20BS01 Linear Algebra And Univariate Calculus

Teaching scheme
Lectures: 3hrs/week

Tutorial: 1hr/week

Number of Credits: 4

Examination scheme
In-Sem Exam: **50** Marks

End-Sem Exam: **50** Marks

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*(10thEdition), (2017)

20BS04 Physics

Teaching Scheme
Lecture: 3 Hrs per week
Number of Credits: 3

Examination Scheme
In – Sem Exam: 50 Marks
End – Sem Exam: 50 Marks

Course Objective:

To introduce undergraduate students of technology to the principles, notions, basic physical ideas, mathematical relations and applications of physical optics, thermodynamics, quantum physics, solid state physics and the properties of nano as well as bulk materials.

Course Outcomes:

By taking this course, the learner will be able to –

CO – 1: **Apply** the generalized Coulomb law and the law of Electromagnetic Radiation to compare the electric fields due to the stationary and the accelerated charges.
CO – 2: Apply the laws of Physical Optics to determine intensity distributions of interference and diffraction patterns, and to identify polarization-types.
CO – 3: Apply the principles of Statistical Physics to determine — the thermal distribution of atoms and molecules in different energy states and the thermal response of engineering materials in terms of their specific heats.
CO – 4: Justify the use of the Quantum Physical laws for — combining probability amplitudes, implementing single quantum-bit logic gates and determining probability distributions of polarized photons.
CO – 5: Differentiate between the physical properties of 'nano' materials and of their 'bulk' counterparts

Title of Module, Brief Description of Course Contents and No. of Lectures

Module – 1: Electromagnetic Radiation and Interference: (8)

Expression for the electric field beyond Coulomb's law; Two dipole radiators and Physics of interference; Mathematical treatment (propagating waves, rotating vectors, complex functions)

Module – 2: Diffraction and Polarization: (8)

The resultant amplitude due to *n* equal oscillators; Diffraction Grating; The electric vector of light; Types of Polarized Light; Birefringence; Polarizers

Module – 3: Statistical Mechanics and Thermodynamics: (8)

Principles of Statistical Mechanics (Distribution of particles in thermal equilibrium); Laws of
Thermodynamics (Carnot Cycle, Entropy, Clausius-Clapeyron Equation); Information Entropy

Module – 4: Quantum Physics: (9)

Laws of combining probability amplitudes; The Hamiltonian matrix & Schrödinger equation; Two-state systems: Pauli spin matrices & Photon polarization states; Single Qubit Logic Gates

Module – 5: Properties of Solids: (9)

Band Theory; Electrical (conductivity, resistivity), Magnetic (dia-para-ferro), Optical (absorbance, reflectance, transmittance), Mechanical (hardness, elasticity) properties (of 'bulk' & 'nano' solids)

Text Book:

R. P. Feynman, R. B. Leighton and M. Sands, **'The Feynman Lectures on Physics'**, *Pearson Education* (2006)

Reference Books:

1. **J. Walker, D. Halliday, R, Resnick, 'Principles of Physics', Wiley *Student Edition* (10th Edition)**

2. **H. Young and Roger Freedman, 'University Physics', Pearson Addison Wesley (12th Edition)**

20ES02 Fundamentals of Programming Language – I (ETC, Instru)

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

Examination Scheme:
End-Sem: 25 Marks

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. Build algorithms and flowcharts for the given problem statement.
2. Develop a program in C language using appropriate control structure for the constructed algorithm.
3. Make use of variables, data types, operators, expressions, strings and array to program design and implementation.
4. Design and implement modular solution to 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

20ES02 Fundamentals of Programming Language – I (Mech)

Teaching Scheme: **Examination Scheme:**

Lectures: 1 Hr. / Week **End-Semester:** 25 marks

Credits: 1

Prerequisites: Basic Mathematics

Course Objectives:

Familiarize students with

3. Python programming constructs
4. Conditionals and loops in Python programming
5. Concept of Modularity and functions for problem decomposition
6. Python data structures – lists, tuples, dictionaries
7. Handling input/output with files in Python

Course Outcomes:

Students will be able to:

6. Implement and execute simple Python programs.
7. Apply logic to write simple Python programs for solving domain specific problems.
8. Use Python lists, tuples, dictionaries for representing compound data.
9. Decompose a Python program into functions.
10. Handle file operations in Python Programs.

Unit – I: Introduction **(05)**

Problem solving, problem solving by using computer and Logic building, Introduction to computer, Anatomy of a computer, Python interpreter, Python language elements, Lines and indentation, identifiers, keywords, operators, delimiters and literals, statements, Numbers:

Integers, complex, floating point, Variable types, assignments

Unit – II: Operators and Expressions **(05)**

Sequences: strings, lists, numpy arrays, tuples, Boolean values, Dictionaries, Numeric operations, Conditional expression

Unit – III: Loops and Functions **(04)**

Loops, Functions, file operations, exceptions, inbuilt libraries and functions for scientific computing and plotting.

Text Books:

4. Reema Thareja, “Python Programming using problem solving Approach”, Oxford University, Higher Education Oxford University Press; First edition (10 June 2017), ISBN-10: 0199480173
5. Robert Sedgewick, Kevin Wayne, Robert Dondero, “Introduction to Programming in Python: An Inter-disciplinary Approach”, Pearson India Education Services Pvt. Ltd., 2016
6. Guido van Rossum and Fred L. Drake Jr, “An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2011

Reference Books:

3. Allen B. Downey, “Think Python: How to Think Like a Computer Scientist’’, 2nd edition, Updated for Python 3, Shroff/O’Reilly Publishers, 2016 (http://greenteapress.com/wp/think-python/)

20ES03 SUSTAINABLE ENGINEERING

Teaching Scheme:

Lectures: 3Hrs/Week
Tutorial: 1Hr/Week

Examination Scheme

In-Semester: 50 Marks
End Semester: 50 Marks

Credits: 4

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:

A Student should be able to:
CO1: Identify the need of sustainable development
CO2: Analyse the inter-relationships between the built environment and natural environment.
CO3: Suggest materials and technologies to improve energy efficiency of building
CO4: Apply the knowledge in the area of sustainability for research and use of different natural resources including renewable and non-renewable resources
CO5: Apply concept of sustainability in smart city designing.
CO6: Analyse and explain local, national and global sustainability using multidisciplinary approach

Unit I: Introduction to sustainable engineering (07)

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 (07)

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 (07)

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 (07)

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:

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

Reference Books:

Bhavik R. Bakshi - **Sustainable engineering (principles and practise)** -*Ohio state university*

Allen D.T and shonnard D. R- **Sustainability engineering concept design and case studies**

Mokia schoiz- **Sustainable Water treatment engineering solution for variable climate**

DT Allen,DR Shonnard- **Green engineering: environmentally conscious design of chemical processes**

R.Rajagopalan – **Environmental Studies from Crisis to Cure** – *Oxford Publication, Third edition,2016.*

Ajith Sankar R.N.- **Environmental Management** - *Oxford Publication, First edition,2015.*

Shah, Kale, Patki – **Building planning and Built environment** -*Tata McGraw Hill*

20ES04 Engineering Graphics

Teaching Scheme
Theory: 2 Hrs/week
Tutorial: 1 Hr/week
Credits: 3

Examination Scheme:
In semester: 50 Marks
End semester: 50 Marks

Course Objectives:

1 To develop the visualization and interpretation skills for the physical objects.
2 To provide the basic knowledge and develop the skills for creating 2 D drawings.
3 To provide the basic knowledge and develop the skills for creating Isometric views.
4 To familiarize about the development of solids.
5 To familiarize the construction and applications of Engineering Curves.

Course Outcomes:

After completing the course students will be able to draw
CO1 Orthographic and sectional orthographic projections of an object
CO2 Isometric views of the given object
CO3 Development of surfaces of the given object
CO4 Engineering curves by applying the given method

Unit – 1

Introduction Layout and sizes of drawing sheets, drawing instruments, types of lines used in drawing practice, dimensioning systems, representation of tolerances, standard codes by B.I.S (SP-46). (Not for Examination**)** **(01)**

Unit – 2

Orthographic Projection Theory of projections, methods of obtaining orthographic views, sectional orthographic projections, Missing views. **(08)**

Unit – 3

Isometric Views Isometric axes, Isometric scale, isometric projections and views, construction of isometric view from given orthographic views**.** **(08)**

Unit – 4

Development of Solids Parallel line development, radial line development, methods to transfer points for development of prisms, pyramids, cylinder and cone. **(05)**

Unit – 5

Engineering Curves Construction of ellipse, parabola, hyperbola, involute, cycloid, Archimedean spiral, helix on cone and cylinder. **(06)**

Text Books:

1. N. D. Bhatt and V. M. Panchal,'Engineering drawing, plane and solid geometry', Charotor Publication House.
2. R. K. Dhawan,'A text book of Engineering Drawing', Pearson Education Inc.
3. P.S. Gill, 'Engineering Graphics', Kataria and sons Publications.
4. M. L. Dabhade, 'Engineering Graphics', Vision Publications.

Reference Books:

1. Warren J. Luzzader, 'Fundamentals of Engineering Drawing', Prentice Hall of India, New Delhi.
2. Fredderock E. Giesecke, Alva Mitchell, 'Principles of Engineering Graphics',Maxwell
3. Dhananjay A. Jolhe, 'Engineering Drawing', Tata McGrawHill Publishing Co. Ltd.

20BS04L Physics Laboratory

Teaching Scheme **Examination Scheme**

2 hours per week In-SEM Exam : 25 Mark
Number of Credits: 1 End-SEM Exam : NA

Course Objectives:

The objective of the Physics Lab course is two-fold :
To inculcate experimental skills,
To demonstrate the interplay between theoretical & experimental physics.

Course outcomes (CO) for Physics Lab - 20BS04L

By taking this course, the students will be able to —

CO - 1: Record the observations as per the least counts of measuring instruments and Perform necessary calculations.
CO - 2: Compare the experimental findings with the corresponding theoretical physics models.
CO - 3: Determine errors in experimental findings and Analyze their sources and causes.
CO - 4: Reach the conclusions pertaining to the observed behaviour of physical systems.

List of Experiments:

Physical Optics Experiments :

I. Michelson Interferometer, II. Diffraction Grating, III. Newton's Rings, and
IV. Polarization of light.

Electromagnetism & Heat Experiments :

I. Faraday's Law, II. Dia-Para-Ferromagnetism, and III. Specific Heat.

Modern Physics Experiments :

I. Planck's Constant, II. Hall Effect, and III. Zeeman Effect.

20ES02L Fundamentals of Programming Language -I Lab (ETC, Instru)

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

20ES02L Fundamentals of Programming Language Lab – I (Mech)

Teaching Scheme: **Examination Scheme:**

Practical: 2 Hrs. / Week **Insemester:** 25 marks

Credits: 1

Prerequisites: Basic Mathematics.

Course Objectives:

Familiarize students with

4. Python programming constructs
5. Conditionals and loops in Python programming
6. Concept of Modularity and functions for problem decomposition
7. Python data structures –- lists, tuples, dictionaries
8. Handling input/output with files in Python.

Course Outcomes:

Students will be able to:

8. Implement and execute simple Python programs.
9. Apply logic to write simple Python programs for solving domain specific problems
10. Use Python lists, tuples, dictionaries for representing compound data.
11. Decompose a Python program into functions.
12. Handle file operations in Python Programs

List of assignments to be done in Python:

11. Learn logic building using tools such as ‘scratch’.
12. Demonstration of installation and configuration of Anaconda and Spyder.
13. A) Accept input (number, name) from the user and print the same.

    B) Display the numbers from 1 to 10.
14. Create an empty dictionary, add elements to the dictionary, update the key values and display the elements of the dictionary.
15. A) Create a tuple, add elements to the tuple and display the elements of the tuple.

    B) Swap two numbers using tuples and display the initial and swapped contents of the tuples.
16. Perform string manipulation functions (concatenation, substring, comparison, palindrome)
17. Find the maximum or minimum number in a given list.
18. Calculate factorial using functions.
19. Generate Fibonacci series using recursion.
20. Implement file operations.
21. Calculate area/circumference of a circle for a given radius using:
    - formula
    - inbuilt function from numpy library.
22. Plot sin(x) and cos(x) functions for values of x between 0 and pi. Use inbuilt libraries numpy and matplotlib.

Text books:

7. Reema Thareja, “**Python Programming using problem solving Approach**”, *Oxford University, Higher Education Oxford University Press*; First edition (10 June 2017), ISBN-10: 0199480173

8. Robert Sedgewick, Kevin Wayne, Robert Dondero, "**Introduction to Programming in Python: An Inter-disciplinary Approach**", *Pearson India Education Services Pvt. Ltd.*, 2016.

9. Guido van Rossum and Fred L. Drake Jr, "**An Introduction to Python – Revised and updated for Python 3.2**", *Network Theory Ltd.*, 2011.

Reference Books:

4) Allen B. Downey, "**Think Python: How to Think Like a Computer Scientist**'', *2nd edition, Updated for Python 3, Shroff/O'Reilly Publishers*, 2016 (http://greenteapress.com/wp/think- python/)

5) Michael B. Feldman and Elliot B. Koffman. "**Ada95: problem solving and program design**", *Addison-Wesley*, *Reading*, *Massachusetts*, 1996.

6) **Fredrik Johansson et al., "mpmath: a Python library for arbitrary-precision floating point arithmetic", December 2013. http://mpmath.org/.**

20ES04L Engineering Graphics Lab

Teaching Scheme | **Examination Scheme**

Practical: 2 Hrs/week | In Semester: 25 marks

Credits: 1

Course Objectives:

To familiarize student about1

1.Advantages of using software for Engineering drawing

2.2-D drafting using a software

3. 3-D modeling using a software

4. 3-D printing technology

Course Outcomes:

After completing the course using a software package students will be able to

CO1: Draw orthographic projections of a given component

CO2: Draw Isometric projections of a given component

CO3: Draw development of solids

CO4: Draw free hand sketches of the machine elements

Part I

Introduction to 2-D Drafting using a drafting software **(20 Hrs.)**

- Orthographic Projections
- Isometric Projections
- Development of surfaces of solids
- Free hand sketching of standard machine elements

Part II

Demonstration of 3-D Modeling and 3-D Printing **(08 Hrs.)**

Creating a 3-D model of a simple component using a solid modeling software and manufacture using a rapid prototyping technique.

Text Books:

N. D. Bhatt and V. M. Panchal,*'Engineering drawing, plane and solid geometry'*,

Charotor Publication House.

M.L.Dabhade, **'Engineering Graphics'**, *Vision Publications.*

Bethune, J.D., "*Engineering Graphics with AutoCAD 2013*", PHI Learning Private Limited, Delhi, 2013

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

1. To select suitable tools for assembly- dissemble a product.
2. To produce joints using materials of specific shape and size by a suitable set of operations and check the accuracy of shape and dimensions using measuring instruments
3. To install operating systems and software on computers

Content:

Sr. No		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.