# KAKATIYA UNIVERSITY
# BACHELOR OF TECHNOLOGY
# FIRST YEAR SYLLABUS
## Structure of Curriculum-Common to All Branches

**Semester –II (First Year)**

Branch/Course: Common to all branches of UG Engineering & Technology

| Sl. No. | Category/ Code | Course Title | Internal Marks | External Marks | Total Marks | Lectures hr/Cr | Tutorials hr/Cr | Practical's hr/Cr | No of Credits |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Basic Sciences Course /BSC 102 | Chemistry | 30 | 70 | 175 | 3/3 | 1/1 | - | 5.5 |
| | | Lab. | 25 | 50 | | - | - | 3/1.5 | |
| 2 | Basic Sciences Course /BSC 104 | Mathematics-II | 30 | 70 | 100 | 3/3 | 1/1 | 0 | 4 |
| 3 | Engineering Science Courses/ESC103 | Programming for Problem Solving | 30 | 70 | 175 | 3/3 | 0 | - | 5 |
| | | Lab. | 25 | 50 | | | | 4/2 | |
| 4 | Engineering Science Courses/ESC104 | Workshop and Manufacturing Practices | -- | ---- | 75 | 1/1 | 0 | - | 3 |
| | | Lab. | 25 | 50 | | - | - | 4/2 | |
| 5 | Humanities and Social Sciences including Management courses/HSMC101 | English | 30 | 70 | 175 | 2/2 | 0 | - | 3 |
| | | Lab. | 25 | 50 | | | | 2/1 | |
| | | Total Credits | | | | | | | 20.5 |

Note: hr=Hours and Cr=Credits

In order to balance the load of the some of the subjects which are made in groups (Physics/Chemistry, Engineering Graphics & Design/ Workshop and Manufacturing Practices, Programming for Problem Solving/Engineering Mechanics, English/BEE), the half of the branches of B.Tech course offer one subject of group in odd semester and other half of the branches of B.Tech course offer another subject of same group in odd semester. In the even semester the subjects of the group will be exchanged

## MANDATORY INDUCTION PROGRAM

**BEFORE BEGINNING OF FIRST SEMESTER**
<u>3 Weeks Duration</u>
- Physical Activity
- Creative Arts
- Universal Human Values
- Literay
- Proficiency Modules
- Lectures by Eminent People
- Visits to Local Areas
- Familiarization to Dept./Branch & Innovations

# KAKATIYA UNIVERSITY
## B.Tech. First Year
## SEMESTER – II
## (Common to all branches)

# CHEMISTRY
### (Theory)

*Class*: **B.Tech. I Year**  *Internal Marks*: **30**
*Lectures*: **3 Hrs/Week**  *External Marks*: **70**

## UNIT-I

**1. ELECTROCHEMISTRY**

**(08Hrs)**

Electrode potential, standard electrode potential, Nernst equation (No derivation); Electro chemical series. Types of electrodes - Hydrogen, Quinhydrone, Calomel, and Ion selective electrode (Glass electrode); Galvanic cell, EMF; Determination of pHusingQuinhydrone and Glass electrodes; Potentiometric titrations (Acid-base and Redox). Numerical problems.
**Batteries:** Primary and secondary batteries - Zinc-Carbon battery & Lead-acid battery.

## UNIT-II

1. **CORROSION(07Hrs)**

Introduction – causes and effects of corrosion. Dry and wet corrosion. Electrochemical theory of corrosion. Galvanic and differential aeration corrosion. Factors affecting rate of corrosion, Corrosion control methods- Cathodic protection – Sacrificial anode and impressed current cathodicprotection. Surface coatings – metallic coatings – methods of application.

2. **WATER ANALYSIS AND TREATMENT(07Hrs)**

Hardness of water - Causes of hardness - Types of hardness: temporary and permanent – expression and units of hardness. Determination of hardness of water using EDTA method.Potable water and its specifications. Steps involved in treatment of water – Disinfection of water by chlorination and ozonization. Brief review of methods of softening of water - Zeolite process and Ion-exchange process. Desalination of water- Reverse osmosis.

## UNIT-III

1 **Organic reactions, synthesis of a drug molecule&Stereochemistry(11 Hrs)**

*Substitution reactions*: Nucleophilic substitution reactions: Mechanism of $S_N^1$, $S_N^2$ reactions. *Electrophilic and Nucleophilic addition reactions*: Addition of HBr to propene. Markownikoff's and anti-Markownikoff's additions; Grignard additions on carbonyl compounds;*Elimination reactions*: Dehydrohalogenation of alkylhalides. Saytzeff rule. *Oxidation reactions*: Oxidation of alcohols using $KMnO_4$ and chromic acid. *Reductionreactions*: reduction of carbonyl compounds using $LiAlH_4$& $NaBH_4$. Hydroboration of olefins. *Synthesis and applications of commonly used drug molecules*: Aspirin and Paracetamol.

**Stereochemistry:**Introduction to representation of 3-dimensional structures, Structural and stereoisomers, configurations, symmetry and chirality. Enantiomers, diastereomers, optical activity and Absolute configuration. Conformation analysis of n- Butane.

## UNIT-IV

1. **Molecular structure and Theories of Bonding**: **(08Hrs)**

   *Atomic and Molecular orbitals*: Linear Combination of Atomic Orbitals (LCAO), molecular orbitals of diatomic molecules.Molecular orbital energy level diagrams (MOED) of $N_2$, $O_2$ and $F_2$ molecules.

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

## UNIT-V

2. **Spectroscopic techniques and applications:** **(07Hrs)**

   Interaction of radiation with matter,spectrum of electromagnetic radiation, Principles of spectroscopy, selection rules and applications of Electronic spectroscopy, Vibrational and Rotational spectroscopyof diatomic molecules. Applications.Numerical problems.

## TEXT BOOKS:
1. Text Book of Physical Chemistry by *PL Soni and OP Dharmarha*, Sulthan Chand & Sons.
2. Engineering Chemistry by *PC Jain & M Jain*, DhanapathiRai publishing Co.
3. Text Book of Engineering Chemistry by *Shashi Chawla*, DhanapathiRai publishing Co.

## REFERENCE BOOKS:
1. Principles of Physical Chemistry by *Maron and Prutton*.
2. Applied Chemistry- A Text Book of Engineers & Technologists by *HD Gesser.*
3. Chemistry in Engineering & Technology by *Kuriacose and Rajaram.*
4. Text Book of Engineering Chemistry by *CP Murthy, Agarwal and A Naidu.*
5. A Text Book ofEngineering Chemistry by *SS Dara.*
6. Engineering Chemistry by *RP Mani, KN Mishra and B Ramadevi.*
7. Engineering Chemistry by *OP Agarwal.*
8. Fundamentals of Molecular Spectroscopy, by C.N. Banwell

## CHEMISTRY LABORATORY
### (Common to all branches)
### (Credits: 1.5)

*Class*: B.Tech. I Year        *Internal Marks*: 25
*Practical*: 3 Hrs/week        *External Marks*: 50

**LIST OF EXPERIMENTS:**
1. Determination of Hardness (Total, Temparary and Permanent) of water using EDTA method.
2. Determination of chloride content of water by Argentometry.
3. Determination of rate constant of acid catalysed hydrolysis of methyl acetate.
4. Colorimetric analysis-verification of Lambert-Beer's law using $KMnO_4$ solution.
5. Conductometric titrationof HCl with NaOH
6. Conductometric titrationof $CH_3COOH$ with NaOH
7. Potentiometric titration of HCl with NaOH
8. Potentiometric titration of $Fe^{2+}$ with $KMnO_4$
9. Verification of Freundlich adsorption isotherm-adsorption of acetic acid on charcoal.
10. Determination of viscosity of castor oil and ground nut oil by using Ostwald's viscometer.
11. Determination of surface tension of a given liquid using stalagmometer.
12. Synthesis of Urea-Formaldehyde resin polymer / Synthesis of Aspirin.

**TEXT BOOKS:**
1. *Vogel's* Inorganic Quantitative analysis (2007).
2. College Practical Chemistry by *VK Ahluwalia* (2007)
3. Senior Practical Physical Chemistry by *BD Khosla, A Gulati and VC Garg* (2001)
4. Practical Physical Chemistry by *B Vishwanathan, PS Raghavan*.
5. Text book on Experiments and calculations in Engineering chemistry – *S.S. Dara*
6. *Vogel*'s text book of practical organic chemistry *5th edition*

# MATHEMATICS -2

### (MAXIMUM HOURS: 48)

### Unit 1: Integral Transforms

Laplace Transforms: Laplace transforms of elementary functions, properties, transform of derivatives, transform of integrals, multiplication by $t$, division by $t$, evaluation of integrals, inverse transforms, convolution theorem, and application to differential equations.

( 21.1, 21.2, 21.3, 21.7, 21.8, 21.9, 21.10, 21.11, 21.12, 21.13, 21.14, 21.15  of Text Book )

### Unit 2: Linear Algebra

Rank of a matrix, solution of linear system of equations, consistency of linear system of equations, linear independence vectors and linear dependence vectors, Eigen values and Eigen vectors, Caley Hamilton theorem, reduction to diagonal form, complex matrices, Hermition matrix and conjugate matrix.

(Sections 2.7(1), 2.9, 2.10, 2.12, 2.13, 2.14, 2.15, 2.16, 2.19 of Text Book)

### Unit 3: Partial Differential Equations

Formation of partial differential equations, linear equations of first order,  non-linear equations of first order, Charpit's method, homogenous equations with constant coefficients , applications ( one dimensional  wave equation,  one dimensional heat flow,  two dimensional heat flow).

(Sections 17.1, 17.2, 17.3, 17.5, 17.6, 17.7, 17.8, 18.1, 18.3, 18.4, 18.5, 18.6 of Text Book)

### Unit 4:  Complex Variable - Differentiation

Limit of complex functions, derivative of a complex function, analytic function, Cauchy-Reimann equations, Harmonic functions, applications to flow problems, some standard transformations.

(Sections 20.1, 20.2, 20.3, 20.4, 20.5, 20.6, 20.7, 20.8 of Text Book)

### Unit 5: Complex Variables - Integration

Complex integration, Cauchy's theorem, Cauchy's  integral formula,  Caucly's inequality, Liouvile's theorem, Taylors series, Laurent's series, Singularities of function,  residues, residue theorem, evaluation of real definite integrals ( integration of trigonometric functions around unit circle, integral of functions around a semi-circle ).

(Sections 20.12, 20.13, 20.14, 20.15(2,3), 20.16, 20.17, 20.18, 20.20(a,b) of Text Book )

Text Book:  B.S. Grewal et.al. Higher Engineering Mathematics, 43$^{rd}$Edition, Khanna Publicationns.

Reference: Erwin Kreyszig, Aadvanced Engineering Mathematics,  8$^{th}$ Edition , John Wiley & Sons.

## Programming for Problem Solving

| Teaching Scheme | | | | Examination Scheme |
|---|---|---|---|---|
| **L** | **T** | **P** | **C** | **Internal marks:30** |
| 3 | - | 4 | 5 | **External marks:70** |

**UNIT-I: (6+2)**

**Introduction:**
Block Diagram of Computer, Number system (Binary, Octal and Hexa decimal), Input-Output devices.
Operating system definition goals and services, compliers and interpreter, Problem solving steps, Algorithms, Flow chart,  Types of programming languages, Introduction to C –language.

**Unit-II: (7+3)**

**Fundamentals of C-language:**
Token of C-languages:  Identifiers, key words, Constants, Data types, Declaration and initialization statements, compound statements, Operators, Expressions and evaluation, Type conversion, Input-output statements, Structure of C-program.

**Unit-III: (7+3)**

**Control structures/statements:**
**Decision statements:** if, if-else, if-else-if, nested-if and switch-case
**Iterative statements:**  while, do-while and for
**Unconditional branching statements:** break, continue, goto and exit .

**Unit-IV: (7+3)**

**Arrays and Pointers:**
**Arrays:** Definition of Arrays, 1-Dimensional arrays, 2-Dimensional arrays and multi dimensional arrays, Strings, String handling functions.
**Pointers:** Definition and declaration of pointer, operation on pointers, pointer and arrays, pointer to functions

**Unit-V: (7+3)**

**Structure-Union:** Definition and syntax of structure, union, Comparison between union & structure, nested structures, array of structures, pointer to structures.
**Functions:** Definition, function prototype, library and user define functions, types of functions, storage classes, parameter passing methods (call by value and call by address), recursion and macros.
**Files:** Introduction, File modes, Input and out operations on files.

**TEXT BOOKS:**

1. Let Us C, 14th Edition, Yashavant P. Kanetkar, BPB Publications, ISBN 13: 9788183331630.
   Herbert Schildt, "C: The complete reference", OsbourneMcgraw Hill, 4<sup>th</sup> Edition, 2002.

2. C Programming Language, Brian W. Kernighan and Dennis M. Ritchie, Prentice-Hall, ISBN 0-13-110362-8

**TEXT/REFERENCE BOOKS:**
1. Programming in ANSI C, SIXTH edition, E.BalaguruSwamy, Tata McGraw Hill Pvt Ltd, ISBN-10: 1259004619.
2. Computer Science: A Structured Programming Approach Using C, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.
3. Programming in C. Second Edition, ReemaThareja, ISBN: 9780199456147, Oxford University Press.

# KAKATIYA UNIVERSITY
## B.Tech. First Year
## SEMESTER – II
## (Common to all branches)

### PROGRAMMING FOR PROBLEM SOLVING LAB USING C

**Teaching Scheme**
  L  T  P  C

-    -  4  2

**Examination Scheme**
**Internal Marks: 25**

**External Marks: 50**

### LIST OF EXPERIMENTS

1. Programs using input output functions
2. Programs for declaration statement, initialization statement, data type conversions
3. Programs using all operators in C
4. Programs using conditional control structures; if, if-else, nested if, if else if ladder and switch
5. Programs using loop control structures: while, do-while, for,
6. Programs using unconditional statements : break, continue, goto
7. Programs on one dimensional array and two dimensional arrays
8. Programs using functions: different types, parameter passing using call-by-value, call-by-reference
9. Programs using recursion
10. Programs using strings and sharing handling functions
11. Programs using pointers, pointers to arrays, pointer to functions
12. Programs using structures and unions

# ENGINEERING WORKSHOP

1. TRADES FOR EXERCISES:

At least two exercises from each trade:

I.  Carpentry –

1.  Study of Carpentry Tools, Equipment and different joints.

2.  Practice of Cross Half lap joint, Half lap Dovetail joint and Mortise Tenon Joint

II. Fitting –

1.  Preparation of square-Fit as per the given specifications.

2.  Preparation of Dovetail Fit as per the given specifications.

3. Preparation of Semi-circular as per the given specifications.

III. Foundry –

1.  Introduction to foundry, Patterns, pattern allowances, ingredients of moulding sand and melting furnaces. Foundry tools and their purposes

2.  Demo of mould preparation

3.  Practice – Preparation of mould by using split pattern.

IV. Welding Practice –

 1.  Introduction, Study of Tools and welding Equipment (Gas and Arc welding)

2.  Selection of welding electrode and current, Bead practice.

3.  Practice of Butt Joint, Lap Joint. VI.  House-wiring – (Parallel & Series, Two-way Switch and Tube Light)

V.Plumbing:

1.  Practice of Internal threading, external threading, pipe bending, pipe fitting.

2.  Pipes with coupling for same diameter and with reducer for different diameters.

3.  Practice of T-fitting, Y-fitting, Gate valves fitting.

# KAKATIYA UNIVERSITY
## B.Tech. First Year
## SEMESTER – II
## (Common to all branches)

**English**

| Course Code | HSMC 101 | | | | |
|---|---|---|---|---|---|
| Category | Humanities and Social Sciences Including Management Courses | | | | |
| Course Title | **English** | | | | |
| Scheme and Credits | L | T | P | Credits | Semester-II |
| | 2 | 0 | 2 | 3 | |
| Exam Pattern | Internal 30 Marks   and External: 70 Marks | | | | |
| Course Completion | Max 48 Hours | | | | |

## Unit 1. Vocabulary Building

1.1 The concept of Word Formation

1.2 Root words from foreign languages and their use in English

1.3 Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives.

1.4 Synonyms, antonyms, and standard abbreviations.

## Unit 2. Basic Writing Skills

2.1 Sentence Structures

2.2 Use of phrases and clauses in sentences

2.3 Importance of proper punctuation

2.4 Creating coherence

2.5 Organizing principles of paragraphs in documents

2.6 Techniques for writing precisely

## Unit 3. Identifying Common Errors in Writing

3.1 Subject-verb agreement

3.2 Noun-pronoun agreement

3.3 Misplaced modifiers

3.4 Articles

3.5 Prepositions

3.6 Redundancies

3.7 Clichés

## Unit 4. Nature and Style of sensible Writing

4.1 Describing

4.2 Defining

4.3 Classifying

4.4 Providing examples or evidence

4.5 Writing introduction and conclusion


## Unit 5. Writing Practices

5.1 Comprehension

5.2 Précis Writing

5.3 Essay Writing

**PRACTICALS/LAB: Oral Communication**
(This unit involves interactive practice sessions in Language Lab)
- Listening Comprehension
- Pronunciation, Intonation, Stress and Rhythm
- Common Everyday Situations: Conversations and Dialogues
- Communication at Workplace
- Interviews
- Formal Presentations

**Prescribed Text Book**
Language and Life: A Skills Approach, Orient Blackswan 2018

**Suggested Readings:**
(i) Practical English Usage. Michael Swan. OUP. 1995.
(ii) Remedial English Grammar. F.T. Wood. Macmillan.2007
(iii) On Writing Well. William Zinsser. Harper Resource Book. 2001
(iv)  Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.
(v) Communication Skills. Sanjay Kumar and PushpLata. Oxford University Press. 2011.
(vi) Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press