination processes - photo current in a P- N diode: principle and working – solar cell and photo detectors: working principle – LED: principle and working – Organic LED: principle and working, advantages over LED – Laser diodes: principle, working and applications.

Total : 45 Periods

Laboratory Components

S.No	List of Experiments	CO Mapping	RBT
1	Determination of rigidity modulus – Torsion pendulum	CO3	Apply
2	Determination of Young's modulus by non-uniform bending method.	CO3	Apply
3	Determination of wavelength, and particle size using Laser	CO1	Apply
4	Determination of acceptance angle in an optical fiber	CO1	Apply
5	Determination of thermal conductivity of a bad conductor by Lee's Disc method	CO2	Apply
6	Determination of velocity of sound and compressibility of liquid - Ultrasonic interferometer	CO3	Apply
7	Determination of Coefficient of viscosity of liquid	CO3	Apply

Total: 30 Periods

TEXT BOOKS:

1. Bhattacharya, D.K and Poonam, T, "Engineering Physics", 2nd edition, Oxford University Press, 2015.
2. M.N. Avadhanulu, M.N. & Kshirsagar PG. "A Text book of Engineering Physics", 10th edition, S.Chand and company, Ltd., New Delhi, 2014.
3. William D. Callister, Jr and David. G. Bethwisch, "Materials Science and Engineering", 9th edition, John Wiley & Sons, Inc, 2019.

REFERENCES:

1. Halliday, D, Resnick, R and Walker, J, "Principles of Physics", 10th edition, Wiley, 2014.
2. Serway, R.A. & Jewett, J.W, "Physics for Scientists and Engineers", 9th edition, Cengage Learning, 2019.
3. Raghavan, V. "Materials Science and Engineering, A First course", 5th edition, PHI Learning, 2015.

Web References:

1. <https://nptel.ac.in/courses/115/107/115107095/>
2. <https://www.coursera.org/lecture/fe-exam/stresses-in-beams-strains-in-pure-and-nonuniform-bending-6aMRx>
3. <https://nptel.ac.in/courses/115/105/115105099/#>
4. <https://www.youtube.com/watch?v=uv0LxMoalEQ>

Mapping of Course Outcomes (CO) with Programme Outcomes (PO) Programme Specific Outcomes (PSO)															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2	1												
CO2	3	1	1												

CO3	3	2	1												
CO4	3	1	1												
CO5	3		1												
Summative assessment															
Bloom's Level	Continuous Assessment												Final Examination (Theory) [50marks]		
	Theory Marks								Practical						
	IAE-I [7.5]	IAE-II [7.5]		IAE-III [10]		Attendance [5]		Rubric based CIA [20 Marks]							
Remember	30		30		30				-				30		
Understand	62		62		62				40				62		
Apply	8		8		8				60				8		
Analyse	-		-		-				-				-		
Evaluate	-		-		-				-				-		
Create	-		-		-				-				-		
3		High			2		Medium				1		Low		

20CS102	PROBLEM SOLVING USING PYTHON (Common to all Branches)	L	T	P	C
		3	0	2	4
Nature of Course	Engineering Sciences				
Pre requisites	Mathematical and Logical Knowledge				

Course Objectives

The course is intended

1. To think logically and write algorithm and draw flow charts for problems.
2. To read and write simple Python programs.
3. To develop Python programs with conditionals and loops.
4. To define Python functions and call them.
5. To use Python data structures — lists, tuples, dictionaries and files.

Course Outcomes

On successful completion of the course, students will be able to

CO. No.	Course Outcome	Bloom's Level
CO1	Develop algorithmic solutions to simple computational problems and read, write, execute by simple python programs.	Apply
CO2	Structure simple python programs for solving problems.	Understand
CO3	Administer the role of control statements and functions involving the idea of modularity.	Apply
CO4	Represent compound data using python strings and lists.	Apply
CO5	Read and write data from/to files in python Programs.	Understand

Course Contents:

Unit I Basics of Computers & Problem Solving

9

Computer Basics – Components-Computer organization - Computer Software- Types of software - Software Development steps -Need for logical analysis and thinking- Algorithms – Flowchart - Number system.

Passed in Board of Studies meeting on 01.10.2021 Approved in Academic council meeting on 04.10.2021

Unit II Introduction of Python Programming 9

Introduction-Python Interpreter-Interactive and script mode -Values and types, variables, operators, expressions, statements, precedence of operators, Multiple assignments, comments, Input and Output Statements.

Unit III Control statements and Functions 9

Conditional (if), alternative (if-else), chained conditional (if-elif-else)-Iteration-while, for, break, continue, pass – Functions - Introduction, inbuilt functions, user defined functions, passing parameters, return values, recursion, Lambda functions.

Unit IV Strings and Lists 9

Strings-String slices, immutability, string methods and operations -Lists-creating lists, list operations, list methods, mutability, aliasing, cloning lists, list and strings, list and functions-list processing-list comprehension, searching and sorting.

Unit V Tuples, Dictionaries and Files 9

Tuples- Tuple assignment, lists and tuples, Tuple as return value- Dictionaries-operations and methods, Files and Exception-Text files, reading and writing files, format Operator, Exception handling.

TOTAL : 45 Periods**Laboratory Components**

S.No	List of Experiments	COMapping	RBT
1	Write a algorithm & draw flowchart for simple computational problems	CO1	Understand
2	Write a program to perform different arithmetic operations on numbers in python.	CO2	Understand
3	Write a python program to implement the various control structures	CO3	Apply
4	Write a python program for computational problems using recursive function.	CO3	Apply
5	Demonstrate use of list for data validation.	CO4	Apply
6	Develop a python program to explore string functions	CO4	Analyze
7	Implement linear search and binary search.	CO4	Apply
8	Develop a python program to implement sorting methods	CO4	Analyze
9	Develop python programs to perform operations on dictionaries.	CO5	Analyze
10	Write a python program to read and write into a file	CO5	Apply

TOTAL: 30 Periods**Text Books:**

1. ReemaThareja, "Problem Solving and Programming with Python", Oxford University Press, 2018
2. Dr. R. NageswaraRao, "Core Python Programming", Dreamtech Press, 2017 Edition

Reference Books:

1. Kenneth A. Lambert, "Fundamentals of Python: First Programs", CENGAGE Learning, 2012
2. Ashok NamdevKamthane, Amit Ashok Kamthane, "Programming and Problem Solving with Python", Mc-Graw Hill Education, 2018.

Passed in Board of Studies meeting on 01.10.2021 Approved in Academic council meeting on 04.10.2021

3. Charles Dierbach, "Introduction to Computer Science using Python: A Computational Problem Solving Focus", Wiley India Edition, 2013
4. Timothy A. Budd, "Exploring Python", Mc-Graw Hill Education (India) Private Ltd., 2015

Mapping of Course Outcomes (CO) with Programme Outcomes (PO) Programme Specific Outcomes (PSO)															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2	1										3	1	
CO2	3	2	1										3	1	
CO3	3	2	2										3	1	
CO4	3	2	2										3	1	
CO5	3	2	2										3	1	
	3	High				2	Medium					1	Low		

Summative assessment						
Bloom's Level	Continuous Assessment					Final Examination (Theory) [50 marks]
	Theory Marks				Practical	
	IAE-I [7.5]	IAE-II [7.5]	IAE-III [10]	Attendance [5]	Rubric based CIA [20 Marks]	
Remember	10	10	10			20
Understand	20	20	20		30	50
Apply	20	20	20		50	30
Analyse	-	-	-		20	-
Evaluate	-	-	-		-	-
Create	-	-	-		-	-

20CS103	COMPUTER PRACTICES LABORATORY (Common to CSE, IT, AI & DS & CSBS)				L	T	P	C
					0	0	2	1
Nature of Course	Engineering Sciences							
Pre requisites	NA							

Course Objectives

The course is intended to

1. Learn the use of basic hardware components
2. Make familiar with BIOS setup and I/O ports
3. Impart knowledge in configuration and partitioning
4. Experiment the installation and uninstallation of various hardware and software components.
5. Develop network group and sharing between devices

Course Outcomes

On successful completion of the course, students will be able to

CO.No.	Course Outcome	Bloom's Level
--------	----------------	---------------

Passed in Board of Studies meeting on 01.10.2021 Approved in Academic council meeting on 04.10.2021

CO1	Interpret the concepts of hardware devices	Understand
CO2	Make simple BIOS setup and I/O ports	Understand
CO3	Experiment the configuration and partitioning	Apply
CO4	Carry out basic installation setup of hardware devices	Apply
CO5	Apply the workgroup creation network and sharing	Apply

List of Exercises

S.No	List of Exercises	CO Mapping	RBT
1	Study of mother Board, Power supply, Keyboard and monitors	CO1	Understand
2	Study of Building and Assembling a Desktop PC	CO1	Understand
3	BIOS Setup Utility. Input- Output Ports	CO1	Understand
4	Hard Disk Drive Partitioning and Formatting	CO2	Understand
5	Installing and configuring a DVD Writer	CO3	Apply
6	Installing and configuring Operating System.	CO4	Apply
7	Installing Motherboard Device Drivers OS Platform	CO4	Apply
8	Installing and uninstalling an Application Software.	CO4	Apply
9	Printers and Installation of Printers and scanners and Local Printer sharing	CO5	Apply
10	Workgroup based Network using Operating System.	CO5	Apply

TOTAL :30 Periods**Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)**

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2	1	3	1									2	3	2
CO2	2	1	3	1									2	3	2
CO3	2	1	3	1									2	3	2
CO4	2	2	3	1									2	3	2
CO5	2	2	3	1									2	3	2
	3	High				2	Medium					1	Low		

Summative assessment based on Continuous and End Semester Examination		
Bloom's Level	Rubric based Continuous Assessment [50 marks]	Final Examination [50 marks]
Remember		
Understand	20	50
Apply	30	50
Analyze		
Evaluate		
Create		

20MC101	Induction Programme	L	T	P	C
		2	0	0	0
Nature of Course	Mandatory, Non Credit				
Pre requisites	Completion of Schooling at Higher Secondary Level				

Course Objectives

The course is intended to

1. To nurture the character and behavior as a student.
2. To have broad understanding of society and relationships.
3. To impart interpersonal and soft skills.
4. To inspire the students in the field of engineering.
5. To provide exposure to industries.

Course Outcomes

On successful completion of the course, students will be able to

CO. No.	Course Outcome	Bloom's Level
CO 1	Perform curricular and co-curricular activities excellently.	Knowledge
CO 2	Do the skill based training with excellence.	Understand
CO 3	Work as team for the given task	Apply
CO 4	Gain character and behaviour	Knowledge
CO 5	Demonstrate the acquired skills effectively	Apply

Course Contents PHYSICAL ACTIVITY

Yoga, Sports

CREATIVE ARTS (students can select any one of their choice) Painting, sculpture, pottery, music, craft making and so on **UNIVERSAL HUMAN VALUES**

Enhancing soft skills

LITERARY AND PROFICIENCY MODULES

Reading, Writing, Speaking- Debate, Role play etc., Communication and computer skills

LECTURES BY EMINENT PEOPLE

Guest lecture by subject experts

VISIT TO LOCAL CITIES

Meditation centers / Industry

FAMILARIZATION TO DEPARTMENT / BRANCH INNOVATION

Lectures by Departments Head and senior faculty members

Total Hours: 45

Mapping of COs with POs and PSOs

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1						2	1	2				3	2		
CO2						2	1	2				3	2		
CO3						2	1	2				3	2		
CO4						2	1	2				3	2		
CO5						2	1	2				3	2		
	3	High				2	Medium					1	Low		

Bloom's Level	Continuous Assessment (Non-Credit, Mandatory)				
	Test -I [20]	Test -II [20]	Test - III [20]	Assignment/ Activity [20]	Attendance [20]
Remember	10	10	10		
Understand	20	20	20	10	
Apply	20	20	20	10	
Analyse					
Evaluate					
Create					

20ENE01	COMMUNICATIVE ENGLISH (Common to all B.E. / B.Tech. Programmes)		L	T	P	C
			2	0	2	3
Nature of Course		Humanities and Social Science				
Pre requisites		Nil				

Course Objectives

The course is intended to

1. Improve lexical, grammatical and semantic competence.
2. Enhance communicative skills in real life situations.
3. Augment thinking in all forms of communication.
4. Equip with oral and written communication skills.
5. Gain employability skills.

Course Outcomes

On successful completion of the course, students will be able to

CO.No.	Course Outcome	Bloom's Level
CO1	Use effectively the lexical, grammatical and semantic knowledge	Remember
CO2	Communicate with clarity using intentional vocabulary in English	Apply
CO3	Articulate perfectly and express their opinions confidently using communicative strategies	Remember
CO4	Accomplish listening and reading skills for lifelong learning	Understand
CO5	Comprehend, interpret and present data	Understand

Course Contents**Unit - I Basic structure and Usage****6**

Parts of Speech -- Articles -- Tenses - Subject-Verb Agreement -- Different Grammatical forms of the same word - Listening to Speeches and Conversations from Communication software -- Listening to Announcements -- Listening and Gap Filling.

Unit - II Vocabulary and Language Development**6**

Intentional vocabulary used in and around Airport, Hospital, Hotel, Court -- Abbreviations and acronyms - One Word Substitution - Compound words-- Homophones and Homonyms -- Types of sentences - Ordering Jumbled Sentences Letter writing -- informal.

Unit -III Oral Communication Skills**6**

Improving fluency -- Articulation with pronunciation -- Voice modulation in Speaking -- One minute talk -Self Introduction and introducing ones friend -- Telephonic conversations -- Group Discussion -- Modal Auxiliaries --discourse markers.

Unit -IV Comprehensive Listening and Reading**6**

Effective listening Strategies -- Listening to Interviews from Communication software-- Phrasal verbs -- Reading Comprehension -- "An Astrologer's Day" by R.K.Narayan and "Building a New State" by Dr. A.P.J. Abdul Kalam.

Unit - V Effective Writing**6**

Interpretation and presentation of data -- developing Hints -- general essays and paragraph writing -- Report Writing -- survey report and accident report - Instructions and Recommendations.

Total:30 Periods

Laboratory Components

S.No	List of Exercises	CO Mapping	RBT
1	Role-play – One minute talk	3	Understand
2	Role-play – Telephonic conversations	3	Understand
3	Listening to speeches and lectures and gap filling	4	Understand
4	Group Discussion.	4	Understand
5	Articulation with pronunciation practice	3	Apply
6	Listening to Announcements – Listening and Gap Filling	4	Understand
7	Listening to Interviews & Native speakers' Conversations	4	Understand
8	Reading practice with articles in magazine and news papers.	4	Understand
9	Model – Job Interviews	4	Understand
10	Introspective report – Personal analysis	5	Understand
11	Telephone etiquette	3	Remember
12	Reading – Shorter texts and News Articles	4	Understand
13	Role Play – Getting and Giving Permission	3	Remember
14	Self Introduction(Formal)	3	Understand
15	Recommendations/Suggestions	3	Apply

Total: 30 Periods**Text Books**

1. Rizvi, Ashraf M., "Effective Technical Communication", Tata McGraw Hill Publishing Company Limited, New Delhi, 5th Edition, 2019.
2. Board of Editors, "Using English – A Coursebook for Undergraduate Engineers and Technologists", Orient BlackSwan Private Limited, Hyderabad, 2nd Edition, 2017.

Reference Books:

1. Meenakshi Raman and Sangeetha Sharma, "Technical Communication", Oxford University Press, USA, 10th Edition, 2019.
2. John Cunnison Catford, "A Practical Introduction to Phonetics", Clarendon Press, Jamaica, 2nd Edition, 2001.
3. Hewings. M, "Advanced English Grammar", Cambridge University Press, Chennai, 3rd Edition, 2000.
4. S P Dhanavel "English and Soft Skills", Orient BlackSwan Private Limited, Hyderabad, 1st Edition, 2010.

Web reference:

https://www.googleadservices.com/pagead/aclk?sa=L&ai=DChcSEWij4dCTucfsAhXE1pYKHch4ABMYABABGgJ0bA&ohost=www.google.com&cid=CAASEuRo76H-Vx9BpazOOBfXeJSKVQ&sig=AOD64_3O-HNEnUO4A5sc31MsUfaTBGG-dQ&q&adurl&ved=2ahUKEwjC3ceTucfsAhXBeisKHatIBewQ0Qx6BAGfEAE

Mapping of Course Outcomes (CO) with Programme Outcomes (PO) Programme Specific Outcomes (PSO)															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1							1			3	2	2	2		
CO2							1			3	2	2	2		
CO3							1			3	2	2	2		
CO4							1			3	2	2	2		
CO5							1			3	2	2	2		
	3	High				2	Medium				1	Low			

Summative assessment						
Bloom's Level	Continuous Assessment					Final Examination (Theory) [50 marks]
	Theory Marks				Practical	
	IAE-I [7.5]	IAE-II [7.5]	IAE -III [10]	Attendance [5]	Rubric based CIA [20 Marks]	
Remember	20	20	20		40	40
Understand	20	20	20		40	40
Apply	10	10	10		20	20
Analyze						
Evaluate						
Create						

20ENE02	Advanced Communicative English (Common to all B.E./ B.Tech Programmes)	L	T	P	C
		2	0	2	3
Nature of Course	Humanities and Social Sciences				
Pre requisites	Basics of Communicative English				

Course Objectives

The course is intended to

1. Demonstrate satisfactory control over complex structures and mechanics in English.
2. Develop fluency and accuracy in oral communication.
3. Communicate effectively and actively in social interactions.
4. Read English at inspectional level.
5. Face interviews with confidence.

Course Outcomes

On successful completion of the course, students will be able to

CO. No.	Course Outcome	Bloom's Level
CO1	Apply knowledge of English grammar for effective communication	Remember
CO2	Make use of common English phrases and vocabulary strength.	Understand

CO3	Build self-confidence and enhance professionalism	Apply
CO4	Implement listening, reading and writing skills in real - life situations	Apply
CO5	Speak fluently in English with proper pronunciation, intonation, tone and accent.	Understand

Course Contents**Unit – I Grammar and usage****6**

Active voice and passive voice – Prefixes and suffixes – Connotation – Clauses - If conditionals – Idioms & Phrases - Right forms of verbs– Modal Auxiliaries - Spotting errors.

Unit - II Lexical competence**6**

Technical Vocabulary- Expressions – Frequency – Cause and effect - Words often Miss-spelled – Syntax and structure - Homophones and Homonyms- Verbal analogy - Idioms and Phrases.

Unit - III Conversational etiquette**6**

Processes description– Tone and accent in speech– Role-play (Job-Interview) – Presentation skills – Mechanics of presentation - Telephone etiquette – Group Discussion strategy - Formal & Informal subjective and objective introduction – Body Language – Mock Interview.

Unit – IV Listening reading and writing**6**

Listen to Scientific/Technical talks and gap filling – Listening to TED/INK Talks – Reading – “Water: The Elixir of Life” by Sir. C.V.Raman. “Progress” by St. John Ervine - Instructions and Recommendations – Letter writing formal –Job application- Report writing–Introspective report – Creative writing – Essays and Paragraphs.

Unit – V Phonetics**6**

Production and classification of speech sound – International Phonetic Alphabet and transcriptions – Phonological rules – way and Place of articulation – Vowels, consonants and diphthongs. Specific characteristics feature of vowel sounds.

Total: 30 Periods**Laboratory Components**

S.No	List of Exercises	CO Mapping	RBT
1	Role-play – Processes Description	2	Remember
2	Listening to TED/INK Talks and gap filling	4	Understand
3	Group Discussion	3	Understand
4	Articulation with pronunciation practice	3	Apply
5	Reading – Longer texts and Technical Articles (Skimming & Scanning).	4	Apply
6	Presentation skills – Mechanics of presentation	5	Understand
7	Individual presentation on given topics	5	Remember
8	Telephone etiquette	5	Understand
9	Instructions and Recommendations	5	Remember
10	Writing – General Essays.	4	Apply
11	Report writing technique- write up	4	Remember
12	Introspective report – Personal analysis	4	Understand
13	Model Job Interviews	3	Understand

14	Job Interviews(Role play)	3	Apply
15	Body Language	3	Understand

Total: 30 Periods**Text Books**

1. Rizvi, Ashraf.M, "Effective Technical Communication", Tata McGraw Hill Publishing Company Limited, New Delhi, 5th Edition, 2019.
2. Hewings. M, "Advanced English Grammar", 3rd Edition, Cambridge University Press, Chennai, 5th Edition, 2000.
3. Board of Editors, "Using English – A Coursebook for Undergraduate Engineers and Technologists", Orient BlackSwan Private Limited, Hyderabad, 2nd Edition, 2017.

Reference Books:

1. Raman M &Sangeetha Sharma, "Technical Communication",Oxford University Press,USA,10thEdition,2019.
2. John CunnisonCatford, "A Practical Introduction to Phonetics",Clarendon Press, Jamaica,2nd Edition, 2001.
3. Norman Whitby, Business Benchmark – "Pre-Intermediate to Intermediate, Students Book", Cambridge University Press, 1st Edition, 2016.
4. DhanavelS. P., "English and Soft Skills", 1stEdition,OrientBlackSwan Private Limited, Hyderabad, 1st Edition, 2010.

Web reference:

1. https://www.coursera.org/lecture/tesol-speaking/video-2-listening-strategies-for-learners-3AeBL?utm_source=mobile&utm_medium=page_share&utm_content=vlp&utm_campaign=top_button
2. blob:<https://www.youtube.com/73f7256d-d302-4563-bed5-9e84c94a26ac>

Mapping of Course Outcomes (CO) with Programme Outcomes (PO) Programme Specific Outcomes (PSO)															
COs	Pos												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1										3	1	2	2		
CO2										3	1	2	2		
CO3										3	1	2	2		
CO4										3	1	2	2		
CO5										3	1	2	2		
	3	High				2	Medium				1	Low			

Summative assessment						
Bloom's Level	Continuous Assessment					Final Examination (Theory) [50 marks]
	Theory Marks				Practical	
	IAE-I [7.5]	IAE-II [7.5]	IAE -III [10]	Attendance [5]	Rubric based CIA [20 Marks]	
Remember	20	20	20		40	40
Understand	20	20	20		40	40
Apply	10	10	10		20	20
Analyse						
Evaluate						
Create						

20MA203	Mathematics – II for Computing Sciences (Common to CSE, IT, AI & DS & CSBS)		L	T	P	C
			3	2	0	4
Nature of Course		Basic Sciences				
Prerequisites		Fundamentals of Calculus and Algebra				

Course Objectives

The course is intended to

1. Incorporate the functions of several variables, Taylor's series expansion, Jacobians, maximum & minimum values.
2. Introduce the basic notions of groups, rings, fields which will then be used to solve related problems.
3. Learn the concepts of rings, finite fields and polynomials.
4. Acknowledge the basic concepts in number theory.
5. Acquire the concepts of Laplace transform and its inverse.

Course Outcomes

On successful completion of the course, students will be able to

CO.No	Course Outcome	Bloom's Level
CO1	Analyze functions of two variables with their visualization, compute their limits, continuity, derivatives and extreme values	Analyze
CO2	Apply the basic notions of groups, rings, fields and to solve their engineering problems	Apply
CO3	Explain the concepts of advanced algebra and identify their role in modern mathematics.	Understand
CO4	Demonstrate accurate and efficient use of advanced algebraic techniques.	Understand
CO5	Find Laplace transform of standard functions and solve initial value problems / differential equations using Laplace transforms	Apply

Course Contents:

UNIT - I Functions of Several Variables

12

Functions of two variables -Limits and Continuity-Partial derivatives - Euler's theorem for homogenous functions -Differentiation of implicit functions -Jacobians-Taylor's expansion - Maxima and Minima - Lagrange's Method of Undetermined Multipliers.

UNIT – II Groups and Rings**12**

Groups: Definition - Properties - Homomorphism - Isomorphism - Cyclic groups – Cosets - Lagrange's theorem. Rings: Definition - Sub rings - Integral domain - Field - Integer modulo n - Ring homomorphism.

UNIT – III Finite Fields and Polynomials**12**

Rings - Polynomial rings - Irreducible polynomials over finite fields - Factorization of polynomials over finite fields.

UNIT – IV Divisibility Theory and Canonical Decompositions**12**

Division algorithm – Base representations – Number patterns – Prime and composite numbers – GCD – Euclidean algorithm – Fundamental theorem of arithmetic – LCM.

UNIT – V Laplace Transforms**12**

Laplace transform – Transform of elementary functions – Properties – Transforms of derivatives and integrals - Transform of periodic functions. Inverse Laplace transform – Statement and applications of Convolution theorem – Initial and Final value theorems – Method of solving second order ordinary differential equations with constant coefficients by using Laplace transform technique.

Total: 60 Periods**Text Books:**

1. Grewal B.S, "Higher Engineering Mathematics", Khanna Publishers, 44th Edition, 2019.
2. Grimaldi, R.P and Ramana, B.V., "Discrete and Combinatorial Mathematics", Pearson Publishers, 5th Edition, 2019.

Reference Books:

1. Ramana B.V, "Higher Engineering Mathematics", Tata McGraw Hill Publishing Company, 1st edition, 2017.
2. Bali.N.P and Dr.ManishGoyal, "A text book of Engineering Mathematics", Laxmi Publications (P)LTD, 8th edition, 2011.
3. Lidl, R. and Pitz, G, "Applied Abstract Algebra", Springer Verlag Publishers, 2nd Edition, 2016.
4. Niven, I., Zuckerman.H.S., and Montgomery, H.L., -An Introduction to Theory of Numbers, John Wiley and Sons Publishers, 2nd Edition, 2015

Additional References:

1. nptel.ac.in/courses/111/105/111105134
2. nptel.ac.in/courses/122/104/122104017

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)															
Cos	Pos												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2	2										1		
CO2	3	2	2										2		
CO3	3	3	2										2		
CO4	3	2	3										2		
CO5	2	3	2										1		
	3	High				2	Medium					1	Low		

Bloom's Level	Assessment Component	Marks	Total marks
Remember	Online Quiz	5	15
Understand	Tutorial Class / Assignment	5	
	Attendance	5	

Summative Assessment

Bloom's Category	Internal Assessment Examinations			Final Examination (60)
	IAE1 (7.5)	IAE2 (7.5)	IAE3 (10)	
Remember	10	10	10	20
Understand	10	10	10	20
Apply	30	30	30	60
Analyze				
Evaluate				
Create				

20CS202	PROGRAMMING AND DATA STRUCTURES (Common to CSE, IT, AI & DS& CSBS)	L	T	P	C
		3	0	0	3
Nature of Course	Professional Core				
Pre requisites	Basics of C				

Course Objectives

The course is intended to

1. Learn the features of C
2. Gain Knowledge in linear and non-linear data structures
3. Explore the applications of linear and non-linear data structures
4. Represent data using graph data structure
5. Learn the basic sorting and searching algorithms

Course Outcomes

On successful completion of the course, students will be able to

CO.No.	Course Outcome	Bloom's Level
CO1.	Determine the basic concepts and terminology of programming in C	Understand
CO2.	Interprets the concept of functions, pointers, structures and unions operations and their usage.	Understand
CO3.	Implement linear data structure operations using C	Apply
CO4.	Suggest appropriate linear / non-linear data structure for any given data set	Apply
CO5.	Appropriately choose the searching and sorting algorithm for an application	Apply

Course Contents:**Unit - I C Programming Basics****9**

Structure of a C program – compilation and linking processes – Constants, Variables – Data Types – Expressions using operators in C – Managing Input and Output operations – Decision Making and Branching – Looping statements. Arrays – Initialization – Declaration – One dimensional and Two-dimensional arrays. Strings- String operations – String Arrays. Simple programs- sorting- searching – matrix operations.

Passed in Board of Studies meeting on 01.10.2021 Approved in Academic council meeting on 04.10.2021

Unit - II Functions, Pointers, Structures and Unions 9

Functions – Pass by value – Pass by reference – Recursion – Pointers – Definition – Initialization – Pointers arithmetic. Structures and unions – definition – Structure within a structure – Union – Programs using structures and Unions – Storage classes, Pre-processor directives.

Unit - III Linear Data Structures 9

Arrays and its representations – Stacks and Queues – Linked lists – Linked list-based implementation of Stacks and Queues – Evaluation of Expressions – Linked list based polynomial addition.

Unit - IV Non-Linear Data Structures 9

Trees – Binary Trees – Binary tree representation and traversals – Binary Search Trees – Applications of trees. Set representations – Union-Find operations. Graph and its representations – Graph Traversals.

Unit - V Searching and Sorting Algorithms 9

Linear Search – Binary Search. Bubble Sort, Insertion sort – Merge sort – Quick sort – Hash tables – Overflow handling.

Total: 45 Periods**Text Books:**

1. PradipDey and ManasGhosh, —Programming in C, Second Edition, Oxford University Press, 2011.
2. Ellis Horowitz, SartajSahni, Susan AndersonFreed, “Fundamentals of Data Structures in C” ,Second Edition, University Press, 2016.

Reference Books:

1. Mark Allen Weiss, —Data Structures and Algorithm Analysis in C, Second Edition, Pearson Education, 1996
2. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, —Data Structures and Algorithms, Pearson Education, 1983.
3. Robert Kruse, C.L.Tondo, Bruce Leung, ShashiMogalla , — Data Structures and Program Design in C, Second Edition, Pearson Education, 2019
4. Jean-Paul Tremblay and Paul G. Sorenson, —An Introduction to Data Structures with Applications, Second Edition, Tata McGraw-Hill, 1991.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2	1	1									3	1	
CO2	3	2	2	1									3	1	
CO3	3	2	1	1									3	1	
CO4	3	3	2	1									3	1	
CO5	3	3	2	2									3	1	
	3	High				2	Medium				1	Low			

Passed in Board of Studies meeting on 01.10.2021 Approved in Academic council meeting on 04.10.2021

Formative assessment			
Bloom's Level	Assessment Component	Marks	Total marks
Apply	Classroom or Online Quiz	5	15
Understand	Class Presentation/Power point presentation	5	
	Attendance	5	

Summative Assessment				
Bloom's Category	Continuous Assessment Tests			Final Examination (60)
	IAE-I (7.5)	IAE-II (7.5)	IAE-III (10)	
Remember	10	10	10	10
Understand	20	20	20	40
Apply	20	20	20	50
Evaluate	0	0	0	0
Create	0	0	0	0

20CH201	CHEMISTRY FOR COMPUTER SCIENCES (Common to CSE, IT, AI & DS& CSBS)	L	T	P	C
		3	0	2	4
Nature of Course	Basic Sciences				
Prerequisites	Nil				

The course is intended to

1. Impart knowledge and understanding about the constituents present in water and the need for purification of water.
2. Understand the fundamentals of batteries.
3. Provide knowledge about materials like metals, refractories and cement.
4. Develop the understanding and applications of basic concepts of electrochemistry.
5. Conversant with the basics of polymers and engineering plastics.

On successful completion of the course, students will be able to

CO. No	Course Outcome	Bloom's Level
CO1	Develop innovative and eco-friendly method for water purification to meet the growing industrial demand	Apply
CO2	Understand the basic principles and mechanism of working of batteries and fuel cells	Understand
CO3	Discuss about various types of alloys and engineering materials	Understand
CO4	Use the principles of electro chemical cells, EMF, electroplating and electrolysis	Apply
CO5	Classify engineering plastics and some important industrial polymers	Understand

Course Contents**Unit-I Water Analysis and Water Treatment 9**

Water analysis: Sources of water, Hard water and soft water, Hardness of water, acidity, alkalinity, pH value, amount of free CO₂, fluoride content and chloride content. Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD). Water treatment: Definition, Zeolite process, Conditioning methods: Internal conditioning (Phosphate, Calgon) and external conditioning (Demineralisation), Desalination, Reverse osmosis (RO).

Unit-II Energy Storage Devices 9

Batteries: Definition, characteristics and classification, Primary battery: Alkaline battery, Secondary battery: lead acid battery, nickel cadmium battery, lithium battery and lithium ion battery, Fuel cells: construction and working of phosphoric acid fuel cell.

Unit-III Alloys and Engineering Materials 9

Alloys: classification and types, Ferrous alloys (Nichrome and stainless steel only), Non-ferrous alloys (brass and bronze), Heat treatment of steel, Refractories: characteristics, classification and manufacture. Cement: manufacture and setting.

Unit-IV Electrochemistry 9

Electrode potential, Nernst equation and problems, Reference electrodes, Standard hydrogen electrode, Calomel electrode, Ion selective electrode (glass electrode), Determination of pH by glass electrode, Electrochemical series, Electrochemical cell, Galvanic cell: measurement of EMF.

Unit-V Polymeric Materials 9

Engineering plastics: Thermosetting and Thermoplastics, Polymers: polyethylene (PE), polyvinyl chloride, Teflon, nylon-6:6, Fabrication: injection moulding, Composites: definition, types, polymer matrix composites, FRP, Biodegradable polymers: definition. Polylactide acid: production, properties and applications.

Total: 45 Periods

Laboratory Component

S.No.	Name of the Experiment	CO Mapping	RBT
1	Determination of hardness of water	CO1	Apply
2	Determination of chloride content in water sample	CO1	Apply
3	Conductometric titration of strong acid versus strong base	CO2	Understand
4	Determination of strength of HCl by pH metry	CO2	Understand
5	Estimation of copper in brass by EDTA method	CO3	Apply
6	Determination of CaO in cement	CO3	Apply
7	Estimation of strength of iron by potentiometric titration	CO4	Apply
8	Determination of molecular weight of a given polymer by Ostwald viscometer	CO5	Apply

Text Books

1. O.G. Palanna, "Engineering Chemistry", Tata McGraw-Hill Pub. Co. Ltd, New Delhi, 1st Edition, 2017
2. P.C. Jain and Monicka Jain, "Engineering Chemistry", Dhanapat Rai Publishing Company Pvt. Ltd, 2nd Edition, 2017.

Reference Books

1. B. Sivasankar "Engineering Chemistry" Tata McGraw-Hill Pub.Co.Ltd, New Delhi, 2nd Edition, 2009.
2. R. Sivakumar and N. Sivakumar, "Engineering Chemistry" Tata McGraw-Hill Pub.Co.Ltd, New Delhi, 1st Edition, 2009.
3. Dr. Sivanesan and Nandagopal, "Engineering Chemistry-I" V. K. Pub. Pvt. Ltd, 2nd Edition, 2011.

Additional Resources

1. <https://nptel.ac.in/downloads/122101001>
2. <https://nptel.ac.in/courses/103103033/module9/lecture1.pdf>
3. <https://nptel.ac.in/courses/102103044/3>
4. <https://www.sciencedirect.com/topics/chemistry/phosphoric-acid-fuel-cells>
5. https://en.wikipedia.org/wiki/Polylactic_acid

Mapping of Course Outcomes (CO) with Programme Outcomes (PO) and Programme Specific Outcomes (PSO)															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2									1				
CO2	3	2									1				
CO3	3	2									1				
CO4	3	2									1				
CO5	3	1									1				
	3	High				2	Medium				1	Low			

Summative Assessment						
	Continuous Assessment					Final
	Theory					
	IAE-I [7.5]	IAE-II [7.5]	IAE-III[10]	Attendance [5]	Rubric based CIA [20]	
Remember	30	20	10		20	
Understand	10	20	30		20	
Apply	10	10	10		10	
Analyze						
Evaluate						
Create						

20ME203	Engineering Graphics	L	T	P	C
		1	0	4	3
Nature of Course	Engineering Sciences				
Pre requisites	Nil				

Course Objectives:

The course is intended to

1. Understand technical drawings in various fields of engineering
2. Imagine and visualize the geometric details of engineering objects.
3. Translate the geometric information of engineering objects into engineering drawings.
4. Develop the graphical skills for communication of concepts, ideas and design of engineering products through technical drawings.
5. Visualize and draw isometric and perspective views

Course Outcomes

On successful completion of the course, students will be able to

CO. No.	Course Outcome	Bloom's Level
CO 1	Develop the conic sections, special curves, and draw orthographic views from pictorial views.	Apply
CO 2	Apply the principles of orthographic projections of points in all quadrants, lines and planes in first quadrant.	Apply
CO 3	Construct the projections of simple solids like prisms, pyramids, cylinder and cone.	Apply
CO 4	Build the sectional views of solids like cube, prisms, pyramids, cylinders & cones and development of its lateral surfaces.	Apply
CO 5	Organize and draw isometric and perspective sections of simple solids.	Apply

Course Contents**Concepts and Conventions (Not for Examination)****1**

Importance of graphics in engineering applications – Use of drafting instruments – BIS conventions and specifications – Size, layout and folding of drawing sheets – Lettering and dimensioning.

UNIT -I Plane Curves and Free Hand Sketching**(3+12)**

Basic Geometrical constructions, Curves used in engineering practices: Conics – Construction of ellipse, parabola and hyperbola by eccentricity method – Construction of cycloid – construction of involutes of square and circle – Drawing of tangents and normal to the above curves. Visualization concepts and Free Hand sketching: Visualization principles –Representation of Three-Dimensional objects – Layout of views- Free hand sketching of multiple views from pictorial views of objects

UNIT –II Projection of Points, Lines and Plane Surfaces (3+12)

Orthographic projection- principles-Principal Planes-First angle projection-projection of points
 Projection of straight lines (only First angle projections) inclined to both the principal planes -
 Determination of true lengths and true inclinations by rotating line method. Projection of planes
 (polygonal and circular surfaces) inclined to both the principal planes by rotating object method.

UNIT –III Projection of Solids (3+12)

Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one
 of the principal planes by rotating object method.

UNIT- IV Projection of Sectioned Solids and Development of Surface (3+12)

Sectioning of above solids in simple vertical position when the cutting plane is inclined to the one of
 the principal planes and perpendicular to the other – obtaining true shape of section, Development
 of lateral surfaces of simple and sectioned solids – Prisms, pyramids cylinders and cones.
 Development of lateral surfaces of solids with cut-outs and holes

UNIT -V Isometric and Perspective Projections (3+12)

Principles of isometric projection – isometric scale –Isometric projections of simple solids and
 truncated solids - Prisms, pyramids, cylinders, cones- combination of two solid objects in simple
 vertical positions and miscellaneous problems. Perspective projection of simple solids-Prisms,
 pyramids and cylinders by visual ray method.

TOTAL: (15+60) Periods**TEXT BOOKS**

1. Venugopal K. and Prabhu Raja V., “Engineering Graphics”, New Age International (P) Limited, 2011
2. Natarajan K.V., “A text book of Engineering Graphics”, Dhanalakshmi Publishers, Chennai, 2016.

REFERENCE BOOKS

1. Bhatt N.D. and Panchal V.M., “Engineering Drawing”, Charotar Publishing House, 50th Edition, 2010.
2. BasantAgarwal and Agarwal C.M., “Engineering Drawing”, Tata McGraw Hill Publishing Company Limited, New Delhi, 2016.
3. ParthasarathyN S and Vela Murali, “Engineering Graphics”, Oxford University, Press, New Delhi, 2015.

Web References

1. [http://nptel.ac.in/courses/112103019/Engineering drawing](http://nptel.ac.in/courses/112103019/Engineering%20drawing)
2. <http://pioneer.netserv.chula.ac.th/~kjrapon/self-practice.html>

Publication of Bureau of Indian Standards

1. IS 10711 – 2001: Technical products Documentation – Size and lay out of drawingsheets.
2. IS 9609 (Parts 0 & 1) – 2001: Technical products Documentation – Lettering.
3. IS 10714 (Part 20) – 2001 & SP 46 – 2003: Lines for technical drawings.
4. IS 11669 – 1986 & SP 46 – 2003: Dimensioning of Technical Drawings.
5. IS 15021 (Parts 1 to 4) – 2001: Technical drawings – Projection Methods.

Special points applicable only to Final Examinations of Engineering Graphics:

1. There will be five questions, each of either-or type covering all units of the syllabus.
2. All questions will carry equal marks of 20 each making a total of 100.
3. The answer paper shall consist of drawing sheets of A3 size only. The students will be permitted to use appropriate scale to fit solution within A3 size.
4. The examination will be conducted in appropriate sessions on the same day

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2										1	2		
CO2	3	2										1	2		
CO3	3	2										1	2		
CO4	3	3										1	2		
CO5	3	2										1	2		
	3	High				2	Medium				1	Low			

Summative assessment						
Bloom's Level	Continuous Assessment					Final Examination (Theory) [50 marks]
	Theory				Practical	
	IAE-I [7.5]	IAE-II [7.5]	IAE-III [10]	Attendance [5]	Rubric based CIA [20 Marks]	
Remember	10	10	10		20	20
Understand	20	20	20		40	40
Apply	20	20	20		40	40
Analyse						
Evaluate						
Create						

20CS203	PROGRAMMING AND DATA STRUCTURES LABORATORY (Common to CSE, IT, AI & DS& CSBS)	L	T	P	C
		0	0	4	2
Nature of Course	Practical				
Pre requisites	Basic Structure of C Program				

Course Objectives

The course is intended to

1. Make familiar with C programming Language
2. Write simple programs using arrays and pointers
3. Develop applications in C using functions and structures
4. Implement linear data structure List ADT in various applications
5. Apply Stack and Queue ADTs using C in real time applications

Course Outcomes

On successful completion of the course, students will be able to

CO. No.	Course Outcome	Bloom's Level
CO1	Write simple C programs using basic language constructs	Understand
CO2	Solve problems using arrays and strings	Apply
CO3	Develop modular programs using functions, pointers and structures	Apply
CO4	Implement various List ADTs for various applications	Apply
CO5	Make use of Stack and Queue ADT to solve real-time problem	Analyze

Course Content:**List of Exercises**

S.No	List of Exercises	CO Mapping	RBT
1	Write programs using simple control statements	CO1	Understand
2	Write a program to implement functions and recursive functions.	CO1	Understand
3	Design and develop a health application that computes indexes and suggest the diet plan.	CO2	Analyze
4	Program to do simple operations with arrays and strings.	CO2	Apply
5	Implement a telephone directory using structures and pointers.	CO3	Analyze
6	Choose an appropriate data structures and create a token system for banking service.	CO3	Analyze
7	Choose an appropriate data structures and create a book rack allocation system in a library.	CO4	Apply
8	Create a C application to get employee information	CO4	Apply
9	Creation of Array and linked list implementation of Stack and Queue ADTs	CO5	Apply
10	Create a food delivering system which allocates the path for delivery of food using appropriate data structures.	CO5	Apply

TOTAL: 60 Periods

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	3	2									2	3	
CO2	3	3	3	2									2	3	
CO3	3	3	3	2									2	3	
CO4	3	3	3	2									2	3	
CO5	3	3	3	3									2	3	
	3	High				2	Medium				1	Low			

Summative assessment based on Continuous and End Semester Examination		
Bloom's Level	Rubric based Continuous Assessment [50 marks]	Final Examination [50 marks]
Remember		
Understand	10	30
Apply	20	50
Analyze	20	20
Evaluate		
Create		

20MC202	INTERPERSONAL SKILLS	L	T	P	C
		2	0	2	0
Nature of Course	Mandatory, Non Credit				
Pre requisites	Nil				

Course Objectives

The course is intended to

1. Use interpersonal communication skills to influence and build good relationships.
2. Identify and pursue personal learning goals.
3. Obtain feedback skills in service of evolving learning goals.
4. Learn about group dynamics, behaviors and feelings
5. Enhance the communication process in both formal and informal contexts

Course Outcomes

On successful completion of the course, students will be able to

CO. No	Course Outcome	Bloom's Level
CO1	Practice interpersonal communication skills to influence and build good relationships	Understand
CO2	Identify and pursue personal learning goals.	Understand
CO3	Give evident feedback	Understand
CO4	Reveal group dynamics and amiable behavior	Understand
CO5	Emphasis the communication process	Understand

Course Contents:

Unit I: Fundamentals of Interpersonal Communication

6

Facts of communication and Interpersonal communication – culture and gender – Communication and Self disclosure – Presentation of Interpersonal perception - Learning goals – Feeling and feedback.

Unit II: Interpersonal communication in action

6

Nature of language – language and culture – usage and abuse of language –Positive communication -Non verbal communication - Listening strategies – Barriers of listening.

Unit III: Emotional Intelligence

6

Influence of emotional experience and expressions – Accepting the responsibilities and changes - Negotiation tactics - Dealing with criticism and appreciation - Collaborative Problem Solving - Resilience Building.

Unit IV: Transactions

6

Different types of transactions - Building Positive Relationship - Managing Conflict – Connecting across Difference –Factors hampering Interpersonal interactions – Assertiveness in communication.

Unit V: Essential Interpersonal Competencies**6**

Behaviour – Understanding limiting behaviour - Interpersonal and small group behavior – Critical and lateral thinking-Win –Win attitude – Positive thinking – Stress management – Assertive feedback - Personal Evaluation of Interpersonal Relationship Skills

Total 30 Periods**Activity Component**

S.No	Name of the Exercises	CO Mapping	RBT
1	Self-Introduction	1	Remember
2	Presentation of Individual perception	2	Understand
3	Role play - Non-verbal communication - Body language	4	Apply
4	Role play - Interpersonal interactions & Assertive feedback	3	Remember
5	Group Discussion	4	Apply
6	Role play - Situational conversation (On spot)	5	Understand

Text Books

1. Bozeman, Jeanine C and Argile Smith, "Interpersonal Relationship Skills for Ministers" Gretna, LA: Pelican Publishing Company, 1st Edition, 2004.
2. Floyd, Kory, "Interpersonal Communication", 2d. Boston: McGraw-Hill, 2nd Edition, 2011.

Reference Books:

1. Augsburg, David, "Caring Enough to Confront How to Understand and Express Your Deepest Feelings Towards Others", updated ed. Ventura, CA: Regal Books, 2nd Edition 2009.
2. Vohs, Kathleen D., and Eli J., Finkel, eds, "Self and Relationships: Connecting Intrapersonal and Interpersonal Processes", New York: Guilford Press, 1st Edition, 2016.

Mapping of Course Outcomes (CO) with Programme Outcomes (PO) Programme Specific Outcomes (PSO)															
COs	Pos												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1										3	2	1	2		
CO2										3	2	1	2		
CO3										3	2	1	2		
CO4										3	2	1	2		
CO5										3	2	1	2		
	3	High				2	Medium				1	Low			

Bloom's Level	Summative Assessment (Internal Mode)	
	Assessment 1 (50 Marks)	Assessment 2 (50 Marks)
Remember	20	20
Understand	10	10
Apply	20	20
Analyze		
Evaluate		
Create		

20ENE02	Advanced Communicative English (Common to all B.E./ B.Tech Programmes)	L	T	P	C
		2	0	2	3
Nature of Course	Humanities and Social Sciences				
Pre requisites	Basics of Communicative English				

Course Objectives

The course is intended to

1. Demonstrate satisfactory control over complex structures and mechanics in English.
2. Develop fluency and accuracy in oral communication.
3. Communicate effectively and actively in social interactions.
4. Read English at inspectional level.
5. Face interviews with confidence.

Course Outcomes

On successful completion of the course, students will be able to

CO. No.	Course Outcome	Bloom's Level
CO1	Apply knowledge of English grammar for effective communication	Remember
CO2	Make use of common English phrases and vocabulary strength.	Understand
CO3	Build self-confidence and enhance professionalism	Apply
CO4	Implement listening, reading and writing skills in real - life situations	Apply
CO5	Speak fluently in English with proper pronunciation, intonation, tone and accent.	Understand

Course Contents

Unit – I Grammar and usage

6

Active voice and passive voice – Prefixes and suffixes – Connotation – Clauses - If conditionals – Idioms & Phrases - Right forms of verbs– Modal Auxiliaries - Spotting errors.

Unit - II Lexical competence

6

Technical Vocabulary- Expressions – Frequency – Cause and effect - Words often Miss-spelled – Syntax and structure - Homophones and Homonyms- Verbal analogy - Idioms and Phrases.

Unit - III Conversational etiquette

6

Processes description– Tone and accent in speech– Role-play (Job-Interview) – Presentation skills – Mechanics of presentation - Telephone etiquette – Group Discussion strategy - Formal & Informal subjective and objective introduction – Body Language – Mock Interview.

Unit – IV Listening reading and writing

6

Listen to Scientific/Technical talks and gap filling – Listening to TED/INK Talks – Reading – “Water: The Elixir of Life” by Sir. C.V.Raman. “Progress” by St. John Ervine - Instructions and Recommendations – Letter writing formal –Job application- Report writing–Introspective report – Creative writing – Essays and Paragraphs.

Unit – V Phonetics

6

Production and classification of speech sound – International Phonetic Alphabet and transcriptions – Phonological rules – way and Place of articulation – Vowels, consonants and diphthongs. Specific characteristics feature of vowel sounds.

Total: 30Periods

Laboratory Components

S.No	List of Exercises	CO Mapping	RBT
1	Role-play – Processes Description	2	Remember
2	Listening to TED/INK Talks and gap filling	4	Understand
3	Group Discussion	3	Understand
4	Articulation with pronunciation practice	3	Apply
5	Reading – Longer texts and Technical Articles (Skimming & Scanning).	4	Apply
6	Presentation skills – Mechanics of presentation	5	Understand
7	Individual presentation on given topics	5	Remember
8	Telephone etiquette	5	Understand
9	Instructions and Recommendations	5	Remember
10	Writing – General Essays.	4	Apply
11	Report writing technique- write up	4	Remember
12	Introspective report – Personal analysis	4	Understand
13	Model Job Interviews	3	Understand
14	Job Interviews(Role play)	3	Apply
15	Body Language	3	Understand

Total: 30 Periods**Text Books**

1. Rizvi, Ashraf.M, “Effective Technical Communication”, Tata McGraw Hill Publishing Company Limited, New Delhi, 5th Edition, 2019.
2. Hewings. M, “Advanced English Grammar”, 3rd Edition, Cambridge University Press, Chennai, 5th Edition, 2000.
3. Board of Editors, “Using English – A Coursebook for Undergraduate Engineers and Technologists”, Orient BlackSwan Private Limited, Hyderabad, 2nd Edition, 2017.

Reference Books:

1. Raman M &Sangeetha Sharma, “Technical Communication”,Oxford University Press,USA,10thEdition,2019.
2. John CunnisonCatford, “A Practical Introduction to Phonetics”,Clarendon Press, Jamaica,2nd Edition, 2001.
3. Norman Whitby, Business Benchmark – “Pre-Intermediate to Intermediate, Students Book”, Cambridge University Press, 1st Edition, 2016.
4. DhanavelS. P., “English and Soft Skills”, 1stEdition,OrientBlackSwan Private Limited, Hyderabad, 1st Edition, 2010.

Web reference:

1. https://www.coursera.org/lecture/tesol-speaking/video-2-listening-strategies-for-learners-3AeBL?utm_source=mobile&utm_medium=page_share&utm_content=vp&utm_campaign=top_button
2. blob:<https://www.youtube.com/73f7256d-d302-4563-bed5-9e84c94a26ac>

Mapping of Course Outcomes (CO) with Programme Outcomes (PO) Programme Specific Outcomes (PSO)															
COs	Pos												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1										3	1	2	2		
CO2										3	1	2	2		
CO3										3	1	2	2		
CO4										3	1	2	2		
CO5										3	1	2	2		
	3	High				2	Medium				1	Low			

Summative assessment						
Bloom's Level	Continuous Assessment					Final Examination (Theory) [50 marks]
	Theory Marks				Practical	
	IAE-I [7.5]	IAE-II [7.5]	IAE -III [10]	Attendance [5]	Rubric based CIA [20 Marks]	
Remember	20	20	20		40	40
Understand	20	20	20		40	40
Apply	10	10	10		20	20
Analyse						
Evaluate						
Create						

20ENE03	HINDI	L	T	P	C
		2	0	2	3
Nature of Course	Humanities and Social Sciences				
Pre requisites	Basic Perceptive of Language				

Course Objectives

The course is intended for learners.

1. To help students acquire the basics of Hindi
2. To teach them how to converse in Hindi on simple day-to-day situations
3. To help students acquire the ability to understand a simple technical text in Hindi

Course Outcomes

On successful completion of the course, students will be able to

CO. No.	Course Outcome	Bloom's Level
CO.1	Construct simple sentences and use vocabulary required for day-to-day conversation	Remember
CO.2	Distinguish and understand the basic sounds of Hindi language.	Remember
CO.3	Appear for Hindi examinations conducted by Dakshin Bharat Hindi Prachar Sabha.	Remember

Course Contents:**UNIT I: Introduction****6**

Hindi Alphabet: Introduction - Vowels - Consonants - Plosives - Fricatives - Nasal sounds - vowel Signs- Chandra Bindu & Visarga - Table of Alphabet - Vocabulary.

UNIT II: Reading**6**

Nouns: Genders (Masculine & Feminine Nouns long vowels and short vowels - Masculine & Feminine - Reading Exercises

UNIT III: Grammar**6**

Pronouns and Tenses: Categories of Pronouns - Personal Pronouns - Second person you & honorific) - Definite & Indefinite pronouns - Relative pronouns - Present tense - Past tense - Future tense - Assertive & Negative Sentences – Interrogative Sentences.

UNIT IV: Vocabulary**6**

Classified Vocabulary: Parts of body - Relatives - Spices - Eatables - Fruit & Vegetables - Clothes - Directions - Seasons - Professions

UNIT V: Speaking**6**

Speaking: Model Sentences and Rhymes - Speaking practice for various occasions.

Total: 30 Periods**Reference:**

1. Hindi Prachar Vahini-1 by Dakshin Bharat Hindi Prachar Sabha Chennai
2. B.R.Kishore, Self Hindi Teacher for Non-Hindi Speaking People, Vee Kumar Publications (P) Ltd., New Delhi, 2009
3. Videos, Stories, Rhymes and Songs.

20ENE04	FRENCH	L	T	P	C
		2	0	2	0
Nature of Course	Humanities and Social Sciences				
Pre requisites	Basic Perceptive of Language				

Course Objectives

The course is intended for learners.

1. To prepare the students for DELFA1 Examination
2. To teach them to converse fluently in French in day-to-day scenarios

Course Outcomes

On successful completion of the course, students will be able to

CO. No.	Course Outcome	Bloom's Level
CO1	To help students acquire familiarity in the French alphabet & basic vocabulary	Remember
CO2	listen and identify individual sounds of French	Remember
CO3	Use basic sounds and words while speaking	Remember
CO4	Read and understand short passages on familiar topics	Understand
CO5	Understand and use basic grammar and appropriate vocabulary in completing language tasks	Understand

Course Contents:**UNIT I : Entrer En Contact****6**

La langue française, alphabets, les numéros, les jours, les mois. Grammaire Les verbes s'appeler, être, avoir, les articles définis, indéfinis Communication - Saluer, s'informer sur quelqu'un, demander de se présenter Lexique - Les alphabets, les nationalités, âge, les pays, les couleurs, les jours de la semaine, les mois de l'année, les professions

UNIT II : Partager Son Lieu De Vie**6**

Les français et leur habitat, des habitations insolites Grammaire- Verbes - Conjugaison : Présent (Avoir / être / ER, IR, RE : Régulier et Irrégulier) – Adjectifs du lieu Communication - Chercher un logement, décrire son voisin, s'informer sur un logement Lexique - L'habitat, les pièces, l'équipement, la description physique

UNIT III: Vivre Au Quotidien**6**

Grammaire - Articles contractés, verbes vouloir, pouvoir, devoir, adjectif interrogatif, futur proche Communication- Exprimer ses goûts, parler de ses loisirs, justifier un choix, exprimer une envie Lexique - le temps libre et les loisirs, les saisons, les activités quotidiennes, le temps (le matin, le soir, la nuit)

UNIT IV: Comprendre Son Environnement Ouvrir La Culture**6**

Grammaire - Verbes- Finir, Sortir, les adjectifs démonstratifs, le passé composé, l'imparfait Communication - Proposer à quelqu'un de faire quelque chose, raconter une sortie au cinéma, parler d'un film Lexique - Les sorties, la famille, art, les vêtements et les accessoires

UNIT V: Gouter À La Campagne**6**

Grammaire La forme négative, les verbes acheter, manger, payer, articles partitifs, le pronom en, quantité Communication Accepter et refuser une invitation, donner des instructions, commander au restaurant Lexique Les services et les commerces, les aliments, les ustensiles, argent.

Total: 30 Periods

Mapping of Course Outcomes (CO) with Programme Outcomes (PO) Programme Specific Outcomes (PSO)															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1										2					
CO2										2					

CO3										3						
CO4										3						
CO5										2						
	3	High				2	Medium				1	Low				
20ENE05		GERMAN											L	T	P	C
													2	0	2	3
Nature of Course		Humanities and Social Sciences														
Pre requisites		Basic Perceptive of Language														

Course Objectives

The course is intended for learners.

1. To help students appear for the A1 level Examination
2. To teach them how to converse fluently in German in day-to-day scenarios

Course Outcome

On successful completion of the course, students will be able to

CO.No.	Course Outcome	Bloom's Level
CO1	listen and identify individual sounds of German	Remember
CO2	use basic sounds and words while speaking	Remember
CO3	read and understand short passages on familiar topics	Remember
CO4	use basic sentence structures while writing	Understand
CO5	understand and use basic grammar and appropriate vocabulary in completing language tasks	Understand

Course Contents:**UNIT I Introduction****6**

Introduction to German language: Alphabet - Numbers - Greetings - Days and Seasons - Working with Dictionary

UNIT II Pronunciation**6**

Nouns - articles - Speaking about one self - Listening to CD supplied with the books, paying special attention to pronunciation

UNIT III Basic Syntax**6**

Regular & Irregular verbs - Personal pronouns - family - Introduction to type's of sentences

UNIT IV Vocabulary**6**

Question words - Types of Questions - Nominative case - Verb Conjugation - country - nationalities

UNIT V: Action Words**6**

Verbs - to be & to have - conjugation - Hobbies - Framing basic Questions and answers

Total: 30 Periods

Reference(s)

1. Kursbuch and Arbeitsbuch, NETZWERK A1 DEUTSCH ALS FREMDSPRACHE, Goyal Publishers & Distributors Pvt. Ltd., New Delhi, 2015
2. Langenscheidt Eurodictionary - German - English / English - German, Goyal Publishers & Distributors Pvt. Ltd., New Delhi, 2009
3. Grundkurs, DEUTSCH Lehrbuch Hueber München, 2019

Mapping of Course Outcomes (CO) with Programme Outcomes (PO) Programme Specific Outcomes (PSO)															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1										2					
CO2										2					
CO3										3					
CO4										3					
CO5										2					
	3	High				2	Medium					1	Low		