GANDHI INSTITUTE OF ENGINEERING AND TECHNOLOGY UNIVERSITY, ODISHA, GUNUPUR

DEPARTMENT

OF

COMPUTER SCIENCE & ENGINEERING

(SCHOOL OF ENGINEERING & TECHNOLOGY)

BACHELOR'S DEGREE PROGRAMME

(B. Tech- IOT)

Course Structure and Syllabus

For

Students Admitted in

[2023-27]

Academic Session

GANDHI INSTITUTE OF ENGINEERING AND TECHNOLOGY UNIVERSITY, ODISHA, GUNUPUR
SCHOOL OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

1. **Institute Vision & Mission, Department Vision & Mission, PEO's, PO's, PSO's**

Institute Vision:

To be a renowned and Globally Recognized University giving importance to academic excellence with latest technology, Research, Innovation and Entrepreneurial Attitude.

Institute Mission:

- To create innovative and committed work force to cater to the societal, environmental and economic needs of the Nation.
- To promote Education and Research Globally at par with the international standards
- To prepare the future leaders with latest skills befitting to become Entrepreneurs or Employable.
- To support and uplift the meritorious students of this Tribal Area to represent as an Ambassador in all forums as a part of our social responsibility.

Department Vision:

To be globally acclaimed as a premier Computer Science and Engineering department through excellent teaching and strong research environment by creating professionally competent engineers with moral values committed to build a vibrant nation.

Department Mission:

- Provide a positive and professional learning environment to master the fundamental principle of computing, problem solving skills, leadership qualities, team-spirit, ethics and societal responsibilities.
- To enable the graduates to use modern tools and technologies in the area of computer science and information technology.
- Establish Industry Institute Interaction program to enhance the employability skills.
- To promote innovative research in Computer Science and Engineering to serve the needs of Industry, Government and Society at large.

Program Educational Objectives:

- To render best platform for adequate training and opportunities to work as teams on projects with effective communication skills and leadership qualities and understand professional ethics, social awareness and organizational context in which their engineering skills are utilized.
- To endow the students with sound knowledge in the field of mathematics, basic science and engineering fundamentals to solve and inculcate the ability to utilize their skills to prepare them for higher studies, research and analyze engineering problems.

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING GIET University GUNUPUR-765022

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- To extend an ability to analyze the need of the society by providing innovation solutions, leading to their personal cum professional growth as an entrepreneur.

Program Outcome:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes:

- To provide students an understanding of the expectations of industry and practical competence with a broad range of programming lan uage and open source platforms through value added courses.
- The ability to analyze and develop computer programs in the areas related to Artificial Intelligence, Big ata Analysis and Cyber Security for e ficient design of computer-based systems of varying complexity.

Program Educational Objectives:

- Develop proficiency in the field of mathematics, basicscience, and engineering fundamentals to analyze andsolve a wide range of computational problems inindustry or other work environments and succeed in anadvanced degree program in a field such asengineering.
- Possess the ability to collaborate as team members andt am leaders for facilitating technical solutions forcomputing systems with awareness and commitment totheir ethical responsibilities.
- Attain the ability to critically analyze the need ofsociety and provide innovative solutions inmulti-disciplinary areas adopting technologies leadingto their personal cum professional growth as anentrepreneur.

GANDHI INSTITUTE OF ENGINEERING AND TECHNOLOGY UNIVERSITY, ODISHA, GUNUPUR

B.Tech. in COMPUTER SCIENCE AND ENGINEERING (IOT)

COURSE STRUCTURE (R-23 Regulations)

I SEMESTER

S. No.	Course Code	Course	L	T	P	Credits
1.	23BBSBS11001	Engineering Mathematics-I	3	1	0	4
2.	23BBSES11003	Programming for Problem Solving	3	0	0	3
3.	23BBSHS11001	Communicative English and Soft Skills	3	0	0	2
4.	23BBSBS10002	Engineering Physics	3	0	0	3
5.	23BBSES10001	Basic Electrical and Electronics Engineering	3	0	0	3
	23BBSES10002	Elements of Mechanical Engineering	3	1	0	4
PRACTICAL / SESSIONAL						
1	23BBSES10101	Basic Electrical and Electronics Engineering Laboratory	0	0	2	1
2.	23BBSES10107	Fundamental of Web Technology Laboratory	1	0	4	3
3.	23BBSES11103	Programming for Problem Solving Laboratory	0	0	4	2
4	23BBSHS11101	Communicative English and Soft Skills Laboratory	0	0	0	1
5	23BBSES10105 23BBSES10106	Engineering Graphics and Design Engineering Workshop	1	0	2	2
6	23BBSHS10002	Human Values and Professional Ethics	1	0	2	1
7	23BBSES10004	Dietetics and Nutrition				
8	23BBSMC11101	Induction Program (3 weeks)	0	0	2	0
		Total				**22**

II SEMESTER

S. No.	Course Code	Course	L	T	P	Credits
1.	23BBSBS12001	Engineering Mathematics-II	3	1	0	4
2.	23BBSES12003	Data Structures and Algorithms	3	0	0	4
3.	23BBSHS12001	Communicative English and Technical Communication	2	0	0	3
4.	23BBSBS10002	Engineering Physics	3	0	0	2
5.	23BBSES10001	Basic Electrical and Electronics Engineering	3	0	0	2
6.	23BBSES10002	Elements of Mechanical Engineering	3	1	0	2
PRACTICAL / SESSIONAL						
1	23BBSES10101	Basic Electrical and Electronics Engineering Laboratory	0	0	2	1
2	23BSES10107	Fundamental of Web Technology Laboratory	0	0	4	3
3	23BBSES12103	Data Structures and Algorithms Laboratory	0	0	4	1
3	23BBSHS12101	Communicative English and Technical Communication Laboratory	0	0	2	1
4	23BBSES10105	Engineering Graphics and Design/	1	0	2	1
5	23BBSES10106	Engineering Workshop	0	0	0	1
6	23BBSHS10002	Human Values and Professional Ethics	1	0	0	0
7	23BBSES10004	Dietetics and Nutrition	0	0	0	0
8	23BBSMC12201	NSS/YOGA				
		Total				**22**

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IIISEMESTER

S.No.	Course Code	CourseTitle	L	T	P	Credits
1	IO301PC	Digital Electronics	3	0	0	3
2	IO302PC	Data Structures	3	0	0	3
3	IO303PC	Operating Systems	3	0	0	3
4	IO304PC	Software Engineering	3	0	0	3
5	IO305PC	Discrete Mathematics	3	1	0	4
6	IO306PC	Digital Electronics Lab	0	0	2	1
7	IO307PC	Data Structures Lab	0	0	2	1
8	IO308PC	Principles of Operating Systems Lab	0	0	2	1
9	IO309PC	Data visualization-R Programming/ Power BI	0	0	2	1
10	*MC310	Constitution of India	3	0	0	0
		Total	**18**	**1**	**08**	**20**

IV Semester

S.No.	Course Code	CourseTitle	L	T	P	Credits
1	IO401PC	Computer Oriented Statistical Methods	3	1	0	4
2	IO402PC	Computer Organization and Architecture	3	0	0	3
3	IO403PC	Sensors and Devices	2	0	0	2
4	IO404PC	Object Oriented Programming through Java	3	0	0	3
5	IO405PC	Computer Networks	3	0	0	3
6	IO406PC	Sensors and Devices Lab	0	0	2	1
7	IO407PC	Java Programming Lab	0	0	2	1
8	IO408PC	Real-time Research Project/ Field Based Research Project	0	0	4	2
9	IO409PC	Node JS/ React JS/ Django	0	0	2	1
10	*MC410	Gender Sensitization Lab	0	0	2	0
		Total	**14**	**1**	**12**	**20**

V SEMESTER

S.No.	Course Code	CourseTitle	L	T	P	Credits
1	IO501PC	Automata Theoryand Compiler Design	3	0	0	3
2	IO502PC	Microprocessors& Microcontrollers	3	1	0	4
3	IO503PC	Database Management Systems	3	0	0	3
4	SM504MS	Business Economics& Financial Analysis	3	0	0	3
5		Professional Elective-I	3	0	0	3
6	IO505PC	Database Management Systems Lab	0	0	2	1
7	IO506PC	Microprocessors& Microcontrollers Lab	0	0	2	1
8	EN508HS	Advanced English Communication Skills Lab	0	0	2	1
9	IO507PC	UIdesign-Flutter	0	0	2	1
10	*MC510	Intellectual Property Rights	3	0	0	0
		Total	**18**	**1**	**08**	**20**

VI SEMESTER

S.No.	Course Code	CourseTitle	L	T	P	Credits
1	IO601PC	IoTSecurity	3	0	0	3
2	IO602PC	Computer Vision and Robotics	3	0	0	3
3	IO603PC	IoT Cloud Processing and Analytics	3	0	0	4
4		Professional Elective–II	3	0	0	3
5		Open Elective-I	3	0	0	3
6	IO604PC	IoT Security Lab	0	0	2	1
7	IO605PC	Computer Vision Lab	0	0	2	1
8	IO607PC	Industrial Oriented Mini Project/ Internship/ Skill Development Course (Bigdata-Spark)	0	0	4	2
9	*MC609	Environmental Science	3	0	0	0
		Total	**18**	**0**	**08**	**20**

Environmental Science in III Yr II Sem Should be Registered by Lateral Entry Students Only.

VII SEMESTER

S.No.	Course Code	CourseTitle	L	T	P	Credits
1	IO701PC	Operating Systems for IoT	3	0	0	3
2	IO702PC	IoT Networks	2	0	0	2
3		Professional Elective- III	3	0	0	3
4		Professional Elective- IV	3	0	0	3
5		Open Elective-II	3	0	0	3
6	IO703PC	Professional Practice, Law & Ethics	0	0	4	2
7		Professional Elective- III Lab	0	0	2	1
8	IO704PC	Project Stage- I	0	0	6	3
		Total Credits	**14**	**0**	**12**	**20**

VIII SEMESTER

S.No.	Course Code	CourseTitle	L	T	P	Credits
1		Professional Elective - V	3	0	0	3
2		Professiona lElective - VI	3	0	0	3
3		Open Elective–III	3	0	0	3
4	IO801PC	Project Stage– IIincluding Seminar	0	0	22	11
		Total Credits	**9**	**0**	**22**	**20**

***MC – Satisfactory/Unsatisfactory**

Professional Elective-I

IO511PE	Architecting Smart IoT Devices
IO512PE	Data Analytics for IoT
IO513PE	IoT System Architectures
IO514PE	IoT Communication Protocols
IO515PE	Algorithms Design and Analysis

Professional Elective-II

IO621PE	Machine Learning
IO622PE	Real Time Systems
IO623PE	Embedded Hardware Design
IO624PE	Energy Sources and Power Management
IO625PE	Software Engineering

Professional Elective-III

IO731PE	Mobile Application Development
IO732PE	Software Testing Methodologies
IO733PE	Cloud Computing and Virtualization
IO734PE	Artificial Intelligence
IO735PE	Light weight Cryptography

#Courses in PE-III and PE-III Lab must be in 1-1correspondence.

Professional Elective -IV

IO741PE	Quantum Computing
IO742PE	Wireless Ad-Hoc Networks
IO743PE	Augmented Reality & Virtual Reality
IO744PE	IoT Automation
IO745PE	Ad-hoc & Sensor Networks

Professional Elective-V

IO851PE	Embedded Software Design
IO852PE	5G & IoT Technologies
IO853PE	Cognitive Computing
IO854PE	Distributed Systems
IO855PE	Edge Computing

Professional Elective–VI

IO861PE	Industrial IoT
IO862PE	Fog Computing
IO863PE	Smart Sensor Technologies
IO864PE	Digital Forensics
IO865PE	Block chain Technology

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COURSE STRUCTURE (FIRST SEMESTER) 2023-2027 BATCH

BRANCH: CSE,CSEAIML,CSEIOT,CSEDS,CST,ECE,EE,EEE

Sl. No.	Course Category	Course Code	Course Title	Hours per week			Credits	CIE	SEE
				L	T	P			
THEORY									
1	BS	23BBSBS11001	Engineering Mathematics-I	3	1	-	4	40	60
2	BS	23BBSBS10002	Engineering Physics	3	-	-	3	40	60
3	ES	23BBSES10001	Basic Electrical and Electronics Engineering	3	-	-	3	40	60
		23BBSES10002	Elements of Mechanical Engineering	3	1	-	4	40	60
4	ES	23BBSES11003	Programming for Problem Solving	3	-	-	3	40	60
5	HS	23BBSHS11001	Communicative English and Soft Skills	2	-	-	2	40	60
PRACTICAL / SESSIONAL									
1	ES	23BBSES10101	Basic Electrical and Electronics Engineering Laboratory	-	-	2	1	30	20
2	ES	23BSES10107	Fundamental of Web Technology Labortary(Project)	1	-	4	3	90	60
3	ES	23BBSES11103	Programming for Problem Solving Laboratory	-	-	4	2	60	40
4	HS	23BBSHS11101	Communicative English and Soft Skills Laboratory	-	-	2	1	30	20
5	ES	23BBSES10105	Engineering Graphics and Design	1	-	2	2	60	40
		23BBSES10106	Engineering Workshop						
6	HS	23BBSHS10002	Human Values and Professional Ethics	1	-	-	1	30	20
	BS	23BBSBS10004	Dietetics and Nutition						
7	MC	23BBSMC11101	Induction Program(3 weeks)	-	-	-	-	-	-
							TOTAL CREDIT	22	

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COURSE STRUCTURE (FIRST SEMESTER) 2023-2027 BATCH

BRANCH: AGE, BT, CIVIL, CHEMICAL, MECHANICAL

Sl. No.	Course Category	Course Code	Course Title	Hours per week			Credits	CIE	SEE
				L	T	P			
THEORY									
1	BS	23BBSBS11001 23BBSBS110B1 (BIOTECH)	Engineering Mathematics-I	3	1	-	4	40	60
2	BS	23BBSBS10002	Engineering Physics	3	-	-	3	40	60
		23BBSBS10003	Engineering Chemistry						
3	ES	23BBSES10001	Basic Electrical and Electronics Engineering	3	-	-	3	40	60
		23BBSES10002	Elements of Mechanical Engineering	3	1	-	4	40	60
4	ES	23BBSES11003	Programming for Problem Solving	3	-	-	3	40	60
5	HS	23BBSHS11001	Communicative English and Soft Skills	2	-	-	2	40	60
PRACTICAL / SESSIONAL									
1	BS	23BBSBS10102	Engineering Physics Labortary	-	-	2	1	30	20
		23BBSBS10103	Engineering Chemistry Labortary						
2	ES	23BBSES10101	Basic Electrical and Electronics Engineering Laboratory	-	-	2	1	30	20
2	ES	23BSES10107	Fundamental of Web Technology Labortary(Project)	1	-	4	3	90	60
3	ES	23BBSES11103	Programming for Problem Solving Laboratory	-	-	4	2	60	40
4	HS	23BBSHS11101	Communicative English and Soft Skills Laboratory	-	-	2	1	30	20
5	ES	23BBSES10105	Engineering Graphics and Design	1	-	2	2	60	40
		23BBSES10106	Engineering Workshop						
6	HS	23BBSHS10002	Human Values and Professional Ethics	1	-	-	1	30	20
	BS	23BBSBS10004	Dietetics and Nutition						
6	MC	23BBSMC11101	Induction Program(3 weeks)	-	-	-	-	-	-
						TOTAL CREDIT	22		

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SYLLABUS

COMMON TO ALL BRANCHES(Except BIOTECH)

Pre-Requisite: Differential Calculus, Function and their Properties, Matrices

Subject Code	Name of the Subject	L	T	P	C
23BBSBS11001	ENGINEERING MATHEMATICS-I	3	1	0	4

Course Educational Objectives

CEO1	To find critical points, and use them to locate maxima and minima.
CEO2	To provide the standard methods for solving differential equations.
CEO3	To study Fourier series and to express a function in Fourier series.
CEO4	To use matrices, determinants and techniques for solving systems of linear equations in the different areas of Linear Algebra.

Course Outcomes:

Towards the end of the course, the students will be able to:

CO1	Memorizing some mathematical definition for solving. mathematical problems.
CO2	Understand and categorize. the basic concept of different problems.
CO3	Determine and articulate the different concept for solving the problems.
CO4	Estimate the Eigen values and vectors of a matrix, and maxima minima for function of two variables.
CO5	Predict the even and odd functions and extreme points.
CO6	Evaluate the engineering problems by using the concept of Partial differentiation and series and to understand its application.

CO-PO Mapping

	PROGRAMME OUTCOMES												
COs	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	
CO1	1	2											
CO2	1	3											
CO3	2	3											
CO4	2	3											
CO5	3	2											
CO6	3	3											
AVG.	2	2.67											2.33

ENGINEERING MATHEMATICS-I

UNIT-1 MATRICES (12 Hours)

Matrices, Types of matrices, Rank of matrix, Solution of system of linear equations using Gauss elimination method, Eigenvalues and Eigenvectors, Cayley – Hamilton theorem (without proof), Orthogonal matrices, Complex matrices, Hermitian and Skew-Hermitian matrices, Unitary matrices, Similar matrices, Diagonalization of matrices. Quadratic forms and Canonical forms, Reduction of Quadratic forms to Canonical forms through orthogonal transformation.

UNIT-2 MULTIVARIABLE CALCULUS (12 Hours)

Partial differentiation, Euler's theorem, Directional derivative, Total derivative, Taylor's theorem on function of two variables (without proof), Maxima and Minima for functions of two variables, Constrained Maxima and Minima using Lagrange multiplier method.

UNIT- 3 FIRST ORDER DIFFERENTIAL EQUATIONS (10 Hours)

Ordinary Differential Equations and their solutions, Variable Separable, Homogeneous, Non-Homogeneous, Linear and Non-Linear, Exact and Non-Exact. Applications to Electrical circuits and heat conduction.

UNIT- 4 HIGHER ORDER DIFFERENTIAL EQUATIONS (14 Hours)

Linear differential equations of higher order and their different methods of Solutions (operator methods). Second order linear differential equations and their solutions: Cauchy-Euler equation solution by method of Undermined coefficients and Variation of parameters. Simple application to electrical circuits.

UNIT-5 FOURIER SERIES (10 Hours)

Fourier series, Dirichlet's conditions, Fourier series expansion of functions with period 2π, Fourier series expansion of functions with arbitrary period, Half Range Fourier expansion.

Text Books:

1. Advanced Engineering Mathematics by E. Kreyszig, Tenth Edition, Willey
2. Differential Calculus by Santi Narayan and P.K .Mittal, S.Chand Publications
3. Higher Engineering Mathematics by B.V.Ramana, McGraw Hills Education

Reference Books:

1. Higher Engineering Mathematics by B.S Grewal: Khanna Publishers, New Delhi.
2. Advanced Engineer Mathematics by N. P. Bali & Manish Goyal
3. Advanced Engineer Mathematics by H. K. Dass , S. Chand & Company .LTD
4. Differential Calculus by J. Sinha Roy & S. Padhi.
5. Differential Calculus" by Vinay Kumar, 3rd Edition 2021, Mc Graw Hill

SYLLABUS

(Only for BIOTECH)

Pre-Requisite: Differential Calculus, Function and their Properties, Matrices

Subject Code	Name of the Subject	L	T	P	C
23BBSBS110B1	ENGINEERING MATHEMATICS-I	3	1	0	4

Course Educational Objectives

CEO1	Concept about the sets, tautology, contra positive and truth table.
CEO2	To use matrices, determinants and techniques for solving system of linear equations in Linear Algebra.
CEO3	To Provide the standard methods for differentiation.
CEO4	To Provide the standard methods for integration.

Course Outcomes:

Towards the end of the course, the students will be able to:

CO1	Remember the basic concept of about logic, set theory and matrices.
CO2	Understand and categorize. the basic concept of different problems by using matrix methods.
CO3	Solve the algebraic equations by using different methods and also understand the concept of interpolation.
CO4	Estimate the integration of standard functions.
CO5	Solve the equations by some numerical methods.
CO6	Solve the problems by using integration and differentiation.

CO-PO Mapping

	PROGRAMME OUTCOMES												
COs	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	
CO1	1	2											
CO2	2	2											
CO3	3	3											
CO4	2	3											
CO5	2	2											
CO6	3	2											
AVG.	2.1	2.3											2.2

ENGINEERING MATHEMATICS-I

UNIT-1 LOGIC AND SET THEORY (12 Hours)

Introduction, Statement, Negation, Conjunction, Disjunction, Conditional, Converse, Bi-Conditional, Inverse, Contra positive, Truth Table, Tautology, Logical Equivalence and Implication. Methods of Proof, Sets, Subset and Power Set, Venn Diagrams and Cartesian Product of Sets. Relations and Functions.

UNIT-2 LINEAR ALGEBRA (10 Hours)

Matrices, Types of matrices, Rank of matrix, Determinants of a matrices, Minors and Cofactors, Inverse of matrix, Transpose of Matrix and Properties, Solution of linear equation s by Cramer's rule, symmetric and skew symmetric matrices, Orthogonal matrix.

UNIT- 3 NUMERICAL METHODS (14 Hours)

Errors, Solving of algebraic and transcendental equations by using Bisection method, Fixed point iteration, and Newton-Raphson's method. Solution of system of Linear equations by Gauss elimination, Gauss Jordan, Gauss Seidal. Inverse of a matrix by Gauss Jordan method.

UNIT- 4 INTERPOLATION (12 Hours)

Errors, Finite Differences, Newton's Forward and Backward Interpolation Formula (without proof), Newton's divided difference interpolation, Lagrange's interpolation.

UNIT-5 STATISTICS (12 Hours)

Mean, Median, Mode, Correlation and Regression analysis, fitting of straight line by method of least squares method. Testing of hypothesis (small sample tests –t, F and chi-square test).

Reference Books:

1. Higher Engineering Mathematics by BS Grewal, Khanna Publishers, New Delhi.
2. Advanced Engineering Mathematics by E. Kreyszig, Tenth Edition, Willey
3. Numerical Method by S. S. Sastry
4. Higher Engineering Mathematics by B.V.Ramana, McGraw Hills Education
5. Advanced Engineer methods by N. P. Bali & Manish Goyal.

ENGINEERING PHYSICS

Pre-Requisite: Basic understanding of Fundamental of Math and Physics.

Subject Code	Name of the Subject	L	T	P	C
23BBSBS10002	ENGINEERING PHYSICS	3	0	0	3

Course Educational Objectives

CEO1	Impart among the students an attitude of being inquisitive so that they are capable of independent and critical thinking.
CEO2	Enable the students to analyse problems starting from first principles, evaluate and validate experimental results, and draw logical conclusions.
CEO3	Prepare the students to pursue research careers, careers in academics, industries in Physical Science and allied fields.
CEO4	To attain fundamental information about Quantum mechanics with applications.

Course Outcomes:

Towards the end of the course, the students will be able to:

CO1	Get good experience in using areas like oscillations, wave mechanics, optics.
CO2	Gain good experience by understanding of electromagnetic theory.
CO3	Explain the ideas of crystal structure, crystal diffraction and crystal defects
CO4	Classify various types of materials and their applications.
CO5	Understand Principle of lasing and optoelectronics devices in communication system.
CO6	Strengthen the student's analytical abilities and help them to formulate different relationships with natural phenomenon like quantum tunneling, potential well etc.

CO-PO Mapping

	PROGRAMME OUTCOMES												
COs	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	
CO1	2	2											
CO2	2	2											
CO3	1	2											
CO4	1	2											
CO5	1	1											
CO6	1	2											
AVG.	1.3	1.8											1.5

UNIT-1 OSCILLATION AND WAVES (10 Hours)

Introduction to Oscillatory motion, Simple harmonic oscillation, Damped harmonic oscillation and its characteristics, Waves and its characteristics, Wave equation, Superposition of Waves, coherent and incoherent superposition, Interference of light waves, Newton's Ring experiment, diameter of rings, determination of wavelength of unknown light and refractive index of liquid.

UNIT-2 ELECTROMAGNETIC THEORY (10 Hours)

Review of grad, divergence and curl, Gauss divergence theorem and Stokes theorem (no derivations), fundamental laws of electrostatics, magneto-statics and electromagnetism, displacement current and conduction current, Maxwell's equations, Equation of continuity using Maxwell's Relations. Electromagnetic wave and its characteristics, electromagnetic wave equation for free space and in Charge free conducting medium, electromagnetic energy and Pointing vector, Pointing theorem.

UNIT- 3 SOLID STATE PHYSICS (08 Hours)

Crystal Structure: crystal direction and plane, Miller indices, Inter planar spacing, Reciprocal Lattice and its characteristics, Reciprocal Lattice of SC, BCC and FCC, Brillouin Zone, X-ray diffraction (Basic) & Bragg's law, Crystal defects.

UNIT- 4 PHYSICS OF MATERIALS AND OPTOELECTRONICS (12 Hours)

Super Conducting Materials: Origin, type-1 and type-2, Meissner effect, critical magnetic field and current density, Applications.

Magnetic Materials: Properties of Magnetic Materials, types and applications.

Di-electric Materials: Polar and non-polar dielectric, types of dielectric, piezoelectric, pyro-electric and ferroelectric, Applications.

Nano Materials: (elementary ideas) Surface to volume ratio, graphene, carbon nano tubes and their applications.

LASER, Lasing action, characteristics and application of laser beam, construction and working of He-Ne Laser, applications of Laser. Optical fiber, Acceptance angle, Numerical aperture, Step index and Graded index fibers, Attenuations in optical fibers, Block diagram of optical fiber communication Systems and applications.

UNIT-5 QUANTUM MECHANICS AND APPLICATION (12 Hours)

Introduction to dual nature: Black body radiation, photoelectric effect, Compton effect (qualitative ideas only), de-Broglie's hypothesis, Heisenberg's uncertainty principle and its application to non-existence of electron inside the nucleus and ground state energy of one dimensional harmonic oscillator, Basic postulates of Quantum Mechanics, Wave function and its characteristics, probability density, normalization, eigen values, eigen functions and expectation values, Schrödinger's equation (time dependent and time independent). Application of Schrödinger equation to particle in a box and its Energy eigen values, Qualitative ideas on potential step and potential barrier with transmission probability.

Reference Books:

1. Materials Science &Engg., V. Raghvan, Prentice Hall of India.
2. Concepts of Modern Physics, A. Beiser, S. Mahajan and S. R. Choudhary, Tata Mc Graw Hill.
3. Lasers & Optical engineering, P Dass, Narosa Publishers, Springer Publisher.
4. Engineering Physics by B. B. Swain and P. K. Jena, Kitab Mahal, Cuttack
5. Sears &Zemansky's University Physics with Modern Physics, Young and Freedman.
6. Fundamental of Physics, Halliday & Resnick, Wiley Publisher.
7. Engineering Physics by D.K. Bhattacharya and Poonam Tanden, Oxford University Press.
8. Engineering Physics, H K Malik and A K Singh, Tata Mc Graw Hill, MGH

ENGINEERING CHEMISTRY SYLLABUS

Pre-Requisite: Basic understanding of Fundamental of Math and Physics.

Subject Code	Name of the Subject	L	T	P	C
23BBSBS10003	ENGINEERING CHEMISTRY	3	0	0	3

Course Educational Objectives

CEO1	To impart the knowledge of application of chemical sciences in the field of engineering
CEO2	To elucidates principles of applied chemistry in industrial systems, water treatment and engineering materials
CEO3	To enlighten the students with the applications of advanced materials.

Course Outcomes:

Towards the end of the course, the students will be able to:

CO1	Understand microscopic chemistry in terms of atomic and molecular orbitals.
CO2	Implementation of water treatment techniques for domestic and industrial purposes.
CO3	Application of electrochemistry for the future study on battery/electrochemical devices related to energy storage.
CO4	Evaluation of corrosion protective techniques to be applied on different materials.
CO5	Design new materials, which are corrosion resistant and or bio-degradable.
CO6	Creation and use of different materials as per the requirements of the society.

CO-PO Mapping

	PROGRAMME OUTCOMES											
COs	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CO1	2	2	1				1					
CO2	3	2	2				2					
CO3	3	3	2				1					
CO4	2	3	2				2					
CO5	2	2	1				1					
CO6	3	2	1				1					
AVG.	2.5	2.3	1.5				1.3					1.9

UNIT-1 ATOMIC AND MOLECULAR STRUCTURE (10 Hours)

De Broglie's theory, Heisenberg's uncertainty principle- wave nature of electron, Schrodinger's wave equation (no derivation), Eigen values and Eigen functions, Significance of wave functions, Particle in one dimensional box, Pauli's exclusion principle – Hund's rule of maximum multiplicity, Aufbau principle. Molecular Orbital theory and Energy level diagram for Homo diatomic molecules of H_2, N_2, O_2 & F_2, and Hetero diatomic molecule CO & NO.

UNIT-2 WATER CHEMISTRY (10 Hours)

Types of Hardness, Determination of Hardness by EDTA method, Treatment of water for Domestic use, Water softening processes Lime-soda process, Ion Exchange method, Boiler feed water, Scale and Sludge, Caustic embrittlement, Carbonate and phosphate conditioning, Colloidal conditioning, Calgon conditioning.

UNIT- 3 ELECTROCHEMISTRY (10 Hours)

Electrodes and electrode potentials – construction of cell and EMF values, Relation between E.M.F and free energy, Electrochemical series, Galvanic series, Conductance, Faraday's Law of Electrolysis, Nernst Equation and applications. Ionic product of water, pH and pH– buffer solutions – use of pH values. Cells –Fuel cells.

UNIT- 4 CORROSION (10 Hours)

Definition of corrosion, Types of corrosion: Dry corrosion and wet corrosion, Galvanic corrosion, Concentration cell corrosion, Factors influencing corrosion, Corrosion control: Cathodic protection (Sacrificial anodic protection and Impressed current cathodic protection), Protective coatings: Electroplating, Galvanization and Tinning.

UNIT-5 POLYMER CHEMISTRY (10 Hours)

Introduction, polymer, Classification of polymers, Plastics: Thermosetting and thermoplastic plastics, Preparation, Properties and uses of different plastics such as PVC, PE, PTFE, Bakelite, Nylon-6,6, Conducting Polymer (Polyaniline, and Polyacetylene), Bio-Degradable and Non-Bio Degradable Polymer.

Reference Books:

01. Engineering chemistry by Jain & Jain, Dhanpat Rai publishing company (p) Ltd.
02. A Text Book of Engineering Chemistry by S. S. Dara, S Chand Publishers.
03. A Text Book of Engineering Chemistry by Sashi Chawla, Dhanpat Rai Publishing house.
04. Text Book of Engineering Chemistry, 2ndedition, by R.Gopalan, D.Venkapaya & Sulochana Nagarajan, Vikas Publishing House Pvt. Ltd.
05. B. Tech Chemistry- IandII by P.K. Kar, S. Dash, B. Mishra kalyani publishers.
06. Physical Chemistry By P.W. Atkins
07. Engineering Chemistry (NPTEL Web Book) by B. L Tembe, Kamaluddin and M.S.Krishna
08. Essentials of Physical Chemistry, Bahl & Tuli, S. Chand Publishing
09. Applied Chemistry, Sunita Rattan, Kataria
10. Engineering Chemistry, Baskar, Wiley
11. Engineering Chemistry Fundamental and Applications, Shikha Agarwal (Second Edition) 2019, Cambridge University Press.
12. University chemistry by B.H.Mahan.
13. Electrochemistry by Samuel Glasstone, East West Press Private, Limited.
14. Polymer Science by V R Gowariker, N V Viswanathan, J Sreedhar, New Age International Publishers 2nd edition.

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

Pre-Requisite: Basic understanding of Fundamental of Math and Physics.

Subject Code	Name of the Subject	L	T	P	C
23BBSES10001	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING	3	0	0	3

Course Educational Objectives

CEO1	Impart a basic knowledge of electrical quantities such as current, voltage, power, energy and frequency to understand the impact of technology in a global and societal context.
CEO2	To provide comprehensive idea about AC and DC circuit analysis, working principles and applications of basic machines in electrical engineering.
CEO3	To expose the students in the field of analog and digital electronics engineering and to acquire the fundamental knowledge in the field.

Course Outcomes:

Towards the end of the course, the students will be able to:

CO1	Analyze the circuits by applying network theorems like Mesh, Nodal analysis, and Thevenin's theorem and find various electrical parameters.
CO2	Illustrate the single-phase and three phase AC circuits along with the concept of impedance parameters and power.
CO3	Understand the working principle and applications of DC & AC machines.
CO4	To acquire the knowledge about the characteristics and working principles of semiconductor diodes.
CO5	Explain the basic principles of CRO, function generator, number system and Boolean algebra.
CO6	Understand the basic concept of sensors and distribution of electrical energy in home.

CO-PO Mapping

	PROGRAMME OUTCOMES												
COs	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	
CO1	3	2	2										
CO2	3	2	2										
CO3	2	1	1										
CO4	2	1	1										
CO5	2	1	1										
CO6	1	1											
AVG.	2.2	1.3	1.4										1.6

UNIT-1 **(12 Hours)**

DC Circuits & Network Theorems: Introduction to electrical terminology, Ohm's Law, Equivalent Resistance, Star-delta transformation, Source conversion, Ideal and practical sources; Kirchhoff's Law, Mesh and Nodal Analysis; Thevenin's theorem excited by independent sources. Single Phase AC Circuits: AC Fundamentals: RMS & Average value, Complex algebra, AC through pure R, L, C, series RL & RC circuits.

UNIT-2 **(10 Hours)**

Three-Phase AC Circuits: Comparison between 1-ph & 3-ph AC circuit, phase sequence, Balanced Star & Delta connection, Relation between line and phase quantities. Elementary concept of DC & AC machines: Construction and working of DC Generator and motor, EMF equation, Types of DC machines, Applications, Single phase transformers: Construction, principle of working, e.m.f equation.

UNIT- 3 **(10 Hours)**

Semiconductor Diodes: Introduction; Ideal Diode; Semiconductor Materials; Energy Levels; Extrinsic Materials- n- and p-Type; Semiconductor Diode; Resistance Levels; Diode Equivalent Circuits; Zener Diode. Diode Applications: Half-Wave Rectification; Full-Wave Rectification, Clipper, Clamper.

UNIT- 4 **(10 Hours)**

Digital Electronics Fundamentals: Binary, Octal, Hexadecimal and Decimal Number System and their Conversion; 1's and 2's Complements; Logic gates: AND, OR, NOT, Universal Gates, Electronic Instrumentation: Introduction; Basic Principle; Digital Oscilloscope; Block Diagram of Cathode Ray Oscilloscope, function generator.

UNIT-5 **(08 Hours)**

Introduction to Sensors: Temperature sensors, Light sensors, Force sensors, Displacement sensors, Motion sensors, Sound sensors, Piezoelectric Sensors

Introduction to Power System & Domestic Wiring: Generation of electricity (Hydro, Thermal and Nuclear power plant); General layout of electrical power system and functions of its elements, Meter board, Fuse, MCB, Earthing (pipe & plate earthing), House wiring, Electric shock & precautions.

Reference Books:

01. E. Hughes, "Electrical and Electronics Technology", Pearson, 2012.
02. B.L. Thereja, A.K. Thereja, „Electrical Technology"Volume-I, S. Chand.
03. Electronic Devices and Circuit Theory by Robert L Boylestad and Louis Nashelsky, 11th Edition, Prentice Hall.
04. Kothari DP and I.J Nagrath, "Basic Electrical and Electronics Engineering", Second Edition, McGraw Hill Education, 2020
05. S.K.Bhattacharya "Basic Electrical and Electronics Engineering", Pearson Education, Second Edition, 2017.
06. Digital Design by M. Morris Mano, 5th Edition, Pearson Education.
07. B.L. Thereja, A.K. Thereja, „Electrical Technology"Volume-I, S. Chand.
08. S. Parker Smith: "Problems in Electrical Engineering" Asia Publications
09. Schaum's Outline of Basic Electrical Engineering.
10. Handbook of Modern Sensors: Physics, Designs, and Applications Paperback – 19 September 2014

ELEMENTS OF MECHANICAL ENGINEERING

Pre-Requisite: Basic understanding of Fundamental of Math and Physics.

Subject Code	Name of the Subject	L	T	P	C
23BBSES10002	ELEMENTS OF MECHANICAL ENGINEERING	3	1	0	4

Course Educational Objectives

CEO1	To understand the Basics of Forces and Force Analysis.
CEO2	To apply the established engineering methods to complex engineering problem.
CEO3	To understand the fundamental Concepts of thermodynamics and to distinguish the components and working principle of heat engine and determine the COP of heat pump and refrigerator.
CEO4	To impart basic knowledge on automation and basic codes in CNC machining, to study different properties of Fluids.

Course Outcomes:

Towards the end of the course, the students will be able to:

CO1	To analyse mechanical engineering systems using vectorial representation of forces and moments.
CO2	To analyze and apply the concept of centroid and center of gravity.
CO3	To apply the concept of friction and ability to solve problem related to the same.
CO4	To apply the basic concept of thermodynamics, its properties and to generate the ability to differentiate different forms of energy i.e. heat and work.
CO5	To apply first law of thermodynamics to closed and flow systems. To realize the need of second law of thermodynamics in nature.
CO6	To understand the fundamental concepts of viscosity, surface tension, pressure (absolute and gauge), CNC coding and FMS.

CO-PO Mapping

PROGRAMME OUTCOMES												
COs	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	
CO1	3	3											
CO2	3	3											
CO3	3	3											
CO4	3	2											
CO5	3	3											
CO6	2	1											
AVG.	2.8	2.5											2.7

UNIT-1 STATICS OF PARTICLES (10 Hours)

Force System: Force, Parallelogram Law, Free body diagram, Determination of reactions, Lami's theorem, Principle of Transmissibility of forces. Moment of a force, Couple, Varignon's theorem, Resolution of a force into a force and a couple. Resultant of coplanar force system. Equilibrium of coplanar force system.

Concept of Centre of Gravity: Basic definition of Centroid and centre of gravity, use of axis of symmetry, determination of centroid of simple figures (like triangle, rectangle, etc), Centroid of composite sections.

UNIT-2 ANALYSIS OF TRUSSES AND FRICTION (10 Hours)

Plane Truss: Perfect and imperfect truss, Assumptions and Analysis of Plane Truss by Method of joints and Method of section.

Friction: Laws of Friction - Angle of Friction-Angle of Repose, Numerical problems including ladder friction.

UNIT- 3 BASICS OF THERMODYNAMICS (10 Hours)

Fundamental Concepts and Definitions: Definition of Thermodynamics, System, surrounding and universe, Macroscopic & microscopic point of view. Property, State, Path, process, Cyclic process, Density, Specific volume, Pressure, temperature. Thermodynamic equilibrium, Quasi-static process, concept of ideal gas, Work and heat transfer, Zeroth law. First law of thermodynamics. Numerical based on simple formula.

UNIT- 4 (08 Hours)

Application of first law in non-flow and flow processes. Steady flow energy equation, limitation of first law. Thermal reservoir, Statements of second law, Heat engine, COP of heat pump and refrigerator. Carnot cycle. Basic concepts of power plant and IC engines. Numericals based on simple formula.

UNIT-5 (12 Hours)

FUNDAMENTALS OF FLUIDS: Fluids: Properties of Fluid like Pressure, Viscosity, Capillary Effect, Surface Tension, Pascal's Law, and Bernoulli's Equation for incompressible fluid flow.

ROBOTICS AND AUTOMATION: Basic concepts of Robotics, Automation and its Classification, Numerical Control of machine tools, Introduction to CNC machine, Basic codes used in CNC, Introduction to Flexible manufacturing system.

Reference Books:

01. Engineering Mechanics by S. S. Bhavikatti, K. G. Rajashekarappa, New Age International
02. Basic Mechanical Engineering by Agrawal & Agrawal, Wiley
03. S.Timoshenko, and D.H.Young, "Engineering Mechanics", TMG Hill Book,5th edition
04. Thermodynamics An Engineering Approach by Cengel & Boles, McGraw Hill
05. Engineering Thermodynamics by P.K.Nag, McGraw Hill
06. A text book of Fluid mechanics and Hydraulic machines by R K Bansal, Laxmi Publications, 2010
07. Computer aided Design and Manufacturing by Mikell P. Groover,McGraw-Hill Inc, 2007

PROGRAMMINGSYLLABUS FOR PROBLEM SOLVING

Pre-Requisite: Computer Basics

Subject Code	Name of the Subject	L	T	P	C
23BBSES11003	PROGRAMMING FOR PROBLEM SOLVING	3	0	0	3

Course Educational Objectives

CEO1	To formulate algorithm, translate into program and then execute the programs for verifying its correctness.
CEO2	To analyse a problem for knowing its efficiency and decompose it into functions using divide and conquer approach.

Course Outcomes:

Towards the end of the course, the students will be able to:

CO1	Memorize features of structure oriented programming and describe control statements, arrays, structures and pointers.
CO2	Classify various types of statements and demonstrate programs on control structures, arrays, functions, pointers and structures.
CO3	Solve problems using different programming logics and can able to discover better solutions.
CO4	Analyse different programs by experimenting on them and estimating their efficiency.
CO5	Evaluate complex programs by verifying their logics and justify their results.
CO6	Develop applications and projects using various features of structure oriented programming.

CO-PO Mapping

	PROGRAMME OUTCOMES												
COs	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	
CO1	3	2	1	1									
CO2	2	3	2	1									
CO3	2	2	3	3	1								
CO4	2	1	3	3	1				1				
CO5	0	0	2	2					1	1			
CO6	0	0	1	1					1	1			
AVG.	2.25	2	2	1.83	1				1	1			1.58

UNIT-1 **(09 Hours)**

Programming Basics: Introduction to Structured Programming Approach, Basic structure of C program, C compilers, Compilation and Execution Process, Error debugging.

Character set, C Tokens, data types, modifiers, format specifiers, escape sequence characters, constants, variables, standard I/O statements, Operators classifications, Operator precedence and associativity, Implicit and Explicit type casting, programs using sequential statements.

UNIT-2 **(09 Hours)**

Selection Control Statements: if, if..else, else if ladder, nested if, switch..case

Loop Control Statements: while, do-while and for loop, break, continue, nested loop.

UNIT- 3 **(09 Hours)**

1-D Array: declaration, initialization, array operations,

2-D Array: declaration, Initialization, 2-D array operations

Character arrays and Strings: String operations, Library Functions: strcmp(), strncmp(), strcat(), strncat(), strcpy (), strncpy (), strlen(), toupper(), tolower (), isupper (), islower().

UNIT- 4 **(09 Hours)**

User Defined Functions: Function categories, Parameter passing in functions, Passing arrays to functions, Recursive functions,storage classes

Pointers: Declaration and initialization of pointers, Pointer arithmetic, Pointer to Array, Pointer to Function, call by value and call by address, Function returning pointer.

UNIT-5 **(09 Hours)**

Dynamic memory allocation with Array and Function. Declaration and initialization of structures, Union, type def, enum , accessing structure elements, nested structures, structures with array, structures with functions, structures with pointer, structures with DMA.

Text Books:

01. E. Balaguruswamy, Programming in ANSI C, 7th edition, Tata McGraw-Hill
02. Let us ‘C’ by Yashwant Kanethekar, 16th edition, BPB Publications
03. Byron Gottfried, Schaum's Outline of Programming with C, 3rd edition, McGraw-Hill

Reference Books:

01. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language,2nd edition, Prentice Hall of India
02. Programming in C, by Reema Thareja, 2nd edition, OUP India
03. C Programming and Coding by swati saxena, BPB Publications

COMMUNICATIVE ENGLISH AND SOFT SKILLS

Subject Code	Name of the Subject	L	T	P	C
23BBSHS11001	COMMUNICATIVE ENGLISH AND SOFT SKILLS	2	0	0	2

Course Educational Objectives

CEO1	To promote communication skills and soft skills.
CEO2	To enhance the employability and entrepreneurial skills.

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

CO1	Understand the importance of effective communication for professional development.
CO2	Apply effective vocabulary and grammar in everyday communication.
CO3	Analyze various types of corporate communication.
CO4	Formulate crucial soft skills for career development.
CO5	Develop useful LSRW skills for professional growth.
CO6	Describe communication process effectively

CO-PO Mapping

	PROGRAMME OUTCOMES												
COs	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	
CO1										3			
CO2											2		
CO3										3			
CO4									3				
CO5										3			
CO6										3			
AVG.									3	3	2		2.6

UNIT-1 IMPORTANCE OF ENGLISH FOR COMMUNICATION IN THE 21ST CENTURY **(8 Hours)**

1.1 Role of English in enhancing employability and entrepreneurial skills, the Nature and Scope of Communication

1.2 Introduction to LSRW skills; appropriate use of skills in communicative contexts

1.3 The process of communication and factors that influence communication: sender, receiver, channel, code, topic, message, context, feedback, noise, filters and barriers (steps such as Ideation, Encoding, Transmission, Decoding, etc.); audience and purpose

1.4 Types of Communication: General and Professional Communication; Written communication and Spoken communication

UNIT-2 ENGLISH VOCABULARY, GRAMMAR & USAGE **(7 Hours)**

2.1 Essential grammar (Tense, Active & Passive voice, Subject Verb Agreement)

2.2 Words often confused

2.3 Technical terms and one word substitutes

2.4 Sentence Structure and syntax

2.5 Common errors in English

2.6 Difference between American, British and Indian English (Vocabulary based)

UNIT- 3 INTRODUCTION TO CORPORATE COMMUNICATION **(8 Hours)**

3.1 Seven C's communication and Ten C's of Non-communication

3.2 Corporate Communication– Types, Characteristics, Importance

3.3 Direction of corporate communication

3.4 Communication challenges in today' s work place: Advances in technology; Culturally diverse workforce; Team-based organizational Settings; Strategies to overcome these challenges

3.5 Use of ICT

3.6 Challenges in today's workplace and how to overcome this

UNIT- 4 BASIC SOFT SKILLS DEVELOPMENT **(7 Hours)**

4.1 Soft Skills, Importance, Characteristics, Hard Skills v/s Soft Skills

4.2 Importance soft skill, lateral thinking, networking skill, emotional intelligence

4.3 Cross Cultural and Inter Cultural communication

UNIT-5 CORPORATE ETIQUETTES **(6 Hours)**

5.1 Email etiquettes

5.2 Business Meeting Etiquettes

5.3 Telephone Etiquettes

Reference Books:

1. Technical Communication-Principle and Practice by Meenakshi Raman & Sangeeta Sharma, Oxford University Press, 2015

2. Business Communication Today by Bovee, Courtland L., Thill, JohnV.PrenticeHall, 2018

3. The Ace of Soft Skills: Attitude, Communication and Etiquette for Success by Gopalaswamy Ramesh and Mahadevan Ramesh. Pearson, 2010

4. Oxford Guide to English Grammar by John East wood. Oxford University Press, 2003

5. 365 Ways to Change Your World by Norman Vincent Peale by Orient Paperbacks,2019

6. Soft Skills For Your Career by Kalyani Samantray Oxford University Press, 2016

ENGINEERING PHYSICS LABORATORY

Pre-Requisite: Basic Understanding of Fundamental of Physical Instruments.

Subject Code	Name of the Subject	L	T	P	C
23BBSBS10102	ENGINEERING PHYSICS LABORATORY	0	0	2	1

Course Educational Objectives

CEO1	Providing fundamental information on basic instruments and their uses.
CEO2	To familiarize different apparatus and applications through different experiments.

Course Outcomes:

Towards the end of the course, the students will be able to:

CO1	Understand the concepts of oscillation and waves through experimental observation.
CO2	Study and explain the experimental observation of interference and diffraction pattern.
CO3	Interpret the fundamental characteristics of various materials and semiconductor materials through experiments.
CO4	Analyse the quantum concept of light by experimental observation.
CO5	Study thermal conductivity and dielectric constant of a given solid.
CO6	Understand surface tension and viscosity properties of liquids.

CO-PO Mapping

	PROGRAMME OUTCOMES												
COs	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	
CO1	2		1	1									
CO2	2		1	1									
CO3	2		1	1									
CO4	2		1	2									
CO5	2		1	2									
CO6	2		1	2									
AVG.	2		1	1.5									1.5

LIST OF EXPERIMENTS: **(10 Hours)**

01. Determination of the acceleration due to gravity by using Bar/Kater's pendulum.
02. Verification of the laws of transverse vibration by using sonometer.
03. Determination of Rigidity modulus of a wire by Static/Dynamic method.
04. Determination of wavelength of light by Newton's Rings apparatus.
05. Determination of no. of lines of a diffraction grating plate.
06. Determination of slit width of a double slit.
07. Determination of plank's constant using photo-voltaic cell.
08. Determination of band gap energy of PN junction (Ge/Si) diode.
09. Determination of the resistivity of a semiconductor with temperature by four- probe method.
10. Determination of dielectric constant of given solid by Lecher wire method.

ADD ON EXPERIMENTS

11. Determination of coefficient of Thermal conductivity (K) of a metal (Cu) by using Searle's apparatus.
12. Study of B-H curve of ferromagnetic substance.
13. Study the Hall Effect.
14. Determination of surface tension of water using Capillary- rise method.
15. Determination of coefficient of viscosity using Stoke's method.

Text Books:

1. Advanced Practical Physics for students, B.L. Flint and H.T. Workshop, 1971, Asia Publishing House.
2. Advanced level Physics Practical, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers.
3. A Text Book of Practical Physics, Indus Prakash and Ramakrishna, 11th Edition, 2011, Kitab Mahal, New Delhi.

ENGINEERING CHEMISTRY LABORATORY SYLLABUS

Pre-Requisite: Basic uderstanding of titration and standard solution preparation.

Subject Code	Name of the Subject	L	T	P	C
23BBSBS10103	ENGINEERING CHEMISTRY LABORATORY	0	0	2	1

Course Educational Objectives

CEO1	To train the students about the applications of chemical sciences in the field of engineering and technology.

Course Outcomes:

Towards the end of the course, the students will be able to:

CO1	Understand the basic methods of chemical analysis and instrumentations involved.
CO2	Prepare standard chemicals.
CO3	Analyze various physical parameters such as pH, DO, etc of unknown sample.
CO4	Apply the principle of chemistry for preparation of drugs.
CO5	Evaluate different chemical parameters (Hardness and alkalinity)
CO6	Design various materials for engineering applications

CO-PO Mapping

	PROGRAMME OUTCOMES											
COs	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CO1	2		1									
CO2	2		2				1					
CO3	2		2				1					
CO4	3		1				1					
CO5	2		1				1					
CO6	2		1				1					
AVG.	2.1		1.3				1					1.5

LIST OF EXPERIMENTS:

01. Determination of amount of OH^- and CO_3^{-2} present in supplied water sample.
02. Determination of total hardness of water.
03. Standardization of $KMnO_4$ using sodium oxalate.
04. Determination of ferrous ion in Mohr's salt by standardized $KMnO_4$.
05. Determination of percentage of dissolved oxygen in given water sample.
06. Estimation of available chlorine in bleaching powder/ chloride content.
07. Determination of rate constant of acid catalyzed hydrolysis of ester.
08. Preparation of drug (aspirin/Paracetamol).
09. Adsorption of acetic acid by charcoal.
10. Acid value of oil.
11. Determination of strength of HCl and CH_3-COOH acid from the mixture of acids using NaOH by Conductrometry.
12. Determination moisture and ash content of coal.
13. Determination of partition coefficient of iodine in benzene and water.
14. Preparation and determination of pH of buffer solution.
15. Determination of viscosity of supplied sample.
16. Potentiometric estimation of Mohr's salt with standard potassium dichromate solution.

ADD ON EXPERIMENTS

01. Synthesis of materials by solgel technology
02. Synthesis of hybrid materials by micro emulsion technique
03. Separation and purification technique (Homogeneous Mixture)
04. Synthesis of Polystyrene and determination of molecular weight by UV method
05. Preparation of Soap and Sanitizer

Text Books:

01. Chemistry Practicals By S. Dara
02. Theory and Practicals of Engineering Chemistry By Dr Sunita Ratan S.K. Kataria & Sons; Reprint 2012 edition (2013)

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LABROTARY

Pre-Requisite: Basic understanding of Fundamental of Math and Physics.

Subject Code	Name of the Subject	L	T	P	C
23BBSES10101	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LABROTARY	0	0	2	1

Course Outcomes:

Towards the end of the course, the students will be able to:

CO1	Explain the concept of network theorems and apply them to laboratory Measurements using different measuring devices.
CO2	Measure power and power factor in ac circuits using different lamps.
CO3	Understand and identify different parts of AC and DC machines.
CO4	Verify the characteristics of diodes, transistors, digital electronic components Experimentally and able to use oscilloscope, signal generator to measure amplitude and frequency of different waveforms.
CO5	Demonstrate the operating principle and VI characteristics of Semiconductor diode and transistor.
CO6	Understand the concept of various logic gates.

CO-PO Mapping

	PROGRAMME OUTCOMES												
COs	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	
CO1	3	1	1		2								
CO2	3	2	2		2								
CO3	2	1	2										
CO4	2	2	2		2								
CO5	2	2	2		2								
CO6	1	1	2										
AVG.	2.16	1.6	1.8		2								1.9

List of experiments/demonstrations:

Electrical Part:

Experiments: (Any 4 Experiments):

01. Study of different electrical equipment's (Voltmeter, Ammeter & Wattmeter)
02. Verification of Thevenin's Theorem.
03. To study the connection and working of fluorescent lamp and to learn about the improvement of power factor using capacitor.
04. Calculation of current, voltage and power in series R-L-C circuit excited by single- phase AC supply and calculation of power factor.
05. Connection and testing of a single-phase energy meter.
06. VI Characteristic of an incandescent lamp.
07. Study of various parts of DC & AC machines.

Electronics Part: (Any 4 Experiments):

01. Familiarization of electronic components and devices (testing of semiconductor diodes and transistors using digital multimeter)
02. Study and use of oscilloscope, signal generator to view waveforms and measure amplitude and frequency of a given waveform.
03. V-I characteristics of semiconductor diode and determining its DC and AC resistance.
04. Studies on half-wave and full-wave rectifier circuits without and with capacitor filter; recording of the waveforms and measurement of average and rms values of the rectifier output.
05. V-I characteristic of an n-p-n or p-n-p transistor, DC biasing the transistor in common-emitter configuration and determination of its operating point (i.e., various voltages and currents).
06. Study and Truth table verification of different logic gates.
07. Studies on Clipper and Clamper along with their corresponding waveforms

FUNDAMENTALS OF WEB TECHNOLOGY SYLLABUS

Pre-Requisite: Basic Computer Knowledge

Subject Code	Name of the Subject	L	T	P	C
23BSES10107	FUNDAMENTALS OF WEB TECHNOLOGY	1	0	4	3

Course Educational Objectives

CEO1	To design a complete web page using HTML and CSS.
CEO2	To design and develop web applications using JavaScript.
CEO3	To compare server-side scripting and Server side programming and develop database connectivity

Course Outcomes:

Towards the end of the course, the students will be able to:

CO1	Develop basic skills in analyzing the usability of a web site using HTML.
CO2	Develop presentable web pages using CSS
CO3	Implement basic programs, along with form validation techniques in JavaScript to ensure data integrity and user input accuracy.
CO4	Understand web development principles using JavaScript, to create interactive and responsive web applications in Client-Side.
CO5	Create and manipulate strings and arrays in PHP, understand different manipulation techniques of them.
CO6	Design and develop practical skills in handling HTML forms including data retrieval, processing, validating and error handling using PHP.

CO-PO Mapping

	PROGRAMME OUTCOMES											
COs	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CO1	3											
CO2		2	1									
CO3	1	2										1
CO4		2	2									
CO5	2											
CO6	1	2	2		2							1
AVG.	1.75	2	1.6		2							1	1.67

UNIT-1 **(09 Hours)**

INTERNET AND HTML BASICS

Introduction to World Wide Web, Network, HTTP, HTTPs. HTML Overview, HTML Document Structure(layout), HTML Tags and Elements, HTML Attributes, HTML Formatting, Grouping Content, HTML Fonts and Colors, HTML Images, HTML Tables and Lists, HTML Links, HTML Forms, HTML Frames and Iframes, and Marquee Tags.

UNIT-2 **(09 Hours)**

CSS Introduction and Syntax, CSS Properties and Styling, Working with Lists and Tables, CSS Id and Class Selectors, Creating Page Layout and Site Designs, External, Internal, and Inline Style Sheets, DOM and Dynamic HTML.

UNIT- 3 **(09 Hours)**

JAVASCRIPT OVERVIEW AND SYNTAX

Enabling and Using JavaScript in Web Browsers, Placement and Variables, Operators and Control Structures, Functions and Event Handling, Document Object Model (DOM), Arrays and Strings, Form Validation.

BOOTSTRAP

Introduction to Bootstrap, Basic Bootstrap Pages, Bootstrap Grids, Responsive Images and Jumbotron/Header, Bootstrap Buttons, Menus, and Forms, Navigation.

UNIT- 4 **(09 Hours)**

INTRODUCTION TO PHP

What is PHP? Setting up a PHP development environment. Writing and running PHP scripts PHP syntax and structure. Decisions and Loops: If statement, Nested if statements, If-else statement, Switch statement. While loop, Do-while loop, For loop. Functions and Libraries: What are functions?

UNIT-5 **(09 Hours)**

CREATING AND CALLING FUNCTIONS

Function arguments and return values, Variable scope, Built-in PHP functions. Strings and Arrays: String manipulation and built-in functions, Array creation and manipulation. Handling HTML Forms with PHP: HTML form basics, Handling form data with PHP, Form validation and error handling, Form security and best practices.

Text Books:

01. Web Warrior Guide to Web Design Technologies, Don Gosselin, Joel Sklar & others, Cengage Learning
02. Learning PHP, MySQL, books by ‘ O’ riley Press

Reference Books:

01. Web Programming: Building Internet Applications, Chris Bates, Wiley Dreamtech.
02. Programming the World Wide Web, Robert W Sebesta, Pearson
03. Web Technologies, Uttam K Roy, Oxford
04. Web Technology: A developer perspective, Gopalan & Akilandeswari, PHI

PROGRAMMING FOR PROBLEM SOLVING LABORATORY

Pre-Requisite: Basics of Computer Science.

Subject Code	Name of the Subject	L	T	P	C
23BBSES11103	PROGRAMMING FOR PROBLEM SOLVING LABORATORY	0	0	4	2

Course Educational Objectives

CEO1	To develop programs for problems on different applications of array, functions, pointers and structure.
CEO2	To analyse different problems by comparing and implementing in programming.

Course Outcomes:

Towards the end of the course, the students will be able to:

CO1	Memorize features of structure oriented programming and describe control statements, arrays, structures and pointers.
CO2	Classify various types of statements and demonstrate programs on control structures, arrays, functions, pointers and structures.
CO3	Solve problems using different programming logics and can able to discover better solutions.
CO4	Analyse different programs by experimenting on them and estimating their efficiency.
CO5	Evaluate complex programs by verifying their logics and justify their results.
CO6	Develop applications and projects using various features of structure oriented programming.

CO-PO Mapping

	PROGRAMME OUTCOMES												
COs	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	
CO1	3	2	1	1									
CO2	2	3	2	1									
CO3	2	2	3	3	1								
CO4	2	1	3	3	1				1				
CO5			2	2					1	1			
CO6			1	1					1	1			
AVG.	2.25	2	2	1.83	1				1	1			1.6

Experiment-1 (Familiarization with Programming Environment)

1) Introduction to OS: Before starting experiments explain the facilities and operations of OS.
2) Introduction to the C compiler, Compilation and Execution Process & writing simple programs.

Experiment 2 (Simple Computational Problems using Arithmetic Expressions)

1) Write a program to input radius of a circle and Find the area, perimeter of it.
2) Write a program to input two numbers and swap them using an intermediate variable.
3) Write a program to input two float values and find their sum
4) Write a program to input 2 sides i.e: length and breadth of a rectangle.

Find the area and perimeter of it.

Experiment 3 (Simple Computational Problems using Arithmetic Expressions)

1) Write a program to accept Fahrenheit and calculate its equivalent Celsius.
2) Write a program to input three unequal numbers and find the greatest using conditional operator.
3) Write a program to find simple interest when principle amount, no. of terms and rate of interest given.

[Given formula: si=(p*t*r)/100]

4) Write a program to find the area of a triangle when the 3 sides of it given as input.

[Given formula: s=(a+b+c)/2 and area= sqrt(s*(s-a)*(s-b)*(s-c))]

Experiment 4 (Simple Computational Problems using Arithmetic Expressions) (09 Hours)

1) Write a program to input three unequal integers and find the largest number using conditional operator.
2) Apply Pythagorean theorem for finding the distance between two points i.e. side 'a' when the two sides namely 'b', 'c' are given as input. [Given formula is a=sqrt(b2+c2)]
3) John, Ram and shah were fishing in a river bank. Input the no. of fishes caught by each person and display who have caught more fishes (use conditional operator).
4) A boy is running in a circular playground having radius R given input. What will be the distance and displacement from one end to other end of ground?[Formula distance=Pi*R and Displacement=2*R]

Experiment 5 (Problems Involving using If Statement)

1) In your garden two flower plants of rose and lily are growing. Input the growth of each plant in centimetres. Display the plant whose height is more. (use if..else)
2) In a software company a project team of 3 members namely manvi, shyam and William. Input their job experience in no. of years. The team lead must have more experience. Display who can be team lead. (use if..else)
3) Write a program to input 3 co-efficient values and find the real roots of quadratic equation.
4) Write a program input a digit within 0 to o6. Display week day example: 0 for Sunday, 1 for Monday etc (use else if ladder).

Experiment 6 (Problems Involving using Switch Case)

1) Write a program to input a lower case alphabet and test whether it is vowel or consonant.(using else..if and switch both)
2) Write a program to input an arithmetic operator and two operands. Calculate and display the result as per the given operator using switch..case.
3) Write a program to find the greatest among three numbers.(using else..if and switch both)

Experiment 7 (Programming with While Loop and Do While Loop)

1) Write a program to input a number and test whether it is prime number or not using while statement.
2) Write a program to test a number is perfect or not using while statement.

(ex: The perfect number is 6, which is the sum of 1, 2, and 3. Other perfect numbers are 28, 496, and 8,128.)

3) Write a program to input a positive number and test whether it is palindrome or not using do..while statement.

SYLLABUS

Experiment-8 (Programming with For Loops and Nested Loop)

1) The length of two rods are given as input in meters. The rods are to be cut into pieces of equal length. Find the maximum length of each piece. (use for loop)
2) Write a program to generate a series of Fibonacci numbers using for statement
3) Write a program to calculate the following sum using nested for statement:

Sum = 1-(x2)/2! +(x4)/4! – (x6)/6! + (x8)/8! – (x10)/10! ..(xn/n!)

4) Write a program to generate the following pyramid using nested for statement:

```
        1
      1 2 1
    1 2 3 2 1
  1 2 3 4 3 2 1
```

Experiment-9 (Programming with 1D Array and 2D Array)

1) Write a program to accept 10 integers in to an array and find largest and smallest integers present in them.
2) Write a program to input 10 numbers into an array. Find how many prime numbers exist in the array.
3) Write a program to input values into a square matrix of size 3X3. Display the transpose of the matrix.
4) Write a program to input elements into two matrices A[3][4], B[4][3]. Multiply A and B store result into matrix C [3][3]. Display the resultant matrix C.

Experiment 10 (Programming with Strings Handling Operations)

1) Write a program to input a string and find the frequency of a given character in it.
2) Write a program to input two strings and compare them for equality without using library function.
3) Write a program to input a string and test it for palindrome or not using library functions.

Experiment 11 (Programming with User Defined Functions)

1) Write a C program which contains three UDF's namely add(), subtract() and multiply(). Each function accepts two integers as their arguments and calculate and return the results.
2) Write a program to create an UDF and test a number is prime or not.
3) Write a program to create an UDF which accepts an array of 10 integers and find the largest element and smallest element present in the array.

Experiment 12 (Programming with Recursive Functions)

1) Write a program to find the factorial of a number using recursive function.
2) Write a program to accept 10 elements into an integer array. Find the largest element present using recursive function.
3) Write a program to generate Fibonacci series using a recursive function.

Experiment 13 (Programming with Pointers)

1) Write a program to swap two numbers using User Defined Function by applying call by address concept.
2) Write a program to perform matrix addition. Create an UDF which accepts the two matrices using two pointers and performs matrix addition.
3) Write a program to store N integer values using dynamic memory allocation. Then find the largest, smallest present in it using User Defined Function.
4) Write a program to store N integers using dynamic memory allocation. Find the average value of the integers using a user defined function.

Experiment 14 (Programming with Structures)

1) Write a program create a structure PRODUCT having members Product no, Name and Price. Using a pointer Input 5 product details into a structure array and then display those products whose price is >1000 rupees.

2) Write a program to store 11 cricket players' details into an array of structure. The structure having member's player name, team name and batting average. Displays the name of players whose batting average is >=30.

3) Write a program to create a structure EMPLOYEE to store N employee details using DMA having members: employee no, name, salary. Create a function which displays only those employee names whose salary>=50000.

4) Write a program to create a structure for store library books using a structure having members book no, name, author, price. Store N books details using dynamic memory allocation. Create an UDF which accepts these books details using pointer and then display only those books whose cost>=1000.

Topic Beyond Syllabus:

1) Write a program to input a set of numbers into a file called NUM.TXT. Display only the even numbers present in the file and also display their sum.

2) Write a program to store a paragraph into a file A.TXT using command line arguments and then create a copy of it with name B.TXT.

Text Books:

01. E. Balaguruswamy, Programming in ANSI C, 7th edition, Tata McGraw-Hill
02. Let us 'C' by YashwantKanethekar, 16th edition, BPB Publications
03. Byron Gottfried, Schaum's Outline of Programming with C, 3rd edition, McGraw-Hill

Reference Books:

01. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language,2nd edition, Prentice Hall of India
02. Programming in C, by ReemaThareja, 2nd edition, OUP India
03. C Programming and Coding by swatisaxena, BPB Publications

COMMUNICATIVE ENGLISH AND SOFT SKILLS LABORATORY

Subject Code	Name of the Subject	L	T	P	C
23BBSHS11101	COMMUNICATIVE ENGLISH AND SOFT SKILLS LABORATORY	0	0	2	1

Course Educational Objectives

CEO1	To develop communication skills of the students.
CEO2	To develop vocabulary and usage skills of students by practice.
CEO3	To enable students to participate in group discussions through listening and speaking.
CEO4	To enable students eliminate grammatical mistakes in speech and writing.

Course Outcomes:

Towards the end of the course, the students will be able to:

CO1	Understand the importance of effective communication for professional development.
CO2	Apply effective vocabulary and grammar in everyday communication.
CO3	Analyse various types of corporate communication.
CO4	Formulate crucial soft skills for career development.
CO5	Develop useful LSRW skills for professional growth.
CO6	Develop confidence for effective presentation.

CO-PO Mapping

	PROGRAMME OUTCOMES												
COs	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	
CO1										3			
CO2											2		
CO3										3			
CO4									3				
CO5										3			
CO6										3			
AVG.									3	3	2		2.67

MOTIVATIONAL VIDEOS **(2 Hours)**
Activity - Listening to videos and filling the gaps in a worksheet
FAMOUS SPEECHES **(2 Hours)**
Activity - Describing, paraphrasing and summarizing famous speeches
SELF-EVALUATION **(2 Hours)**
Activity - Evaluating self through assessments using British Council App
LISTENING FOR PRONUNCIATION **(2 Hours)**
Activity - Listening to ted talks and focusing on segmental sounds and intonation by articulating it.
ORAL PRESENTATION **(2 Hours)**
Activity - Verbal presentation and speaking for 1 to 5 minutes
JUST A MINUTE **(2 Hours)**
Activity - Speaking on any given topic for a minute
STORY TELLING **(2 Hours)**
Activity - Analyzing and narrating a story
PPT PRESENTING **(2 Hours)**
Activity - Presentation and engaging topic with visual presentation
NEWS ARTICLE READING **(2 Hours)**
Activity - Regulating reading speed by loud reading and reading news article
READING STORY **(2 Hours)**
Activity - Story reading with proper intonation
POEM RECITATION **(2 Hours)**
Activity - Reading poems focusing on rhythm and specific reading skills
PROSE READING **(2 Hours)**
Activity - Reading prose focusing on the punctuations and pronunciation
BASIC WRITING SKILL **(2 Hours)**
Activity - Focusing on basic writing skills by sequencing of thoughts and ideas
STORY WRITING **(2 Hours)**
Activity - Writing a story using the given clues
PRECISE WRITING **(2 Hours)**
Activity - Paraphrase a given passage
ARTICLE WRITING **(2 Hours)**
Activity - Writing newspaper article and magazines

Reference Books:

1. Form and Finesse, Business Communication and Soft skills by Shruti Das, Published by Orient Black Swan, 2022
2. Business and Corporate Soft skills developed by RaiTech. University (PDF available)
Spoken English (with CD). Sasikumar V nd PVD hamija. New Delhi:Tata McGraw-Hill Education Pvt. Ltd.(2ndEd.),2008

ENGINEERING GRAPHICS & DESIGN LABROTARY

Pre-Requisite: Basic understanding of Fundamental of Math and Physics.

Subject Code	Name of the Subject	L	T	P	C
23BBSES10105	ENGINEERING GRAPHICS & DESIGN LABROTARY	1	0	2	2

Course Educational Objectives

CEO1	To enable students to acquire and use engineering drawing skills as a means of accurately and clearly communicating ideas, information and instructions.
CEO2	To enable students to acquire requisite knowledge, techniques and attitude required for advanced study of engineering drawing and basic of AUTOCAD.

Course Outcomes:

Towards the end of the course, the students will be able to:

CO1	Understand the basics of engineering drawing and method dimensioning in engineering systems.
CO2	Prepare the orthographic projections of points and straight lines placed in various quadrants.
CO3	Demonstrate the ability of drawing orthographic projections of various planes & solids parallel, perpendicular and inclined to different planes.
CO4	Sketch the isometric view of different planes and solids by showing all their features in 3D.
CO5	Draw and interpret the sectioned views of solids.
CO6	Apply the software skills to prepare engineering drawings using AUTOCAD.

CO-PO Mapping

	PROGRAMME OUTCOMES												
COs	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	
CO1	3			1									
CO2	2		2	2									
CO3	2		2	2									
CO4	2		2	2									
CO5	2		2	2									
CO6	3		2		3								
AVG.	2.3		2	1.8	3								2.29

UNIT-1 **(10 Hours)**

Introduction: Drawing Instruments and their uses, BIS conventions, Types of line, Types of scale.
Projections : Introduction, Types, Definitions - Planes of projection, reference line and conventions employed, Orthographic Projections of points in all the four quadrants, Projections of straight lines (located in First quadrant/first angle only),True and apparent lengths, projection of line inclined to one plane and both the planes.

UNIT-2 **(10 Hours)**

Orthographic Projections of Plane Surfaces (First Angle Projection Only):
Introduction, Definitions–projections of plane surfaces–triangle, square, rectangle, pentagon, hexagon and circle, planes in different positions by change of position method, projection of inclined planes.
Orthographic Projections of Solids (First Angle Projection Only) :

UNIT- 3 BASICS OF THERMODYNAMICS **(10 Hours)**

Isometric Projections: Introduction, projection of plane-square, triangular, circle, method of point and four center method
Isometric projection of solids: projection of prisms, pyramids method of drawing non-isometric lines, box method , offset method, projection some typical solids.

UNIT- 4 **(08 Hours)**

Sections and Development of Lateral Surfaces of Solids: Introduction, Section planes, Sections, Section views, Sectional views, Apparent shapes and True shapes of Sections of right regular prisms, pyramids, cylinders and cones resting with base on HP.

UNIT-5 **(12 Hours)**

Introduction to AUTO CAD: Layout of the software, standard tool bar/menus and description of most commonly used toolbars, navigational tools. Co-ordinate system and reference planes. Definitions of HP, VP, RPP &LPP. Creation of 2D/3D environment. Selection of drawing size and scale. Commands and creation of Lines, Co-ordinate points, axes, poly-lines, square, rectangle, polygons, splines, circles, ellipse, text, move, copy, off-set, mirror, rotate, trim, extend, break, chamfer, fillet, curves, constraints.

Reference Books:

01. Engineering Drawing - N.D. Bhatt & V.M. Panchal, Charotar Publishing House, Gujarat.
02. Computer Aided Engineering Drawing - S. Trymbaka Murthy, 4th Ed, University Press Engineering Drawing by N.S. Parthasarathy and Vela Murali Oxford University Press.
03. Engineering Graphics - K.R. Gopalakrishna, Subash Publishers Bangalore.
04. Fundamentals of Engineering Drawing with an Introduction to Interactive Computer Graphics for Design and Production-Luzadder Warren J., Duff John M., Eastern Economy Edition, Prentice-Hall of India Pvt. Ltd., New Delhi.
05. Computer Aided Engineering drawing, Prof. M. H. Annaiah, New Age International Publisher, New Delhi

ENGINEERING WORKSHOP

Subject Code	Name of the Subject	L	T	P	C
23BBSES10106	ENGINEERING WORKSHOP	1	0	2	2

Course Educational Objectives

CEO1	To develop an appreciation for the importance of safety, ethics, and sustainability in engineering practice.
CEO2	To develop practical skills and knowledge in the field of mechanical engineering, including the ability to use hand and machine tools, read technical drawings, and fabricate simple components.

Course Outcomes:

Towards the end of the course, the students will be able to:

CO1	Familiarity on various safety precautions in a workshop setting, including the ability to identify potential hazards and risks, and to develop appropriate safety measures to mitigate those risks.
CO2	Understanding of the various hand and machine tools used in fitting and the ability to select the appropriate tool for a given task.
CO3	Gain knowledge of the various components and working principles of a standard center lathe machine and developing skills in preparing a cylindrical job using a lathe machine, including facing, taper turning, step turning, and knurling operations.
CO4	Acquire skills in preparing different types of joints, including lap joint, butt joint, corner joint, and T-joint, using electric arc welding and oxy-acetylene gas welding.
CO5	Develop an understanding of the principles and techniques of calibration, including the ability to calibrate various instruments, such as LVDT, load cell, and thermocouple, using appropriate tools and techniques.
CO6	Acquire skills in surface roughness testing, including the ability to determine the surface roughness of various components using appropriate instruments and techniques.

CO-PO Mapping

	PROGRAMME OUTCOMES											
COs	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	
CO1	2												
CO2	2		2										
CO3	2		2										
CO4	2		2										
CO5	2		2										
CO6	2		1										
AVG.	2		1.8										1.75

List of Experiment (Any eight)

01. To study various safety precaution in workshop.
02. To study different hand tools and machine tools used in fitting.
03. To study various components and working principle of Standard centre Lathe machine.
04. To prepare a cylindrical job by Lathe machine (Facing, Taper Turning, Step Turning, Knurling)
05. To study and know the working principle of Shaper and Milling machine.
06. To prepare Lap joint, Butt joint, Corner joint and T-Joint with the help of Electric arc welding.
07. To Prepare a Lap joint with the help of Oxy-Acetylene gas welding.
08. To calculate the angle of the given tapered component by using sine bar and slip gauges.
09. To determine the flatness of a given surface plate.
10. To determine the surface roughness test of various components.
11. Calibration of LVDT by using micrometer.
12. Calibration of load cell by using proving ring.
13. Calibration of thermocouple by using thermometer.

Text Books:

01. Elements Of Workshop Technology Vol 1 and 2 , by S. K. Hajra Choudhury
02. Laboratory Manual

HUMAN VALUES AND PROFESSIONAL ETHICS

Subject Code	Name of the Subject	L	T	P	C
23BBSHS10002	HUMAN VALUES AND PROFESSIONAL ETHICS	1	0	0	1

Course Educational Objectives

CEO1	Comprehend the essence of value education
CEO2	Engage in self exploration to understand personal identity
CEO3	Recognize the interplay between understanding, relationships & physical well-being

Course Outcomes:

Towards the end of the course, the students will be able to:

CO1	Explain the basics of value education, self-exploration, happiness, and prosperity.
CO2	Recall human aspirations and the current state of happiness and prosperity.
CO3	Differentiate between the needs of the self and the body to achieve harmony.
CO4	Analyze trust and respect in relationships to foster harmony in family and society.
CO5	Assess the interconnectedness and mutual fulfillment in nature to understand co-existence.
CO6	Design strategies for professional ethics that support sustainable development and climate action.

CO-PO Mapping

	PROGRAMME OUTCOMES												
COs	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	
CO1								3	2			3	
CO2								3	2			3	
CO3								3	3			3	
CO4								3	3			3	
CO5							3	3	3			3	
CO6							3	3	3			3	
AVG.							3	3	2.7			3	2.9

UNIT-1 FOUNDATIONS OF VALUE EDUCATION (07 Hours)

Understanding Value Education, Self Exploration–what is it? Right understanding, Relationship and Physical Facilities

UNIT-2 UNDERSTANDING HARMONY IN HUMAN BEING (06 Hours)

Continuous Happiness and Prosperity- A look at basic Human Aspirations, Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario

UNIT- 3 UNDERSTANDING SANYAM AND SWASTHYA (07 Hours)

Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer), Understanding the harmony of I with the Body: Sanyam and Swasthya

UNIT- 4 UNDERSTANDING HARMONY IN FAMILY & SOCIETY (07 Hours)

Harmony in the Family and Society, 'Trust'& 'Respect'–as Foundational Values in Relationship, Understanding Harmony in the Society & Universal Human Order

UNIT-5 UNDERSTANDING HARMONY IN THE NATURE/EXISTENCE (07 Hours)

Understanding the harmony in the Nature, Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature

Text Books:

01. R.R Gaur, R Sangal, G P Bagaria, A foundation course in Human Values andprofessional Ethics, Excel books, New Delhi, 2010, ISBN 978-8-174-46781-2

Reference Books:

01. B L Bajpai, 2004, Indian Ethos and Modern Management, New Royal Book Co.,Lucknow. Reprinted 2008.

02. PL Dhar, RR Gaur, 1990, Science and Humanism, Commonwealth Purblishers.

03. Sussan George, 1976, How the Other Half Dies, Penguin Press. Reprinted 1986,1991

04. Ivan Illich, 1974, Energy & Equity, The Trinity Press, Worcester, and HarperCollins,USA

05. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III,1972, limits to Growth, Club of Rome's Report, and Universe Books.

DIETETICS AND NUTITION SYLLABUS

Pre-Requisite: Basic understanding of Fundamental of Chemistry and Physics.

Subject Code	Name of the Subject	L	T	P	C
23BBSBS10004	DIETETICS AND NUTITION	1	0	0	1

Course Educational Objectives

CEO1	Graduates can understand the importance of diet for good health.
CEO2	Graduates should know about balance diet, menu planning and critically evaluation of meal.

Course Outcomes:

Towards the end of the course, the students will be able to:

CO1	Know about importance of health and balance diet.
CO2	Understand about composition of human diet and their function.
CO3	Have the knowledge on importance of macro and micro nutrients.
CO4	Acquire knowledge on role of vitamins and minerals in food.
CO5	Know the digestive system of the human beings.
CO6	Get an idea about menu planning and critically evaluation of meal.

CO-PO Mapping

	PROGRAMME OUTCOMES												
COs	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	
CO1	2	1	1									0	
CO2	1	2	1									0	
CO3	2	1	2									1	
CO4	1	1	1									0	
CO5	2	2	1									1	
CO6	2	1	2									1	
AVG.	1.6	1.3	1.3									1	1.3

ENGINEERING MATHEMATICS-II

UNIT-1 **(10 Hours)**

Basic Aspects: Definition of the terms Health, Nutrition and Nutrients. Importance of food (Physiological, Psychological and social function of food) in maintaining good health. Classification of nutrients, Balanced diet, food groups. Balanced Diet: Definition, Importance of balanced diet, RDA for various nutrients- age, gender, physiological state.

Macronutrients: Carbohydrates-Definition, Classification (Mono, di and polysaccharides), Dietary Sources, Function- Excess. Lipids-Definition, Classification, Dietary Sources, Functions.

UNIT-2 **(10 Hours)**

Protein-Definition, Classification based upon amino acid composition, Dietary sources, Functions, Methods of improving quality of protein in food(special emphasis on soya protein and whey protein), Evaluation of protein quality: PER, BV, NPU and Chemical score.

Energy: Definition of Energy and Units of its measurement (Kcal), Energy contribution from macronutrients(carbohydrates, proteins, and fat), Factors affecting energy requirements, Concept of BMR, SDA, Factors affecting BMR, Thermic effect of food, Dietary Sources of energy, Concept of energy balance and the health hazards associated with Underweight, Overweight

UNIT- 3 **(06 Hours)**

Water: Definition, Dietary Sources (visible, invisible), Function of water, Role of water maintaining health(water balance)

Dietary Fibre: Definition, Dietary Sources, Classification, Physiological effects of deficiency.

Micronutrients: Vitamins-Definition and classification (water and fat soluble vitamins), Food Sources, function and significance of Fat soluble vitamins (Vitamin A, D, E, K), Water soluble vitamins (Vitamin C,Thiamine, Riboflavin, Niacin, Cyanocobalamin and Folic acid)

UNIT- 4 **(06 Hours)**

Minerals: Definition and classification (major and minor), Food Sources, functions and significance of calcium, Iron, Sodium, Iodine and Fluorine.

Digestion: Digestion and Absorption, Mechanical and Chemical breakdown of food. Menu Planning-Planning of nutritionally balanced meals based upon the three food group system, Factor affecting food planning, Critical evaluation of few meals served at the Institutes/Hotels based on the principle of meal planning, Calculation of proximate principles and energy of 3 Indian and 3 Conti lunch menus, Critical evaluation and suggested improvement.

UNIT-5 **(06 Hours)**

Food in day to day life: Principles of food preservation (Fruits- Squashes and jams, Vine & Vegetables by Pickling), Nutrition in physical fitness. Immunomodulator foods.

Text Books:

01. Food Science and nutrition- Sunetra Roday
02. Food hygiene and sanitation -Sohna Roda

Reference Books:

01. BamjiMS (2019) Text book of Human Nutrition, 4th Edn, Oxford & IBH Publishing Co Pvt. Ltd, ISBN 9788120417908.
02. Food Science- Porter and Hotchkin
03. Advanced Nutrition and Dietetics in Nutrition Support, Editor(s):Mary Hickson PhD RD, Sara Smith PhD RD, Kevin Whelan PhD RD FBDA

SYLLABUS

COMMON TO ALL BRANCHES(Except BIOTECH)

Pre-Requisite: Differential Calculus, Integral Calculus and Vectors Properties

Subject Code	Name of the Subject	L	T	P	C
23BBSBS12001	ENGINEERING MATHEMATICS-II	3	1	0	4

Course Educational Objectives

CEO1	To focus on partial derivative and its methods.
CEO2	To make them understand about Laplace and Fourier and transform.
CEO3	To calculate the gradients and directional derivatives of functions of several variables.
CEO4	To introduce the concept of Vector differentiation and integration that finds applications in various fields like solid mechanics, fluid flow, heat problems and

Course Outcomes:

Towards the end of the course, the students will be able to:

CO1	Understand the concept of partial differential equations and Laplace transforms, vector and scalar fields.
CO2	Summarizing the concept of sequences and vector differentiation and integration.
CO3	Determine gradient, curl and divergence and Laplace transforms.
CO4	Analyze the solution of partial differential equation and multiple integrals
CO5	Evaluate Laplace transforms, and convergence and divergent of some series.
CO6	Solve partial differential equation, and Ordinary differential and integral equation.

CO-PO Mapping

	PROGRAMME OUTCOMES												
COs	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	
CO1	2	1											
CO2	2	3											
CO3	2	3											
CO4	2	3											
CO5	3	3											
CO6	3	3											
AVG.	2.3	2.67											2.48

ENGINEERING MATHEMATICS-II

UNIT-1 PARTIAL DIFFERENTIAL EQUATIONS (12 Hours)

Formation of Partial differential equations, linear partial differential equation of first order: Lagrange's linear differential equation, Non-Linear partial differential equation of first order using standard types and Char pit's method. Higher order Homogeneous Linear Partial Differential Equations with Constant Coefficients.

UNIT-2 SEQUENCES AND SERIES (12 Hours)

Sequence and series: convergent, Divergent and Oscillatory Series, D'Alembert's Ratio Test, Cauchy's Root Test, Radius of Convergence, Power Series Solution of ODE of First order and Second order.

UNIT- 3 LAPLACE TRANSFORM (14 Hours)

Definition, Sufficient condition for existence of Laplace Transform, Properties of Laplace Transform, Evaluation of integrals by using Laplace Transform. Inverse Laplace Transform, Convolution theorem, Laplace transform of unit step function, unit impulse function, and periodic function. Solution of

UNIT- 4 MULTIPLE INTEGRALS AND VECTOR DIFFERENTIAL (12 Hours)

Double integrals and triple integrals. Area and volume using multiple integrals.

Vector and scalar functions and fields, Directional Derivatives, Curves, tangents and arc Length, gradient, divergence, curl and their properties with simple applications.

UNIT-5 VECTOR INTEGRAL CALCULUS (12 Hours)

Evaluation of double and triple integrals for vector valued functions. Evaluation of line integral, Surface integral and volume integral and their applications. Green's Theorem, Stoke's Theorem and Gauss

Text Books:

1. Advanced Engineering Mathematics by E. Kreyszig, John Willey & Sons Inc. 10th Edition.

Reference Books:

1. Higher Engineering Mathematics by B. V. Ramana, Mc Graw Hill Education.
2. Higher Engineering Mathematics by BS Grewal, Khanna Publishers, New Delhi.
3. Advanced Engineering mathematics by H. K. Dass.
4. Differential Calculus by J. Sinha Roy & S. Padhi

SYLLABUS

(Only for BIOTECH)

Pre-Requisite: Differential Calculus, Function and their Properties, Matrices

Subject Code	Name of the Subject	L	T	P	C
23BBSBS120B1	ENGINEERING MATHEMATICS-II	3	1	0	4

Course Educational Objectives

CEO1	To focus on coordinate system.
CEO2	To study vector function and scalar function in vectors.
CEO3	To provide the standard methods for solving algebraic equations.
CEO4	To study the probability and its properties.

Course Outcomes:

Towards the end of the course, the students will be able to:

CO1	Understand the concept of straight-line and circle and application.
CO2	Understand the concept of conditional probability and testing of hypothesis.
CO3	Determine the differentiation of standard functions.
CO4	Categorize different types of curves and their properties,
CO5	Evaluate the different type of interpolation.
CO6	Evaluate the properties of curl ,divergence and gradient and its application.

CO-PO Mapping

	PROGRAMME OUTCOMES												
COs	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	
CO1	1	2											
CO2	2	3											
CO3	1	3											
CO4	2	3											
CO5	2	3											
CO6	2	3											
AVG.	1.6	2.8											2.2

ENGINEERING MATHEMATICS-II

UNIT-1 CO-ORDINATE GEOMETRY (12 Hours)

Straight Lines: Introduction, Slope of a line and angle between two lines. Various forms of equations of a line: parallel to axes, Point-Slope form, Slope-Intercept form, Two Point form, Intercepts Form and Normal Form. General equation of a line.

Circles: circle, Equation of circle whose centre and radius is known, General equation of a circle, equation of tangent and normal Equation of circle passing through three given points, Equation of circle whose diameters is line joining two points.

UNIT-2 DIFFERENTIAL CALCULUS (14 Hours)

Limit and continuity Simple problems on limit, Simple problems on continuity, Differentiability, Derivatives using first principle, Derivatives of sum, difference, product and quotient of two functions, Differentiation of functions of functions (Simple problem based on it), Logarithmic differentiation (Simple problem based on it), Differentiation by substitution method.

UNIT- 3 INTEGRAL CALCULUS (12 Hours)

Integration of simple functions, Integration by substitution method, Definite Integral (simple problems based on it), Integration by parts, Integration by partial fraction, Area under simple well-known curves (simple problems based on it).

UNIT- 4 PROBABILITY (12 Hours)

Events, Sample space, Definition of probability, Axioms of probability, Addition theorem of probability with examples, Multiplication theorem of probability with illustrate examples. Conditional probability, Bayer's theorem, simple problems.

UNIT-5 VECTOR ANALYSIS (12 Hours)

Vectors and Scalars, Types Of Vectors, Algebra Of Vectors, Position Vectors, Scalar Product, Vector Product, Unit Vectors, Scalar Triple Product And Vector Triple Product, Vector Functions, Derivatives, Gradient, Divergence, Curl And Their Simple Applications.

Reference Books:

1. Higher Engineering Mathematics by BS Grewal, Khanna Publishers, New Delhi.
2. Advanced Engineering Mathematics by E. Kreyszig, Tenth Edition, Willey
3. Numerical Method by S. S. Sastry
4. Higher Engineering Mathematics by B.V.Ramana, McGraw Hills Education
5. Advanced Engineer methods by N. P. Bali & Manish Goyal.

DATA STRUCTURES AND ALGORITHMS

Pre-Requisite: Basic knowledge of Algorithms.

Subject Code	Name of the Subject	L	T	P	C
23BBSES12003	DATA STRUCTURES AND ALGORITHMS	3	0	0	3

Course Educational Objectives

CEO1	Develop algorithms for performing different operations on arrays, stack, Queue, linked list. Analyze the difference between them and understand different applications. Understand different searching and sorting methods and applications.
CEO2	Understand and analyze Binary Search Tree, AVL Tree, Heap Tree and their applications. Understand the memory representation of graph, its traversal methods and applications. Analyze the Hashing techniques in compare with other sorting techniques.

Course Outcomes:

Towards the end of the course, the students will be able to:

CO1	Understand the basic concepts of data structures, remember the fundamental concepts.
CO2	Understand the methods by comparing the different data structures concepts.
CO3	Develop algorithms for implementing different operations on data structures.
CO4	Analyses of the algorithms regarding different operations on data structures.
CO5	Solve and evaluate complex problems by coding on linear and non-linear data structures.
CO6	Design algorithms on advanced concepts of data structure by implementation in different application of data structure.

CO-PO Mapping

	PROGRAMME OUTCOMES												
COs	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	
CO1	3	3							0	0			
CO2	2	3	2	1					0	0			
CO3	2	3	3	1					1	0			
CO4	2	3	3	1	1				1	0			
CO5	2	2	1		0				1	1			
CO6	1	1			0				0	0			
AVG.	2	2.5	2.25	1	1				1	1			1.55

UNIT-1 **(09 Hours)**

Basic concepts: Data abstraction, Data structures and types. Algorithm specification, 1D array: operations, 2D array: row major order and column major order, sparse matrix and storing into triplet matrix.

Stack: Basic concepts, operations and implementation of stack using arrays, Mathematical procedure for conversions of arithmetic expressions. Applications of stack: infix to postfix conversion and postfix evaluation.

UNIT-2 **(09 Hours)**

Queue: Linear queue, operations and implementation using arrays, circular queue and its operations, Basics concepts of Double ended Queue and priority queue.

Searching: Linear search and Binary search on elements in a linear array.

Sorting: Bubble sort, Insertion sort, Selection sort, radix sortusing linear array.

UNIT- 3 **(09 Hours)**

Linked Lists: The concepts and operations: insertion of a node(at the beginning, at the end, at location), deletion of a node(from the beginning, from the end, from a specific location), searching for a node in single linked list, circular single linked list and Double linked list. Implementation of stack and queue using single linked list. Basic concept of Circular double linked list.

UNIT- 4 **(09 Hours)**

Trees: Introduction, Terminology, Binary Trees, Memory Representation of Binary Trees using arrays and linked lists, Binary Tree recursive traversal methods, Construction of binary tree using in-order & pre-order sequences, in-order & post-order sequence.

Binary Search Trees: Algorithm for construction, searching and insertion operation, Introduction to Height Balanced trees, Balance factor, Balancing the BST by rotations during insertions of a node.

UNIT-5 **(09 Hours)**

Heaps: Introduction to binary heaps, definition of a Max-heap, Min-heap, creating Heap Tree using insertion. Graphs: Terminologies, Graph Memory representation - Adjacency matrix, Incidence Matrix, Linked Representation, path matrix, Warshall's Algorithm to find path matrix, Graph Traversals (BFS & DFS),. Hashing: Hashing Functions: Division, Mid-square, Folding methods.

Text Books:

01. "Fundamental of Data Structure" (Schaums Series) Tata-McGraw-Hill.
02. Pai: "Data Structures & Algorithms; Concepts, Techniques & Algorithms "Tata McGraw Hill.
03. Gilberg and Forouzan: "Data Structure- A Pseudo code approach with C" by Thomson publication

Reference Books:

01. "Fundamentals of data structure in C" Horowitz, Sahani & Freed, Computer Science Press.
02. "Data Structures and algorithms" by Narasimha Karumanchi, Career Monk Publications
03. "Data structures through C in depth" by S.K.Srivastava, BPB Publications

COMMUNICATIVE ENGLISH AND TECHNICAL COMMUNICATION

Subject Code	Name of the Subject	L	T	P	C
23BBSHS12001	COMMUNICATIVE ENGLISH AND TECHNICAL COMMUNICATION	2	0	0	2

Course Educational Objectives

CEO1	To develop communication skills and soft skills of the students.
CEO2	To enhance employability and entrepreneurial skills.

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

CO1	Understand the importance of technology in communication.
CO2	Develop skills important for career making.
CO3	Apply technical approach to reading.
CO4	Prepare professional documents for career needs(e.g. Job application letter, Resume) and Professional needs (e.g., Memo and E-mail writing).
CO5	Develop creativity and imagination.
CO6	Execute Self-learning through technology.

CO-PO Mapping

PROGRAMME OUTCOMES												
COs	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CO1										3		
CO2									2			
CO3									2			
CO4										3		
CO5									3			
CO6										3		
AVG.									2.3	3		2.6

UNIT-1 INTRODUCTION TO TECHNICAL COMMUNICATION (7 Hours)

1.1 Introducing technical communication, Nature and Scope, Characteristics, Importance

1.2 Self-learning through technology, use of internet for technical learning

1.3 Need of technical communication for career development

1.4 Computer Assisted Language Learning(CALL)for developing English language

UNIT-2 SKILLS FOR CAREER MAKING (8 Hours)

2.1. Career Making: Setting Goals, SWOT analysis

2.2 Preparing a Resume, Elements of a Resume; Types of Resumes: Chronological Resume, Functional Resume; Use of job portals

2.3 Group Discussion

2.4 Job Interview

2.5 Effective Oral Presentation

2.6 Handling a Meeting

UNIT- 3 TECHNICAL APPROACH TO READING (7 Hours)

3.1 Know your Reading speed; Advantages of speed reading

3.2 SQ4R Techniques of Reading

3.3 Techniques of Rapid Reading: Skimming, Scanning, Intensive and Extensive

3.4 Barriers to effective readings

UNIT- 4 TECHNICAL WRITING (7 Hours)

4.1 Writing a technical paper

4.2 Writing business letters–significance, purpose, structure and elements, layout; types of business letters, Job application/ cover letter

4.3 Email Etiquette

4.4 Business Reports and Technical proposals

UNIT-5 ADVANCED SOFT SKILLS DEVELOPMENT (7 Hours)

5.1 What is conflict resolution; Importance, tips to improve conflict resolution

5.2 What is Problem Solving Skills, Importance, tips to improve problem solving skills

5.3 Difference between Conflict resolution and Problem Solving Skills

Reference Books:

1. Basic Communication Skills for Technology by Andrea J. Rutherford, Pearson Education Asia, Patparganj, New Delhi, 2001

2. Business Communication by Varinder Kumar and Bodh Raj. Kalyani Publishers, 2014

3. A Textbook of English Phonetics for Indian Students by T.Balasubramanian, 2017

4. Technical Communication, Principle and Practice by Meenakshi Raman & Sangeeta Sharma, Oxford University Press, 2015

5. How to Read better and Faster by Norman Lewis. 4th Edition. Publisher: Crowell, 1978

6. Soft Skills For Your Career by Kalyani Samantray, Oxford University Press, 2016

SYLLABUS

COMMUNICATIVE ENGLISH AND TECHNICAL COMMUNICATION LABORATORY

Subject Code	Name of the Subject	L	T	P	C
23BBSHS12101	COMMUNICATIVE ENGLISH AND TECHNICAL COMMUNICATION LABORATORY	0	0	2	1

Course Educational Objectives

CEO1	To develop communication skills and soft skills of the students.
CEO2	To enhance employability and entrepreneurial skills.

Course Outcomes:

Towards the end of the course, the students will be able to:

CO1	Understand the importance of technology in communication.
CO2	Develop skills important for career making.
CO3	Apply technical approach to reading.
CO4	Prepare professional documents for career needs (e.g. Job application letter, resume) and Professional needs(e.g., Memo and E-mail writing).
CO5	Develop creativity and imagination.
CO6	Execute self learning through technology.

CO-PO Mapping

PROGRAMME OUTCOMES												
COs	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CO1										3		
CO2									2			
CO3									2			
CO4										3		
CO5									3			
CO6										3		
AVG.									2.3	3			2.65

PROFESSIONAL WRITING **(2 Hours)**
Activity -Techniques to write Circular/notice writing
RESUME WRITING **(2 Hours)**
Activity - Types and format for writing an effective resume
WRITING COVER LETTER **(2 Hours)**
Activity - Techniques, types and format for writing over letter
GROUP DISCUSSION **(2 Hours)**
Activity - Case study based, opinion based discussions
JOB INTERVIEW **(2 Hours)**
Activity- Mock Interview
PPT PRESENTATION **(2 Hours)**
Activity - Presenting any technical topics.
DEBATE **(2 Hours)**
Activity - Debate on current affairs.
ACTIVITIES INVOLVED IN A MEETING **(2 Hours)**
Activity - Pre, during and post meeting activities. (agenda, MOM, etc.)
SWOT ANALYSIS **(2 Hours)**
Activity - Creating SWOT matrix and self-analysis
VOCABULARY BASED ACTIVITY **(2 Hours)**
Activity - Flash cards and worksheets will be given based on technical writing
Use of CALL and ESL (software) vocabulary games.
CONTENT WRITING **(2 Hours)**
Activity - recording of reviews on various content and events.
SOCIAL/BUSINESS ETIQUETTES **(2 Hours)**
Activity - Visual presentation on social etiquettes
PROFILING A COMPANY **(2 Hours)**
Activity - Giving a detailed description of a company of the student's choice.
PICTURE DESCRIPTION **(2 Hours)**
Activity - Gap filling
SUMMARIZING **(2 Hours)**
Activity - Summarize a book, research paper or news article

Teaching Methods: Chalk & Board/ PPT/Video Lectures

Reference Books:

1. Basic Communication Skills for Technology by Andrea J. Rutherford, Pearson Education Asia, Patparganj, New Delhi, 2001.
2. Business Communication by Varinder Kumarand Bodh Raj. Kalyani Publishers, 2104.
3. A Text book of English Phonetics for Indian Students by T.Balasubramanian, 2017.
4. Technical Communication, Principle and Practice by Meenakshi Raman & Sangeeta Sharma, Oxford University Press, 2015.
5. How to Read better and Faster by NormanLewis.4thEdition. Publisher: Crowell, 1978.
Soft Skills For Your Career by Kalyani Samantray Oxford University Press, 2016

DATA STRUCTURES AND ALGORITHMS LABROTARY SYLLABUS

Pre-Requisite: Basics of Computer Science.

Subject Code	Name of the Subject	L	T	P	C
23BBSES12103	DATA STRUCTURES AND ALGORITHMS LABROTARY	0	0	4	2

Course Educational Objectives

CEO1	Develop programs for performing different operations on Arrays, Stack, Queue, Linked list. Analyze the difference between them and understand different applications.
CEO2	Develop programs for understanding different searching and sorting methods and their applications.

Course Outcomes:

Towards the end of the course, the students will be able to:

CO1	Understand the basic concepts of data structures, remember the fundamental concepts.
CO2	Understand the programming by comparing the types of data structures concepts.
CO3	Develop the codes for implementing different operations on data structures.
CO4	Analyses of the codes regarding different operations on data structures.
CO5	Solve and evaluate complex problems by coding on linear and non-linear data structures.
CO6	Design the codeson advanced concepts of data structure by implementation in different application of data structure.

CO-PO Mapping

	PROGRAMME OUTCOMES												
COs	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	
CO1	3	2											
CO2	2	2	2										
CO3	2	3	3	1									
CO4	2	2	3	2	1				1				
CO5	2	3	2						1	1			
CO6	1	2											
AVG.	2	2.33	2.25	1.5	1				1	1			1.6

Experiment-1 (Functions and Arrays)

Q-1) Write a program to create an UDF for input 10 numbers into a 1D array. Create two functions MAX() and MIN(). MAX() is used to return the largest element and MIN() is used to return the smallest number in array.

Q-2) Write a C program to create methods for operations insertion and display on 1D array of elements using UDF.

Q-3) Write a C program to create methods for operations deletion, and display on 1D array of elements using UDF.

Experiment 2 (Concepts of Matrix and Sparse Matrix)

Q-1) Write a C program to create function for performing matrix multiplication using UDF

Q-2) Write a C program to input elements into a square matrix and display the transpose of it using UDF.

Q-3) Write a program to input elements into a 4X4 matrix, check it for sparse or not. If sparse then store the non-zero elements into an alternate matrix and then display it using UDF.

Experiment 3 (Pointer, Structure and DMA)

Q-1) Write a program to store N numbers using dynamic memory allocation and then find the largest element using UDF.

Q-2) Write a C program to create a structure called student to store your roll no, name, age. Create an array to input 5 students data and then create an UDF to display details where age>=20.

Q-3) Write a program to create a structure for products of a super market. Store product no, name and cost for N products using dynamic memory allocation. Display the products whose cost is in between 100 rupees to 1000 rupees.

Experiment 4 (Stack and Queue) (09 Hours)

Q-1) Write a program using C to create a stack of numbers and perform using UDF:
(i) push operation (ii) pop operation (iii) display operation

Q-2) Write a C program to create a linear queue and perform the following operations using UDF:
(i) insertion (ii) deletion and iii) Traversal

Q-3) Write a C program to create a circular queue and perform the following operations using UDF:
(i) insertion (ii) deletion and (iii) Traversal

Experiment 5 (Searching and Sorting)

Q-1) Write a program to implement binary search on array elements using UDF

Q-2) Write a program to implement selection sort on a given list of array elements.

Q-3) Write a program to input a string and sort the alphabets in ascending order using bubble sort.

Experiment 6 (Sorting and Merging)

Q-1) Write a program to input elements into two arrays A[5] and B[5]. Input the elements in ascending order and then merge their values into a resultant array C[10] in sorted manner using UDF.

Q-2) Write a program to implement insertion sort on a given list of array elements.

Experiment 7 (Single Linked List)

Q-1) Write a C program to perform the operations on a single linked list:
i) Insertion at beginning, ii) Deletion of 1st node iii) display all nodes

Q-2) Write a C program to perform the operations on a single linked list:
i) insertion at end, i) deletion of last node iii) display all the nodes

Q-3) Write a C program to perform the operations on a single linked list:
i) insertion at location ii) searching for a node item iii) display all the nodes.

Experiment-8 (Linked Stack and Linked Queue)

Q-1) Write a C program that uses functions to implement linked stack on single linked list.

Q-2) Write a C program that uses functions to implement linked queue on single linked list.

Experiment-9 (Double Linked List)

SYLLABUS

Q-1) Write a C program to perform the operations on a single linked list:
i) Insertion at beginning, ii) Deletion of 1st node iii) display all nodes
Q-2) Write a C program to perform the operations on a single linked list:
i) insertion at end, i) deletion of last node iii) display all the nodes

Experiment 10 (Advanced Programs using Linked List)

Q-1) Write a program to create a single linked list for storing the N cricket player details having member's player name, team name and batting average. Display only those players information whose batting average>=50
Q-2) Write a program to create a double linked list for storing account details of bank customers such as AC no, name, balance. Store details for N bank account holders and find the total balance for all account holders.

Topic Beyond Syllabus:

Q-1) Write a C program to implement quick sort to a given list of integers to sort in ascending order.
Q-2) Write a program to construction a Binary Search Tree for storing N unique numbers. Apply insertion(), deletion() and display() operation on it using UDF.
Q-3) Write a program to create a connected graph when its adjacency list is given and display it.

Text Books:

01. "Fundamental of Data Structure" (Schaums Series) Tata-McGraw-Hill.
02. Pai: "Data Structures & Algorithms; Concepts, Techniques & Algorithms "Tata McGraw Hill.
03. Gilberg and Forouzan: "Data Structure- A Pseudo code approach with C" by Thomson publication

Reference Books:

01. "Fundamentals of data structure in C" Horowitz, Sahani & Freed, Computer Science Press.
02. "Data Structures and algorithms" by Narasimha Karumanchi, Career Monk Publications
03. "Data structures through C in depth" by S.K.Srivastava, BPB Publications

Experiment-9 (Double Linked List)

Q-1) Write a C program to perform the operations on a single linked list:
i) Insertion at beginning, ii) Deletion of 1st node iii) display all nodes

Q-2) Write a C program to perform the operations on a single linked list:
i) insertion at end, i) deletion of last node iii) display all the nodes

Experiment 10 (Advanced Programs using Linked List)

Q-1) Write a program to create a single linked list for storing the N cricket player details having member's player name, team name and batting average. Display only those players information whose batting average>=50

Q-2) Write a program to create a double linked list for storing account details of bank customers such as AC no, name, balance. Store details for N bank account holders and find the total balance for all account holders.

Topic Beyond Syllabus:

Q-1) Write a C program to implement quick sort to a given list of integers to sort in ascending order.

Q-2) Write a program to construction a Binary Search Tree for storing N unique numbers. Apply insertion(), deletion() and display() operation on it using UDF.

Q-3) Write a program to create a connected graph when its adjacency list is given and display it.

Text Books:

01. "Fundamental of Data Structure" (Schaums Series) Tata-McGraw-Hill.
02. Pai: "Data Structures & Algorithms; Concepts, Techniques & Algorithms "Tata McGraw Hill.
03. Gilberg and Forouzan: "Data Structure- A Pseudo code approach with C" by Thomson publication

Reference Books:

01. "Fundamentals of data structure in C" Horowitz, Sahani & Freed, Computer Science Press.
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03. "Data structures through C in depth" by S.K.Srivastava, BPB Publications

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