# Autonomous Programme Structure (Revision-1)
## F. Y. B. Tech. Sem-I
## Computer Engg and Information Technology Programmes
## A. Y.: 2020-21 Onwards

| F. Y. B. Tech. First Semester | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Course Code** | **Course Title** | **Teaching Scheme Hours / Week** | | | **Examination Scheme** | | | **Marks** | **Credit** |
| 20BS01 | Linear Algebra and Univariate Calculus | 3 | 1 | 0 | 50 | 50 | 0 | 100 | 4 |
| 20BS02 | Chemistry | 3 | 0 | 0 | 50 | 50 | 0 | 100 | 3 |
| 20ES01 | Basic Electrical and Electronics Engg. | 3 | 0 | 0 | 50 | 50 | 0 | 100 | 3 |
| 20ES02 | Fundamentals of Programming Language- I | 1 | 0 | 0 | 0 | 25 | 0 | 25 | 1 |
| 20ES03 | Sustainable Engineering | 3 | 1 | 0 | 50 | 50 | 0 | 100 | 4 |
| 20BS02L | Chemistry Lab | 0 | 0 | 2 | 25 | 0 | 0 | 25 | 1 |
| 20ES01L | Basic Electrical and Electronics Engg. Lab | 0 | 0 | 2 | 25 | 0 | 0 | 25 | 1 |
| 20ES02L | Fundamentals of Programming Language- I Lab | 0 | 0 | 2 | 25 | 0 | 0 | 25 | 1 |
| 20ES07L | Technical Skill Development Lab | 0 | 0 | 2 | 25 | 0 | 0 | 25 | 1 |
| **Total** | | **14** | **2** | **8** | **300** | **225** | **0** | **525** | **19** |
| **Grand Total** | | **24** | | | **525** | | | **525** | **19** |

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MKSSS's Cummins College of Engineering For Women ★ Karve Nagar, Pune 411052.

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## 20BS01 Linear Algebra And Univariate Calculus

| **Teaching scheme** | **Examination** |
|---|---|
| **scheme** | |
| Lectures: 3hrs/week | In-Sem Exam: **50** Marks |
| Tutorial: 1hr/week | End-Sem Exam: **50** Marks |
| Number of Credits: 4 | |

**Course Objectives:**

1. To familiarize the prospective engineers with techniques in linear algebra and calculus of one variable.
2. To equip the students with standard concepts and tools in Linear algebra and calculus of one variable which will find them useful in their disciplines.

**Course Outcomes:**

**CO1: Use** matrix method to solve linear system of equations, Linear Transformations.

**CO2: Calculate** eigenvalues, eigenvectors and apply it to diagonalize a matrix.

**CO3: Apply** knowledge of linear algebra to solve simple real life problems.

**CO4: Compute** differentiation, series expansion, integration of function of one variable.

**Unit-I: Matrices** **(08)**

Rank of a matrix, Echelon form, System of linear equations, Euclidean vector spaces and Linear Transformations

**Unit-II: Diagonalization of a Matrix** **(08)**

Eigenvalues, Eigenvectors, Properties of Eigenvalues, Diagonalization of a matrix

**Unit-III: Applications of Linear Algebra** **(09)**

Introduction to Modular Arithmetic, Euclid's algorithm, Encrypt and decrypt the statement using matrix, Applications to simple real life problems

**Unit-IV: Differential Calculus** **(08)**

Successive differentiation, nth order derivatives of some standard functions, Taylor's and Maclaurin's theorem, Standard series expansions

**Unit-V: Integral Calculus** **(09)**

Reduction formulae, Beta Function, Gamma function, Differentiation under integral sign, Error function

**Text-Books:**

1. David Poole,**' Linear Algebra: A Modern Introduction'** , 2nd Edition, Brooks/Cole (2005).
2. B. V. Ramana ,**'Higher Engineering Mathematics'**, *Tata McGraw-Hill Publications*, (2007).
3. B.S. Grewal, '**Higher Engineering Mathematics**', *Khanna publishers*, Delhi (40thedition), (2008).

**Reference Books:**

1. C.R. Wylie, L. C. Barrette, *'***Advanced Engineering Mathematics***'*, *McGraw-Hill Publications*, *New Delhi* ( 6 th edition),(2006)
2. Maurice Weir, Joel Hass, Thomas **'Calculus'** , 12th edition, *Pearson India*(2016)
3. George Thomas, Jr., Ross Finney, Late, **Calculus,** 9th edition, *Pearsons India*
4. Sudhir Ghorpade, Balmohan Limaye, '**A Course in Calculus and Real Analysis** *'*, (Undergraduate Text in Mathematics), *Springer*(2006).

5. Erwin Kreyszig, '**Advanced Engineering Mathematics'**, *Wiley Eastern Ltd*(10th Edition), (2017)

## 20BS02 Chemistry

| **Teaching Scheme** | **Examination Scheme** |
|---|---|
| Lectures: 3Hrs/week | In-Semester: 50 Marks |
| Credits: 3 Marks | End-Semester: 50 |

### Course Objectives

The Chemistry course is designed such that the learners imbibe chemical principles relevant in the engineering context. The course facilitates undergraduates to understand chemical processes, methods of analysis, structure-property relationship and evaluate role of chemical substances for engineering applications. Further the course inculcates basic problem-solving skills involving chemistry principles.

### Course Outcomes

The students will be able to –

1. Interpret properties and applications of molecules based on their atomic structure.
2. Analyze quality parameters for water, coal, petrol using analytical methods.
3. Apply chemical principles for problems related to water, batteries, fuel or polymers.
4. Outline the process of synthesis for inorganic substances and nanomaterials.
5. Elucidate the construction and functioning of a device/chemical reagent.

### Module 1: Physical Chemistry (13)

**Unit 1.** Chemical Bonding: Types of bonds, intermolecular forces, bonding in molecules: valence bond theory, molecular orbital theory for diatomic molecules.

**Unit 2.** Electrochemistry: Electrochemical cell, Nernst equation, EMF of cell, reference and indicator electrodes, battery characteristics, Lead-acid, Lithium-ion battery, Fuel cell technology.

### Module 2: Inorganic and Materials Chemistry (13)

**Unit 3.** General overview of the Periodic table and properties; chemistry of some elements like H, Si and their compounds, Si for chipmaking, $H_2$ gas as fuel.

**Unit 4.** (A) Engineering materials: Structural features, properties and applications of OLEDs - PPV (- solar cell), liquid crystal polymers, conducting polymers – as a chemical sensor, polymer composites.

(B) Nanomaterials:

Introduction to nanomaterials, synthesis by top down and bottom-up methods. Structure, synthesis and some typical applications of nanomaterials.

**Module 3: Analytical Chemistry** **(16)**

**Unit 5.** Analysis of -

(A) Water: Hardness determination in water, TDS, effect of hard water in boilers, Internal and external treatment of hardness, water softening techniques -zeolite and ion exchange method. Desalination methods-Reverse osmosis. Electrodialysis. Waste water recycling.

(B) Carbon based fuels: Analysis of coal/petrol.

**Unit 6.** Analytical techniques such as spectroscopy, pH-metry, conductometry and their applications.

**Text Books:**

1. S.S. Dara 'Engineering Chemistry' S. Chand Publications (2010)
2. B.S. Chauhan 'Engineering Chemistry': Univ Sc Press. (Third edition)2009
3. Shashi Chawla 'A Text Book of Engineering Chemistry': Dhanpat Rai & Co. (2015)
4. Jain and Jain 'A Text Book of Engineering Chemistry' Dhanpat Rai & Co.
5. G. Chatwal 'Instrumental methods of Chemical Analysis' Himalaya publication house

**Reference Books:**

1. Steven S. Zumdahl, 'Chemistry concepts and applications', Cengage learning publication (2009)
2. Ram D. Gupta, 'Hydrogen fuel 'C.R.C. Publications (2009)
3. Puri, Sharma, Pathania 'Principles of Physical Chemistry': Vishal Publ. Co.
4. Robert Braun' Instrumental methods of analysis' Pharma med press (2010)
5. J.D. Lee, 'Concise Inorganic Chemistry', 4th edition, Wiley Publication (2019)

## 20ES01 Basic Electrical and Electronics Engineering

| **Teaching Scheme:** | **Examination Scheme** |
|---|---|
| Lectures: 3 Hrs./Week | In-Semester: **50** Marks |
| Credits: 3 | End-Semester: **50** Marks |

**Course Objectives:**

1. To educate the students about the realization of basic theoretical concepts & laws in electrical engineering in real physical world.
2. To make students familiar with three phase supply.
3. To make students familiar with single phase transformers.
4. To understand the construction and applications of diode and BJT
5. To understand basics of combinational logic, Boolean algebra and flip -flops.

**Course Outcomes:**

After completion of course, students will be able to
**CO1:** Analyze and calculate parameters of DC circuits
**CO2:** Analyze and calculate parameters of AC circuits
**CO3:** Calculate performance parameters of single-phase transformer.
**CO4:** Analyze I-V characteristics of semiconductor diodes and transistors and design simple analog circuits using these devices
**CO5:** Build simple combinational and sequential logic circuits.

**Unit – I: DC Networks**
**(08)**

Kirchhoff's laws, Mesh and Nodal Analysis, Thevenin and Superposition Theorems, maximum power transfer theorem, Network Simplifications using star-delta / delta-star transformations.

**Unit – II: AC Circuits**
**(07)**

Series and parallel RL, RC and RLC circuits , concept of Impedance and admittance, power triangle and power factor. Resonance in series and parallel RLC circuit, Three phase voltage generation and waveform, star and delta balanced systems. Relationship between phase and line quantities, phasor diagram, power in a three phase circuit.

**Unit – III: Electromagnetism and Single Phase Transformers (06)**

Magnetic materials and B-H curve, self and mutual inductance,1 Φ transformer: concept, types, working, ideal transformer, practical transformer, equivalent circuit, phasor diagram, efficiency and regulation calculations.

**Unit – IV: Diodes and rectifiers (07)**

Construction and characteristic of p-n junction diode, LED, photodiode, Half wave, full wave and bridge rectifiers, need of capacitor filter, rectifier operation with capacitor filter, Zener diode as a voltage regulator, block diagram of Regulated power supply

**Unit – V: Junction Transistor Amplifiers** **(07)**

Bipolar junction transistor, Construction of BJT, Types of biasing:-fixed bias and self bias circuit, BJT characteristics for-CE,CB,CC configurations, relationship between α and β, load line for a transistor, application of transistor as a switch and amplifier.

**Unit – VI: Digital Electronics** **(07)**

Basic gates, implementation of basic gates using universal gates, Boolean algebra, standard representation of logic functions (SOP and POS forms), Introduction of Combinational logic circuits like multiplexer ,demultiplexer, half adder and full adder, Introduction of Sequential logic circuits like flip- flops (SR, D), counters and shift registers.

**Text Books:**

1. Hughes, 'Electrical and Electronic Technology', Pearson education, (10th edition), (2008)

**Reference Books:**

1. D.P. Kothari and I.J. Nagrath, 'Basic Electrical Engineering', McGraw-Hill, (3rd edition), (2010)
2. A.E.Fitzgerald, A.Grabiel,'Basic Electrical engineering',McGraw-Hill, (5th edition), (2009)
3. Floyd, 'Electronic Devices and Circuits', pearson education, (7th edition),(2008)
4. AP Malvino & Donald Leach,'Digital Principles and Applications', McGraw Hill Education,( 6 th edition), (2009)

## 20ES02 Fundamentals of Programming Language-1

**Teaching Scheme:**
**Lecture: 1 Hr/week**

**Examination Scheme:**
**End-Sem: 25 Marks**

**Credits: 1**

**Course Objectives:**
To facilitate the learners:
1. To learn the fundamentals of building blocks of computer system.
2. To develop problem solving ability by developing an algorithm, flowchart for given problem.
3. To implement the logic / solution for given problem using C programming language.
4. To understand the decision and iteration interpretation in a programming language.

**Course Outcomes:**
By taking this course, the learner will be able to:
1. Illustrate the use of algorithms, flow charts and components of computer systems.
2. Demonstrate the use of appropriate control structure for program development.
3. Make use of variables, data types, operators, expressions, strings and arrays for program development.
4. Solve the given problem using functions.

**Unit 1: Introduction** **(2)**
Introduction to components of a Computer System, types of programming languages.
Introduction to Algorithm: As flow chart, pseudo code, as a program.

**Unit 2: Fundamentals of Procedural Programming Language** **(1)**
Keywords, Identifiers, Constants and Variables, concept of memory, Structuring procedural program using exemplary language such as C.

**Unit 3: Data Types and operators** **(2)**
Data types, Typecasting, variable scope, Operators, Basic Input and Output Operations, Expressions and Precedence of Operators.
Illustration using real life examples and use cases.

**Unit 4: Control Structures** **(2)**

Selection ( if-else ladder), Iteration (for loop, while loop).
Illustration using real life examples and use cases.

**Unit 5: Arrays and String** **(2)**
Introduction to linear structure (Arrays) and Strings,String functions
Illustration using real life examples and use cases.

**Unit 6: Functions** **(2)**

Use of function for modularization, Parameter passing.
Illustration using real life examples and use cases.

**Text Books:-**

1) Kernighan and Ritchie, " The C programming language" (2nd edition)., Prentice Hall of India, 1988.
2) G. Dromey, "How to Solve it by Computer", Prentice-Hall Inc., Upper Saddle River, NJ, 1982.
3) Yashwant Kanetkar, "Let's C", Allied Publishers, 1998.

**Reference books:-**

1) Reema Thareja, "Introduction to C programming", Oxford University Press (2nd edition), 2015.
2) Alan R. Feuer, "The C Puzzle book", Pearson, 1999

## 20ES03 SUSTAINABLE ENGINEERING

**Teaching Scheme:**
Lectures: 3 Hrs/Week
Tutorial: 1 Hr/Week
Credits: 4

**Examination Scheme:**
In-Semester : 50 Marks
End-Semester : 50 Marks

**Course Objectives:**

1. To understand interdisciplinary approach towards sustainable development
2. To acquire knowledge, skills, values & attitudes that empowers to contribute to sustainable development
3. Understand the relevance and importance of natural resources & protection of environment for sustainability
4. To understand the role of engineering & technology within sustainable development

**Course Outcomes:**
After completion of course, students will be able to

**CO1: Identify** the need of sustainable development

**CO2: Analyze** the challenges posed at the interface of natural & man-made environment

**CO3: Distinguish** between conventional & green building with respect to environmental efficiency

**CO4: Apply** the knowledge of sustainability in the area of water & energy conservation

**CO5: Distinguish** between smart cities with other cities with respect to quality criteria

**CO6: Specify** the role of different stakeholders in sustainable development

**Unit – I: Introduction to sustainable engineering** **(05)**

Need and concept of sustainability, Principles of sustainability, Pillars of sustainable development, Multidisciplinary approach for sustainable development, Case study on Innovative technologies

**Unit – II: Environmental sustainability** **(06)**
Concept of natural and built environment , Concept of integrated built environment, Environmental global issue - Urban sprawl , Role of individual to protect environment

**Unit – III: Green materials and green building (06)**

Basic concept of Green buildings & its co-relation with sustainability, Material selection for sustainable design of green building, Concept of circular economy, Concept of IGBC, Green building certification, Methods for increasing energy efficiency of buildings

**Unit – IV: Sustainable use of water and energy resources (08)**

Water resources – use and conservation of water ,sustainable use of drinking water – waste water management- case study

Energy resources – Renewable and non-renewable sources of energy – conservation of non-renewable energy sources – case study, Definition & case study on LCA.

**Unit – V: Smart City (05)**

Concept and features of smart city, Strategies, Concept of smart village, Two case studies.

**Unit – VI: Role of community and society in sustainable development (06)**

Role of government,Global environmental agreements and protocols (Montreal& Kyoto protocol), Copenhagen summit, Role of citizen, Contribution of NGOs - social networking , Case study

**Text Books:**

1. *R.L.Rag, Lekshmi dinachandran Ramesh* - ***Introduction to Sustainable engineering***

**Reference Books:**

1. Bhavik R. Bakshi - **Sustainable engineering ( principles and practise)** -*Ohio state university*
2. Allen D.T and shonnard D. R- **Sustainability engineering concept design and case studies**
3. *Mokia schoiz-* ***Sustainable Water treatment engineering solution for variable climate***
4. *DT Alle*DR Shonnard*n,-* Green engineering: environmentally conscious design of chemical processes
5. R.Rajagopalan **– Environmental Studies from Crisis to Cure – *Oxford Publication, Third edition,2016.***
6. A`Sankar R.N.- **Environmental Management** - *Oxford Publication, First edition,2015.*
7. *Shah, Kale, Patki – **Building planning and Built environment** -Tata McGraw Hill*

**Websites:**

Down to Earth - Magazine (hard copy and softcopies available)-

www.unsdsn.org/ For the World
-www.cseindia.org - For India
- indiaenvironmentalportal.org.in
- TERI - www.teriin.org
-cwmi.css.cornell.edu
-rodaleinstitute.org

## 20BS02L Chemistry Laboratory

**Teaching Scheme:**
2 hours per week
Marks
Number of Credits: 1

**Continuous assessment**
Term Work: 25

### Course outcomes

| CO | On completion of this course, student will be able to: |
|---|---|
| CO1 | Apply chemistry principles for quantitative analysis. |
| CO2 | Make use of an instrument for chemical analysis. |
| CO3 | Calculate chemical parameter based on recorded observations . |
| CO4 | Evaluate quality of coal and polymer based on their chemical properties. |
| CO5 | Prepare a chemical substance such as soap,zeolite,biopolymer etc. based on experimental procedure. |

### LIST OF EXPERIMENTS:

1. Determination of total hardness of sample water by EDTA Method (complexometric titration)
2. Determination of total alkalinity of sample water .
3. Measuring EMF of electrochemical cell to predict spontaneity as well as to calculate Gibb's free energy and equilibrium constant.
4. Viscometric method to determine Molecular weight of a Polymer.
5. Estimation of sodium from given solution using flame photometry.
6. Colorimetric estimation of $KMnO_4$ from solution.
7. Proximate analysis of coal samples and Comment on it's quality.

Laboratory preparation of soap.

## 20ES01L Basic Electrical and Electronics Engineering Lab

**Teaching Scheme:**

Practical: 2 Hrs./Week

Credits: 1

**Examination Scheme:**

Term Work: 25 marks

**Course Outcomes:**

After completion of course, students will be able to

- Perform basic domestic wiring
- Apply circuit laws to find the parameters of given electrical network
- Build a basic regulated DC power supply
- Obtain frequency response of CE amplifier
- Build basic digital circuits

**List of experiments:**

- Introduction of different electrical and electronics components and instruments.
- To perform electrical wiring to control lamps using one way and two-way switches.
- To verify Thevenin's theorem & superposition theorem.
- To determine phase angle of L-C-R series circuit.
- To perform load test on single phase transformer to determine regulation and efficiency.
- To determine output voltage and ripple voltage of half wave, full wave rectifier with center tap transformer and bridge rectifier with and without filter.
- Assemble and build simple DC regulated power supply.
- To determine frequency response of CE amplifier.
- Assemble and build half adder & full adder circuits.

## 20ES02L Fundamentals of Programming Language -I Lab

**Teaching Scheme:**
Practical: 2 Hr/week
Credits: 1

**Examination Scheme:**
In-Sem: 25 Marks

**Course Objectives:**

To facilitate the learners:
1. To learn the fundamentals of C programming for logic building.
2. To implement solution of given problem using appropriate data type, operators of C language.
3. To understand the decision and iteration interpretation in a programming language.
4. To implement the logic using arrays, strings, functions and structures of C programming language.

**Course Outcomes:**

By taking this course, the learner will be able to:
1. Apply logic development skills to solve simple real life problems.
2. Implement, test and execute developed logic or algorithm to C program using appropriate data type, operators.
3. Implement the given problem using appropriate control structures available in C language.
4. Identify different functions for a problem to construct a modular solution.

Following example list of problems are grouped into A, B and C, with increasing level of difficulty and understanding. Group A problem statements addresses the concepts of constant, variable, data type, operator and expressions. Group B problem statements addresses the concept of control structures and Group C includes problem which can be solved using functions and string concepts along with the concept covered in Group A and Group B.
Assignments can be framed and expanded in such a way that it explores concepts, language constructs, logic of solution and simple application. Students will be encouraged to solve open problems in different domains. Course tutor will set up assignments to challenge students through code debugging, code improvisation and code transformation. Course tutor will appropriately adopt assignments on similar lines as the examples shown here.

Instructors can conduct a total 10 assignments . Four assignments from Group A, four assignments from Group C and two assignments from Group C.

**Example List of Assignments**

**(Minimum 10 assignments to be implemented, covering maximum Four from each Group. Assignment number 9, 10, 11 from Group C can be considered as extra assignments. Students can explore more on C constructs to implement these assignments. ) :-**

**Group A**

Group A problem statements addresses the concepts of constant, variable, data type, operator and expressions.

1) Write C programs for basic problems Engineering Mathematics and Physics like area calculation, sin wave calculation, speed calculation, determine type of trainagle, verify pythogarous theorem etc.
2) Write C program to convert feet to inches, convert inches to centimeters, and convert centimeters to meters. Write a program that prompts a user for a measurement in feet and converts and outputs this value in meters. Facts to use: 1 ft = 12 inches, 1 inch = 2.54 cm, 100 cm = 1 meter.
3) Write a C program to swap 2 numbers.
4) Write C program to convert Kilograms to grams, convert grams to milligrams and vice a versa.
5) Write C program to convert Dollar to Rupees, convert Euro to Rupees, and vice a versa.
6) Write C program for temperature conversion Degree to Fahrenheit and vice a versa.
7) Write a C program to convert specified days into years, weeks and days.
8) Write a C program that accepts three integers and find the maximum of three.

**Group B**

Group B problem statements addresses the concept of control structures such as for loop, while loop.

1) Write C program to calculate Least common multiple (LCM) and Greatest Common Divisor (GCD) of given number.
2) Write C program to check whether the given number is prime or not.
3) Write C program to print a given pattern.
4) Write a C program to obtain the first 25 numbers of a Fibonacci sequence. In a Fibonacci sequence the sum of two successive terms gives the third term. Following are the first few terms of the Fibonacci sequence: 1 1 2 3 5 8 13 21 34 55 89...
5) Write C program for simple interest and compound interest calculation.

**Group C**

Group C includes problem which can be solved using functions and string concepts along with the concept covered in Group A and Group B.

1) Write a C program to swap 2 integers using user defined functions (call by value, call by reference).
2) Write a program in C to compute the factorial of the given positive integer using function.
3) Write a menu driven program to perform following operations using Array of integers like (accept, display, sum of all numbers, search a number, maximum and minimum of number).
4) Write a menu driven program to perform string operations.
5) Write a program in C to compute addition / subtraction / multiplication of two matrices.
6) Write a C program to perform employee operations such as accept, display, search by name, search by number, update a record. Explore the possibility of modularity for implementation.
7) Write a C program to perform bank account related operations such as accept, display, withdraw and deposit money, check balance.

8) A string is provided from the user. Calculate the total number of characters in the string and the total number of vowels in the string with the number of occurrence in the string.
9) For a class an examination is conducted and the results for the students of all the 5 subjects are recorded. Write C program to display the record of students. On the basis of the record compute:
   i. The average score of class
   ii. Highest score and lowest score of class
   iii. Marks scored by most of the students
   iv. List of students who were absent for the test
10) Write a menu-based modular program in C to perform following operations for complex numbers:
   i. reading a complex number
   ii. writing a complex number
   iii. addition of two complex numbers
   iv. subtraction of two complex numbers
   v. multiplication of two complex numbers
11) Two friends issued 5 books each from the library, Write a program in C to compute set operations
   i. List of all books with them
   ii. List common titles with them
   iii. List of books with friend1 but not with friend 2

## 20ES07 Technical Skill Development Laboratory

**Teaching Scheme:**

Practical: 2 Hrs/Week

**Examination Scheme:**

In-Semester:25 Marks

**Course Objective:** Student will able to learn

I. To identify tools, work material and measuring instruments useful for assembly dissemble of products and different machining operations
2. To handle tools and instruments and use them to prepare joints of specific shape and size.
3. To install software and Operating system on computers

**Course Outcome:** Student will able to

1. select appropriate tools/equipment for measurement and manufacturing.
2. troubleshoot hardware software in computer systems.
3. produce joints of specific shape, size and material
4. assemble and disassemble components of a product.
5. Implement safety measures required to be taken while using the tools and machines

| Sr. No. | Content : | Hrs |
|---|---|---|
| 1 | Use of measuring devices and instruments : Vernier Calliper, Micrometer, Digital Multi-meter, Tachometer, Lux meter etc. | 2 |
| 2 | Assembly -disassembly of products: Electric Iron, Water Purifier, Fan, Mixer Grinder etc. | 4 |
| 3 | Use of joining methods: Soldering and Welding. | 4 |
| 4 | Study and Hands on different day to day machining operations: such as drilling, tapping PVC pipe fitting, hacksaw cutting and filing. | 2 |
| 5 | Use of Machine Tool (Lathe machine) | 6 |
| 6 | Basic troubleshooting computer System in Hardware and Software. Installing and Uninstalling software's (OS 4 APPS) Computer system security aspects (Physical and logical) | 6 |

**NOTE: Practical No. 5 is For Mechanical Engineering Branch and Practical No. 6 is for COMP/IT/E&TC/INSTRU Branch

**Text Books:**

I. Elements of Mechanical Engineering - Hajra Choudhury & others, Media Promoters 2010.
2. The Elements of Workshop Technology - Vol I & Il, SK. Hajra Choudhury, A.K. Hajra Choudhury, Nirjhar Roy, I Ith edition 2001 others, Media Promoters and Publishers, Mumbai.

**Reference:**
I. Workshop manual prepared by Department of Mechanical Engineering.