TKR COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

B.TECH. CIVIL ENGINEERING-R18

B.TECH I SEMESTER COURSE STRUCTURE

B. Tech. I Semester

S. No	Course Code	Course Title	L	T	P	Credits
1	**BBSM1**	Engineering Mathematics-I	3	1	0	3
2	**BBSP1**	Engineering Physics	4	1	0	4
3	**BHSEN**	Professional Communication Language	3	0	0	3
4	**BBSBE**	Basic Electrical Engineering	3	1	0	3
5	**BBSEG**	Engineering Graphics	2	1	2	3
6	**BP112**	Engineering Physics Lab	0	0	3	1.5
7	**BE22**	Professional Communication Language Lab	0	0	3	1.5
8	**BBEEL2**	Basic Electrical Engineering Lab	0	0	3	1.5
9	**BBSEW**	Engineering Workshop	0	0	3	1.5
			TOTAL			22.0

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B.TECH. CIVIL ENGINEERING-R18

ENGINEERING MATHEMATICS – I - BBSM1

B.Tech. I Semester   **L/T/P/C**
                                                                          3/1/0/3

COURSE OBJECTIVES:
To learn:

1. Concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations
2. Concept of eigen values and eigen vectors and to reduce the quadratic form to canonical form.
3. Concept and nature of the series.
4. Partial differentiation and finding maxima and minima of function of two and three variable.
5. Evaluation of multiple integrals

COURSE OUTCOMES:

After learning the contents of this paper the student must be able to

1. Write the matrix representation of a set of linear equations and to analyses the solution of the system of equations.
2. Reduce the quadratic form to canonical form using orthogonal transformations.
3. Analyze the nature of sequence and series.
4. Find the extreme values of functions of two variables with / without constraints.
5. Ability to solve double and triple integrals

UNIT-1:
Matrices & system of equations
Types of matrices **-** rank of a matrix by Echelon form and normal form- Inverse of Nonsingular matrices by Gauss-Jordan method - System of linear equations- solving system of Homogeneous and Non homogeneous equations- Gauss elimination method - LU Decomposition method.

UNIT –II:
Eigen values and Eigen Vectors
Eigen values and Eigen vectors and their properties - Cayley-Hamilton theorem(without proof) finding inverse and powers of a matrix by Cayley-Hamilton theorem- Diagonalization of a

matrix- Linear transformation and Orthogonal transformation - Quadratic forms and nature of the Quadratic forms- Reduction of Quadratic form to Canonical forms by Orthogonal Transformation.

UNIT –III:
Sequences & Series:
Sequence - Series- Series of Non negative terms- Comparison test- p- test- D-Alembert's ratio test- Raabe's test- Logarithmic test - Cauchy's root test - Cauchy's Integral test. Alternating series- Leibnitz test- Absolute and conditionally Convergence.

UNIT-IV:
Functions of Several Variables
Partial Differentiation- Euler's Theorem- Total derivative- Jacobian- Functional dependence & independence- Maxima and minima of functions of two variables and three variables using method of Lagrange multipliers

UNIT-V:
Multiple Integrals
Evaluation of Double Integrals (Cartesian and polar coordinates) - change of order of integration (only Cartesian form)- Evaluation of Triple Integrals- Change of variables (Cartesian to polar) for double and (Cartesian to Spherical and Cylindrical polar coordinates) for triple integrals.
Applications of definite integrals to evaluate surface areas and volumes of revolutions of curves (only in Cartesian Coordinates).

TEXTBOOKS

1. B.S.Grewal- Higher Engineering Mathematics- Khanna Publishers-36th Edition-2010.
2. Erwin Kreyszig- Advanced Engineering Mathematics- 9th Edition- John Wiley & Sons- 2006.
3. G.B.Thomas and R.L.Finney- Calculus and Analytic Geometry - 9th Edition -Pearson- Reprint-2002.

REFERENCE BOOKS

1. N.P.Bali and Manish Goyal- A text book of Engineering Mathematics- Laxmi Publications- Reprint-2008.
2. Ramana B.V. - Higher Engineering Mathematics- Tata McGraw Hill New Delhi- 11th Reprint- 2010.
3. Michael Green Berge -Advanced Engineering Mathematics -Second Edition - Pearson Education.

B.Tech. I Semester   L/T/P/C
                                                          4/1/0/4

COURSE OBJECTIVES:

To learn:

1. The course aims at making students to understand the basic concepts of Principles of Physics in a broader sense with a view to lay foundation for the various engineering courses.
2. Students will be able to demonstrate competency and understanding of the concepts found in Mechanics, Harmonic Oscillations, Waves in one dimension, wave Optics, Lasers, Fiber Optics and a broad base of knowledge in physics.
3. The main purpose of this course is to equip engineering undergraduates with an understanding of the scientific method, so that they may use the training beneficial in their higher pursuits.
4. Today the need is to stress principles rather than specific procedures, to select areas of contemporary interest rather than of past interest, and to condition the student to the atmosphere of change he will encounter during his career.

COURSE OUTCOMES:

Upon graduation, the graduates will have

1. The knowledge of Physics relevant to engineering is critical for converting ideas into technology.
2. An understanding of Physics also helps engineers understand the working and limitations of existing devices and techniques, which eventually leads to new innovations and improvements.
3. In the present course, the students can gain knowledge on the mechanism of physical bodies upon the action of forces on them, the generation, transmission and the detection of the waves, Optical Phenomena like Interference, diffraction, the principles of lasers and FibreOptics.
4. Various chapters establish a strong foundation on the different kinds of characters of several materials and pave a way for them to use in at various technical and engineering applications.

UNIT-I:

Introduction to Mechanics: Transformation of scalars and vectors under Rotation transformation, Forces in Nature, Newton's laws and its completeness in describing particle motion, Form invariance of Newton's second law, Solving Newton's equations of motion in polar coordinates, Problems including constraints and friction, Extension to cylindrical and spherical coordinates.

UNIT-II:

Harmonic Oscillations: Mechanical and electrical simple harmonic oscillators, Complex number notation and phasor representation of simple harmonic motion, Damped harmonic oscillator: heavy, critical and light damping, Energy decay in a damped harmonic oscillator, Quality factor, Mechanical and electrical oscillators, Mechanical and electrical impedance, Steady state motion of forced damped harmonic oscillator, Power observed by oscillator.

UNIT-III:

Waves in one dimension: Transverse wave on a string , The wave equation on a string, Harmonic waves, Reflection and transmission of waves at a boundary, Impedance matching, Standing waves and their Eigen frequencies, Longitudinal waves and the wave equations for them, Acoustic waves and speed of sound, Standing sound waves. Transmission of sound & transmission loss. Sabine formula, absorption coefficients.

UNIT-IV:

Wave Optics: Huygen's principle, Superposition of waves and interference of light by wave front splitting and amplitude splitting, Young's double slitexperiment, Newton's rings, Michelson's interferometer, Mach-Zehnder interferometer, types of diffraction, Fraunhofer diffraction from a single slit, N-slitsand circular aperture, Diffraction grating- resolving power.

UNIT-V:

Lasers and Fibre Optics: Lasers: Introduction to interaction of radiation with matter, Coherence, Principle and working of Laser, Population inversion, Components of lasers, Types of Lasers: Ruby laser, Carbon dioxide (CO_2) laser, He-Ne laser, Applications of laser. Fibre Optics: Introduction, Optical fibre as a dielectric wave guide, Total internal reflection, Acceptance angle, Acceptance cone and Numerical aperture, Step and Graded index fibres, Losses associated with optical fibres, Applications of optical fibres.Optical fibres in communication system.

TEXT BOOKS

1. Engineering Mechanics, 2nd ed.- MK Harbola, CengageLearning

2. I. G. Main, "Vibrations and waves in physics', 3rdEdn, Cambridge   University Press, 2018.
3. AjoyGhatak, " Optics", McGraw Hill Education,2012

REFERENCES BOOKS

1. H. J. Pain, "The physics of vibrations and waves", Wiley,2006
2. O. Svelto, "Principles ofLasers"
3. "Introduction to Mechanics", M.K.Verma, UniversitiesPress
4. Fundamental s of acoustics, Kinster& Frey, John. Wiley & Sons.

B.Tech. I Semester   **L/T/P C**
                                                                                                3/0/0/3

INTRODUCTION

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire language skills, the syllabus of English has been designed to develop linguistic, communicative and critical thinking competencies of Engineering students.

In English classes, the focus should be on the skills development in the areas of vocabulary, grammar, reading and writing. For this, the teachers should use the prescribed text for detailed study. The students should be encouraged to read the texts leading to reading comprehension and different passages may be given for practice in the class. The time should be utilized for working out the exercises given after each excerpt, and also for supplementing the exercises with authentic materials of a similar kind, for example, newspaper articles, advertisements, promotional material etc. *The focus in this syllabus is on skill development, fostering ideas and practice of language skills in various contexts and cultures.*

COURSE OBJECTIVES:

The course will help to

1. Improve the language proficiency of students in English with an emphasis on Vocabulary (Identify different types of words), Grammar (the structure and form of the language), Reading and Writing skills.
2. Equip students to study academic subjects more effectively and critically using the theoretical and practical components of English syllabus.
3. Develop study skills and communication skills in formal and informal situations.

COURSE OUTCOMES:

Students should be able to

1. Use English Language effectively in spoken and written forms.
2. Comprehend the given texts and respond appropriately.
3. Communicate confidently in various contexts and different cultures.
4. Acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.

UNIT –I:
'The Raman Effect' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.
Vocabulary Building: The Concept of Word Formation --The Use of Prefixes and Suffixes and root words.
Grammar: Identifying Common Errors in Writing with Reference to Articles and Prepositions.
Reading: Reading and Its Importance- Techniques for Effective Reading.

Basic Writing Skills: Sentence Structures - Use of Phrases and Clauses in Sentences-Importance of Proper Punctuation- Techniques for writing precisely – **Paragraph writing** – Types, Structures and Features of a Paragraph - Creating Coherence-Organizing Principles of Paragraphs in Documents.

UNIT –II:
Letter/Report writing
Vocabulary: Synonyms, Antonyms.
Grammar: Identify Common Errors in Writing with Reference to Noun-pronoun Agreement and Subject-verb agreement. Tenses, Active and Passive Voice, Direct and Indirect Speech
Reading: Improving Comprehension Skills – Techniques for Good Comprehension **Writing:** Format of a Formal Letter-**Writing Formal Letters** E.g.., Letter of Complaint, Letter of Requisition, Job Application with Resume.

UNIT –III:
"Blue Jeans" from the prescribed textbook 'English for Engineers' published by Cambridge University Press.
Vocabulary: Acquaintance with Prefixes and Suffixes from Foreign Languages in English to form Derivatives-Words from Foreign Languages and their Use in English.
Grammar: Degrees of Comparison, Simple, Compound and Complex sentences.
Reading: Sub-skills of Reading- Skimming and Scanning
Writing: Nature and Style of Sensible Writing- **Defining- Describing** Objects, Places process/experiment and Events.

UNIT –IV:
'What Should You Be Eating' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.
Vocabulary: Standard Abbreviations in English, Idioms and phrases, one word substitutes.
Grammar: Redundancies and Clichés in Oral and Written Communication.
Reading: Comprehension- Intensive Reading and Extensive Reading
Writing: Writing Practices--Writing Introduction and Conclusion -Précis Writing.

UNIT –V:

'How a Chinese Billionaire Built Her Fortune' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.

Vocabulary: Technical Vocabulary and their usage

Grammar: Common Errors in English,

Reading: Reading Comprehension-Exercises for Practice

Writing: Technical Reports- Introduction – Characteristics of a Report – Categories of Reports

Formats- Structure of Reports (Manuscript Format) -Types of Reports - Writing aReport.

TEXTBOOKS

1. Sudarshana, N.P. and Savitha, C. (2018). English for Engineers. Cambridge University Press.

REFERENCE BOOKS

1. Swan, M. (2016). Practical English Usage. Oxford University Press.
2. Kumar, S and Lata, P.(2018). Communication Skills. Oxford University Press.
3. Wood, F.T. (2007).Remedial English Grammar. Macmillan.
4. Zinsser, William. (2001). On Writing Well. Harper Resource Book.
5. Hamp-Lyons, L. (2006).Study Writing. Cambridge University Press.
6. Exercises in Spoken English. Parts I –III. CIEFL, Hyderabad. Oxford University Press.

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B.TECH. CIVIL ENGINEERING –R18

BASIC ELECTRICAL ENGINEERING - BBSBE

B.Tech. I Semester   **L/T/P/C**
                                                                                        3/0/0/3

OBJECTIVES:

Objectives of this course are

1. To introduce the concept of DC and AC electrical circuits and its applications.
2. To study the concepts of different testing on DC Machines.
3. To determine the performance of single phase transformer
4. To acquire knowledge about various configurations for electrical installations and its applications

COURSE OUTCOMES:

After this course, the student will be able to

1. Understand and analyze DC, AC and magnetic circuits using basic principles
2. Analyze and evaluate electrical circuits using various theorems
3. Understand the characteristics and performance of DC Machines and Transformers
4. Understand the applications of various electrical installations

UNIT-1:

DC Circuits and Magnetic Circuits

DC Circuits

Electrical circuit elements (R, L and C), voltage and current sources, Kirchoff current and voltage laws, Analysis of Resistive circuits-Mesh, Nodal Analysis and Star-Delta Transformations, Numerical problems.

Magnetic Circuits

Magneto Motive force, Flux, Reluctance, Permeability, Faradays laws, Lenz's Law, Self and Mutual Inductance, coefficient of coupling, Magnetic materials, BH characteristics, Numerical problems.

UNIT - 2:
AC Circuits

A.C. Fundamentals: Sinusoidal voltage and currents, mathematical and graphical representation, concept of cycle period, frequency, instantaneous, peak, average, RMS values, peak factor, form factor, phase difference, lagging, leading and in phase quantities and phasor representation. Rectangular and polar representation of phasors. Analysis of single-phase ac circuits consisting of R, L, C, RL, RC and RLC combinations (series and parallel), resonance. Three phase balanced circuits, voltage and current relations in star and delta connections.

UNIT -3:
Theorems:

Thevenin's, Norton's, Superposition, Reciprocity, Maximum Transfer, Tellgen's, Millman's, theorems for both AC & DC Circuits, Numerical Problems.

UNIT-4:
DC Machines and Transformers
DC Machines

Construction of DC machines, Armature windings – DC Generator – Principle of operation - EMF Equation – DC Motor – Principle of operation – Back EMF - Torque Equation.

Transformer: Ideal and Practical Transformer, Equivalent Circuit, Losses in Transformers, Regulation and Efficiency. Auto-Transformer.

UNIT 5:
Electrical Installations

Basic concept of wiring systems, Service Mains, Meter board and Distribution board, Concept of Earthing. Switch Fuse UNIT (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Types of

Batteries, Important Characteristics for Batteries. Elementary calculations for energy consumption, power factor improvement and battery backup.

TEXTBOOKS

1. S.K.Bhattacharya, "Basic Electrical & Electronics Engineering", Pearson Publications
2. S.K.Bhattacharya, "Electrical installations and House Wiring", Pearson Publications

REFERENCE BOOKS

1. V. N. Mittal and Arvind Mittal;, " Basic Electrical Engineering" McGraw Hill
2. Edward Hughes, " Electrical Technology,", Pearson Education
3. Edminister.J., "Electrical Circuits" Schaum's Outline Series, Tata McGrawHill
4. Sudhakar and Shyam Mohan, "Circuits and Networks Analysis and Synthesis, Tata McGrawHill
5. D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2010.

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B.TECH. CIVIL ENGINEERING –R18

ENGINEERING GRAPHICS - BBSEG

B.Tech. I Semester   L/T/P/C
                                                                                          3/0/0/3

COURSE OBJECTIVES:

1. To provide basic concepts in engineering drawing.

2. To impart knowledge about standard principles of orthographic projection of objects.

3 To draw sectional views and pictorial views of solids.

COURSE OUTCOMES:

1. Preparing working drawings to communicate the ideas and information.

2. Read, understand and interpret engineering drawings

UNIT-1:
Introduction to Engineering Drawing: Principles of Engineering Graphics and their Significance, Usage of Instruments, Conic Sections--Ellipse, Parabola, Hyperbola and Rectangular Hyperbola ; General method only. Cycloid, Epicycloid and Hypocycloid, Involute.

UNIT-2:
Orthographic Projections: Principles of Orthographic Projections – Conventions – Projections of Points and Lines inclined to both principal planes.. Projections of Plane regular geometric figures inlined to both principal planes, Regular planes such as square, rectangle, Rhombus, triangle, pentagon,Hexagon, Circle, Semi circle—Auxiliary Plane method in drawing projection of lines and plane figures (which are given above) may be followed.

UNIT-3:
Projections of Regular Solids, axis parallel, perpendicular and inclined to reference Planes. The regular solids are cube, Rhomboid, Square pyramid, Rectangular prism and pyramids, Pentagonal Prism and Pyramid, Hexagonal Prism and Pyramid, Cylinder Cone . Solving by using auxiliary plane method may be followed.

UNIT-4:
Sections or Sectional views of Right Regular Solids – Prism, Cylinder, Pyramid, Cone – Auxiliary views – Development of Surfaces of Right Regular Solids – Rectangular and Triangular Prism , Pentagonal and Hexagonal Pyramid, Cylinder and Cone.

UNIT-5:

Isometric Projections: Principles of Isometric Projection – Isometric Scale – Isometric Views – Conventions – Isometric Views of Plane Figures, Simple and Compound Solids – Isometric Projection of objects having non- isometric lines. Conversion of Isometric Views to Orthographic Views and Vice-versa.

Introduction to CAD: (For Internal Evaluation Weightage only): Introduction to CAD Software Package Commands.- Free Hand Sketches of 2D- Creation of 2D Sketches by CAD Package.

TEXT BOOKS

1) Engineering Drawing / Basant Agrawal and Mc Agrawal/ Mc Graw Hill

2) Engineering Drawing: Gopala Krishna, Subhas Stores

REFERENCE BOOKS

1) Engineering Drawing / N.S. Parthasarathy and Vela Murali/ Oxford
2) Engineering Drawing N.D. Bhatt / Charotar

3) Engineering Drawing/ M.B. Shah, B.C. Rane / Pearson.

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B.TECH. CIVIL ENGINEERING –R18

ENGINEERING PHYSICS LAB - BP112

B.Tech. I Semester　　　　　　　　　　　　　　　　　　**L/T//P /C**

　　　　　　　　　　　　　　　　　　　　　　　　　　　0/ 3/0/1.5

LIST OF EXPERIMENTS:

All experiments compulsory

1. **Melde'sexperiment:**
   To determine the frequency of a vibrating bar or turning fork using Melde's arrangement.

2. Compound pendulum

3. **Newton'srings:**
   To determine the radius of curvature of the lens by forming Newton's rings.

4. **Diffractiongrating:**
   To determine the number of lines per inch of the grating and resolving power of a grating

5. **CoupledOscillator:**
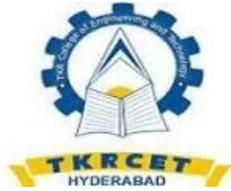   To determine the spring constant by single coupled oscillator.

6. **LCRCircuit:**
   To determine quality factor and resonant frequency of LCR circuit.

7. **LASER:**
   To study the characteristics of LASER sources.

8. **Opticalfibre:**
   To determine the bending losses and Numerical aperture of a given fibre Optical fibre

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B.TECH. CIVIL ENGINEERING –R18

PROFESSIONAL COMMUNICATION LANGUAGE LAB- BE22

B.Tech. I Semester   **L/T/P/C**
                                                                                                    0/0/3/1.5

The **Language Lab** focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations both in formal and informal contexts.

COURSE OBJECTIVES:
1. To facilitate computer-assisted multi-media instruction enabling individualized and independent language learning
2. To sensitize students to the nuances of English speech sounds, word accent, intonation and rhythm
3. To bring about a consistent accent and intelligibility in students' pronunciation of English by providing an opportUNITy for practice in speaking
4. To improve the fluency of students in spoken English and neutralize their mother tongue influence
5. To train students to use language appropriately for public speaking and interviews

LEARNING OUTCOMES: Students will be able to attain
1. Better understanding of nuances of English language through audio- visual experience and group activities
2. Neutralization of accent for intelligibility
3. Speaking skills with clarity and confidence which in turn enhances their employability skills

English Language and Communication Skills Lab (ELCS) shall have two parts:
   a. **Computer Assisted Language Learning (CALL) Lab**
   b. **Interactive Communication Skills (ICS) Lab**

Listening Skills
Objectives
1. To enable students develop their listening skills so that they may appreciate its role in the LSRW skills approach to language and improve their pronunciation
2. To equip students with necessary training in listening so that they can comprehend the

speech of people of different backgrounds and regions

Students should be given practice in listening to the sounds of the language, to be able to recognize them and find the distinction between different sounds, to be able to mark stress and recognize and use the right intonation in sentences.

- Listening for general content
- Listening to fill up information
- Intensive listening
- Listening for specific information

Speaking Skills

Objectives

1. To involve students in speaking activities in various contexts
2. To enable students express themselves fluently and appropriately in social and professional contexts
   - Oral practice: Just A Minute (JAM) Sessions
   - Describing objects/situations/people
   - Role play – Individual/Group activities
   - Activities to develop speaking skills: Picture Description, Exposure to structured talk and Extempore mock interviews.

The following course content is prescribed for the English Language and Communication Skills Lab based on UNIT-6 of AICTE Model Curriculum 2018 for B.Tech First English. As the syllabus is very limited, it is required to prepare teaching/learning materials by the teachers collectively in the form of handouts based on the needs of the students in their respective colleges for effective teaching/learning and timesaving in the Lab)

Exercise – I
CALL Lab:
Understand: Listening Skill- Its importance – Purpose- Process- Types- Barriers of Listening. *Practice*: Introduction to Phonetics – Speech Sounds – Vowels and Consonants.
ICS Lab:
Understand: Communication at Work Place- Spoken vs. Written language.
Practice: Ice-Breaking Activity and JAM Session- Situational Dialogues – Greetings – Taking Leave – Introducing Oneself and Others.

Exercise – II

CALL Lab:

Understand: Structure of Syllables – Word Stress and Rhythm– Weak Forms and Strong Forms in Context.

Practice: Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms in Context.

ICS Lab:

Understand: Features of Good Conversation – Non-verbal Communication.

Practice: Situational Dialogues – Role-Play- Expressions in Various Situations –Making Requests and Seeking Permissions - Telephone Etiquette.

Exercise - III

CALL Lab:

Understand: Intonation-Errors in Pronunciation-the Influence of Mother Tongue (MTI).

Practice: Common Indian Variants in Pronunciation – Differences in British and American Pronunciation.

ICS Lab:

Understand: How to make Formal

Presentations, Describing a picture

Practice: Formal Presentations-individual and

team.

Exercise – IV

CALL Lab:

Understand: Listening for General Details.

Practice: Listening Comprehension Tests.

ICS Lab:

Understand: Public Speaking – Exposure to Structured Talks.
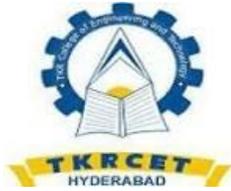
Practice: Making a Short Speech – Extempore.

Exercise – V

CALL Lab:

Understand: Listening for Specific

Details. *Practice:* Listening

Comprehension Tests.

ICS Lab:

Understand: Introduction to Interview Skills.

Practice: Mock Interviews-Role Play.

B.Tech. I Semester   **L/T/P C**
                                                                     0/0/3 1.5

COURSE OBJECTIVES:

1. Students will gain the basic knowledge of electrical circuits using various laws.
2. Identify and apply different theorems for electrical circuits.
3. Understand the power and power factor in single phase ac circuits using 3 voltmeter.
4. Assess the performance of different DC machines and single phase transformer.
5. Apply basic electrical engineering knowledge for house wiring practice.

COURSE OUTCOMES:

After the completion of this laboratory course, the student will be able to

1. Apply various laws to solve electrical networks.
2. Apply network theorems to solve complex electrical networks.
3. Analyze single phase AC circuits.
4. Evaluate the performance of DC machines and single phase transformer by conducting various tests
5. Understand and analyze electrical installations using different lamp controlled methods, stair case wiring and different wiring connection

List of Experiments: (Any 10 Experiments)

1. Verification of Kirchhoff's current and voltage laws.

2. To study and verify Thevenin's and Nortons theorems.

3. To study and verify reciprocity and Superposition theorem

4. To verify maximum power transfer theorem

5. To study and verify Tellgen's, and Millman's, theorem

6. To measure power and power factor in a single phase ac circuits using 3 voltmeters and 3 ammeter method

7. Magnetization characteristics of DC shunt generator.

8. Conduct brake test on dc shunt motor.

9. Conduct load test on transformer.

10. To perform open circuit and short circuit test on single phase transformer

11. Make circuit for series and parallel connection of lamps

12. Make a circuit for one lamp controlled by one switch with PVC surface conduit system

13. Make a circuit for two lamps controlled by two switches with PVC surface conduit system

14. Make a circuit for stair case wiring

15. Make a circuit for Godown wiring

16. Make a circuit for electrical bell connection

17. Plot BH loop and obtain hysteresis loss.

B.TECH. CIVIL ENGINEERING –R18

ENGINEERING WORK SHOP - BBSEW

B.Tech. I Semester   **L/T/P/C**
                                                                                         0/0/3/1.5

COURSE OBJECTIVES:

1. To Study of different hand operated power tools, uses and their demonstration.

2. To gain basic working knowledge required for the production of engineering products.

3. To provide hands on experience about use of different engineering materials, tools, equipments and processes those are common in the engineering field.

4. To develop a right attitude, team working, precision and safety at work place.

5. It explains the construction, function, use and application of different working tools, equipment and machines.

6. To study commonly used carpentry joints.

7. To have practical exposure to various welding and joining processes.

8. Identify and use marking out tools, hand tools, measuring equipment and to work to Prescribed tolerances.

COURSE OUTCOMES:

At the end of the course, the student will be able to:

1. Study and practice on machine tools and their operations

2. Practice on manufacturing of components using workshop trades including pluming, fitting, carpentry, foundry, house wiring and welding.

3. Identify and apply suitable tools for different trades of Engineering processes including drilling, material removing, measuring, chiseling.

4. Apply basic electrical engineering knowledge for house wiring practice

TRADES FOR EXERCISES: At least two exercises from each trade:

1) Machine shop

2) Carpentry shop

3) Fitting shop

4) Electrical

5) Electronics

6) Welding shop (Arc welding and Gas welding)

7) Casting

8) Black Smithy, Tin-Smithy and Development of jobs carried out and soldering

9) Plastic molding

10) Gas Cutting

TRADES FOR DEMONSTRATION & EXPOSURE:

Plumbing, , Metal Cutting (Power Hack saw machine), Metal Cutting (Water Plasma), Power tools in construction, Foundry.

TEXTBOOKS

1. Workshop Practice /B. L. Juneja / Cengage
2. Workshop Manual / K. Venugopal / Anuradha.

B.TECH. CIVIL ENGINEERING –R18

B.TECH I SEMESTER COURSE STRUCTURE

B. Tech. II Semester

S. No	Course Code	Course Title	L	T	P	Credits
1	**BBSM2**	Engineering Mathematics-II	3	1	0	3
2	**BBSCP**	Computer Programming using C	3	0	0	3
3	**BESEM**	Engineering Mechanics	3	0	0	3
3	**BBSC1**	Engineering Chemistry	4	1	0	4
4	**BBSFE**	Fundamentals of mechanical Engineering	2`	1	0	2
5	**BCH2**	Engineering Chemistry Lab	0	0	3	1.5
6	**BCPL2**	Computer Programming using C Lab	0	0	3	1.5
7	**BBSCL**	CAD Lab	0	0	3	1.5
					Total	**19.5**
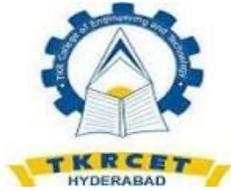
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B.TECH. CIVIL ENGINEERING –R18

ENGINEERING MATHEMATICS– II –BBSM2

B.Tech. II Semester   **L/T/P/C**
                                                                           3/1/0/3

COURSE OBJECTIVES:

To learn

1. Methods of solving the differential equations of first and higher order.

2. Concepts & properties of Laplace Transforms

3. Solving differential equations using Laplace transform techniques

4. The physical quantities involved in engineering field related to vector valued functions
5. The basic properties of vector valued functions and their applications to line- surface and volume integrals.

COURSE OUTCOMES:

After learning the contents of this paper the student must be able to

1. Identify whether the given differential equation of first order is exact or not
2. Solve higher differential equation and apply the concept of differential equation to real world problems
3. Use Laplace transforms techniques for solving DE's
4. Apply knowledge of gradient, divergence, curl to solve real world problems.
5. Evaluate the line- surface and volume integrals and converting them from one to another

UNIT-I:
Ordinary Differential Equations
Exact- linear and Bernoulli's equations- Orthogonal Trajectories - Applications - Newton's law of cooling- Law of natural growth and decay.

UNIT-II:
Second order Ordinary Differential Equations
Second order linear differential equations with constant coefficients- Non-Homogeneous terms of the type e^{ax} - sin ax - cos ax- polynomials in x- $e^{ax}V(x)$ and $xV(x)$ - method of variation of

parameters- Equations reducible to linear ODE with constant coefficients- Legendre's equation- Cauchy-Euler equation.

UNIT-III:
Laplace Transforms
Laplace transforms of standard functions- Shifting theorems- derivatives and integrals- properties- UNIT step function- Dirac's delta function- Periodic function- Inverse Laplace transforms- Convolution theorem (without proof).

Applications- Solving ordinary differential equations (initial value problems) using Laplace transforms

UNIT-IV:
Vector Differentiation
Vector point functions and scalar point functions- Gradient- Divergence and Curl. Directional derivatives- Tangent plane and normal line. Vector Identities. Scalar potential functions. Solenoid and Irrotational vectors.

UNIT-V:
Vector Integration
Line- Surface and Volume Integrals- Theorems of Green- Gauss and Stokes (without proofs) and their applications.

TEXT BOOKS

1. B.S. Grewal- Higher Engineering Mathematics- Khanna Publishers- 36th Edition- 2010
2. Erwin kreyszig- Advanced Engineering Mathematics- 9th Edition- John Wiley & Sons-2006
3. G.B. Thomas and R.L. Finney- Calculus and Analytic geometry- 9thEdition- Pearson- Reprint- 2002.

REFERENCE BOOKS

1. Paras Ram- Engineering Mathematics- second Edition- CBS Publishes
2. S. L. Ross- Differential Equations- third Edition.- Wiley India- 1984.
3. R K Jain & S R K Iyengar - Advanced Engineering Mathematics -fifth Edition -Narosa Publications.

TKR COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

B.TECH. CIVIL ENGINEERING –R18

Computer Programming using C- BBSCP

B.Tech. II Semester   **L/T/P/C**
                                                                     3 /0 /0 /3

COURSE OBJECTIVES:

1. To learn the fundamentals of computers
2. To Understand the various steps in programme development
3. To learn the syntax and semantics of C Programming Language
4. To learn how to write modular and readable c Programmes
5. To learn to write programmes using structured programming approach in c to solve problems

COURSE OUTCOMES:
Upon completion of course the student will be able to

1. Demonstrate the basic knowledge of computer hardware and software
2. Write algorithms for solving problems
3. Draw flow charts for solving problems
4. Code a given logic in C programming language
5. Gain knowledge in using C language for solving problems.

UNIT – I:
Introduction to Computers: Data Representation, Number Systems, Computer Languages, Algorithms.
Introduction to C Language: Data types, Operators, Expressions, Statements-Selection Statements – if and Switch Statements, Repetition (Loop) statements.

UNIT – II:
Arrays: One and two dimensional arrays, multidimensional arrays, inter function communication Arrays applications- linear search, binary search, bubble sort, Implementation of stacks and queues.
Functions: Scope and Extent, storage classes, recursive functions

UNIT – III:
Pointers: Introduction, Pointers for inter function communication, arrays of pointers, pointer arithmetic and arrays, passing an array to a function, memory allocation functions, pointers to functions, pointers to pointers.
Strings: Concepts, String Input/ Output functions, arrays of strings, string manipulation functions.

UNIT – IV:
User Defined Datatypes Structure and Unions. Initialization, accessing structures, operations on structures. Complex structures-Nested structures, structures containing arrays, structures containing pointers, arrays of structures, structures and functions, Passing structures through pointers, self-referential structures, unions, bit fields, C programming examples, command–line arguments, pre-processor commands.

Fundamentals of Data structures: Linear and Non-Linear data structures, concepts of stacks and queues.

UNIT V:
Input and output: Concept of a file, streams, text files and binary files, file input/output functions (standard library input/output functions for files), error handling, positioning functions (fseek, rewind and ftell).
Case studies Scientific Calculator, student Information system, Employee information system, Search and Retrieval, Gaming.

TEXT BOOKS

1. Computer Science: A Structured Programming Approach Using C, B. A. Forouzan and R. F. Gilberg,Third Edition, Cengage Learning.
2. Programming in C. P. Dey and M Ghosh, Second Edition, Oxford University Press.

REFERENCE BOOKS

1. The C Programming Language, B.W. Kernighan and Dennis M. Ritchie, Second Edition, Pearson education.
2. Programming with C, B. Gottfried, 3rd edition, Schaum's outlines, McGraw Hill Education (India) Pvt Ltd.
3. C From Theory to Practice, G S. Tselikis and N D. Tselikas, CRC Press.
4. Basic computation and Programming with C, SubrataSaha and S. Mukherjee, Cambridge University Press.

TKR COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

B.TECH. CIVIL ENGINEERING –R18

ENGINEERING MECHANICS - BESEM

B.Tech. II Semester   **L/T/P/C**
                                                                                            3/0 /0 /3

COURSE OBJECTIVES:
The objectives of this course are to
   1. Explain the resolution of a system of forces, compute their resultant and solve problems using equations of equilibrium
   2. Perform analysis of bodies lying on rough surfaces.
   3. Locate the centroid of a body and compute the area moment of inertia and mass moment of inertia of standard and composite sections
   4. Explain kinetics and kinematics of particles, projectiles, curvilinear motion, centroidal motion and plane motion of rigid bodies.
   5. Explain the concepts of work-energy method and its applications to translation, rotation and plane motion and the concept of vibrations.

COURSE OUTCOMES:
At the end of the course, students will be able to
   1. Determine resultant of forces acting on a body and analyse equilibrium of a body subjected to a system of forces.
   2. Solve problem of bodies subjected to friction.
   3. Find the location of centroid and calculate moment of inertia of a given section.

   4. Understand the kinetics and kinematics of a body undergoing rectilinear, curvilinear, rotatory motion and rigid body motion.
   5. Solve problems using work energy equations for translation, fixed axis rotation and plane motion and solve problems of vibration.

UNIT-I:
Introduction to Engineering Mechanics: Basic concepts, System of Forces, Coplanar Concurrent Forces, Components in Space – Resultant- Moment of Forces and its Application; Couples and Resultant of Force System.

Equilibrium of System of Forces: Free body diagrams, Equations of Equilibrium of Coplanar Systems and Spatial Systems;

UNIT-II:
Friction: Types of friction, Limiting friction, Laws of Friction, Static and Dynamic Friction; Motion of Bodies, wedge friction, screw jack ;
Centroid and Centre of Gravity -Centroid of Lines, Areas , centroid of composite sections;

UNIT-III:
Centre of Gravity 0f bodies- Composite figures – Theorem of Pappus
Area moment of inertia- Definition, Moment of inertia of plane sections from first principles, Theorems of moment of inertia, Moment of inertia of standard sections and composite sections; Parallel Axis Theorem, Perpendicular Axis Theorem.

UNIT-IV:
Mass Moment of Inertia : Moment of Inertia of Masses - Transfer Formula for Mass Moments of Inertia – Mass moment of inertia of composite bodies.
Kinetics of Rigid Bodies -Basic terms, general principles in dynamics; Types of motion, Instantaneous centre of rotation in plane motion and simple problems; D'Alembert's principle and its applications in plane motion and connected bodies; Work Energy principle and its application in plane motion of connected bodies.

UNIT-V:
Mechanical Vibration: Definition and concepts- Simple Harmonic motion- free vibrations – simple and Compound pendulum.
Virtual Work : Theory of virtual work –Application

TEXT BOOKS:
1**.** Engineering Mechanics : R.K.Bansal , Laxmi Publications
2. Engineering Mechanics : S.S.Bavakati, New age International
3. Engineering Mechanics, Shames and Rao (2006) ,Pearson Education
4.Singer's Engineering Mechanics – Statics & Dynamics Reddy Vijay Kumar K. and J. Suresh Kumar (2010),

REFERENCE BOOKS:
1. Timoshenko S.P and Young D.H., "Engineering Mechanics", McGraw Hill International Edition, 1983.
2. Andrew Pytel, Jaan Kiusalaas, "Engineering Mechanics", Cengage Learning, 2014.

3. Beer F.P & Johnston E.R Jr. Vector, "Mechanics for Engineers", TMH, 2004.
4. Hibbeler R.C & Ashok Gupta, "Engineering Mechanics", Pearson Education, 2010.
5. Tayal A.K., "Engineering Mechanics – Statics & Dynamics", Umesh Publications, 2011.
6. Basudeb Bhattacharyya, "Engineering Mechanics", Oxford University Press, 2008.
7. Meriam. J. L., "Engineering Mechanics", Volume-II Dynamics, John Wiley & Sons, 2008.

B.Tech. II Semester   **L/T/P/C**
                                                          4/1/0/4

COURSE OBJECTIVES:

1. To know the atomic molecular structure of compounds which makes the student to understand technology based on them.
2. To bring the knowledge of batteries, nature of metals with respect to corrosion.
3. To acquire the knowledge of water treatment this is essential in industries.
4. To the able to know the structures of compounds by Spectroscopic techniques.
5. To be able to Know the types of organic reactions
6. To Understand Stereochemistry of Compounds.

COURSE OUTCOMES:

1. The knowledge of atomic, molecular and electronic changes, band theory related to conductivity.
2. The required principles and concepts of electrochemistry, corrosion and in understanding the problem of water and its treatments.
3. The required skills to get clear concepts on basic spectroscopy and application to medical and other fields.
4. The knowledge of configurationally and conformational analysis of molecules and Reaction mechanisms.

UNIT - I:

Molecular structure and Theories of Bonding: atomic and Molecular orbitals. Linear Combination of Atomic Orbital's (LCAO), homo nucleus diatomic molecules, molecular orbital energy level diagrams of N_2, O_2 and F_2 molecules.Hetero Nucleus Diatomic molecules CO&HF .π molecular orbital's of butadiene and benzene.

Crystal Field Theory (CFT): Salient Features of CFT – Crystal Field Splitting of transition metal ion d- orbital's in Tetrahedral, Octahedral and square planar geometries. Band structure of solids and effect of doping on conductance.

UNIT - II:

Water and its treatment: Introduction – hardness of water – Causes of hardness - Types of hardness: temporary and permanent – expression and UNITs of hardness – Estimation of hardness of water by complexometric method. Potable water and its specifications. Steps involved in treatment of water – Disinfection of water by chlorination and ozonization.

Boiler troubles –biolercorrosion.Boiler feed water and its treatment – Calgon conditioning, Phosphate conditioning and Colloidal conditioning. External treatment of water – Ion exchange process. Desalination of water – Reverse osmosis. Numericalproblems.

UNIT - III:

Electrochemistry and corrosion: Electro chemical cells – electrode potential, standard electrode potential, types of electrodes – calomel, Quinhydrone and glass electrode. Nernst equation Determination of pH of a solution by using quinhydrone and glass electrode.Electrochemical series and its applications.Numerical problems.Potentiometric titrations. Batteries – Primary (Lithium cell) and secondary batteries (Lead – acid storage battery and Lithium ion battery).Fuel cells-hydrogen-oxygen fuel cell and its applications.

Causes and effects of corrosion – theories of chemical and electrochemical corrosion – mechanism of electrochemical corrosion, Types of corrosion: Galvanic, water-line and pitting corrosion. Factors affecting rate of corrosion, Corrosion control methods- Catholic protection
– Sacrificial anode and impressed current catholic methods. Surface coatings – metallic coatings – methods of application.

UNIT - IV:

Stereochemistry, Reaction Mechanism and synthesis of drug molecules: Introduction to representation of 3-dimensional structures, Structural and stereoisomers, configurations, symmetry and chirality. Enantiomers, diastereomers, optical activity and Absolute configuration. Conformation alanalysis of n- butane.

Substitution reactions: Nucleophilic substitution reactions: Mechanism of S_N1, S_N2 reactions. Electrophilic and nucleophilic addition reactions: Addition of HBrto propene. Markownikoff and anti Markownikoff's additions.Grignard additions on carbonyl compounds. Elimination reactions: Dehydro halogenation of alkylhalides. Saytzeff rule.

Rearrangement reactions and types.Pinakolpinacolone rearrangement wagnermeerwein rearrangementOxidation reactions: Oxidation of alcohols using $KMnO_4$ and chromicacid.

Reduction reactions: reduction of carbonyl compounds using $LiAlH_4$& $NaBH_4$. Hydroboration of olefins. Structure, synthesis and pharmaceutical applications of Paracetamol andAspirin.

UNIT - V:

Spectroscopic techniques and applications: Introduction of spectroscopy, selection rules and applications of electronic spectroscopy. Vibrational and rotational spectroscopy of

diatamicmoleculs and its applications. Basic concepts of Nuclear magnetic resonance Spectroscopy, chemical shift. Introduction to Magnetic resonance imaging.

TEXT BOOKS
1. Physical Chemistry, by P.W.Atkins
2. Engineering Chemistry by P.C.Jain&M.Jain; DhanpatRai Publishing Company (P) Ltd., NewDelhi.
3. Fundamentals of Molecular Spectroscopy, by C.N.Banwell
4. Organic Chemistry: Structure and Function by K.P.C. Volhardt and N.E.Schore, 5th Edition.
5. University Chemistry, by B.M. Mahan, Pearson IVEdition.
6. Engineering Chemistry (NPTEL Web-book), by B.L. Tembe, Kamaluddin and M.S. Krishnan
7. Text book of Engineering chemistry by Dr.AJayashree, Wiley Publications New delhi(2018).

TKR COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

B.TECH. CIVIL ENGINEERING –R18

FUNDAMENTALS OF MECHANICAL ENGINEERING- BBSFE

B.Tech. II Semester   **L/T/P/C**
                                                      2/1/0/2

COURSE OBJECTIVES:
Understanding of basic principles of Mechanical Engineering is required in various field of engineering.

COURSE OUTCOMES:
 After learning the course the students should be able to:
 1. To understand the fundamentals of mechanical systems.
 2. To understand and appreciate significance of mechanical engineering in different Fields of engineering.

UNIT - I
Introduction: Prime movers and its types, Concept of Force, Pressure, Energy, Work, Power, System, Heat, Temperature, Specific heat capacity, Change of state, Path, Process, Cycle, Internal energy, Enthalpy, Statements of Zeroth Law and First law.
Energy: Introduction and applications of Energy sources like Fossil fuels, Nuclear fuels, Hydel, Solar, wind, and bio-fuels, Environmental issues like Global warming and Ozone depletion.

UNIT - II
Properties of gases: Gas laws, Boyle's law, Charle's law, Combined gas law, Gas constant, Relation between Cp and Cv, Various non-flow processes like constant volume process, constant pressure process, Isothermal process, Adiabatic process, Poly-tropic process **Properties of Steam:** Steam formation, Types of Steam, Enthalpy, Specific volume, Internal energy and dryness fraction of steam, use of Steam tables, steam calorimeters.
Steam Boilers: Introduction, Classification, Cochran, Lancashire and Babcock and Wilcox boiler, functioning of different mountings and accessories.

UNIT - III
Heat Engines: Heat Engine cycle and Heat Engine, working substances, Classification of heat engines, Description and thermal efficiency of Carnot; Rankine; Otto cycle and Diesel cycles.
Internal Combustion Engines: Introduction, Classification, Engine details, four- stroke/ two-stroke cycle Petrol/Diesel engines, Indicated power, Brake Power, Efficiencies.

UNIT - IV
Pumps: Types and operation of Reciprocating, Rotary and Centrifugal pumps, Priming
Air Compressors: Types and operation of Reciprocating and Rotary air compressors, significance of Multistage.
Refrigeration & Air Conditioning: Refrigerant, Vapor compression refrigeration system, vapor absorption refrigeration system, Domestic Refrigerator, Window and split air conditioners.

UNIT - V
Couplings, Clutches and Brakes: Construction and applications of Couplings (Box; Flange; Pin type flexible; Universal and Oldham), Clutches (Disc and Centrifugal), and Brakes (Block; Shoe; Band and Disc).
Transmission of Motion and Power: Shaft and axle, Belt drive, Chain drive, Friction drive, Gear drive.
Engineering Materials: Types and applications of Ferrous & Nonferrous metals, Timber, Abrasive material, silica, ceramics, glass, graphite, diamond, plastic and polymer.

TEXT BOOKS:
1. Basic Mechanical Engineering / Pravin Kumar/ Pearson
2. Introduction to Engineering Materials / B.K. Agrawal/ Mc Graw Hill

REFERENCE BOOKS:
1. Fundamental of Mechanical Engineering/ G.S. Sawhney/PHI
2. Thermal Science and Engineering / Dr. D.S. Kumar/ Kataria

TKR COLLEGE OF ENGINEERING & TECHNOLOGY
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B.TECH. CIVIL ENGINEERING –R18

ENGINEERING CHEMISTRY LAB – BCH2

B.Tech. II Semester   **L/T/P/C**
                                                                                             0/0/3/1.5

COURSE OBJECTIVES:

The course consists of experiments related to the principles of chemistry required for engineering student. The student will earn:
1. Estimation of hardness and chloride content in water to check its suitability for drinking purpose.
2. To determine the rate constant of reactions from concentrations as a function of time.
3. The measurement of physical properties like adsorption and viscosity.
4. To synthesize the drug molecules and check the purity of organic molecules by thin layer chromatographic (TLC) technique.

COURSE OUTCOMES:

The experiments will make the student gain skills on:

3. Determination of parameters like hardness and chloride content in water.
4. Estimation of rate constant of a reaction from concentration – time relationships.
5. Determination of physical properties like adsorption and viscosity.
6. Calculation of R_f values of some organic molecules by TLC technique.

List of Experiments:
1. Determination of total hardness of water by complexometric method using EDTA
2. Determination of chloride content of water by Argentometry
3. Estimation of an HCl by Conductometrictitrations
4. Estimation of Acetic acid by Conductometrictitrations
5. Estimation of HCl by Potentiometrictitrations
6. Estimation of Fe^{2+} by Potentiometry usingKMnO$_4$
7. Determination of rate constant of acid catalysed hydrolysis of methylacetate
8. Synthesis of Aspirin and Paracetamol
9. Thin layer chromatography calculation of R_f values. egortho and para nitrophenols
10. Determination of acid value of coconut oil

11. Verification of freundlich adsorption isotherm-adsorption of acetic acid on charcoal
12. Determination of viscosity of castor oil and ground nut oil by using Ostwald's viscometer.
13. Determination of partition coefficient of acetic acid between n-butanol and water.
14. Determination of surface tension of a give liquid using stalagmometer.
15. Determination of Mn Present in $KMnO_4$ by colorimetry.

REFERENCE BOOKS

1. Senior practical physical chemistry, B.D. Khosla, A. Gulati and V. Garg (R. Chand & Co.,Delhi)
2. An introduction to practical chemistry, K.K. Sharma and D. S. Sharma (Vikas publishing, N.Delhi)
3. Vogel's text book of practical organic chemistry 5thedition
4. Text book on Experiments and calculations in Engineering chemistry – S.S.Dara

Computer Programming using C Lab-BCPL2

B.Tech. II Semester   **L/T/P/C**
                                                                                              0/0/3/1.5

LABORATORY OBJECTIVE:

   To write programs in C using structured programming approach to solve the problems

LABORATORY OUTCOMES

   1. Ability to design and test programs to solve mathematical and scientific problems.
   2. Ability to write structured programs using control structures and functions.

Recommended Systems/Software Requirements:

1. Intel based desktop PC
2. GNU C Compiler

1. a) Write a C program to find the factorial of a positive integer.
    b) Write a C program to find the roots of a quadratic equation.
2. **a)** Write a C program to determine if the given number is a prime number or not.
    b) A Fibonacci sequence is defined as follows: the first and second terms in the sequence
    are 0 and 1.Subsequent terms are found by adding the preceding two terms in the
    sequence. Write a C program to generate the first n terms of the sequence.
3. **a)** Write a C program to construct a pyramid of numbers.
    b) Write a C program to calculate the following
    Sum: Sum=1-x2/2! +x4/4!-x6/6!+x8/8!-x10/10!
4. **a)** The Least Common Multiple (LCM) of two positive integers a & b is the smallest
    integerthat is evenly divisible by both a and b. Write a C program that reads two integers
    andcalls GCD (a, b) function that takes two integer arguments and returns their LCM. Thelcm
    (a, b) function should calculate the least common multiple by calling the GCD (a,b) function
    and using the following relation:
    LCM (a,b) = ab / GCD (a,b)
    b) Write a C program that reads two integers n and r to compute the ncr value using
    thfollowing relation:
    ncr (n,r) = n! / r! (n-r)! . Use a function for computing the factorial value of an integer.
5. **a)** Write C program that reads two integers x and n and calls a recursive function to
     compute x^n.
    b) Write a C program that uses a recursive function to solve the Towers of Hanoi
    problem.

c) Write a C program that reads two integers and calls a recursive function to compute ncr value.

6. **a)** Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user using Sieve of Eratosthenes algorithm.
    b) Write a C program that uses non recursive function to search for a Key value in a given list of integers. Use linear search method.

7. **a)** Write a menu-driven C program that allows a user to enter n numbers and then choose between finding the smallest, largest, sum, or average. The menu and all the choices are to be functions. Use a switch statement to determine what action to take. Display an error message if an invalid choice is entered.
    b) Write a C program that uses non recursive function to search for a Key value in a given sorted list of integers. Use binary search method.

8. **a)** Write a C program that implements the Bubble sort method to sort a given list of integers in ascending order.
    b) Write a C program that reads two matrices and uses functions to perform the following:
    i) Addition of two matrices
    ii) Multiplication of two matrices

9. **a)** Write a C program that uses functions to perform the following operations:
    i) to insert a sub-string into a given main string from a given position.
    ii) to delete n characters from a given position in a given string
    b) Write a C program that uses a non-recursive function to determine if the given string is a palindrome or not.

10. **a)** Write a C program to replace a substring with another in a given line of text.
    b) Write a C program that reads 15 names each of up to 30 characters, stores them in an array, and uses an array of pointers to display them in ascending (ie. alphabetical) order.

11. **a)** 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C program to find the 2's complement of a binary number.
    b) Write a C program to convert a positive integer to a roman numeral. Ex. 11 is converted to XI.

12. **a)** Write a C program to display the contents of a file to standard output device.
    b) Write a C program which copies one file to another, replacing all lowercase characters with their uppercase equivalents.

13. **a)** Write **a C** program to count the number of times a character occurs in a text file. The file name and the character are supplied as command-line arguments.
    b) Write a C program to compare two files, printing the first line where they differ.

14. **a)** Write a C program to change the nth character (byte) in a text file. Use fseek function.
    b) Write a C program to reverse the first n characters in a file. The file name and n are specified on the command line. Use fseek function.
15. **a)** Write a C program to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file).
    b) Define a macro that finds the maximum of two numbers. Write a C program that uses the macro and prints the maximum of two numbers.

REFERENCE BOOKS

1. Mastering C, K.R. Venugopal and S.R. Prasad, TMH Publishers.
2. Computer Programming using Cin C, V. Rajaraman, PHI.
3. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
4. C++: The complete reference, H. Schildt, TMH Publishers.
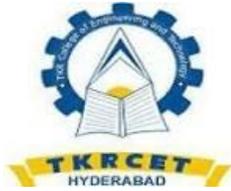
B.TECH. CIVIL ENGINEERING –R18

CAD LAB-BBSCL

B.Tech. II Semester	**L/T/P/C**
	0/0/3/1.5

PRE-REQUISITES: NIL

COURSE OBJECTIVES:

1. To provide basic concepts of AUTO CAD
2. To impart knowledge about standard principles of Computer engineering drawing
3. To draw the basic blocks of drawing elements using Computer.
4. To draw various solids using AUTO CAD.

COURSE OUTCOMES:

At the end of the course, the student will be able to:

1. Preparing working drawings to communicate the ideas and information.
2. Read, understand and interpret engineering drawings.

LIST OF EXPERIMENTS:

1. Introduction and Practice on Computer aided Drawing.
2. Geometric Constructions & Elements of building drawing.
3. Preparation of basic drawings (point, lines, Planes and Solids) using AUTO CAD.
4. Preparation of engineering drawings using AUTO CAD software.

LIST OF EXPERIMENTS IN DETAIL:

1. Introduction and Practice on Computer aided drafting (CAD)
1.1 Introduction to AUTO CAD package
1.2 Menu Operations in AUTO CAD
1.3 Practices the methods of selecting/entering commands to start new drawing accessing Auto CAD commands by selecting from menus, tool bars and entering Commands on command line.
1.4 Sets the limits of the drawing to get the needed working area.
1.5 Practices the setting commands - Grid, Snap, & Ortho Commands
1.6 Practices Draw commands - point, line, Pline, rectangle, circle, tangent, ellipse, arc, polygon. Mention the dimensions of the given figures.

1.7 Practices 'modify commands – erase, copy, mirror, move, rotate, scale, stretch, trim, extend, break, chamfer, fillet, explode, Pedit, Mledit.
1.8 Practices construct commands – offset, array, Divide, measure.
1.9 Practices edit commands – Undo, Redo, Oops, CopyClip, PasteClip, Del.
1.10 Practices view commands – Redraw, Regen, Zoom, Pan.
1.11 Practices Hatch commands – Bhatch, Hatch.
1.12 Practices insert commands – Block, Wblock, Insert, Minsert.

2. Practice on Geometric Constructions & Elements of building a drawing
2.1 Divide a given line into desired number of equal parts internally.
2.2 Drawing a line with different methods.
2.3 Draw tangent lines and arcs.
2.4 Construction of a hexagon from the given data.
2.5 Construction of ellipse, parabola, hyperbola, cycloid.
2.6 Practice any two Engineering Drawing line problems.

3. Preparation of basic drawings (point, lines, Planes and Solids) using AUTO CAD
3.1 Practice Projection of points, lines;
3.2 Planes (Plane Parallel, inclined, perpendicular to HP and VP or both);
3.3 Solids (Solids: Cube, Prisms, Pyramids, Cylinders and Cone - Axis inclined to both planes)

4. Preparation of any Engineering drawings problems using AUTO CAD software.
4.1 Draw the given diagrams in AUTO CAD (in A0 size) with conventional signs as per I.S. standards, symbols used in Civil Engineering drawing. (from line, Plane, Solids.

TEXT BOOKS
1. Computer Aided Design Laboratory by M.N.Sesha Prakash & Dr. G.S. Servesh – Laxmi Publications.
2. Engineering Drawing N.D. Bhatt / Charotar.
3. Engineering Drawing / N. S. Parthasarathy and Vela Murali/ Oxford.

REFERENCE BOOKS

1. Engineering Drawing / Basant Agrawal and McAgrawal/ McGraw Hill.
2. Engineering Drawing/ M. B. Shah, B.C. Rane / Pearson.
3. Computer Aided Engineering Drawing – K Balaveera Reddy et al – CBS Publishers.