K.S. SCHOOL OF ENGINEERING AND MANAGEMENT, BENGALURU - 560109

DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

CO-PO Mapping

Course: Data Structures and Applications				
Type: Integrated Professional Core Course			**Course Code: 21CS32**	
No of Hours				
Theory (Lecture Class)	Tutorials	Practical/Field Work/Allied Activities	Total/Week	Total hours of Pedagogy
4	0	3	7	40 T + 20 P

Marks			
CIE	SEE	Total	Credits
50	50	100	4

Aim/Objectives of the Course

1. To explain fundamentals of data structures and their applications essential for programming/problem solving.
2. To illustrate linear representation of data structures: Stack, Queues, Lists, Trees and Graphs.
3. To demonstrate sorting and searching algorithms.
4. To find suitable data structure during application development/Problem Solving.

Course Learning Outcomes

After completing the course, the students will be able to

CO1	**Apply** the basic data structures concepts such as arrays, structures, unions, pointers, strings and dynamic memory allocation function to solve simple problems.	**Applying (K3)**
CO2	**Make use of** stacks to evaluate mathematical expression and apply queues to solve problems.	**Applying (K3)**
CO3	**Utilize** linked list for implementation of lists, stacks, queues, polynomials and sparse matrix.	**Applying (K3)**
CO4	**Construct** various types of trees using linked list and array representation and apply tree traversal method for expression evaluation.	**Applying (K3)**
CO5	**Make use of** BFS, DFS, searching, sorting, hashing techniques appropriately.	**Applying (K3)**

Syllabus Content

Module 1: Introduction: Data Structures, Classifications (Primitive & Non Primitive), Data structure Operations, Review of Arrays, Structures, Self-Referential Structures, and Unions. Pointers and Dynamic Memory Allocation Functions. Representation of Linear Arrays in Memory, Dynamically allocated arrays. **Array Operations:** Traversing, inserting, deleting, searching, and sorting. Multidimensional Arrays, Polynomials and Sparse Matrices. **Strings:** Basic Terminology, Storing, Operations and Pattern Matching algorithms.	**CO1** 8 hrs PO1-1 PO2-3 PO3-3 PO4-3

Laboratory Experiments: Design, Develop and Implement a menu driven Program in C for the following Array operations a. Inserting an Element (ELEM) at a given valid Position (POS) b. Deleting an Element at a given valid Position POS) c. Display of Array Elements d. Exit. Support the program with functions for each of the above operations. **LO:** At the end of this session the student will be able to 1. Understand the basic data structures concepts. 2. Analyze the pattern matching problem and sparse matrix 3. Understand the string terminologies.	PO6-1 PO12 -1 PSO1-3 PSO2-1

Module 2: Stacks: Definition, Stack Operations, Array Representation of Stacks, Stacks using Dynamic Arrays, Stack Applications: Polish notation, Infix to postfix conversion, evaluation of postfix expression. **Recursion** - Factorial, GCD, Fibonacci Sequence, Tower of Hanoi, Ackerman's function. **Queues**: Definition, Array Representation, Queue Operations, Circular Queues, Circular queues using Dynamic arrays, dequeues, Priority Queues. **Laboratory Experiments:** 1. Design, Develop and Implement a menu driven Program in C for the following operations on STACK of Integers (Array Implementation of Stack with maximum size MAX) a. Push an Element on to Stack b. Pop an Element from Stack c. Demonstrate Overflow and Underflow situations on Stack d. Display the status of Stack e. Exit .Support the program with appropriate functions for each of the above operations 2. Design, Develop and Implement a Program in C for the following Stack Applications a. Evaluation of Suffix expression with single digit operands and operators: +, -, *, /, %, ^ b. Solving Tower of Hanoi problem with n disks. **LO:** At the end of this session the student will be able to 1. Analyze the stack operations. 2. Understand recursion concepts. 3. Define and solve the simple queue problems.	**CO2** 8 hrs. PO1-1 PO2-3 PO3-3 PO4-3 PO6-1 PO12-1 PSO1-3 PSO2-1
Module 3: Linked Lists: Definition, Representation of linked lists in Memory, Memory allocation; Garbage Collection. Linked list operations: Traversing, Searching, Insertion, and Deletion. Doubly Linked lists, Circular linked lists, and header linked lists. Linked Stacks and Queues. Applications of Linked lists – Polynomials, Sparse matrix representation. Programming Examples. **Laboratory Experiments:** 1. Singly Linked List (SLL) of Integer Data a. Create a SLL stack of N integer. b. Display of SLL c. Linear search. Create a SLL queue of N Students Data Concatenation of two SLL of integers. 2. Design, Develop and Implement a menu driven Program in C for the following operations on Doubly Linked List (DLL) of Professor Data with the fields: ID, Name, Branch, Area of specialization a. Create a DLL stack of N Professor's Data. b. Create a DLL queue of N Professor's Data. Display the status of DLL and count the number of nodes in it. **LO:** At the end of this session the student will be able to	**CO3** 8 hrs PO1-1 PO2-3 PO3-3 PO4-3 PO6-1 PO12-1 PSO1-3 PSO2-1

1. Understand the concepts of linked list. 2. Solve simple problems on linked list such as sparse matrix and polynomials.	
Module 4: Trees: Terminology, Binary Trees, Properties of Binary trees, Array and linked Representation of Binary Trees, Binary Tree Traversals - Inorder, postorder, preorder; Additional Binary tree operations. Threaded binary trees, Binary Search Trees – Definition, Insertion, Deletion, Traversal, Searching, Application of Trees-Evaluation of Expression. **Laboratory Experiments:** 1. Given an array of elements, construct a complete binary tree from this array in level order fashion. That is, elements from left in the array will be filled in the tree level wise starting from level 0. Ex: Input : arr[] = {1, 2, 3, 4, 5, 6}. 2. Design, Develop and Implement a menu driven Program in C for the following operations on Binary Search Tree (BST) of Integers a. Create a BST of N Integers b. Traverse the BST in Inorder, Preorder and Post Order **LO:** At the end of this session the student will be able to 1. Understand the tree terminologies. 2. Solve binary tree traversals. 3. Evaluate the expression of the given tree. 4. Determine the various operations on trees like insertion, deletion.	**CO4** 8 hrs PO1-1 PO2-3 PO3-3 PO4-3 PO6-1 PO12-1 PSO1-3 PSO2-1
Module 5: Trees 2: AVL tree, Red-black tree, Splay tree, B-tree. **Graphs**: Definitions, Terminologies, Matrix and Adjacency List Representation Of Graphs, Elementary Graph operations, Traversal methods: Breadth First Search and Depth First Search. **Hashing**: Hash Table organizations, Hashing Functions, Static and Dynamic Hashing. **Laboratory Experiments:** 1. Design, Develop and implement a program in C for the following operations on Graph (G) of cities a. Create a Graph of N cities using Adjacency Matrix. b. Print all the nodes reachable from a given starting node in a diagraph using DFS/BFS method. 2. Design and develop a program in C that uses Hash Function H:K->L as H(K)=K mod m(reminder method) and implement hashing technique to map a given key K to the address space L. Resolve the collision (if any) using linear probing. **LO:** At the end of this session the student will be able to 1. Understand the graph terminologies. 2. Solve tree traversals using BFS & DFS methods. 3. Understand hashing technique. 4. Define the basics of file and their organization.	**CO5** 8hrs PO1-1 PO2-3 PO3-3 PO4-3 PO6-1 PO12-1 PSO1-3 PSO2-1
Text Books 1. Ellis Horowitz and Sartaj Sahni, **Fundamentals of Data Structures in C**, 2nd Ed, Universities Press, 2014. 2. Seymour Lipschutz, **Data Structures Schaum's Outlines**, Revised 1st Ed, McGraw Hill, 2014. 3. Reema Thareja**, Data Structures using C**, 3rd Ed, Oxford press, 2012.	

Reference Books (specify minimum two foreign authors text books)

1. Gilberg & Forouzan, Data Structures: **A Pseudo-code approach with C**, 2nd Ed, Cengage Learning,2014.
2. Jean-Paul Tremblay & Paul G. Sorenson, **An Introduction to Data Structures with Applications**, 2nd Ed, McGraw Hill, 2013
3. A M Tenenbaum, **Data Structures using C**, PHI, 1989
4. Robert Kruse, **Data Structures and Program Design in C**, 2nd Ed, PHI, 1996.

Useful Websites

- https://nptel.ac.in/courses/106102064/
- https://www.youtube.com/watch?v=Db9ZYbJONHc
- https://www.youtube.com/watch?v=DFpWCl_49i0
- https://www.youtube.com/watch?v=3hyxc4juJRg

Useful Journals

- IEEE TECHNOLOGY NAVIGATOR
- Journal of informatics and data mining
- Journal of computer and system sciences-Elsevier

Teaching and Learning Methods

1. Lecture class: 40 hrs
2. Tutorial classes: 15 hrs
3. Practical classes: 20hrs

Assessment

Type of test/examination: Written examination

Continuous Internal Evaluation(CIE) : 1) Three Tests each of 20 marks (duration 01 hour)

2) Two assignments each of 10 Marks

3) Practical Sessions for 20 Marks

Rubrics for each Experiment taken average for all Lab components – 15 Marks. • Viva-Voce– 5 Marks (more emphasized on demonstration topics)

The sum of three tests, two assignments, and practical sessions will be out of 100 marks and will be scaled down to 50 marks

Total CIE: 50 Marks

Semester End Exam (SEE) : 100 marks (students have to answer all main questions) which will be reduced to 50 Marks.

Test duration: 1 hr

Examination duration: 3 hrs

CO to PO Mapping

PO1: Science and engineering Knowledge **PO2:** Problem Analysis **PO3:** Design & Development **PO4:**Investigations of Complex Problems **PO5:** Modern Tool Usage **PO6:** Engineer & Society	**PO7:**Environment and Society **PO8:**Ethics **PO9:**Individual & Team Work **PO10:** Communication **PO11:**Project Mngmt & Finance **PO12:**Life long Learning

PSO1: An ability to design and develop Artificial Intelligence technology into innovative products for solving real world problems.

PSO2: An ability to design and develop Data Science methods for analyzing massive datasets to extract insights by applying AI as a tool.

CO	PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2
18CS 32	K-level														
CO1	K3	1	3	3	3	-	1	-	-	-	-	-	1	3	1
CO2	K3	1	3	3	3	-	1	-	-	-	-	-	1	3	1
CO3	K3	1	3	3	3	-	1	-	-	-	-	-	1	3	1
CO4	K3	1	3	3	3	-	1	-	-	-	-	-	1	3	1
CO5	K3	1	3	3	3	-	1	-	-	-	-	-	1	2	1

Course In charge HOD-AI & DS IQAC Coordinator Principal

K.S. SCHOOL OF ENGINEERING AND MANAGEMENT, BANGALORE - 560109

DEPARTMENT OF APPLIED SCIENCE

SESSION: 2022-2023 (ODD SEMESTER)

CO-PO MAPPING

Course: Mathematics-I for Computer Science and Engineering stream			
Type: Integrated		Course Code: BMATS101	
No of Hours			
Theory (Lecture Class)	Practical/Field Work/Allied Activities	Total/Week	Total teaching hours
Marks			
Internal Assessment	Examination	Total	Credits
50	50	100	4

Aim/Objectives of the Course

- To familiarize the important tools of calculus and differential equations that are essential in all branches of engineering.
- To develop the knowledge of matrices and linear algebra in a comprehensive manner.

Course Learning Outcomes

After completing the course, the students will be able to

CO1	**Apply** the knowledge of calculus to solve problems related to polar curves and its applications in determining the bentness of a curve.	**Applying (K3)**
CO2	**Demonstrate** the partial differentiation to calculate rates of change of multivariate functions and solve problems related to composite functions and Jacobians.	**Applying (K3)**
CO3	**Use** matrix theory for solving system of linear equations and compute eigenvalues and eigenvectors required for matrix diagonalization process	**Applying (K3)**
CO4	**Solve** first order linear/nonlinear differential equation analytically using standard methods	**Applying (K3)**
CO5	**Apply** the knowledge of modular arithmetic to computer algorithms.	**Applying (K3)**

Syllabus Content

Module 1: **Introduction to polar coordinates and curvature relating to Computer Science and Engineering.** Polar coordinates, Polar curves, angle between the radius vector and the tangent, angle between two curves. Pedal equations. Curvature and Radius of curvature - Cartesian, Parametric, Polar and Pedal forms. Problems.	**CO1** 8 hrs. PO1-3 PO2 -2

Self-study: Center and circle of curvature, evolutes and involutes. **Applications:** Computer graphics, Image processing. **(RBT Levels: L1, L2 and L3)** **LO:** At the end of this session the student will be able to 1. Find the angle between the radius vector and tangent, angle between two curves. 2. Find the Pedal equation of the curve. 3. Find the curvature and radius of curvature.	PO4-1 PO9-1 PO10-1 PO12-1 PSO1-3 PSO2-2

Module-2:Series Expansion and Multivariable Calculus (8 hours) **Introduction of series expansion and partial differentiation in Computer Science & Engineering applications.** Taylor's and Maclaurin's series expansion for one variable (Statement only) – problems. Indeterminate forms – L' Hospital's rule-Problems. Partial differentiation, total derivative - differentiation of composite functions. Jacobin and problems. Maxima and minima for a function of two variables. Problems. **Self-study:** Euler's theorem and problems. Method of Lagrange's undetermined multipliers with single constraint. **Applications:** Series expansion in computer programming, Computing errors and approximations. **(RBT Levels: L1, L2 and L3)** **LO:** At the end of this session the student will be able to 1. Obtain the series solution for the given functions.. 2. Evaluates the given limits. 3. Find the Total derivatives, maxima and minima for a function of two variables.	**CO2** 8 hrs. PO1-3 PO2 -2 PO4-1 PO9-1 PO10-1 PO12-1 PSO1-3 PSO2-2
Module-3: Linear Algebra (8 hours) **Introduction of linear algebra related to Computer Science &Engineering.** Elementary row transformation of a matrix, Rank of a matrix. Consistency and Solution of system of linear equations - Gauss-elimination method, Gauss-Jordan method and approximate solution by Gauss-Seidel method. Eigenvalues and Eigenvectors, Rayleigh's power method to find the dominant Eigenvalue and Eigenvector. **Self-Study:** Solution of system of equations by Gauss-Jacobi iterative method. Inverse of a square matrix by Cayley- Hamilton theorem. **Applications:** Boolean matrix, Network Analysis, Markov Analysis, Critical point of a network system. Optimum solution. **(RBT Levels: L1, L2 and L3).**	**CO3** 8 hrs PO1-3 PO2 -2 PO4-1 PO9-1 PO10-1 PO12-1 PSO1-3 PSO2-2

LO: At the end of this session the student will be able to 1. Find Rank of a matrix by reducing into echelon form. 2. Solve the system of equations using Gauss-elimination method, Gauss – Jordan method and Gauss-Seidel method. 3. Find the largest eigen value and eigen vector using Rayleigh's power method.	
Module-4: Ordinary Differential Equations (ODEs) of First Order (8 hours) **Introduction to first-order ordinary differential equations pertaining to the applications for Computer Science & Engineering.** Linear and Bernoulli's differential equations. Exact and reducible to exact differential equations -Integrating factors on Orthogonal trajectories, L-R & C-R circuits. Problems. **Non-linear differential equations:** Introduction to general and singular solutions, Solvable for p only, Clairaut's equations, reducible to Clairaut's equations. Problems. **Self-Study:** Applications of ODEs, Solvable for x and y. **Applications of ordinary differential equations:** Rate of Growth or Decay, Conduction of heat. **(RBT Levels: L1, L2 and L3)** **LO:** At the end of this session the student will be able to 1. Solve first order linear/nonlinear differential equation analytically using standard methods.	**CO4** 8 hrs PO1-3 PO2 -2 PO4-1 PO9-1 PO10-1 PO12-1 PSO1-3 PSO2-2
Module-5: Modular Arithmetic (8 hours) **Introduction of modular arithmetic and its applications in Computer Science and Engineering.** Introduction to Congruences, Linear Congruences, The Remainder theorem, Solving Polynomials, Linear Diophantine Equation, System of Linear Congruences, Euler's Theorem, Wilson Theorem and Fermat's little theorem. Applications of Congruences-RSA algorithm. **Self-Study:** Divisibility, GCD, Properties of Prime Numbers, Fundamental theorem of Arithmetic. **Applications:** Cryptography, encoding and decoding, RSA applications in public key encryption. **(RBT Levels: L1, L2 and L3)** **LO:** At the end of this session the student will be able to 1.Solve the congruences by Remainder theorem, Diaphontain equations	**CO5** 8 hrs PO1-3 PO2 -2 PO4-1 PO9-1 PO10-1 PO12-1 PSO1-3 PSO2-2

Text Books

1. **B. S. Grewal**: "Higher Engineering Mathematics", Khanna Publishers, 44thEd., 2021.
2. **E. Kreyszig**: "Advanced Engineering Mathematics", John Wiley & Sons, 10thEd., 2018.
3. **David M Burton:** "Elementary Number Theory" Mc Graw Hill, 7th Ed.,2017.

Reference Books

1. **V. Ramana:** "Higher Engineering Mathematics" McGraw-Hill Education, 11th Ed., 2017
2. **Srimanta Pal & Subodh C.Bhunia**: "Engineering Mathematics" Oxford University Press, 3rd Ed., 2016.
3. **N.P Bali and Manish Goyal**: "A Textbook of Engineering Mathematics Laxmi Publications, 10th Ed., 2022.
4. **C. Ray Wylie, Louis C. Barrett:** "Advanced Engineering Mathematics" McGraw – Hill Book Co., New York, 6th Ed., 2017.
5. **Gupta C.B, Sing S.R and Mukesh Kumar:** "Engineering Mathematic for Semester I and II", Mc-Graw Hill Education(India) Pvt. Ltd 2015.
6. **H. K. Dass and Er. Rajnish Verma:** "Higher Engineering Mathematics" S. Chand Publication, 3rd Ed., 2014.
7. **James Stewart:** "Calculus" Cengage Publications, 7thEd., 2019.
8. **David C Lay:** "Linear Algebra and its Applications", Pearson Publishers, 4th Ed., 2018.
9. **Gareth Williams:** "Linear Algebra with Applications", Jones Bartlett Publishers Inc., 6th Ed., 2017.
10. **Gilbert Strang:** "Linear Algebra and its Applications", Cengage Publications, 4th Ed. 2022.
11. **William Stallings:** "Cryptography and Network Security" Pearson Prentice Hall, 6th Ed., 2013.
12. **Kenneth H Rosen:** "Discrete Mathematics and its Applications" McGraw-Hill, 8th Ed. 2019.
13. **Ajay Kumar Chaudhuri:** "Introduction to Number Theory" NCBA Publications, 2nd Ed., 2009.
14. **Thomas Koshy:** "Elementary Number Theory with Applications Harcourt Academic Press, 2nd Ed., 2008.

Web links and Video Lectures (e-Resources):

- http://nptel.ac.in/courses.php?disciplineID=111
- http://www.class-central.com/subject/math(MOOCs)
- http://academicearth.org/
- VTU e-Shikshana Program
- VTU EDUSAT Program

Useful Journals

- Annals of Mathematics
- Acta Mathematica
- International Journal of Mathematics
- Communications on pure and applied Mathematics.

Teaching and Learning Methods

1. Lecture class: 50 hrs
2. Practical classes: 0

Assessment

Type of test/examination: Written examination

Continuous Internal Evaluation(CIE) :

1) Three Tests each of 20 marks (duration 01 hour)

2) Two assignments each of 10 Marks

3) Practical Sessions for 10 Marks for each Experiment taken average for all Lab components to Marks. Then scaled up to 15 marks. Lab internals for 50 marks and scaled down to 5 marks.

The sum of three tests, two assignments will be out of 80 marks and will be scaled down to 30 marks+Practical 20 marks.

Total CIE: 50 Marks

Semester End Exam (SEE): 100 marks (students have to answer all main questions) which will be reduced to 50 Marks.

Test duration: 1 hrs

Examination duration: 3 hrs Assessment.

CO	PO	PO1	PO2	PO3	PO4	PO5	PO6	PO 7	PO 8	PO 9	PO10	PO 11	PO12	PS O1	PSO 2
18 MA T11	K-level														
CO1	K3	3	2	-	1	-	-	-	-	1	1	-	1	3	2
CO2	K3	3	2	-	1	-	-	-	-	1	1	-	1	3	2
CO3	K3	3	2	-	1	-	-	-	-	1	1	-	1	3	2
CO4	K3	3	2	-	1	-	-	-	-	1	1	-	1	3	2
CO5	K3	3	2	-	1	-	-	-	-	1	1	-	1	3	2

CO to PO Mapping

PO1: Science and engineering Knowledge **PO2:** Problem Analysis **PO3:** Design & Development **PO4:**Investigations of Complex Problems **PO5:** Modern Tool Usage **PO6:** Engineer & Society	**PO7:**Environment and Society **PO8:**Ethics **PO9:**Individual & Team Work **PO10:** Communication **PO11:**Project Management & Finance **PO12:**Life long Learning

PSO1: Ability to apply concept of Mathematics in engineering to design a system, a component or a process/system to address a real world challenges

PSO2: Ability to develop effective communication, team work, entrepreneurial and computational skills

Course In charge

Head of the Department
Dr. C. VASUDEV
Professor & HOD
Department of Applied Science
K.S. School of Engineering & Management
Bangalore - 560 109

Principal
Dr. K. RAMA NARASIMHA
Principal/Director
K S School of Engineering and Management
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K.S. SCHOOL OF ENGINEERING AND MANAGEMENT, BENGALURU - 560109

DEPARTMENT OF APPLIED SCIENCE

SESSION: 2022-2023 (ODD SEMESTER)

CO-PO MAPPING

Course Title: Applied Physics for ME Stream			
Course Type: Integrated		**Course Code:BPHYM102**	
No of Hours			
Theory (Lecture Class)	Practical/Field Work/Allied Activities	Total hours/Week	Total teaching hours
4	3	7	76(40 hours Theory + 36 Lab hours)
Marks			
Internal Assessment	Examination	Total	Credits
50	50	100	4

Aim/Objectives of the Course

1. Applied Physics is one of a basic subject for all engineering course. In this course, principles of Physics are taught to build strong foundation of knowledge required for mechanical engineering courses.
2. Learning the basic concepts in Physics which are very much essential in understanding and solving engineering related challenges.
3. Gaining the knowledge of newer concepts in Low temperature phenomena and the various relevant material characterization techniques.

Course Learning Outcomes

After completing the course, the students will be able to

CO1	**Utilizing** the knowledge of simple harmonic motion, **derive** the expressions for various types of oscillations and to understand the role of shock waves in various fields.	**Applying (K3)**
CO2	**Use** the elastic properties of materials for engineering applications and practice to conduct experiments.	**Applying (K3)**
CO3	**Interpret** the application of sensitive instrumentation for Nano-scale system.	**Applying (K3)**
CO4	**Investigate** the fundamentals of Thermoelectric materials and their application.	**Applying (K3)**
CO5	**Illustrate** the low temperature phenomena and generation of low temperature.	**Applying (K3)**

Syllabus Content

Module -1: Oscillations and Shock waves Simple Harmonic motion (SHM), Differential equation for SHM (No derivation), Sprigs: Stiffness Factor and its Physical Significance, Series and Parallel combination of springs (Derivation), Types of Springs and their applications. Theory of Damped oscillations (Qualitative), Types of Damping (Graphical Approach). Engineering applications of	**CO1** 08 hrs PO1-3 PO2-3

Damped oscillations, Theory of Forced oscillations (Qualitative), Resonance, Sharpness of resonance. Numerical Problems. Shock waves: Mach number and Mach Angle, Mach Regimes, Definition and Characteristics of Shock waves, Construction and working of Reddy Shock tube, Applications of Shock Waves, Numerical problems. **LO:** At the end of this module, the students will be able to 1. Explain SHM and derive the equivalent force constant for two springs in series and parallel combination. 2. Derive the differential equation for damped and forced oscillations 3. Explain Mach number, classification based on Mach number and Reddy shock tube.	PO4-2 PO6-3 PO7-2 PO12 -2 PSO1-3 PSO2-3

Module -2: Elasticity Stress-Strain Curve, Stress hardening and softening. Elastic Moduli, Poisson's ratio, Relation between Y, n and σ (with derivation), mention relation between K, Y and σ, limiting values of Poisson's ratio. Beams, Bending moment and derivation of expression, Cantilever and I section girder and their Engineering Applications, Elastic materials (qualitative). Failures of engineering materials - Ductile fracture, Brittle fracture, Stress concentration, Fatigue and factors affecting fatigue (only qualitative explanation), Numerical problems. **LO:** At the end of this module, the students will be able to 1. Explain the different types of elastic moduli. Derive the relation between elastic modulus. 2. Derive the bending moment in terms of Moment inertia. 3. Explain the failures of Engineering applications.	**CO2** 08 hrs PO1-3 PO2-3 PO4-2 PO6-3 PO7-3 PO12-2 PSO1-3 PSO2-3
Module 3: Material Characterization and Instrumentation Techniques Introduction to nano materials: Nanomaterial and nanocomposites. Principle, construction and working of X-ray Diffractometer, Crystallite size determination by Scherrer equation, Atomic Force Microscopy (AFM): Principle, construction, working and applications, X-ray photoelectron spectroscopy(XPS), Scanning electron microscopy (SEM), Transmission electron microscopy (TEM), Numerical Problems. **LO**: At the end of this module, the students will be able to 1. Explain nanomaterials and nanocomposites. 2. Determine crystal size using Scherrer equation. 3. Explain the construction and working of various nanomaterial characterization instruments.	**CO3** 08hrs PO1-3 PO2-2 PO4-1 PO6-3 PO7-2 PO12-2 PSO1-3 PSO2-3
Module 4: Thermoelectric materials and devices Thermo emf and thermo current, Seeback effect, Peltier effect, Seeback and Peltier coefficients, figure of merit (Mention Expression), laws of thermoelectricity. Expression for thermo emf in terms of T1 and T2, Thermo couples, thermopile, Construction and Working of Thermoelectric generators (TEG) and Thermoelectric coolers (TEC), low, mid and high temperature thermoelectric materials, Applications: Exhaust of Automobiles, Refrigerator, Space Program (RTG), Numerical Problems.	**CO4** 08hrs PO1-3 PO2-3 PO4-2 PO6-3

LO: At the end of this module, the students will be able to 1. Explain the Seebeck effect, Peltier effect, Seeback and Peltier coefficients. 2. Explain the laws of thermoelectricity and hence derive the expression for thermo emf interms of T_1 and T_2. 3. Explain the construction and working of various thermoelectric devices.	PO7-3 PO12-2 PSO1-3 PSO2-3
Module 5: Cryogenics Production of low temperature - Joule Thomson effect (Derivation with 3 cases), Porous plug experiment with theory, Thermodynamical analysis of Joule Thomson effect, Liquefaction of Oxygen by cascade process, Lindey's air liquefier, Liquefaction of Helium and its properties, Platinum Resistance Thermometer, Applications of Cryogenics, in Aerospace, Tribology and Food processing(qualitative), Numerical Problems. **LO**: At the end of this module, the students will be able to 1. Obtain the theory of Joule Thomson effect and explain the three cases. 2. Explain the construction and working of various Cryogenics devices. 3. Explain the applications of cryogenics.	**CO5** 08hrs PO1-3 PO2-2 PO4-1 PO6-3 PO7-2 PO12-2 PSO1-3 PSO2-3

Text Books

Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)

1. Vibrations and Waves (MIT introductory Physics Series), A P French, CBS, 2003 Edition
2. Timoshenko, S. and Goodier J.N. "Theory of Elasticity", 2nd Edition, McGraw Hill Book Co, 2001.
3. Sadhu Singh, "Theory of Elasticity", Khanna Publishers, 1997
4. Mechanical Properties of Engineered Materials by Wole Soboyejo, CRC Press; 1st edition, 2002
5. Heat & Thermodynamics and Statistical Physics(XVIII-Edition) – Singhal, Agarwal &Satyaprakash – Pragati Prakashan, Meerut, 2006. 4
6. Heat and Thermodynamics (I-Edition) – D.S.Mathur - S. Chand & Company Ltd., New-Delhi, 1991
7. Heat and Thermodynamics, Brijlal & Subramanyam,S. Chand & Company Ltd., New-Delhi.
8. Physics of Cryogenics by Bahman Zohuri, Elsevier, 2018
9. Materials Characterization Techniques-Sam Zhang, Lin Li, Ashok Kumar, CRC Press, First Edition, 2008.
10. Characterization of Materials- Mitra P.K . Prentice Hall India Learning Private Limited.
11. Nanoscience and Nanotechnology: Fundamentals to Frontiers – M.S.Ramachandra Rao & Shubra Singh, Wiley India Pvt Ltd.
12. Nano Composite Materials-Synthesis, Properties and Applications, J. Parameswaranpillai, N.Hameed, T.Kurian, Y. Yu, CRC Press.
13. Shock waves made simple by Chintoo S Kumar, K Takayama and K P J Reddy: Willey India Pvt. Ltd, Delhi,2014

Reference Books (specify minimum two foreign authors text books)

1. Introduction to Mechanics — M.K. Verma: 2nd Ed, University Press(India) Pvt Ltd, Hyderabad 2009
2. Lasers and Non Linear Optics – B.B. Laud, 3rd Ed, New Age International Publishers 2011
3. LASERS Principles, Types and Applications by K.R,Nambiar-New Age International Publishers.
4. Solid State Physics-S O Pillai, 8th Ed- New Age International Publishers-2018
5. Shock waves made simple- Chintoo S Kumar, K Takayama and KPJ Reddy: Willey India Pvt. Ltd.New Delhi2014
6. Materials Characterization Techniques-Sam Zhang, Lin Li, Ashok Kumar, CRC Press, First Edition, 2008

7. Characterization of Materials- Mitra P.K . Prentice Hall India Learning Private Limited

Web links and Video Lectures (e-Resources):

Simple Harmonic motion:https://www.youtube.com/watch?v=k2FvSzWeVxQ
Shock waves:https://physics.info/shock/
Shock waves and its applications:https://www.youtube.com/watch?v=tz_3M3v3kxk
Stress- strain curves:https://web.mit.edu/course/3/3.11/www/modules/ss.pdf
Stress curves:https://www.youtube.com/watch?v=f08Y39UiC-o
Fracture in materials:https://www.youtube.com/watch?v=x47nky4MbK8
Thermoelecticity:https://www.youtube.com/watch?v=2w7NBuu5w9c&list=PLtkeUZItwHK5y6qy1GFxa4Z4Rc
mzUaaz6
Thermoelectric generator and coolers:https://www.youtube.com/watch?v=NruYdb31xk8
Cryogenics:https://cevgroup.org/cryogenics-basics-applications/
Liquefaction of gases:https://www.youtube.com/watch?v=aMelwOsGpIs
Virtual lab:https://www.vlab.co.in/participating-institute-amrita-vishwa-vidyapeetham
Material characterization :https://onlinecourses.nptel.ac.in/noc20_mm14/preview
https://www.encyclopedia.com/science-and-technology/physics/physics/cryogenics
https://www.usna.edu/NAOE/_files/documents/Courses/EN380/Course_Notes/Ch10_Deformation.pdf

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

http://nptel.ac.in
https://swayam.gov.in
https://virtuallabs.merlot.org/vl_physics.html
https://phet.colorado.edu
https://www.myphysicslab.com

Useful Journals

- Journal of Nature Physics
- Journal of Foundation of Physics
- Journal of Physical Review
- Journal of Applied Physics
- Journal of Classical and Quantum Gravity

Laboratory Component:

Any Ten Experiments have to be completed from the list of experiments

Note: The experiments have to be classified into

a) Exercise

b) Demonstration

c) Structured Inquiry

d) Open Ended

Based on the convenience classify the following experiments into above categories. Select at least one simulation /spreadsheet activity.

List of Experiments

1. Determination of Young's modulus of the material of the given bar Uniform Bending.
2. Determination of Rigidity modulus of the Material of the wire using Torsional Pendulum.
3. Study of Forced Mechanical Oscillations and Resonance.
4. Study of the frequency response of Series & Parallel LCR circuits.
5. Determination of Fermi Energy of the given Conductor.
6. Determination of Resistivity by Four Probe Method.
7. Determination of effective spring constant of the given springs in series and parallel combinations.
8. Determination of Young's modulus of the material of the given bar Single Cantilever.
9. Determination of the Moment of Inertia of the given irregular body using torsional pendulum.
10. Determination of Wavelength of Laser using Diffraction Grating.
11. Determination of Acceptance angle and Numerical Aperture of the given Optical Fiber.
12. Determination of the Radius of Curvature of the given Plano Convex Lens by setting Newton's Rings.
13. Step Interactive Physical Simulations.
14. Study of motion using spread Sheets
15. Application of Statistics using Spread Sheets.
16. PHET Interactive Simulations

:(https://phet.colorado.edu/en/simulations/filter?subjects=physics&type=html,prototype)

Teaching and Learning Methods

1. Lecture class: 40 hours
2. Practical classes: 3 hours

Assessment

Type of test/examination: Written examination

Continuous Internal Evaluation(CIE) : 50 marks (20 marks i.e., Sum of three tests + 20 marks i.e., Sum of two Assignments + 20 marks Lab I.A(15 marks daily based performance+5 marks lab test))

Semester End Exam (SEE): 100 marks (students have to answer all main questions) which will be reduced to 50 Marks.

Test duration: 1 :00 hours

Examination duration: 3 hours

CO	PO	PO1	PO2	PO3	PO 4	PO5	PO6	PO 7	PO8	PO9	PO10	PO1 1	PO12	PSO 1	PSO 2
BPHYS102	K-level														
CO1	K3	3	3	-	2	-	3	2	-	-	-	-	2	3	3
CO2	K3	3	3	-	2	-	3	3	-	-	-	-	2	3	3
CO3	K3	3	2	-	1	-	3	2	-	-	-	-	2	3	3
CO4	K3	3	3	-	2	-	3	3	-	-	-	-	2	3	3
CO5	K3	3	2	-	1	-	3	2	-	-	-	-	2	3	3

CO to PO mapping

PO1: Science and engineering Knowledge **PO2:** Problem Analysis **PO3:** Design & Development **PO4:** Investigations of Complex Problems **PO5:** Modern Tool Usage **PO6:** Engineer & Society	**PO7:** Environment and Society **PO8:** Ethics **PO9:** Individual & Team Work **PO10:** Communication **PO11:** Project Mngmt & Finance **PO12:** Life long Learning

PSO1: Ability to understand the basic principles, laws, theories and problem solving skills of Engineering Physics and their application in engineering and technology.

PSO2: Ability to apply the concepts of physics to design a process to address the real world challenges.

Course In charge

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K.S. SCHOOL OF ENGINEERING AND MANAGEMENT, BENGALURU - 560109

DEPARTMENT OF APPLIED SCIENCE

SESSION: 2022-2023 (ODD SEMESTER)

CO-PO MAPPING

Course: Applied Chemistry for Computer Science & Engineering stream-AI&DS			
Type: Core (Theory/Practical/Integrated)		Course Code: BCHES202	
No of Hours			
Theory (Lecture Class)	Practical/Field Work/Allied Activities	Total/Week	Total teaching hours
4	3	7 (4 + 3)	76 (40 + 36)
Marks			
Internal Assessment	Examination	Total	Credits
50	50	100	4

Aim/Objectives of the Course

1. To enable students to acquire knowledge on principles of chemistry for engineering applications.
2. To develop an intuitive understanding of chemistry by emphasizing the related branches of engineering.
3. To provide students with a solid foundation in analytical reasoning required to solve societal problems.

Course Learning Outcomes

After completing the course, the students will be able to

CO1	**Utilize** various concepts of chemistry for corrosion control and to analyze engineering materials.	**Applying (K3)**
CO2	**Make use** of different techniques for the production of green fuels and also able to determine molecular weight of a polymer.	**Applying (K3)**
CO3	**Utilize** the principle of electrochemical and optical sensors for the estimation of different components in the analyte.	**Applying (K3)**
CO4	**Utilize** the properties of Liquid Crystal, Organic Light Emitting Diodes and Quantum Light emitting diodes to Illustrate the working mechanism of display systems.	**Applying (K3)**
CO5	**Apply** various recycling and extraction techniques in the e-waste management	**Applying (K3)**

Syllabus Content

MODULE 1: Corrosion and Electrode System **Corrosion Chemistry:** Introduction, electrochemical theory of corrosion, types of corrosion- differential metal and differential aeration. Corrosion control - galvanization, anodization and sacrificial anode method. Corrosion Penetration Rate (CPR) - Introduction and numerical problem. **Electrode System:** Introduction, types of electrodes. Ion selective electrode – definition, construction, working and applications of glass electrode. Determination of pH using glass electrode. Reference electrode- Introduction, calomel electrode– construction, working and applications of calomel electrode. Concentration cell– Definition, construction and Numerical problems.	**CO1** 8 hrs PO1-3 PO2-3 PO3-1 PO5-1 PO6-1

Analytical Techniques: Introduction, principle and instrumentation of Conductometry: its application in the estimation of weak acid. Potentiometry: its application in the estimation of iron. **Self-learning:** IR and UV-Visible spectroscopy. **Practical Component:** 1. Conductometric estimation of acid mixture 2. Potentiometric estimation of FAS using $K_2Cr_2O_7$ 3. Determination of pKa of vinegar using pH sensor (Glass electrode) 4. Estimation of Copper present in electroplating effluent (PCB) by optical sensor (colorimetry) 5. Estimation of total hardness of water by EDTA method **LO:** At the end of this session the student will be able to 1. Utilize the concept of electrochemical theory of corrosion to illustrate various types of corrosion and its control. Also, able to determine corrosion penetration rate of metals at different corrosive medium. 2. Derive an expression for P^H using glass electrode and determine E_{cell} of concentration cell. 3. Make use of principle and instruments of electrochemical and optical sensors for sample analysis.	PO7-2 PO9-3 PO12-1 PSO1-2 PSO2-1
MODULE 2: Polymers and Green Fuels **Polymers**: Introduction, Molecular weight: Number average, weight average and numerical problems. Preparation, properties, and commercial applications of Kevlar fiber. Conducting polymers– synthesis and conducting mechanism of polyacetylene and commercial applications. **Green Fuels:** Introduction, construction and working of solar photovoltaic cell, advantages, and disadvantages. Generation of energy (green hydrogen) by electrolysis of water and its advantages. **Self-learning:** Regenerative fuel cells. **LO:** At the end of this session the student will be able to 1. Apply electrolysis concept in the production of hydrogen 2. Find Number average and Weight average Molecular weight of polymers to know the nature of polymer. 3. Explain working and applications of P.V. cell	**CO2** 8 hrs PO1-3 PO2-3 PO3-1 PO5-1 PO6-1 PO7-1 PO9-1 PO12-1 PSO1-2 PSO2-1
MODULE 3: Sensors and Energy Systems **Sensors:** Introduction, working, principle and applications of Conductometric sensors, Electrochemical sensors, Thermometric sensors (Flame photometry) and Optical sensors (colorimetry). Sensors for the measurement of dissolved oxygen (DO). Electrochemical sensors for the pharmaceuticals. Electrochemical gas sensors for Sox and NOx . Disposable sensors in the detection of biomolecules and pesticides. **Energy Systems:** Introduction to batteries, construction, working and applications of Lithium ion and Sodium ion batteries. Quantum Dot Sensitized Solar Cells (QDSSC's)-Principle, Properties and Applications. **Self-learning**: Types of electrochemical sensor, Gas sensor - O_2 sensor, Biosensor – Glucose sensors. **Practical Component:** 1. Estimation of iron in TMT bar by external indicator method. 2. Estimation of metal in e-waste by optical sensors. 3. Determination of Chemical Oxygen Demand (COD) of industrial waste water sample. 4. Determination of Viscosity coefficient of lubricant (Ostwald's viscometer). 5. Determination of strength of an acid in Pb-acid battery. **LO:** At the end of this session the student will be able to 1. Apply redox reaction concept to illustrate the working of batteries.	**CO3** 8 hrs PO1-3 PO2-3 PO3-1 PO5-1 PO6-1 PO7-1 PO8-1 PO9-3 PO12-1 PSO1-2 PSO2-1

2. Make use of principle and instruments of electrochemical and optical sensors for sample analysis. 3. Determine strength of an acid in Pb-acid battery.	
MODULE 4: Materials for Memory and Display Systems **Memory Devices:** Introduction, Basic concepts of electronic memory, History of organic/polymer electronic memory devices, Classification of electronic memory devices, types of organic memory devices(organic molecules, polymeric materials, organic, inorganic hybrid materials). **Display Systems**: Photoactive and electroactive materials, Nanomaterials and organic materials used in optoelectronic devices. **Liquid crystals (LC's)** - Introduction, classification, properties and application in Liquid Crystal Displays (LCD's). Properties and application of Organic Light Emitting Diodes (OLED's) and Quantum Light Emitting Diodes (QLED's), Light emitting electrochemical cells. **Self-learning:** Properties and functions of Silicon (Si), Germanium (Ge), Copper (Cu), Aluminium (Al),and Brominated flame retardants in computers. **Practical Component:** **1.** Synthesis of iron oxide nanoparticles **LO:** At the end of this session the student will be able to 1. Classify different type of memory devices. 2. Utilize the properties of Liquid Crystal, Organic Light Emitting Diodes and Quantum Light emitting diodes to Illustrate the working mechanism of display systems. 3. Synthesize iron oxide nano particles by precipitation method.	**CO4** 8 hrs PO1-3 PO2-3 PO3-1 PO5-1 PO6-1 PO7-1 PO9-3 PO12-1 PSO1-2 PSO2-1
MODULE 5: E-Waste Management E-Waste: Introduction, sources of e-waste, Composition, Characteristics, and Need of e-waste management. Toxic materials used in manufacturing electronic and electrical products, health hazards due to exposure to e-waste. Recycling and Recovery: Different approaches of recycling (separation, thermal treatments, hydrometallurgical extraction, pyro metallurgical methods, direct recycling). Extraction of gold from E-waste. Role of stakeholders in environmental management of e-waste (producers, consumers, recyclers, and statutory bodies). Self-learning: Impact of heavy metals on environment and human health. **Practical Component:** 1. Synthesis of iron oxide nanoparticles. **LO:** At the end of this session the student will be able to 1. Explain various sources of e-waste 2. Apply various recycling and extraction techniques in the e-waste management.	**CO5** 8 hrs PO1-3 PO2-3 PO3-1 PO5-1 PO6-1 PO7-3 PO9-1 PO12-1 PSO1-2 PSO2-1

Text Books

1. Basuchandra's Applied Chemistry for Electrical and Electronic Engineering Stream Fourth edition-2022
2. A Text Book of Engg. Chemistry, Shashi Chawla, & Co.(P)Ltd.
3. SS Dara & Dr. SS Umare. -A Text book of Engineering Chemistry, S Chand & Company Ltd., 12th Edition, 2011.
4. R.V. Gadag and Nithyananda Shetty-A Text Book of Engineering Chemistry, I.K. International Publishing house. 2nd Edition, 2019.
5. B.S. Jai Prakash, R. Venugopal, Sivakumaraiah& Pushpa Iyengar.,- Chemistry for Engineering Students", Subash Publications, Bangalore.5th Edition, 2014
6. Principles of Physical Chemistry, B.R. Puri, L.R. Sharma & M.S. Pathania, S. Nagin Chand & Co., 41 Edition, 2004.

Reference Books (specify minimum two foreign authors text books)

1. Wiley Engineering Chemistry, Wiley India Pvt .Ltd. New Delhi,2013-2ndEdition.
2. Engineering Chemistry, Satyaprakash & Manisha Agrawal, Khanna Book Publishing, Delhi
3. G.A.Ozin, A.C. Arsenault &Lud ovicoCademartiri "*Nanochemistry A Chemical Approach to Nanomaterials*", Royal Society of Chemistry, First Edition, 2005.

4. Wiley,"*Engineering Chemistry*", India Pvt. Ltd. New Delhi. Second Edition. 2013.
5. V.R.Gowariker, N.V.Viswanathan&J.Sreedhar.. "*Polymer Science*", Wiley-Eastern Ltd. New Delhi, First Edition, 1986.
6. M.G.Fontana., "*Corrosion Engineering*", Tata McGraw Hill Publishing Pvt. Ltd. New Delhi, Third Edition, 1986.

Weblinks and Video Lectures(e-Resources):

- http://libgen.rs/
- https://nptel.ac.in/downloads/122101001/
- https://nptel.ac.in/courses/104/103/104103019/
- https://ndl.iitkgp.ac.in/
- https://www.youtube.com/watch?v=faESCxAWR9k
- https://www.youtube.com/watch?v=TBqXMWaxZYM&list=PLyhmwFtznRhuz8L1bb3X9IbHrDMjHWWh
- https://www.youtube.com/watch?v=j5Hml6KN4TI
- https://www.youtube.com/watch?v=X9GHBdyYcyo
- https://www.youtube.com/watch?v=1xWBPZnEJk8
- https://www.youtube.com/watch?v=wRAo-M8xBHM

Activity Based Learning (Suggested Activities in Class)/Practical Based learning

- https://www.vlab.co.in/broad-area-chemical-sciences
- https://demonstrations.wolfram.com/topics.php
- https://interestingengineering.com/science

Useful Journals

1. Journal of Power Sources.(*www.**journals**.elsevier.com/**journal-of-power-sources**)*
2. Journal of Alloys and Compounds.(*www.journals.elsevier.com/journal-of-alloys-and-compounds)*
3. Fuel Cells Bulletin.(*www.journals.elsevier.com/**fuel-cells-bulletin***)
4. Electrochemical Acta. (*www.journals.elsevier.com/**electrochimica-acta)***
5. European Polymer Journal. (*www.**journals**.elsevier.com/**european-polymer-journal***)

Teaching and Learning Methods

1. **Lecture class**: 40 hrs
2. **Practical classes:** 36

Assignment: 2 assignments

Type of test/examination: Written examination/Assignment

Continuous Internal Evaluation (CIE):

1. Three Unit Tests each of 25 Marks (**Test duration:** 1hour)
2. Two assignments each of 25 Marks
3. **CIE for the practical component:** On completion of every experiment in the laboratory, the students shall be evaluated and marks shall be awarded on the same day. The 15 marks are for conducting the experiment, Brief procedure writeup and preparation of the laboratory record, the other 10 marks shall be for the test conducted at the end of the semester (The laboratory test duration of 03 hours is conducted for 50 marks and scale down to 10 marks)

The sum of Two/three tests, two assignments will be out of 100 marks and scale down to 25 marks. Lab component 25 marks added to theory component to access total CIE of 50 marks.

Semester End Exam (SEE):

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (duration 03 hours)

1. The question paper will have ten questions. Each question is set for 20 marks.

2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), should have a mix of topics under that module. The students have to answer 5 full questions, selecting one full question from each module.
SEE will be conducted for 100 marks (students have to answer all main questions) which will be reduced to 50 Marks.

Examination duration: 3 hrs.

CO to PO Mapping

PO1: Science and engineering Knowledge **PO2:** Problem Analysis **PO3:** Design & Development **PO4:** Investigations of Complex Problems **PO5:** Modern Tool Usage **PO6:** Engineer & Society	**PO7:** Environment and Society **PO8:** Ethics **PO9:** Individual & Team Work **PO10:** Communication **PO11:** Project Mngmt & Finance **PO12:**Lifelong Learning

PSO1: Ability to apply concept of Chemistry to design a system, to address a real-world challenge.
PSO2: Ability to develop effective communication, team work and computational skills.

CO	PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BCHES202	K-level														
CO1	K3	3	3	1	-	1	1	2	-	3	-	-	1	2	1
CO2	K3	3	3	1	-	1	1	1	-	1	-	-	1	2	1
CO3	K3	3	3	1	-	1	1	1	-	3	-	-	1	2	1
CO4	K3	3	3	1	-	1	1	1	-	3	-	-	1	2	1
CO5	K3	3	3	1	-	1	1	3	1	1	-	-	1	2	1

Course In charge

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K.S. SCHOOL OF ENGINEERING AND MANAGEMENT, BENGALURU - 560109

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CO-Mapping

Course: USER INTERFACE DESIGN			
Type: Elective		**Course Code: 18CS734**	
No of Hours			
Theory (Lecture Class)	Practical/Field Work/Allied Activities	Total/Week	Total teaching hours
3	0	3	40
Marks			
Internal Assessment	Examination	Total	Credits
40	60	100	3

Aim/Objectives of the Course

1. To study the concept of menus, windows, interfaces.
2. To study about business functions.
3. To study the characteristics and components of windows and the various controls for the windows.
4. To study about various problems in window design with text, graphics.
5. To study the testing methods.

Course Learning Outcomes

After completing the course, the students will be able to

CO1	**Summarize** the importance of user interface, characteristics of graphical system, web user interface and its principles.	**Understanding (K2)**
CO2	**Demonstrate** user interface design process and **outline** the business functions.	**Understanding (K2)**
CO3	**Explain** different system menu and navigation schemes.	**Understanding (K2)**
CO4	**Discuss** different presentation styles, discuss device based and screen-based controls in user interface design.	**Understanding (K2)**
CO5	**Illustrate** kinds of test, retest, and visualize various aspects of screen - based control.	**Understanding (K2)**

Syllabus Content

Module 1: The User Interface-Introduction, Overview, the importance of user interface - Defining the user interface, The importance of good design, Characteristics of graphical and web user interfaces, Principles of user interface design **LO:** At the end of this session the student will be able to 1. Explain the characteristics of GUI. 2. Compare and contrast GUI and web interface design. 3. Explain the general principles of UID.	**CO1** 8 hrs PO1-3 PO2-3 PO3-2 PO5 -3 PO6 -2 PO7 -1

4. Mention the advantages & disadvantages of GUI in detail.	PO9-1 PO10-1 PO12-1 PSO1-3 PSO2-3
Module 2: The User Interface Design process- Obstacles, Usability, Human characteristics in Design, Human Interaction speeds, Business functions-Business definition and requirement analysis, Basic business functions, Design standards. **LO:** At the end of this session the student will be able to 1. Explain the usefulness of user interface design process 2. Explain the challenges of user interface design process 3. Explain the human characteristics in design. 4. Explain the speed of human interaction. 5. Explain direct and indirect methods in requirement analysis.	**CO2** 8 hrs PO1-3 PO2-3 PO3-2 PO5 -3 PO6 -2 PO7 -1 PO9-1 PO10-1 PO12-1 PSO1-3 PSO2-3
Module 3 System menus and navigation schemes- Structures of menus, Functions of menus, Contents of menus, Formatting of menus, Phrasing the menu, selecting menu choices, Navigating menus, Kinds of graphical menus. **LO:** At the end of this session the student will be able to 1. Explain the guidelines for formatting menus. 2. Explain structure of menus. 3. Explain the content of menu. 4. What are the advantages of menu bar 5. Explain the kinds of graphical menus.	**CO3** 8 hrs PO1-3 PO2-3 PO3-2 PO5 -3 PO6 -2 PO7 -1 PO9-1 PO10-1 PO12-1 PSO1-3 PSO2-3
Module 4: Windows - Characteristics, Components of window, Window presentation styles, Types of windows, Window management, organizing window functions, Window operations, Web systems, Characteristics of device-based controls. **LO:** At the end of this session the student will be able to 1. Explain the types and components of windows. 2. Give short notes on windows presentation styles. 3. Explain various window management techniques. 4. Explain briefly about various device-based controls.	**CO4** 8 hrs PO1-3 PO2-3 PO3-2 PO5 -3 PO6 -2 PO7 -1 PO9-1 PO10-1 PO12-1 PSO1-3 PSO2-3

Module 5: Screen based controls- Operable control, Text control, Selection control, Custom control, Presentation control, Windows Tests-prototypes, kinds of tests. **LO:** At the end of this session the student will be able to 1. Discuss about screen-based selection controls. 2. Explain different tests and retest on windows layout. 3. Explain the prototypes of test that can done in UID.	**CO5** 8 hrs PO1-3 PO2-3 PO3-2 PO5 -3 PO6 -2 PO7 -1 PO9-1 PO10-1 PO12-1 PSO1-3 PSO2-3

Text Books

1. Wilbert O. Galitz, "The Essential Guide to User Interface Design", John Wiley & Sons, Second Edition 2002.

Reference Books (specify minimum two foreign authors text books)

1. Ben Sheiderman, "Design the User Interface", Pearson Education, 1998.
2. Alan Cooper," The Essential of User Interface Design", Wiley- Dream Tech Ltd.,2002

Useful Websites

1. https://www.usability.gov/what-and-why/user-interface-design.html
2. https://careerfoundry.com/en/blog/ui-design/what-is-ui-design-guide/
3. https://pidoco.com/en/help/ux/user-interface-design
4. https://www.coursera.org/specializations/user-interface-design

Useful Journals

1. https://www.ripublication.com/ijaer17/ijaerv12n20_96.pdf
2. https://www.tandfonline.com/doi/abs/10.1207/s15327051hci0104_2

Teaching and Learning Methods

1. Lecture class: 40 hrs
2. Practical classes: 0hrs

Assessment

Type of test/examination: Written examination

Continuous Internal Evaluation(CIE) : 40 marks (Average of three tests will be considered)

Semester End Exam(SEE): 100 marks (students have to answer all main questions) which will be reduced to 60 Marks.

Test duration: 1 :30 hrs

Examination duration: 3 hrs

CO to PO Mapping

PO1: Science and engineering Knowledge **PO2:** Problem Analysis **PO3:** Design & Development **PO4:**Investigations of Complex Problems **PO5:** Modern Tool Usage **PO6:** Engineer & Society	**PO7:**Environment and Society **PO8:**Ethics **PO9:**Individual & Team Work **PO10:** Communication **PO11:**Project Management & Finance **PO12:**Lifelong Learning

PSO1: Understand fundamental and advanced concepts in the core areas of Computer Science and Engineering to analyze, design and implement the solutions for the real-world problems.

PSO2: Utilize modern technological innovations efficiently in various applications to work towards the betterment of society and solve engineering problems.

CO	PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
18CS734	K-level														
CO1	K2	3	3	2	-	3	2	1	-	1	1	-	1	3	3
CO2	K3	3	3	2	-	3	2	1	-	1	1	-	1	3	3
CO3	K2	3	3	2	-	3	2	1	-	1	1	-	1	3	3
CO4	K2	3	3	2	-	3	2	1	-	1	1	-	1	3	3
CO5	K2	3	3	2	-	3	2	1	-	1	1	-	1	3	3

Course In charge

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DEPARTMENT OF CIVIL ENGINEERING

CO-PO Mapping

2022-23 (ODD SEM)

Course: Strength of Materials				
Type: Integrated Professional Core Course			Course Code: 21CV33	
No of Hours				
Theory (Lecture Class)	Tutorials	Practical/Field Work/Allied Activities	Total/Week	Total hours of Pedagogy
2	2	2	6	50
Marks				
CIE	SEE		Total	Credits
50	50		100	4

Aim/Objectives of the Course

1. To understand the basic concepts of the stresses and strains for different materials and strength of structural elements and analyze principal stresses due to the combination of two dimensional stresses on an element.
2. To know the development of internal forces and resistance mechanism for one dimensional and two-dimensional structural elements.
3. To analyse and understand different internal forces and stresses induced due to representative loads on structural elements.
4. To determine slope and deflections of beams.
5. To evaluate the behavior of torsion members, columns and struts.

Course Learning Outcomes

After completing the course, the students will be able to

CO1	**Determine** the stresses, strains and strengths of various structural elements and **investigate** the behaviour of structural elements under the action of compound stresses.	**Applying (K3)**
CO2	**Investigate** the behaviour of beams subjecting to various loading conditions and **draw** shear force and bending moment diagrams.	**Applying (K3)**
CO3	**Determine** the bending and shear stresses in beams.	**Applying (K3)**
CO4	**Investigate** the behaviour of members subjected to torsion, behaviour of thick and thin cylinders subjected to internal & external pressures and **determine** the diameter of members subjected to torsion and pressures on cylinders.	**Applying (K3)**
CO5	**Investigate** the behaviour of structural elements such as beams (deflection), columns and struts.	**Applying (K3)**

Syllabus Content	
Module 1: Simple Stresses and Strains: Introduction, Properties of Materials, Stress, Strain, Hooke's law, Poisson's Ratio, Stress - Strain Diagram for structural steel, Principles of superposition, Total elongation of tapering bars of circular and rectangular cross sections. Composite section, Volumetric strain, expression for volumetric strain, Elastic constants, relationship among elastic constants (No Numerical), Thermal stress and strains **Compound stresses:** Introduction, Stress components on inclined planes, General two-dimensional stress system, Principal planes and stresses, maximum shear stresses and their planes (shear planes). Compound stress using Mohr's circle method. **LO:** At the end of this session the student will be able to 1. Define stress, strain, elastic limit, and modulus of elasticity, Hooke's law, Poisson's ratio, elastic constants, composite member, temperature stresses, principle of superposition, and modulus of elasticity, modular ratio, and lateral strain. 2. Derive expressions for deformation of tapering circular and rectangular bars subjected to axial force, deformation of a member due to self-weight, and relation between elastic constants. 3. Explain the salient features of stress-strain diagram for structural steel. 4. Determine stress, strain for the given member, Poisson's ratio, elongation of bars, temperature stresses induced, deformation in compound sections, and elastic constants. 5. Define principle stresses, principal planes, Mohr's circle, thick and thin cylinders, hoop stress, longitudinal stress, and radial stress. 6. Explain the procedure for determining normal and tangential stresses, lame's equation and construction of Mohr's circle for compound stress in 2D system. 7. Construct Mohr's circle for the given data. 8. Show that sum of any two orthogonal components of stresses at a point is constant and that longitudinal stress is equal to half of hoop stress. Determine the magnitude of principal stresses, direction of the principal planes and magnitude of maximum shear stress and direction from the given data. **Laboratory Experiments:** Dimensionality of bricks, Water absorption, Initial rate of absorption, Specific gravity of coarse and fine aggregate. **LO:** At the end of this session the student will be able to 1. To study the dimensionality of bricks and determine its suitability for use in construction. 2. To determine the specific gravity of the given aggregate sample.	**CO1** 10 hrs PO1-3 PO2-3 PO12 -1 PSO1-3 PSO2-2
Module 2: Bending moment and shear force diagrams in beams: Definition of shear force and bending moment, Sign convention, Relationship between loading, shear force and bending moment, Shear force and bending moment equations, development of Shear	

Force Diagram(SFD) and Bending Moment Diagram (BMD) with salient values for cantilever, simply supported and overhanging beams for point loads, UDL(Uniformly Distributed Load), UVL(Uniformly Varying Load) and Couple. **LO:** At the end of this session the student will be able to 1. Define shear force, bending moment, shear force diagram, bending moment diagram, point of contra flexure. 2. Explain hogging bending moment and sagging bending moment. 3. List and explain the different types of beams, loading and supports with sketches. 4. Derive the relation between load intensity, bending moment and shear force. 5. Calculate shear force and bending moment at salient points and sketch SFD and BMD for the given beam. Locate point of contra flexure if any. 6. Obtain the loading pattern and also draw the BMD from the given shear force diagram. 7. Derive general expressions for shear force and bending moment for various standard loading conditions and sketch relevant diagrams. **Laboratory Experiments:** Fineness modulus of Fine and Coarse aggregate, Compressive strength tests on building blocks (brick, solid blocks and hollow blocks). **LO:** At the end of this session the student will be able to 3. To determine the fineness modulus of aggregates. 4. To determine the strength of the given specimen under compressive loading.	**CO2** 10hrs PO1-3 PO2-3 PO12 -1 PSO1-3 PSO2-2
Module 3: Bending stress in beams: Introduction – Bending stress in beam, Pure bending, Assumptions in simple bending theory, derivation of Simple bending equation (Bernoulli's equation), modulus of rupture, section modulus, Flexural rigidity, Problems **Shear stress in beams:** Derivation of Shear stress intensity equations, Derivation of Expressions of the shear stress intensity for rectangular, triangular and circular cross sections of the beams. Problems on calculation of the shear stress intensities at various critical levels of T, I and Hollow rectangular cross sections of the beam. **LO:** At the end of this session the student will be able to 1. Define bending stress, shear stress, pure bending theory, modulus of rupture, section modulus, flexural rigidity, short and long column, effective length, slenderness ratio, radius of gyration, buckling load, neutral axis, moment of resistance and shear centre. 2. List the assumptions made in Bernoulli's pure bending theory, Euler's theory of columns and limitations of Euler's theory. 3. Relate between bending stresses and radius of curvature, moment and radius of curvature. 4. Calculate the bending stress and shear stress across the section and draw the stress distribution diagram for the same at various points on the beam.	**CO3** 10 hrs. PO1-3 PO2-3 PO12 -1 PSO1-3 PSO2-2

Laboratory Experiments: Tension test on Mild steel and HYSD bars, Compression test on HYSD, Cast iron. **LO:** At the end of this session the student will be able to 1. To study the behaviour of given specimen under tensile and compressive loading and determine the modulus of elasticity value for the given specimen.	
Module 4: Torsion: Twisting moment in shafts, simple torque theory, derivation of torsion equation, tensional rigidity, polar modulus, shear stress variation across solid circular and hollow circular sections, Problems **Thin cylinders:** Introduction: Longitudinal, circumferential (hoop) stress in thin cylinders. Expressions for longitudinal and circumferential stresses. Efficiency of longitudinal and circumferential joints. Problems on estimation of change in length, diameter and volume when the thin cylinder subjected to internal fluid pressure. **Thick cylinders:** Concept of Thick cylinders Lame's equations applicable to thick cylinders with usual notations, calculation of longitudinal, circumferential and radial stresses – simple numerical examples. Sketching the variation of radial stress (pressure) and circumferential stress across the wall of thick cylinder. **LO:** At the end of this session the student will be able to 1. Define torsion, torsional rigidity, polar moment of inertia. 2. List the assumptions made in the theory of pure torsion. 3. Show that hollow shaft is stronger and stiffer than a solid shaft of same material, length and weight. 4. Derive expressions for the theory of pure torsion and relationship between the torque transmitted and shear stress induced in the shaft. 5. Determine suitable diameter for the shaft from the given data. 6. Compare the strengths of a hollow shaft to that of a solid shaft and calculate the percentage saving in weight that can be achieved by changing over to hollow shaft. 7. Calculate stresses for the given thick and thin cylinders for the given data. 8. Derive expressions for stresses in thin and thick cylinders (Lame's equation). **Laboratory Experiments:** Bending Test on Wood under two-point loading, Shear Test on Mild steel – single and double shear **LO:** At the end of this session the student will be able to 1. To study the behaviour of given specimen under bending and determine the modulus of elasticity value. 2. To find the shear strength of given material when subjected to single and double shear.	**CO4** 10 hrs PO1-3 PO2-3 PO3-2 PO12 -1 PSO1-3 PSO2-2

Module 5: Elastic stability of columns: Introduction – Short and long columns, Euler's theory on columns, Effective length, slenderness ratio, radii of gyration, buckling load, Assumptions, derivations of Euler's Buckling load for different boundary conditions, Limitations of Euler's theory, Rankine's formula and related problems. **Deflection of determinate Beams:** Introduction, Elastic curve –Derivation of differential equation of flexure, Sign convention, Slope and deflection using Macaulay's method for statically determinate beams subjected to various vertical loads, moment, couple and their combinations. Numerical problems. **LO:** At the end of this session the student will be able to 1. Define the terms, slope, deflection and curvature. 2. Derive the moment-curvature equation. 3. Determine the slope and deflection of the given beams. 4. Distinguish between long and short columns. 5. Derive the crippling load for different end conditions of columns. 6. Determine the crippling load for the column from the given data by Euler's and Rankine's formula. **Laboratory Experiments:** Impact test on Mild Steel (Charpy& Izod) **LO:** At the end of this session the student will be able to 1. To determine the impact strength of the given material by Izod and Charpy tests.	**CO5** 10hrs PO1-3 PO2-3 PO12 -1 PSO1-3 PSO2-2

Suggested Learning Resources:

1.Timoshenko and Young, "Elements of Strength of Materials" ,EastWest Press, 5th edition 2003
2.R. Subramanyam, "Strength of Materials", Oxford University Press, 3rd Edition -2016
3.B.C Punmia Ashok Jain, Arun Jain, "Strength of Materials", Laxmi - 2018-22 Publications, 10th Edition-2018

Web links and Video Lectures (e-Resources):

1.Strength of Materials web course by IIT Roorkee https://nptel.ac.in/courses/112107146/
2.Strength of Materials video course by IIT Kharagpur https://nptel.ac.in/courses/105105108/
3.Strength of Materials video course by IIT Roorkee https://nptel.ac.in/courses/112107147/18
4.All contents organized http://www.nptelvideos.in/2012/11/strengthof-materials-prof.html
5.http://www.aboutcivil.org/strength-of-materials.html

Useful Journals

- International Journal of Mechanical and Materials Engineering
- International Journal of Materials Science and Engineering

Teaching and Learning Methods

1. Lecture class: 20 hrs
2. Tutorial classes: 10 hrs
3. Practical: 20 hrs

Assessment

Type of test/examination: Written examination

Continuous Internal Evaluation (CIE): Theory component: Two out of Three Tests each of 20 marks and Two assignments each of 10 Marks reduced to 30 Marks.

Practical component 20 Marks. **Total CIE: 50 Marks**

Semester End Exam (SEE): 100 marks (students have to answer all main questions) which will be reduced to 50 Marks.

Test duration: 1 hrs

Examination duration: 3 hrs

CO to PO Mapping

PO1: Science and engineering Knowledge **PO2:** Problem Analysis **PO3:** Design & Development **PO4:**Investigations of Complex Problems **PO5:** Modern Tool Usage **PO6:** Engineer & Society	**PO7:**Environment and Sustainability **PO8:**Ethics **PO9:**Individual & Team Work **PO10:** Communication **PO11:**Project Management & Finance **PO12:**Life long Learning

PSO1: The proficiency in mathematics, physical and management sciences helps to excel in the areas of planning, analysis related to Civil Engineering systems.

PSO2: Identify sustainable materials and technologies, code of practices in construction industry and transportation systems.

CO	PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
21CV33	K-level														
CO1	K3	3	3	-	-	-	-	-	-	-	-	-	1	3	2
CO2	K3	3	3	-	-	-	-	-	-	-	-	-	1	3	2
CO3	K3	3	3	-	-	-	-	-	-	-	-	-	1	3	2
CO4	K3	3	3	2	-	-	-	-	-	-	-	-	1	3	2
CO5	K3	3	3	-	-	-	-	-	-	-	-	-	1	3	2

Course In charge

Head - Dept

Professor & Head
Dept. of Civil Engineering
K.S. Group of Institutions
K.S. School of Engineering & Management
Bangalore-560 062.

IQAC Coordinator

Principal

Principal / Director
K.S. School of Engineering & Management
Bangalore-560 062

K.S. SCHOOL OF ENGINEERING AND MANAGEMENT, BANGALORE - 560109

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

CO-PO Mapping

Course: Multimedia Communication			
Type: Elective		Course Code: 18EC743	
No of Hours			
Theory (Lecture Class)	Practical/Field Work/Allied Activities	Total hours/Week	Total teaching hours
3	1	4	40
Marks			
Internal Assessment	Examination	Total	Credits
40	60	100	3

Aim/Objectives of the Course

1. To have a knowledge of various communication terminologies, networks and media, and applications.
2. To understand how various types of media are generated and represented in communications systems.
3. To gain a working understanding of various media compression principles and their implementation in the real world.
4. To understand the concepts of Distributed Multimedia Systems, and their implementations.
5. To appreciate the technologies involved in the communication of multimedia across various communication networks

Course Learning Outcomes

After completing the course, the students will be able to

CO1	**List** and **Describe** various kinds of Multimedia networks, applications and terminologies used in communications. Also, **Calculate** the time taken to transfer the data using different networks.	**Applying (K3)**
CO2	**Make Use of** the principles behind representation of media of different forms, for different applications	**Applying (K3)**
CO3	**Utilize** the concepts used in the compression of text, image, and **implement** the algorithms used.	**Applying (K3)**
CO4	**Analyze** the concepts used in the compression of audio and video, and describe the algorithms used.	**Applying (K3)**
CO5	**Illustrate** the concepts of Distributed Multimedia Systems, their implementations, and**Describe** how various types of media are transferred across various types of communication networks.	**Applying (K3)**

Syllabus Content

Module 1: Multimedia Communications: Introduction, Multimedia informationrepresentation, multimedia networks – Telephone, Data, Broadcast Television, ISDN, Broadband Multiservice network, multimedia applications – Interpersonal applications, Interactive Applications over the Internet, Entertainment Applications, Application and networking terminology - Media Types, Communication modes, network types, multipoint conferencing, Network QoS, ApplicaionQoS, Problems. **LO:** At the end of this session the student will be able to 1. List and Explain various multimedia networks. 2. Describe multimedia applications and their operating principles. 3. Explain the various QoS parameters related to different types of networks.	**CO1** 8hrs PO1-3 PO2-1 PO6-1 PO12-1 PSO1-3

Module 2: Information Representation: Introduction, Digitization principles – Analog Signals, Encoder and Decoder Design, Text – Unformatted, Formatted and Hypertexts, Images – Graphics, Digitized Documents, Digitized Pictures, Audio – PCM Speech, CD-quality Audio, Synthesized Audio, Video – Broadcast Television, Digital Video, PC Video, Video Content **LO:** At the end of this session the student will be able to 1. Explain the basic principles used in the digitization of analog signals of various types. 2. Describe how multimedia content of various types are represented in digital form 3. Explain the operating principles of various standards used in the representation of audio and video signals, for different applications.	**CO2** 8 hrs. PO1-3 PO2-2 PO6-1 PO12-1 PSO1-3
Module 3: Text and image compression: Introduction, Compression principles – Source and Destination Encoders, Lossless and Lossy Compression, Entropy and Source Encoding, Text Compression – Static and Dynamic Huffman coding, Arithmetic Coding, Lempel-Ziv and Lempel-Ziv-Welsh coding, Image Compression – GIF, TIFF formats, Digitized Documents and Pictures, JPG Encoding and Decoding. **Distributed multimedia systems**: Introduction, Main Features of a DMS, Resource management of DMS, Networking – IP Networking, Integrated Management Architecture for IP-Based Networks, ATM, Integration of IP and ATM, Real Time Multimedia over ATM, Multimedia Operating Systems – CPU, Memory, I/O and File System Management **LO:** At the end of this session the student will be able to 1. Describe the principles used in compression of text and images, and the algorithms used. 2. Design algorithms and derive Huffman codes and Arithmetic codes for a given set of information. 3. Explain the design and working of a JPEG encoder and decoder. 4. Describe a Distributed Multimedia System and its design and operation. 5. Explain how the DMS is integrated with different computer networks.	**CO3** **CO5** 8hrs PO1-3 PO2-2 PO3-2 PO6-1 PO12-1 PSO1-3
Module 4: Audio and video compression: Introduction, Audio Compression – Differential PCM, Adaptive Differential PCM, Linear and Adaptive Predictive Coding, Code-excited LPC, Perceptual coding, MPEG and Dolby audio coders, Video Compression, video compression principles – H.261, H.263, MPEG, MPEG-1, MPEG-2, MPEG-4 **LO:** At the end of this session the student will be able to 1. Describe various Audio compression technologies and their working principles. 2. Describe various Video compression techniques, the algorithms used, and their applications.	**CO4** 8 hrs PO1-3 PO6-1 PO12-1 PSO1-3
Module 5: Multimedia Communication Across Networks: Packet Audio/Video in the Network Environment – Packet Voice, Integrated Packet Networks, Packet Video, Video Transport Across Generic Networks – Layered Video Coding, Error-Resilient Video Coding Techniques, Scalable Rate Control, Streaming Video Across the Internet, Multimedia Transport across ATM Networks – Multiplexing, Video Delay, Errors and Losses in ATM Networks, MPEG Video Error Concealment, Loss Concealment, Video across WATM Networks, Heterogeneous Networking	**CO5** 8 hrs PO1-3 PO6-1 PO12-1 PSO1-3

LO: At the end of this session the student will be able to

1. Describe the communication models used to transmit various types of multimedia in networks.
2. Explain the various techniques used to ensure reliable transmission of media across various networks.
3. Explain the techniques used to minimize losses in data during transfer of multimedia over networks.

Text Books

1. Fred Halsall, "**Multimedia Communications**", Pearson education, 2001.
2. K. R. Rao, Zoran S. Bojkovic, Dragorad A. Milovanovic, "**Multimedia Communication Systems**", Pearson education, 2004.

Reference Books

1. Jerry D. Gibson, "**Multimedia Communications: Directions and Innovations (Communications, Networking & Multimedia)**", Academic Press Inc, 1st Ed, 2000.
2. Franklin F. Kuo, Joaquin Garcia Luna-Aceves, Wolfgang Effelsberg, "**Multimedia Communications: Protocols and Applications**", Prentice Hall; 1st Ed, 1997.
3. Prabhat K. Andleigh, KiranThakrar, "**Multimedia Systems Design**", PHI, 2004

Useful Websites

- **W1:**https://www.cs.cf.ac.uk/Dave/Multimedia/node200.html
- **W2:**http://dvd-hq.info/data_compression_1.php#Introduction
- **W3:**http://www.cse.wustl.edu/~jain/cis788-97/ftp/ip_multimedia/
- **W4:**http://multimedia.cx/network.html

Useful Journals

- International Journal of Multimedia Communications (www.oldcitypublishing.com/journals/ijmc-home/)
- The International Journal of Mobile Computing and Multimedia Communications (www.igi-global.com/journal/international-journal...multimedia)
- ACM Transactions on Multimedia Computing, Communications, and Applications (http://tomm.acm.org/)
- International Journal of Computer Communications (www.journals.elsevier.com/computer-communications/)

Teaching and Learning Methods

1. Lecture class: 40 hours
2. Tutorial Classes: 10 hours

Assessment

Type of test/examination: Written examination

Continuous Internal Evaluation(CIE) : 400 marks (30 marks -Average of three tests + 10 marks Assignments)

Semester End Exam(SEE): 100 marks (students have to answer all main questions) which will be reduced to 60 Marks.

Test duration: 1 :30 hours

Examination duration: 3 hours

CO to PO Mapping

PO1: Science and engineering Knowledge **PO2:** Problem Analysis **PO3:** Design & Development **PO4:**Investigations of Complex Problems **PO5:** Modern Tool Usage **PO6:** Engineer & Society	**PO7:**Environment and Sustainability **PO8:**Ethics **PO9:**Individual & Team Work **PO10:** Communication **PO11:**Project Management& Finance **PO12:**Life long Learning

At the end of the Program, the students should:

PSO1: Be able to acquire knowledge and apply concepts in the field of engineering and interdisciplinary subjects.

PSO2: Be able to identify the existing problems, effectively utilize tools to provide solution, and disseminate the information.

CO	PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO 12	PSO1	PSO 2
18 EC743	K-level														
CO1	K3	3	1	-	-	-	1	-	-	-	-	-	1	3	-
CO2	K3	3	2	-	-	-	1	-	-	-	-	-	1	3	-
CO3	K3	3	2	2	-	-	1	-	-	-	-	-	2	3	-
CO4	K3	3	2	2	-	-	1	-	-	-	-	-	2	3	-
CO5	K3	3	-	-	-	-	1	-	-	-	-	-	2	3	-

Course In charge

Head - Dept

Professor & Head
Dept. of Electronics & Communication Engineering
K. S School of Engineering & Management
Bangalore-560 109

Principal

Dr. K. RAMA NARASIMHA
Principal/Director
K S School of Engineering and Management
Bengaluru - 560 109

K.S. SCHOOL OF ENGINEERING AND MANAGEMENT, BANGALORE - 560109

DEPARTMENT OF MANAGEMENT STUDIES & RESEARCH CENTRE

CO-PO Mapping

Course: MANAGEMENT AND ORGANIZATION BEHAVIOR			
Type: Core		**Course Code: 22MBA11**	
No of Hours			
Theory (Lecture Class)	Practical/Field Work/Allied Activities	Total/Week	Total teaching hours
3	2	5	52
Marks			
Internal Assessment	Examination	Total	Credits
40	60	100	3

Aim/Objectives of the Course

1. The student will be able to recite the theories and models of Management and Organisational Behavior.
2. The student will be able to apply and solve the workplace problems.
3. The student will be able to classify in differentiating between the best methods to solve the problem.
4. The student will be able to compare the appropriate framework for solving the problems at the workplace
5. The student will be able to design model in dealing with the problems in the organisation.

Course Learning Outcomes

After completing the course, the students will be able to

CO1	Gain practical experience in the field of Management and Organization Behaviour	**Applying (K3)**
CO2	Acquire the conceptual knowledge of Management, various functions of Management and theories in Organizational Behaviour.	**Applying (K3)**
CO3	Apply managerial and behaviour knowledge in real world situations.	**Applying (K3)**
CO4	Develop a greater understanding about Management to analyse the concepts related to Functions of management	**Applying (K3)**
CO5	Develop a greater understanding about Behavioural aspects to analyse the concepts related to individual behavior, attitude, perception and personality	**Applying (K3)**
CO6	Understand and demonstrate their exposure on recent trends in management	**Applying (K3)**

Syllabus Content

Unit 1:Introduction to Management Management -Introduction, Meaning, Nature, Objectives, Importance, Difference between Administration and Management, Levels of Management, Types of Managers, Managerial Skills, Managerial Competencies, Scope of Management, Functions of Management, Evolution of Management Thought, Fayol's fourteen principles of Management, Recent Trends in Management. **LO:** At the end of this session the student will be able to 1. Understand the meaning and define Management 2. Understand all the 10 managerial skills	**CO1** **9 hours** PO1, PSO2

CO-PO Mapping

3. Trace the Evolution of management 4. Comprehend the recent trends in management	
Unit 2: Functions of Management Planning- Definition, Features, Nature, Importance, Types, Steps in Planning, Planning Tools and Techniques, Essentials of a Good Plan. Organisation- Definitions, Importance, Principles, Types of Organisation Structures, Span of Control, Centralisation and Decentralisation of Authority. Directing-Definitions, Importance, Elements of Directing, Principles of Directing, Characteristics of Directing; Controlling-Definitions, Need of Controlling, Characteristics of Control, Steps in the Controlling Process, Resistance to Control, Design of Effective Control System, Types of Control, Control Techniques. Decision-making- Concepts, Types, Models, Difficulties in Decision-making, Decision-making for Organisational Effectiveness, Decision-making Styles. **LO:** At the end of this session the student will be able to 1. Understand the planning function in detail 2. Understand the organising function in detail 3. Understand the directing function in detail 4. Understand decision making in detail	**CO2** **10 hours** PO1, PSO1,PSO2
Unit 3:. Organisational Behaviour Organisational Behaviour: Introduction, Definitions, Nature, Goals, Importance, Approaches to Organisational Behaviour, Models. Attitude- Meaning, Definition, Types, Components, Attitudes and Behaviour, Changing Attitudes in the Workplace; Perception-Perception, Perceptual Process, Factors Influencing Perception, Perception and Decision-making; Personality-Definitions, Factors Influencing Personality, Big Five Personality Traits, Myers–Briggs Type Indicator (MBTI), Personality Tools and Tests; Motivation-Definitions, Process of Motivation (Cycle of Motivation), Nature, Importance, Types, Theories. **LO:** At the end of this session the student will be able to 1. Understand the concept of Organizational behaviour 2. Remember the different models of OB 3. Grasp the concept of different Personalities	**CO3** **10 hours** PO4, PSO1,PSO2
Unit 4: Managing Human at Work Group Dynamics- Meaning of Group, Group Characteristics, Classification of Groups, Models of Group Development, Meaning of Group Dynamics, Group Behaviour, Impact of Group on Individual's Behaviour, Impact of External Factors on Group Behaviour. Teamwork- Nature of Teams, Team Characteristics, Teams Versus Groups, Teamwork, Processes of Teamwork, Types of Teams, Reasons for Team Failure, Creating Effective Teams. **LO:** At the end of this session the student will be able to 1. Understand the concept of group 2. Understand the necessity of teams 3. Different aspects of teams	**CO4** **7 hours** PO1, PO4, PSO2
Unit 5: Organizational Power, Politics and Culture Power and Politics- Nature of Power and Politics, Early Voices, Questioning	

Power and Authority, Sources of Power for Individuals, Managing Organisational Politics. Culture- Definitions of Organisational Culture, Strong Versus Weak Culture, Characteristics, Types, Levels, Dimensions, Creating Organisational Culture, Changing Organisational Culture. **LO:** At the end of this session the student will be able to 1. Undersyand the concept of Power and politics 2. How one can be organizational politician 3. What Organizational culture means	**CO5** **7 hours** PO3, PSO1,PSO2
Unit 6: Change and Stress Management Change- Nature, Characteristics, Process, Forces Responsible for Change in Organizations, Resistance to Change, Managing Resistance to Change. Stress Management-Definitions, Types of Stress, Causes of Stress, Managing Stress. **LO:** At the end of this session the student will be able to 1. Concept of change 2. Dealing with resistance to change 3. Explain the Concept of Stress	**CO-6** **7 hours** PO3, PSO1,PSO2

Text Books

- Essentials of Management ,Koontz ,McGraw Hill ,8e, 2014
- Principles and Practices of Management and Organisational Behaviour ,Chandrani Singh and Aditi Khatri ,Sage Publication ,2016
- Organizational behaviour ,Stephen P Robbins, Timothy Pearson 14e, 2012

Reference Books (specify minimum two foreign authors text books)

- Organizational Behaviour Fred Luthans, McGraw Hill International 12/e, 2011
- Principles of Management ,Ramesh B. Rudani, Tata McGraw-Hill 2013
- Masters of Management Thought ,Mahanand Charati& M M Munshi Swapna Book House 2015

Useful Websites

- OBWeb - Organizational Behavior Division
- OpenLearn Learning Space - The Open University
- An introduction to business cultures
- Business organisations and their environments: culture
- Creating an ethical organisation
- ProQuest Ebook Central

Useful Journals

- Journal of Organizational Behavior - Wiley Online Library
- Journal of Organizational Behavior
- Research in Organizational Behavior
-

K.S. SCHOOL OF ENGINEERING AND MANAGEMENT, BANGALORE - 560109

DEPARTMENT OF MANAGEMENT STUDIES

CO-PO Mapping

Teaching and Learning Methods

1. Lecture class: 44 hrs
2. Practical classes: 08 hrs

Assessment

Type of test/examination: Written examination

Continuous Internal Evaluation(CIE) : 40 marks (Average of THREE tests will be considered)

Semester End Exam(SEE) : 100 marks (students have to answer all main questions) which will be reduced to 60 Marks.

Test duration: 1 :30 hrs **Examination duration:** 3hrs

PO1: Acquire sufficient theoretical knowledge and are enabled to apply them to solve practical problems in business and other organizations/ institutions of importance.

PO2: Apply effective communication skills with a high degree of lateral and critical thinking that enhances learn ability, developed for being continuously employable.

PO3: Demonstrate leadership qualities, ethically sound, enabled with decision making skills that reflect a high degree of social consciousness

PO4: Recognize the need for sustained research orientation to comprehend a growing complex, economic, legal and ethical environment

PO5: Possess self- sustaining entrepreneurship qualities that encourages calculated risk taking.

PSO1: Develop viable Managerial solutions in the dynamic Business eco system

PSO2: Establish and Encourage Entrepreneurial zeal along with Ethical Values in the business

CO		PO						
		PO1	PO2	PO3	PO4	PO5	PSO1	PSO2
18MBAHR302	K- Level							
CO1	K3	3	2	2		2	1	
CO2	K3	3			2			
CO3	K3	2				2		2
CO4	K3	3	2		2			
CO5	K3		2	1		2	1	
CO6	K3	2		2		1		

Course In charge

Head of the Department

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Principal

Dr. K. RAMA NARASIMHA
Principal/Director
K S School of Engineering and Management
Bengaluru - 560 109

K.S. SCHOOL OF ENGINEERING AND MANAGEMENT, BANGALORE - 560109

DEPARTMENT OF MECHANICAL ENGINEERING

CO-PO Mapping (2022-23)

Course: Control Engineering		**Course Code: 18ME71**	
Type: Core			
No of Hours			
Theory (Lecture Class)	Practical/Field Work/Allied Activities	Total hours/Week	Total teaching hours
3	1	4	40
Marks			
Internal Assessment	Examination	Total	Credits
40	60	100	3

Aim/Objectives of the Course

1. **Modeling of mechanical, hydraulic, pneumatic and electrical systems.**
2. **Representation of system elements by blocks and its reduction.**
3. **Transient and steady state response analysis of a system and root locus plots.**
4. **Frequency response analysis using polar plot and Bode plot.**
5. **Different system compensators and variable characteristics of linear systems.**

Course Learning Outcomes

After completing the course, the students will be able to

CO1	**Recognize** control system and its types , control actions	**Applying (K3)**
CO2	**Determine** the system governing equations for physical models(Electrical, Thermal, Mechanical, Electro Mechanical) and Calculate the gain of the system using block diagram and signal flow graph	**Applying (K3)**
CO3	**Illustrate** the response of 1st and 2nd order systems	**Applying (K3)**
CO4	**Determine** the stability of transfer functions in complex domain and frequency domain	**Applying (K3)**
CO5	**Employ** state equations to study the controllability and observability	**Applying (K3)**

Syllabus Content

Module 1: INTRODUCTION: Concept of automatic controls, Open loop and closed loop systems, Concepts of feedback, requirements of an ideal control system, Types of controllers- Proportional, Integral Proportional Integral, Proportional Integral Differential controllers. Learning Outcomes	**CO1** **8 hrs** PO1-3 PO2-3 PO3-2 PO4 - 2

At the end of this unit student able to 1. Define the basic terms involved in the controls system 2. Explain the various open loop and closed loop controls systems 3. Distinguish between the open loop and closed loop system 4. State the characteristics of the controller	PO5-1 PO12 -1 PSO1-3 PSO2-1

Module 2: **Mathematical Models:** Mathematical models of Mechanical, Electrical, Thermal, Hydraulic and pneumatic systems Analogous systems: Direct and invert analogs for mechanical, thermal and fluid systems. **Learning Outcomes** **At the end of this unit student able to** 1. Define the Transfer function 2. Study the different types of models(mech, electrical,etc.,) 3. Develop the mathematical model and Determine the Transfer Functions of the above mentioned models. **Block Diagrams and Signal Flow Graphs:** Transfer Functions definition, function, block representation of systems elements, reduction of block diagrams, Signal flow graphs: Mason's gain formula. **Learning Outcomes** **At the end of this unit student able to** 1. Define and Explain the functions of the block diagrams 2. Modify the original block diagram in to reduced Block diagram in determining the Transfer function. Apply of Mason's gain formula in determining the Transfer Function	**CO2** **8 hrs.** PO1-3 PO2-3 PO3-2 PO4-2 PO5-1 PO6-1 PO12-1 PSO1-3 PSO2-1

Module 3: **Transient and Steady State Response Analysis:** Introduction, first order and second order system response to step, ramp and impulse inputs, concepts of time constant and its importance in speed of response. System stability Routh's-Hurwitz Criterion. **Learning Outcomes** **At the end of this unit student able to** 1. Identify the various responses for first order and second order systems 2. Determine the stability of the linear invariant system using RH criteria	**CO3** **8 hrs** PO1-3 PO2-3 PO3-2 PO4-2 PO5-1 PO6-1 PO12-1 PSO1-3 PSO2-1
Module 4: **Frequency Domain Analysis:** Relationship between time and frequency response, Polar plots, bode's plot, Nyquist plot and Nyquist stability criterion,, Relative stability concepts, Gain margin and phase margin. **Learning Outcomes** **At the end of this unit student able to** 1. **Define** the terms involved in Frequency Response Analysis and Explain Nyquist criteria,cauchyi's principle 2. Sketch the polar plot for given Transfer function 3. Check for the stability of the system **Frequency Response Analysis Using Bode Plots:** Bode attenuation diagrams, Stability analysis using Bode plots, Simplified Bode Diagrams. **Learning Outcomes** **At the end of the unit student able to:** 1. List the factor affecting in plotting bode plot and Explain the bode plot 2. Draw the bode plot for following control systems 3. Determine the gain margin and phase margin for the control system	**CO4** **8 hrs** PO1-3 PO2-3 PO3-2 PO4-2 PO5-1 PO6-1 PO12-1 PSO1-3 PSO2-1
Module 5: System Compensation and State Variable Characteristics of Linear Systems: Series and feedback compensation, Introduction to state concepts, state equation of linear continuous data system. Matrix representation of state equations, controllability and observability, Kalman and Gilberts test. **Learning Outcomes**	**CO5** **8 hrs** PO1-3 PO2-3 PO3-2 PO4-1 PO5-1

At the end of the unit student able to	PO6-1 PO12-1 PSO1-3 PSO2-2
1. Define compensators 2. Explain the different types of compensators 3. Derive the transfer function for the compensator 4. Draw the block diagram for series compensation control system	

Text Books

1. Modern Control Engineering, Katsuhiko Ogatta, Pearson Education,2004.
2. Control Systems Principles and Design, M.Gopal, 3rd Ed.,TMH,2000.
3. Control Systems, N K Sinha, Publisher: New Age International Pub (2002), ISBN-10: 8122411681

Reference Books (specify minimum two foreign authors text books)

1. Modern Control Systems, Richard.C.Dorf and Robert.H.Bishop, Addison Wesley,1999
2. System dynamics & control, Eronini-Umez, Thomson Asia pte Ltd. singapore, 2002.
3. Feedback Control System, Schaum's series. 2001.

Useful Websites

1. http://nptel.iitg.ernet.in
2. http://elearning.vtu.ac.in
3. http://freevideolectures.com/Subject/Mechanical
4. http://video.mit.edu/channel/mechanical-engineering

Useful Journals

1. http://www.nitc.ac.in/app/webroot/img/upload/Modern_Control.pdf
2. http://cce.iisc.ernet.in/Advanced%20Control%20Systems.htm
3. http://www.springer.com/engineering/robotics/journal/12555
4. www.journals.elsevier.com/control-engineering-practice/

Teaching and Learning Methods

1. Lecture class : 40 hrs
2. Self-study : 00 hrs
3. Field visits/Group Discussions/Seminars : 02 hrs
4. Practical classes : 00 hrs

Assessment

Type of test/examination: Written examination

Continuous Internal Evaluation(CIE) : 20 marks (15 marks -Average of three tests + 5 marks Assignments)

Semester End Exam(SEE) : 80 marks (students have to answer all main questions).

Test duration: 1 :30 hours

Examination duration: 3 hours

CO to PO Mapping

PO1: Science and engineering Knowledge	**PO7:**Environment and Society
PO2: Problem Analysis	**PO8:**Ethics
PO3: Design & Development	**PO9:**Individual & Team Work
PO4: Investigations of Complex Problems	**PO10:** Communication
PO5: Modern Tool Usage	**PO11:**Project Mgmt. & Finance
PO6: Engineer & Society	**PO12:**Lifelong Learning

PSO1: Ability to apply concept of mechanical engineering to design a system, a component or a process/system to address a real world challenges

PSO2: Ability to develop effective communication, team work, entrepreneurial and computational skills

	PO	PO1	PO2	PO3	PO 4	PO5	PO6	PO 7	PO8	PO9	PO10	PO1 1	PO12	PS O1	PS O 2
15 ME73	K-level														
CO1	K3	3	3	2	2	1	--	-	-	-	-	-	1	3	2
CO2	K3	3	3	2	2	1	1	-	-	-	-	-	1	3	2
CO3	K3	3	3	2	2	1	1	-	-	-	-	-	1	3	2
CO4	K3	3	3	2	2	1	1	-	-	-	-	-	1	3	2
CO5	K3	3	3	2	1	1	1		-	-	-	-	1	3	2

Course In charge **Head of the Department** **Principal**