School of Engineering and Technology

Programme Structure & Syllabus

Computer Science & Engineering

2024-25

K.K. University
Bihar Sharif, Nalanda - 803115

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Programme Structure & Syllabus for
B.Tech in Computer Science & Engineering

Sr. No.	Type of Course	Category	Credit
1	HSMC/AEC	Humanities and Social Sciences including Management Courses/ Ability Enhancement Courses	12
2	BSC	Basic Science Courses	25
3	ESC	Engineering Science Courses including workshop, drawing, basics of electrical/ mechanical/computer etc.	24
4	PCC	Professional Core Courses	48
5	PEC	Professional Elective Courses relevant to chosen specialization/branch	18
6	OEC	Open subjects – Electives from other technical Or emerging subjects	18
7	PROJ	Project Work, Technical Seminar, Internship in Industry or elsewhere	15
8	SEC	Skill Enhancement Course in the respective field of learning on engineering & technology.	8
Total Credit			**168**

** Eight credits have been allotted for Ability Enhancement Courses (AEC) in first and second semester.

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B.Tech. Program: Semester-wise details

Semester-I								
S.No.	Subject Code	Subject Name	TEACHING SCHEME			CONTACT HRS/WK	CREDIT	Type of Course
			L	T	P			
1.	BMAB1101	Engineering Mathematics I	3	1	0	4	4	BSC
2.	BCHB1102	Engineering Chemistry	3	1	0	4	4	BSC
3.	BENH1103	English Language Skills for Communication- I	2	1	0	3	3	HSMC/AEC
4.	BPHB1104	Engineering Physics	3	1	0	4	4	BSC
5.	BCSS1105	Introduction to Artificial Intelligence	2	1	0	3	3	SEC
PRACTICALS								
6.	BENH1113	English Language Lab I	0	0	2	2	1	HSMC/AEC
7.	BCHB1112	Engineering Chemistry Lab	0	0	2	2	1	BSC
8.	BIDE1111	Inter-disciplinary Experimental Active Learning (IDEA) Lab	0	0	2	2	1	ESC
9.	BPHB1114	Engineering Physics Lab	0	0	2	2	1	BSC
10.	BWSE1115	Engineering Workshop Practice Lab	0	0	2	2	1	ESC
11.	BCSS1115	Introduction to artificial intelligence with Python LAB	0	0	0	2	1	SEC
		TOTAL				**30**	**24**	

Second Semester

S. NO.	CODE	SUBJECT	TEACHING SCHEME			CONTACT HRS/WK	CREDIT	Type of Course
			L	T	P			
1.	BMAB1201	Engineering Mathematics II	3	1	0	4	4	BSC
2.	BECE1202	Basic Electrical and Electronics Engineering	3	0	0	3	3	ESC
3.	BENH1203	Technical Communication & Project Management	3	1	0	4	4	HSMC/AEC
4.	BPCE1204	Programming in C	3	0	0	3	3	ESC
5.	BFME1205	Fundamental of Mechanical & Civil Engineering	3	1	0	4	4	ESC
PRACTICALS								
6.	BECE1212	Basic Electrical and Electronics Engineering Lab	0	0	2	2	1	ESC
7.	BPCE1214	Programming in C LAB	0	0	2	2	1	ESC
8.	BFME1215	Fundamental of Mechanical & Civil Engineering Lab	0	0	2	2	1	ESC
9.	BGDE1216	Engineering Graphics & Design	0	0	2	2	1	ESC

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		TOTAL				**22**	**26**	

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Third Semester

S. NO.	CODE	SUBJECT	TEACHING SCHEME			CREDIT	CONTACTS HRS/WK	TYPE OF COURSE
			L	T	P			
1.	BMAB2301	Engineering Mathematics –III	3	1	0	4	4	BSC
2.	BCSC2302	Data Structure and Algorithm	3	0	0	3	3	PCC
3.	BEDE2303	Electronic Device and Circuit	3	0	0	3	3	ESC
4.	BDEE2304	Digital Electronic	3	0	0	3	3	ESC
5.	DCSC2305	Object oriented Programming using C++	3	0	0	3	3	PCC
6	BCSC2306	Operating System	3	0	0	3	3	PCC
PRACTICALS								
1.	BCSC2313	Data Structure and algorithm Lab	0	0	2	1	2	PCC
2.	BEDE2313	Electronic Device and Circuit Lab	0	0	2	1	2	ESC
3.	BDEE2314	Digital Electronics Lab	0	0	2	1	2	ESC
4.	DCSC2315	Object oriented Programming using C++ Lab	0	0	2	1	2	PCC
5.	BCSC2316	Operating System Lab	0	0	2	1	2	PCC
		TOTAL				**24**	**27**	

Fourth Semester

S. NO.	CODE	SUBJECT	TEACHING SCHEME			CREDIT	CONTACTS HRS/WK	TYPE OF COURSE
			L	T	P			
1.	BCSC2401	Discrete Mathematics	3	0	0	3	3	PCC
2.	BCSC2402	Dot Net Technology	2	0	0	2	2	PCC
3.	BCSC2403	Design and Analysis of Algorithm	3	1	0	4	4	PCC
4.	BCSC2404	Problem Solving and Python Programming	3	0	0	3	3	PCC
5.	BCSC2405	Database Management System	3	0	0	3	3	PCC
PRACTICALS								
1.	BCSC2412	Dot Net Technology	0	0	2	1	2	PCC
2.	BCSC2413	Design and Analysis of Algorithm Lab	0	0	2	1	2	PCC
3.	BCSC2414	Problem solving and python Programming Lab	0	0	2	1	2	PCC
4.	BCSC2415	Database Management System	0	0	2	1	2	PCC
		TOTAL				**19**	**23**	

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Fifth Semester

S. NO.	CODE	SUBJECT	TEACHING SCHEME			CREDIT	CONTACTS HRS/WK	TYPE OF COURSE
			L	T	P			
1.	BCSC3501	Theory of Computation	3	0	0	3	3	PCC
2.	BCSC3502	Java Programming	3	0	0	3	3	PCC
3.	BCSC3503	Software Engineering	3	0	0	3	3	PCC
4.	BCSC3504	Computer Organization	3	1	0	4	4	PCC
5.	BCSP3505	Elective I	3	0	0	3	3	PEC
6.	BCSO3506	Open Elective – I	3	1	0	4	4	OEC
7.	BCSJ3507	Industrial Training & Seminar	0	0	0	2	2	PROJ
PRACTICAL								
1.	BCSC3512	Java Programming Lab	0	0	2	1	2	PCC
2.	BCSO3516	Open Elective – I Lab	0	0	2	1	2	OEC
		TOTAL	**14**	**3**	**10**	**24**	**27**	

Sixth Semester

S. NO.	CODE	SUBJECT	TEACHING SCHEME			CREDIT	CONTACTS HRS/WK	TYPE OF COURSE
			L	T	P			
1.	BCSC3601	Computer Network	3	0	0	3	3	PCC
2.	BEVB3602	Environmental Science	3	0	0	3	3	BSC
3.	BAEV3603	Application of Embedded System for Robotics	3	0	0	3	3	SEC
4.	BCSP3604	Elective –II	3	1	0	4	4	PEC
5.	BCSO3606	Open Elective II	3	1	0	4	4	OEC
6.	BCSJ3607	Minor Project -I &	0	0	2	2	4	PROJ

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		Seminar						
PRACTICALS								
1.	BAEV3613	Application of Embedded System for Robotics	0	0	2	1	2	SEC
2.	BCSP3614	Elective –II Lab	0	0	2	1	2	PEC
3.	BCSO3616	Open Elective II Lab	0	0	2	1	2	OEC
		TOTAL				**22**	**27**	

Seventh Semester

S. NO.	**CODE**	**SUBJECT**	**TEACHING SCHEME**			**CREDIT**	**CONTACTS HRS/WK**	**TYPE OF COURSE**
			L	**T**	**P**			
1.	BCSP4701	Elective –III	3	1	0	4	4	PEC
2.	BCSP4702	Elective IV	3	1	0	4	4	PEC
3.	BCSO4703	Open Elective III	3	1	0	4	4	OEC
4.	BCSJ4704	Minor Project -II & Seminar	3	0	0	3	3	PROJ
PRACTICALS								
2.	BCSP4712	Elective –III Lab	0	0	2	1	2	PEC
3.	BCSP4713	Elective IV Lab	0	0	2	1	2	PEC
		TOTAL				**17**	**24**	

Eight Semester

S. NO.	**CODE**	**SUBJECT**	**TEACHING SCHEME**			**CREDIT**	**CONTACTS HRS/WK**	**TYPE OF COURSE**
			L	**T**	**P**			
1.	BCSJ4801	Project I	4	2	2	8	8	PROJ
2.	BCSO4802	Open Elective IV	3	1	0	4	4	OEC
3.	BCSH4803	Industrial Management	4	0	0	4	4	HSMC
		TOTAL				**16**	**23**	

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Professional Elective Course II				
S.No.	**Course Code**	**Subject Name**	**Semester**	**Credits**
1	BCSP3604	Artificial Intelligence with Machine Learning	6	4+1=5
2	BCSP3604	Mobile Computing	6	4+1=5
3	BCSP3604	Computational Intelligence	6	4+1=5

Professional Elective Course [PEC]

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Professional Elective Course I				
S.No.	**Course Code**	**Subject Name**	**Semester**	**Credits**
1	BCSP3505	Software Testing	5	3
2	BCSP3505	Cyber Security	5	3
3	BCSP3505	Embedded System	5	3

Professional Elective Course III				
S.No.	**Course Code**	**Subject Name**	**Semester**	**Credits**
1	BCSP4702	Internet of Things	7	4+1=5
2	BCSP4702	Natural language Processing	7	4+1=5
3	BCSP4702	Cloud Computing	7	4+1=5

Professional Elective Course IV				
S.No.	**Course Code**	**Subject Name**	**Semester**	**Credit**
1	BCSP4703	Computer Graphics and Multi Media	7	4+1=5
2	BCSP4703	Fundamental of Data Communication	7	4+1=5
3	BCSP4703	Information Security	7	4+1=5

Open Elective Course I				
S.No.	**Course Code**	**Subject Name**	**Semester**	**Credit**
1	BCSO3506	PHP	5	4+1=5
2	BCSO3506	Intellectual property rights	5	4+1=5
3	BCSO3506	Distributed Computing	5	4+1=5

Open Elective Course II				
S.No.	**Course Code**	**Subject Name**	**Semester**	**Credit**
1	BCSO3606	Data warehouse & Data Mining	6	4+1=5
2	BCSO3606	Wireless Ad-hoc and sensor network	6	4+1=5
3	BCSO3606	Neural Network and its application	6	4+1=5

Open Elective Course III

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S.No.	Course Code	Subject Name	Semester	Credit
1	BCSO4704	Cryptography & Network Security	7	4
2	BCSO4704	Parallel algorithm	7	4
3	BCSO4704	Software Defined Network	7	4

Open Elective Course IV				
S.No.	**Course Code**	**Subject Name**	**Semester**	**Credit**
1	BCSO4802	Soft Computing	8	4
2	BCSO4802	Block Chain	8	4
3	BCSO4802	Human Computer Interaction	8	4

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SEMESTER I

Program Structure	B. Tech
Subject Code	BMAB1101
Course Name	Engineering Mathematics - I
Course Credits	(3 L+1P)
Total Course Credit	168

Abbreviations: L- Lecture, T-Tutorial , P-Practical

1. Course Overview:

Techniques in matrices, differentiation and Integration, advanced level of Mathematics and applications.

2. Prerequisite:

Basic knowledge of Algebra & Calculas.

3. Objective of Syllabus:

- Techniques in matrices, differentiation and Integration.
- It aims to equip the student's to deal with advanced level of Mathematics and applications that would be essential for their disciplines.

4. Course Outcome:

S. No.	Course Outcomes (Cos)
CO1	Use both the limit definition and rules of differentiation to differentiate functions.
CO2	Apply differentiation to solve maxima and minima problems.
CO3	Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus.
CO4	Evaluate integrals using techniques of integration, such as substitution, partial fractions and integration by parts.
CO5	Determine convergence/divergence of improper integrals and evaluate convergent proper integrals.
CO6	Apply various techniques in solving differential equations

5. Syllabus.

UNIT I: LINEAR ALGEBRA

Matrix algebra, Determinant, Inverse and rank of a matrix by elementary transformation, solution of system of linear equation, vector, Basis, L.D&L.I, Eigen value and Eigen vector of a real matrix, properties of Eigen values, cay-lay Hamilton theorem. diagonalization of matrices.

UNIT II: DIFFERENTIAL CALCULUS

Limit, continuity and Differentiability, Successive differentiation, Leibnitz theorem, mean value theorem (Rolle's, Lagrange's Cauchy) Maxima & Minima for single variable, Taylor &

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Maclaurin Series.

UNIT III: FUNCTION OF SEVERAL VARIABLES

Partial derivative, Homogeneous functions and euler's theorem Total derivative, Differentiation of implicit function of two variables, Maxima and Minima of function of variables, Lagrange's method of undetermined co-efficient.

UNIT IV: INTEGRAL CALCULUS

Integration of various functions, Definition of proper and improper integral, Convergence of improper integral, Beta and gamma functions, Differentiation under integral sign.

UNIT V: CURVE TRACING

Curve tracing of Cartesian and Polar form, Surface area and volume of Surface of revolution.

REFERENCE BOOKS

1. B. S. Grewal, Higher Engineering Mathematics, Khanna Publisher's, 36 th edition, 2010.
2. Erwin Kresyszig, Advance Engineering Mathematics, John Wiley and Sons, 9 th edition, 2006.

Program Structure	B. Tech
Subject Code	BCHB1102
Course Name	ENGINEERING CHEMISTRY
Course Credits	3 (L) + 1(T)= 4
Total Course Credit	168

Abbreviations: L- Lecture, T-Tutorial , P-Practical

1. Course Overview:

A number of academic and research options are available to students in various fields such as pharmaceuticals, food products, environmental monitoring and assessments, environmental chemistry, fuel chemistry, cosmetic chemistry, biochemistry, biomaterials, nano-chemistry, materials chemistry, polymer chemistry, industrial chemistry, water chemistry, etc. in addition to physical, organic and inorganic chemistry that a student can explore for choosing a professional career.

2. Prerequisite:

Students must have Chemistry as a one subject at +2 levels.

3. Objective of Syllabus:

i. Broad and balance knowledge in chemistry in addition to understanding of key chemical concepts, principles and theories.
ii. To develop students' ability and skill to acquire expertise over solving both theoretical and applied chemistry problems.
iii. To provide knowledge and skill to the students' thus enabling them to undertake further studies in chemistry in related areas or multidisciplinary areas that can be helpful for self employment/entrepreneurship.

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4. Course Outcome:

S. No.	Course Outcomes (Cos)
CO1	Characterize bonding between atoms, molecules, interaction and energetics (ii) hybridization and shapes of atomic, molecular orbitals, bond parameters, bond- distances and energies.
CO2	Importance of hydrogen bonding, metallic bonding
CO3	Understanding chemistry of Water and its properties
CO4	Understanding principle of UV-Vis/FTIR spectroscopy and its applications.
CO5	Understanding principles of NMR analysis and study of Flame photometry of materials/characterization of materials.
CO6	Understanding chemistry of polymers, their structures and uses.

5. Syllabus.

UNIT- I: CHEMICAL BONDING

Introduction, Molecular Orbital Theory (MOT), Sigma (σ) and pi (π) Molecular Orbitals, Energy level Diagram for Mono and Di atomic Molecules, Linear Combination of Atomic Orbitals (LCAO) Method, Crystal Field Theory, Calculation of CFSE

UNIT- II: WATER AND ITS TREATMENT

Introduction, Soft and Hard Water, Type of Hardness, Techniques for Water Softening- Lime Soda Process, Zeolite Process, Ion Exchange Process.

UNIT- III: SPECTROSCOPIC TECHNIQUES AND APPLICATIONS

Basic concept of spectroscopy. Principle and Applications of different spectroscopic techniques (UV-Visible and IR spectroscopy). Nuclear magnetic resonance and magnetic resonance imaging. Elementary Discussion of Flame photometry.

UNIT- IV: POLYMER

Introduction, types of polymerization. Classification, mechanism of polymerization (Free radical and Ionic polymerization). Thermoplastic, and thermosetting polymers Elementary idea of Biodegradable polymers, preparation, properties and uses of the following polymers- PVC, PMMA, Teflon, Nylon-6, Polyester phenol formaldehyde, Urea-Formaldehyde, Buna-s, Vulcanization of Rubber.

UNIT- V: CORROSION AND LUBRICANT

Lubricant- Definition, Classification with examples. Functions of Lubricant, Physical Characterisitics of Lubricants Such and Viscosity, Viscosity Index, Oiliness, Volatility, Flash & Fire Point, and Cloud & Pour Point. Chemical Characteristics of Luricant such as Acid Value or Neutralization Number, Emulsification, Saponification Value etc.

TEXT BOOKS:

- University Chemistry,byB.H.Mahan
- Chemistry Principles and Applications, by M.J.Sienko and R.A.Plane
- Fundamentals of Molecular Spectroscopy, by C.N.Banwell

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- Engineering Chemistry(NPTEL Web-book),by B.L. Tembe,KamaluddinandM.S.Krishnan
- Physical Chemistry, by P.W.Atkins

BENH1103 ENGLISH LANGUAGE SKILLS FOR COMMUNICATION - 1

Programme Structure	**B. Tech**
Subject Code	**BENH1103**
Course Name	**English Language Skills For Communication - 1**
Course Credits	**2 (L) + 1(T)**
Total Course Credit	**168**

Abbreviations: L- Lecture, T-Tutorial , P-Practical

1. **Course Overview**:This course will encourage students for self awareness,self Development, and will give good communication skill,Leadership knowledge, and will also have knowledge about Ethics.

2. **Prerequisite:**students should have knowledge about Basic English and communication and also about Basic Leading knowledge **.**

3. **Objective of the Syllabus:** The objective of this course to help the students to develop as team member, leader and all round professional in the long run. This course would focus on over all personality development of the student and to improve his technical writing and documentation.

4. **Course Outcomes:**

S.No.	CourseOutcomes(Cos)
CO1	Communicate, interact and present his ideas to the other professionals
CO2	Understand and aware of importance, role and contents of soft skills through instructions, knowledge acquisition, demonstration and practice
CO3	Have right attitude in al and behavioral aspects, and build the same through activities.
CO4	Possess right professional and social ethical values.
CO5	Posses knowledge about Time Management.

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5. Syllabus:

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UNIT I: SELF AWARENESS AND SELF-DEVELOPMENT

Self-Assessment, Self-Awareness, Perceptions and Attitudes, Positive Attitude, Values and Belief Systems, Self-Esteem, Self-appraisal, Personal Goal setting, Career Planning, Personal success factors, Handling failure, Emotional Intelligence, Lateral thinking, Depression and Habit, relating SWOT analysis &goal setting, prioritization.

UNIT II: COMMUNICATION SKILL

Importance of communication, Aspects of communication, communication through words, communicationthroughbodylanguage,communicationthroughtechnology,Oralcommunication,

Listening Skills, Group Discussion and Interview Skills, Presentations kills: preparing the presentation, performing the presentation, Written communication: Reading comprehension, précis writing, Business and technical reports, Styles, Business correspondence, Memorandum writing, Notice, Agenda and Minutes, Research papers and articles, Advertising and job Description, Mechanics of Manuscript preparation.

UNIT III: INTERPERSONAL RELATIONSHIP

Teamwork, Team effectiveness, Group discussion, Decision making- Team Communication. Team, Conflict Resolution, Team Goal Setting, Team Motivation Understanding Team Development, Team Problem Solving, Building the team dynamics, Multicultural Diversity and Socializing

UNIT IV: LEADERSHIP SKILLS

Leaders: their skills, roles, and responsibilities. Vision, Empowering and delegation, motivating others, organizational skills, team building, Organizing and conducting meetings,decision making,giving support,Vision,Mission,Coaching,Mentoring and counseling, Appraisals and feedback, conflict, Power and Politics, Public Speaking.

UNIT V: OTHER SKILLS

Managing Time, Managing Stress, Meditation. Improving personal memory, Study skills that include Rapid Reading, Note Taking, Self-learning, Complex proble solving and creativity, listening skill and speaking skills, Corporate and Business Etiquettes.

UNIT VI: ETHICS IN ENGINEERING PRACTICE AND RESEARCH Introduction to ethical reasoning and engineer ethics, Right and responsibilities regarding Intellectual property, workplace rights and responsibilities, Central Professional Responsibilities of Engineers, Responsibility for environment.

TEXTBOOKS:

1. DevelopingCommunicationSkill:KrishnaMohan,MeeraBanerji,-MacMillanIndiaLtd.
2. BNGhosh, :ManagingSoftSkillsforPersanalityDevelopment"McGrawHill
3. EthicsinEngineeringPracticeandResearch:CarolineWhitbeck,CambridgeUniversitypress
4. ACourseInCommunicationSkills:KiranmaiDutt,CambridgeUniversitypress
5. EnglishforBusinessCommunication:SimonSweeney,CambridgeUniversityPress
6. BasicsOfCommunicationInEnglish:FrancisSounderaj,MacMillanIndiaLtd.
7. GroupDiscussionsandInterviewSkills:PriyadarshiPatnaik,CambridgeUniversityPress
8. ProfessionalPresentations:MalcolmGoodale,CambridgeUniversityPress
9. An IntroductiontoProfessionalEnglishAndSoft Skills:Das,CambridgeUniversityPress
10 ApracticalcourseinEffectiveEnglishspeakingskills,G.K.Gangal,PHIPublication.

Program Structure	B. Tech
Subject Code	BPHB1104
Course Name	Engineering Physics.
Course Credits	3 (L) + 1(T)
Total Course Credit	168

Abbreviations: T-Theory, P-Practical

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1. Course Overview:

To impart knowledge in basic concepts of physics relevant to engineering applications. To introduce advances in technology for engineering applications. Apply Biot- Savart Law and Ampere's Law. To impart knowledge on the concepts of electrostatics, electric potential, energy.

2. Prerequisite: Basic Concept of semiconductor, Optics and Laser.

3. Objective of Syllabus:

- To impart knowledge in basic concepts of physics relevant to engineering applications.
- To introduce advances in technology for engineering applications.
- Apply Biot- Savart Law and Ampere's Law to compute magnetic field due to a current distribution.
- Calculate the field of a magnetized object.
- To impart knowledge on the concepts of electrostatics, electric potential, energy density and their applications.

4. Course Outcome:

S. No.	Course Outcomes (Cos)
CO1	To design and conduct simple experiments as well as analyze and interpret data.
CO2	Engineering applications Capability to understand advanced topics in engineering.
CO3	Identify formula and solve engineering problems.
CO4	Apply quantum physics to electrical phenomena.
CO5	Apply engineering and physics concepts to the nano-scale and non-continuum doma

5. Syllabus.

UNIT I: ELECTROSTATICS AND ELECTROMAGNETIC

Electrostatics, Electric charge as point charge, charge distribution, Coulomb s law, Electric field, electric field due to point charge & charge distribution, Electrostatic Potential , Potential due to point charge, long charged wire, charged Spherical conductor & Electric dipole ,Ampere's law, application of Ampere's law, Biot- Savart law, Application of biot- savart law.

UNIT II: OPTICS & LASER

Reflection and refraction, Snell's law, physical significance of refractive index (simple problems), Total internal reflection, Lasers , Characteristics of Laser, Ruby laser, Working Principle of He-Ne Laser. Polarization of light, Brewster's Law, Malu's Law.

UNIT III : QUANTUM PHYSICS

Planck's theory of black body radiation, Compton effect, Photo electric effect, Wave particle duality, De-Broglie waves, De-Broglie wave velocity, Wave and group velocity, Heisenberg's uncertainty principle, Application of uncertainty principle.

UNIT IV: SEMICONDUCTORS

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Introduction of semiconductor, intrinsic & Extrinsic semiconductor, P –N junction , P-N junction with forward bias, P-N junction with reverse bias, reverse breakdown ,light emitting diode ,Zener diode, properties of zener diode .

UNIT V: NANO-PHYSICS

Introduction and Basic definition of Nano Technology, Properties of Nano particles, Elementary ideas of Synthesis of Nano particles, Application of Nano particles.

REFERENCE BOOKS:

1. Modern Physics by G. Aruldhas & P. Rajagopal; Pub: Prentice Hall of India.
2. Quantum Physics by H.C. Verma Pub.: Surya Publication .
3. Lasers and Non-Linear Optics by B.B. Laud; Pub: New Age International (P) Ltd.
4. Principles of electricity by Leigh Page and Normal llsley Adams, Pub.: Eurasia Publishing House, New Delhi.
5. Engineering physics by Dr. Rakesh Dogra Pub: S.k kataria & sons.
6. Engineering physics by Dr. Abhijit Nayak Pub: S.k kataria & sons.

Program Structure	B. Tech
Subject Code	BCSS1105
Course Name	Introduction to Artificial Intelligence
Course Credits	3 (L)
Total Course Credit	168

Abbreviations: T-Theory, P-Practical

1. **Course Overview:**

   The primary objective of this course is to introduce the basic principles techniques, and applications of. Artificial Intelligence, students will get a basic knowledge about Searching techniques like hill climbing,A* Algorithm, AO*.

2. **Prerequisite:**

   To understand the basic knowledge of Reasoning, Mathematics, Psychology and Learning Techniques.

3. **Objective of Syllabus:**

   - The primary objective of this course is to introduce the basic principles
   - techniques, and applications of. Artificial Intelligence
   - In this course, students will get a basic introduction to the building blocks and components of artificial intelligence
   - learning about concepts like algorithms.

4. **Course Outcome:**

S. No.	Course Outcomes (Cos)
CO1	To understand Introduction to AI, Overview of AI, Problems of AI, AI technique,

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	Searching techniques like hill climbing, A* Algorithm, AO*.
CO2	Understand the basic concept of Python, Data types, Variables, Basic input – output operations, Basic Operators, literals, Strings, Number and Conditional Statement, Loop Statements.
CO3	Ability to Define and Accessing List, tuple, Dictionary, Functions, Numpy, Matplotlib.
CO4	To understand Problem in representing knowledge, Knowledge representation propositional and predicate logic, resolution.
CO5	Ability to understand Probabilistic reasoning, Baye's Theorem, Semantic networks logic, forward and backward reasoning.
CO6	Ability to understands Learning, various techniques in Learning, Introduction to Neural networks, application of Neural network, common sense and reasoning.

5. Syllabus.

UNIT I:
Introduction to AI: History of AI, Overview of AI, Problems of AI, AI technique, Production Systems, Characteristics of production systems, Tic-Tac-Toe problems, Searching techniques like hill climbing,A* Algorithm, AO* Algorithm etc , and various types of control strategies.

UNIT II:
Introduction to Python: Python basics – Data types, Variables, Basic input –output operations, Basic operators, Python literals, Strings, Number, list, tuple, Dictionary, Functions, Conditional Statement, Loop Statements, Numpy, Matplotlib, Simple programming exercises using Python.

UNIT III:
Knowledge representation, Problem in representing knowledge, Knowledge representation using propositional and predicate logic, resolution, refutation, deducation, Theory proving, monotonic and non-monotonic reasoning.

UNIT IV:
Probabilistic reasoning, Baye's Theorem, Semantic networks, Scripts, Schema, frames, conceptual dependency, fuzzy logic, forward and backward reasoning, introduction to understanding,natural language processing.

UNIT V:
Introduction to learning, various techniques in Learning, Introduction to neural networks, application Neural network, common sense, reasoning, some example of expert systems.

TEXTBOOKS / REFERENCES

1. Artificial Intelligence: Elaine Rich, Kevin Knight, Mc-Graw Hill.
2. Introduction to AI & Expert System: Dan W. Patterson, PHI.
3. Artificial Intelligence by Luger (Pearson Education)
4. Russel & Norvig, Artificial Intelligence: A Modern Approach, Prentice-Hall

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ENGLISH LANGUAGE LAB-1 SUB. CODE: BENH1113 CREDIT 01

LIST OF EXPERIMENTS

- Work/Assignments
- SWOT analysis Personal & Career Goal setting – Short term &long term Presentation Skill
- Dining EtiquettesLetter/Application/Notice/Agenda/MinuteswritingReportwriting
- Listening skills using Language laboratory
- Group discussion
- Resume writing

ENGINEERING CHEMISTRY LAB SUB. CODE: BCHB1112 CREDIT 01

OBJECTIVES OF THE COURSE:

This Engineering Chemistry Laboratory is common to first year branches of UG Engineering. At the end of the course the student is expected to provide the students with a solid foundation in Chemistry laboratory required to solve engineering problems. Practical implementation of fundamental concepts.

LIST OF EXPERIMENT:-

1. Qualitative analysis of given salts having three acidic and basic radicals.
   Basic radicals:- Pb2+,Cu2+,Al3+,Fe2+,Fe3+,Cr3+,Zn2+,Ca2+,Ba2+ etc.
   Acidic radicals:- Cl-,Br-,I-,,SO4,NO3,OH- etc.

2. Determination the total hardness of given water sample.

3. To Determine the Saponification value of given oil sample.

4. To Determine the acid value of given oil sample.

4. Adsorption of acetic acid by charcoal.

6. Synthesis of polymer /drug.

7. To Determine the Ph of given solution by universal indicator or pH meter.

8. To determine dissolved oxygen in water sample.

9. To determine thinner content in oil paint.

10. To determine carbon monoxide, carbon di-oxide, ontent emission from petrol vehicle.

INTER DISCIPLINARY EXPERIMENTAL ACTIVE LEARNING (IDEA) LAB
SUB. CODE: BIBE1111 CREDIT 01

LIST OF EXPERIMENTS:-

Week 1 To study various active & passive devices like R, L & C, battery etc.

Week 2 To study the basics of mechatronics and various parts of a robot.

Week 3 To study the refrigeration and Air-conditioning system with future perspectives.

Week 4 Identification of various types fabrics like cotton, woolen, linen, silk etc.

Week 4 Identification of different types of stones and aggregates (visual identification) with study of their properties and applications.

Week 5 Identification of timbers: teak, Sal, chir, shisum, siras, deodar, kail and mango. (Visual identification) and with study of their properties and applications.

Week 6 Identification of hard drive, RAM, mother board and other important parts in a desktop computer

Week 7 To study the types of soil, water and renewable energy with present scenario and future challenges for sustainable development.

Week 8 To learn the parts of fan, LED bulb, induction cook top, electric iron etc.

Week 9 To study the working principle and various parts of a Hybrid Electric Vehicle (HEV)

Week 10 To study the various components of Green Building (also called as Zero Energy Building

ENGINEERING PHYSICS LAB SUB-CODE: BPHB**1114** **CREDIT: 01**

LIST OF EXPERIMENTS:

Week 1: Find the acceleration due to gravity (g) with the help of bar Pendulum.
Week 2: To determine the external diameter of solid Cylinder by the slide calipers.
Week 3: To determine the thickness of glass plate by using Spherometer.
Week 4: To determine the diameter of metal wire by using Micrometer (Screw Gauge).
Week 5: Study the junction diode.
Week 6: To find the refractive index of a material given in the form of a prism by using a Spectrometer.
Week 7: To obtain the particle size by the laser.

ENGINEERINGWORKSHOP PRACTICE SUB-CODE: BWSE**1115** **CREDIT: 01**

LIST OF EXPERIMENTS:-

Week 1 Smithy Shop

(a) To prepare a ring a mild steel rod in black smithy shop.
(b) To prepare an eye-nail of M.S rod of 125 mm long & 8 mm thickness.

Week 2 Foundry Shop

(a) To prepare a V block casting using pit furnace.

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Week 3 Carpentry Shop

(a) To prepare a dovetail joint in carpentry shop.

(b) To prepare a cross lap joint in carpentry shop.

Week 4 Fitting Shop

(a) Toprepare a matching joint in fitting shop.

(b) To prepare a square by chipping & filling.

Week 5 Machine Shop

(a) To prepare a cylindrical job of dia. 25 mm to 22.5 mm on lathe using turning operation.

(b) DrillingPractice

Week 6 Welding

(a) To prepare a T-joint by arc welding.

(b) To prepare an L-shape corner joint by Arc welding.

Week 7 Sheet Metal Shop

(a) Toprepare a conical funnel with soldering in sheet metal shop.

TEXT BOOK:

1. Jain, R.K. Production Technology.

2. Rao, P. N. Manufacturing Technology (Vol. I &II)

Introduction to A.I with Python LAB **SUB-CODE:** BCSS1105 **CREDIT: 01**

LIST OF EXPERIMENTS:

Week 1: Python program to demonstrate the example for arithmetic operators
Week 2: Python program for simple interest
Week 3: Python program to find power of a number using exponential operator
Week 4: Python program Find largest of three number using nested if else.
Week 5: Python program Calculate discount based on the sale amount.
Week 6: Python program Demonstrate an example of for loop
Week 7: Python program Examples of loops (based on their control)
Week 8: Python program Find factorial of a given number
Week 9: Python Program to print Odd and Even numbers from the list of integers.
Week 10: Python Program to calculate n-th term of a Fibonacci Series
Week 11: Python Program to check whether a given Number is prime or not prime.
Week 12: Python Program to check whether a given Number is Armstrong or not.

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SEMESTER II

Program Structure	**B. Tech**
Subject Code	**BMAB1201**
Course Name	**ENGINEERING MATHEMATICS –II**
Course Credits	**3 (T)**
Total Course Credit	**168**

Abbreviations: T-Theory, P-Practical

1. **Course Overview:**

This course will introduce the core concepts of differential equations, Laplace and Fourier transform, Fourier series and advanced level of mathematics and applications.

2. **Prerequisite:**

Basic knowledge of differential equation.

3. **Objective of Syllabus:**

- The objective of this course is to familiarize the prospective engineers with techniques in ordinary and partially differential equations, Laplace and Fourier transform, Fourier series, complex variables
- It aims to equip the students to deal with advanced level of mathematics and applications that would be essential for their discipline

4. **Course Outcome:**

S. No.	Course Outcomes (Cos)
CO1	After successfully completing the course, the student will have a good understanding of the following topics and their applications:
CO2	Analytic function, singularity, residues and complex integration
CO3	Laplace and Fourier transform and its properties, application of Laplace and Fourier transform
CO4	Laplace and Fourier transform and its properties, application of Laplace and Fourier transform.
CO5	Finding the solution of ode and pde

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5. Syllabus.

UNIT 1: ORDINARY DIFFERENTIAL EQUATION

Ordinary differential equation: definitions,order and degree of differential equation, equation, exact differential equations, equations solvable for x, y and p, Clairaut's form, second order linear differential equation with constant coefficient, Cauchy -Euler's equation, Method of variation of parameter.

UNIT 2: PARTIAL DIFFERENTIAL EQUATION

Partial differential equations: Definition and formulation, partial differential equation of the first order, Non-linear Partial differential equations, Legendre's and Charpit's method,Homogeneous linear partial differential equation with constant co-efficient, Methods for finding C.F. and P.I. of Linear Homogeneous Partial Differential Equations.

UNIT 3: LAPLACE TRANSFORM

Laplace Transform: Definition and properties of Laplace transform, shifting theorem, Transform of derivative and integrals, Multiplication by t^n, Division by t.Inverse Laplace transform, convolution theorem (without proof) and its application.

UNIT 4: FOURIER SERIES AND FOURIER TRANSFORM

Fourier series: Periodic Function, Function of arbitrary period, Even and odd functions, half range SeriesFourier Transform: definition and properties of Fourier transform, convolution, Parseval's identity for Fourier transforms, Relation between Fourier transform and Laplace transform.

UNIT 5: COMPLEX ANALYSIS

Complex Analysis: definitions, Cauchy- Riemann Equations, Harmonic functions, Elementary Analytic function and their properties, Cauchy Integral formula (without proof),Taylor's Series, Singularities, Residues, Cauchy Residue Theorem (without proof).

REFERENCE BOOK:

B.S. Grewal, Higher Engineering Mathematics, Khanna publisher's,44thedition
Erwin Kresyszig, Advance Engineering mathematics, John Wiley and Sons,9th edition

Program Structure	B. Tech
Subject Code	BECE1202
Course Name	Basic Electrical & Electronics Engineering
Course Credits	3 (T) + 1 (P)
Total Course Credit	168

Abbreviations: T-Theory, P-Practical

1. **Course Overview:**

The course provides a thorough understanding of fundamental electrical concepts, beginning with potential difference, current, resistance, and Ohm's law, progressing to advanced topics such as electromagnetism, magnetic circuits, and energy stored in magnetic

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fields. Students learn analysis techniques for DC circuits and AC fundamentals, including Kirchhoff's laws and sinusoidal voltage/current characteristics. Single-phase transformers and electrostatics are explored, covering construction, working principles, and capacitance. Semiconductor theory, diodes, rectifiers, and transistor configurations and applications are also studied. The course concludes with an introduction to Boolean algebra, logic gates, and simplification techniques, equipping students with a comprehensive skill set for electrical engineering and related disciplines.

Prerequisite: The prerequisite for the course encompasses a solid understanding of fundamental electrical concepts, including potential difference, current, resistance, and Ohm's law. Additionally, familiarity with electromagnetism, magnetic circuits, and basic analysis techniques for DC circuits and AC fundamentals is required. Students should also possess knowledge of single-phase transformers, electrostatics, semiconductor theory, and Boolean algebra.

2. **Objective of the Syllabus:**
   - To explain the laws used in the analysis of DC and AC circuits.
   - To understand and analyze AC & DC circuits.
   - To provide students with a fundamental knowledge of Single-phase transformer construction and working.
   - To provide students with a fundamental knowledge of AC Fundamentals.
   - To provide students with a fundamental knowledge of Electrostatics.
   - Familiarize with semiconductor devices, rectifier circuits, and their applications.
   - Describe the basic applications of transistors.
   - Define logic gates & understand the working principles of logical circuits.
   - Describe the significance of Boolean algebra in digital circuits.

3. **Course Outcomes:**

S. No.	Course Outcomes (Cos)
CO1	Students will comprehend fundamental electrical principles and electromagnetism, enabling them to analyze circuits and understand magnetic effects.
CO2	Learners will master DC and AC circuit analysis techniques, including Kirchhoff's laws and sinusoidal characteristics, enhancing their ability to analyze and design electrical circuits.
CO3	By the end of this module, students will be proficient in understanding the operation of single-phase transformers and electrostatic phenomena, enabling them to evaluate transformer efficiency and capacitor behavior.

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CO4	Participants will gain expertise in semiconductor theory, diode, and transistor operation, facilitating their capability to design and analyze electronic circuits.
CO5	Students will develop skills in Boolean algebra and logic gates, allowing them to simplify logical expressions and design digital systems effectively.

4. Syllabus:

Unit I ELEMENTARY CONCEPTS

Prerequisite: Concept of Potential difference. Current and resistance. Ohm's law, resistance Temperature coefficient, insulation resistance, SI units of work Power and Energy (B) Electromagnetism: Magnetic effect of an electric current, cross and dot conventions, right-hand thumb rule and corkscrew rule, Concept of M.M.F., flux, flux density, reluctance, permeability and Field strength, their units and relationships, the analogy of electrical and magnetic circuit, Energy stored In a magnetic field.

Unit II D. C. CIRCUITS AND AC FUNDAMENTALS

Kirchhoff's law, ideal and practical voltage and current sources. Mesh and Nodal analysis (Supernode And super mesh excluded). Source transformation. Star delta transformation. Superposition Theorem, Thevevnins's theorem Norton's theorem, maximum power transfer theorem (Source Transformation not allowed for superposition theorem, Mesh and Nodal analysis. (B) Sinusoidal voltage and currents, their mathematical and graphical representation, the concept of Cycle period, frequency, instantaneous, peak, average, R.M.S. values, peak factor, and form factor, Phase difference.

Unit III SINGLE PHASE TRANSFORMER AND ELECTROSTATICS

Single phase transformers: Construction, principle of working, e.m.f. equations, voltage, and current ratios, losses, the definition of regulation and efficiency, determination of these by direct loading method. B) Electrostatics: electrostatic field, electric flux density, electric field strength, absolute permittivity, relative permittivity, and capacitance, composite dielectric capacitors, capacitors in series and parallel, energy stored in capacitors.

Unit IV ANALOG DEVICES

Semiconductor theory:- Intrinsic and Extrinsic Semiconductors - N type and P type materials –mechanism of the hole and free electrons- majority and minority carriers, drift and diffusion current - Semi conductor diode - V -I characteristics of PN Junction diode, B) Rectifiers: Working and Waveforms of Half wave - Full wave - Bridge rectifiers (without filters) – Differences. C) Transistor: Working Principle of NPN and PNP transistor - Transistor as a switch - Transistor working as an amplifier- common base - common collector- common emitter configuration - input and output characteristics.

Unit V BOOLEAN ALGEBRA AND LOGIC GATES

Number representation: Decimal, Binary, Octal, and Hexa- decimal number systems - Conversion of numbers from one number system to another without decimal points - BCD Codes and limitations – Conversion of BCD to decimal and vice versa. B) Logic gates: Definition, truth table, symbol, and logical equations of logic gates: AND – OR - NOT- NAND – NOR-EXOR - EXNOR (Only 2-inputs) – Universal gates. C) Logic Simplification: Rules and laws of Boolean algebra – Demorgan's Theorem and proof - Simplification of logic functions using Boolean.

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TEXT / REFERENCES BOOKS:

1. D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2010
2. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009
3. L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 2011
4. E. Hughes, "Electrical and Electronics Technology, Pearson, 2010
5. V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989

Programme Structure	**B. Tech**
Subject Code	**BENH1203**
Course Name	**TECHNICAL COMMUNICATION & PROJECT MANAGEMENT**
Course Credits	**3 (T)**
Total Course Credit	**168**

Abbreviations: T-Theory

1. **Course Overview**:

In this course student will learn about letter writing and technical presentation skills.

2. **Prerequisite:**

Basic knowledge of grammar, letter & application.

3. **Objective of the Syllabus**

- To introduce the students to the fundamentals of mechanics of writing.
- To facilitate them with the style of documentation and specific formal written communication.
- To initiate in them the art of critical thinking and analysis.
- To help them develop techniques of scanning for specific information, comprehension and organization of ideas.
- To enhance their technical presentation skills.

4. Course Outcomes:

S.No.	CourseOutcomes(Cos)
CO1	Students will heighten their awareness of correct usage of English grammar in writing and speaking
CO2	Acquisition of technical communication's generic aspects like Reading Technical Material, Technical Writing, Listening

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CO3	Learning the skill of proofreading and copy editing, paraphrasing and spinning using technical tools
CO4	Learning the technical phrases and writing styles like descriptive, argumentative etc for developing good technical documents for presentations or disseminating technical documents
CO5	Accessing the reading material and developing the writing technical material with the use of technical concepts and tools

5.Syllabus:

UNIT I:
Mechanics of Writing: Grammar rules -Articles, Tenses, Part of Speech. General Reading and Listening comprehension – rearrangement & organization of sentences.

UNIT II:
Different kinds of written documents: Definitions- descriptions- instructions- recommendations- user manuals – reports – proposals. Formal Correspondence: Writing formal Letters. Reading & Listening Comprehension.

UNIT III:
Technical paper writing: documentation style – document editing – proof reading – Organizing and formatting Reading and listening comprehension of technical documents Technical presentations

UNIT IV:
Reading and listening comprehension of technical documents Technical presentations

UNIT V:

Project Writing

TEXT BOOKS:

- Essential Communication Strategies for Scientists, Engineers and Technology Professionals. II Edition. New York: IEEE press, 2002
- Technical Communication: A Reader-Centred Approach. V Edition. Harcourt Brace College Publication, 2003
- Technical Report Writing Today. VIII Edition (Indian Adaptation). New Delhi: Biztantra, 2004.
- Practical English Usage, Oxford University Press, 2000

Program Structure	**B. Tech**
Subject Code	**BPCE1204**
Course Name	**Programming in C**
Course Credits	**3 (T) + 1(P)= 4**
Total Course Credit	**168**

Abbreviations: T-Theory, P-Practical

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1. Course Overview:

Understand the basic concept of C Programming, and its different modules that include

Conditional and looping expressions, Arrays, Functions, Pointers, Structures and files.

2. Prerequisite:

To understand the basic knowledge of computer, Keyboard and operating system.

3. Objective of Syllabus:

• Understand the basic concept of C Programming, and its different modules that include conditional and looping expressions, Arrays, Strings, Functions, Pointers, and Structures.

• Acquire knowledge about the basic concept of writing a program.

• Role of constants, variables, identifiers, operators, type conversion and other building blocks of C Language

• Use of conditional expressions and looping statements to solve problems associated with conditions and repetitions.

4. Course Outcome:

S. No.	Course Outcomes (Cos)
CO1	Understand the basic concept of C Programming, Constants, variables & data types Operators and expressions managing input and output operators, and Branching Decision Making and Looping.
CO2	Understanding One–dimensionalArrays and their declaration and Initialisations, Two-dimensional Arrays and their initialisations, Multidimensional Arrays, Dynamic Arrays, String Variables, Reading and Writing Strings, Arithmetic Operations on characters, Putting Strings together, Comparison of Two Strings.
CO3	Understand the concept of Functions, Declaration, Definition and Calling of functions, Nesting function and Recursion, Passing array and string to functions, Storage classes: automatic, external and static variables.
CO4	Ability to Defining Structure, Declaring Structure Variable and Accessing Structure Members, Initialisation of Structure, Comparing Structure Variables, Operation on Individual Members, Arrays of Structures, Structures within structures, Structures and Functions, Unions, Size of Structures
CO5	Understanding Pointers, Accessing the Address of a Variable, Declaration and Initialization of Pointer Variables, Accessing a Variable through its Pointer, Chain of Pointers, Pointer Expressions, Pointer Increments and Scale Factor
CO6	Understanding Pointers and Arrays, Pointers and Character Strings, Arrays of Pointers, Pointers and Function Arguments, Functions Returning Pointers, Pointers to Functions, Pointers and Structures, Union, File Management in C.

5. Syllabus.

UNIT I: INTRODUCTION TO PROGRAMMING

Introduction to components of a computer system (disks, memory, processor, where a Program is stored and executed, operating system, compilers etc.). Idea of Algorithm: steps to solve logical and numerical problems. Representation of Algorithm:

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Flowchart/Pseudo Code with examples. From algorithms to programs; source code, variables (with data types) Variables and memory locations, Syntax and Logical Errors in compilation, object and executable code, Arithmetic expressions and precedence.

UNIT II: CONDITIONAL BRANCHING AND LOOPS & ARRAYS

Writing and evaluation of conditionals and consequent branching, Iteration and loops Arrays (1-D, 2- D), Character arrays and Strings

UNIT III: BASIC ALGORITHMS & FUNCTIONS

Searching, Basic Sorting Algorithms (Bubble, Insertion and Selection), Finding roots of equations, notion of order of complexity through example programs (no formal definition required) Functions (including using built in libraries), Parameter passing in functions, call by value, Passing arrays to functions: idea of call by reference

UNIT IV: RECURSION

Recursion, as a different way of solving problems. Example programs, such as Finding Factorial Fibonacci series, Ackerman function etc. Quick sort or Merge sort**.**

UNIT V: STRUCTURE & POINTERS

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

TEXTBOOKS / REFERENCES

1. ByronGottfried,Schaum's Outline of ProgrammingwithC,McGraw-Hill
2. E.Balaguruswamy,Programming ANSIC,TataMcGraw-Hill
3. C in Depth by S.K.Srivastava/ Deepali Srivastava
4. C Programming Language (Prentice Hall)
5. https://www.tutorialspoint.com/cprogramming/index.htm
6. https://www.geeksforgeeks.org/c-programming-language/
7. https://www.javatpoint.com/c-programming-language-tutorial

Programme Structure	B. Tech
Subject Code	BFME1205
Course Name	Fundamental of Mechanical and Civil Engineering
Course Credits	3 (T) + 1 (P)
Total Course Credit	168

Abbreviations: T-Theory, P-Practical

1. Course Overview:

A course on "Fundamental of Mechanical and Civil Engineering" is foundational for understanding the physical principles that govern the behavior of solids and fluids. This part of the course covers topics such as force systems, moments, equilibrium conditions, free-body diagrams, and analysis of trusses, frames, and beams. Students learn how to calculate reactions, internal forces, and stresses in static systems. Fluid mechanics deals with the behavior of fluids (liquids and gases) at rest and in motion. Topics include fluid properties,

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fluid statics, fluid dynamics, continuity equation, Bernoulli's equation, momentum equation, flow in pipes, and boundary layer theory. Students learn about the principles governing fluid flow and their applications in engineering systems. Overall, a course on Fundamental of Mechanical & Civil Engineering provides students with a strong foundation in the principles of mechanics, enabling them to analyze and design mechanical and structural systems with confidence and precision.

2. Prerequisite:

Throughout the course, students are exposed to a variety of engineering problems and applications that require the application of mechanics principles. This could include analyzing structures, designing mechanical components, and solving real-world engineering challenges.

3. Objective of the Syllabus:

The main learning objective of this course is to prepare the students for:

- Applying the various methods to determine the resultant forces and its equilibrium acting on a particle in 2D and 3D.
- Applying the concepts of frictional forces at the contact surfaces of various engineering systems.
- To understand the concepts of Centroid and centre of gravity.
- To study the concepts of power plant, IC engine components refrigeration's and air conditioning.
- To study the concepts of properties of fluids.
- To study the civil engineering materials and building components.

4. Course Outcomes:

Upon completion of this course, the students will be able to:

S.No.	Course Outcomes (Cos)
CO1	Apply the various methods to determine the resultant forces and its equilibrium acting on a particle in 2D and 3D. Apply the concepts of frictional forces at the contact surfaces of various engineering systems.
CO2	Apply the concepts of locating Centroid / center of gravity of various sections
CO3	To study the concepts of power plant, IC engine components refrigeration's and air conditioning.
CO4	To study the concepts of properties of fluids.
CO5	To study the Civil Engineering Material, Survey and Building Components.

5. Syllabus:

UNIT 1 FORCE SYSTEMS AND FRICTION

Introduction –Laws of Mechanics – Lami's theorem,Triangle, Parallelogram and polygon law of forces –Force system and its classifications –Equivalent systems of forces, free body

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diagram.
Beam and types of beam – Support and types of support, Shear force and bending moment diagram– for cantilever and simply supported beam with concentrated, distributed load and couple.
Friction-its types, Laws of friction, Co-efficient of friction, Angle of friction, Angle of repose and its relation.

UNIT 2 CENTROID, CENTRE OF GRAVITY AND MOMENT OF INERTIA

Center of gravity and Moment of inertia; Centroid and center of gravity, Moment Inertia of area and mass, Radius of Gyration

UNIT 3 THERMAL ENGINEERING

Introduction, Classification of power plants – Working principle of steam, Gas, Diesel, Hydro-electric and Nuclear power plants - Internal combustion engines as automobile power plant – Working principle of Petrol and Diesel Engines – Four stroke and two stroke cycles - Principle of vapour compression system – Layout of typical domestic refrigerator – Window and split type room Air conditioner

UNIT 4 BASIC CONCEPTS OF FLUID MECHANICS

Fluid – definition, - Properties of fluids - density, specific weight, specific volume, specific gravity, temperature, viscosity, compressibility, vapour pressure, capillary and surface tension,Fluid statics: concept of fluid static pressure, absolute and gauge pressures - pressure measurements by manometers and pressure gauges.Bernoulli's equation and its applications.

UNIT 5 CIVIL ENGINEERING MATERIAL, SURVEY AND BUILDING COMPONENTS

Civil Engineering Material:Brick, Stone, Cement, Concrete and its properties.
Surveying:Principles, Measurements of distances, Determination of angles, area, and leveling
Building components: Foundation and its types, bearing capacity,Requirement of goodfoundation
Superstructure: Brick masonry, Stone Masonry, beams, columns, Lintels, roofing, flooring, plastering.

BOOKS AND REFERENCES

Text Books

1. Beer Ferdinand P, Russel Johnston Jr., David F Mazurek, Philip J Cornwell, SanjeevSanghi, Vector Mechanics for Engineers: Statics and Dynamics, McGraw Higher Education. 11thEdition, 2017
2. Vela Murali, “Engineering Mechanics-Statics and Dynamics”, Oxford University Press, 2018.
3. Nag. P.K. “Power Plant Engineering” Third Edition, Tata McGraw – Hill Publishing Company Ltd., 2008
4. B. C. Punamia- Surveying part-1
5. N.S. Basak – Surveying
6. Building Material – S. K. Duggal
7. R. K. Bansal Fluid Mechanics and Machinery

Reference Books

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1. Boresi P and Schmidt J, Engineering Mechanics: Statics and Dynamics, 1/e, Cengage learning, 2008.
2. Hibbeller, R.C., and Engineering Mechanics: Statics, and Engineering Mechanics: Dynamics, 13th edition, Prentice Hall, 2013.

Basic Electrical & Electronics Engineering Lab SUB-CODE:BECE1212 CREDIT: 01

A. BASIC ELECTRICAL ENGINEERING-

WEEK 1-5

1. Verification of Ohm's Law.
2. Verification of KVL (Kirchhoff's Voltage Law) and KCL (Kirchhoff's Current Law).
3. Verification of Superposition theorem.
4. To Verify the Maximum Power Transfer theorem.
5. Measurement of power and power factor of single phase AC circuit using three voltmeter methods.
6. Verification of The venin's theorem.
7. 7. To verify Norton's theorem.
8. To measure power and power factor in a single-phase A.C. circuit using a wattmeter.

B. BASIC ELECTRONICS ENGINEERING-

WEEK 6-11

1. CRO – Applications.
2. V- I characteristics of Silicon & Germanium PN junction diodes.
3. V-I characteristics of Zener diode.
4. Characteristics of BJT in Common Emitter Configuration.
5. Characteristics of JFET in common source configuration.
6. Half and Full wave rectifier without a filter.
7. Half wave and Full wave rectifier with Filter.
8. Characteristics of Common Emitter BJT amplifier.

REFERENCE BOOKS:

- E. Hughes, "Electrical and Electronics Technology, Pearson, 2010
- V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989

PROGRAMMING IN C LAB SUB-CODE: BPCE1214 **CREDIT: 01**

A. Theory: Variable, Data type, Keyword ,Operator, Hello world Program, Control Structure, Array, Pointer

Week 1: Write a C program to find the sum of individual digits of a positive integer.
Week 2: Write a C program to generate Fibonacci series.
Week 3: Write a C program to generate all the prime numbers between 1 and n is a Value supplied by the user.

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Week 4: Write a C program to find the roots of a quadratic equation.
Week 5: Two integer operands and one operator form user, performs the operation and then prints the result.
Week 6: Write a C program to find the factorial of a given integer by using recursive and non-recursive functions.
Week 7: A C program to find both the largest and smallest number in list of integers
Week 8: Write A C- Program to Determine If The Given String Is A Palindrome Or Not
Week 9: Example of Array In C programming to find out the average of 4 integers
Week 10: Write a program in c to Addition of two matrix in C
Week 11: Write a C program to implement the following searching method.
i) Linear search ii) Binary search
Week 12: Write C programs that implement the following sorting methods to sort a given list of integers in ascending order by using Bubble sort.

Fundamental of Mechanical and Civil Engineering Lab SUB-CODE: BFME 1215 **CREDIT: 01**

Course Objective:
The main learning objective of this course is to prepare the students for:
- Applying the various methods to determine the resultant forces and its equilibrium acting on a particle in 2D and 3D.
- Applying the concepts of frictional forces at the contact surfaces of various engineering systems.
- To understand the concepts of Centroid and centre of gravity.
- To study the concepts of power plant, IC engine components refrigeration's and air conditioning.
- To study the concepts of properties of fluids.
- To study the civil engineering materials and building components.

Course Outcomes:
At the end of the course the students will be able to:
- Apply the various methods to determine the resultant forces and its equilibrium acting on a particle in 2D and 3D. Apply the concepts of frictional forces at the contact surfaces of various engineering systems.
- To study the concepts of IC engine components.

Syllabus:
Week 1 To verify the parallelogram law of forces.

Week 2 To verify the lami's theorem.

Week 3 To determine the coefficient of Friction of an inclined Plane.

Week 4 To study about the model of two stroke petrol engine.

Week 5 To study about the four stroke petrol engine and diesel engine.

Week 6 To Verify the Bernoulli's Theorem.
Week 7 To determine the compressive strength of Brick

Week 8 To determine the horizontal angle with prismatic and surveyor compass.

Week 9 To determine the area by chain survey.

Week 10 To measure horizontal and vertical angles in the field by using Theodolite.

BOOKS AND REFERENCES

Text Books

1. Beer Ferdinand P, Russel Johnston Jr., David F Mazurek, Philip J Cornwell, SanjeevSanghi, Vector Mechanics for Engineers: Statics and Dynamics, McGraw Higher Education. 11thEdition, 2017

2. Vela Murali, "Engineering Mechanics-Statics and Dynamics", Oxford University Press, 2018.

3. Nag. P.K. "Power Plant Engineering" Third Edition, Tata McGraw – Hill Publishing Company Ltd., 2008

4. B. C. Punamia- Surveying part-1

5. N.S. Basak – Surveying

6. Building Material – S. K. Duggal

7. R. K. Bansal Fluid Mechanics and Machinery

Reference Books

1. Boresi P and Schmidt J, Engineering Mechanics: Statics and Dynamics, 1/e, Cengage learning, 2008.

2. Hibbeller, R.C., and Engineering Mechanics: Statics, and Engineering Mechanics: Dynamics, 13th edition, Prentice Hall, 2013

ENGINEERING GRAPHICS & DESIGN LAB SUB-CODE: BGDE1216 **CREDIT: 01**

CONCEPTS AND CONVENTIONS

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

MODULE I: PLANE CURVES

Plane Curves: - Basic Geometrical constructions, Curves used in engineering practices: Conics – Construction of ellipse, parabola and hyperbola by eccentricity method – Construction of cycloid – construction of in volutes of square and circle – Drawing of tangents and normal to the above curves.

MODULE II: PROJECTION

Projection: - Types of projection, Orthographic projection, First and Third angle projection, Projection of points and lines, Line inclined to one plane, Inclined with both the plane.

MODULE III: PROJECTION OF PLANES AND SOLIDS

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Projection of Planes and Solids: - Projection of Planes likes circle and polygons in different positions; Projection of polyhedrons like prisms, pyramids and solids of revolutions like cylinder, cones in different positions.

MODULE IV: SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES

Section of Solids: - Section of right solids by normal and inclined planes; Intersection of cylinders.

Development of Surfaces: - Parallel line and radial - line method for right solids, Introduction of surfaces-cylinder.

MODULE V: ISOMETRIC PROJECTIONS & COMPUTER AIDED DRAFTIN

Isometric Projections:- Isometric scale, Isometric axes, Isometric Projection from orthographic drawing.

Computer Aided Drafting (CAD): Introduction, benefit, software's basic commands of drafting entities like line, circle, polygon, polyhedron, cylinders; transformations and editing commands like move, rotate, mirror, array; solution of projection problems on CAD.

BOOKS AND REFERENCES:

1) Bhatt, N.D.,Panchal V M and Pramod R. Ingle, "Engineering Drawing", Charotar Publishing House, 53rd Edition, 2014.
2) Parthasarathy, N. S. and Vela Murali, "Engineering Drawing", Oxford University Press, 2015
3) Agrawal, B. and Agrawal C.M., "Engineering Drawing", Tata McGraw, N. Delhi, 2008.
4) Gopalakrishna, K. R., "Engineering Drawing",Subhas Stores, Bangalore, 2007.
5) Natarajan, K. V., "A text book of Engineering Graphics", 28thEd.,Dhanalakshmi Publishers, Chennai, 2015
6) Shah, M. B., and Rana, B. C., "Engineering Drawing", Pearson, 2nd Ed., 2009.Venugopal, K. and Prabhu Raja, V., "Engineering Graphics", New Age, 2008

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