KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE
(An Autonomous Institute under Kakatiya University, Warangal)
(Approved by AICTE, New Delhi; Recognised by UGC under 2(f) & 12(B); Sponsored by EKASILA EDUCATION SOCIETY)
Opp : Yerragattu Gutta, Hasanparthy (Mandal), WARANGAL - 506 015, Telangana, INDIA.
काकतीय प्रैद्योगिकी एवं विज्ञान संस्थान, वरंगल - ५०६ ०१५
కాకతీయ సాంకేతిక విజ్ఞాన శాస్త్ర విద్యాలయం, వరంగల్ - ౫౦౬ ౦౧౫
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DEPARTMENT OF INFORMATION TECHNOLOGY

B.Tech - INFORMATION TECHNOLOGY

URR-18

(Applicable from the Academic Year 2020-21)

SYLLABI (III to VIII SEMESTERS)

DEPARTMENT OF INFORMATION TECHNOLOGY
KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE, WARANGAL – 15
(An Autonomous Institute under Kakatiya University, Warangal)

SCHEME OF INSTRUCTION AND EVALUATION
III-SEMESTER OF 4-YEAR B.TECH DEGREE PROGRAMME

[6Th+3P+1MC]

Sl. No.	Course Category	Course Code	Course Title	Hours per Week			Credits	Evaluation Scheme				
				L	T	P		CIE			ESE	Total Marks
								TA	MSE	Total		
1	BSC	U18MH301	Engineering Mathematics-III	3	1	-	4	10	30	40	60	100
2	HSMC	U18MH302	Professional English	-	-	2	1	100	-	100	-	100
3	PCC	U18IT303	Object Oriented Programming through C++	3	-	-	3	10	30	40	60	100
4	BSC	U18MH304	Discrete Mathematics	3	-	-	3	10	30	40	60	100
5	PCC	U18IT305	Computer Architecture and Organization	3	-	-	3	10	30	40	60	100
6	ESC	U18EC306	Switching Theory and Logic Design	3	-	-	3	10	30	40	60	100
7	PCC	U18IT307	Operating Systems	3	-	-	3	10	30	40	60	100
8	PCC	U18IT308	Object Oriented Programming through C++ Laboratory	-	-	2	1	40	-	40	60	100
9	PCC	U18IT309	Operating Systems Laboratory	-	-	2	1	40	-	40	60	100
10	MC	U18MH315	Essence of Indian Traditional Knowledge*	2	-	-	-	10	30	40	60	100
			Total	**20**	**1**	**6**	**22**	**250**	**210**	**460**	**540**	**1000**

L= Lecture, T = Tutorials, P = Practicals& C = Credits
Contact hours per week : 27
Total Credits : 22

U18MH301 ENGINEERING MATHEMATICS- III

Class: B.Tech. III-Semester **Branch:** Common to all branches

Teaching Scheme :

L	T	P	C
3	1	-	4

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):

This course will develop students' knowledge in / on…

LO1: *Laplace transform and its use to find the solutions of certain initial and boundary value problems occur in engineering*

LO2: *Fourier series and its importance*

LO3: *functions of complex variables and the property of analyticity of a function of complex variable and their applications*

LO4: *integration of a function of complex variable, and evaluation of certain real integrals using complex analysis*

UNIT-I(9+3)

Laplace Transforms: Integral transforms, Kernel of a transform, Laplace transform of a function, Inverse Transform-Existence and uniqueness of Laplace Transforms, S- plane and region of convergence (ROC), Laplace Transform of some commonly used signals- Dirac-delta (impulse) function $[\delta(t)]$,step $[u(t)]$,ramp $[tu(t)]$,parabolic $[t^2u(t)]$,real exponential $[e^{at}u(t)]$, complex exponential $[e^{j\Omega t}u(t)]$, sine and cosine functions, damped sine and cosine functions, hyperbolic sine and cosine functions, damped hyperbolic sine and cosine functions, rectangular pulse and triangle. Properties of Laplace Transforms- Linearity, First shifting theorem (Frequency shift property), Laplace transforms of derivatives and integrals, time scaling property, time reversal property, Laplace Transform of Heaviside unit step function, Second shifting theorem (time shift property), Initial value and final value theorems, Laplace transform of periodic functions- Convolution theorem.

Operational Calculus: Transfer functions, Solution of ordinary differential equations with constant coefficients and system of ordinary differential equations with constant coefficients using Laplace Transforms. Application of Laplace transforms to the first order and second order system subjected to impulse, step, periodic, rectangular, square, ramp, triangular and sinusoidal functions

UNIT-II (9+3)

Fourier Series: Periodic functions, orthogonal and orthonormal functions and systems of orthogonal functions, representation of a function as Trigonometric Fourier series (FS) in a range of length 2π, Euler formulae, Conditions for the existence of Fourier series (Dirichlet's conditions), FS for typical wave forms-square wave, pulse train, impulse train(comb function), periodic rectangular wave, triangle, saw tooth, half wave rectified signal, full wave rectified signal, plotting FS coefficients - line spectrum (magnitude and Phase spectra), Fourier series on an arbitrary period, effects of symmetry of function on FS coefficients, half range series – half range cosine and sine series expansions, exponential FS

UNIT-III (9+3)

Complex Variables: Functions of complex variables, Limit, Continuity, Differentiability, Analytic Functions, Cauchy-Riemann Equations in Cartesian and Polar coordinates. Elementary functions, Harmonic Functions, Construction of Analytic functions. Applications to find velocity potential and stream function of a flow. Conformal mapping and bilinear transformation

UNIT-IV (9+3)

Complex Integration: Line integration in complex plane, integral of a non-analytic function, dependence on path of integration, *ML*-Inequality, Cauchy's integral theorem, Cauchy's integral formula, series expansion of complex functions: Taylor's series and Laurent's series, zeros and singularities, residues, Residue Theorem- Applications of Residue theorem to the properly chosen integrals around a unit circle and semi-circle

Text Books:

[1] Grewal, B.S., "Higher Engineering Mathematics", *Khanna Publishers,* Delhi, 43rded. 2014.

Reference Books:

[1] Kreyszig E., "Advanced Engineering Mathematics", *John Wiley & Sons, Inc.,* U.K 9thed.2013.

[2] Churchill R.V., "Complex Variable and its Applications", *McGraw Hill*, New York, 9thed. 2013.

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: *find the Laplace transform of a given function and apply Laplace transforms to solve and certain differential equations whose solutions cannot be computed using classical methods. compute abstract quantitative information*

CO2: *describe a given function as Fourier series in an interval and understand its importance in engineering*

CO3: *understand the concept of a function of complex variable and verify whether a function is analytic or not, construct analytic function when real/imaginary part of the function is known; find velocity potential and stream function of a fluid flow using complex analytical methods*

CO4: *represent a given function in Taylor's and Laurent's series and evaluate certain real integrals using integral theorems*

Course Articulation Matrix (CAM): U18MH301ENGINEERING MATHEMATICS- III

CO		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	U18MH301.1	2	2	-	-	-	-	-	-	-	-	-	1	1	-	-
CO2	U18MH301.2	2	2	-	-	-	-	-	-	-	-	-	1	1	-	-
CO3	U18MH301.3	2	2	-	-	-	-	-	-	-	-	-	1	1	-	-
CO4	U18MH301.4	2	1	-	-	-	-	-	-	-	-	-	1	1	-	-
U18MH301		**2**	**1.75**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**1**	**-**	**-**

U18MH302 PROFESSIONAL ENGLISH

Class:B.Tech III - Semester **Branch:** Common to all branches

Teaching Scheme:Examination Scheme:

L	T	P	C
-	-	2	1

Continuous Internal Evaluation	100 marks
End Semester Examination	-

Course Learning Objectives (LOs):
This course will develop the student's knowledge in/on…

LO1: *reading skill and sub skills to comprehend the text*
LO2: *vocabulary and using it appropriately to describe situations*
LO3: *using phrasal verbs in speech and writing*
LO4: *grammar and improve language ability to write effectively*

Week	Topic Name
I	a. Reading Comprehension- Significance of Reading Skimming b. Verbal Ability- Synonyms c. Grammar- Articles
II	a. Reading Comprehension- Scanning b. Verbal Ability- Antonyms c. Grammar- Articles
III	a. Reading Comprehension- Critical Reading b. Verbal Ability- Sentence completion with correct alternative word/group c. Grammar- Prepositions
IV	a. Reading Comprehension- Intensive Reading b. Verbal Ability- Sentence completion with correct alternative word/group c. Grammar- Reported Speech
V	a. Reading Comprehension- Intensive Reading b. Verbal Ability- Jumbled Sentences c. Grammar- Error Detection
VI	a. Reading Comprehension- Inferential Reading b. Verbal Ability- Jumbled Sentences c. Grammar- Error Detection
VII	a. Reading Comprehension- Lexical Reading b. Verbal Ability- Phrasal Verbs c. Grammar- Tenses, Structures
VIII	a. Reading Comprehension- Read to Interpret b. Verbal Ability- Single Word Substitutes c. Grammar- Tenses, Uses
IX	a. Reading Comprehension- Read to Analyze b. Verbal Ability- Collocations c. Grammar- Tenses, Uses
X	a. Reading Comprehension- Read to Summarize b. Verbal Ability- Spellings c. Grammar, Agreement between Subject & verb (concord)

Text Books:

[1] Professional English *Manual prepared by the faculty of English, KITSW*

[2] Arun Sharma & Meenakshi Upadhyay, Verbal Ability and Reading Comprehension for CAT & Other Management Examinations,8th ed.*McGraw Hill Education (India) Private Ltd*, Chennai, 2018

Reference Books:

[1] Nishit K. Sinha, Verbal Ability and Reading Comprehension for the CAT, 3rd ed.*Pearson India Education Services Pvt. Ltd.,* Chennai

[2] Harper Collins, Collins COBUILD English Grammar,3rded. *Harper Collins Publishers Ltd.*

[3] Rosemary & Courtney, Longman-English-Chinese Dictionary of Phrasal Verbs

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: *analyze the passage using skill and sub skill to solve different types of questions related to reading comprehension*

CO2: *identify grammatical errors in the given sentences and correct them*

CO3: *select correct synonyms/antonyms/phrasal verbs and complete sentences with suitable words or phrases*

CO4: *keep the given jumbled sentences in proper sequence to make a coherent paragraph*

Course Articulation Matrix (CAM): U18MH302 PROFESSIONAL ENGLISH																
CO		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	U18MH302.1	-	-	-	-	-	-	-	-	1	2	-	1	-	-	-
CO2	U18MH302.2	-	-	-	-	-	-	-	-	1	2	-	1	-	-	-
CO3	U18MH302.3	-	-	-	-	-	-	-	-	1	2	-	1	-	-	-
CO4	U18MH302.4	-	-	-	-	-	-	-	-	1	2	-	1	-	-	-
	U18MH302	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**2**	**-**	**1**	**-**	**-**	**-**

U18IT303 OBJECT ORIENTED PROGRAMMING THROUGH C++

Class: B.Tech. III-Semester **Branch:** Information Technology

Teaching Scheme :

L	T	P	C
3	-	-	3

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):

This course will develop students' knowledge in /on…

LO1: *concepts of object-oriented programming paradigms, functions &structures*
LO2: *classes and operator overloading in problem solving*
LO3: *implementing inheritance, polymorphism and templates*
LO4: *concepts of exception handling and files*

UNIT–I (9)

Programming Paradigms: Procedural Programming, Modular Programming, Object-Oriented Programming and Generic Programming
Introduction to C++: Structure of C++ program, Basic I/O, Tokens, Data types, Reference variables, Operators, Expressions, Control Structures
Functions in C++: Inline function, Default arguments, Overloading, Parameter passing mechanisms, Name Spaces, Structures

UNIT–II (9)

Classes and Objects: Specifying a Class, Defining member functions, Making an outside function inline, Nesting of member functions, Arrays within a class, Array of objects, Static data members, Static member functions, Friend functions, Objects as arguments, Returning objects, Pointers to members, Constructors and Destructors.
Operator Overloading: Overloading of Unary and Binary operators, Overloading of Unary and Binary operators using friend functions, Type Conversions

UNIT–III (9)

Inheritance: Single inheritance, Multilevel inheritance, Multiple inheritance, Hierarchical inheritance, Hybrid inheritance, Making private member inheritable, Virtual Base class, Abstract class, Constructors in derived classes
Polymorphism: Pointers to objects, this pointer, Pointers to derived classes, Virtual Functions, Pure virtual functions
Templates: Class templates, Class templates with multiple parameters, Function templates, Function templates with multiple parameters, Overloading of template functions

UNIT–IV (9)

Exception Handling: Exception handling mechanism, Throwing mechanism, Catching mechanism, Re-throwing of exception, Specifying the exceptions
Managing Console I/O operations: Introduction, C++ Streams, C++ Stream Classes, Un- formatted I/O Operations, Formatted I/O Operations, Managing output with manipulators

Files: Classes for file stream operations, Opening and closing a file, Detecting EOF, File Modes, File pointers and their manipulators, Sequential input and output operations, Random access files, Command line arguments

Text Books:

[1] E.Balagurusamy, Object-Oriented Programming with C++, *McGraw-Hill Education India Pvt. Ltd*, 6thed.

Reference Books:

[1] Bjarne Stroustrup, The C++ Programming Language, *Addison-Wesley Publications*, 2nded.
[2] K.R. Venugopal, Rajkumar, T.Ravishankar, Mastering C++,*McGraw-Hill Education India Pvt.Ltd*, 2nded. 1997.
[3] Timothy A Budd, An Introduction to Object Oriented Programming, *Pearson Education,* 2nded.

Course Learning Outcomes (COs):
On completion of this course, students will be able to…

CO1: *explain the differences between different programming paradigms and explain the features of C++ supporting object-oriented programming*
CO2: *develop object-oriented programming using classes and operator overloading*
CO3: *apply reusability concepts like inheritance, polymorphism and templates in application development*
CO4: *apply exception handling, files concepts in problem solving*

Course Articulation Matrix (CAM): U18IT303 OBJECT ORIENTED PROGRAMMING THROUGH C++

CO		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	U18IT303.1	1	-	-	-	-	-	-	-	-	-	-	1	-	-	-
CO2	U18IT303.2	2	2	1	1	-	-	-	-	-	-	-	2	2	1	-
CO3	U18IT303.3	2	2	1	1	-	-	-	-	-	-	-	2	2	2	1
CO4	U18IT303.4	2	2	1	1	-	-	-	-	-	-	-	2	2	2	2
U18IT303		**1.75**	**2**	**1**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1.75**	**2**	**1.66**	**1.5**

U18MH304 DISCRETE MATHEMATICS

Class: B.Tech. III-Semester **Branch:** Common to CSE &IT branches

Teaching Scheme :

L	T	P	C
3	-	-	3

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):

This course will develop students' knowledge in /on…

LO1: *necessary mathematical concepts that are prerequisite for computer related subjects namely database management systems, knowledge based systems and artificial intelligence*

LO2: *different types of logics namely first-order logic ,quantifier logic and predicator logic so as to gain knowledge of artificial intelligence*

LO3: *elementary Combinations and permutations with repetitions, different methods of solving recurrence relations*

LO4: *concepts and algorithms related various types of graphs, trees and applications to real life problems*

UNIT-I (9)

Foundation: Sets and operations on sets, relations and functions, binary relations, equivalence relations, partial order relations, Hasee diagram and lattices, Transitive closure of a relation, Paths and closures, digraphs, adjacency matrices of binary relations, Warshall algorithm

UNIT-II (9)

Fundamentals of Logic: Propositions and connectives, truth tables, propositional functions, logical inferences, first order logic, predicate calculus and quantified logic, pigeonhole principle, mathematical induction

UNIT-III (9)

Elementary combinations and recurrence Relations: Basic concepts of permutations and combinations, enumeration with unlimited repetition and applications, enumeration with constrained repetitions and applications, principle of inclusion and exclusion

Generating function of sequences: Coefficients of generating function, recurrence relations and its applications, solutions of recurrence relations by method of substitution, characteristic roots and generating functions, solving non-linear recurrence relations

UNIT-IV (9)

Graphs: Basic concepts, isomorphism, sub graphs, trees and their properties, spanning trees, binary trees, planner graphs, Euler's formula, multi graphs and Eulerian circuits, Hamiltonian graphs, chromatic number, four color problem

Text Books:

[1] J.L.Mott, A.Kandel and T.P.Baker – Discrete Mathematics for Computer Scientists, *Prentice- Hall of India,* New Delhi, 2nd ed. 1999.*(Chapter 1, 4, 2, 3, 5).*

Reference Books:

[1] J.P.Tremblay, R.Manohar,Discrete Mathematical Structures with Applications to Computer Science, *Mc. Graw Hill*, New York, 1977.
[2] Zohar Manna, Mathematical Theory of Computation, *Mc. Graw Hill*, New Delhi.
[3] C.L. Liu,Elements of Discrete mathematics, *Tata Mc. Graw Hill*, 3rded.2008.

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: *explain the basic concepts of sets and relations and their applications to lattice problems, to determine all the possible paths available in directed paths*

CO2: *analyze the different types of logic in order to establish knowledge based systems, to verify numerical statements using induction*

CO3: *solvedifferent type of enumeration problemsand apply to real life problems*

CO4: *solve different problems like Koenig's Berge seven bridges, using Euler graphs and find the chromatic number of the different graphs*

Course Articulation Matrix (CAM): U18MH304 DISCRETE MATHEMATICS

CO		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	U18MH304.1	2	2	-	-	-	-	-	-	-	-	-	1	1	-	-
CO2	U18MH304.2	2	2	-	-	-	-	-	-	-	-	-	1	1	-	-
CO3	U18MH304.3	2	2	-	-	-	-	-	-	-	-	-	1	1	-	-
CO4	U18MH304.4	2	2	-	-	-	-	-	-	-	-	-	1	1	-	-
	U18MH304	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**1**	**-**	**-**

U18IT305 COMPUTER ARCHITECTURE AND ORGANIZATION

Class: B.Tech. III-Semester

Branch: Information Technology

Teaching Scheme:

L	T	P	C
3	-	-	3

Examination Scheme:

Continuous Internal Examination	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LO):

This course will develop students' knowledge in/on…

LO1: *basic operations of computer system, byte addressability, addressing modes and instruction formats*
LO2: *input/output (I/O) devices, functional units of a processor and its functionality*
LO3: *improving performance by overlapping the execution of machine instructions, and accessing I/O devices*
LO4: *the organization of main memory, and basic arithmetic operations*

UNIT-I (9)

Basic Structure of Computers: Functional Units, Basic Operational Concepts, Performance
Instruction Set Architecture: Memory Locations and Addresses, Memory Operations, Instructions and Instruction Sequencing, Addressing Modes, Assembly language

UNIT-II (9)

Basic Input/Output: Accessing I/O Devices, Interrupts
Basic Processing Unit: Some Fundamental Concepts, Instruction Execution, Hardware Components, Instruction Fetch and Execution Steps, Control Signals, Hard-wired Control, CISC-Style Processors

UNIT-III (9)

Pipelining: Basic Concept, Pipeline Organization, Pipelining Issues, Data Dependencies, Memory Delays, Branch Delays, Resource Limitations, Performance Evaluation, Superscalar Operation, Pipelining in CISC Processors
Input/Output Organization: Bus Structure, Bus Operation, Arbitration, Interface Circuits, Interconnection Standards

UNIT-IV (9)

The Memory System: Basic Concepts, Semiconductor RAM, Read-only Memories, Direct Memory Access, Memory Hierarchy, Cache Memories, Performance Considerations
Arithmetic: Multiplication of Unsigned Numbers, Multiplication of Signed Numbers, Fast Multiplication, Integer Division, Floating-Point Numbers and Operations

Text Books:

[1] Carl Hamacher, ZvonkoVranesic, SafwatZaky, NaraigManjikian, Computer Organization and Embedded Systems, *McGraw-Hill Education*, 6th ed. 2012 (Chapters 1 to 3, 5 to 9).

Reference Books:

[1] M. Morris Mano, Computer System Architecture, *Pearson Education*, 3rd ed. 2007.
[2] V. Rajaraman, T. Radhakrishnan, Computer Architecture and Organization, *PHI Learning*, 4th ed.2011.
[3] B Ram, Sanjay Kumar, Computer Fundamentals: Architecture and Organization, *New Age International Publishers*, 5th ed.

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: *identify functional units of computer and explain addressing modes of instructions for execution*

CO2: *discuss the functionality of I/O devices, write control sequence for execution of an instruction and explain different controls*

CO3: *design the pipeline hardware, and implement synchronous and asynchronous schemes for transferring data*

CO4: *analyze memory access time to fetch instructions from main memory, and implement computer arithmetic operations*

Course Articulation Matrix (CAM): U18IT305 COMPUTER ARCHITECTURE AND ORGANIZATION

CO		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	U18IT305.1	2	2	-	-	-	-	-	-	-	-	-	1	1	-	-
CO2	U18IT305.2	2	2	1	1	-	-	-	-	-	-	-	2	1	2	-
CO3	U18IT305.3	2	2	2	2	1	-	-	-	-	-	-	2	2	1	1
CO4	U18IT305.4	2	2	2	2	1	-	-	-	-	-	-	2	2	2	1
U18IT305		**2**	**2**	**1.66**	**1.66**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**1.75**	**1.5**	**1.66**	**1**

U18EC306 SWITCHING THEORY AND LOGIC DESIGN

Class: B.Tech. III-Semester **Branch:** Information Technology

Teaching Scheme :

L	T	P	C
3	-	-	3

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):

This course will develop students' knowledge in /on…

LO1: *number system, binary codes and minimization of switching functions*
LO2: *combinational circuits design and implementation using logic gates, adders/subtractors, multiplexer and decoders*
LO3: *implementation of sequential circuits, counters, registers using flip flops and logic gates*
LO4: *finite state machines and its minimization; algorithmic state machines*

UNIT–I (9)

Number Systems: Review of number systems, binary weighted and non-weighted codes binary arithmetic, 1's & 2's complement subtraction, error detecting and error correcting codes
Boolean Algebra: Postulates and theorems, logic gates and truth tables, representation of switching functions using SOP & POS forms, Karnaugh map representation, minimization using K-Map and Quine Mc'Clusky method

UNIT–II (9)

Design of Combinational Circuits: Adders– half Adder, full Adder; subtractors-half subtractor, full subtractor, parallel adder, carry look ahead adder, BCD adder, multiplexers, decoders - BCD to 7 segment, BCD to decimal decoders. Encoders-priority encoders, demultiplexers, realization of switching functions using multiplexers and decoders

UNIT–III (9)

Sequential Circuits: Flip Flops – SR flip flop, JK flip flop, D flip flop, T flip flop and master-slave flip flop. Design of synchronous counters, asynchronous counters, shift registers, bidirectional shift registers, ring counter and Johnson counter; state table, state diagram, state assignment, state minimization, synthesis of synchronous, sequential circuits – sequence detectors

UNIT–IV (9)

Finite State Machines: Mealy and Moore machines – capabilities and limitations of finite state machine, state equivalence and machine minimization- Merger graph and Merger table
Algorithmic State Machines: Salient features of the ASM charts, design example- ASM chart-timing sequence – Data path design, ASM design examples using flip-flops

Text Books:

[1] Moris Mano, Digital Design, *Prentice Hall of India, New Delhi.*4thed. 2006.
[2] Zvi. Kohavi, Switching and Finite Automata Theory, *Cambridge University Press,* 3rd ed. 2010.

Reference Books:

[1] G.K. Kharate, Digital Electronics, *Oxford University Press*, Hyderabad, India, 2012.
[2] R.P. Jain, Modern Digital Electronics, *Tata McGraw-Hill,* India, 4th ed. 2010.
[3] A. Anand Kumar, Switching Theory & Logic Design, *Prentice Hall of India*, New Delhi, 2014

[4] Samuel. C. Lee & B.S. Sonde, Digital Circuits & Logic Design, *Prentice Hall of India*, New Delhi, 1976

Course Learning Outcomes (COs):
On completion of this course, students will be able to…

CO1: *explain number systems, binary codes; prove the given Boolean identity and apply minimization techniques to obtain minimal SOP/POS forms of logic functions*
CO2: *design switching functions using combinational circuits for given application*
CO3: *develop a sequential circuit using flip flops and logic gates for given specifications*
CO4: *develop finite state machine with optimum states for given specifications; draw an ASM chart and state diagram for a specific application and build corresponding control unit*

Course Articulation Matrix (CAM): U18EC306 SWITCHING THEORY AND LOGIC DESIGN

CO		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	U18EC306.1	3	2	1	-	-	1	1	-	-	-	-	1	1	-	-
CO2	U18EC306.2	3	2	1	-	-	1	1	-	-	-	-	1	2	-	-
CO3	U18EC306.3	3	2	2	1	-	2	2	-	-	-	-	1	2	-	-
CO4	U18EC306.4	3	2	3	3	-	3	3	-	-	-	-	1	2	-	-
U18EC306		**3**	**2**	**1.75**	**2**	**-**	**1.75**	**1.75**	**-**	**-**	**-**	**-**	**1**	**1.75**	**-**	**-**

U18IT307 OPERATING SYSTEMS

Class: B.Tech. III- Semester **Branch:** Information Technology

Teaching Scheme:

L	T	P	C
3	-	-	3

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives(LOs):

This course will develop students' knowledge in/on…

LO1: *basics of operating systems, process concepts, communications and threads*
LO2: *understanding scheduling and process synchronization techniques like semaphores and monitors*
LO3: *exploring deadlocks, memory management and virtual memory techniques*
LO4: *file system organization , disk management and protection techniques used in operating systems*

UNIT–I (9)

Introduction: What Operating Systems Do, Computer-System Organization, Operating-system operations, Process management, Memory management, Storage management, Protection and security, Computing environments

System Structures: Operating-system services, System calls, Types of system calls, System programs, Operating-system structure, System boot

Process Concept: Process concept, Process scheduling, Interprocess communication

Multithreaded Programming: Overview, Multicore Programming, Multithreading Models

UNIT-II (9)

Process Scheduling: Basic concepts, Scheduling criteria, Scheduling algorithms – First- Come First Served, Shortest-Job-First, Priority, Round-Robin, Multilevel queue, Multilevel feedback queue

Synchronization: Background**,** Thecritical-section problem, Peterson's solution, Synchronization hardware, Mutex locks, Semaphores, Classic problems of synchronization, Monitors

UNIT-III (9)

Deadlocks: System model, Deadlock characterization, Methods for handling deadlocks, Deadlock prevention, Deadlock Avoidance, Deadlock detection, Recovery from deadlock

Memory Management Strategies: Background, Swapping, Contiguous memory allocation, Segmentation, paging, Structure of page table-Hierarchical paging, Hashed page tables, Inverted page tables

Virtual-Memory Management: Background, Demand paging, Page replacement, Allocation of frames, Thrashing

UNIT-IV (9)

File System: File concept, Access methods, Directory and Disk structure

Implementing File-Systems: File-system structure, File-system implementation, Allocation Methods, Free-space management

Mass-Storage Structure: Overview of mass-storage structure, Disk structure, Disk scheduling, Disk management, Swap-space management

System Protection: Goals of protection, Principle of protection, Domain of protection, Access matrix, Implementations of the Access matrix

TextBook:

[1] Abraham Silberschatz, Peter B Galvin, Gerg Gagne, Operating System Concepts, *Wiley* , 9th ed. 2016.

Reference Books:

[1] Ekta Walia, Operating Systems, *Khanna Publishing House*, Delhi, 2nd ed. 2015.

[2] Dhananjay M. Dhamdhere, Operating Systems A Concept-Based Approach, *McGraw Hill Education*, 2008.

[3] William Stalling, Operating Systems, *Maxwell, McMillan International Editions*, 1992.

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: *explain the functional architecture of operating system, process concepts and threads.*
CO2: *differentiate various process scheduling algorithms and process synchronization techniques*
CO3: *describe deadlock avoidance and recovery techniques, different memory management techniques*
CO4: *illustrate the techniques of file management, disk management and different protection methods*

Course Articulation Matrix (CAM): U18IT307 OPERATING SYSTEMS

CO		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	U18IT307.1	2	1	2	1	-	-	-	-	-	-	-	-	1	2	1
CO2	U18IT307.2	3	2	2	2	-	-	-	-	-	-	-	-	1	2	1
CO3	U18IT307.3	3	2	2	2	2	-	-	-	-	-	-	1	1	2	1
CO4	U18IT307.4	2	2	2	1	2	-	-	-	-	-	-	-	1	2	1
	U18IT307	**2.5**	**1.75**	**2**	**1.5**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**1**	**2**	**1**

U18IT308 OBJECT ORIENTED PROGRAMMING THROUGH C++ LABORATORY

Class: B.Tech. III-Semester **Branch:** Information Technology

Teaching Scheme :

L	T	P	C
-	-	2	1

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):

This course will develop students' knowledge in /on…

LO1: *basic concepts of functions and structures*
LO2: *classes & operator overloading in problem solving*
LO3: *reusability concepts like inheritance*
LO4: *exceptional handling, input and output & files*

List of Experiments

Experiment-I

1. Read 10 numbers and display them in sorted order.
2. Write a program to find Armstrong numbers between 1 and 10,000.
3. Write a program to demonstrate dynamic memory allocation.

Experiment-II

4. Write a program to find square (A+B)-square (C+D) using inline function.
5. Find volume of cube, cuboid and cylinder using function overloading.
6. Find the area of square, rectangle & circle using function overloading.

Experiment-III

7. Write functions to swap two numbers using pointers and references.
8. Create a structure for storing students details (sno, sname, course, Array of five subject's marks), provide the functions for reading and printing the total marks and percentage acquired. (Note: Include the functions within the structure)
9. Write a program to demonstrate default arguments.

Experiment-IV

10. Create a class for storing students details (sno, sname, course, Array of five subject's marks) and define the methods (member functions) inside the class for printing the total marks and percentage acquired.
11. Create a Distance class with methods for addition and subtraction of two distances (note:1 feet = 12 inches) Display the output as (4'-6") form.
12. Create a class which provides a method to count the number of objects which are created for that class using static method.

Experiment-V

13. Create a complex number class with default, parameterized, copy constructors and a destructor.
14. Create a class INT that behaves exactly like an int. (Note: overload +, -, *, /, %).
15. Create a string class and overload + to concatenate two Strings, overload () to print substring.

Experiment-VI

16. Create a string class to overload <, <=, >, >=, = = operators to compare two string objects.
17. Create a user defined array class Array and overload + to add two arrays, overload * to multiply two arrays.
18. Create a complex number class and overload +, -, * operators using friend functions.

Experiment-VII

19. Programs to demonstrate Single, Multiple, Multilevel inheritance.
20. Programs to demonstrate Hierarchical, Hybrid and Multipath inheritance.
21. Programs to demonstrate constructors in inheritance.

Experiment-VIII

22. Create a class Shape with methods perimeter, area and derive classes Circle, Square and Triangle from Shape class. Provide implementation for perimeter, area in the derived classes. (Declare perimeter, area as pure virtual functions).
23. Implement Multipath inheritance by declaring pointers to base class and access the derived class methods using base class pointers.

Experiment-IX

24. Write a function template to overload max method, which can find maximum of any data type.
25. Create function template to sort an array, which can sort array of any type.
26. Create a Generic calculator class to perform +, -, *, / operations on any type.

Experiment-X

27. Find the roots of a quadratic equation. Handle exception for divide by zero.
28. Handle the Array Index out of Bounds Exception when accessing the elements of Arrays.
29. Program to demonstrate Re-throwing an exception.

Experiment-XI

30. Program to demonstrate manipulators.
31. Create a text file of student information and display the contents of file.
32. Write a program to read a text file and remove all white space characters and replace each alphanumeric character with next character in the alphabet (Replace z by a and 9 by 0).

Experiment-XII

33. Copy the contents of one file into another file.
34. Create a file with floating point numbers. Read pair of floating numbers from the file and write into another file.

Laboratory Manual:

[1] *Object Oriented Programming through C++ Laboratory Manual*, Dept. of IT, KITSW.

Reference Books:

[1] E.Balagurusamy, Object-Oriented Programming with C++, *McGraw-Hill Education India Pvt. Ltd*, 6th ed. 2012.

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: *develop applications using functions and structures*

CO2: *implement programs using classes and operator overloading*

CO3: *apply reusability concepts in application development*

CO4: *implement programs on exception handling and files*

Course Articulation Matrix (CAM): U18IT308 OBJECT ORIENTED PROGRAMMING THROUGH C++ LABORATORY																
CO		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	U18IT308.1	1	-	-	-	-	-	-	-	-	-	-	1	-	-	-
CO2	U18IT308.2	2	2	1	1	-	-	-	-	-	-	-	2	2	1	-
CO3	U18IT308.3	2	2	1	1	-	-	-	-	-	-	-	2	2	2	1
CO4	U18IT308.4	2	2	1	1	-	-	-	-	-	-	-	2	2	2	2
U18IT308		**1.75**	**2**	**1**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1.75**	**2**	**1.66**	**1.5**

U18IT309 OPERATING SYSTEMS LABORATORY

Class: B.Tech. III - Semester **Branch:** Information Technology

Teaching Scheme:

L	T	P	C
-	-	2	1

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):

This Lab course will develop students' knowledge in/on…

LO1: *understanding and familiarizing the UNIX environment*
LO2: *fundamental concepts of shell programming*
LO3: *different CPU scheduling algorithms and Dead Lock Avoidance algorithm*
LO4: *understanding different page replacement algorithms*

List of Experiments

Experiment-I

1. Practice basic UNIX commands:
   a. General Utility Commands: login, cal, date, who, uname, echo, passwd, pwd, exit.
   b. File and Directory Related Commands :ls, cd, mkdir, rmdir, cat, cp, rm, mv, wc, comm, diff, split, ln, touch, chmod, chown, chgrp.
2. Practice the following examples.
   a. Display the contents of file (filenames starting with 'a' and ending with X)
   b. Copy the contents of directory1 to directory2.
   c. Remove all .C files from current directory.
   d. Merge three different files into single one.
   e. Display the list of files in given directory.
   f. Set given file as read only.

Experiment-II

3. Filters: (Data Processing Commands): more, head, tail, cut, paste, sort, uniq, nl, tr.
4. Communication Commands: write, mail, talk, finger, news.

Experiment-III

5. Practice the following commands
   a. Process Related Commands : ps, kill, nice, at & batch
   b. Pattern Searching Commands: grep, egrep, fgrep.
6. Write the programs for the following:
   a. Display the details of all users those who are working on the system.
   b. Display the details of all users in an order they logged on to system (based on time) who are working on the system.

Experiment-IV

7. Practice the Vi editor commands.
8. Shell Script Related Commands**:** sh, read, command line arguments ($1), $ @ & $*, set, exit, status ($?), logical operators: ||, &&, exit, if, sleep & wait, case, while & until, for, export, expr commands.

Experiment-V

9. Write programs for the following
   a. Reading a character and displaying on the screen.
   b. Display the name and class of student in separate line.
   c. To check the given two characters are equal or not.
10. Write programs for the following
   a. Display the given character in its binary form.
   b. To check given number is even or odd.
   c. Write a shell script to accept login name as command line argument and find out at how many terminals the user has logged in.

Experiment-VI

11. Write a shell script which gets executed at login time and displays a blinking message "Good morning/Good Afternoon / Good Evening" depending upon the time at which the user logs in.
12. Write a shell script to check the given character is vowel or not.
13. Write a shell script to perform all basic arithmetic operations using switch statement.
14. Write a menu driven program which has the following options:
   a. contents of a given file
   b. list of users who have currently logged in
   c. present working directory
   d. exit

Experiment-VII

15. Write the shell programs for the following:
   a. To print the Fibonacci series
   b. To check the given number is prime or not
   c. To print the following format:

```
1
1    2
1    2    3
1    2    3    4
…..
```

Experiment-VIII

16. Write a shell script to display the given string in reverse order.
17. Write a shell script to find min and max elements in the given Array of integers.
18. Write a shell script function for factorial of a number.

Experiment-IX

19. Implement the following CPU Scheduling Algorithms.
    a. FCFS b. RR

Experiment-X

20. Implement the following CPU Scheduling Algorithms.
    a. SJF b. Priority Scheduling

Experiment-XI

21. Implement the Banker's Algorithm for Deadlock Avoidance.

Experiment-XII

22. Implement the following Page Replacement Algorithms.
    a. FIFO b. LRU

Laboratory Manual:

[1] *Operating Systems Laboratory Manual*, Dept. of IT, KITSW.

Referencet Books:

[1] Sumitabha Das, Your Unix: The Ultimate Guide, *McGraw Hill, 3*rded. 2005.
[2] Yashavant P. Kanetkar, Unix Shell Programming, *BPB Publications,* 1996.

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: *recognize the importance of various categories of UNIX commands.*
CO2: *apply shell programming concepts for developing applications*
CO3: *implement different scheduling algorithms and compare their performance and apply the Banker's algorithm for solving the dead lock problem.*
CO4: *implement page replacement algorithms to differentiate efficiency of algorithms*.

Course Articulation Matrix (CAM): U18IT309 OPERATING SYSTEMS LABORATORY																
CO		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	U18IT309.1	2	2	-	3	1	-	-	-	-	-	1	2	1	1	2
CO2	U18IT309.2	3	3	2	2	-	-	-	-	-	-	-	2	1	2	2
CO3	U18IT309.3	2	2	2	2	-	-	-	-	-	-	-	2	1	2	1
CO4	U18IT309.4	2	2	1	-	-	-	-	-	-	-	-	1	1	2	1
U18IT309		**2.25**	**2.25**	**1.66**	**2.33**	**1**	**-**	**-**	**-**	**-**	**-**	**1**	**1.75**	**1**	**1.75**	**1.5**

U18MH315 ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE

Class : B.Tech. III - Semester **Branch : Common to all branches**

Teaching Scheme :

L	T	P	C
2	-	-	-

Examination Scheme :

Continuous Internal Evaluation	40 Marks
End Semester Examination	60 Marks

Course Learning Objectives (LOs):

This course will develop the student's knowledge in/on…

LO1: *basic structure of Indian knowledge system*
LO2: *Indian perspective of modern science*
LO3: *basic principles of yoga and holistic health care*
LO4: *benefits of yoga practice*

UNIT–I (6)

Basic Structure of Indian Knowledge System: Introduction, Vedas – Origin, Classification, Structure, Rig Veda, Sama Veda, Yajur Veda, Atharva Veda; Upavedas – Dhanurveda, Sthapatveda, Gandharvaveda, Ayurveda; Vedang – Shiksha, Chanda, Vyakarna, Nirukta, Kalpa, Jyothisha; Upanga – Dharmashastra, Mimamsa, Tarkashastra, Purana

UNIT–II (6)

Modern Science and Indian Knowledge System: Introduction – Vedas as Basis for Modern Science – Architectural Developments – Medicine and its relevance – Mathematical Sciences in Vedas – Space and Military related developments – Chemical Sciences

UNIT–III (6)

Yoga and Holistic Health Care: Healthy mind in healthy body – Yoga: Definition, types; Yoga to keep fit: Diet, Yoga Asanas – Fundamentals; Breathing techniques in Patanjali Yoga tradition – Pranayama; chakras; meditation;Benefits of Yoga – Physical Health, Emotional Health, Prevention of Disease, Reducing or Alleviating Symptoms of Problems

UNIT–IV (6)

Case Studies – Yoga Practice: Yoga as an effective tool for management of human crisis – Depression, Self – Concept & Mental health, Yoga for stress management; Yoga: A way to cure for Insomnia

Requisite: Yoga practice sessions are to be conducted for all the students taking this course by the time they complete Unit 1 and Unit 2

Text Books :

[1] Sathish Chandra Chaterjee, Dhirendramohan Datta, An Introduction to Indian Philosophy, *Rupa Publications Pvt. Ltd.* New Delhi. (Chapter 2, 3)

[2] Priyadaranjan Ray, S.N. Sen, The Cultural Heritage of India, Vol. 6, Science and Technology, The Ramakrishna Mission Institute of Culture, Calcutta

[3] Yoga Sutra of Patanjali, Ramakrishna Mission, Kolkatta

[4] RNJha, Science of Consciousness Psychotherapy and Yoga Practices, VidyanidhiPrakasham Delhi, 2016 (Chapter 4, 5, 6, 7, 8)

Reference Books:

[1] Swami Jitatmananda, Holistic Science and Vedanta, Bharatiya Vidya Bhavan Bombay. (Chapter 2, 3)

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: *summarize the basic structure of Vedas, Upavedas, Vedanga, Upanga*
CO2: *explain Vedas as principal source of knowledge for scientific inventions*
CO3: *describe different yogasanas, breathing techniques, chakras, meditation and their benefits*
CO4: *discuss the benefits of yoga as an effective tool for management of human crisis*

Course Articulation Matrix (CAM):U18MH315 ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE																
CO		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	U18MH315.1	-	-	-	-	-	1	-	2	1	1	-	-	-	-	-
CO2	U18MH315.2	-	-	-	-	-	1	1	2	1	1	-	-	-	-	-
CO3	U18MH315.3	-	-	-	-	-	1	-	2	2	1	-	2	-	-	-
CO4	U18MH315.4	-	-	-	-	-	1	1	2	2	1	-	2	-	-	-
U18MH315		**-**	**-**	**-**	**-**	**-**	**1**	**1**	**2**	**1.5**	**1**	**-**	**2**	**-**	**-**	**-**

DEPARTMENT OF INFORMATION TECHNOLOGY
KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE, WARANGAL – 15
(An Autonomous Institute under Kakatiya University, Warangal)
SCHEME OF INSTRUCTION AND EVALUATION
IV-SEMESTER OF 4-YEAR B.TECH DEGREE PROGRAMME

[5Th+4P+1MC]

Sl. No.	Course Category	Course Code	Course Title	Hours per Week			Credits	Evaluation Scheme				
				L	T	P		CIE			ESE	Total Marks
								TA	MSE	Total		
1	OE	U18OE401	Open Elective-II	3	1	-	4	10	30	40	60	100
2	HSMC	U18TP402	Soft and Interpersonal Skills	-	-	2	1	100	-	100	-	100
3	OE	U18OE403	Open Elective-I	3	-	-	3	10	30	40	60	100
4	PCC	U18IT404	Theory of Computation	3	-	-	3	10	30	40	60	100
5	PCC	U18IT405	Database Management Systems	3	1	-	4	10	30	40	60	100
6	PCC	U18IT406	Java Programming	3	-	-	3	10	30	40	60	100
7	PCC	U18IT407	Java Programming Lab	-	-	2	1	40	-	40	60	100
8	PCC	U18IT408	Database Management Systems Laboratory	-	-	2	1	40	-	40	60	100
9	OE	U18OE411	Open Elective-I based Lab	-	-	2	1	40	-	40	60	100
10	MC	U18CH416	Environmental Studies*	2	-	-	-	10	30	40	60	100
			Total	**15/17***	**2**	**8**	**21**	**270/280***	**150/180***	**420/460***	**480/540***	**900/1000***

L= Lecture, T = Tutorials, P = Practicals& C = Credits
*** indicates mandatory non-credit course for Lateral Entry Students only Contact hours per week: 25/27* Total Credits : 21**

Open Elective-I	**Open Elective-II**	**Open Elective-I based Laboratory**
U18OE403B: Fluid Mechanics & Hydraulic Machines (CE)	U18OE401A: Applicable Mathematics (M&H)	U18OE411B: Fluid Mechanics & Hydraulic Machines Laboratory (CE)
U18OE403C: Mechatronics (ME)	U18OE401B: Basic Electronics Engineering (ECE)	U18OE411C: Mechatronics Laboratory (ME)
U18OE403E: Microprocessors(ECE)	U18OE401C: Elements of Mechanical Engineering (ME)	U18OE411E: Microprocessors Laboratory (ECE)
U18OE403F: Strength of Materials (CE)	U18OE401D: Measurements & Instrumentation (EIE)	U18OE411F: Strength of Materials Laboratory (CE)
	U18OE401F: Renewable Energy Sources (EEE)	

U18OE401A APPLICABLE MATHEMATICS

Class: B.Tech. IV-Semester **Branch:** Common to all branches

Teaching Scheme :

L	T	P	C
3	1	-	4

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):

This course will develop students' knowledge in /on…

LO1: *application of Fourier series to solve wave equation, heat conduction equation and Laplace equation*
LO2: *the methods of fitting curves by the method of least squares, statistical methodsand probability distributions with applications to engineering disciplines*
LO3: *finite difference operators; the concept of interpolation and numerical integration*
LO4: *numerical methods and application to find numerical solutions of differential equations*

UNIT-I (9+3)

Applications of Partial Differential Equations: Basic concepts of partial differential equations, classification of second order partial differential equations, solution of a partial differential equation, solution through the method of separation of variables

Vibrating String: Wave equation and its solution by the method of separation of variables, D'Alembert's solution of wave equation, solutions of various boundary value problems based on vibrating string

One Dimensional Heat Flow: Transient heat flow equation, heat flow through a bar of finite length with homogeneous and non homogeneous boundary conditions, heat flow through a bar with insulated ends

Two Dimensional Heat Flow: Equation of two dimensional heat flow (Laplace's equation) under steady state / the electrostatic potential of electrical charges in any region that is free of these charges (problems based on Trigonometric FS only),solution of Laplace's equation in Cartesian and polar form, heat flow through infinite rectangular plates, finite square plate and semi circular and circular plates

UNIT-II (9+3)

Statistics: Statistical data: Review of measures of central tendency and measures of dispersion, correlation coefficient, rank correlation, regression – Linear regression equations

Curve Fitting: Method of least squares –fitting of (i) Straight line (ii) Second degree parabola (iii) Exponential curves, most plausible solution of a system of linear algebraic equations

Probability: Review of the concepts of probability, random variables, Discrete and continuous probability distributions, mean and variance of a distribution, Binomial distribution, Poisson distribution, and Normal distribution, fitting of these probability distributions to the given data

UNIT-III (9+3)

Numerical Analysis: Finite differences and difference operators

Interpolation: Newton's forward and backward interpolation formulae. Lagrange interpolation

Numerical Differentiation: First and second derivatives using forward and backward interpolation polynomials at the tabulated points

Numerical Integration: Gaussian quadrature formula, Trapezoidal rule, Simpson's $1/3^{rd}$ rule and Simpson's $3/8^{th}$ rule

UNIT-IV (9+3)

Solution to System of Linear Equations: Gaussian elimination method, Jacobi Method and Guass-Siedel Iteration Method

Numerical Solution of Algebraic and Transcendental Equations: Bisection method, Regula-Falsi method and Newton Raphson's method

Numerical Solution of Ordinary Differential Equations: Taylor's method, Picard's method, Euler's method and Runge - Kutta methods of second and fourth order

Text Books:

[1] Grewal, B.S., Higher Engineering Mathematics, *Khanna Publishers,* Delhi, 43rd ed. 2014.

Reference Books:

[1] Gupta and Kapoor, Fundamentals of Mathematical Statistics, *Sulthan Chand and & sons,* New Delhi,11th ed. 2010.

[2] Kreyszig E., Advanced Engineering Mathematics, *John Wiley& sons, Inc.,U.K.,*9th ed. 2013.

[3] Sastry S.S, Introduction to numerical Analysis,*Prentice Hall of India Private Limited*, New Delhi. 4th ed. 2005.

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: *solve wave equation, heat conduction equation and Laplace equation using Fourier series*

CO2: *find correlation regression coefficients, fit curves using method of least squares for given data and apply theoretical probability distributions in decision making*

CO3: *estimate value of a function by applying interpolation formulae*

CO4: *apply numerical methods to solve simultaneous algebraic equations, differential equations, find roots of algebraic and transcendental equations*

Course Articulation Matrix (CAM):U18OE401A APPLICABLE MATHEMATICS																
CO		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	U18OE401A.1	2	2	-	-	-	-	-	-	-	-	-	1	1	-	-
CO2	U18OE401A.2	2	2	-	-	-	-	-	-	-	-	-	1	1	-	-
CO3	U18OE401A.3	2	2	-	-	-	-	-	-	-	-	-	1	1	-	-
CO4	U18OE401A.4	2	2	-	-	-	-	-	-	-	-	-	1	1	-	-
U18OE401A		**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**1**	**-**	**-**

U18OE401 BASIC ELECTRONICS ENGINEERING

Class: B.Tech. IV - Semester

Branch: Common to all branches

Teaching Scheme:

L	T	P	C
3	1	-	4

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives:
This course will develop student's knowledge on/in…

LO1: to *introduce the basic concepts of semiconductors and conductivity in semiconductors*
LO2: to *impart the knowledge on working of semiconductor diode as Rectifier*
LO3: to *make the students to understand the basic concepts of BJT &DC biasing concepts*
LO4: to *introduce the fundamental concepts and basic principles of special semiconductor devices.*

UNIT-I(9+3)

Introduction to Electronics: Analog Signals (DC & AC), Sources (DC & AC), Digital Signals
Semiconductors: Energy bands in solids, Concept of forbidden gap, Insulator, Metals and Semiconductors, Transport phenomenon in semiconductors: Mobility and conductivity, Intrinsic semiconductor, Donor and Acceptor impurities, Fermi level, Drift currents and Diffusion currents, Temperature dependence of conductivity, Hall Effect

UNIT-II(9+3)

Semiconductor Diode: P-N Junction, Band diagram, Depletion layer, V-I characteristics of P-N Diode, Diode resistance and capacitance, Avalanche and Zener breakdown mechanisms
Diode Circuits: Rectifier circuits – Half wave, Full wave & Bridge rectifiers, Ripple factor with and without filters, Voltage regulation using Zener diode, Block diagram of DC adapter.

UNIT-III(9+3)

Bipolar Junction Transistor: Physical structure, Transistor current components, CE, CB & CC configurations and their Input & Output characteristics
DC Analysis of BJT Circuits: DC load line, Need for biasing, Transistor biasing techniques for CE configuration, Basic transistor applications: Switch and Amplifier.

UNIT-IV(9+3)

Field Effect Transistor: Physical **s**tructure, Operation and Characteristics of a Junction Field Effect Transistor (JFET), MOSFET, DMOSFET, EMOSFET.
Special Semiconductor Devices: Operation and Characteristics- Tunnel Diode, Schottky diode, Photo Diode, Photo Transistor, PIN Diode, LED, LASER, UJT.

Text Books:

[1] Bhargava and Kulashresta, Basic Electronics and Linear Circuits, *TTTI, Tata McGraw Hill, India.*
[2] S.Salivahanan and N.Suresh Kumar, Electronic Devices and Circuits, *Tata McGraw Hill Education (India) Private* Ltd, 2nded. 2009.

Reference Books:

[1] Jacob Millman, Christos C Halkias, Electronic Devices and Circuits, 3rded. *TMH,* India.
[2] David.A.Bell, Electronic Devices and Circuits, *Oxford University Press,* New Delhi, India.
[3] Neil Storey, Electronics: A systems Approach, 4ed. *Pearson Education Publishing company Pvt. Ltd*, India.

Course Learning Outcomes (COs):
On completion of this course, students will be able to…

CO1: *analyze the behavior of semiconductor devices*
CO2: *design half wave and full wave rectifier circuits with filters*
CO3: *characterize BJT configurations with input output characteristics and biasing techniques*
CO4: *acquire knowledge of new emerging areas of science and technology in differentiating semiconductor devices*

Course Articulation Matrix (CAM):U18EC401B BASIC ELECTRONICS ENGINEERING																
CO		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	U18OE401B.1	2	2	1	2	-	-	-	-	-	-	-	-	-	--	-
CO2	U18OE401B.2	2	2	2	2	-	-	-	-	-	-	-	-	-	-	-
CO3	U18OE401B.3	2	2	2	2	-	-	-	-	-	-	-	-	-	-	-
CO4	U18OE401B.4	2	2	1	2	-	-	-	-	-	-	-	2	1	-	-
U18OE401B		**2**	**2**	**1.5**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**1**	**-**	**-**

U18OE401C ELEMENTS OF MECHANICAL ENGINEERING

Class: B.Tech. IV-Semester **Branch:** Common to all branches

Teaching Scheme :

L	T	P	C
3	1	-	4

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):
This course will develop students' knowledge in/on…

LO1: *types of materials, design methodology and elements of power transmission*
LO2: *different manufacturing processes and their applications*
LO3: *laws of thermodynamics and types of systems*
LO4: *principle and applications of SI &CI engines*

UNIT-I (12)

Engineering Materials: Classification, properties and applications
Design Criterion: Discrete steps in engineering design process
Power Transmission: Classification; flat belt drives - length of open and cross belts, belt tensions and power transmitted; Gears-types and applications; spur gear-nomenclature
Bearings: Types – sliding& rolling contact bearings and applications

UNIT-II (12)

Manufacturing Processes: Classification; Foundry- steps in sand casting process; pattern-types, materials and allowances, mould cross section, moulding sand-composition and properties; Machining: lathe machine-line diagram and operations; Welding-classification; principle of arc welding- AC and DC welding, principle of gas welding, principle of brazing and soldering;
Metal forming process: forging, rolling, extrusion

UNIT-III (12)

Thermodynamics: System-types, state, property, process and cycle; Energy-property; Zeroth law, thermodynamic equilibrium, laws of perfect gases
Law of Thermodynamics: First law- applied to a cycle, change of state, Internal energy, Enthalpy; Work and Heat in closed systems- Isobaric, Isochoric, Isothermal, Adiabatic and Polytropic; PMM-I, limitations of first law of thermodynamics

UNIT-IV (12)

Second Law of Thermodynamics: Kelvin-Planck and Clausius Statements and their equivalence; Carnot cycle, Carnot theorem, heat engine, heat pump and refrigerator; working principle of domestic air conditioner-line diagram
IC Engines: Classification; working principle of four and two stroke SI and CI engines

Text Book:

[1] Mathur, Mehta and Tiwari, Elements of Mechanical Engineering, *Jain Brothers*, New Delhi, 2017.

Reference Books:

[1] Hazra Chowdary. S. K and Bose, Basic Mechanical Engineering, *Media Promoters and Publishers Pvt. Ltd,* India, 2010.
[2] P. K. Nag, Engineering Thermodynamics, *Tata McGraw Hill*, New Delhi.
[3] Hazra Chowdary. S. K and Bose, Workshop Technology, Vol. I & II, *Media Promoters and publishers Pvt Ltd,* India.

Course Learning Outcomes (COs):
On completion of this course, students will be able to…

CO1: *explain mechanical properties of an engineering materials and learn the steps in design methodology*
CO2: *describe the principles of manufacturing processes*
CO3: *apply first law of thermodynamics to various processes to calculate work and heat for a closed system*
CO4: *define second law of thermodynamics and demonstrate the working principle of IC engines*

Course Articulation Matrix (CAM):U18OE401C ELEMENTS OF MECHANICAL ENGINEERING																
CO		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	U18OE401C.1	2	2	-	-	-	-	-	-	-	-	-	-	1	-	-
CO2	U18OE401C.2	2	-	-	-	-	-	-	-	-	-	-	-	1	-	-
CO3	U18OE401C.3	2	2	-	-	-	-	-	-	-	-	-	-	1	-	-
CO4	U18OE401C.4	2	2	-	-	-	-	-	-	-	-	-	-	1	-	-
U18OE401C		**2**	**2**	-	-	-	-	-	-	-	-	-	-	**1**	-	-

U18OE401D FUNDAMENTALS OF MEASUREMENTS & INSTRUMENTATION

Class:B.Tech. IV – Semester **Branch**: Common to all Branches

Teaching Scheme :

L	T	P	C
3	1	-	4

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course LearningObjectives (LOs):
This course will develop students' knowledge on /in…

LO1: *working principle of DC measuring instruments; DC, AC bridge circuits and their applications*
LO2: *principle of operation of Q meter, DVM, DMM, CRO, DSO and display devices*
LO3: *working principle of various transducers and their applications*
LO4: *working principle of seismic transducers, piezoelectric accelerometer, sound level meter, level transducer, flow meter and data acquisition system*

UNIT–I (9+3)

DC measuring instruments (principle of operation): Measurement system – block diagram and example; performance characteristics – accuracy, precision, resolution, threshold, span, % error and fidelity; DC meters (working principle) – PMMC mechanism, shunt type ammeter, series type voltmeter, shunt type ohmmeter; DC potentiometers - Crompton's DC potentiometer, calibration of meters (ammeter, voltmeter & wattmeter) using DC potentiometer
DC & AC bridges: General bridge balance equation, bridge calibration, applications of bridges, Wheatstone bridge, Maxwell bridge, Schering bridge, Wien's bridge

UNIT–II (9+3)

Electronic instruments (principle of operation): Q-meter – basic Q-meter circuit; digital meter – characteristics (resolution & count), DC & AC attenuators, block diagram of dual slope type digital voltmeter, block diagram of digital multimeter (DMM); oscilloscopes – working principle of cathode ray tube (CRT), block diagram of cathode ray oscilloscope (CRO) , block diagram of digital storage oscilloscope (DSO); display devices – working principle of LED & LCD types

UNIT–III (9+3)

Transducers (principle of operation): Transducer - classification, examples and ideal requirements; sensors – cantilever beam & proving ring types of load cells, bourdon tube & diaphragm type pressure sensors; resistive transducers – piezo-resistive effect of strain gauge (SG), gauge factor, SG type force transducer, SG type pressure transducer and RTD; thermocouple type temperature transducer, LVDT type inductive transducer, differential type capacitive transducer, piezoelectric type transducer; photoelectric type transducer

UNIT–IV (9+3)

Transducers (principle of operation): Seismic transducers – displacement transducer, velocity pickup and accelerometer, piezoelectric accelerometer, sound level meter (block diagram), capacitive microphone, capacitive type level transducer (double electrode type), ultrasonic flow meter and electromagnetic flow meter; introduction to data acquisition (DAQ) system

Text Books:

[1] P. Pruthviraj, B. Bhudaditya, S. Das and K. Chiranjib, Electrical and Electronic Measurement and Instrumentation, McGraw-Hill Education, 2nd ed. 2013, New Delhi. (*Chapters 1 to 3, 8 to 10 and 13 to 15*)

[2] ArunK. Ghosh, Introduction to Transducers, *PHI*, 4thed. 2015, New Delhi. (*Chapters 1 to7)*

Reference Books:

[1] A.K. Sawhney, Electrical and Electronics Measurements and Instrumentation, *Dhanpatrai*& Co., 2015, New Delhi.

[2] Helfrick. A.D and Cooper W.D., Modern Electronic Instrumentation and Measurement Techniques, *Pearson India Education,* 2nd ed.2016, New Delhi.

[3] B.C. Nakra, K.K Choudhry, Instrumentation Measurement and Analysis, *TMH,* 4th ed. 2008, New Delhi.

[4] D.V.S. Murthy, Transducers and Instrumentation, *Prentice Hall of India,* 2nded. 2012, New Delhi.

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: *explain about working principle of measurement system, PMMC based meters and applications of DC & AC bridge circuits*

CO2: *describe the principle of operation of Q-meter, DVM, DMM, CRO, DSO and display devices*

CO3: *elaborate on the working principle of resistive, inductive, capacitive and piezoelectric transducers and their applications*

CO4: *explain about seismic transducers, sound level meter, level transducer, flow meters and block diagram of data acquisition system*

Course Articulation Matrix (CAM): U18EI401D FUNDAMENTALS OF MEASUREMENTS & INSTRUMENTATION

CO		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	U18EI401D.1	2	1	1	1	-	-	1	-	-	-	-	1	1	-	-
CO2	U18EI401D.2	2	1	1	1	-	-	1	-	-	-	-	1	1	-	-
CO3	U18EI401D.3	2	1	1	1	-	-	1	-	-	-	-	1	1	-	-
CO4	U18EI401D.4	2	1	1	1	-	-	1	-	-	-	-	1	1	-	-
U18EI401D		**2**	**1**	**1**	**1**	**-**	**-**	**1**	**-**	**-**	**-**	**-**	**1**	**1**	**-**	**-**

U18OE401E FUNDAMENTALS OF COMPUTER NETWORKS

Class:B.Tech. IV- Semester **Branch:** Common to all branches

Teaching Scheme :

L	T	P	C
3	-	-	3

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LO) :

This course will develop students' knowledge in/on…

LO1: *network topologies, network reference models, network architecture and data transmission*

LO2: *design issues and protocols of data link layer, error detection and correction, MAC protocols and ethernet standards*

LO3: *principles and design issues of network layer and internet protocols*

LO4: *transport layer design issues, protocols and application layer services*

UNIT-I (9)

Introduction: History of Computer Networks and The Internet, Principles of Computer Network Design, Network Architecture, Network Types

Physical Layer: Factors Affecting Data Transmission, Data Transmission, Data Transmission Codes: Non-return to Zero, Manchester Encoding, Digital modulation & Modems, Transmission Media

UNIT-II (9)

Data Link Layer: Functions of Data Link Layer, Framing Techniques, Error Detection and Correction, Elementary Data Link Layer Protocols for Flow Control

Local Area Networks: Medium Access Protocols, LAN Protocol Stack, Ethernet Protocols, IEEE 802.11 LAN Standard: IEEE 802.11 Protocol Stack, Wireless LAN Topologies, Frames in IEEE 802.11

UNIT-III(9)

The Network Layer: Network Layer Services, Packet Switching Networks, The Internet Protocol(IP):IP Header in IPv4, IP Addressing in IPv4, Subnet addressing and Classless Inter-Domain Routing (CIDR), Address Resolution Protocol, Dynamic Host Configuration Protocol, Internet Layer Protocols, Fragmentation and Reassembly, IP Version 6: Motivation for IPv6 Development, Features of IPv6, IPv6 Address Representation

Routing Protocols: Elements of Routing Protocol Performance, Flooding, Distance-Vector and Link State Routing Protocols, Hierarchical Routing

UNIT-IV (9)

The Transport Layer: User Datagram Protocol, Transmission Control Protocol, TCP State Transition Diagram, Other TCP Timers, TCP Congestion Control

The Application Layer: World Wide Web, Domain Name System, Electronic Mail

Network Security: Threats and Vulnerabilities in Computer Networks, Cryptographic Algorithms, Data Encryption Standard

Text Books:

1. Mayank Dave, Computer Networks, 2nd ed. Cengage Learning, 2014.

Reference Books:

1. Forouzan, Data Communication and Networking, 5th ed. *TMH*, *ISBN*978-0-07-296775-3, 2012.
2. William Stallings, "Data and Computer Communications", 9th ed. *Prentice-Hall India*, 2011.
3. Andrew S.Tanenbaum , David J. Wetherall, Computer Networks, 5th ed. *Pearson Education*, 2011.

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: *describe various network topologies, architecture and techniques for data transmission modes*

CO2: *outline various design issues in data link layer and develop protocols to handle data link layer operation*

CO3: *describe various design issues and develop protocols for network Layer*

CO4: *explain various design issues , protocols of transport layer & application layer services*

Course Articulation Matrix (CAM):U18OE401E FUNDAMENTALS OF COMPUTER NETWORKS

CO		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	U18OE401E.1	2	1	-	1	-	1	-	-	-	-	-	1	1	1	-
CO2	U18OE401E.2	3	3	2	1	1	1	-	-	-	-	-	1	2	2	-
CO3	U18OE401E.3	3	3	2	2	1	1	-	-	-	-	-	1	2	2	-
CO4	U18OE401E.4	3	3	2	2	1	1	-	-	-	-	-	1	2	2	-
U18OE401E		**2.75**	**2.5**	**2**	**1.5**	**1**	**1**	**-**	**-**	**-**	**-**	**-**	**1**	**1.75**	**1.75**	**-**

U18OE401F RENEWABLE ENERGY SOURCES

Class: B.Tech. IV-Semester **Branch:** Common to all branches

Teaching Scheme:

L	T	P	C
3	-	-	3

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs) :

This course will develop student's knowledge in/on…

LO1: *different renewable energy sources and principle of solar energy systems*
LO2: *wind energy, geothermal energy and MHD power generation systems*
LO3: *harnessing energy from oceans and biomass*
LO4: *working of fuel cells and different energy storage systems*

UNIT-I (9)

Introduction: Conventional and non-conventional sources of energy – Brief description of different Renewable energy sources

Solar Energy: Introduction to prospects of solar photovoltaic (SPV) systems, principle of a PV cell, large scale SPV systems, economic considerations of SPV systems, PV cell technology, merits and limits of SPV systems, applications of SPV systems-street lighting, domestic lighting, Battery charging, SPV pumping systems

UNIT-II (9)

Wind Energy: Principles of wind power- Operation of a wind turbine- Site Characteristics

Geothermal Energy: Origin and types of geothermal energy- Operational Difficulties- Vapor dominated systems- Liquid dominated systems- Petro- thermal systems

Magneto-Hydro Dynamic (MHD) Power Generation: MHD system- Open and Closed systems- Advantages of MHD systems

UNIT-III (9)

Energy from Oceans: Ocean temperature differences, ocean waves-Wave motions and tides-Energy from the waves; Introduction of tidal power, basic principle of tidal power, components of tidal power plants, advantages and disadvantages

Bio-Energy: Introduction-bio-mass conversion, technologies-wet process, dry process, photo synthesis; Biogas generation- biogas from power plant wastes, methods of maintaining biogas production, utilization of biogas, biogas gasification, applications of gasifiers

UNIT-IV (9)

Chemical Energy Sources: Introduction of fuel cells, Principle of Operation of fuel cell, Classification of Fuel cells, Advantages and disadvantages of fuel cells

Types of Energy Storage Systems: Introduction, Different types of Batteries, Ultra Capacitors, Flywheels, Super Conducting Magnetic storage

Text Books:

[1] Rai G.D,Non-Conventional Energy Sources, *Khanna Publishers*, New Delhi

[2] Felix A. Farret, M. Godoy Simoes, ―Integration of Alternative Sources of Energy, *John Wiley & Sons*, 2006

[3] Bansal N.K,Kaleemanand M.Miller, Renewable Energy Sources and Conversion Technology,*TATA Mc Graw-Hill*, NewDelhi

Reference Books:

[1] EL-Wakil M.M, Power Plant Technology, *Mc Graw-Hill*, NewYork
[2] Duffie and Beckman, Solar Energy Thermal Process, *John Wiley & Sons*, New York

Course Learning Outcomes (COs):
On completion of this course, students will be able to…

CO1: *compare conventional and non-conventional energy resources; explain the working principle of solar energy harnessing and its applications*
CO2: *explain the working principles of wind energy, geothermal energy and MHD power generation systems*
CO3: *describe the harnessing of electric power from oceans and biomass*
CO4: *explain the principle of operation of fuel cells and different types of energy storage systems*

Course Articulation Matrix (CAM):U18OE401F RENEWABLE ENERGY SOURCES																
CO		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	U18OE401F.1	3	-	-	-	-	-	1	-	-	-	-	-	1	-	-
CO2	U18OE401F.2	3	-	-	-	-	-	1	-	-	-	-	-	1	-	-
CO3	U18OE401F.3	3	-	-	-	-	-	1	-	-	-	-	-	1	-	-
CO4	U18OE401F.4	3	-	-	-	-	-	1	-	-	-	-	-	1	-	-
U18OE401F		**3**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**-**

U18TP402 SOFT AND INTERPERSONAL SKILLS

Class: B. Tech IV -Semester **Branch:** Common to all branches

Teaching Scheme :

L	T	P	C
-	-	2	1

Examination Scheme :

Continuous Internal Evaluation	100 marks
End Semester Examination	-

Course Learning Objectives (LOs):

This course will develop students' knowledge in/on…

LO1: *logical construction of speech appropriate for the occasion and exhibiting team work*
LO2: *acquiring spontaneity, presence of mind for effective communication*
LO3: *identifying, analyzing the theme of the topic and understanding presentation skills*
LO4: *communicating professionally and developing strategies in selecting career objectives in line with industry expectations*

LIST OF ACTIVITIES

Activity 1 : Team interaction
Activity 2 :SWOT analysis
Activity 3 :Debate
Activity 4 : Group Discussion
Activity 5 : Presentations through PPTs
Activity 6 : Video Synthesis
Activity 7 : Resume Writing
Activity 8 : Email Etiquette
Activity 9 : My interview Plan: Self Introduction & FAQs
Activity 10 : My Career Plan" Oral presentation
} Comprehensive Presentation

Text Books:

[1] Developing Communications Skills – Krishna Mohan & Meera Benerji
[2] Soft Skills - Alex.K
[3] Soft skills Cornerstone of Professional success – Raman & Meenakshi

References:

[1] https://onlinecourses.nptel.ac.in/noc19_hs20/preview
[2] https://onlinecourses.nptel.ac.in/noc18_hs30/preview

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: *introspect to convert strengths into opportunities, identify weaknesses, bypass threats*
CO2: *present views on various issues confidently in a group*
CO3: *make effective PPT presentations, synthesize videos*
CO4: *prepare a professional resume, communicate effectively to attain better opportunities*

Course Articulation Matrix (CAM):U18TP402 SOFT AND INTERPERSONAL SKILLS																
CO		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	U18TP402.1	-	-	-	-	-	-	-	-	2	3	-	-	-	-	-
CO2	U18TP402.2	-	-	-	-	-	-	-	2	3	3	-	-	-	-	-
CO3	U18TP402.3	-	-	-	-	-	-	-	-	2	3	-	-	-	-	-
CO4	U18TP402.4	-	-	-	-	-	-	-	1	2	3	-	-	-	-	-
U18TP402		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1.5**	**2.25**	**3**	**-**	**-**	**-**	**-**	**-**

U18OE403B FLUID MECHANICS AND HYDRAULIC MACHINES

Class: B.Tech. IV-Semester **Branch:**Common to all branches

Teaching Scheme :

L	T	P	C
3	-	-	3

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):
This course will develop students' knowledge in /on

LO1: *various properties of fluids and fluid statics*
LO2: *application of Bernoulli's equation and dimensional analysis*
LO3: *flow through pipes and working principles of hydraulic turbines*
LO4: *performance of reciprocating and centrifugal pumps*

UNIT-I(9)

Fluid fundamentals: Classification of fluids, fluid properties - density, specific weight, specific gravity, specific volume, viscosity, capillarity, vapor pressure, compressibility, surface tension, cohesion and adhesion
Fluid statics: Pascal's Law, hydrostatic Law, measurement of pressure, manometers, Piezometer, U-tube differential manometer, inverted differential manometer, hydrostatic forces on submerged plane and curved surfaces, buoyancy, metacenter, stability of floating and submerged bodies

UNIT-II (9)

Fluid dynamics: Classification of fluid flow, continuity equation in one, two and three dimensional flow, velocity potential and stream function, forces causing motion, Euler's equation of motion, Bernoulli's Equation, applications of Bernoulli's equation, venturi meter, orifice meter, pitot tube, linear momentum equation ,application of linear momentum equation to forces on pipe bend
Dimensional analysis: Dimensional analysis by Rayleigh's method and Buckingham π's theorem, dimensionless numbers and model laws, Reynolds law and Froude's law

UNIT-III(9)

Flow through pipes: Loss of head in pipes, expression for head loss due to major and minor losses in pipes, HGL and TEL lines, pipes in series and parallel, equivalent pipe
Hydraulic turbines: Concept of impact jets, classification, head, losses and various efficiencies, Pelton turbines, components, velocity triangles, power and efficiencies, reaction turbines, Francis and Kaplan turbines, efficiencies and characteristics, unit quantities, specific speed, draft tube theory

UNIT-IV (9)

Reciprocating pumps: Working of single and double acting pumps, work done and efficiencies, slip, negative slip, performance characteristics of pumps, air vessel
Centrifugal pumps: Principle, components, work done and efficiency, pumps in series and in parallel, multi stage pumps, characteristics, cavitation and priming

Text Books:

[1] P.N.Modi and S.M. Seth, Hydraulics and Fluid Mechanics Including Hydraulic Machines, Standard Book House, *Rajsons Publications Private Limited*, 21thed. 2017

Reference Books:

[1] R.K.Bansal, Fluid Mechanics and Hydraulic Machines, *Periodicals Private Ltd.*,2018
[2] Victor Streeter and E. Benjamin Wylie, Fluid Mechanics, *McGraw Hill*, Singapore, 9thed. 2017.
[3] Frank M. White, Fluid Mechanics, Special Indian Edition, *Tata McGraw Hill*, New Delhi, 2011.
[4] A.K. Jain, Fluid Mechanics Including Hydraulic Machines, *Khanna Publications*, 12th ed. 2018.

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: *summarize fluid properties using fundamental laws of fluid statics*
CO2: *analyse fluid flows using Bernoulli's equation and model laws*
CO3: *estimate losses in pipes and characterize hydraulic turbines*
CO4: *discuss the working principle and characteristics of pumps*

Course Articulation Matrix (CAM):U18OE403BFLUID MECHANICS AND HYDRAULIC MACHINES

CO		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	U18OE403B.1	2	1	-	-	-	-	-	-	1	1	-	1	1	-	-
CO2	U18OE403B.2	2	1	-	1	-	-	-	-	1	1	-	1	1	-	-
CO3	U18OE403B.3	2	1	-	1	-	-	-	-	1	1	-	1	1	-	-
CO4	U18OE403B.4	2	1	-	1	-	1	-	-	1	1	-	1	1	-	-
U18OE403B		**2**	**1**	**-**	**1**	**-**	**1**	**-**	**-**	**1**	**1**	**-**	**1**	**1**	**-**	**-**

U18OE403C MECHATRONICS

Class:B.Tech. IV-Semester **Branch:** Common to all branches

Teaching Scheme :

L	T	P	C
3	-	-	3

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Outcomes (LOs):
This course will develop students' knowledge in /on…

LO1: *role of mechatronics based technology, sensors and transducers used in industry*
LO2: *various types of actuation systems, working principles and their applications*
LO3: *mathematical models for various types of systems*
LO4: *various transfer functions and control modes*

UNIT-I (9)

Introduction to Mechatronics: Measuring system, Control systems, Microprocessor based controllers. Mechatronics approach
Sensors and Transducers: Performance, terminology, displacement, position, proximity, velocity and motion

UNIT-II (9)

Actuation Systems: working principles of pneumatic and hydraulic systems, directional control valves, pressure control valves, process control valves and rotary actuators
Electrical Actuation Systems: working principles of electrical system, mechanical switches, solid-state switches solenoids, DC motors, AC motors and stepper motors

UNIT-III (9)

Basic Models: Mathematical models, mechanical system building blocks, electrical system building blocks, fluid system building blocks and thermal system building blocks
System Models: Engineering system, rotational-translational system and electro- mechanical systems and hydraulic-mechanical system

UNIT-IV (9)

System Transfer functions: Transfer function, first order system, second order system, system in series and systems with feedback loops
Closed Loop Controllers: Continuous and discrete processes. Control modes. Two step mode and proportional mode. Derivative control, integral control, PID controller, digital controllers, velocity controllers and adaptive control

Text Book:

[1] Bolton W., Mechatronics, *PearsonPublications,* 6thed. 2015.

Reference Books:

[1] NitaigourPremchandMahalik, Mechatronics: Principles Concepts and Applications, *Tata McGraw Hill,* 2nded.2017.
[2] HMT, Mechatronics, *Tata McGraw-Hill,* New Delhi, 2000.
[3] Devdas Shetty, Richard and Kilk, Mechatronics System and Design, *Cengage Learning*, Inc. 2nded.2010.

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: *apply the mechatronics approach ad select suitable sensors and transducers for a given application*

CO2: *explain working principles of mechanical, hydraulic, pneumatic and electrical actuators and their applications*

CO3: *develop basic building blocks for mechanical, electrical, fluid and thermal systems and build mathematical models and analyze*

CO4: *explain various system transfer functions and select an appropriate closed loop controller for a*

Course Articulation Matrix (CAM):U18OE403C MECHATRONICS																
CO		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	U18OE403C.1	2	2	1	-	2	2	-	-	-	1	-	1	1	-	-
CO2	U18OE403C.2	2	2	1	-	2	-	-	-	-	1	-	1	1	-	-
CO3	U18OE403C.3	2	2	1	3	2	-	-	-	-	1	-	1	1	-	-
CO4	U18OE403C.4	2	2	1	1	2	-	-	-	-	1	-	1	1	-	-
U18OE403C		**2**	**2**	**1**	**2**	**2**	**2**	**-**	**-**	**-**	**1**	**-**	**1**	**1**	**-**	**-**

U18OE403E MICROPROCESSORS

Class:B.Tech. IV-Semester **Branch:** Common to all branches

Teaching Scheme:

L	T	P	C
3	-	-	3

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives:

This course will develop students' knowledge in/on…

LO1: *architectural issues of 8086 Microprocessor*
LO2: *programming concepts of 8086 Microprocessor*
LO3: *interfacing of 8086 microprocessor to various I/O subsystems*
LO4: *serial data communication types and standards like RS232, IEEE 488 Bus*

UNIT–I(9)

Review of 8085 MPU Architecture
8086 Family Architecture: Organization of 8086 CPU, Concept of Memory Segmentation, Segment Registers, Physical and Logical Addressing, Addressing Modes and Instruction Formats, Instruction Set

UNIT–II(9)

Assembly Language Programming: Assembler Directives, Simple Programming of 8086, Arithmetic, Logical and Data Processing Programs; Implementation of Control Loops, Structures, Strings, Procedures, Macros
Pin Configuration, Minimum / Maximum Modes, Timing Diagrams, Delay Subroutines

UNIT–III(9)

Interfacing with 8086: 8086 Interrupts, Interrupt Service Routines, Programmable Interrupt Controller 8259, Programmable Peripheral Interface 8255, Interfacing of Switches, Keyboards, LEDs, Stepper Motor, ADCs and DACs

UNIT–IV(9)

DMA Controller 8257, Programmable Timer/Counter 8254
Serial Data Communication through 8086: Types of Serial Communication, Synchronous and Asynchronous Communication, Serial Data Communication through USART 8251, Serial Data Communication Standards, RS-232, IEEE 488 Bus (GPIB)

Text Books:

[1] D.V.Hall, Microprocessors and Interfacing: Programming & Hardware, 2nd ed.*Tata McGraw Hill*, New Delhi, 1992. (Chapter 3 to 10)

[2] Yuchang Liu, Glen A. Gibson, Microcomputer Systems. The 8086/8088 Family, Architecture, Programming and Design, 2nded. *PHI*, New Delhi, 1995. (Chapter 2 to 11)

Reference Books:

[1] Kenneth J. Ayala, Ayala Kenneth, The 8086 Microprocessor: Programming and Interfacing The PC, *West Pub*., 1994.

[2] Barry B. Brey,The Intel Microprocessors: Architecture, Programming and Interfacing, 2nd ed.*PHI, New Delhi*, 1998.

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: *describe the architecture of 8086 microprocessor and explain instructions with suitable examples*
CO2: *write Assembly Language Programs (ALPs) to perform a given task*
CO3: *design 8086 microprocessor based system for given specifications with memory mapping*
CO4: *explain serial communication modes and discuss it standards*

Course Articulation Matrix (CAM):U18OE403E MICROPROCESSORS

CO		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	U18OE403E.1	3	3	2	1	-	-	-	-	-	-	-	-	1	-	-
CO2	U18OE403E.2	3	2	2	1	-	-	-	-	-	-	-	-	1	-	-
CO3	U18OE403E.3	3	3	2	1	-	-	-	-	-	-	-	-	1	-	-
CO4	U18OE403E.4	3	3	2	1	-	-	-	-	-	-	-	1	1	-	-
U18OE403E		**3**	**2.75**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**1**	**-**	**-**

U18OE403F STRENGTH OF MATERIALS

Class: B.Tech. IV-Semester **Branch:** Common to all branches

Teaching Scheme :

L	T	P	C
3	-	-	3

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):
This course will develop students' knowledge in /on…

LO1: *behaviour of bodies subjected to various types of stresses and strains*
LO2: *shear force and bending moment for determinate beams*
LO3: *bending and shearing stresses for beams in flexure*
LO4: *behaviour of circular shafts, springs and thin cylinders*

UNIT-I (9)

Simple stresses and strains: Types of stresses, strains, stress–strain diagram, elastic limit, Hooke's law, bars of varying sections, uniformly tapering circular and rectangular sections, elongation of bars due to self weight, temperature stresses in uniform bars
Elastic Modulii: Elastic constants, longitudinal strain, lateral strain, Poisson's ratio, complimentary shear stress, state of simple shear, modulus of elasticity (E), modulus of rigidity (N), bulk modulus (K), relation between E, N & K, strain energy, resilience, impact loading

UNIT-II (9)

Principal stresses: Definition, normal and shear stress, principal stresses, principal planes and their graphical representation by Mohr's circle
Shear force and bending moment: Types of supports, classification of beams, concept of shear force and bending moment, shear force diagram and bending moment diagram for simply supported, cantilever and overhanging beams, loading from shear force and bending moment diagram, principle of superposition

UNIT-III(9)

Bending stresses in beams: Assumptions, theory of simple bending, application of bending equation and calculation of bending stresses in beams of homogeneous and flitched beam material, beams of uniform strength
Shearing stresses in beams: Shearing stress due to bending, variation of flexural shear stress distribution across rectangular, triangular, circular, flanged section, shear resilience

UNIT-IV (9)

Circular shafts and springs: Theory of pure torsion in solid and hollow circular shafts, shear stresses, angle of twist, power transmitted by shaft, close-coiled and open-coiled helical spring subjected to axial load and axial twist, springs in series and parallel
Thin cylinders: Analysis of thin walled pressure vessels, hoop stress, longitudinal stress

Text Books:

[1] Rajput R.K., Strength of Materials, 7thed. *S Chand and Company.*
[2] Gunneswara Rao T. D.and MudimbyAndal,Strength of Materials, 2018,*Cambridge University Press.*

Reference Books:

[1] Timoshenko and Gere, Mechanics of Materials,*Mc Graw Hill International*.

[2] Punmia B.C., Arun K. Jain, Ashok K. Jain, Mechanics of Materials, 2nded. *Laxmi Publications,* New Delhi.

[3] Subramanian R., Strength of Materials,3rd ed. *Oxford University Press*.

[4] Ramamrutham S.,Strength of Materials,2nd ed. *Dhanpat Rai & Sons*, New Delhi.

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: *estimate various types of stresses and strains*

CO2: *construct Mohr's circle, shear force and bending moment diagrams for determinate beams*

CO3: *determine the bending and shearing stresses for beams subjected to pure bending*

CO4: *analyze stresses in thin cylinders, circular shafts and springs by theory of pure torsion*

Course Articulation Matrix (CAM):U18OE303F STRENGTH OF MATERIALS																
CO		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	U18OE403F.1	2	2	1	1	-	-	-	-	-	1	-	2	1	-	-
CO2	U18OE403F.2	2	2	1	-	-	-	-	-	-	1	-	1	1	-	-
CO3	U18OE403F.3	2	2	1	1	-	-	-	-	-	-	-	1	1	-	-
CO4	U18OE403F.4	2	2	1	2	-	-	-	-	-	1	-	1	1	-	-
U18OE403F		**2**	**2**	**1**	**1.33**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**1.25**	**1**	**-**	**-**

U18IT404 THEORY OF COMPUTATION

Class:B.Tech. IV-Semester **Branch:** Information Technology

Teaching Scheme :

L	T	P	C
3	-	-	3

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):

This Course will develop student's knowledge in/on

LO1: *formal notation for strings, languages and finite automata*

LO2: *properties of regular languages, types of grammars and applications of context free grammar*

LO3: *equivalence of languages accepted by pushdown automata and languages generated by context free grammars*

LO4: *computability & non-computability and decidability & un-decidability problems in turing machines*

UNIT–I (9)

Automata Theory: Introduction to Finite Automata, Structural Representations and The Central Concepts of Automata Theory.

Finite Automata: Deterministic Finite Automata, Non-Deterministic Finite Automata, Finite Automata with Epsilon Transitions, Finite Automata with Output.

Regular Expressions and Languages: Regular Expressions, Finite Automata and Regular Expressions, Applications of Regular Expressions, Regular Sets and Regular Grammars.

UNIT–II (9)

Properties of Regular Languages: Proving Languages Not to Be Regular, Closure Properties of Regular Languages, Equivalence and Minimization of Automata

Context-Free Grammars and Languages: Chomsky Classification of Languages, Context-Free Grammars, Parse Trees, Applications of Context-Free Grammars, Ambiguity in Grammars and Languages, Simplification of Context-Free Grammars

UNIT–III (9)

Properties of Context-Free Languages: Normal Forms for Context-Free Grammars, The Pumping Lemma for Context-Free Languages, Closure Properties of Context-Free Languages, Decision Properties of Context-Free Languages

Pushdown Automata: Definition of Pushdown Automaton, Deterministic Pushdown Automata, The Languages of Pushdown Automata, Equivalence of Pushdown Automata and Context-Free Grammar

UNIT–IV(9)

Introduction to Turing Machines: Problems that Computers Cannot Solve, The Turing Machine, Programming Techniques for Turing Machines, Extensions to The Basic Turing Machine

Undecidability: A Language that is not Recursively Enumerable, An Undecidable Problem that is Recursively Enumerable, Undecidable Problems about Turing Machines, Post's Correspondence Problem, The Classes P & NP, An NP-Complete Problem

Text Books:

[1] John E. Hopcroft, Rajeev Motwani and Jeffrey D. Ullman, Introduction to Automata Theory, Languages, and Computation, *Pearson Education Asia*, 3rded. 2007.(Chapters: 1.1.1 , 1.1.2, 1.5, 2.2, 2.3, 2,5, 3.1-3.3, 4.1, 4.2, 4.4., 5.1-5.4, 7.1-7.4,6.1-6.4,8.1-8.4, 9.1-9.4, 10.1-10.2)

[2] Mishra K.L.P., Chandrasekaran N, Theory of Computer Science: Automata, Languages and Computation, *PHI Learning Pvt. Ltd.,*3rded. 2012.(Chapters: 3.8 , 4.2 , 5.6, 6.3)

Reference Books:

[1] Harry R. Lewis and Christos H. Papadimitriou, Elements of the Theory of Computation, *PearsonEducation Asia,*2nded.1998.

[2] Michael Sipser, Introduction to the Theory of Computation, PWS Publishing, *Books/Cole Thomson Learning*, 2nded. 2001.

[3] John Martin, Introduction to Languages and The Theory of Computation, *Tata McGraw-HillEducation Pvt. Ltd.,* 3rd ed.2007.

[4] Dexter C. Kozen, Automata and Computability, Undergraduate Texts in Computer Science, *Springer*,1997.

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: *write a formal notation for strings, languages and Finite Automata.*

CO2: *design context free grammars to generate strings of context free language*

CO3: *determine equivalence of languages accepted by pushdown automata and languages generated by context free grammars*

CO4: *distinguish between computability & non-computability and decidability & un-decidability in turing machines*

Course Articulation Matrix (CAM):U18IT404 THEORY OF COMPUTATION

CO		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	U18IT404.1	2	2	2	2	-	1	-	-	-	-	-	-	2	2	-
CO2	U18IT404.2	2	2	2	-	-	1	-	-	-	-	-	-	2	2	-
CO3	U18IT404.3	2	2	2	2	-	1	-	-	-	-	-	-	2	2	-
CO4	U18IT404.4	2	2	2	2	-	1	-	-	-	-	-	2	2	2	-
	U18IT404	**2**	**2**	**2**	**2**	**-**	**1**	**-**	**-**	**-**	**-**	**-**	**2**	**2**	**2**	**-**

U18IT405 DATABASE MANAGEMENT SYSTEMS

Class:**B.Tech.** IV-Semester **Branch**: Information Technology

Teaching Scheme :

L	T	P	C
3	1	-	4

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LO) :

This course will develop students' knowledge in/on…

LO1: *diverse issues involved in the design and implementation of a database management system*
LO2: *study the physical and logical database designs, database modeling and different database models*
LO3: *distinct normalization techniques on database systems and query optimization technique*
LO4: *transaction processing, concurrency control, database recovery, security and authorization techniques*

UNIT - I (9+3)

Databases and Database Users: Introduction, Characteristics of the database approach, Actors on the scene, Workers behind the scene, Advantages of using a DBMS, When not to use a DBMS

Database System Concepts and Architecture: Data models, Schemas and instances, Three-schema architecture and data independence, Database languages and interfaces, The database system environment, Classification of database management systems

The Relational Data Model, Relational Database Constraints: Relational model concepts, Relational constraints and the Relational database schemas, Update operations and dealing with constraint violations

Basic SQL: SQL Data Definition and Data Types, Specifying Constraints in SQL, Basic Retrieval Queries in SQL, INSERT, DELETE, and UPDATE Statements in SQL

UNIT - II (9+3)

Data modeling using the Entity-Relationship Model: Using high-level conceptual data models for database design, Entity types, Entity sets, Attributes and keys, Relationships types, Relationship sets, Roles and structural constraints, Weak entity types, ER diagrams

Enhanced Entity-Relationship: Sub classes, Super classes and Inheritance, Specialization and generalization, Constraints and characteristics of specialization and generalization hierarchies, Modeling of union types using categories

Relational Database Design by ER-and EER-to-Relational Mapping: Relational database design using ER-to-Relational mapping, Mapping EER model constructs to relations

UNIT - III (9+3)

Database Design Theory and Normalization: Informal design guidelines for relation schemas, Functional dependencies, Normal forms based on primary keys, General definitions of second and third normal forms, Boyce-Codd normal form, Algorithms for relational database schema design, Multivalued dependency and fourth normal form , Join dependencies and fifth normal form

The Relational Algebra and Relational Calculus: Basic relational algebra operations, Examples of queries in relational algebra, The tuple relational calculus, The domain relational calculus

Query Processing and Optimization: Translating SQL queries into relational algebra, Using heuristics in query optimization

UNIT - IV (9+3)

Introduction to Transaction Processing Concepts and Theory: Introduction to transaction processing, Transaction and system concepts, Desirable properties of transactions, Characterizing Schedules Based, Characterizing Schedules Based on Serializability

Concurrency Control Techniques: Two-PhaseLocking techniques for concurrency control, Concurrency control based on Timestamp Ordering

Database Recovery Techniques: Recovery concepts, NO-UNDO/REDO Recovery Based on deferred update, Recovery techniques based on immediate update, Shadow paging

Database Security and Authorization: Introduction to database security issues, Discretionary access control based on granting and revoking privileges, Mandatory Access Control and Role-Based Access Control for Multilevel Security

Text Book:

[1] RamezElmasri and Shamkanth B. Navathe, Fundamentals of Database Systems, *Pearson Education*, 6thed.ISBN-13: 978-0-136-08620-8, 2010.

Reference Books:

[1] Raghu Ramakrishnan andJohannes Gehrke, Database Management Systems, *McGraw-Hill Education*, 3rded. 2002.

[2] Abraham Silberschatz, Henry F.Korth and S.Sudarshan, Database System Concepts, *McGraw-Hill Education*, 3rded. 1997.

[3] Thomas Connolly and Carolyn Begg, Database Systems, *Pearson Education*, 3rded. 2003.

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: *design the database management system effectively*

CO2: *design the databases, which includes enhanced entity relationship model*

CO3: *outline the database by using normalization and query optimization techniques to avoid redundancy and maintain the performance of database*

CO4: *discuss the concepts of transactions, concurrency control, recovery methods and manage multi-level security in databases*

Course Articulation Matrix (CAM):U18IT405 DATABASE MANAGEMENT SYSTEMS																
CO		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	U18IT405.1	2	2	1	1	-	-	-	-	-	-	-	1	2	2	2
CO2	U18IT405.2	2	2	2	2	-	-	-	-	-	-	-	1	2	2	2
CO3	U18IT405.3	2	2	2	2	-	-	-	-	-	1	1	1	2	2	2
CO4	U18IT405.4	2	2	2	2	-	-	-	-	-	-	-	1	2	2	2
U18IT405		**2**	**2**	**1.75**	**1.75**	**-**	**-**	**-**	**-**	**-**	**1**	**1**	**1**	**2**	**2**	**2**

U18IT406 JAVA PROGRAMMING

Class: B.Tech. IV-Semester **Branch:**Information Technology

Teaching Scheme:

L	T	P	C
3	-	-	3

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LO):
This course will develop students' knowledge in/on

LO1: *basic concepts of Java programming*
LO2: *inheritance, polymorphism, packages, interfaces and exceptional handling features in Java*
LO3: *multithreading, input &output and collection framework*
LO4: *concepts of applet basics, event handling and graphical user interface programming*

UNIT–I (9)

Java Programming Fundamentals: The history and evolution of Java, Data types, Variables, Operators, Control statements, Type conversion and casting, Arrays, Introducing classes: Classes, Objects, Constructors, Methods, Garbage collection, Variable length arguments, Understanding static: Variables, blocks and methods, String, StringBuffer& StringBuilder classes, StringTokenizer class

UNIT–II (9)

Inheritance: Inheritance basics, Member access and inheritance, Usage of super keyword, Usage of final keyword for- variables, methods and classes, the Object class
Polymorphism: Overloading of methods and constructors, Method Overriding, Dynamic method dispatch
Packages: Defining, Creating and accessing a package, Understanding CLASSPATH, Importing packages, Understanding access controls in packages
Interfaces: Differences between Abstract Classes and Interfaces, Defining an interface, Implementing an interface and extending interfaces
Exception Handling: Exception-handling fundamentals, Exception types, Uncaught exceptions, Using try and catch, Multiple catch clauses, Nested try statements, throw, throws, finally, Java's built-in exceptions, Creating your own exception subclasses

UNIT–III (9)

Multithreading: Creating a thread, Thread priorities, Synchronization, Interthread communication
I/O: Stream Classes, Byte Streams: Input stream, Output Stream, File Input Stream, File Output Stream, Data Input Stream, and Data Output Stream, Character Streams: File Reader, File Writer, Buffered Reader, Buffered Writer
Collection Framework: Collection Interfaces: List Interface, Set Interface, Collection Classes: ArrayList Class, LinkedList Class, HashSet Class, TreeSet Class

UNIT–IV (9)

Applet Basics: The Applet Class and Applet initialization and termination
Event Handling: The delegation Event model: Events, Event sources, Event listeners, Event classes, Examples: Handling a button click, Handling mouse and keyboard events, Adapter classes
GUI Programming: The AWT classes, Introducing Swing: Two key swing features, The MVC Connection, Containers and Components: JFrame, JApplet, JWindow, JDialog, JPanel, Jbutton, JToggleButton, JCheckBox, JRadioButton, JLabel, JTextField, JTextArea, JList, JComboBox, JMenu. Understanding Layout Managers: FlowLayout, BorderLayout, Grid Layout

Text Books:

[1] Herbert Schildt, JAVA The Complete Reference, *McGraw-Hill Education India Pvt. Ltd*, 9thed.2014 (Chapters 1, 3 to 11, 16, 18 to 20, 23 to 26, 31 to 33).

Reference Books:

[1] Herbert Schildt, Dale Skrien, Java Fundamentals (A Comprehensive Introduction), *McGraw Hill Education*, 2012.

[2] Kathy Sierra, Bert Bates, Head First Java *O'Reilly Publications*, 2nded.2005.

[3] K. Somasundaram, Advanced Programming in Java 2, *Jaico Publishing House*, 2008.

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: *analyze the importance of object oriented programming concepts of java and develop modular programming using classes*

CO2: *apply reusability concepts like inheritance, polymorphism, packages, interfaces and exceptional handling in application development*

CO3: *develop multithreading, I/O, collection framework applications*

CO4: *develop different applications using applet basics, event handling and graphical user interface programming concepts*

Course Articulation Matrix (CAM):U18IT406 JAVA PROGRAMMING																
CO		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	U18IT406.1	1	1	-	-	-	-	-	-	-	-	-	-	1	-	-
CO2	U18IT406.2	2	2	1	1	-	-	-	-	-	-	-	2	2	1	-
CO3	U18IT406.3	2	2	2	2	1	-	-	-	-	-	-	2	2	2	1
CO4	U18IT406.4	2	2	2	2	1	-	-	-	-	-	-	2	2	2	2
U18IT406		**1.75**	**1.75**	**1.66**	**1.66**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**1.75**	**1.66**	**1.5**

U18IT407 JAVA PROGRAMMING LABORATORY

Class: B.Tech. IV-Semester **Branch:** Information Technology

Teaching Scheme:

L	T	P	C
-	-	2	1

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LO):

This course will develop students' knowledge in/on

LO1: *core programming features of Java*
LO2: *inheritance, polymorphism, exceptional handling, packages and interfaces*
LO3: *multithreading, I/O streams and collection framework in Java*
LO4: *graphical user interface programming using AWT and swings*

List of Experiments

Experiment-I

1. Print all Fibonacci numbers which lies between given two numbers a and b.
2. Write a program to read an array and display them using foreach loop. Finally display the sum of array elements.

Experiment-II

3. Write a program to read a matrix and display whether it is an identical matrix or not. Use civilized form of *break* statement.
4. Write a program to define a two dimensional array where each row contains different number of columns. Display the 2D-array using for each.
5. Write a program to accept the string from keyboard, count number of vowels and remove all vowels from the string and display it using string and string buffer class.

Experiment-III

6. Write a program to read ***N*** number of strings from keyboard and display in sorted order.
7. Write a program to accept a line of text, tokenize the line using *StringTokenizer* class and print the tokens in reverse order.
8. Write a program to define a single function which can receive any number of integer values and display the sum of them.

Experiment-IV

9. Write program to demonstrate dynamic method dispatch in java.
10. Write a program to demonstrate use of abstract class.

Experiment-V

11. Write a program to demonstrate the use of overriding *equals()* method which is defined in Object class.
12. Write a program to read two integer numbers using commandline argument and display the coefficient. Handle ArrayIndexOutofBoundsException, NumberFormatException and DivideByZeroException using multiple catch blocks.

Experiment-VI

13. Write a program to demonstrate re-throw of exception and finally block.

14. Find the average of N numbers where N to be input from the keyboard. If the N is zero or negative then a suitable user defined exception must be thrown. If it is not possible to convert input to integer then NumberFormatException must be caught.

Experiment-VII

15. Write a program to demonstrate access specifiers in packages.
16. Write a program to implement multiple interfaces into a single class.
17. Write a java program to create an Interface named Shape that contains two methods namely printArea() and printPerimeter(). Implement the interface in three classes named Rectangle, Triangle and Circle.

Experiment-VIII

18. Create two threads. One thread displays "Hello" for every half second and another thread displays "Hai" for every second.
19. Create an account class which implements all account operations. Provide locking such that account details are consistent when the debit or credit operations invoked by the account holders simultaneously who have shared account.
20. Give a solution for producer and consumer problem using thread synchronization and communication, where a producer produces a set of integers and consumer consumes those integers.

Experiment-IX

21. Write a Java Program that loads names and phone numbers from a text file where the data is organized as one line per record and each filed in a record are separated by a tab (\t). It takes a name or phone number as input and prints the corresponding other value from the hash table (Hint: use hash tables).
22. Write a Java program to create a text file and display the contents on screen using file reader and file writer class.
23. Write a Java program to demonstrate methods of ArrayList.

Experiment-X

24. Develop an applet that draws different geometric shapes and fill them with different colors.
25. Design an applet to display "good Morning" if current time is between "6 AM and 12 PM" and "Good Afternoon" if the current time is between 12 PM and 6PM, and "Good Evening" if the current time is between 6PM and 12AM.

Experiment-XI

26. Write a Java program to implement mouse events using Swing components.
27. Write a Java program to implement keyboard events using Swing components.

Experiment-XII

28. Design a Java application to design Basic Calculator using Swing components.
29. Design a Java application to implement JScrollBar components.

Laboratory Manual:

[1] *Java Programming Laboratory Manual*, Dept. of IT, KITSW.

Text Books:

[1] Herbert Schildt, JAVA The Complete Reference, *McGraw-Hill Education India Pvt.Ltd*, 9thed. 2014.

[2] Herbert Schildt, Dale Skrien,Java Fundamentals (A Comprehensive Introduction), *McGraw Hill Education*, 2012.

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: *implement object oriented programming concepts using Java*

CO2: *apply the concepts of inheritance, polymorphism, packages, interfaces and exception handling in application development*

CO3: *develop applications using multithreading, I/O streams and collection framework*

CO4: *develop different Java applications using graphical user interface concepts*

Course Articulation Matrix (CAM):U18IT407 JAVA PROGRAMMING LABORATORY															
CO		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	U18IT407.1	2	1	-	-	-	-	-	-	-	-	-	-	2	2	
CO2	U18IT407.2	2	1	2	2	-	-	-	-	-	-	-	2	3	2	1
CO3	U18IT407.3	2	2	2	2	1	-	-	-	-	-	-	2	3	2	1
CO4	U18IT407.4	2	2	2	2	1	-	-	-	-	-	-	2	2	2	2
U18IT407		**2**	**1.5**	**2**	**2**	**1**	**-**	-	-	-	-	-	-	**2.5**	2	**1.33**

U18IT408 DATABASE MANAGEMENT SYSTEMS LABORATORY

Class:B.Tech. IV-Semester **Branch:** Information Technology

Teaching Scheme :

L	T	P	C
-	-	2	1

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LO):

This course will develop students' knowledge in/on…

LO1: *data definition language, data manipulation language, transaction control languages, and data control languages commands*
LO2: *built-in functions of SQL, sub queries, indexes, user defined data types, views and sequences*
LO3: *basic PL/SQL programs and cursors*
LO4: *stored procedures/functions, exception handling, packages and triggers*

List of Experiments

Structured Query Language (SQL):

Experiment-I
1. Queries on DDL and DML statements.
2. Queries on TCL and DCL commands.
3. Queries on column level and table level constraints.

Experiment -II
4. Queries using built-in functions of NUMBER, CHARACTER, DATE Data types.
5. Queries on Data type conversion functions.

Experiment -III
6. Queries on single row functions and operators.

Experiment -IV
7. Queries on aggregate functions.

Experiment -V
8.Queries on joins and nested queries.

Experiment -VI
9. Write SQL statements to create simple, composite indexes, user-defined data types, views, sequences.

PL/SQL Programs:

Experiment –VII
10. Write sample PL/SQL programs using conditional and iterative statements.

Experiment -VIII
11. Write PL/SQL programs using cursors.

Experiment -IX

12. Write PL/SQL programs using parameterized cursors.

Experiment-X

13. Write PL/SQL programs to handle exceptions.
14. Write PL/SQL programs using stored procedures and functions.

Experiment –XI

15. Write PL/SQL programs for creating packages.

Experiment -XII

16. Write PL/SQL programs for creating triggers.

Laboratory Manual:

[1] *Database Management Systems Laboratory Manual*, Dept. of IT, KITSW.

Text Book:

[1] Ivan Bayross, SQL, PL/SQL: The Programming Language of Oracle, *BPB publications*, 4thed. 2010.

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: evaluate SQL queries using DDL/DML/TCL/DCL commands to create and manipulate data in database by enforcing constraints

CO2: design various database objects using SQL queries

CO3: implement block structured programming with cursors to enable traversal over the records of the database redundancy and maintain the performance of database.

CO4: implement pre-compiled stored programs, run-time errors checking, database objects collection in PL/SQL packages and high-level security using triggers

Course Articulation Matrix (CAM):U18IT408 DATABASE MANAGEMENT SYSTEMSLABORATORY																
CO		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	U18IT408.1	2	2	1	1	-	-	-	-	-	-	1	2	2	2	1
CO2	U18IT408.2	2	2	2	2	-	-	-	-	-	-	2	2	2	2	2
CO3	U18IT408.3	2	2	2	2	-	-	-	-	-	1	1	2	2	2	2
CO4	U18IT408.4	2	2	2	2	-	-	-	-	-	1	1	2	2	2	2
U18IT408		**2**	**2**	**1.75**	**1.75**	**-**	**-**	**-**	**-**	**-**	**-**	**1.25**	**2**	**2**	**2**	**1.75**

U18OE411B FLUID MECHANICS AND HYDRAULIC MACHINES LABORATORY

Class: B.Tech. IV -Semester **Branch:** Common to all branches

Teaching Scheme :

L	T	P	C
-	-	2	1

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):

This course will develop students' knowledge in /on…

LO1: *determining the hydraulic coefficient for various flow measuring devices*
LO2: *implementing Bernoulli's equation and application of Bernoulli's theorem in estimating various losses in pipe*
LO3:*studying the various parameters which effects the impact of jet*
LO4: *studying the characteristics of hydraulic machines*

LIST OF EXPERIMENTS

1. Determination of Coefficient of Discharge for given Orifice meter and Venturi meter.
2. Determination of Coefficient of Discharge for given notches (triangular/rectangular)
3. Determination of Coefficient of Discharge for given orifice and mouth piece.
4. Verification of Bernoulli's theorem.
5. Estimation of coefficients of various head losses in pipes due to major and minor losses (sudden enlargement, sudden contraction and bend).
6. Determineof Reynolds's number usingReynolds's apparatus.
7. Determination of coefficient of impact for a jet on given vane.
8. Determination of performance characteristics of Francis Turbine
9. Determination of performance characteristics of Pelton Wheel.
10. Determination of performance characteristics of Centrifugal Pump.
11. Determination of performance characteristics of Submersible Pump.
12. Determination of performance characteristics of Reciprocating Pump.

Laboratory Manual:

[1] *Fluid Mechanics Laboratory Manual*, Dept. of Civil Engineering, KITSW.

Reference Books:

[1] N. Kumara Swamy,Fluid Mechanics and Machinery Laboratory Manual,*Charotar Publishing House Pvt., Ltd.*, 2008.
[2] Sarbjit Singh, Experiments in Fluid Mechanics, *PHI Learning Private Limited*, New Delhi, 2009.

Course Learning Outcomes (COs):
On completion of this course, students will be able to…

CO1: *determine the hydraulic coefficient for various flow measuring devices*
CO2: *apply Bernoulli's equation in estimating head lossin pipes*
CO3: *apply the principles of impact of jet on different vanes*
CO4: *demonstrate the characteristics of hydraulic machines*

Course Articulation Matrix (CAM):U18OE411B FLUID MECHANICS AND HYDRAULIC MACHINES LABORATORY															
CO		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	U18OE411B.1	2	1	-	1	-	-	-	-	1	-	-	1	1	-	-
CO2	U18OE411B.2	2	1	-	1	-	-	-	-	1	-	-	1	1	-	-
CO3	U18OE411B.3	2	1	-	1	-	-	-	-	1	-	-	1	1	-	-
CO4	U18OE411B.4	2	1	-	1	-	-	-	-	1	1	-	1	1	-	-
U18OE411B		**2**	**1**	**-**	**1**	**-**	**-**	**-**	**-**	**1**	**1**	**-**	**1**	**1**	**-**	**-**

U18OE411C MECHATRONICS LAB

Class: B.Tech. IV- Semester **Branch:** Mechanical Engineering

Teaching Scheme :

L	T	P	C
-	-	2	1

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Outcomes (LOs):

This course will develop students' knowledge in /on…

LO1: *basic elements underlying mechatronic systems: analog electronics, digital electronics, sensors, transducers, actuators, microcontrollers and embedded software*
LO2: *interface of various systems to a PLC*
LO3: *integration of various systems through programming*
LO4: *design and simulation of hydraulic and pneumatic circuits*

LIST OF EXPERIMENTS

1. Controlling A.C. Non servomotor clockwise and anti clockwise with time delay.
2. Controlling A.C. Non servo motor using digital inputs proximity sensors.
3. Controlling of Single acting Pneumatic Cylinder with time delay
4. Controlling of double acting Pneumatic Cylinder with time delay and sequencing
5. Control of D.C servomotor (rotating table clockwise and counter clockwise)
6. Integration of AC Non servo motors, single acting pneumatic cylinder and double acting pneumatic cylinder.
7. Integration of AC Non- servomotor and pneumatic cylinders with digital inputs.
8. Controlling of X table and Y table.
9. Controlling of various systems using manual inputs.
10. Controlling of traffic lights with time delay.
11. Controlling of lift operations with time delay.
12. Hydraulic and Pneumatic simulation.

Laboratory Manual:

1. *Mechatronics Lab Manual*, Dept. of Mechanical Engineering, KITSW

REFERENCE BOOKS:

1. ATS Manual of L.S. Mechatronics 2000.
2. Bolton W., Mechatronics, *PearsonPublications,* 5th ed. 2011.

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: *develop PLC program to control AC non servomotors, single acting and double acting pneumatic cylinders with different operation conditions*
CO2: *develop PLC program to control various systems*
CO3: *integrate various mechanical and electrical systems and operate them*
CO4: *design and simulate the hydraulic and pneumatic circuits*

Course Articulation Matrix (CAM):U18OE411C MECHATRONICS LAB																
CO		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	U18OE411C.1	1	2	1	2	-	-	-	-	-	1	-	1	1	-	-
CO2	U18OE411C.2	1	2	1	2	2	-	-	-	-	1	-	1	1	-	-
CO3	U18OE411C.3	1	2	1	2	2	-	-	-	-	1	-	1	1	-	-
CO4	U18OE411C.4	1	2	1	2	2	-	-	-	-	1	-	1	1	-	-
U18OE411C		1	2	1	2	2	-	-	-	-	1	-	1	1	-	-

U18OE411E MICROPROCESSORS LABORATORY

Class: B.Tech. IV-Semester

Branch: Common to all branches

Teaching Scheme:

L	T	P	C
-	-	2	1

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LO):
This course will develop students' knowledge on/in…

LO1: *programming using 8086 Microprocessor kit*
LO2: *basic arithmetic programs and sorting using 8086 Microprocessor kit*
LO3: *string manipulation and code conversions using MASM*
LO4: *interfacing of subsystems to 8086 microprocessor kit*

List of Experiments

1. Study of 8086 Trainer Board
2. Simple Arithmetic Operations (Addition, Subtraction, Multiplication and Division)
3. Finding Sum, Average.
4. Largest/Smallest Number in a given array
5. Arranging in Ascending/ Descending order
6. Finding Factorial using recursive procedure
7. Transfer of bytes from DS to ES
8. ALPs for String Manipulation
9. ALPs for Code conversions
10. Wave form Generation using DAC modules
    i. Square wave ii. Saw tooth wave iii. Triangular wave
11. ADC interfacing
12. Stepper motor–interfacing

Laboratory Manual:

[1] *Microprocessors Laboratory Manual*, Dept. of ECE, KITSW.

Course Learning Outcomes (COs):
On completion of this course, students will be able to…

CO1: *write and execute assembly language programs for given tasks on 8086 microprocessor kit*
CO2: *implement code conversions and bit manipulations programs in 8086 using MASM*
CO3: *write waveform generation code using DAC modules*
CO4: *interface stepper motor, keyboard, memory etc. with 8086 microprocessor*

Course Articulation Matrix (CAM):U18OE411E MICROPROCESSORS LABORATORY																
CO		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	U18OE411E.1	3	3	2	1	-	-	-	-	-	-	-	-	1	-	-
CO2	U18OE411E.2	3	2	2	1	-	-	-	-	-	-	-	-	1	-	-
CO3	U18OE411E.3	3	2	1	1	-	-	-	-	-	-	-	-	1	-	-
CO4	U18OE411E.4	3	3	2	1	-	-	-	-	-	-	-	-	1	-	-
U18OE411E		**3**	**2.5**	**1.75**	**1**	-	-	-	-	-	-	-	-	**1**	-	-

U18OE411F STRENGTH OF MATERIALS LABORATORY

Class:B.Tech. IV-Semester **Branch:**Common to all branches

Teaching Scheme :

L	T	P	C
-	-	2	1

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):
This course will develop students' knowledge in /on…

LO1: testing of civil engineering materials
LO2: mechanical properties of civil engineering materials
LO3: behavior of civil engineering materials when tested
LO4: codal specifications of various engineering materials

LIST OF EXPERIMENTS

1. Determination of Stress–Strain characteristics of (a) Mild steel and (b) TOR steel.
2. Determination of the compressive strength of wood and punching shear strength.
3. Determination of the brinell's hardness numbers for steel, brass and aluminum.
4. Determination of the modulus of rigidity by conducting torsion test on solid shaft or hollow shaft.
5. Determination of the modulus of rigidity by conducting compression test on spring.
6. Determination of the Young's modulus of the given material by conducting flexural test on simply supported beam.
7. Determination of the Young's modulus of the given material by conducting flexural test on continuous beam.
8. Determination of the Young's modulus of the given material by measuring conducting flexural test on propped cantilever beam.
9. Bend and rebend test on steel specimen.
10. Shear test for Mild steel specimen.
11. Impact test on Metal Specimens using Izod test.
12. Impact test on Metal Specimens using Charpy test.
13. Demonstration of measuring strains using strain gauges, LVDTs

Laboratory Manual:
[1] *Strength of Materials Laboratory Manual*, Dept. of Civil Engineering, KITSW

Reference Books:

[1] Harmer E. Davis and George Earl Troxell, Testing and Inspection of Engineering Materials, *McGraw-Hill book company, inc,* 2nd ed. 1955.
[2] A.V.K. Suryanarayana, Testing of Metallic Materials, *Prentice-Hall of India*, 2nd ed. 2007.
[3] IS 1786:2008High strength deformed steel bars and wires for concrete reinforcement-specification, *Bureau of Indian standards*, New Delhi, 2008.
[4] IS 432(Part-I):1982 Specification for mild steel and medium tensile steel bars and Hard drawn steel wires for concrete reinforcement, *Bureau of Indian standards,* New Delhi, 1992.
[5] IS 432(Part-II):1982 Specification for mild steel and medium tensile steel bars and Hard drawn steel wires for concrete reinforcement, *Bureau of Indian standards*, New Delhi, 2004.

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: correlate theory with the testing of engineering materials for quality assessment

CO2: evaluate the mechanical properties of civil engineering materials

CO3: appraise the behavior of civil engineering materials when tested under loads

CO4: realize the specifications recommended by codes to civil engineering materials

Course Articulation Matrix (CAM):U18OE411F STRENGTH OF MATERIALS LABORATORY															
CO		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	U18OE411F.1	1	-	-	1	-	1	-	-	2	1	1	1	1	-	-
CO2	U18OE411F.2	1	-	-	1	-	1	-	-	2	-	-	1	1	-	-
CO3	U18OE411F.3	1	-	-	1	-	1	-	-	2	-	-	1	1	-	-
CO4	U18OE411F.4	1	-	-	1	-	1	-	2	1	1	1	1	1	-	-
U18OE411F		**1**	**-**	**-**	**1**	**-**	**1**	**-**	**2**	**1.75**	**1**	**1**	**1**	**1**	-	-

U18CH416 ENVIRONMENTAL STUDIES

Class: B. Tech. IV-Semester **Branch:** Common to all branches

Teaching Scheme :

L	T	P	C
2	-	-	2

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Exam	60 marks

Course Learning objectives (LOs):
This course will develop students' knowledge in/on…

LO1: *necessity to use natural resources more equitably*
LO2: *concepts of ecosystem and the importance of biodiversity conservation*
LO3: *causes, effects and control measures of various environmental issues*
LO4: *issues involved in enforcement of environmental legislation*

UNIT-I (6)

Introduction - The multidisciplinary nature of environmental studies - definition, scope and importance

Natural Resources: Forest Resources - Use and over–exploitation of forests, deforestation, timber extraction, mining, dams - their effects on forests and tribal people; **Water Resources -** Use and over-utilization of surface and ground water, floods, drought, conflicts over water; **Mineral Resources -** Environmental effects of extracting and using mineral resources; **Agricultural Land -** Land as a resource, land degradation, soil erosion and desertification; **Food Resources** - World food problems, effects of modern agriculture, fertilizer-pesticide problems, water logging and salinity

Energy Resources - Renewable and non-renewable energy sources, use of alternate energy sources

UNIT-II (6)

Ecosystem and Biodiversity: Ecosystem - Concepts of an ecosystem, food chain, food webs, ecological pyramids, energy flow in the ecosystem and ecological succession

Biodiversity and its Conservation – Introduction, definition, genetic, species and ecosystem diversity, value of biodiversity, biodiversity in India, hot spots of biodiversity, man-wildlife conflicts, endangered and endemic species of India, in-situ and ex-situ conservation

UNIT-III (6)

Environmental Pollution: Global climatic change, green house gases, effects of global warming, ozone layer depletion; International conventions/protocols - Earth summit, Kyoto protocol and Montreal protocol; causes and effects of air, water, soil, marine and noise pollution with case studies; solid and hazardous waste management, effects of urban industrial and nuclear waste; natural disaster management - flood, earthquake, cyclone and landslides.

UNIT-IV (6)

Social Issues and the Environment: **Role of Individual and Society** - Role of individual in prevention of pollution, water conservation, Rain water harvesting and watershed management

Environmental Protection / Control Acts - Air (Prevention and control of Pollution) Act- 1981, water (Prevention and Control of Pollution) Act-1974, water Pollution Cess Act-1977, Forest conservation Act (1980 and 1992), wildlife Protection Act 1972 and environment protection Act 1986, issues involved in enforcement of environmental legislations

Human Population and Environment - Population growth, family welfare programmes, women and child welfare programmes, role of information technology in environment and human health

Text Books:

[1] ErachBharucha, Text Book of Environmental Studies for Under Graduate Courses,2nd ed. *Universities Press (India) Private Limited,* 2013.

Reference Books:

[1] Y. Anjaneyulu, Introduction to Environmental Science, *B.S. Publications*, 2004.
[2] Gilbert M. Masters, Introduction to Environmental Engineering & Science, P*rentice Hall of India,*3rd ed. 1991.
[3] Anubha Kaushik, C.P. Kaushik, Environmental Studies, 4thed. *New Age InternationalPublishers,* 2014.
[4] R.Rajagopalan, Environmental Studies from crisis to cure, *Oxford University Press*, 2nded. 2011.

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1:investigate any environmental issue using an interdisciplinary framework

CO2:formulate an action plan for sustainable alternatives and conserving biodiversity that integrates science, humanist, social and economic perspective

CO3:identify and explain the complexity of issues and processes which contribute to an environmental problem

CO4:participate effectively in analysis and problem-solving through knowledge in environmental legislations

Course Articulation Matrix (CAM):U18CH416 ENVIRONMENTAL STUDIES

CO		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	U18CH416.1	2	1	2	1	-	2	1	-	1	-	-	-	-	-	-
CO2	U18CH416.2	-	-	2	-	-	1	2	-	1	-	-	-	-	-	-
CO3	U18CH416.3	1	2	1	-	-	1	2	1	1	-	-	-	-	-	-
CO4	U18CH416.4	-	-	1	-	-	1	2	-	1	-	-	-	-	-	-
U18CH416		**1.5**	**1.5**	**1.5**	**1**	**-**	**1.25**	**1.75**	**1**	**1**	**-**	**-**	**-**	**-**	**-**	**-**

DEPARTMENT OF INFORMATION TECHNOLOGY
KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE, WARANGAL – 15
(An Autonomous Institute under Kakatiya University, Warangal)

SCHEME OF INSTRUCTION AND EVALUATION
V-SEMESTER OF 4-YEAR B.TECH DEGREE PROGRAMME [6Th+3P+1 Seminar]

Sl. No.	Course Category	Course Code	Course Title	Hours per Week			Credits	Evaluation Scheme				
				L	T	P		CIE			ESE	Total Marks
								TA	MSE	Total		
1	HSMC	U18TP501	Quantitative Aptitude and Logical Reasoning	2	-	-	1	10	30	40	60	100
2	PE	U18IT502	Professional Elective-I/MOOCs–I	3	-	-	3	10	30	40	60	100
3	PCC	U18IT503	Design and Analysis of Algorithms	3	-	-	3	10	30	40	60	100
4	PCC	U18IT504	Web Technologies	3	-	-	3	10	30	40	60	100
5	PCC	U18IT505	Computer Networks	3	-	-	3	10	30	40	60	100
6	PCC	U18IT506	Compilers	3	-	-	3	10	30	40	60	100
7	PCC	U18IT507	Design and Analysis of Algorithms Lab	-	-	2	1	40	-	40	60	100
8	PCC	U18IT508	Web Technologies Laboratory	-	-	2	1	40	-	40	60	100
9	PCC	U18IT509	GUI Programming Laboratory	-	-	2	1	40	-	40	60	100
10	PROJ	U18IT510	Seminar	-	-	2	1	100	-	100	-	100
			Total:	**17**	**-**	**8**	**20**	**280**	**180**	**460**	**540**	**1000**
			Additional Learning*: *Maximum credits allowed for Honours/Minor*	-	-	-	**7**	-	-	-	-	-
			Total credits for Honours/Minor students:	**-**	**-**	**-**	***20+7***	**-**	**-**	**-**	**-**	**-**

** List of courses for additional learning through **MOOCs** towards Honours/Minor in Engineering shall be prescribed by the department under Honours/ Minor Curricula*

L= Lecture, T = Tutorials, P = Practicals& C = Credits; Contact hours per week : 25

Professional Elective-I / MOOCs-I:
U18IT502A: Principles of Programming Languages
U18IT502B: Neural Networks
U18IT502C: Computer Graphics & Multimedia
U18IT502M: MOOCs- I Course

U18TP501 QUANTITATIVE APTITUDE AND LOGICAL REASONING

Class: B.Tech V - Semester **Branch:** Information Technology (IT)

Teaching Scheme:

L	T	P	C
2	-	-	1

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):

This course will develop students' knowledge on /in…

LO1: quantitative aptitude &problem solving skills

LO2: computing abstract quantitative information

LO3: application of basic mathematics skills & critical thinking to draw conclusions

LO4: evaluating the validity & possible biases in arguments presented in authentic contexts

UNIT - I (6)

Quantitative Aptitude-I: Number system, Averages, Percentages, Ratios & proportions, Time, Speed & distance, Time and work, Data interpretation

UNIT - II (6)

Quantitative Aptitude-II: Simple Interest, Compound Interest, Profit & loss, Ages, Permutations & Combinations, Probability

UNIT - III (6)

Logical Reasoning-I: Series completion, Analogy, Coding and decoding, Blood relations, Number, Ranking & Time sequence test, Linear & Circular arrangements

UNIT - IV (6)

Logical Reasoning-II: Data sufficiency, Logical Venn diagram, Syllogisms, Statement & Arguments, Statement & Assumptions, Direction sense test

Text Books:

[1] R S Agarwal, *Quantitative Aptitude for Competitive Examinations*, 3rd ed. New Delhi: S. Chand Publications, 2019. *(Chapters 1,6,7,8,10,11,12,15,17,21,22,30,31)*

[2] R S Agarwal, *A Modern Approach to Verbal and Non-Verbal Reasoning*, 3rd ed. New Delhi: S. Chand Publications, 2019. *(Chapters Section I: 1,3,4,5,6,8,16, Section II: 2,3)*

Reference Books:

[1] Dinesh Khattar, *Quantitative Aptitude for Competitive Examinations*, New Delhi: Pearson India, 2019.

[2] Nishit K Sinha, *Reasoning for Competitive Examinations*, New Delhi: Pearson India, 2019.

[3] R.N.Thakur , *General Intelligence and Reasoning*, New Delhi: McGraw Hill Education, 2017.

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: *solve arithmetic relationships and interpret data using mathematical models*

CO2: *compute abstract quantitative information*

CO3: *apply basic mathematics & critical thinking skills to draw conclusions and solve problems*

CO4: *evaluate the validity & possible biases in arguments presented in authentic contexts logically & sensibly*

Course Articulation Matrix (CAM): U18TP501 QUANTITATIVE APTITUDE AND LOGICAL REASONING																
CO		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	U18IT501.1	1	2	-	1	-	-	-	-	-	-	-	1	1	-	-
CO2	U18IT501.2	1	2	-	1	-	-	-	-	-	-	-	1	1	-	-
CO3	U18IT501.3	-	1	-	2	-	2	-	-	-	-	-	1	1	-	-
CO4	U18IT501.4	-	1	-	2	-	2	-	-	-	-	-	1	1	-	-
U18IT501		**1**	**1.5**	**-**	**1.5**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**-**

U18IT502A PRINCIPLES OF PROGRAMMING LANGUAGES

Class: B.Tech. V- Semester **Branch:** Information Technology (IT)

Teaching Scheme:

L	T	P	C
3	-	-	3

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):
This course will develop students' knowledge in/on…

LO1: *core concepts, syntax & semantics of programming languages*
LO2: *methods for structuring and organizing data values*
LO3: *computational structure and program structure of C & C++*
LO4: *principles & features of functional, logic & rule based languages*

UNIT - I (9)

Introduction: Software development process, Languages and software development environment, Languages and software design methods, Languages and computer architecture, Programming language qualities, The bird's-eye view of programming language concepts, A simple program, Syntax and semantics, Expressions, Program organization, Program data and algorithms, Data, Computation, External environment

Syntax and Semantics: Language definition, Syntax, An introduction to formal semantics, Language processing, The concept of binding, Variables, Generic routines, Aliasing and overloading, An abstract semantic processor, Run-time structures, C1, C2, C3, C4, C5 languages, The structure of dynamic languages, Parameter passing

UNIT - II (9)

Structuring the Data: Built-in types and Primitive types, Data aggregates and type constructors, Insecurities of pointers, User-defined types and abstract data types, Abstract data types in C++, Type systems, Static versus Dynamic program checking, Strong typing and type checking, Type compatibility, Type conversions, Types and subtypes, Generic types, Monomorphic versus Polymorphic type systems, The type structure of representative languages, Pascal, C++, Implementation models, Built-in primitive types and enumerations, Pointers and garbage collection

UNIT - III (9)

Structuring the Computation: Expressions and statements, Conditional execution, Iteration, Routines, Style issues, Side effects and aliasing, Exceptions, Exceptions handling in C++, Pattern matching, Non determinism and Backtracking, Event driven computations, Concurrent computations, Process, Synchronization and communication, Rendezvous

Structuring the Program: Software design methods, Concepts in support of modularity, Language features for programming in large in C, C++, Abstract data types, classes and modules, Generic units, Generic data structures, Generic algorithms, Generic modules, Higher levels of genericity

UNIT - IV (9)

Functional Programming: Characteristics of imperative languages, Mathematical and programming functions, Principles of functional programming, Representative functional languages, LISP, APL, Functional programming in C++

Logic and Rule-based languages: Specification versus Implementation, Principles of logic programming, PROLOG, Functional programming versus Logic programming, Rule-based languages

Text Book:

[1] C. Ghezzi and M. Jazayeri, *Programming Language Concepts*, 3rded. Singapore: John Wiley & Sons, 2002.

Reference Books:

[1] T.W. Pratt and M.V. Zelkowitz, *Programming Languages-Design and Implementation*, 3rd ed. Singapore: Pearson Education, 2000.
[2] Robert W. Sebesta, *Concepts of Programming languages*, 8th ed. New Delhi: Pearson Education, 2009.
[3] Ravi Sethi, *Programming Language Concepts and Constructs*, 2nd ed. New Delhi: Pearson Education 2005.

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: *identify the qualities & characteristics of a programming language*
CO2: *illustrate the properties of data types for effective use in application development*
CO3: *distinguish the features of C & C++ in the development of structured applications*
CO4: *classify the functional, logic & rule based languages to select suitable language for application development*

Course Articulation Matrix (CAM):U18IT502A PRINCIPLES OF PROGRAMMING LANGUAGES

CO		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	U18IT502A.1	1	1	1	1	-	-	-	-	-	-	-	1	1	-	-
CO2	U18IT502A.2	1	2	2	1	-	-	-	-	-	-	-	1	1	-	-
CO3	U18IT502A.3	1	2	1	2	1	-	-	-	-	-	-	1	1	1	1
CO4	U18IT502A.4	1	1	2	1	1	-	-	-	-	-	-	1	1	1	1
U18IT502A		**1**	**1.5**	**1.5**	**1.25**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**1**	**1**	**1**

U18IT502B NEURAL NETWORKS

Class:B.Tech. V–Semester **Branch:** Information Technology (IT)

Teaching Scheme: **Examination Scheme:**

L	T	P	C
3	-	-	3

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):

This course will develop students' knowledge in/on…

LO1: neural network concepts and different types of learning methods
LO2: single layer & multi-layer perceptrons in neural network
LO3: back propagation techniques and support vector machine in pattern matching
LO4: conversion of multi dimensional to two dimensional matrix using self-organizing maps

UNIT - I (9)

Introduction: Human brain, Models of a neuron, Neural networks viewed as a directed graphs, Feedback, Network architectures, Knowledge representation, Artificial intelligence and neural networks

Learning Process: Error-correction learning, Memory-based learning, Hebbian learning, Competitive learning, Boltzmann learning, Credit assignment problem, Learning with a teacher, Learning without a teacher, Learning tasks, Memory, Adaption

UNIT – II (9)

Single Layer Perceptrons: Linear least-square filters, Least-mean-square algorithm, Learning curves, Learning rate annealing techniques, Perceptron, Perceptron convergence algorithm, Differences between Perceptron and Bayes classifier

Multilayer Perceptrons: Some preliminaries, Back-propagation algorithm, XOR Problem, Heuristics for making the back-propagation algorithm perform better, Output representation and decision rule, Computer experiment, Feature detection

UNIT - III (9)

Back-Propagation: Back-propagation and differentiation, Hessian matrix, Generalization, approximations of functions, Cross-validation, Network pruning techniques, Virtues and limitations of back propagation learning, Accelerated convergence of back-propagation learning, Convolutional networks

Support Vector Machines: Optimal hyper plane for linearly separable patterns, Optimal Hyper-plane for non-separable patterns, How to build a support vector machine for pattern recognition, Example-XOR problem (revisited), Computer experiment

UNIT - IV (9)

Self-Organizing Maps: Introduction, Two basics feature- mapping models, Self-organizing map, Summary of the SOM algorithm, Properties of the feature map, Computer simulations, Learning vector quantization, Computer experiment: Adaptive pattern classification, Hierarchical vector quantization, Contextual maps

Text Book:

[1] Simon Haykin, *Neural Networks - A Comprehensive Foundation,* 2nd ed. New Delhi: Prentice-Hall India, 2006.

Reference Books:

[1] Mohammad H. Hassoun, *Fundamentals of Artificial Neural Networks*, USA: Prentice Hall India, 1999.

[2] B. Yegnanarayana, *Artificial Neural Networks*, New Delhi: Prentice-Hall India, 2006.

[3] Laurene V. Fausett, *Fundamentals of Neural Networks: Architectures, Algorithms and Applications*, 3rd ed. New Delhi: Pearson Education India, 2008.

Course Learning Outcomes (COs):

On completion of this course, students will be able to …

CO1: *utilize different types of learning processes and architecture with knowledge representation to design neural network*

CO2: *investigate different perceptron to develop innovative and efficient neural network algorithms*

CO3: *use back propagation and support vector machine techniques to develop expert machines for neural network*

CO4: *examine the conversion of high dimensional dataset into two dimensional dataset with the help of self organizing map techniques*

Course Articulation Matrix (CAM): U18IT502B NEURAL NETWORKS																
CO		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	U18IT502B.1	2	1	-	-	-	1	-	-	-	-	-	-	2	2	-
CO2	U18IT502B.2	2	1	-	1	-	1	-	-	-	-	-	-	2	2	-
CO3	U18IT502B.3	2	2	-	-	-	1	-	-	-	-	-	-	2	1	-
CO4	U18IT502B.4	2	2	-	1	-	1	-	-	-	-	-	-	2	2	1
U18IT502BB		**2**	**1.5**	**-**	**1**	**-**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**1.75**	**1**

U18IT502C COMPUTER GRAPHICS AND MULTIMEDIA

Class: B.Tech. V-Semester **Branch:** Information Technology (IT)

Teaching Scheme :

L	T	P	C
3	-	-	3

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):
This course will develop students' knowledge in/on…

LO1: algorithms for line, circle generation, creating & filling of polygons and 2D transformations
LO2: segments, windowing, clipping and clipping algorithms
LO3: three-dimensional graphics, projections & hidden surface and line removal algorithms
LO4: multimedia concepts, sound & audio, MIDI devices and its usage

UNIT - I (9)

Introduction to Computer Graphics: Application of computer graphics, Pixel, Frame buffer, Graphics standards, Image representation, DDA and Bresenham line generation and circle generation algorithms, Graphics primitive operations, Character generation methods, Aliasing and anti-aliasing
Polygons: Polygon representation, Inside test methods, Seed filling and Scanline filling algorithms
Two Dimensional Transformations: Scaling, Translation and Rotation transformations, Rotation about arbitrary point, Homogenous coordinates, Inverse transformations, Transformation routines, Reflection and shearing transformations, Instance transformations

UNIT - II (9)

Segments: Segment creation algorithm, Segment closing algorithm, Segment deletion and Segment renaming algorithms, Image transformation
Windowing and Clipping: Window and view port, viewing transformation matrix, Implementation of viewing transformation, Multiple windowing, clipping, The Cohen-Sutherland Outcode algorithm, Sutherland Hodgman clipping algorithm, Midpoint subdivision clipping algorithm, Generalized clipping

UNIT - III (9)

Three-Dimensional Graphics: 3D Primitives, 3D Transformations, Rotation about arbitrary axis, 3D Viewing, Viewing parameters
Projections: Parallel projection, Perspective projection, Derivation of parallel projection matrix, Derivation of perspective projection matrix
Hidden Surface and Lines Removal Algorithms: Z-Buffer algorithm, Painters algorithm, Wornock algorithm, Franklin algorithm and Back face removal algorithm

UNIT - IV (9)

Multimedia: Media and data streams, Main properties of multimedia systems, Traditional data stream characteristics, Asynchronous transfer mode, Synchronous transfer mode
Sound and Audio: Basic sound concepts, Computer representation of sound, audio formats, Music
MIDI: MIDI concepts, MIDI devices, MIDI messages, MIDI software, Music and speech, Speech generation, Speech analysis, Speech transmission

Text Books:

[1] Steven Harrington, *Computer Graphics*, 2nd ed. United States: McGraw-Hill, 1987. (Chapters 1 to 6, 8 & 9)

[2] Ralf Steinmetz and Klara Nahrstedt, *Multimedia: Computing, Communications & Applications*, New Delhi: Pearson Education India, 2002. (Chapters 1 to 3 & 17)

Reference Books:

[1] James D.Foley, Andries Van Dam, Steven K. Fernier and John Hugs, *Computer Graphics Principles and Practice*, 3rd ed. United States: Addison-Wesley professional, 2013.

[2] Donald Hearn and Pauline Baker, *Computer Graphics*, 2nd ed. New Delhi: Pearson Education Asia, 2001.

[3] Newman and Sproulle, *Principles of Interactive Computer Graphics*, United States: McGraw Hill, 1987.

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: *apply DDA &Bresenhams line generation algorithms to draw lines and utilize 2D transformation routines to represent lines in different angles*

CO2: *illustrate the segments for image transformation and apply line clipping algorithms for conversion of windows to viewport & viewport to window*

CO3: *utilize 3D graphics & projections for representation of image and apply hidden surface removal algorithms to increase image efficiency*

CO4: *examine multimedia concepts, audio representation formats & MIDI devices based on their usage*

Course Articulation Matrix (CAM): U18IT502 COMPUTER GRAPHICS AND MULTIMEDIA

CO		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	U18IT502C.1	2	1	1	1	1	-	-	-	-	-	-	-	2	2	-
CO2	U18IT502C.2	2	1	2	1	2	-	-	-	-	-	-	-	2	2	1
CO3	U18IT502C.3	2	2	2	2	2	-	-	-	-	-	-	-	2	1	1
CO4	U18IT502C.4	2	2	1	1	1	-	-	-	-	-	-	-	2	2	2
U18IT502C		**2**	**1.5**	**1.5**	**1.25**	**1.5**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**1.75**	**1.33**

U18IT503 DESIGN AND ANALYSIS OF ALGORITHMS

Class: B.Tech. V – Semester **Branch:** Information Technology (IT)

Teaching Scheme:

L	T	P	C
3	-	-	3

Examination Scheme:

Continuous Internal Examination	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):

This course will develop students' knowledge in/on…

LO1: algorithms with time & space complexities
LO2: greedy method and concepts of dynamic programming
LO3: dynamic programming technique and backtracking
LO4: concepts of branch & bound techniques, NP-hard and NP-complete problems

UNIT–I (9)

Introduction: Algorithm, Algorithm specification, Performance analysis: Space complexity, Time complexity, Amortized complexity, Asymptotic notation (O, Ω, Θ), Practical complexities, Performance measurement

Elementary Data Structures: Sets and Disjoint Set Union: Introduction, Union and find operations

Divide and Conquer: General method, Defective chessboard, Finding the maximum and minimum, Merge sort, Quick sort: Performance measurement, Randomized sorting algorithms, Strassen's matrix multiplication

UNIT–II (9)

Greedy Method: The General Method, Container loading, Knapsack problem, Tree vertex splitting, Job sequencing with deadlines, Minimum-cost spanning, Trees: Prim's algorithm, Krushkal's algorithm, Optimal storage on tapes, Optimal merge patterns, Single source shortest paths

Dynamic Programming: The general method, Multistage graphs, All-pairs shortest paths, Single source shortest paths

UNIT–III (9)

Dynamic Programming: Optimal binary search trees, String editing, 0/1 Knapsack, Reliability design, The traveling salesperson problem, Flow shop scheduling

Backtracking: The general method, 8–Queens problem, Sum of subsets, Graph coloring, Hamiltonian cycles, Knapsack problem

UNIT–IV (9)

Branch and Bound: The method: Least cost (LC) search, The 15-puzzle: An example, Control abstractions for LC-search, 0/1 Knapsack problem, Traveling salesperson

NP-Hard and NP-Complete Problems: Basic concepts: Nondeterministic algorithms, The classes NP-hard and NP-complete, COOK's theorem, NP-Hard graph problems: Clique decision problem (CDP), Node cover decision problem (NCDP), Traveling salesperson decision problem (TSP)

Text Book:

[1] Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, *Fundamentals of Computer Algorithms*, 2nd ed. Hyderabad: Universities Press, 2008.

Reference Books:

[1] S. Sridhar, *Design and Analysis of Algorithms*, England, New Delhi: Oxford University Press, 2014.

[2] Gajendra Sharma, *Design & Analysis of Algorithms*, 4thed. New Delhi: Khanna Books Publishing, 2019.

[3] Dave and Himanshu B, *Design And Analysis Of Algorithms*, 2nd ed. New Delhi: Pearson India, 2013.

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: *distinguish algorithms based on their complexities to find algorithm efficiency*
CO2: *solve real time problems using greedy & dynamic programming techniques*
CO3: *apply dynamic programming & backtracking techniques to solve the given problem*
CO4: *utilize branch & bound techniques to solve puzzles and identify NP-hard & NP-complete*

Course Articulation Matrix (CAM): U18IT503 DESIGN AND ANALYSIS OF ALGORITHMS																
CO		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	U18IT503.1	2	2	2	2	-	-	-	-	-	-	-	-	2	2	-
CO2	U18IT503.2	2	2	2	2	-	2	-	-	-	-	-	1	2	2	-
CO3	U18IT503.3	2	2	2	2	-	1	-	-	-	-	-	1	2	2	-
CO4	U18IT503.4	2	2	2	2	-	-	-	-	-	-	-	1	2	2	-
U18IT503		**2**	**2**	**2**	**2**	**-**	**1.5**	**-**	**-**	**-**	**-**	**-**	**1**	**2**	**2**	**-**

U18IT504 WEB TECHNOLOGIES

Class: B.Tech. V – Semester

Branch: Information Technology (IT)

Teaching Scheme:

L	T	P	C
3	-	-	3

Examination Scheme:

Continuous Internal Examination	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):

This course will develop students' knowledge in/on…

LO1: concepts of HTML & Cascading Style Sheet

LO2: XML technologies and JavaScript

LO3: web based applications using server-side scripting with JSP & Servlets

LO4: server-side scripting in PHP and Database connectivity

UNIT–I (9)

Introduction to HTML: HTML Basics, Elements, Attributes, Tags, Basic Tags: HTML Comments, HTML Background, Paragraph, Text Styles, Heading, Lists and Symbols. Advanced Tags: Table, Forms and its elements, frames, Images, Meta tag, Planning of webpage, Model and Structure for a website, Designing web pages

CSS: Introduction, Advantages, Adding CSS, Selectors: Grouping, Type, Universal, Descendant, Child, Class selectors, ID selectors

UNIT–II (9)

XML: Role of XML, Prolog, Body, Elements, Attributes, Validation, Displaying XML, Namespace, XML DTD: Introduction to DTD, Purpose of DTD, Using DTD in an XML document, Element type declaration, Attribute declaration, Attribute types, String types, Tokenized types

JavaScript: Introduction, Variables, Literals, Operators, Control Structure, Conditional Statements, Arrays, Functions, Objects

UNIT–III (9)

Server-side Programming: Servlets: Servlet architecture, Servlet life cycle, GenericServlet and HttpServlet, Building and Installing Servlet, Passing parameters to servlets, Retrieving parameters, Problems with servlet

Java Server Pages: How JSP works, JSP and servlet, JSP syntax, JSP components, Beans, Session tracking, Database connectivity, JDBC drivers, Loading a driver, Making a connection, Execute an SQL statement

UNIT–IV (9)

Introduction to PHP: Declaring variables, datatypes, arrays, strings, operators, expressions, control structures, functions, Reading data from web form controls like textboxes, radio buttons, lists etc., Handling file uploads, Connecting to database (MySQL), executing simple queries, handling results

File Handling in PHP: File operations like opening, closing, reading, writing, appending, deleting etc., on text files, listing directories

Text Books:

[1] Uttam K. Roy, *Web Technologies*, United Kingdom: Oxford University Press, 2016.

[2] Steven Holzner, *The Complete Reference PHP*, 2nd ed. New York: Tata McGraw-Hill Education, 2008.

Reference Books:

[1] Kogent, *Web Technologies: HTML, CSS, JavaScript, ASP.NET, Servlets, JSP, PHP, ADO.NET, JDBC and XML*, New Delhi: Dreamtech Press, 2013.

[2] Larry Ullman, *PHP for the Web: Visual QuickStart Guide*, 4th ed. United Kingdom: Pearson Education, 2008.

[3] Gary Bollinger and Bharathi Natarajan, *JSP: A Beginner's Guide*", New York: McGraw-Hill Education, 2001.

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: *apply HTML tags with Cascading Style Sheet to develop static web pages*
CO2: *design interactive web pages using JavaScript & XML*
CO3: *develop web applications using JSP & Servlet technologies*
CO4: *develop dynamic web applications using server-side PHP programming with database connectivity*

Course Articulation Matrix (CAM) : U18IT504 WEB TECHNOLOGIES

CO		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	U18IT504.1	2	2	2	1	-	-	-	-	-	1	-	1	2	1	1
CO2	U18IT504.2	2	2	2	1	-	-	-	-	-	1	-	1	2	2	2
CO3	U18IT504.3	2	2	2	1	-	-	-	-	-	1	-	1	2	2	2
CO4	U18IT504.4	2	2	2	1	-	-	-	-	-	1	-	1	2	2	2
U18IT504		**2**	**2**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**1**	**2**	**1.75**	**1.75**

U18IT505 COMPUTER NETWORKS

Class: B.Tech. V- Semester **Branch:** Information Technology

Teaching Scheme: **Examination Scheme:**

L	T	P	C
3	-	-	3

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs)

This course will develop students' knowledge in/on…

LO1: *network topologies, network reference models, physical layer, media types & switching techniques*

LO2: *digital transmission, data link layer concepts, error detection & correction techniques and Ethernet technology*

LO3: *principles and design issues of network layer, Internet protocols & routing techniques*

LO4: *transport layer design issues, protocols & application layer services*

UNIT – I (9)

Introduction: Data Communications, Networks, Network types, TCP/IP protocol suite, The OSI model

Physical Layer: Introduction, Data and signals, Periodic analog signals, Digital signals, Transmission impairment, Performance, Guided media, Unguided media: Wireless

Switching: Circuit switched networks and Packet switching

UNIT – II (9)

Digital Transmission: Digital to digital conversation

Analog Transmission: Digital to analog conversion

Data Link Layer: Introduction, Link layer addressing

Error Detection and Correction: Introduction, Block coding, Cyclic codes, Forward error correction

Data Link Control (DLC): DLC Services, Data link layer protocols

Wired LAN: Ethernet protocol, Standard Ethernet, Fast Ethernet, Gigabit Ethernet

UNIT – III (9)

Medium Access Control (MAC): Random Access and Channelization

Network Layer: Services, Network layer performance, IPv4 addresses

Next Generation IP: IPv6 addressing, The IPv6 protocol

Unicast Routing : Routing algorithms, Unicast routing protocols

Multicast Routing: Introduction, Multicasting basics, Intra – Inter domain multicast protocols

UNIT – IV (9)

Transport-Layer: Introduction, Transport layer protocols, User datagram protocol, Transmission control protocol

Application Layer: Introduction, Client server programming

Standard Client Server Protocols: World Wide Web and HTTP, FTP, Electronic mail, TELNET, Secure Shell (SSH), Domain Name System (DNS)

Text Book:

[1] Behrouz A. Forouzan, *Data Communications and Networking*, 5th ed. United States: Tata McGraw Hill, 2017.

Reference Books:

[1] Andrew S. Tanenbaum and David J. Wetherall, *Computer Networks*, 5th ed. New Delhi: Pearson India Education Service Pvt Ltd, 2016.

[2] Behrouz A. Forouzan and FirouzMosharraf, *Computer Networks: A top-down Approach,* 2nd ed. United States: Tata McGraw Hill Education, 2011.

[3] William Stallings, *Data and Computer Communications*, 10th ed. Pearson India education services Pvt Ltd, 2014.

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: *illustrate the types of networks, protocol models, concepts of physical layer and classify switching techniques to configure the network*

CO2: *identify the errors using error detection & correction techniques during transmission and classify ethernet protocols*

CO3: *classify the IP addresses to allocate IP in network and apply different routing algorithms to implement network protocols*

CO4: *examine the working procedures of transport layer & application layer protocols*

Course Articulation Matrix (CAM): U18IT505 COMPUTER NETWORKS

CO		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	U18IT505.1	2	1	-	-	-	-	-	1	-	-	-	1	2	-	-
CO2	U18IT505.2	2	2	2	-	-	-	-	1	-	-	-	1	2	-	-
CO3	U18IT505.3	2	2	1	-	-	-	-	1	-	-	-	1	2	1	-
CO4	U18IT505.4	2	1	-	-	-	-	-	1	-	-	-	1	2	1	1
U18IT505		**2**	**1.5**	**1.5**	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**-**	**1**	**2**	**1**	**1**

U18IT506 COMPILERS

Class: B.Tech. V- Semester **Branch:**Information Technology (IT)

Teaching Scheme :

L	T	P	C
3	-	-	3

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):

This course will develop students' knowledge in/on…

LO1: different phases of compiler and lexical analyzer tool
LO2: syntax directed translation and implementation of parsing methods
LO3: memory storage allocation techniques and intermediate code generation
LO4: code optimization techniques and machine code generation

UNIT - I (9)

Introduction to Compiling: Compilers, Phases of a compiler, Cousins of the compiler, Grouping of phases, Compiler construction tools

Lexical Analysis: Role of lexical analyzer, Input buffering, Specification of tokens, Recognition of tokens, A language for specifying lexical analyzers, Finite automata, Design of a lexical analyzer

UNIT - II (9)

Syntax Analysis: Role of the parser, Writing grammars, Context-free grammars, Top down parsing, Bottom-up parsing, Operator precedence parsing, LR parsers, Using ambiguity grammars, Parser generators

Syntax Directed Translation: Syntax directed definitions, Construction of syntax trees, Bottom- up evaluation of S-attributed definitions, L-attributed definitions, Space for attribute values at compile time

UNIT - III (9)

Type Checking: Type systems, Specification of a simple type checker, Equivalence of type expressions, Type conversions

Runtime Environments: Source language issues, Storage organization, Storage-allocation strategies, Symbol tables, Language facilities for dynamic storage allocation, Dynamic storage allocation techniques

Intermediate Code Generation: Intermediate languages, Boolean expressions, Back patching

UNIT - IV (9)

Code Generation: Issues in the design of code generator, The target machine, Basic blocks and flow graphs, Next-use information, A simple code generator, DAG representation of basic blocks, Peephole optimization, Generating code from DAGs

Code Optimization: Introduction, Principal sources of optimization, Optimization of basic blocks, Loops in flow graphs

Text Book:

[1] Alfred Aho, Ravi Sethi and Jeffrey D Ullman, *Compilers Principles, Techniques and Tools*, London: Pearson Education, 2002.

Reference Books:

[1] C. N. Fischer and R. J. LeBlanc, *Crafting a compiler with C*, California, USA: Benjamin Cummings, 2003.

[2] J.P. Bennet, *Introduction to Compiler Techniques*, 2nd ed. New Delhi: Tata McGraw- Hill, 2003.

[3] Allen I.Holub, *Compiler Design in C*, New Delhi: Prentice Hall of India, 1993.

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: *identify the features of compiler phases and make use of lexical analyzer tool*

CO2: *distinguish different parsing methods and examine syntax errors of compilation process*

CO3: *utilize memory allocation process, symbol table storage & intermediate code generation techniques for compiler design*

CO4: *utilize the code generation & optimization techniques to improve the performance of a program in terms of speed, space and develop target code for a given flow graph specifications*

Course Articulation Matrix (CAM): U18IT506 COMPILERS

CO		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	U18IT506.1	1	1	1	1	1	-	-	-	-	-	-	1	1	-	-
CO2	U18IT506.2	1	2	2	1	-	-	-	-	-	-	-	1	1	-	-
CO3	U18IT506.3	1	2	1	2	-	-	-	-	-	-	-	1	1	1	1
CO4	U18IT506.4	1	1	2	1	-	-	-	-	-	-	-	1	1	1	1
U18IT506		**1**	**1**	**1.5**	**1.25**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**1**	**1**	**1**

U18IT507 DESIGN AND ANALYSIS OF ALGORITHMS LABORATORY

Class: B.Tech. V– Semester **Branch:** Information Technology (IT)

Teaching Scheme:

L	T	P	C
-	-	2	1

Examination Scheme:

Continuous Internal Examination	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):

This course will develop students' knowledge in/on…

LO1: *operations of trees & graphs*
LO2: *minimum cost spanning trees and shortest path algorithms*
LO3: *shortest path in the graph by using dynamic programming techniques*
LO4: *sum of subsets and N-Queen problem using backtracking*

List of Experiments

Experiment – I:

1. Program to create a binary tree and write its recursive traversal techniques:
    a. In-order traversal
    b. Pre-order traversal
    c. Post-order traversal

Experiment – II:

2. Program to create a Binary Search Tree and perform the following operations:
    a. Insertion of a node
    b. Deletion of a node

Experiment – III:

3. Program for the implementation of the following graph traversal techniques:
    a. Depth First Search
    b. Breadth First Search

Experiment – IV:

4. Program to implement Merge Sort
5. Program to implement Strassen's matrix multiplication

Experiment – V:

6. Program to implement Knapsack problem using Greedy method
7. Program to find the maximum profit job sequence from a given array of jobs with deadlines and profits

Experiment – VI:

8. Program to find Minimum Cost Spanning trees of a given undirected graph using:
    a. Prim's algorithm
    b. Krushkal's algorithm

Experiment – VII:

9. Program to find Single Source Shortest path using Dijkstra's algorithm

Experiment – VIII:

10. Program to find All-Pairs Shortest path using Floyd-Warshall algorithm

Experiment – IX:

11. Program to find Optimal Binary Search Tree using Dynamic programming
12. Program to implement 0/1 Knapsack problem using Dynamic programming

Experiment – X:

13. Program to implement Travelling Salesperson Problem using Dynamic programming

Experiment – XI:

14. Program to find a subset of a given set S = {s1,s2,...,sn} of *n* positive integers whose sum is equal to a given positive integer *d*. For example, if S= {1, 2, 5, 6, 8} and *d* = 9, there are two solutions {1,2,6} and {1,8}. A suitable message is to be displayed if the given problem instance doesn't have a solution

Experiment – XII:

15. Program to implement N-Queen problem using backtracking

Laboratory Manual:

[1] *Design and Analysis of Algorithms Laboratory Manual*, Dept. of IT, KITSW.

Reference Books:

[1] Ellis Horowitz, Sartaj Sahni and SanguthevarRajasekaran, *Fundamentals of Computer Algorithms*, 2nd ed. Hyderabad: Universities Press, 2008.

[2] S. Sridhar, *Design and Analysis of Algorithms*, England, New Delhi: Oxford University Press, 2014.

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: *develop programs on trees and graphs with its operations*

CO2: *apply Prim's and Krushkal's algorithms to find minimum cost spanning trees and Dijkstra's algorithm to find single source shortest path*

CO3: *apply OBST, 0/1 Knapsack and Travelling Salesperson problems using Dynamic programming*

CO4: *develop program to solve sum of subsets problem and N-Queen problem using Backtracking method*

Course Articulation Matrix (CAM): U18IT507 DESIGN AND ANALYSIS OF ALGORITHMS LABORATORY																
CO		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	U18IT507.1	2	2	2	2	-	-	-	-	-	-	-	-	2	2	-
CO2	U18IT507.2	2	2	2	2	-	2	-	-	-	-	-	1	2	2	-
CO3	U18IT507.3	2	2	2	2	-	1	-	-	-	-	-	1	2	2	-
CO4	U18IT507.4	2	2	2	2	-	-	-	-	-	-	-	1	2	2	-
U18IT507		**2**	**2**	**2**	**2**	**-**	**1.5**	**-**	**-**	**-**	**-**	**-**	**1**	**2**	**2**	**-**

U18IT508 WEB TECHNOLOGIES LABORATORY

Class: B.Tech. V – Semester **Branch:** Information Technology (IT)

Teaching Scheme:

L	T	P	C
-	-	2	1

Examination Scheme:

Continuous Internal Examination	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):

This course will develop students' knowledge in/on…

LO1: *static and dynamic web pages using HTML and JavaScript*

LO2: *XML technologies and Servlet programming*

LO3: *Java Server Pages to design web applications*

LO4: *PHP, database connectivity and socket programming*

List of Experiments

Experiment – I:

1. Create a simple webpage using HTML
2. Design a web page, which allows user to enter their biographical details

Experiment – II:

3. Design a web page with two frames in single window, where one frame contains ordinary text and another contains image
4. Create a web page containing row of images/logos and when user click on that image its enlarged view should appear in
   - **a.** same window
   - **b.** new window

Experiment – III:

5. Design a webpage using frames to include images and videos
6. Design a web page for student registrations (new admissions) into engineering college (use validations for checking the information entered by student)

Experiment – IV:

7. Design a webpage using Cascading Style Sheet features (CSS Colors, CSS Backgrounds, CSS Borders)
8. Design a login page with validations using JavaScript

Experiment – V:

9. Design a home page showing an overview of the college
10. Design a simple application to demonstrate Servlets

Experiment – VI:

11. Design a Servlet for validating log-in information entered by user from remote system and the Servlet has to report back to user regarding the status of connection
12. Design a Servlet which accepts information from student, for an engineering college admission and store the information entered into the database. (use the validations while student entering the information)

Experiment – VII:

13. Design a web page to store and display the details of employee at server database using JSP

Experiment – VIII

14. Write a PHP script to print prime numbers between 3 to 50
15. Write a PHP script to find the length of a string, count number of words in a string, and reverse a string

Experiment – IX:

16. Write a PHP script to merge two sorted arrays
17. Write a PHP script that reads data from one file and write into another file

Experiment – X:

18. Design a web page to upload the documents, images, media files into server database using PHP
19. Design a web page to store and display the details of student at server database using PHP

Experiment-XI

20. Java network programming:
    - Processing internet address.
    - Applications with TCP and UDP sockets.

Experiment-XII

21. Implement TCP/IP client and server technology using JAVA network programming.

Laboratory Manual:

[1] *Web Technologies Laboratory Manual*, Dept. of IT, KITSW.

Reference Books:

[1] Uttam K. Roy, *Web Technologies*, United Kingdom: Oxford University Press,2016.
[2] Steven Holzner, *The Complete Reference PHP*, 2nd ed. New Delhi: Tata McGraw-Hill Education, 2008.

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: design well formatted web pages using HTML & JavaScript
CO2: apply servlets and XML technology in developing web pages
CO3: develop web applications using JSP & servlets
CO4: develop websites using PHP and apply Socket Programming for creating client server application

Course Articulation Matrix (CAM):U18IT508 WEB TECHNOLOGIES LABORATORY																
CO		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	U18IT508.1	2	2	2	1	2	-	-	1	2	1	-	1	2	2	2
CO2	U18IT508.2	2	2	2	1	2	-	-	1	2	1	-	1	2	2	2
CO3	U18IT508.3	2	2	2	1	2	-	-	1	2	1	-	1	2	2	2
CO4	U18IT508.4	2	2	2	1	2	-	-	1	2	1	-	1	2	2	2
U18IT508		**2**	**2**	**2**	**1**	**2**	**-**	**-**	**1**	**2**	**1**	**-**	**1**	**2**	**2**	**2**

U18IT509 GUI PROGRAMMING LABORATORY

Class: B.Tech.V - Semester **Branch:** Information Technology (IT)

Teaching Scheme :

L	T	P	C
-	-	2	1

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Exam	60 marks

Course Learning Objectives (LOs):

This course will develop students' knowledge in/on…

LO1: *type conversions and OOP techniques*
LO2: *WPF & windows controls for designing the user interface of windows applications*
LO3: *server controls, AJAX, master pages and deploying web applications*
LO4: *validations and database connectivity programs in windows & web applications*

List of Experiments

Experiment-I

1. Program to demonstrate boxing and unboxing
2. Program to find the sum of all the elements present in a jagged array of 3 inner arrays
3. Program to demonstrate creating, managing, synchronizing and destroying threads using multithreading concept
4. Program to demonstrate collections

Experiment-II

5. Program to demonstrate error handling using try, catch and finally blocks
6. Program to demonstrate use of virtual and override keywords
7. Program to build a class which implements an interface which already exists
8. Program to illustrate the concept of function delegates

Experiment-III

9. A sample WPF applications creation using textbox and button controls
10. Windows application to develop mini calculator

Experiment-IV

11. Windows application to design a new form with panel, picturebox, progressbar and timer controls
12. Design customer application which takes customer name, country, gender, hobby and status, and a preview screen that will display data entered into the customer data entry screen

Experiment-V

13. Develop windows application to transfer data between multiple forms
14. Program to demonstrate adding controls and setting properties at design time and run time to create login application
15. Design windows application to create a form with button, label, textbox and listbox, checkbox, radio button and groupbox controls

Experiment-VI

16. Develop notepad application with OpenFileDialog, SaveFileDialog, FontDialog and ColorDialog controls by adding menu items at design time and runtime

Experiment-VII

17. Develop student database application to create a new data connection using ADO.NET objects and to access data using data binding navigator control
18. Develop employee database table to create data using ADO.NET components, and display data grid view control by select, insert, update and delete commands

Experiment-VIII

19. Design simple and complex data binding application using Windows Presentation Foundation

Experiment-IX

20. Design a application to access data using OleDbDataReader
21. Design a application to access data using OleDbDataAdapter and DataSet

Experiment-X

22. Develop ASP.NET web application to connect through database server using connection and command objects

Experiment-XI

23. Design reading and writing XML documents with XML text reader/writer class
24. Develop ASP web page that has a form taking the user's name as input, storing the name in a permanent cookie & whenever the page is opened again, then value of the name field should be attached with the cookies content

Experiment-XII

25. Use ad-rotator to change advertisements on client-side request
26. Implement session tracking using user authentication
27. Develop a program to delete all cookies of website that has created on the client's computer
28. Demonstrate web service application

Laboratory Manual:

[1] *GUI Programming Laboratory Manual*, Dept. of IT, KITSW.

Reference Books:

[1] Karli Watson, Jacob Vibe Hammer, Jon D. Reid, Morgan Skinner, Daniel Kemper and Christian Nagel, *Beginning Visual C# 2012 Programming*, USA: John Wiley & Sons Publications, 2012.

[2] *C# 2012 Programming Covers .NET 4.5 Black Book*, New Delhi: Dreamtech Press, 2013.

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: *apply object oriented concepts in development of console applications*
CO2: *develop GUI applications using Windows Presentation Foundation (WPF) user interface framework*
CO3: *design web applications using various client & server controls of ASP.NET*
CO4: develop database applications by using ADO.NET

Course Articulation Matrix (CAM): U18IT509 GUI PROGRAMMING LABORATORY																
CO		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	U18IT509.1	1	1	1	1	-	-	-	-	-	-	-	-	1	-	-
CO2	U18IT509.2	1	1	1	1	1	-	-	-	-	-	-	-	1	-	-
CO3	U18IT509.3	1	2	2	2	1	1	-	-	-	-	-	1	1	2	-
CO4	U18IT509.4	1	1	2	1	1	1	-	-	1	-	1	1	1	2	2
U18IT509		**1**	**1.25**	**1.5**	**1.25**	**1**	**1**	**-**	**-**	**1**	**-**	**1**	**1**	**1**	**2**	**2**

U18IT510 SEMINAR

Class: B.Tech. V- Semester **Branch:**Information Technology

Teaching Scheme :

L	T	P	C
-	-	2	1

Examination Scheme :

Continuous Internal Evaluation	100 marks
End Semester Examination	-

Course Learning Objectives (LOs):
This course will develop students' knowledge on /in…

LO1: selecting topic, referring to peer reviewed journals / technical magazines / conference proceedings
LO2: literature review and well-documented report writing
LO3: creating PPTs and effective technical presentation
LO4: preparing a technical paper in scientific journal style & format

Student has to give independent seminar on the state-of-the-art technical topics relevant to their program of study, which would supplement and complement the program assigned to each student.

Guidelines:

1. The HoD shall constitute a Department Seminar Evaluation Committee (DSEC)
2. DSEC shall allot a faculty supervisor to each student for guiding on (i) selection of topic (ii) literature survey and work to be carried out (iii) preparing a report in proper format and (iv) effective seminar presentation
3. There shall be only Continuous Internal Evaluation (CIE) for seminar
4. The CIE for seminar is as follows:

Assessment	Weightage
Seminar Supervisor Assessment	20%
Seminar Report	30%
Seminar Paper	20%
DSEC Assessment: *Oral presentation with PPT andviva-voce*	30%
Total Weightage:	100%

Note: It is mandatory for the student to appear for oral presentation and viva-voce to qualify for course evaluation

(a) **Seminar Topic**: The topic should be interesting and conducive to discussion. Topics may be found by looking through recent issues of peer reviewed Journals / Technical Magazines on the topics of potential interest

(b) **Report:** Each student is required to submit a well-documented report on the chosen seminar topic as per the format specified by*DSEC.*

(c) **Anti-Plagiarism Check:** The seminar report should clear plagiarism check as per the Anti-Plagiarism policy of the institute.

(d) **Presentation:** Each student should prepare PPT with informative slides and make an effective oral presentation before the *DSEC* as per the schedule notified by thedepartment

(e) The student has to register for the Seminar as supplementary examination in the following cases:
   i) he/she is absent for oral presentation and viva-voce
   ii) he/she fails to submit the report in prescribed format
   iii) he/she fails to fulfill the requirements of seminar evaluation as per specified guidelines

(f) i) The CoE shall send a list of students registered for supplementary to the HoD concerned

ii) The DSEC, duly constituted by the HoD, shall conduct seminar evaluation and send the award list to the CoE within the stipulated time

Course Learning Outcomes (COs):
On completion of this course, students will be able to…

CO1: select current topics in their engineering discipline & allied areas from peer reviewed journals / technical magazines/ conference proceedings
CO2: demonstrate the skills for performing literature survey, identify gaps, analyze the technical content and prepare a well-documented seminar report
CO3: create informative PPT and demonstrate communication skills through effective oral presentation showing knowledge on the subject & sensitivity towards social impact of the seminar topic
CO4: write a "seminar paper" in scientific journal style & format from the prepared seminar report

Course Articulation Matrix (CAM): U18IT510 SEMINAR

CO		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	U18IT510.1	1	1	-	1	1	-	1	2	2	2	1	2	_	_	-
CO2	U18IT510.2	1	1	-	-	-	-	-	2	2	2	-	2	1	-	-
CO3	U18IT510.3	-	-	-	-	-	-	1	2	2	2	-	2	1	-	-
CO4	U18IT510.4	-	-	-	-	-	-	-	2	2	2	-	2	1	1	-
U18IT510		**1**	**1**	**-**	**1**	**1**	**-**	**1**	**2**	**2**	**2**	**1**	**2**	**1**	**1**	**-**

DEPARTMENT OF INFORMATION TECHNOLOGY
KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE, WARANGAL – 15
(An Autonomous Institute under Kakatiya University, Warangal)

SCHEME OF INSTRUCTION AND EVALUATION
VI-SEMESTER OF 4-YEAR B.TECH DEGREE PROGRAMME

[6Th+2P+1MC+1Mini Project]

Sl. No.	Course Category	Course Code	Course Title	Hours per Week			Credits	Evaluation Scheme				
				L	T	P		CIE			ESE	Total Marks
								TA	MSE	Total		
1	MC	U18MH601	Universal Human Values-II	2	-	-	-	10	30	40	60	100
2	OE	U18OE602	Open Elective-III	3	-	-	3	10	30	40	60	100
3	PE	U18IT603	Professional Elective-II/MOOCs-II	3	-	-	3	10	30	40	60	100
4	PCC	U18IT604	Cryptography and Network Security	3	-	-	3	10	30	40	60	100
5	PCC	U18IT605	Artificial Intelligence	3	-	-	3	10	30	40	60	100
6	PCC	U18IT606	Data Warehousing and Data Mining	3	-	-	3	10	30	40	60	100
7	PCC	U18IT607	Software Engineering	3	-	-	3	10	30	40	60	100
8	PCC	U18IT608	Data Mining using Python Laboratory	-	-	2	1	40	-	40	60	100
9	PCC	U18IT609	Software Testing Laboratory	-	-	2	1	40	-	40	60	100
10	PROJ	U18IT610	Mini Project	-	-	2	1	100	-	100	-	100
Total:				**20**	**-**	**6**	**21**	**250**	**210**	**460**	**540**	**1000**
Additional Learning*: *Maximum credits allowed for Honours/Minor*				-	-	-	*7*	-	-	-	-	-
Total credits for Honours/Minor students:				**-**	**-**	**-**	***21+7***	**-**	**-**	**-**	**-**	**-**

** List of courses for additional learning through **MOOCs** towards Honours/Minor in Engineering shall be prescribed by the department under Honours/ Minor Curricula*

L= Lecture, T = Tutorials, P = Practicals& C = Credits ; **Contact hours per week : 26**

Open Elective-III	**Professional Elective–II / MOOCs-II**
U18OE602A : Disaster Management	U18IT603A: Distributed Computing
U18OE602B : Project Management	U18IT603B: Information Retrieval Systems
U18OE602C : Professional Ethics in Engineering	U18IT603C: Advanced Databases
U18OE602D : Rural Technology and Community Development	U18IT603M: MOOCs- II Course

U18MH601 UNIVERSAL HUMAN VALUES - II

Class: B.Tech. VI – Semester **Branch:**Information Technology (IT)

Teaching Scheme:

L	T	P	C
2	-	-	-

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):
This course will develop students' knowledge on /in…
LO1: self-exploration, happiness and prosperity as the process of value education
LO2: harmony in the human being - self & family
LO3: co-existence of human being with society & nature
LO4: professional ethics, commitment and courage to act

UNIT – I (6)

Introduction - Need, Basic Guidelines, Content and Process for Value Education:
Purpose and motivation for the course, Recapitulation from Universal Human Values - I(*Induction programme*)
Self-Exploration: Its content and process, Natural acceptance and experiential validation – As the process for self-exploration
Continuous Happiness and Prosperity: A look at basic human aspirations, Right understanding, Relationship and physical facility - The basic requirement for fulfillment of aspirations of every human being with their correct priority
Understanding Happiness and Prosperity correctly: A critical appraisal of the current scenario, Method to fulfill the above human aspirations - Understanding and living in harmony at various levels

UNIT – II (6)

Understanding Harmony in the Human Being- Harmony in Myself & Family:
Harmony in Myself: Understanding human being as a co-existence of the sentient 'I' and the material 'Body', Understanding the needs of Self ('I') and 'Body' - Happiness and physical facility; Understanding the 'Body' as an instrument of 'I' (I being the doer, seer and enjoyer), Understanding the characteristics and activities of 'I' and harmony in 'I', Understanding the harmony of 'I' with the 'Body' - Sanyam and Health; Correct appraisal of physical needs, Meaning of prosperity in detail, Programs to ensure Sanyam and Health
Harmony in Family: Understanding values in human - Human relationship; Meaning of justice (Nine universal values in relationships), Program for its fulfillment to ensure mutual happiness, Trust and respect as the foundational values of relationship, Understanding the meaning of trust, Difference between intention and competence; Understanding the meaning of respect, Difference between respect and differentiation, The other salient values in relationship

UNIT – III (6)

Understanding Harmony with Society, Nature & Existence:

Understanding the harmony in the society (society being an extension of family): Resolution, Prosperity, Fearlessness (trust) and Co-existence as comprehensive human goals, Visualizing a universal harmonious order in society – Undivided society; Universal order - From family to world family

Understanding the harmony in the nature: Interconnectedness and mutual fulfillment among the four orders of nature - Recyclability and self-regulation in nature

Whole Existence as Co-existence: Understanding existence as co-existence of mutually interacting units in all-pervasive space, Holistic perception of harmony at all levels of existence

UNIT – IV (6)

Implications of Holistic Understanding of Harmony on Professional Ethics:

Natural acceptance of human values, Definitiveness of ethical human conduct, Basis for Humanistic education, Humanistic constitution and Humanistic universal order

Competence in professional ethics: a) Ability to utilize the professional competence for augmenting universal human order b) Ability to identify the scope and characteristics of people friendly and eco-friendly production systems and c) Ability to identify and develop appropriate technologies and management patterns for above production systems

Case studies: Case studies of typical holistic technologies, Management models and production systems, Strategy for transition from the present state to Universal human order **–** a) At the level of individual: As socially and ecologically responsible engineers, technologists and managers b) At the level of society: As mutually enriching institutions and organizations

Text Book:

[1] R .R. Gaur, R. Sangal and G. P. Bagaria, *Human Values and Professional Ethics*, New Delhi: Excel Books, 2010.

Reference Books:

[1] Nagaraj, *JeevanVidya: EkParichaya*, Raipur: Jeevan Vidya Prakashan, Amarkantak, 2018.

[2] A.N. Tripathi, *Human Values*, 3rd ed. New Delhi: New Age International Publisher, 2019.

[3] M. Govindrajran, S. Natrajan& V.S. Senthil Kumar, *Engineering Ethics (includes Human Values)*, 12th ed. Haryana: PHI Learning Pvt. Ltd., 2011.

[4] Jayshree Suresh, B. S. Raghavan, *Human Values & Professional Ethics*, 4th ed. New Delhi: S. Chand & Co. Ltd., 2012.

Additional Resources:

R.R Gaur, R Sangal, G P Bagaria, *A foundation course in Human Values and professional Ethics (Teacher's Manual)*, New Delhi: Excel books, 2010.

A set of DVDs containing - Video of Teachers' Orientation Program - PPTs of Lectures and Practice Sessions (*Audio-visual material for use in the practice sessions*)

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: interpret the importance of continuous happiness & prosperity through self exploration and imbibe skills to examine harmony

CO2: appraise the concept of sentience, distinguish between intention & competence and prioritize human values in relationships

CO3: *build fearlessness & co-existence as comprehensive human goal and agree upon interconnectedness & mutual fulfillment*

CO4: *assess the understanding of harmony, adapt professional ethics and take part in augmenting universal human order*

Course Articulation Matrix (CAM): U18MH601UNIVERSAL HUMAN VALUES - II																
CO		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	U18IT601.1	-	-	-	-	-	1	-	2	1	1	-	2	-	-	-
CO2	U18IT601.2	-	-	-	-	-	1	-	2	1	1	-	2	-	-	-
CO3	U18IT601.3	-	-	-	-	-	1	-	2	1	1	-	2	-	-	-
CO4	U18IT601.4	-	-	-	-	-	1	-	2	1	1	-	2	-	-	-
U18IT601		**-**	**-**	**-**	**-**	**-**	**1**	**-**	**2**	**1**	**1**	**-**	**2**	**-**	**-**	**-**

U18OE602A DISASTER MANAGEMENT

Class: B.Tech. VI – Semester **Branch**: Information Technology (IT)

Teaching Scheme:

L	T	P	C
3	-	-	3

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):
This course will develop students' knowledge in/on…

LO1: *disaster types, its impacts & national policy on disaster management*
LO2: *prevention, preparedness and mitigation measures for different disasters, emergency support functions and relief camps*
LO3: *different types of vulnerability, macroeconomic, financial management of disaster and its related losses*
LO4: *disaster management for infrastructure, treatment of plants, geo spatial information in agriculture, multimedia technology in disaster risk management and training*

UNIT – I (9)

Introduction & Principles of Disaster Management: Nature - Development, Hazards and disasters; Natural disasters - Earth quakes, Floods, Fire, Landslides, Cyclones, Tsunamis, Nuclear; Chemical dimensions and Typology of disasters - Public health disasters, National policy on disaster management

UNIT –II (9)

Prevention Preparedness and Mitigation Measures: Prevention, Preparedness & mitigation measures for various disasters, Post disaster reliefs and logistics management, Emergency support functions and their coordination mechanism, Resources and material management, Management of relief camp

UNIT– III (9)

Risk and Vulnerability: Building codes and land use planning, Social vulnerability, Environmental vulnerability, Macroeconomic management and sustainable development, Climate change, Risk rendition, Financial management of disaster and related losses

UNIT - IV (9)

Role of Technology in Disaster Management: Disaster Management for infrastructures, Taxonomy of infrastructure, Treatment plants and process facilities, Electrical sub stations, Roads and Bridges, Geo spatial information in agriculture, Drought assessment, Multimedia technology in disaster risk management and training

Text Books:

[1] Rajib shah and R.R Krishnamurthy, *Disaster management – Global Challenges and local solutions,* Hyderabad: Universities Press (India) Pvt. Ltd., 2009.

Reference Books:

[1] Satish Modh, *Introduction to Disaster management,* Bengaluru:Macmillan India Ltd., 2010.

Course Learning Outcomes (COs):

On completion of this course, students will be able to ...

CO1: *classify the disasters and discuss natural & non-natural disasters, their implications, the institutional & legal framework for national policy on disaster management in India*

CO2: *identify mitigation strategies, preparedness & prevention measures and prioritizes the rescue&relief operations to reduce the impact of a disaster*

CO3: *list the vulnerable groups in disaster; examine the concepts of macroeconomic & sustainability & impact of disaster on development*

CO4: discuss disaster management for infrastructure, utilize geospatial information in agriculture and apply multimedia technology for disaster risk management & training

Course Articulation Matrix (CAM): U18OE602A DISASTER MANAGEMENT

CO		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	U18OE602A	-	-	-	-	-	2	2	1	-	-	1	1	-	-	-
CO2	U18OE602A	-	-	-	-	-	2	2	1	-	-	1	1	-	-	-
CO3	U18OE602A	-	-	-	-	-	2	2	1	-	-	1	1	-	-	-
CO4	U18OE602A	-	-	-	-	-	2	2	1	-	-	1	1	-	-	-
U18OE602A		**-**	**-**	-	-	-	**2**	**2**	**1**	**-**	**-**	**1**	**1**	**-**	**-**	**-**

U18OE602B PROJECT MANAGEMENT

Class: B.Tech. VI – Semester

Branch: Information Technology (IT)

Teaching Scheme:

L	T	P	C
3	-	-	3

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):

This course will develop student's knowledge in/on…

LO1: role of project manager, organization and management functions
LO2: effective time &conflict management, ethics & professional responsibilities
LO3: project planning, scheduling and budgeting
LO4: cost control, risk management and quality control techniques

UNIT – I (9)

Project Management: Understanding project management, Role of project manager, Classification of projects, Project management growth, Definitions and Concepts, Organizational structures - Organizing and staffing the project management office and team; Management functions

UNIT – II (9)

Time and Conflict Management: Understanding time management, Time management forms, Effective time management, Stress and burnout, Conflict environment, Conflict resolution, Management of conflicts, Performance measurement, Financial compensation and rewards, Morality, ethics, Corporate culture, Professional responsibilities, Success variables, Working with executives

UNIT – III (9)

Project planning: General planning, Life-cycle phases, Proposal preparation, Project planning, The statement of work, Project specifications, Milestone schedules, Work breakdown structure, Executive role in planning, The planning cycle, Handling project phase outs and transfers, Stopping projects, Scheduling techniques - CPM and PERT, Pricing and estimating

UNIT – IV (9)

Cost and quality control: Understanding cost control, Earned Value Measurement System, Cost control problems, Methodology for trade-off analysis, Risk management process, Risk analysis, Risk responses, Monitoring and control of risks, Contract management, Quality management concepts, Cost of quality, Quality control techniques

Text Books:

[1] Harold Kerzner, P*roject Management: A Systems Approach to Planning, Scheduling and Controlling*, 10th ed. Hoboken, NJ: John Wiley & Sons Inc., 2009.

Reference Books:

[1] Jack R Meredith & Samuel J mantel Jr., *Project Management: A Managerial Approach*, 8th ed. Hoboken, NJ: John Wiley & Sons Inc., 2012.

[2] John M Nicholas & Herman Steyn, *Project Management for Business, Engineering and Technology*, 4th ed. Abingdon, UK: Taylor & Francis, 2012.

[3] Adedeji B. Badiru, *Project Management: Systems, Principles and Applications*, Florida, USA: CRC Press, 2012.

Course Learning Outcomes (COs):

On completion of the course, the student will be able to…

CO1: evaluate the desirable characteristics of effective project managers

CO2: plan to resolve issues in conflicting environments

CO3: apply appropriate approaches to plan a new project in-line with project schedule & suitable budget

CO4: estimate the risks to be encountered in a new project and apply appropriate techniques to assess & improve ongoing project performance

Course Articulation Matrix (CAM):U18OE602B PROJECT MANAGEMENT																
CO		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	U18OE602B	-	-	-	-	-	1	-	-	-	1	1	-	-	-	-
CO2	U18OE602B	-	-	-	-	-	1	-	2	-	1	1	-	-	-	-
CO3	U18OE602B	1	1	-	-	-	1	-	-	-	1	1	-	-	-	-
CO4	U18OE602B	1	1	-	-	-	1	-	-	-	1	1	-	-	-	-
U18IT602B		**1**	**1**	**-**	**-**	**-**	**1**	**-**	**2**	**-**	**1**	**1**	**-**	**-**	**-**	**-**

U18OE602C PROFESSIONAL ETHICS IN ENGINEERING

Class: B.Tech. VI – Semester **Branch**: Information Technology (IT)

Teaching Scheme:

L	T	P	C
3	-	-	3

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs) :

This course will develop students' knowledge in/on …

LO1: human values and engineering ethics
LO2: professionalism, theory of virtues and code of ethics
LO3: safety & risk benefit analysis, professional and intellectual property rights
LO4: environmental & computer ethics and various roles of engineers in a company

UNIT – I (9)

Human Values: Morals, Values & ethics, Integrity, Work ethic, Service learning, Civic virtue, Respect for others, Living peacefully, Caring, Sharing, Honesty, Courage, Valuing time, Co-operation, Commitment, Empathy, Self-confidence, Character, Spirituality

Engineering Ethics: Senses of "Engineering Ethics", Variety of moral issues, Types of inquiry, Moral dilemmas, Moral autonomy, Kohlberg's theory, Gilligan's theory - Consensus and controversy

UNIT – II (9)

Profession and professionalism: Profession and its attributes, Models of professional roles

Theory of Virtues: Definition of virtue and theories of virtues, Self-respect, Responsibility and senses, Modern theories of virtues, Uses of ethical theories

Engineering as social experimentation: Engineering as experimentation, Engineers as responsible experimenters, Codes of ethics, A balanced outlook on law, The challenger case study

UNIT –III (9)

Safety, Responsibilities and Rights: Safety and risk, Assessment of safety and risk, Risk benefit analysis and reducing risk - Three Mile Island and Chernobyl case studies; Collegiality and loyalty, Respect for authority, Collective bargaining, Confidentiality, Conflicts of interest, Professional rights, Employee rights, Intellectual Property Rights (IPR), Discrimination

UNIT – IV (9)

Global Issues: Multinational corporations - Environmental ethics, Computer ethics, Engineers as managers, Consulting engineers, Engineers as expert witnesses and advisors, Moral leadership, Sample code of ethics (*Specific to a particular engineering discipline*)

Text Books:

[1]D.R. Kiran, *Professional Ethics and Human Values*, New York: McGraw Hill, 2013.

Reference Books:

[1] Govindarajan. M, Natarajan. S, Senthil Kumar. V.S, *Professional Ethics and Human Values,* New Delhi: Prentice Hall of India, 2013.

[2] Mike Martin and Roland Schinzinger, *Ethics in Engineering*, 4th ed. New York: McGraw Hill, 2014.

[3] Charles D. Fleddermann, *Engineering Ethics*, 4th ed. New Delhi: Prentice Hall, 2004.

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: identify the need for human values, morals & ethics and apply Gilligan's & Kohlberg's theories for morale development

CO2: identify the desired characteristics of a professional & the need for code of ethics & balanced outlook on law

CO3: estimate the safety margin & threshold level and describe the procedure for obtaining a patent

CO4: analyze the role of engineer in multinational companies as an advisor, consultant & manager

Course Articulation Matrix (CAM): U18OE602C PROFESSIONAL ETHICS IN ENGINEERING																
CO		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	U18OE602C	-	-	-	-	-	1	-	2	1	-	-	1	-	-	-
CO2	U18OE602C	-	-	-	-	-	1	-	2	1	-	-	1	-	-	-
CO3	U18OE602C	-	-	-	-	-	1	-	2	1	-	-	1	-	-	-
CO4	U18OE602C	-	-	-	-	-	1	-	2	1	-	-	1	-	-	-
U18IT602C		**-**	**-**	**-**	**-**	**-**	**1**	**-**	**2**	**1**	**-**	**-**	**1**		**-**	**-**

U18OE602D RURAL TECHNOLOGY AND COMMUNITY DEVELOPMENT

Class: B.Tech. VI – Semester **Branch**: Information Technology (IT)

Teaching Scheme:

L	T	P	C
3	-	-	3

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):

This course will develop students' knowledge in/on...

LO1: building technologies, modern agricultural implements and food processing methods

LO2: medicinal & aromatic plants to fulfill the needs of pharmaceutical industries and rural energy for eradication of drudgery

LO3: purification of drinking water, rain water harvesting and employment generating technologies in rural areas

LO4: objectives & characteristics of community development, need for community mobilization and approaches for community organization

UNIT – I (9)

Technologies and Process: Building materials and components - Micro concrete roofing tiles, Water & fire proof mud walls and thatch, Red mud/rice husk cement, Types of bricks, Ferro-cement water tanks and other products, Cement blocks, Preservation of mud walls, Agricultural implements - Naveen sickle, Animal drawn digger, Grubber weeder, Self propelled reaper, Seed drill, Improved bakhar

Food Processing: Fruit and vegetable preservation - Process flow sheet, Scale of operation, Economic feasibility, Source of technology; Soya milk - Process, Economics; Dehydration of fruits and vegetables, Cultivation of oyster mushroom - Preparation of beds, Spawning, Removal of bags for production of mushrooms, Harvesting and marketing, Economics, Process flow sheet, Source of technology

UNIT – II (9)

Medicinal and Aromatic plants: Plants and its use, Aromatic plants, Cymbopogons, Geranium, Manufacturing of juice, Gel and powder, Rural energy - Cultivation ofjatrophacurcus and production of biodiesel, Low cost briquetted fuel, Solar cookers and oven, Solar drier, Bio-mass gasifier

Bio-fertilizers: Introduction, Vermicompost, Improvement over traditional technology/process, Techno economics, Cost of production, Utilization of fly ash for wasteland development and agriculture

UNIT – III (9)

Purification of Drinking water: Slow sand filtration unit, Iron removal plant connected to hand pump, Chlorine tablets, Pot chlorination of wells, Solar still, Fluoride removal, Rain water harvesting through roof top, Rain water harvesting through percolation tank, Check dams, Recharging of dug wells

Employment Generating Technologies: Detergent powder and cake - Process, Process for liquid detergent, Carcass utilization - Improvement over traditional technology, Flow chart, Process, Capital investment; Indigo blue - Dye, Organic plant production, Dye extraction techniques, Aspects of indigo market, Economics; Modernization of bamboo based industries - Process for bamboo mat making, Machinery, Products, Agarbatti manufacturing; Vegetable tanning of leathers - Raw material, Soaking, Liming, Reliming, Deliming, Pretanning, Malani, Setting, Yield

UNIT – IV (9)

Community Development: Community organization - Definition, Need, Functions, Principles, Stages; Community development - Definition, Need, Objectives, Characteristics, Elements, Indicators; Differences between community organization and community development

Community Mobilization: Need, Benefits, Preparing, Initial contact with community, Coordinating, Functions of the community, Challenges, Techniques for mobilizing community, Community contributions, Leadership and capacity building, Community participation, Role of community worker in community mobilization, Models of community organization practice - Local development model, Social planning model, Social action model, Approaches to community organization

Text Books:

[1] M.S. Virdi, *Sustainable Rural Technology*, New Delhi: Daya Publishing House, 2009.

[2] Asha Ramagonda Patil, *Community Organization and Development: An Indian Perspective*, New Delhi: Prentice Hall of India, 2013.

Reference Books:

[1] Punia Rd Roy, *Rural Technology*, New Delhi: Satya Prakashan Publishers, 2009.

[2] S.B. Verma, S.K. Jiloka, Kannaki Das, *Rural Education and Technology*, New Delhi: Deep & Deep Publications Pvt. Ltd., 2006.

[3] Edwards, Allen David and Dorothy G.Jones, *Community and Community Development*, The Hague, Netherlands: Mouton, 1976.

[4] Lean, Mary, *Bread, Bricks and Belief: Communities in Charge of Their Future*, West Hartford, US: Kumarian Press, 1995.

[5] Heskin, Allen David, *The Struggle for Community*, Colorado, US: West View Press, Clinard, Marshall marron, *Slums and Community Development: Experiments in Self- Help*, Mumbai: Free Press, 1970.

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: *discuss various building technologies, modern agricultural implements and food processing methods which can be implemented in rural areas*

CO2: *identify major medicinal plants that are required for pharmaceutical companies & alternative fuel that meets substantial oil need in the country and the need and usage of bio- fertilizers*

CO3: *analyze several cost effective technologies for purification of water, rain water harvesting techniques for collection & storage of rain water and examine the employment generating technologies in tribal/ rural areas*

CO4: *distinguish between community organization and community development and identify techniques for community mobilization & approaches to community organization for social change*

Course Articulation Matrix (CAM): U18OE602D RURAL TECHNOLOGY AND COMMUNITY DEVELOPMENT

CO		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	U18OE602D	-	-	1	-	-	1	2	-	-	-	-	1	-	-	-
CO2	U18OE602D	-	-	1	-	-	1	2	-	-	-	-	1	-	-	-
CO3	U18OE602D	-	-	1	-	-	1	2	-	-	-	-	1	-	-	-
CO4	U18OE602D	-	-	-	-	-	1	2	-	-	-	-	-	-	-	-
U18IT602D		**-**	**-**	**1**	**-**	**-**	**1**	**2**	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**-**

U18IT603A DISTRIBUTED COMPUTING

Class: B.Tech. VI – Semester **Branch:** Information Technology (IT)

Teaching Scheme:

L	T	P	C
3	-	-	3

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives(LOs) :

This course will develop students' knowledge in/on…

LO1: *hardware, software & protocols involved in distributed systems*
LO2: *processes & naming concepts of distributed systems*
LO3: *synchronization & object-based systems in distributed systems*
LO4: *distributed document and coordination based systems*

UNIT – I (9)

Introduction: Definition of distributed System, Goals of distributed system, Hardware concepts, Software concepts, Client-server model

Communication: Layered protocols, Remote procedure call, Remote object invocation, Message oriented communication, Stream oriented communication

UNIT - II (9)

Processes: Threads, Clients, Servers, Code migration, Software agents

Naming: Naming Entities, Name resolution, Implementation of namespace, DNS, X.500, Locating mobile entities, Naming Vs locating entities, Home-based approaches, Hierarchical approaches, Removing unreferenced entities

UNIT – III (9)

Synchronization: Clock synchronization, Logical clocks, global state, election algorithms, mutual exclusion

Distributed Object-Based Systems: CORBA: Processes, Naming, synchronization, caching and replication, Fault tolerance, security. Distributed COM, GLOBE

UNIT - IV (9)

Distributed Document Based Systems: WWW, Lotus notes and comparisons

Distributed Coordination Based Systems: TIB/Rendezvous: Communication, Processes, Naming, Synchronization, Caching and replication, Security; JINI, Comparisons of JINI and TIB/Rendezvous

Text Book:

[1] Andrew S. Tanenbaum and Marteen Van Steen, *Distributed Systems: Principles and Paradigms*, United States of America: Prentice Hall, 2002.

Reference Books:

[1] Singhal M, Shivaratri N.G, *Advanced Concepts in Operating Systems*, New York: McGraw-Hill, 1994.

[2] Eric Newcomer, *Understanding Web Services: XML, WSDL, SOAP, and UDDI*, United States: Addison-Wesley Professional, 2002.

[3] James Edward Keogh, *J2EE: The complete Reference*, McGraw-Hill, 2002.

[4] Rajkumar Buyya, *High Performance Cluster Computing: Architectures and Systems*, New Delhi: Pearson Education, 1999.

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: *illustrate the hardware, software & protocols for RMI and RPC in distributed systems*
CO2: *identify the network processes & the naming conventions used in distributed systems*
CO3: *utilize synchronization techniques in distributed processing & distributed object-based systems*
CO4: *categorize distributed document based systems & coordination based systems*

Course Articulation Matrix(CAM): **U18IT603A DISTRIBUTED COMPUTING**

CO		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	U18IT603A.1	2	1	1	-	-	-	-	-	-	-	-	1	1	1	1
CO2	U18IT603A.2	2	2	2	1	-	-	-	-	-	-	-	2	2	2	2
CO3	U18IT603A.3	2	2	2	1	-	-	-	-	-	-	-	2	2	2	2
CO4	U18IT603A.4	2	2	2	2	-	-	-	-	-	-	-	2	2	2	2
U18IT603A		**2**	**1.75**	**1.75**	**1.33**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1.75**	**1.75**	**1.75**	**1.75**

U18IT603B INFORMATION RETRIEVAL SYSTEMS

Class:B.Tech. VI - Semester **Branch**: Information Technology (IT)

Teaching Scheme :

L	T	P	C
3	-	-	3

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs) :

This course will develop students' knowledge in/on…

LO5: *retrieval of information and indexing techniques*
LO6: *various data structures in information retrieval system and automatic indexing*
LO7: *document clustering, user search and visualization techniques*
LO8: *text search algorithms, multimedia information retrieval system and IR System evaluation*

UNIT-I (9)

Introduction: Definition, Objectives, Functional overview, Relationship to database management systems, Digital libraries and Data warehouses
Information Retrieval System Capabilities: Search, Browse and miscellaneous
Cataloging and Indexing: Objectives, Indexing process, Automatic indexing and information extraction

UNIT-II (9)

Data Structure: Introduction, Stemming algorithms, Inverted file structures, N-gram data structure, PAT Data structure, Signature file structure and Hypertext and XML data structures, Hidden Markov Models
Automatic Indexing: Classes of automatic indexing, Statistical indexing, Natural language, Concept indexing, Hypertext linkages

UNIT-III (9)

Document and Term Clustering: Introduction, Thesaurus generation, Item clustering, Hierarchy of clusters
User Search Techniques: Search statements and binding, Similarity measures and ranking, Relevance feedback, Selective dissemination of information search, Weighted searches of Boolean systems, Searching the internet and hypertext
Information Visualization: Introduction, Cognition and perception, Information visualization technologies

UNIT-IV (9)

Text Search Algorithms: Introduction, Software text search algorithms, Hardware text search systems
Multimedia Information Retrieval: Spoken language audio retrieval, Non-Speech audio retrieval, Graph retrieval, Image retrieval, Video retrieval
Information System Evaluation: Introduction, Measures used in system evaluation

Text Book:

[1] Gerald J. Kowalski and Mark T. Maybury, *Information Storage and Retrieval Systems: Theory and Implementation*, 2nd ed. New York: Kluwer Academic Publishers (Springer Publisher), 2002.

Reference Books:

[1] Ricardo Baeza-Yates and BerthierRibeiro-Neto, *Modern Information Retrieval*, England: Addison Wesley Publication, 2011.

[2] Christopher D. Manning, PrabhakarRaghavan and HinrichSchutze, *Introduction to Information Retrieval*, United Kingdom: Cambridge University Press, 2008.

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: classify information retrieval system capabilities and use indexing techniques for information extraction

CO2: discriminate data structures for information retrieval system and illustrate automatic indexing techniques

CO3: classify document clustering techniques and demonstrate user search & visualization techniques

CO4: examine text search algorithms, multimedia information retrieval techniques & IR system evaluation procedures

Course Articulation Matrix (CAM) :U18IT603B INFORMATION RETRIEVAL SYSTEMS

CO		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	U18IT603B.1	2	1	1	-	-	2	-	-	-	-	-	-	1	1	2
CO2	U18IT603B.2	2	1	2	1	-	2	-	-	-	-	-	2	2	1	2
CO3	U18IT603B.3	1	2	2	2	1	2	-	-	-	-	-	2	2	2	2
CO4	U18IT603B.4	1	2	2	2	1	2	-	-	-	-	-	2	2	2	2
U18IT603B		**1.5**	**1.5**	**1.75**	**1.6**	**1**	**2**	**-**	**-**	**-**	**-**	**-**	**2**	**1.75**	**1.5**	**2**

U18IT603C ADVANCED DATABASES

Class: B.Tech.VI - Semester **Branch**: Information Technology (IT)

Teaching Scheme :

L	T	P	C
3	-	-	3

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course learning objectives (LO) :

This course will develop students' knowledge in/on…

LO1: *basic concepts of database storage & indexing*
LO2: *query evaluation, external sorting and relational operators*
LO3: *parallel, distributed database and object database systems*
LO4: *datalog and spatial data management*

UNIT - I (9)

Overview of Storage and Indexing: Data on external storage, File organizations and indexing, Index data structures, Comparison of file organizations, Indexes and Performance tuning
Storing Data Disks and Files: The memory hierarchy, Redundant arrays of independent disks, Disk space management, Buffer manager, Files of records, Page formats, Record formats
Tree-Structured Indexing: Intuition for tree indexes, ISAM, B+ trees, Search, Insert, Delete, Duplicates, B+ Trees in practice
Hash-Based Indexing: Static hashing, Extendible hashing, Linear hashing, Extendible versus Linear hashing

UNIT - II (9)

Overview of Query Evaluation: The System catalog, Introduction to operator evaluation, Algorithms for Relational Operations, Introduction to query optimization, Alternative plans, What a typical optimizer does
External Sorting: A simple Two-Way merge sort, External merge sort, Minimizing I/O cost versus number of I/Os, Using B+ trees for sorting
Evaluating Relational Operators: The selection operation, General selection conditions, The projection operation, The join operation, The set operations, Aggregate operations, The impact of binding

UNIT - III (9)

Parallel and Distributed Databases: Introduction, Architectures for parallel databases, Parallel query evaluation, Parallelizing individual operations, Parallel query optimization, Introduction to distributed databases, Distributed DBMS architectures, Storing data in distributed DBMS, Distributed catalog management, Distributed query processing, Updating distributed data, Distributed transactions, Distributed concurrency control, Distributed recovery
Object-Database Systems: Motivating example, Structured data types, Operations on structured data, Encapsulation and ADTs, Inheritance, Objects, OIDs and Reference types, Database design for an ORDBMS, ORDBMS implementation challenges, OODBMS, Comparing RDBMS, OODBMS and ORDBMS

UNIT - IV (9)

Deductive Databases: Introduction to recursive queries, Theoretical foundations, Recursive queries with negation, From Datalog to SQL, Evaluating recursive queries

Spatial Data Management: Types of spatial data and queries, Applications involving spatial data, Introduction to spatial indexes, Indexing based on space-filling curves, Grid files, R Trees: Point and region data, Issues on high dimensional indexing

Text Book:

1. Raghu Ramakrishnan and Johannes Gehrke, *Database Management Systems*, 3rd ed. Singapore: McGraw-Hill Education, 2002.

Reference Books:

[1] RamezElmasri and Shamkanth B. Navathe, *Fundamentals of Database Systems*, 6th ed. United States of America: Pearson Education, 2010.

[2] Abraham Silberschatz, Henry F.Korth and S.Sudarshan, *Database System Concepts*, 3rd ed. Singapore: McGraw-Hill Education, 1997.

[3] Thomas Connolly and Carolyn Begg, *Database Systems*, 3rd ed. United States of America:n Pearson Education, 2003.

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: illustrate the ways of storing data in disk & indexing of files for efficient retrieval of data
CO2: apply relational operators & sorting techniques to optimize the execution of queries
CO3: classify parallel & distributed databases and apply object oriented concepts in database systems
CO4: apply recursion in queries and illustrate storing & indexing of spatial data

Course Articulation Matrix (CAM): U18IT603C ADVANCED DATABASES

CO		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	U18IT603C.1	2	1	1	1	-	-	-	-	-	-	-	-	1	-	-
CO2	U18IT603C.2	2	1	2	1	-	-	-	-	-	-	-	1	2	1	2
CO3	U18IT603C.3	2	2	1	1	1	-	-	-	-	-	-	1	2	2	1
CO4	U18IT603C.4	2	2	2	2	1	-	-	-	-	-	-	1	2	2	2
U18IT603C		**2**	**1.5**	**1.5**	**1.25**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**1.75**	**1.66**	**1.66**

U18IT604 CRYPTOGRAPHY AND NETWORK SECURITY

Class:B.Tech.VI - Semester **Branch**: Information Technology (IT)

Teaching Scheme :

L	T	P	C
3	-	-	3

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LO):

This course will develop students' knowledge in/on…

LO1: security attacks, services, mechanisms and symmetric key cryptographic algorithms
LO2: number theory and public key cryptographic algorithms
LO3: hash techniques, message authentication techniques and key management & distribution
LO4: IP security, web security, firewalls and various malicious software

UNIT – I (9)

Overview: The OSI security architecture, Security attacks, Security services, Security mechanisms, A model for network security

Classical Encryption Techniques: Symmetric cipher model, Substitution techniques, Transposition techniques, Steganography

Block Ciphers and the Data Encryption Standard: Traditional block cipher structure, The data encryption standard, The strength of DES, Block cipher design principles, Block cipher operation

Advanced Encryption Standard: AES structure, AES transformation functions, AES key expansion

UNIT - II (9)

Number Theory: Prime numbers, Fermat's and Euler's theorems, Discrete logarithms

Public-Key Cryptography and RSA: Principles of public-key cryptosystems, The RSA algorithm

Other Public-Key Cryptosystems: Diffie-Hellman key exchange, Elliptic curve arithmetic, Elliptic curve cryptography

UNIT - III (9)

Cryptographic Hash functions: Applications of cryptographic hash functions, Two simple hash functions, Secure hash algorithm (SHA)

Message Authentication Codes: Message authentication requirements, Message authentication functions, Requirements for message authentication codes, Security of MACs, HMAC

Digital Signature and Authentication Protocols: Digital signatures, Schnorr digital signature scheme

Key Management and Distribution: Symmetric key distribution using symmetric encryption, Symmetric key distribution using asymmetric encryption, Distribution of public keys, X.509 certificates

Electronic Mail Security: Pretty good privacy, S/MIME

UNIT - IV (9)

IP Security: IP security overview, IP security policy, Encapsulating security payload, Combining security associations

Transport-Level Security: Web security considerations, Secure sockets layer, Transport layer security

Malicious Software: Types of malicious software, Propagation-infected content-viruses, Virus countermeasures
Firewalls: The need for firewalls, Firewall characteristics, Types of firewalls

Text Book:

[1] William Stallings, *Cryptography and Network Security: Principles and Practice*, 6th ed. Pearson Education, 2014.

Reference Books:

[1] Behrouz A. Forouzan and Debdeep Mukhopadhyay, *Cryptography and Network Security*, 2nded. New Delhi: Mc Graw Hill Education, 2010.
[2] Atul Kahate, *Cryptography and Network Security,* New Delhi: McGraw Hill Education, 2003.
[3] Denning. D, *Cryptography and Data Security*, United Kingdom, Addison Wesley, 1982.
[4] V. K. Iain, *Cryptography and Network Security,* New Delhi: Khanna Publishing House, 2013.

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: classify different security attacks, services, mechanisms and symmetric key cryptographic algorithms
CO2: apply mathematical concepts in cryptographic algorithms for providing security & key exchange
CO3: categorize the hash & message authentication techniques and examine key management for distribution of keys
CO4: analyze the security issues at network layer & transport layer for protecting data from unauthorized persons, intruders & malicious software

Course Articulation Matrix (CAM): U18IT604 CRYPTOGRAPHY AND NETWORK SECURITY

CO		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	U18IT604.1	1	-	-	-	-	-	-	-	-	-	-	2	-	1	-
CO2	U18IT604.2	2	2	2	1	-	-	-	-	-	-	-	2	2	2	1
CO3	U18IT604.3	2	2	2	1	-	1	-	-	-	-	-	2	1	2	1
CO4	U18IT604.4	2	2	1	1	-	1	-	-	-	-	-	2	2	2	1
U18IT604		**1.75**	**2**	**1.67**	**1**	**-**	**1**	**-**	**-**	**-**	**-**	**-**	**2**	**1.67**	**1.75**	**1**

U18IT605 ARTIFICIAL INTELLIGENCE

Class:B.Tech.VI - Semester **Branch**: Information Technology (IT)

Teaching Scheme :

L	T	P	C
3	-	-	3

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):

This course will develop students' knowledge in/on…

- *LO1: basic concepts of artificial intelligence and different heuristic search techniques used in AI problem solving*
- *LO2: knowledge representation issues, predicate logic and representing knowledge using rules*
- *LO3: slot and filler structures, game playing and expert systems technology*
- *LO4: statistical reasoning methods, non-monotonic reasoning techniques and natural language processing*

UNIT - I (9)

Introduction to Artificial Intelligence: The AI problem domains, The underlying assumption, An AI technique, The level of the model, Criteria for success

Problems, Problem Spaces and Search: Defining the problem as a state space search, Production systems, Problem characteristics, Production system characteristics, Issues in the design of search programs, Additional problems

Heuristic Search Techniques: Generate-and-Test, Hill climbing, Best-first-search, Problem reduction, Constraint satisfaction, Means-Ends Analysis

UNIT - II (9)

Knowledge Representation Issues: Knowledge representations and mappings, Approaches to knowledge representation, Issues in knowledge representation, The frame problem

Using Predicate Logic: Representing simple facts in logic, Representing instance and is a relationships, Computable functions and predicates, Resolution, Natural deduction

Representing Knowledge Using Rules: Procedural versus declarative knowledge, Forward versus backward reasoning

UNIT - III (9)

Weak Slot and Filler Structures: Semantic nets, Frames

Strong Slot and Filler Structures: Conceptual dependencies, Scripts, CYC

Game Playing: The Min-Max search procedure, Adding alpha-beta cutoffs, Iterative deepening

Strong Method Problem Solving: Overview of expert system technology, Rule-based expert systems

UNIT - IV (9)

Reasoning in Uncertain Situations: Introduction to non-monotonic reasoning, Logic-based abductive inference, Abduction - Alternative to logic

Understanding Natural Language: Role of knowledge in language understanding, Deconstructing language: A symbolic analysis, Syntax, Syntax and knowledge with ATN parsers, Natural language applications

Statistical Reasoning: Bayesian networks, Dempster-Shafer theory, Fuzzy logic

Text Books:

[1] Elaine Rich, Kevin Knight and Shivashankar B Nair, *Artificial Intelligence*, 3rd ed. New Delhi: Tata McGraw-Hill, 2012. (Chapters 1 to 6, 8 to 10 & 12)

[2] George F Luger, *Artificial Intelligence*, 4th ed. London: Pearson Education Asia, 2003. (Chapters 8, 9 & 15)

Reference Books:

[1] Stuart Russell and Peter Norvig, *Artificial Intelligence (A Modern Approach)*, 3rd ed. USA: Pearson Education, 2002.

[2] Eugene Charniak and Drew Mc Dermott, *Introduction to Artificial Intelligence*, 3rd ed. Noida: Pearson Education, 2000.

[3] S.S. Vinod Chandra, S. Anand Hareendran, *Artificial Intelligence and Machine Learning*, New Delhi: PHI Learning PVT LTD, 2014.

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: categorize the problem characteristics, production systems for a given problem and compare different heuristic Search techniques

CO2: classify different approaches, issues in knowledge representations and solve the problems using predicate logic knowledge representation method

CO3: identify weak, strong slot and filler structures of knowledge representation for a given problem and use Min-Max search technique in solving game playing problems

CO4: illustrate non-monotonic reasoning techniques, natural language processing methods and solve the given AI problem using Dempster-Shafter theory & fuzzy logic approach

Course Articulation Matrix (CAM): U18IT605 ARTIFICIAL INTELLIGENCE

CO		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	U18IT605.1	2	1	1	1	1	-	-	-	-	-	-	1	2	1	-
CO2	U18IT605.2	1	1	2	1	1	-	-	1	1	-	-	1	2	1	1
CO3	U18IT605.3	1	2	1	1	1	-	-	-	1	1	1	1	2	2	1
CO4	U18IT605.4	2	2	2	2	1	-	-	1	-	-	-	1	2	2	2
U18IT605		**1.5**	**1.5**	**1.5**	**1.25**	**1**	**-**	**-**	**1**	**1**	**1**	**1**	**1**	**2**	**1.5**	**1.33**

U18IT606 DATA WAREHOUSING AND DATA MINING

Class:B.Tech.VI - Semester **Branch**: Information Technology (IT)

Teaching Scheme :

L	T	P	C
3	-	-	3

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):

This course will develop students' knowledge in/on…

LO1: *fundamental theories and concepts of data warehouse and different data preprocessing techniques*
LO2: *basic algorithms and techniques for mining frequent patterns, associations & correlations*
LO3: *classification techniques and prediction techniques*
LO4: *different clustering techniques, web mining and application of data mining techniques in business domains*

UNIT - I (9)

Data Warehouse: What is a data warehouse, Differences between operational database systems and data warehouses, Why have a separate data warehouse
Multidimensional Data Model: Data tables to data cubes evolution, Star, Snowflake and fact constellation schemas, Concept hierarchies, OLAP operations
Data Warehouse Architecture: Steps for the design and construction of data warehouses, Three-tier architecture, Metadata repository, Types of OLAP servers, Efficient computation of data cubes, Indexing OLAP, Efficient processing of OLAP queries
Data Preprocessing: Data cleaning, Integration, Transformation and reduction

UNIT - II (9)

Data Mining: What is data mining, Types of data, Functionalities, Classification of data mining systems, Data mining task primitives, Major issues in data mining and DMQL
Association Rule Mining: Basic concepts, Apriori algorithm, Generating association rules from frequent itemsets, Improving the efficiency of Apriori algorithm, FP-growth algorithm, Mining frequent itemsets using vertical data format, Mining closed frequent itemsets, Mining multilevel and multidimensional association rules, Correlation analysis, Constraint-based association mining

UNIT - III (9)

Predictive Data Mining: What is predictive data mining, Issues regarding classification and prediction
Classification: Classification by decision tree induction, Bayesian classification, Classification by back propagation, Associative classification, K-Nearest neighbor classifiers, Fuzzy set approaches
Prediction: Linear and multiple regression, Nonlinear regression, Accuracy and error measures, Evaluating the accuracy of a classifier or predictor, Ensemble methods-increasing the accuracy

UNIT - IV (9)

Cluster Analysis: Introduction, Types of data in cluster analysis, Partitioning methods: KMeans, K-Medoids, CLARANS, Hierarchical method with BIRCH, Density-based method with DBSCAN algorithm, Grid based method with STING, Clustering high dimensional data with CLIQUE, Outlier analysis

Data Mining Applications: Web mining, Financial data analysis, Retail industry, Telecommunication industry, Biological data analysis, Scientific applications and intrusion detection

Text Book:

[1] Jiawei Han and Micheline Kambler, *Data Mining Concepts and Techniques*, 2nd ed. United States of America: Morgan Kaufmann Publishers, 2006.

Reference Books:

[1] Sam Anahory and Dennis Murray, *Data Warehousing in the real world*, New Delhi: Pearson Education, 2003.
[2] C.S.R. Prabhu, *Data Warehousing Concepts, Techniques, Products and Applications*, 2nd ed. New Delhi: Prentice-Hall of India, 2002.
[3] Arun K. Pujari, *Data Mining Techniques*, 2nd ed. New Delhi: Universities Press, 2010.

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: illustrate various architectures used for designing data warehouse & data preprocessing techniques
CO2: discover association rules from datasets using different association rule mining algorithms
CO3: investigate patterns generated by classification & prediction algorithms
CO4: categorize clustering techniques to group similar data and examine the role of data mining techniques in different application domains

Course Articulation Matrix :U18IT606 DATA WAREHOUSING ANDDATA MINING																
CO		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	U18IT606.1	1	1	1	1	-	-	-	-	-	-	-	-	1	1	-
CO2	U18IT606.2	2	1	2	1	-	-	-	-	-	-	-	1	2	1	2
CO3	U18IT606.3	2	1	1	1	1	-	-	-	-	-	-	1	1	2	2
CO4	U18IT606.4	1	1	2	2	1	-	-	-	-	-	-	1	2	2	2
U18IT606		**1.5**	**1**	**1.5**	**1.25**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**1.5**	**1.5**	**2**

U18IT607 SOFTWAREENGINEERING

Class:B.Tech.VI - Semester **Branch**: Information Technology (IT)

Teaching Scheme :

L	T	P	C
3	-	-	3

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):

This course will develop students' knowledge on/ in…

LO1: software engineering fundamentals and different process models

LO2: different types of software modeling designs & patterns

LO3: user interface design and different testing methods for a given software

LO4: estimating quality & total time needed to complete the project using different metrics

UNIT - I (9)

Software Engineering Concepts: The changing nature of software, Software application domains, Legacy software, Software myths, Software engineering layered technology, A process framework, The capability maturity model integration (CMMI), Agile software

Process Models: Prescriptive process models, RAD model, Specialized Process models, Unified process model, Personal and team process models

Software Engineering Practices: Software engineering practices, Communication practices, Planning practices, Modeling practices, Construction practices, Deployment practices, Requirements engineering tasks, Requirements analysis and modeling strategies

UNIT - II (9)

Design Engineering: Design within the context of software engineering, Design process and design quality, Design concepts, The design model, Pattern based software design

Creating an Architectural Design: Software architecture, Architectural styles and patterns, Architectural design, Assessing alternative architectural designs, Architectural mapping using data flow, Designing class based components, Component level design for webapps, Designing traditional components

UNIT - III (9)

User Interface Design: The golden rules, User interface analysis and design, Webapp interface design

Testing Strategies: Software testing fundamentals, Test strategies for conventional software, Test strategies for object-oriented software, Validation testing, System testing, Debugging process, White box testing, Basis path testing, Control structure testing, Black box testing

UNIT - IV (9)

Product Metrics: Measures, Metrics and indicators, Metrics for the requirements model, Metrics for the design model, Metrics for source code, Metrics for testing, Metrics for maintenance

Metrics for Process and Projects: Metrics in the process and project domains, Software measurement, Metrics for software quality, Integrating metrics within the software

process, The W5HH principle
Project Scheduling: Project scheduling, Scheduling for web apps projects, Earned value analysis

Text Book:

[1] Roger S. Pressman, *Software Engineering*, 7th ed. New Delhi: Tata McGraw Hill, 2010.

Reference Books:

[1] IAN Somerville, *Software Engineering,* 6th ed. London: Pearson Education, 2002.
[2] Deepak Jain, *Software Engineering,* Melbourne: Oxford University Press, 2008.
[3] Jalote and Pankaj *Integrated Approach to Software Engineering*, New Delhi: Narosa 1993.
[4] Ghezzi, C. Jazayeri M. and Mandrioli, D. *Fundamentals of Software Engineering*, London: Prentice Hall of India, 1992.

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: select the appropriate software model for real time applications based on software requirements
CO2: utilize design patterns of software models to develop software
CO3: select user interface design & software testing strategies
CO4: utilize project metrics, software quality metrics & earned value analysis for project management

Course Articulation Matrix (CAM) :U18IT607 SOFTWARE ENGINEERING																
CO		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	U18IT607.1	2	2	1	1	-	1	1	-	2	1	1	1	2	-	1
CO2	U18IT607.2	2	2	2	1	-	1	1	-	1	-	1	1	2	2	-
CO3	U18IT607.3	2	2	2	2	-	1	1	-	2	1	1	1	2	1	1
CO4	U18IT607.4	2	2	2	2	-	1	1	-	2	1	1	1	2	2	1
U18IT607		**2**	**2**	**1.75**	**1.5**	**-**	**1**	**1**	**-**	**1.75**	**1**	**1**	**1**	**2**	**1.66**	**1**

U18IT608 DATA MINING USING PYTHON LABORATORY

Class: B.Tech.VI - Semester **Branch**: Information Technology (IT)

Teaching Scheme :

L	T	P	C
-	-	2	1

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LO):

This course will develop students' knowledge in/on…

LO1: building data warehouse and implementation of OLAP operations
LO2: basics of python, operators and collections
LO3: data representation and visualization using python
LO4: data mining algorithms using python

List of Experiments

Experiment-I

1. Write a program to perform multidimensional data model using SQL queries (Star, snowflake and fact constellation schemes)

Experiment-II

2. Write a program to perform various OLAP operations

Experiment-III

3. Introduction to Python programming, Basics of Python
4. Python operators, Functions and strings

Experiment-IV

5. List collection and tuple collection
6. Dictionary collection and set collection
7. Control structures and functions

Experiment-V

8. Introduction to NumPy, Operations on NumPy arrays

Experiment-VI

9. Introduction to Pandas, Getting and cleaning data

Experiment-VII

10. Introduction to Data visualization
11. Basics of visualization: Plots, Subplots and their functionalities
12. Plotting Data distributions, Categorical and time-series data

Experiment-VIII

13. Plotting Data distributions, Categorical and Time-Series data

Experiment-IX

14. Generate association rules from frequent item sets

Experiment-X

15. Regression and Classification: Linear regression and logistic regression

Experiment-XI

16. Implement decision tree, random forest, K-Nearest Neighbor algorithms

Experiment-XII

17. Implement K-means and hierarchical clustering algorithms

Laboratory Manual:

[1] *Python Programming Laboratory Manual*, Dept. of IT, KITSW.

Reference Books:

[1] David Barron, *The World of Scripting Languages*, United Kingdom: Wiley Publications, 2000.
[2] Bill Lubanovic, *Introducing Python*, New York: O'Reilly Media, 2014.

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: *design data warehouse and perform OLAP operations*
CO2: *experiment with the basic features of python*
CO3: *develop programs to implement association rules, classification algorithms using python*
CO4: *develop programs to implement clustering algorithms using python*

Course Articulation Matrix (CAM) :U18IT608 DATA MINING USING PYTHON LABORATORY																
CO		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	U18IT608.1	2	1	1	1	-	-	-	-	-	-	-	-	1	1	-
CO2	U18IT608.2	2	1	2	1	-	-	-	-	-	-	-	1	2	1	1
CO3	U18IT608.3	2	1	2	1	1	-	-	-	-	-	-	1	1	2	2
CO4	U18IT608.4	2	1	2	2	1	-	-	-	-	-	-	1	2	2	1
U18IT608		**2**	**1**	**1.75**	**1.25**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**1.5**	**1.5**	**1.33**

U18IT609 SOFTWARE TESTING LABORATORY

Class:B.Tech.VI - Semester **Branch**: Information Technology (IT)

Teaching Scheme :

L	T	P	C
-	-	2	1

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):
This course will develop students' knowledge in/on…

LO1: *testing levels, test case templates and test plan documents*
LO2: *automation testing using Selenium*
LO3: *commands, Locators and Handling objects using selenium*
LO4: *performance testing using Jmeter*

List of Experiments

Experiment-I

1. Introduction to manual testing
2. Prepare test strategy and test plan document for any sample application

Experiment-II

3. Introduction to test cases
4. Working with the test case template
5. Write programs in "C" Language to demonstrate the working of the following constructs and write possible test cases

   i) do...while ii) while….do iii) if…else iv) switch v) for

Experiment-III

6. Write the test cases for any known application (e.g. Banking Application)
7. Consider any system (e.g. ATM system) and study its system specifications and report various bugs

Experiment-IV

8. Introduction to automation testing.
9. Demonstrate Manual & Automation testing using Login page.

Experiment-V

10. Introduction of Selenium
11. Different Selenium Components(Selenium.IDE, WebDriver, Selenium GRID)

Experiment-VI

12. Demonstration of Features and Limitations of Selenium Webdriver
13. Configure Selenium with Eclipse IDE(Adding Selenium Libraries)
14. Configure Selenium with Chrome

Experiment-VII

15. Demonstrate Browser Commands, Navigation Commands and Handling Cookies.

Experiment-VIII

16. Locators: Object Identification, findElement and findElements

Experiment-IX

17. Handling TextField, Text Area, Checkbox's, RadioButtons, Links and Buttons

Experiment-X

18. Introduction to Performance Testing.
19. Introduction to JMeter, Downloading and Installing Jmeter.

Experiment-XI

20. Test Plan, Thread Group, Recording, View Results, Concurrent Users with IP Spoofing, Regular Expression Extractor

Experiment-XII

21. Thread Groups, Config Elements, Pre –Processors, Post –Processors, Listeners

Laboratory Manual:

[1] *Software Testing Laboratory Manual*, Dept. of IT, KITSW.

Reference Books:

[1] Dr. K.V.K.K. Prasad, *Software Testing Tools*, New Delhi: Dreamtech Press, 2009.
[2] Navneesh Garg, *Test Automation using Selenium WebDriver with Java*, New Delhi: Dover Publications, 2014.

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: *design test cases for accelerated releases*
CO2: *utilize selenium tool to perform automation testing of project or product*
CO3: *apply selenium tool to handle web application objects*
CO4: *utilize JMeter tool to test the performance of project or product*

Course Articulation Matrix (CAM):U18IT609 SOFTWARE TESTING LABORATORY

CO		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	U18IT609.1	2	2	2	1	2	-	-	1	2	1	-	1	2	2	2
CO2	U18IT609.2	2	2	2	1	2	-	-	1	2	1	-	1	2	2	2
CO3	U18IT609.3	2	2	2	1	2	-	-	1	2	1	-	1	2	2	2
CO4	U18IT609.4	2	2	2	1	2	-	-	1	2	1	-	1	2	2	2
U18IT609		**2**	**2**	**2**	**1**	**2**	**-**	**-**	**1**	**2**	**1**	**-**	**1**	**2**	**2**	**2**

U18IT610 MINI PROJECT

Class: B.Tech.VI - Semester **Branch**: Information Technology (IT)

Teaching Scheme:

L	T	P	C
-	-	2	2

Examination Scheme:

Continuous Internal Evaluation	100 marks
End Semester Examination	-

Course Learning Objectives (LOs):
This course will develop students' knowledge on /in…
LO1: *implementing a project independently by applying knowledge to practice*
LO2: *literature review and well-documented report writing*
LO3: *creating PPTs and effective technical presentation skills*
LO4: *writing technical paper in scientific journal style & format and creating video pitch*

Student has to take up independent mini project on innovative ideas, innovative solutions to common problems using their knowledge relevant to courses offered in their program of study, which would supplement and complement the program assigned to each student.

Guidelines:

1. The HoD shall constitute a *Department Mini Project Evaluation Committee (DMPEC)*
2. DMPEC shall allot a faculty supervisor to each student for guiding on (i) selection of topic (ii) literature survey and work to be carried out (iii) preparing a report in proper format and (iv) effective mini project oral presentation
3. There shall be only Continuous Internal Evaluation (CIE) for mini project
4. The CIE for seminar is as follows:

Assessment	Weightage
Mini Project Supervisor Assessment	20%
Working model / process / software package / system developed	20%
Mini Project report	20%
Mini Project paper	10%
Video pitch	10%
DMPEC Assessment: *Oral presentation with PPT andviva-voce*	20%
Total Weightage:	100%

Note: It is mandatory for the student to appear for oral presentation and viva-voce to qualify for course evaluation

(g) **Mini Project Topic**: The topic should be interesting and conducive to discussion. Topics may be found by looking through recent issues of peer reviewed Journals / Technical Magazines on the topics of potential interest

(h) **Working Model**: Each student is requested to develop a working model / process / system on the chosen work and demonstrate before the *DMPEC* as per the dates specified by *DMPEC*

(i) **Report:** Each student is required to submit a well-documented report on the chosen seminar topic as per the format specified by*DMPEC*

(j) **Anti-Plagiarism Check:** The seminar report should clear plagiarism check as per the Anti-Plagiarism policy of the institute

(k) **Presentation:** Each student should prepare PPT with informative slides and make an effective oral presentation before the *DMPEC* as per the schedule notified by

thedepartment

(l) **Video Pitch:** Each student should create a pitch video, which is a video presentation on his / her mini project. Video pitch should be no longer than 5 minutes by keeping the pitch concise and to the point, which shall also include key points about his / her business idea / plan (*if any*) and social impact

(m) The student has to register for the Mini project as supplementary examination in the following cases:
   iv) he/she is absent for oral presentation and viva-voce
   v) he/she fails to submit the report in prescribed format
   vi) he/she fails to fulfill the requirements of Mini project evaluation as per specified guidelines

(n) i) The CoE shall send a list of students registered for supplementary to the HoD concerned
   ii) The DSEC, duly constituted by the HoD, shall conduct Mini project evaluation and send the award list to the CoE within the stipulated time

Course Learning Outcomes (COs):
On completion of this course, students will be able to…

CO5: *apply knowledge to practice to design & conduct experiments and utilize modern tools for developing working models / process / system leading to innovation & entrepreneurship*

CO6: *demonstrate the competencies to perform literature survey, identify gaps, analyze the problem and prepare a well-documented Mini project report*

CO7: *make an effective oral presentation through informative PPTs, showing knowledge on the subject & sensitivity towards social impact of the Mini project*

CO8: *write a "Mini project paper" in scientific journal style & format from the prepared Mini project report and create a video pitch on Mini project*

Course Articulation Matrix (CAM) :U18IT610 MINI PROJECT																
CO		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	U18IT610.1	1	1	2	2	1	1	1	2	2	2	1	2	2	1	-
CO2	U18IT610.2	1	1	-	2	-	-	-	2	2	2	-	2	2	-	-
CO3	U18IT610.3	-	-	-	-	-	-	1	2	2	2	-	2	2	-	-
CO4	U18IT610.4	-	-	-	-	-	-	-	2	2	2	-	2	2	1	-
U18IT610		**1**	**1**	**2**	**2**	**1**	**1**	**1**	**2**	**2**	**2**	**1**	**2**	**2**	**1**	**-**

DEPARTMENT OF INFORMATION TECHNOLOGY
KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE, WARANGAL – 15
(An Autonomous Institute under Kakatiya University, Warangal)

SCHEME OF INSTRUCTION AND EVALUATION
VII-SEMESTER OF 4-YEAR B.TECH DEGREE PROGRAMME

[4Th+2P+1MC+1 Major Project]

Sl. No.	Course Category	Course Code	Course Title	Hours per Week			Credits	Evaluation Scheme				
				L	T	P		CIE			ESE	Total Marks
								TA	MSE	Total		
1	HSMC	U18MH701	Management, Economics & Accountancy	3	-	-	3	10	30	40	60	100
2	PE	U18IT702	Professional Elective-III/MOOCs-III	3	-	-	3	10	30	40	60	100
3	PE	U18IT703	Professional Elective-IV/MOOCs-IV	3	-	-	3	10	30	40	60	100
4	PCC	U18IT704	Internet of Things	3	-	-	3	10	30	40	60	100
5	PCC	U18IT705	Scripting Languages Laboratory	-	-	2	1	40	-	40	60	100
6	PCC	U18IT706	Modeling and Project Management Laboratory	-	-	2	1	40	-	40	60	100
7	PROJ	U18IT707	Major Project Work *Phase–I*	-	-	6	3	100	-	100	-	100
8	MC	U18IT708	Internship Evaluation	-	-	2	-	100	-	100	-	100
Total:				**12**	**-**	**12**	**17**	**320**	**120**	**440**	**360**	**800**
Additional Learning*: *Maximum credits allowed for Honours/Minor*				-	-	-	***7***	-	-	-	-	-
Total credits for Honours/Minor students:				**-**	**-**	**-**	***17+7***	**-**	**-**	**-**	**-**	**-**

** List of courses for additional learning through **MOOCs** towards Honours/Minor in Engineering shall be prescribed by the department under Honours/ Minor Curricula*

L= Lecture, T = Tutorials, P = Practicals & C = Credits ; Contact hours per week : 24

Professional Elective–III / MOOCs-III	**Professional Elective–IV / MOOCs-IV**
U18IT702A: Advanced Data Mining	U18IT703A: Machine Learning
U18IT702B: Cloud Computing	U18IT703B: Service Oriented Architecture
U18IT702C: Adhoc and Sensor Networks	U18IT703C: Digital Image Processing
U18IT702M: MOOCs-III Course	U18IT703M: MOOCs-IV Course

U18MH701 MANAGEMENT ECONOMICS AND ACCOUNTANCY

Class: B. Tech. VII-Semester **Branch:** ME, CSE, IT & CSN

Teaching Scheme:

L	T	P	C
3	–	–	3

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):

This course will develop students' knowledge on /in…

LO1: basic concepts of management
LO2: concepts of economics and forms of business organizations
LO3: fundamentals of accountancy and journalising
LO4: preparation of final accounts

UNIT-I (9)

Management: Meaning and definition, Scientific Management - Definition, Characteristics, Principles of management

Functions of Management: Planning - Definition, Characteristics; Organizing - Definition, Characteristics; Staffing - Meaning, Functions of personnel management; Directing- Leadership, Nature; Motivation – Nature, Types (financial, non-financial, intrinsic and extrinsic), Communication- Process, Types, Co- ordination- Definition, Steps to achieve effective coordination, Controlling- Definition, process

UNIT-II (9)

Economics: Meaning and definition, Scope, Micro and Macro Economics, Methods of Economics, Laws of Economics

Forms of Business Organization: Sole Proprietor ship, Partnership firm - Types of Partners, Cooperative society, Joint Stock Company - Features, Types, Merits and demerits

UNIT-III (9)

Double Entry System and Book Keeping: Accounting concepts and conventions, Overview of accounting cycle, Journal-meaning, Journalizing, Ledger - Meaning, Ledger posting, Balancing; Cash book (Single column), Preparation of Trial balance

UNIT – IV (9)

Final Accounts: Trading Account, profit and loss account and Balance Sheet with simple adjustments

Text Books:

[1] Y. K. Bhushan, *Fundamentals of Business Organization and Management*, 20th ed. New Delhi: Sultan Chand & Sons, 2017. (*Chapters 1, 2 & 4*)

[2] T. S. Grewal, S.C. Gupta, *Introduction to Accountancy*, 8th ed. New Delhi: S. Chand Publications, 2014. (*Chapters1, 2, 3, 4, 6 & 8*)

Reference Books:

[1] Harold Koontz and Heinz Weihrich, *Essentials of Management*, 6th ed., New Delhi: Tata Mc Graw HillPublications, 2006.

[2] L.M. Prasad, *Principles and Practice of Management*, 9th ed., New Delhi: Sultan Chand, 2016.

[3] R.L. Gupta & V.K. Gupta, *Principles and Practice of Accountancy*, 14th ed., New Delhi: Sultan Chand and Sons, 2018.

Course Research Papers: Research papers (Journal/Conference papers) relevant to the course content will be posted by the course faculty in CourseWeb page.

Course Patents: Patents relevant to the course content will be posted by the course faculty in CourseWeb page

Course Projects: Course project is an independent project carried out by the student during the course period, under the supervision of course faculty. Course faculty will post few course projects titles in CourseWeb page. Students are encouraged to come up and experiment with the ideas that interest them.

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: comprehend the basic concepts of management
CO2: distinguish between micro &macro economics& forms of business organizations
CO3: pass journal entries & post them into ledgers
CO4: prepare profit & loss accounts and assess the financial position through the balance sheet

Course Articulation Matrix: U18MH701 MANAGEMENT ECONOMICS AND ACCOUNTANCY															
CO		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	PSO 3
CO1	U18MH701.1	-	-	-	-	-	-	-	-	1	1	1	1	-	-	-
CO2	U18MH701.2	-	-	-	-	-	-	-	-	1	1	2	1	-	-	-
CO3	U18MH701.3	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-
CO4	U18MH701.4	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-
U18MH 701		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**1**	**1.25**	**1**	**-**	**-**	**-**

U18IT702A: ADVANCED DATA MINING

Class: B.Tech. VII–Semester **Branch:** Information Technology

Teaching Scheme:

L	T	P	C
3	-	-	3

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):

This course will develop students' knowledge in/on

LO1: mining time-series data and sequence patterns in transactional databases

LO2: graph mining and social network analysis

LO3: text mining and sentiment analysis

LO4: classification and clustering techniques in data streams

UNIT – I (9)

Mining Time-Series Data: Trend analysis, Similarity Search in time-series analysis- Data reduction and transformation techniques, Indexing methods for similarity search, Similarity search methods, Query languages for time sequences

Mining Sequence Patterns in Transactional Databases: Sequential pattern mining: Concepts and primitives, Scalable methods for mining sequential patterns-GSP: A sequential pattern mining algorithm based on candidate generate-and-test, SPADE: An apriori-based vertical data format sequential pattern mining algorithm, PrefixSpan: Prefix-projected sequential pattern growth, Constraint-based mining of sequential patterns, Periodicity analysis for time-related sequence data

UNIT – II (9)

Graph Mining: Methods for mining frequent sub graphs-Apriori-based approach, Pattern-growth approach, Mining variant and constrained substructure patterns-Mining closed frequent substructures, Applications: Graph indexing

Social Network Analysis: Social network, Characteristics of social networks, Link Mining: Tasks and challenges, Mining on social networks-Link prediction, Mining customer networks for viral marketing, Mining newsgroups using networks, Community mining from multirelational networks

UNIT – III (9)

Text Mining: Text data analysis and information retrieval-Basic measures for text retrieval: Precision and Recall, Text retrieval methods, Text indexing techniques, Query processing techniques, Dimensionality reduction for text-Latent semantic indexing, Locality preserving indexing, Probabilistic Latent semantic indexing, Text mining approaches-Keyword-based association analysis, Document classification analysis, Document clustering analysis

Case study: Sentiment analysis using Twitter data

UNIT – IV (9)

Mining Data Streams: Methodologies for stream data processing and stream data systems-Random sampling, Sliding windows, Histograms, Multiresolution methods, Sketches, Randomized algorithms, Data stream management systems and stream queries, Stream query processing, Stream OLAP and stream data cubes- Time dimension with compressed time scale: tilted time frame, Critical layers, Partial materialization of a stream cube, Frequent-pattern mining in data streams- Lossy counting algorithm, Classification of dynamic data streams- Hoeffding tree algorithm, Very Fast Decision Tree (VFDT) and Concept-Adapting Very Fast Decision Tree (CVFDT), A classifier ensemble approach to stream data classification, Clustering evolving data streams-Stream: A k-medians-based stream clustering algorithm, Clustream: Clustering evolving data streams

Text Book:

[1] Jiawei Han and Micheline Kambler, *Data Mining Concepts and Techniques*, 2nd ed. United States of America: Morgan Kaufmann Publishers, 2006.

Reference Books:

[1] Vipin Kumar, Pang-Ning Tan, Michael Steinbach, *Introduction to Data Mining*, South Asia, Pearson Education, 2016.
[2] David L, Olson Dursun Delen, *Advanced Data Mining Techniques*, Verlag: Springer, 2008.
[3] Ikvinderpal Singh, *Data Mining and Warehousing*, New Delhi, Khanna Publishing, 2014.
[4] Arun K. Pujari, *Data Mining Techniques*, 2nd ed. New Delhi: Universities Press, 2010.

Course Research Papers: Research papers (Journal/Conference papers) relevant to the course content will be posted by the course faculty in CourseWeb page.

Course Patents: Patents relevant to the course content will be posted by the course faculty in CourseWeb page

Course Projects: Course project is an independent project carried out by the student during the course period, under the supervision of course faculty. Course faculty will post few course projects titles in CourseWeb page. Students are encouraged to come up and experiment with the ideas that interest them.

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: apply data mining algorithms on time-series data and generate sequential patterns
CO2: analyze graphs and social network data
CO3: discover useful patterns from text data and apply text mining in sentiment analysis
CO4: apply classification and clustering techniques on data streams

Course Articulation Matrix: U18IT702A ADVANCED DATA MINING

CO		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	PSO 3
CO1	U18IT702A.1	1	1	-	-	-	-	-	-	1	1	-	1	1	-	-
CO2	U18IT702A.2	2	2	1	1	1	-	-	-	1	1	-	1	2	1	-
CO3	U18IT702A.3	2	2	2	2	1	-	-	-	1	1	-	1	2	2	1
CO4	U18IT702A.4	2	2	2	2	1	-	-	-	1	1	-	1	2	2	2
U18IT702A		**1.75**	**1.75**	**1.66**	**1.66**	**1**	**-**	**-**	**-**	**1**	**1**	**-**	**1**	**1.75**	**1.66**	**1.5**

U18IT702B CLOUD COMPUTING

Class: B.Tech. VII- Semester **Branch:** Information Technology

Teaching Scheme:

L	T	P	C
3	-	-	3

Examination Scheme:

Continuous Internal Evaluation	40 Marks
End Semester Exam	60 Marks

Course Learning Objectives(LOs):

This course will develop student's knowledge in/on…

LO1: basic concepts of cloud and computing environments
LO2: cloud architecture and virtualization techniques
LO3: cloud platforms and real time applications used in industry
LO4: importance of security in cloud environment

UNIT – I (9)

Introduction: Cloud computing at a glance, Historical developments, Building cloud computing environment, Computing platforms and technologies

Principles of Parallel and Distributive Computing: Eras of computing, Parallel vs. distributive computing, Elements of parallel computing, Elements of distributive computing, Technologies for distributive computing

UNIT - II (9)

Virtualization: Introductions, Characteristics of virtualized environments, Taxonomy of virtualization techniques, Virtualization and cloud computing, Pros and cons of virtualization, Technology examples

Cloud Computing Architecture: Introduction, Cloud reference model, Types of cloud, Economics of the cloud, Open challenges

UNIT - III (9)

Data Intensive Computing: What is data intensive computing? Technologies for data intensive computing

Cloud Platform in Industry: Amazon web services, Google app engine, Microsoft azure

Cloud Applications: Scientific applications: ECG analysis in the cloud, Business and consumer applications: CRM and ERP

UNIT - IV (9)

Cloud Security: Security the top concern for cloud users, Cloud security risks, Privacy and privacy impact assessment, Trust, Cloud data encryption, Security of database services, Operating system security, Virtual machine security, Security of virtualization, Security risks posed by shared images, Security risks posed by a management operating system, Mobile devices and cloud security

Text Books:

[1] Rajkumar Buyya, Christian Vecchiola, Thamarai Selvi, *Mastering Cloud Computing*, New Delhi: McGraw Hill, 2013 (Chapters 1 to 4 and 8 to 11)

[2] Dan C. Marnescu, *Cloud Computing Theory and Practice*, 2nd ed. Cambridge: Elsevier, 2018. (Chapter 9)

Reference Books:

[1] Dr. Kumar Saurabh, *Cloud Computing: Architecting Next-Gen Transformations Paradigms*, 4th ed. New Delhi: Wiley India Private Limited, 2018.

[2] Barrie Sosinsky, *Cloud Computing Bible*, Indiana: Wiley Publications, 2011.

[3] Anthony T.Velte, Toby J Velte and Robert Elsenpeter, *Cloud Computing: A practical Approach*, New York: McGraw Hill, 2010.

Course Research Papers: Research papers (Journal/Conference papers) relevant to the course content will be posted by the course faculty in CourseWeb page.

Course Patents: Patents relevant to the course content will be posted by the course faculty in CourseWeb page.

Course Projects: Course project is an independent project carried out by the student during the course period, under the supervision of course faculty. Course faculty will post few course projects titles in CourseWeb page. Students are encouraged to come up and experiment with the ideas that interest them.

Course Learning Outcomes (COs):

On completion of this course, students' will be able to…

CO1: analyze various cloud models and computing environments
CO2: develop cloud applications using various virtualization techniques
CO3: apply cloud platform technologies for developing real time applications.
CO4: analyze the degree of security at user level and architectural level for a given cloud application

Course Articulation Matrix U18IT702B CLOUD COMPUTING															
CO		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	U18IT702B.1	2	2	2	2	-	1	1	-	1	1	-	-	2	1	1
CO2	U18IT702B.2	2	1	1	1	-	1	1	-	1	1	1	-	1	1	-
CO3	U18IT702B.3	2	1	1	1	-	1	1	-	1	1	-	1	1	1	1
CO4	U18IT702B.4	2	2	2	1	-	1	1	-	1	1	2	1	2	1	1
U18IT702B		**2**	**1.5**	**1.5**	**1.25**	**-**	**1**	**1**	**-**	**1**	**1**	**1.5**	**1**	**1.5**	**1**	**1**

U18IT702C AD HOC AND SENSOR NETWORKS

Class: B.Tech. VII–Semester

Branch: Information Technology

Teaching Scheme:

L	T	P	C
3	-	-	3

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):

This course will develop students' knowledge in/on

LO1: applications, challenges and routing in ad hoc networks

LO2: wireless LANS and wireless PANs

LO3: directional antenna usage and TCP in ad hoc networks

LO4: basics and data retrieval in sensor networks

UNIT - I (9)

Introduction: Applications of MANETs, Challenges

Routing in Ad Hoc Networks: Introduction, Topology based versus position based approaches, Topology based routing protocols, Position-based routing, Other routing protocols

UNIT – II (9)

Wireless LANs: Introduction, Why wireless LANs, Transmission techniques, Medium access control protocol issues, The IEEE 802.11 standard for wireless LANs, Enhancement to IEEE 802.11 MAC

Wireless PANs: Introduction, Why wireless PANs, The bluetooth technology, Enhancements to bluetooth, The IEEE 802.15 working group for WPANs, Comparison between WPAN systems, WLANs versus WPANs

UNIT – III (9)

Directional Antenna Systems: Introduction, Antenna concepts, Evolution of directional antenna Systems, Advantages of using directional antennas, Directional antennas for ad hoc networks, Protocol issues on the use of directional antennas, Medium access control, Routing.

TCP over Ad Hoc Networks: Introduction, TCP protocol overview, TCP and manets, Solutions for TCP over ad hoc.

UNIT – IV (9)

Wireless Sensor Networks: Introduction, The mica mote, Sensing and communication range, Design issues, Energy consumption, Clustering of sensors, Applications

Data Retrieval in Sensor Networks: Introduction, Classifications of WSNs, MAC layer, Routing layer, High level application layer support, Adapting to the inherent dynamic nature of WSNs.

Text Book:

[1] Carlos de Morais Cordeiro, Dharma Prakash Agrawal, *Ad Hoc & Sensor Networks - Theory and Applications,* Singapore : World Scientific Publishing Co Pvt. Ltd., 2006.

Reference Books:

[1] C. Siva Ram Murthy, B. S. Manoj *Ad Hoc Wireless Networks: Architectures and Protocols,* USA: Pearson Education, 2004.

[2] Kazem Sohraby, Daniel Minoli, Taieb Znati, *Wireless sensor networks : Technology, Protocols and Applications,* USA: John Wiley & Sons, Inc., 2007.

Course Research Papers: Research papers (Journal/Conference papers) relevant to the course content will be posted by the course faculty in CourseWeb page.

Course Patents: Patents relevant to the course content will be posted by the course faculty in CourseWeb page

Course Projects: Course project is an independent project carried out by the student during the course period, under the supervision of course faculty. Course faculty will post few course projects titles in CourseWeb page. Students are encouraged to come up and experiment with the ideas that interest them.

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: summarize the different routing techniques in ad hoc networks

CO2: illustrate the wireless LANs and Wireless PANs

CO3: apply the directional antenna systems during the implementation of wireless networks

CO4: develop sensor networks with data retrieval systems to solve real time problems

Course Articulation Matrix: U18IT702C AD HOC AND SENSOR NETWORKS

CO		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	PSO 3
CO1	U18IT702C.1	2	-	-	-	-	-	-	-	1	1	-	1	-	1	-
CO2	U18IT702C.2	2	1	1	-	-	-	-	-	1	1	-	1	-	1	-
CO3	U18IT702C.3	2	1	1	-	-	-	-	-	1	1	-	1	2	1	-
CO4	U18IT702C.4	2	1	2	-	-	1	-	-	1	1	-	1	2	2	1
U18IT702C		**2**	**1**	**1.33**	**-**	**-**	**1**	**-**	**-**	**1**	**1**	**-**	**1**	**2**	**1.25**	**1**

U18IT703A MACHINE LEARNING

Class: B.Tech. VII- Semester

Branch: Information Technology

Teaching Scheme:

L	T	P	C
3	-	-	3

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives(LOs):

This course will develop students' knowledge in/on…

LO1: machine learning fundamentals, binary classification and advanced classification techniques

LO2: different learning algorithms

LO3: different models to classify training data

LO4: improving and measuring the classifiers' accuracy by using different methods

UNIT – I (9)

Introduction: Tasks: the problems that can be solved with machine learning, Models-the output of machine, Features-the workhorses of machine

Binary Classification and Related Tasks: Classification, Scoring and ranking, Class probability estimation

Beyond Binary Classification: Handling more than two classes, Regression, Unsupervised and descriptive learning

UNIT – II (9)

Concept Learning: The hypothesis space, Paths through the hypothesis space, Beyond conjunctive concepts, Learnability

Tree Models: Decision trees, Ranking and probability estimation trees, Tree learning as variance reduction

Rule Models: Learning ordered rule lists, Learning unordered rule sets, Descriptive rule learning, First-order rule learning

UNIT – III (9)

Linear Models: The least-squares method, The perceptron, Support vector machines, Obtaining probabilities from linear classifiers, Going beyond linearity with kernel methods

Probabilistic Models: The normal distribution and its geometric interpretations, Probabilistic models for categorical data, Discriminative learning by optimizing conditional likelihood, Probabilistic models with hidden variables, Compression-based models

UNIT – IV (9)

Features: Kinds of feature, Feature transformations, Feature construction and selection.

Model Ensembles: Bagging and random forests, Boosting, Mapping the ensemble landscape.

Machine Learning Experiments: What to measure, How to measure it, How to interpret it.

Text Book:

[1] Peter Flach, *Machine Learning: The Art and Science of Algorithms that Make Sense of Data*, U.K., Cambridge University Press, 2012.

Reference Books:

[1] Jason Bell, *Machine Learning: Hands-On for Developers and Technical Professionals*, Canada, John Wiley & Sons, 2014.

[2] Tom M. Mitchell, Jaime G. Carbonell,Ryszard S. Michalski, *Machine Learning: A Guideto Current Research*, West Springfield Avenue, Kluwer Academic Publishers,2011.
[3] Tom M. Mitchell, *Machine Learning*, India, McGraw Hill, 1997.
[4] Kevin P. Murphy, *Machine Learning: A Probabilistic Perspective,* London, MIT Press,2012.

Course Research Papers: Research papers (Journal/Conference papers) relevant to the course content will be posted by the course faculty in CourseWeb page.

Course Patents: Patents relevant to the course content will be posted by the course faculty in CourseWeb page

Course Projects: Course project is an independent project carried out by the student during the course period, under the supervision of course faculty. Course faculty will post few course projects titles in CourseWeb page. Students are encouraged to come up and experiment with the ideas that interest them.

Course Learning Outcomes(COs):
On completion of this course, students' will be able to…
CO1: develop models using various classification algorithms
CO2: build prediction models based on decision tree algorithms
CO3: formulate error rates and normal distribution using linear and probabilistic models for a given data
CO4: create prediction models using various ensemble methods for a given data

Course Articulation Matrix (CAM): U18IT703A MACHINE LEARNING															
CO		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	U18IT703A.1	2	1	1	1	-	1	1	-	1	1	1	1	1	1	-
CO2	U18IT703A.2	2	1	1	1	-	1	1	-	1	1	1	1	1	1	-
CO3	U18IT703A.3	2	2	2	2	-	1	1	-	1	1	2	1	2	2	1
CO4	U18IT703A.4	2	2	2	2	-	1	1	-	1	1	2	1	2	2	1
U18IT703A		**2**	**1.5**	**1.5**	**1.5**	**-**	**1**	**1**		**1**	**1**	**1.5**	**1**	**1.5**	**1.5**	**1**

U18IT703B SERVICE ORIENTED ARCHITECTURE

Class: B.Tech. VII-Semester **Branch:** Information Technology

Teaching Scheme:

L	T	P	C
3	-	-	3

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):

This course will develop students' knowledge in/on

LO1: core characteristics, evolution and web services of SOA
LO2: concepts of activity management, advanced messaging, metadata security and service-orientation
LO3: understanding the concepts of service layers, SOA delivery strategies and service-oriented analysis
LO4: SOA composition guidelines, service-oriented design approaches and SOA service designs

UNIT - I (9)

Introducing SOA: Fundamental SOA, Common misperceptions about SOA, Common tangible benefits of SOA, Common pitfalls of adopting SOA

The Evolution of SOA: An SOA timeline (from XML to web services to SOA), The continuing evolution of SOA, The roots of SOA

Web Services and Primitive SOA: The Web services framework- Services, Service descriptions, Messaging with SOAP

UNIT - II (9)

Web Services and Contemporary SOA *(Activity management and composition)***:** Message exchange patterns, Service activity, Coordination, Atomic transactions, Business activities, Orchestration, Choreography

Web Services and Contemporary SOA *(Advanced Messaging, Metadata & Security)***:** Addressing, Reliable messaging, Correlation, Policies, Metadata exchange, Security, Notification and eventing

SOA and Service-Orientation: Principles of service-orientation, Service- orientation and the enterprise, Anatomy of a service-oriented architecture, Common principles of service-orientation

Case study on Micro service Architecture

UNIT - III (9)

Service Layers: Service-orientation and contemporary SOA, Service layer abstraction, Application service layer, Business service layer, Orchestration service layer, Agnostic services, Service layer configuration scenarios

Building SOA and SOA Delivery Strategies: SOA delivery lifecycle phases, The top-down strategy, The bottom-up strategy, The agile strategy

Service-Oriented Analysis: Introduction to service-oriented analysis, Benefits of a business-centric SOA, Deriving business services, Service modeling, Service modeling guidelines, Classifying service model logic, Contrasting service modeling approaches

UNIT - IV (9)

Service-Oriented Design: Introduction to service-oriented design, WSDL related XML schema language basics, WSDL language basics, SOAP language basics, Service interface design tools
SOA Composition Guidelines: Steps to composing SOA, Considerations for choosing service layers, Considerations for positioning of core SOA standards, Considerations for choosing SOA extensions
SOA Service Design: Overview, Entity-centric business service design, Application service design,Task- centric service design and service design guidelines

Text Book:

[1] Thomas Erl, Service-Oriented Architecture: Concepts, Technology & Design, 2nd Impression, Boston:PearsonEducation Inc, 2008.

Reference Books:

[1] Arnon Rotem-Gal-Oz, *SOA Patterns*, India: Manning publications, 2012.
[2] Michael Rosen, Boris Lublinsky, Kevin T. Smith, Marc J. Balcer, *Applied SOA: Service Oriented Architecture and Design Strategies*, India: Wiley Publishing Inc, 2010.
[3] Thomas Erl, Benjamin Carlyle, Cesare Pautasso, Raj Balasubramanian, *SOA with REST: Principles, Patterns & Constraints for Building Enterprise Solutions with REST*, India: Pearson Education, 2008.

Course Research Papers: Research papers (Journal/Conference papers) relevant to the course content will be posted by the course faculty in CourseWeb page.

Course Patents: Patents relevant to the course content will be posted by the course faculty in CourseWeb page

Course Projects: Course project is an independent project carried out by the student during the course period, under the supervision of course faculty. Course faculty will post few course projects titles in CourseWeb page. Students are encouraged to come up and experiment with the ideas that interest them.

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1 describe the basics of SOA, messaging and web service technologies
CO2 illustrate web services for activity management & composition, security of metadata, reliable messaging and service-orientation
CO3 analyze different service layers, delivery strategies, business work flow and service-oriented analysis
CO4 develop physical designs using service-oriented design, composition guidelines of SOA and service-oriented designs

Course Articulation Matrix: U18IT703B SERVICE ORIENTED ARCHITECTURE																
CO		**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**	**PSO 3**
CO1	U18IT703B.1	1	1	1	-	-	-	-	-	1	1	-	1	1	-	-
CO2	U18IT703B.2	2	1	2	1	-	-	-	-	1	1	-	1	2	1	2
CO3	U18IT703B.3	1	2	2	2	-	-	-	-	1	1	-	1	2	2	1
CO4	U18IT703B.4	2	2	2	2	1	-	-	-	1	1	-	1	2	2	2
U18IT703B		**1.5**	**1.5**	**1.75**	**1.66**	**1**	**-**	**-**	**-**	**1**	**1**	**-**	**1**	**1.75**	**1.66**	**1.66**

U18IT703C DIGITAL IMAGE PROCESSING

Class: B.Tech. VII–Semester **Branch:** Information Technology

Teaching Scheme:

L	T	P	C
3	-	-	3

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):

This course will develop students' knowledge in/on

LO1: basic concepts, principles and methods of digital image processing

LO2: intensity Transformations, Spatial Filtering and Filtering in the Frequency Domain

LO3: image restoration and color image processing

LO4: image compression techniques morphological image processing and concepts of image segmentation

UNIT – I (9)

Introduction: The origins of digital image processing, Fundamental steps in digital image processing, Components of an image processing system

Digital Image Fundamentals: Elements of visual perception, Light and the electromagnetic spectrum, Image sensing and acquisition, Image sampling and quantization, some basic relationships between pixels, An introduction to the mathematical tools used in digital image processing

UNIT – II (9)

Intensity Transformations and Spatial Filtering: Some basic intensity transformation functions, Histogram processing, Fundamentals of spatial filtering, smoothing spatial filters, Sharpening Spatial filters, Combining spatial enhancement methods

Filtering in the Frequency Domain: Introduction to the Fourier transform and basics of filtering in the frequency domain, Image smoothing using frequency domain filters, Image sharpening using frequency domain filters

UNIT – III (9)

Image Restoration: A model of the image degradation/restoration process, Noise models, Restoration in the presence of noise only-spatial filtering

Color Image Processing: Color fundamentals, Color models, Pseudo color image processing, Basics of full-color image processing, Color transformations, Noise in color images

UNIT – IV (9)

Image Compression: Fundamentals, Some basic compression methods, Digital image water marking

Morphological Image Processing: Preliminaries, Dilation and erosion, Opening and closing, The Hit-or-Miss transformation, Some basic morphological algorithms

Image Segmentation: Point, Line and edge detection, Thresholding, Region-base segmentation, Segmentation using morphological watersheds

Text Book:

[1] Rafael C. Gonzalez and Richard E. Woods, *Digital Image Processing*, 3rd ed., London: Prentice Hall, 2010.

Reference Books:

[1] Anil K. Jain, *Fundamentals of Image Processing*, New Delhi: Prentice-Hall, 2008.

[2] B. Chanda, D. Dutta Majunder, *Digital Image Processing & Analysis*, New Delhi: Prentice Hall, 2002.

Course Research Papers: Research papers (Journal/Conference papers) relevant to the course content will be posted by the course faculty in CourseWeb page.

Course Patents: Patents relevant to the course content will be posted by the course faculty in CourseWeb page

Course Projects: Course project is an independent project carried out by the student during the course period, under the supervision of course faculty. Course faculty will post few course projects titles in CourseWeb page. Students are encouraged to come up and experiment with the ideas that interest them.

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: describe the fundamental concepts of digital image processing

CO2: outline frequency domain and spatial domains filters for image smoothing and sharpening

CO3: identify the image restoration and color image processing techniques

CO4: apply image compression techniques, image morphing methods on digital image and the techniques used for image segmentation

Course Articulation Matrix: U18IT703C DIGITAL IMAGE PROCESSING																
CO		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	U18IT703C.1	1	1	1	1	1	-	-	-	1	1	-	1	2	1	-
CO2	U18IT703C.2	2	1	1	1	1	1	-	-	1	1	-	1	2	1	-
CO3	U18IT703C.3	2	2	1	1	1	1	-	-	1	1	-	1	2	1	1
CO4	U18IT703C.4	2	2	2	1	1	1	-	-	1	1	-	1	2	1	2
U18IT703C		**1.75**	**1.5**	**1.25**	**1**	**1**	**1**	**-**	**-**	**1**	**1**	**-**	**1**	**2**	**1**	**1.5**

U18IT704 INTERNET OF THINGS

Class: B.Tech. VII–Semester

Branch: Information Technology

Teaching Scheme:

L	T	P	C
3	-	-	3

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):

This course will develop students' knowledge in/on

LO1: designs, levels and domains of IoT

LO2: machine to machine interface and system management with NETCOZF-YANG

LO3: design methodology and physical devices of IoT

LO4: physical servers and cloud offerings

UNIT - I (9)

Introduction to Internet of Things: Introduction, Physical design of IoT – Logical design of IoT, IoT enabling technologies, IoT levels and deployment templates

Domain Specific IoTs: Home automations, Cities, Environment, Energy, Agriculture and industry, Health & life style

UNIT - II (9)

IoT and M2M: Introduction, M2M, Difference between IoT and M2M, SDN and NFV

IoT System Management with NETCOZF- YANG: Need for IoT systems management, Simple network management protocol, Network operator requirements, NETCONF, YANG, IoT system management with NETCONF – YANG

UNIT - III (9)

IoT Platform Design Methodology: Introduction, IoT design methodology.

IoT Physical Devices & Endpoints: IoT device, Exemplary device: Raspberry Pi, About the board, Raspberry PI interfaces, Programming Raspberry PI with python

Motors: Controlling servo motors, Controlling the speed of a DC motor, Controlling the direction of a DC motor, Using a unipolar & bipolar stepper motor

UNIT - IV (9)

Sensors: Using resistive sensors, Measuring light, Measuring temperature with a thermistor, Detecting methane, Measuring a voltage, Reducing voltages for measurement, Using resistive sensors with an ADC, Measuring temperature with an ADC, Measuring temperature, humidity, and pressure with a sense HAT, Measuring temperature using a digital sensor, Measuring distance, Displaying sensor values

IoT Physical Servers and Cloud Offerings: Introduction to cloud storage models and communication APIs, Python web applications framework – Django, Designing a RESTful web API, Amazon web services for IoT

Case Study: Forest fire detection, Smart irrigation

Text Book:

[1] Arshdeep Bahga and Vijay Madisetti, *Internet of Things - A Hands-on Approach*, Kolkata: Universities Press, 2016.

[2] Simon Monk, *Raspberry Pi Cookbook*, 2nd ed., USA: O'Reilly Media,2016.

Reference Books:

[1] Jeeva Jose, *Internet of Things*, New Delhi: Khanna Publishing Co. Ltd., 2018.

[2] N. Ida, *Sensors, Actuators and Their Interfaces- A Multidisciplinary Introduction*, 2nd ed., London: CPI Group (UK) Ltd., 2020.

Course Research Papers: Research papers (Journal/Conference papers) relevant to the course content will be posted by the course faculty in CourseWeb page.

Course Patents: Patents relevant to the course content will be posted by the course faculty in CourseWeb page

Course Projects: Course project is an independent project carried out by the student during the course period, under the supervision of course faculty. Course faculty will post few course projects titles in CourseWeb page. Students are encouraged to come up and experiment with the ideas that interest them.

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: summarize the designs of IoT and classify the domains in IoT

CO2: compare IoT with M2M and illustrate the system management with NETCOZF-YANG

CO3: apply the design methodologies for IoT applications and deploy applications on Raspberry Pi

CO4: categorize the physical servers and cloud offerings and classify the sensors for IoT applications

Course Articulation Matrix: U18IT704 INTERNET OF THINGS

CO		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	PSO 3
CO1	U18IT704.1	2	-	-	-	-	-	-	-	1	1	-	1	-	1	-
CO2	U18IT704.2	2	1	-	-	-	-	-	-	1	1	-	1	-	1	-
CO3	U18IT704.3	2	2	-	-	2	-	-	-	1	1	-	1	2	2	-
CO4	U18IT704.4	2	2	2	2	2	1	2	-	1	1	-	1	2	2	1
U18IT704		**2**	**1.66**	**2**	**2**	**2**	**1**	**2**	**-**	**1**	**1**	**-**	**1**	**2**	**1.5**	**1**

U18IT705 SCRIPTING LANGUAGES LABORATORY

Class: B.Tech. VII - Semester

Branch: Information Technology

Teaching Scheme:

L	T	P	C
-	-	2	1

Examination Scheme:

Continuous Internal Evaluation	40 Marks
End Semester Examination	60 Marks

Course Learning Objectives (LOs):

This course will develop students' knowledge in/on

LO1: validation using JavaScript

LO2: AngularJS built in directives and filters

LO3: attributes, expressions and components in ReactJS

LO4: PowerShell variables, datatypes ,operators and loops

List of Experiments

Experiment-I

1. Write a JavaScript to design a simple calculator to perform basic arithmetic operations.
2. Write a JavaScript that calculates the squares and cubes of the numbers from 1 to 10 and display the resulting values in an HTML table format.
3. Write a JavaScript code that displays text "TEXT-GROWING" with increasing font size in the interval of 100ms in RED COLOR, when the font size reaches 50pt it displays "TEXT-SHRINKING" in BLUE color. Then the font size decreases to 5pt.

Experiment-II

4. Develop an application using JavaScript and XHTML document which takes the Roll Number (the valid format is: One uppercase character followed by two digits followed by two uppercase characters followed by three digits; no embedded spaces allowed)[Ex:B20IT001] of the student. Event handler must be included for the form element that collects this information to validate the input. Appropriate error message to be displayed.
5. Develop an application using HTML5 and JavaScript (Use functions) for the following problems:
   a. Parameter: Any string
   Output: The position of the left-most vowel in the string
   b. Parameter: Any number
   Output: Display the number in reverse order

Experiment-III

6. Develop an application using JavaScript and XHTML document that contains three short paragraphs of text, stacked on top of each other and only partial text of each paragraph is visible. When mouse pointer is placed on any of the paragraphs, it should move to the top and full text become visible.
7. Develop and validate the registration form, user login, user profile and payment by credit card pages using JavaScript.

Experiment-IV

8. Introduction to client side scripting languages
9. Introduction to AngularJS and its history

Experiment-V

10. Create an application with reusable components using the following AngularJS built-in directives
    i.The ngApp directive
    ii.The ngController directive
    iii.The ngBind directive
    iv.The ngBindHtml directive
    v.The ngRepeat directive

Experiment-VI

11. Create an application to implement following filters using AngularJS
    i. currency
    ii. date
    iii. filter
    iv. json
    v. limitTo
    vi. lowercase
    vii. number
    viii. orderBy
    ix. uppercase

Experiment-VII

12. Introduction to ReactJS
13. Using JSX in ReactJS
14. Nested Elements, Attributes and Expressions in ReactJS.

Experiment-VIII

15. Create an application to implement components interacting in ReactJS.
16. Create an application to implement nested components in ReactJS.

Experiment-IX

17. Create an application to manage component data with React state, and manage multi-component apps using stateless and stateful components

Experiment-X

18. Introduction of PowerShell and its types.
19. PowerShell history and features.
20. PowerShell Cmdlet.

Experiment-XI

21. Develop a PowerShell script to implement variables, datatypes and operators.

Experiment-XII

22. Develop a script to implement loops in PowerShell
23. Applications of PowerShell.

Laboratory Manual:

[1] Scripting Languages Laboratory Manual, *prepared by the faculty of Dept. of IT.*

Reference Books:

[1] David Barron, "*The World of Scripting Languages",* 2nd ed., Wiley Publications, 2009.

[2] Valeri Karpov, Diego Netto, "*Professional AngularJS*", John Wiley Publications, 2015.

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: design webpages with validations using JavaScript

CO2: build user interface applications using AngularJS built in directives and filters

CO3: develop web applications using ReactJS attributes, expressions and components

CO4: develop scripts in PowerShell using variables, datatypes, operators and loops.

Course Articulation Matrix: U18IT705 SCRIPTING LANGUAGES LABORATORY

CO		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	PSO 3
CO1	U18IT705	2	2	2	1	2	-	-	-	2	1	-	1	2	2	2
CO2	U18IT705	2	2	2	1	2	-	-	-	2	1	-	1	2	2	2
CO3	U18IT705	2	2	2	1	2	-	-	-	2	1	-	1	2	2	2
CO4	U18IT705	2	2	2	1	2	-	-	-	2	1	-	1	2	2	2
U18IT705		**2**	**2**	**2**	**1**	**2**	**-**	**-**	**-**	**2**	**1**		**1**	**1**	**2**	**2**

U18IT706 MODELING AND PROJECT MANAGEMENT LABORATORY

Class: B.Tech. VII-Semester **Branch:** Information Technology

Teaching Scheme :

L	T	P	C
-	-	2	1

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):

This course will develop students' knowledge in /on

LO1: creating use case, interaction and activity diagrams for a software system
LO2: creating state chart and class diagrams for a software system
LO3: JIRA tool for project management
LO4: TFS tool for project management

List of Experiments

Experiment-I

1. Construct Use case diagrams for the following
    a. Library information system
    b. Banking system

Experiment-II

2. Construct Sequence and collaboration diagrams for the following
    a. Library information system
    b. Use case student register for a course

Experiment-III

3. Construct Activity diagrams for the following
    a. Library information system
    b. ATM system

Experiment-IV

4. Construct State Chart diagrams for the following
    a. Library information system
    b. ATM system

Experiment-V

5. Design class diagrams for the following
    a. Library information system
    b. ATM system

Experiment-VI

6. Introduction to JIRA and its uses
7. JIRA Scheme

Experiment-VII

8. JIRA Issues
9. JIRA Issue Types

Experiment-VIII

10. JIRA Components
11. JIRA Screen
12. JIRA Issue Attributes

Experiment-IX

13. Create an issue in JIRA with following tasks
    i. Sub-Task
    ii. Workflows
    iii. Plug-ins in JIRA
    iv. JIRA Agile
    v. Creating issue in Agile
    vi. How to create an Epic in Agile
    vii. Use of Clone and Link in JIRA

Experiment-X

14. Introduction to TFS

Experiment-XI

15. Version control using TFS

Experiment-XII

16. Application life cycle management using TFS

Laboratory Manual:

1. Modeling and Project Management Laboratory Manual, *prepared by the faculty of Dept. of IT.*

Reference Books:

1. G. Booch, J. Rumbaugh, and I. Jacobson, *The Unified Modeling Language User Guide*, Addison-Wesley, 1998.
2. Ravi Sagar, *Mastering JIRA,* Packt Publishing Limited, 2015.
3. Tarun Arora, *Microsoft Team Foundation Server 2015 Cookbook,* Packt Publishing, 2016.

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: construct use case, interaction and activity diagrams for a software system
CO2: develop state chart and class diagrams for a software system
CO3: analyze the real world problems using JIRA
CO4: analyze the real world problems using TFS

Course Articulation Matrix: U18IT706 MODELING AND PROJECT MANAGEMENT LABORATORY																
CO		**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**	**PSO 3**
CO1	U18IT706.1	1	1	1	1	1	-	-	-	2	1	-	1	1	1	2
CO2	U18IT706.2	1	1	2	1	1	-	-	-	2	1	-	1	1	1	2
CO3	U18IT706.3	1	2	1	1	2	-	-	-	1	1	2	1	2	2	1
CO4	U18IT706.4	1	2	2	1	2	-	-	-	2	2	1	1	2	2	2
U18IT706		**1**	**1.5**	**1.5**	**1**	**1.5**	**-**	**-**	**-**	**1.75**	**1.25**	**1.5**	**1**	**1.5**	**1.5**	**1.5**

U18IT707: MAJOR PROJECT WORK PHASE-I

Class: B.Tech. VII - Semester

Branch: Information Technology

Teaching Scheme:

L	T	P	C
-	-	6	3

Examination Scheme:

Continuous Internal Evaluation	100 marks
End Semester Examination	--

Course Learning Objectives (LOs):

The major project work will develop students' knowledge on /in…

LO1: *real-world complex engineering problems, literature review, problem formulation; and experimental and data analysis techniques*

LO2: *design/development of solutions to real-world engineering problems; conduct of investigations of complex problems; modern tool usage to design, build and test a prototype; impact of solution in society, environment and sustainability contexts*

LO3: *ethics, team work and project management skills such as budgeting, scheduling*

LO4: *oral, written and multimedia communication skills; self-directed independent learning and life-long learning*

1. Final Year Major Project work represents the culmination of study towards the B. Tech degree. ***Major project offers an opportunity to integrate the knowledge acquired from various courses and apply it to solve real-world complex engineering problems***. The **student learning assessment process** (SLAP) shall include good number of presentations, demonstration of work undertaken, submission of a project report, writing project paper in scientific journal style & format, preparing project poster and creating video pitch on the complete project work.
2. Activities of major project SLAP shall be planned in such a way to ensure that the students acquire the essential knowledge, skills and qualities (KSQ) of a professional engineer.
3. **Team work:** Major project work is a team work.
   (i) The students of a project team shall work together to achieve a common objective.
   (ii) Every student of a project team is expected to function effectively as an individual, and also with others as a team member in an ecosystem of team having knowledge diversity, gender diversity, social and cultural diversity among its members.
4. **Two phases:** Major project work shall be carried out in two phases. Nearly 50 - 75% of the proposed work to be completed in 7th semester as *Phase-I* and the remaining work to be continued and completed in 8th semester as *Phase-II.*
5. Every student is expected to put approximately **72 hours of work** into the major project *phase-I* course over the 12 weeks of 7th semester.
6. **Major project work *Phase-I*: 7th semester**
   (i) The HoD shall constitute the ***department project evaluation committee (DPEC)*** with following composition

Department project evaluation committee (DPEC)	
HoD	Chairman
Senior Faculty	Convener
Coordinator(s)	Section - wise coordinator(s) *One coordinator for each section*
Three Faculty members	Section-wise faculty members *Three faculty members for each section representing various socializations.* *(Five specializations will be covered including the coordinator's and Convener's)*

(ii) **Major project allotment to students during last working week of 6th semester**:

(a) **First / Second week of 6th Semester**: The process shall be initiated during the first / second week of 6th semester by collecting project titles from the department faculty research groups, on offering innovative ideas/solutions for engineering problems.

(b) **MSE-I period of 6th Semester – Notifying project titles**: The finalized project titles shall be notified to students during the MSE-I period of 6th semester and student teams shall be allowed to exercise their options on titles that interest them.

(c) **Last working week of 6th Semester – Allotment of titles and supervisors to project teams**: The project title allotment to major project teams shall be completed before the last day of instruction of 6th semester

(d) **6th semester summer break - Literature review**: This 6th semester schedule enables students to complete literature review, preliminary simulations / investigations / experimentation during 6th semester summer break and *start the work from day-one in 7th semester*

(e) **Registration Presentation - Notifying the tentative dates:** The major project teams are expected to give registration presentation during second / third week from the commencement of 7th semester. The tentative dates for conducting the registration presentation shall be notified at the time of releasing the circular on allotted project title and project supervisors, as indicated in (c) above. This enables student teams to plan the work accordingly during summer break, to complete the literature review, preliminary simulations / investigations and get ready for informative, confident and comfortable presentations on their project work.

(iii) The convener DPEC shall notify, during MSE-I period of 6th semester, the list of implementable project titles offered by the faculty of different research groups of the department

(a) Project titles shall come with the following details to be made available to students on dept webpage and notice boards, facilitating students to select problems that interest them.

i. abstract
ii. deliverables / outcomes
iii. knowledge and skills required to complete the project
iv. resources required
v. one of the deliverables shall be writing a technical paper out of the major project work done for submission to a reputed non-predatory conference/non-paid peer reviewed journal

(iv) The major project teams, finalized by the convener DPEC, shall be allowed to exercise their options on the titles that interest them from the notified list

(v) **Project supervisor allotment**: The convener DPEC shall allot, during the last week of 6th semester, the faculty supervisors to all project teams

(a) **The project supervisors shall**

i. define project objectives and expected deliverables
ii. **help the students plan their project work and timeline**
iii. **provide enough resources for successful project completion**

(vi) **The faculty supervisors are expected to provide guidance to project teams on**

(a) *Knowledge, skills and qualities (KSQ) to be acquired* to propose solutions to the identified real-world problems

(b) *Problem analysis* - to identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences

(c) *Applying engineering knowledge* - to apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems

(d) *Design/development of solutions* - to design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental Considerations

(e) *Conduct investigations of complex problems* - to use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions

(f) *Modern tool usage* – to create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations

(g) *Engineering and society* – to apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice

(h) *Environment and sustainability* – to understand the impact of the professional engineering solutions in societal and environmental contexts, demonstrate the knowledge of, and need for sustainable development

(i) *Ethics* – to apply ethical principles and commit to professional ethics, responsibilities, and norms of the engineering practice

(j) *Individual and team work* – to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings

(k) *Communication* – to communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions

(l) *Project management and finance* – to demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments

(m) *Life-long learning* – to recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change

(vii) The project supervisors are also expected to continuously emphasize and guide students on

(a) **Meeting Cadence:**

i. **Regular meetings with supervisor:** Short and frequent meetings increase a team's work momentum. Regular meetings with supervisor to review the status of project are very essential. All students of the team shall participate in discussions and take notes.

ii. **Meeting Frequency: Semi-weekly cadence,** i.e., the meeting frequency shall be **twice a week.** Due weightage will be given to meeting cadence and considered for evaluation during presentations, i.e., number of planned meetings and number attended by students

(b) **Project Log Book:** The activity journaling in project log book is very important for a successful project.

i. Project log book is a written record showing the daily project activity on project goals from the very first thing like starting the project (an introduction statement what the project is all about), to the completion of the work (including the final results, and whether project met the core objectives / outcomes, etc.).

ii. In project log book, the activities like regular meetings with project supervisor, and work carried out on daily/weekly basis are to be recorded. This ensures that the student progress is being monitored well.

iii. The project supervisor shall regularly check the log book of every student of project team and endorse each and every activity by affixing his signature with date. With this, the number of planned meetings and number attended by the students will be also monitored.

iv. Log books are to be shown during all presentations and will be graded along with the project.

v. At the conclusion of the project work *phase-I*, the supervisor shall specifically comment, in the project log book, on whether the project team met each of the project work *phase-I* goals and to give evidence which describes the quality of work. For project teams, this also serves as self-assessment.

(c) **Following project timeline**: completing the tasks as planned in project timeline

(d) The relevant knowledge, skills and qualities (**KSQ**) an engineering graduate should possess, which can be specially acquired by participating in major project work

(e) **Writing down whatever is done and making notes of whatever is read**. Writing down the procedures/models followed, designs made, experiments conducted, simulations carried out, intermediate results obtained, ***difficulties faced and how they were fixed*** are very important. This kind of documenting the whole process as we go with project implementation is a very effective way and will help preparing a well- documented report having original content. Note down and include information about all the resources that you used, magazines, Journals, patents, books, and so on.

This information will be needed for the bibliography in your project report. On the other hand, documenting a report ***on the spur of the moment*** would end up copying things from other sources resulting in a plagiarized document.

(f) **Good and sufficient literature review**: Literature review is a description and analysis of information related to the topic of project work. Reading good number of review articles, research articles published in recent issues of peer reviewed journals, technical magazines, patents, reference books on the topics of potential interest, will help one understand what has already been discovered and what questions remain to identify gaps in the literature.

(g) Completing nearly 50 - 75% of the proposed work during phase-I

(h) Right conduct of research to promote academic integrity, honesty and time management

(i) Preparing a well-documented report in proper format, covering the progress made during Phase-I

(j) Consequences of plagiarism and use of anti-plagiarism software to detect plagiarism in documents

(k) Submission of major project phase-I report within acceptable plagiarism levels, as per the ***Anti-plagiarism policy-2020 of our institute***.

(l) **Video pitch:** Capturing short videos, photos, screenshots on experiments conducted, simulations carried out, prototype / working model / process / software package / system developed during course of project execution, photos showing interaction with supervisor for creating a short video pitch on the work done during *phase-I.*

(m) **Project Paper**: Writing a technical paper at the end of *phase-II* based on the solution(s) proposed, results obtained and prototype / working model / process/ software package / system developed, for submission to a reputed non-predatory conference/non-paid peer reviewed journal.

(n) **Project poster**: At the end of phase-II, the project teams shall have to present their project in the form of posters, at the time of demonstration of complete prototype/ working model / software package / system developed.

(viii) Phase – I evaluation: There shall be only Continuous Internal Evaluation (CIE) for major project work *phase-I* with following components

(a) **Registration Presentation** *(during second / third week of 7th semester):* The Registration Presentation shall include a brief report and presentation focusing the identified problem, objective(s), literature review, identifying research gap in the literature, implementation of existing methods, proposed solution, and expected outcome(s).

i. The registration presentation shall invariably include the **project plan timeline** with actual start and finish dates– monthly/weekly project milestones/ timeline prepared in MS Excel or any other project management tool.

ii. **Project timeline** – *Weekly project milestones*: It's a compact and creative way to present a project plan. Identify the project intermediate goals and related tasks for completing each of those goals. Categorize tasks for each week. In the project timeline use different colors to the tasks for each week. Horizontal timeline layouts shall be preferred or any other layout of team's choice.

iii. Project teams shall create and present the following during registration presentation
   1. *Complete project timeline*
   2. *Phase-I project timeline*
   3. *Phase-II project timeline*

iv. During every presentation, project teams shall compulsorily show the following as part of their presentation
   1. *The slides on project timeline and*
   2. *A table showing targeted tasks as per timeline and status – whether tasks accomplished?*

v. **Project log book**: Every student of the Project team shall compulsorily show the activity journaling in the log book (*with due signatures of project supervisor*) during presentations

(b) **Progress Presentation-I** *(during penultimate week of 7th semester):* At the end of first stage (7th semester), student teams shall be required present, before the DPEC, the progress made during phase-I and submit a well-documented report of work done for evaluation to the project coordinator

i. **Following project timeline**: The project timeline shall be meticulously followed and the tasks shall be completed as planned in project timeline.

ii. Project teams shall compulsorily show the following as part of their progress presentation-I
   1. *The slides on project timeline and*
   2. *A table showing targeted tasks as per timeline and whether tasks accomplished?*

iii. **Project log book**: Every student of the Project team shall compulsorily show the activity journaling in the log book (*with due signatures of project supervisor*)

(c) **CIE schedule**: The convener DPEC shall release complete schedule of CIE before start of 7th semester well in advance, so that student teams will complete the scheduled works and get ready with informative, confident and comfortable presentation for registration and progress presentations.

(ix) CIE for the Major project work phase-I shall be as given below:

Major project work Phase-I Assessment *(7th semester)*	**Weightage**
A. Supervisor Assessment	**20%**
B. DPEC Assessment *(i) Registration Presentation (10%)* *(ii) Progress Presentation-I (20%)* *(iii) Project progress*: Part of working model/ process/software package/system developed (30%)* *(iii) Well-documented Progress Report on Phase-I work (10%)* *(iv) Video pitch on Phase-I (10%)*	**80%**
Total Weightage	**100 %**

* *Students are advised to complete major part of the project in phase-I only*

(a) **Working Model:** Every project team shall be required to develop a working model/ process/software package/system, on the chosen work. The progress made in this shall be demonstrated during progress presentation-I at the end of *phase-I* and the completed working model/ process/software package/system before the DPEC as per the dates specified by DPEC at the end of *phase-II*.

(b) **Progress Report on *phase-I*:** Every project team shall be required to submit a well-documented progress report on dissertation phase-I as per format specified by DPEC.

a. **Tangible outcomes of *phase-I* in Conclusions - Chapter:** These are the lessons learnt from doing a project work. The students have to describe in their own words what they learnt from the *phase-I* project work experience. They have to describe what specific KSQs are acquired by them, with reference to the expected COs, after successful completion of *phase-I* work. Finally, a table depicting systematic mapping of what they have learnt and the expected major project work COs, is to be presented in the conclusions chapter of *phase-I* report

(c) **Video pitch on *phase-I*:** Every project team shall be required to create a pitch video, which is a video presentation on their major project work *phase-I*. The project team shall present the produced video pitch during progress presentation-I. The produced video pitch should

a. be 3 to 5-minute-long video (no longer than 5 minutes)
b. be concise and to the point, on the problem and proposed solution
c. show project timeline and sample page of log book
d. highlight the progress made at various stages during *phase-I* project implementation with the help of short videos / photos / screenshots on experiments conducted, simulations carried out, part of prototype / working model / process / software package / system being under development as part of proposed solution and also photos showing team interactions with supervisor and the team working in the lab on project
e. discuss the impact of proposed solution in *ethical, environmental, societal and sustainable development contexts.*
f. emphasize key points about *business idea, potential market for the proposed solution*

(x) It is mandatory for

(a) every student of the team to *appear for oral presentation and viva-voce*, as part of progress presentation -I to qualify for course evaluation
(b) every project team *to submit a well-documented progress report on major project work phase-I*, as part of progress presentation -I to qualify for course evaluation
(c) every project team to create and present a good video pitch on major project work *phase-I*, as part of progress presentation -I to qualify for course evaluation

(xi) A student shall register for supplementary examination for the Major project work *phase-I* in the following cases:

(a) He/she is absent for oral presentation and viva-voce as part of progress presentation-I

(b) The project team fails to submit the progress report on *phase-I* in prescribed format

(c) The project team fails to submit the video pitch on the progress made during the *phase-I* period.

(e) he/she fails to fulfill the requirements of Major project work *phase-I* evaluation as per specified guidelines

(xi) Supplementary examination for Major project work *phase-I*

(a) The CoE shall send the list of students, registered for supplementary examination, to the HoDs concerned

(b) The DPEC, duly constituted by the HoD, shall conduct Major project phase-I supplementary exam and send the award list to the CoE within the stipulated time

****

Course Learning Outcomes (COs):

Upon completion of major project work, students will be able to…

CO1: *review research literature, identify gaps in the literature, formulate problem, apply knowledge of mathematics, sciences, engineering fundamentals, experimental and data analysis techniques; synthesize technical knowledge and innovative approaches to generate suitable solutions for real-world complex engineering problems* (**Technical skills**)

CO2: *design a system or product based on product/customer specifications; develop, analyze, and critically evaluate the design alternatives in order to justify the solutions to a real-world problem guided by ethical, environmental, societal and sustainable development considerations; use modern engineering and IT tools to design, build and test a prototype within specified project timeline and budget* (**Problem solving and critical thinking skills**)

CO3: *apply project management and organizational skills; demonstrate integrity, leadership, creativity, professional and ethical responsibilities as an individual and as a member or leader to produce time-sensitive deliverables in a multi-disciplinary team* (**Ethics and teamwork**)

CO4: *collate the results, compare performance of prototype to design specifications and present clearly and effectively the proposed solution, conclusions and/or recommendations in written (report, poster, technical paper), oral (presentations) and multimedia formats (video pitch) and engage in self-directed independent learning and life-long learning demonstrating the KSQ of a professional engineer* (**Communication skills and life-long learning**)

	Course Articulation Matrix (CAM) : U18IT707 MAJOR PROJECT WORK PHASE-I															
CO	**CO Code**	**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**	**PSO 3**
CO1	**U18IT707.1**	2	2	2	2	-	-	-	3	-	2	-	3	2	2	1
CO2	**U18IT707.2**	2	2	2	-	2	2	2	3	-	-	-	3	2	2	2
CO3	**U18IT707.3**	-	-	-	-	-	-	-	3	2	-	2	3	-	1	1
CO4	**U18IT707.4**	-	-	2	2	-	-	-	3	-	2	-	3	2	2	2
	U18IT707	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**3**	**2**	**2**	**2**	**3**	**2**	**1.75**	**1.5**

U18IT708 INTERNSHIP EVALUATION

Class: B.Tech. VII–Semester **Branch:** Information Technology

Teaching Scheme:

L	T	P	C
6 - 8 weeks internship			

Examination Scheme:

Continuous Internal Evaluation	100 marks
End Semester Examination	--

Course Learning Objectives (LOs):

The internships will develop student interns' knowledge in real-world or industry environment in/on

LO1: pre-employment training opportunities, career information and employability-enhancement skills

LO2: communication and personal development skills

LO3: critical thinking and problem-solving skills

LO4: professionalism / work ethics and teamwork / collaboration in real organizational setting

Mandatory Internships:

1. The internships provide exposure to the real-world, get a feel for the work environment and how a professional workplace operates.
2. During the internship, students will experience a real-life engineering workplace and understand how their engineering and professional knowledge, skills and qualities (KSQs) can be utilized in industry.
3. Students can learn, more importantly, how to apply the KSQs they have acquired during an internship to their future workplaces.
4. Students will also be able to demonstrate functioning engineering knowledge, both new & existing, and identify areas of further development for their future careers.
5. Internships give the student an opportunity to bridge theory and practice
6. Internships also provide students with the soft skills needed at workplace and leadership positions.
7. The internship guidelines are governed by the rules stipulated in the Institute's Internship policy-2020 document.
8. The students shall have to undergo 6-8 weeks of mandatory internship during summer/winter vacation at industry/R&D organization / Academic Institutes like IITs, IIITs& NITs.
9. HoD, along with Prof i/c internships, shall address students (*of 2nd, 4th and 6th semesters*) during last week of even semester of every academic year on the following
   a. creating awareness on mandatory 6-8 weeks internship by every student
   b. creating awareness on COs of internships
   c. KSQs the students would acquire doing internships
   d. expected internship outcomes
   e. available internship options, and organizations offering internships
   f. progressively completing 6-8 weeks internship by the end of 6th semester summer, starting from 2nd semester summer break.
   g. internship evaluation in 7th semester
   h. internship report submission and oral presentation (through PPT) by student
10. Students undergoing the internship shall be required to submit their details to the department internship coordinators of the respective branches. He will coordinate all the internship activities of the students of that department.
11. Students have to submit a signed undertaking to the department internship coordinator for demonstrating honesty, integrity, professionalism and regular attendance at work place to add value to the organization where the internship is allotted. Students also have to uphold the professional image of our institute.

12. In case, a student is found to violate the internship rules and regulations, the student will have to produce a valid reason for the violation of internship rules. Without a valid reason, the student will be debarred from taking part in subsequent placement activities of the institute.
13. The students preferably shall undergo internship at one organization only. In case of any difficulty, the stipulated period of internship shall be completed at different organizations with minimum of one week internship at every stage.
14. The internship evaluation shall be done in the VII semester of study and hence the students shall complete the prescribed period of internship before start of VII semester (from end of II semester to commencement of VII semester).
15. The student learning assessment process (SLAP): The SLAP in internships shall include feedback from internship supervisor, submission of internship report on the complete internship and PPT presentation.
16. Internship Log Book: The activity journaling in a log book is very important for a successful internship.
    a. The internship supervisor identifies the work goals at the beginning of the internship
    b. Student has to maintain internship log book, where in the activities undertaken during internship and timely submission at periodic intervals are to be documented.
    c. At the conclusion of the internship, the supervisor shall specifically comment, in the internship log book, on whether the student met each of the work goals and to give evidence which describes the quality of work. For student, this also serves as a self-assessment.
    d. Internship log book *(with due signatures of the internship supervisor)* shall be considered for evaluation during presentation, i.e., number of planned meetings with internship supervisor and number attended by student
17. **Meeting Cadence:**
    i. **Regular meetings with internship supervisor:** Regular meetings with the internship supervisor to discuss work goals and review the status of activities undertaken are very essential. Student shall participate in discussions and take notes.
    ii. **Meeting Frequency:** The meeting cadence, *i.e., meeting frequency* shall be fixed in consultation with the internship supervisor and accordingly student has to participate in discussions and take notes. Take signatures of internship supervisor as per the planned cadence in the internship log book.
18. The internship evaluation shall be done by ***department internship evaluation committee*** **(DIEC)** based on the submitted report by student and oral presentation.
19. There shall be only Continuous Internal Evaluation (CIE) for internship evaluation.
20. CIE for the Internship evaluation in VII semester shall be as below:

Internship evaluation	**Weightage**
A. **Internship Supervisor's Assessment** *(i) Feedback from the internship supervisor* *- on completion of internship assignment / work (20%)* *(ii) Feedback from the internship supervisor* *- on quality of work in internship assignment / work (10%)* *(iii) Feedback from the internship supervisor* *- internship log book (10%)* *(iv) Feedback from the internship supervisor* *- on attendance, punctuality and work hours (10%)* (For the case of 6-8 weeks internship done in more than one spell, it will be average of all the internship supervisors' assessment)	**50%**
B. DIEC Assessment *(i) Internship duration (8 /6 weeks) (15% / 10%)* *(ii) Internship Report (20%)* *(iii) Oral Presentation (with PPT) and viva voce (15%)*	**50%**
Total Weightage:	**100%**

Note: *It is mandatory for the student to appear for oral presentation (with PPT) and viva voce to qualify for course evaluation*

(a) Internship Report: Each student is required to submit a well-documented internship report (both *soft copy and softbound hard copy*) as per format specified by DIEC. In case of completing the 6-8 weeks internship in more than one organization, the student shall be required to prepare separate softbound internship reports signed by the internship supervisor(s)along with the seal(s) of the organization(s). The student shall submit two final softbound internship reports along with a soft copy, keeping all the certificate(s) issued by the internship supervisor(s) and all the individual internship reports cleared by respective internship supervisor. The Chapter-1 of the final internship report shall clearly describe the following indicating overall summary.

(i) **Internship(s) attended**: A table with name & address of organization, organization's vision and mission, internship weeks attended, internship period (exact dates attended), internship supervisor, head of the section and head of the organization

(ii) **Duties/tasks during internship(s)**: Table describing name & address of organization, and the duties / tasks undertaken during internships. This indicates what opportunities and learning experiences the interns got to get hands-on experience on a wide range of KSQs of a professional engineer.

(iii) **Tangible outcomes of internship:** These are the lessons learnt from internship experience. The students have to describe in their own words what they learnt from the internship experience. The student has to describe what specific KSQs are acquired by him, with reference to the expected internship COs, after successful completion of internship(s). Finally, a table depicting systematic mapping of what they have learnt and the expected internship COs, is to be shown

(iv) **Student feedback on internship:** To gather information on whether internship was useful and gave practical experience on chosen field of interest, and other learning, a well-defined feedback questionnaire (*made available by the dept*)with closed and open questions shall be kept in the report.

(v) **Pictures at the worksite**: Student has to keep, in the report, his working pictures at the worksite, discussing with the internship supervisor, the creative project he is working on, or an event he is attending for work, group photo of the team/section/department he worked with.

(b) Anti-Plagiarism Check: The internship report should clear plagiarism check as per the Anti-Plagiarism policy-2020 of the institute.

(c) Presentation: Each student should prepare PPT with informative slides and make an effective oral presentation before the DIEC as per the schedule notified by the department. The presentation shall compulsorily have slides on the points mentioned in (a)(i)-(v)

(d) It is mandatory for every student to *appear for oral presentation(with PPT) and viva-voce*, to qualify for internship evaluation

(e) A student shall register for supplementary examination for the internship evaluation in the following cases:

(i) absent for oral presentation and viva-voce

(ii) fails to submit the internship report in prescribed format

(iii) fails to fulfill the requirements of internship evaluation as per specified guidelines

(f) Supplementary examination for internship evaluation

(i) The CoE shall send the list of students, registered for supplementary examination, to the HoD concerned

(ii) The DIEC, duly constituted by the HoD, shall conduct internship evaluation supplementary exam and send the award list to the CoE within the stipulated time

Course Learning Outcomes (COs):

Upon completion of the internship, student interns will be able to…

CO1: *gain career awareness, company/industry/workspace related knowledge, skills and work experience to add to resume, employer expectations for workplace behaviours; explore career alternatives prior to graduation; initiate and build a professional network and acquire employment contacts leading directly to a full-time job following graduation from institute; apply practice-oriented 'hands-on' interdisciplinary working experience in the real world or industry to solve real life challenges in the workplace by integrating academic theory and practice and analysing work environment and conditions; commitment to quality and continuous improvement; integrate internship experience with academic plan and articulate career options* **(Career information and employability-enhancement skills)**

CO2: *receive and interpret messages in the communication; present thoughts and ideas clearly and effectively in oral, written, computer-based, graphical forms as required for particular workplace settings; collaborate effectively and appropriately with different professionals in the work environment; demonstrate time management, planning, independence, professional judgement and positive attitudes (self-reliance & self-confidence, openness, respect, proactive attitude, conscientiousness)***(Communication and personal development skills)**

CO3: *review research literature, apply the knowledge of science, mathematics, and engineering with higher order cognitive skills to solve real-world problems and impact of solutions in society, environment and sustainability contexts; integrate existing and new technologies for industrial application; conduct investigations of problems; demonstrate analytical skills, including the ability to understand information and interpret data; exhibit foresight, independent thinking, resourcefulness, and the ability to make decisions; design systems, devices and components as needed and use the right tool (e.g., strategy, system, technology, etc.) for the right task* **(Critical thinking and problem solving skills)**

CO4: *demonstrate effective leadership with work ethics including time management, punctuality, honesty, integrity, personal accountability, adaptability; work effectively in teams and real multidisciplinary organizational settings; interact respectfully with all people and understand individuals' differences; build professional relationships with interpersonal skills; maintain a sense of commitment to professional, ethical and social responsibilities; engage on life-long learning of technologies through critical reflection of internship experiences and the KSQ of a professional engineer* **(Professionalism / Work ethic and Teamwork / Collaboration)**

	Course Articulation Matrix (CAM) :U18IT708 INTERNSHIP															
CO	**CO code**	**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**	**PSO 3**
CO1	U18IT708.1	3	-	-	-	-	3	-	3	-	-	3	3	2	2	2
CO2	U18IT708.2	-	-	-	-	-	-	-	3	-	3	3	3	2	2	3
CO3	U18IT708.3	3	3	3	3	3	3	3	3	-	-	3	3	2	3	3
CO4	U18IT708.4	-	-	-	-	-	-	-	3	3	-	3	3	2	2	3
U18IT708		**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**2.25**	**2.75**

DEPARTMENT OF INFORMATION TECHNOLOGY
KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE, WARANGAL – 15
(An Autonomous Institute under Kakatiya University, Warangal)

SCHEME OF INSTRUCTION AND EVALUATION
VIII-SEMESTER OF 4-YEAR B.TECH DEGREE PROGRAMME

[3Th+1 Major Project]

Sl. No.	Course Category	Course Code	Course Title	Hours per Week			Credits	Evaluation Scheme				
				L	T	P		CIE			ESE	Total Marks
								TA	MSE	Total		
1	PE	U18IT801	Professional Elective–V/MOOCs-V	3	-	-	3	10	30	40	60	100
2	PE	U18IT802	Professional Elective–VI/MOOCs-VI	3	-	-	3	10	30	40	60	100
3	OE	U18OE803	Open Elective – IV/MOOCs-VII	3	-	-	3	10	30	40	60	100
4	PROJ	U18IT804	Major Project Work *Phase–II*	-	-	14	7	40	-	40	60	100
Total:				**9**	**-**	**14**	**16**	**70**	**90**	**160**	**240**	**400**
Additional Learning*: *Maximum credits allowed for Honours/Minor*				-	-	-	***7***	-	-	-	-	-
Total credits for Honours/Minor students:				**-**	**-**	**-**	***16+7***	**-**	**-**	**-**	**-**	**-**

** List of courses for additional learning through **MOOCs** towards Honours/Minor in Engineering shall be prescribed by the department under Honours/ Minor Curricula*

L= Lecture, T = Tutorials, P = Practicals & C = Credits; Contact hours per week : 23

Open Elective-IV/ MOOCs-VII	**Professional Elective-V/ MOOCs-V**	**Professional Elective-VI / MOOCs-VI**
U18OE803A: Operations Research	U18IT801A: Computer Forensics	U18IT802A: Data Science
U18OE803B: Management Information Systems	U18IT801B: Big Data Analytics	U18IT802B: Predictive Analytics
U18OE803C: Entrepreneurship Development	U18IT801C: Blockchain Technologies	U18IT802C: Cyber Security
U18OE803D: Forex and Foreign Trade	U18IT801M: MOOCs-V Course	U18IT802M: MOOCs-VI Course
U18OE803M: MOOCs-VII Course		

U18IT801A COMPUTER FORENSICS

Class: B.Tech. VIII-Semester **Branch:** Information Technology

Teaching Scheme:

L	T	P	C
3	-	-	3

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):

This course will develop students' knowledge in/on…

LO1: *computer forensics fundamentals and types of computer forensics technology*
LO2: *computer investigations and data acquisition*
LO3: *processing crime incident scenes and current computer forensic tools*
LO4: *working with windows and DOS systems*

UNIT - I (9)

Computer Forensics Fundamentals: Computer forensics, Use of computer forensics in law enforcement, Computer forensics assistance to human resources/employment proceedings, Computer forensics services, Benefits of professional forensics methodology, Steps taken by computer forensics specialists

Types of Computer Forensics Technology: Types of military computer forensic technology, Types of law enforcement, Computer forensic technology, Types of business computer forensic technology

UNIT - II (9)

Understanding Computer Investigations: Preparing a computer investigation, Taking a systematic approach, Procedures for corporate high-tech investigations, Understanding data recovery workstations and software, Conducting an investigation

Data Acquisition: Understanding storage format for digital evidence, Determining the best acquisition method, Contingency planning for image acquisitions, Using acquisition tools, Validating data acquisitions, Performing RAID data acquisitions, Using remote network acquisition tools, Using other forensics acquisition tools

UNIT - III (9)

Processing Crime Incident Scenes: Identifying digital evidence, Collecting evidence in private-sector incident scenes, Processing law enforcement crime scenes, Preparing for search, Securing a computer incident or crime scene, Seizing digital evidence at the scene, Storing digital evidence, Reviewing a case

Current Computer Forensic Tools: Evaluating computer forensic tool needs, Computer forensic software tools, Computer forensic hardware tools, Validating and testing forensic software

UNIT - IV (9)

Working with Windows and DOS Systems: Understanding file systems, Exploring microsoft file structures, Examining NTFS disks, Understanding whole disk encryption, Understanding the windows registry, Understanding microsoft startup tasks, Understanding MS-DOS startup tasks, Understanding virtual machines

Case Study on digital forensics and mobile forensics

Text Books:

[1] John R,Vacca, Computer Forensics, *Computer Crime Scene Investigation,* 2nd ed., New Delhi: Firewall Media, 2012. (*Chapter 1, 2*)

[2] Nelson, Phillips Enfinger and Steuart, *Computer Forensics and Investigations,* 5th ed., New Delhi: Cengage Learning, 2015. (*Chapter 2, 4, 5, 6, 7*)

Reference Books:

[1] Keith J. Jones, Richard Bejtiich, Curtis W. Rose, *Real Digital Forensics*, New Delhi: Addison Wesley Pearson Education, 2005.

[2] Tony Sammes and Brian Jenkinson, *Forensic Compiling*, 2nd ed., London: Springer-Verlag, 2007.

[3] Warren G. Kruse II and Jay G. Heiser, *Computer Forensics: Incident Response Essentials*, USA: Addison Wesley, 2002.

Course Research Papers: Research papers (Journal/Conference papers) relevant to the course content will be posted by the course faculty in CourseWeb page.

Course Patents: Patents relevant to the course content will be posted by the course faculty in CourseWeb page

Course Projects: Course project is an independent project carried out by the student during the course period, under the supervision of course faculty. Course faculty will post few course projects titles in CourseWeb page. Students are encouraged to come up and experiment with the ideas that interest them.

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: *identify the types of computer forensic methodologies and services*

CO2: *analyze the computer investigations and data acquisition methods*

CO3: *apply different computer forensic tools to process crime incident scenes for a wide variety of investigations*

CO4: *develop effective solutions for cyber crime by working with windows and DOS systems*

Course Articulation Matrix : U18IT801A COMPUTER FORENSICS

CO		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	PSO 3
CO1	U18IT801A.1	1	1	1	1	-	-	-	-	1	1	-	1	1	-	-
CO2	U18IT801A.2	1	2	2	1	-	-	-	-	1	1	-	1	1	-	-
CO3	U18IT801A.3	1	2	1	2	1	-	-	-	2	1	-	1	1	1	1
CO4	U18IT801A.4	1	1	2	1	1	-	-	-	2	1	-	1	1	1	1
U18IT801A		**1**	**1.5**	**1.5**	**1.25**	**1**	**-**	**-**	**-**	**1.5**	**1**	**-**	**1**	**1**	**1**	**1**

U18IT801B BIG DATA ANALYTICS

Class: B.Tech. VIII–Semester

Branch: Information Technology

Teaching Scheme:

L	T	P	C
3	-	-	3

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):

This course will develop students' knowledge in/on

LO1: different types of digital data, characteristics of big data, challenges of big data and big data analytics

LO2: Hadoop, an open source software framework and features of MapReduce programming

LO3: NoSQL databases like MongoDB and Cassandra

LO4: Hive and Pig, major components of Hadoop ecosystem

UNIT – I (9)

Types of Digital Data: Classification of digital data

Introduction to Big Data: Characteristics of data, Evolution of big data, Definition of big data, Challenges with big data, Other characteristics of data which are not definitional traits of big data, Traditional business intelligence versus big data, What is changing in the realms of big data

Big Data Analytics: Classification of analytics, Top challenges facing big data, Why is big data analytics important, What kind of technologies are we looking toward to help meet the challenges posed by big data, Data science, Data scientist your new best friend, Terminologies used in big data environments, Few top analytics tools

UNIT – II (9)

Introduction to Hadoop: Introducing hadoop, RDBMS versus hadoop, Distributed computing challenges, Hadoop overview, Use case of hadoop, HDFS, Processing data with hadoop, Managing resources and applications with hadoop YARN, Interacting with hadoop ecosystem

MapReduce and the New Software Stack: Distributed file systems, MapReduce, Algorithms using MapReduce, Extensions to MapReduce, The communication cost model, Complexity theory for MapReduce

UNIT – III (9)

Introduction to MongoDB: What is mongoDB, Why mongoDB, Terms used in RDBMS and mongoDB, Data types in mongoDB, MongoDB query language

Introduction to Cassandra: Apache cassandra, Features of cassandra, CQL data types, CQLSH, Keyspaces, CRUD, Collections, Using a counter, Time to live, Alter commands, Import and export, Querying system tables

UNIT – IV (9)

Introduction to Hive: What is hive, Hive architecture, Hive data types, Hive file format, Hive query language, RCFile implementation, User defined functions

Introduction to Pig: What is pig, The anatomy of pig, Pig on hadoop, Pig philosophy, Use case for pig: ETL processing, Pig latin overview, Data types in pig, Running pig, Execution modes of pig, HDFS commands, Relational operators, Eval function, Complex data types, Piggy bank, User defined functions, Parameter substitution, Diagnostic operator, Word count example using pig, When to use pig, When not to use pig, Pig versus Hive

Text Books:

[1] Seema Acharya, Subhashini Chellappan, *Big Data and Analytics*, 2nd ed., New Delhi: Wiley India Pvt. Ltd., 2019.

[2] Jure Leskovec, Anand Rajaraman, Jeffrey David Ullman, *Mining of Massive Datasets,* 3rd ed., United Kingdom: Cambridge University Press, 2020.(*Chapter 2*)

Reference Books:

[1] V.K. Jain, *Big Data and Hadoop*, New Delhi: Khanna Book Publishing Co. (P) Ltd., 2017.

[2] DT Editorial Services, *Big Data (Covers Hadoop 2, MapReduce, Hive, YARN, Pig, R and Data Visualization), Black Book*, New Delhi: Dream Tech Press, 2015.

[3] Tom White, *Hadoop: The Definitive Guide*, 4th ed., California: O'Reilly Media, Inc, 2015.

[4] Raj Kamal and Preeti Saxena, *Big Data Analytics*, Chennai: McGraw Hill Education (India) Pvt. Ltd., 2019.

Course Research Papers: Research papers (Journal/Conference papers) relevant to the course content will be posted by the course faculty in CourseWeb page.

Course Patents: Patents relevant to the course content will be posted by the course faculty in CourseWeb page

Course Projects: Course project is an independent project carried out by the student during the course period, under the supervision of course faculty. Course faculty will post few course projects titles in CourseWeb page. Students are encouraged to come up and experiment with the ideas that interest them.

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: classify digital data, address the challenges and understand the realm of Big Data

CO2: develop solutions for big data problems using HDFS and map reduce programming

CO3: store and retrieve data using NoSQL databases like MongoDB and Apache Cassandra

CO4: develop big data processing applications using Hive and Pig software tools

Course Articulation Matrix : U18IT801B BIG DATA ANALYTICS																
CO		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	U18IT801B.1	1	1	-	-	-	-	-	-	1	1	-	1	1	-	-
CO2	U18IT801B.2	1	2	1	1	1	-	-	-	1	1	-	1	1	1	-
CO3	U18IT801B.3	2	2	2	2	1	-	-	-	1	1	-	1	2	2	1
CO4	U18IT801B.4	2	2	2	2	1	-	-	-	1	1	-	1	2	2	2
U18IT801B		**1.5**	**1.75**	**1.66**	**1.66**	**1**	**-**	**-**	**-**	**1**	**1**	**-**	**1**	**1.5**	**1.66**	**1.5**

U18IT801C BLOCKCHAIN TECHNOLOGIES

Class: B.Tech. VIII - Semester **Branch**: Information Technology

Teaching Scheme:

L	T	P	C
3	-	-	3

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):

This course will develop students' knowledge in/on

LO1: basic concepts of blockchain and its types, consensus theorem , decentralization

LO2: cryptography techniques working in blockchain using different encryption algorithms

LO3: Bitcoins, cryptographic keys, transactions with bitcoin network and payments

LO4: Bitcoin APIs, Alternate Coins, Smart Contracts and Ethereum

UNIT – I (9)

Blockchain: The growth of blockchain technology, Distributed systems, The history of blockchain, Types of blockchain

Consensus: Consensus mechanism, Types of consensus mechanisms, Consensus in blockchain.

Decentralization: Decentralization using blockchain, Methods of decentralization, Routes to decentralization, Blockchain and full ecosystem decentralization

UNIT – II (9)

Symmetric Cryptography: Working with the openSSL command line, Cryptography, Confidentiality, Integrity, Authentication, Non-repudiation, Accountability

Cryptographic Primitives: Keyless primitives, Symmetric cryptography, Data encryption standard(DES), Advanced encryption standard(AES).

Public Key Cryptography: Mathematics**,** Asymmetric cryptography, Cryptographic constructs and blockchain technology

UNIT – III (9)

Introducing Bitcoin: Bitcoin-an overview: The beginnings of bitcoin, Egalitarianism versus authorianism, Bitcoin definition, Bitcoin - A users perspective

Cryptographic keys: Private keys in bitcoin, Public keys in bitcoin, Addresses in bitcoin

Transactions: The transaction life cycle, The transaction data structure, Types of scripts, Coinbase transactions, Transaction validation, Transaction bugs, Blockchain, Mining, Mining pools

Bitcoin Network and Payments: The Bitcoin Network, Wallets, Bitcoin Payments, Innovation in Bitcoin, Advanced protocols, Bitcoin investment and buying and selling

UNIT – IV (9)

Bitcoin Clients and APIs: Bitcoin client Installation, Experimenting further with bitcoin-cli, Bitcoin programming
Alternative Coins: Introducing altcoins, Theoritical foundations: Alternatives to proof of work (PoW) , Proof of stake (PoS), Proof of activity(PoA), Non-outsourceable puzzles
Smart Contracts: Introduction, History, Ricardian contracts, Smart contract templates, Deploying smart contracts
Ethereum: Introduction, The ethereum network, Components of the ethereum ecosystem Transactions and messages, Ether cryptocurrency / tokens (ETC and ETH), The Ethereum Virtual Machine (EVM)

Text Book:

[1] Imran Bashir, *Mastering Blockchain: Distributed ledger technology, decentralization, and smart contracts explained*, 2nd ed., Packt Publishing Limited, 2018.

Reference Books:

[1] Narayanan A, Bonneau J, Felten E, Miller A, and Goldfeder S, *Bitcoin and Cryptocurrency Technologies – A Comprehensive Introduction*, 2nd ed., Princeton University Press, 2016.
[2] Andreas M. Antonopoulos, *Mastering Bitcoin: Programming the Open Blockchain*,2nd ed., O'Reilly Media, Inc., 2018.

Course Learning Outcomes (COs):

On completion of this course, students will be able to…
CO1: illustrate the concepts of blockchain with its types, consensus theorem and decentralization
CO2: apply cryptography techniques in blockchain to ensure security of blockchain
CO3: develop the bitcoin in blockchain technology and experiment with transactions
CO4: analyse the smart contracts to identify best contract and examine the ethereum development Processes

Course Articulation Matrix: U18IT801C BLOCKCHAIN TECHNOLOGIES

CO		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	PSO 3
CO1	U18IT801C.1	2	2	2	1	2	-	-	-	2	1	-	1	2	2	2
CO2	U18IT801C.2	2	2	2	1	2	-	-	-	2	1	-	1	2	2	2
CO3	U18IT801C.3	2	2	2	1	2	-	-	-	2	1	-	1	2	2	2
CO4	U18IT801C.4	2	2	2	1	2	-	-	-	2	1	-	1	2	2	2
U18IT801C		**2**	**2**	**2**	**1**	**2**	**-**	**-**	**-**	**2**	**1**	**-**	**1**	**1**	**2**	**2**

U18IT802A DATA SCIENCE

Class: B.Tech. VIII- Semester **Branch:** Information Technology

Teaching Scheme:

L	T	P	C
3	-	-	3

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):

This course will develop students' knowledge in/on

LO1: data science fundamentals and basic statistical techniques

LO2: concepts of data visualization techniques and various data analysis techniques

LO3: concepts of data wangling techniques

LO4: gradient descent, collecting and working with data

UNIT – I (9)

Introduction to Data Science: Data science, Terminology related with data science, Methods of data repository, Personnel involved with data science, Types of data, The Data Science Process (DSP), Popular data science toolkits, Familiarity with example applications

Data Analysis using R Programming Language: Introduction to applied statistical techniques, Types of statistical data, Types of big data analytics, Collecting data for sampling and distribution, Probability, Frequency distribution, Population and parameters, Central tendency or central value, Measures of central tendency, Different types of statistical means, Problems of estimation, Normal distribution curve

UNIT – II (9)

Data Visualization: Conventional data visualization methods, Retinal variables, Mapping variables to encodings, Introduction to Bokeh

Recent Trends in Data Science: Recent trends in various data collection and analysis techniques, Various big data visualization tools, Visualizing big data, Pre-attentive attributes, Challenges of big data visualization, Potential solutions

UNIT – III (9)

A Deep Dive into Data Wrangling with Python: Subsetting, filtering and grouping, Detecting outliers and handling missing values, Concatenating, merging and joining, Useful methods of Pandas, Working with the audit income dataset (UCI)

UNIT – IV (9)

Gradient Descent: The idea behind gradient descent, Estimating the gradient, Using the gradient, Choosing the right step size, Putting it all together, Stochastic gradient descent

Getting Data: stdin and stdout, Reading files, Scraping the web, Using APIs, Example: Using the twitter APIs

Working with Data: Exploring your data, Cleaning and munging, Manipulating data, Rescaling, Dimensionality reduction

Text Books:

[1] V.K.Jain, *Data Science & Analytics*, New Delhi: Khanna Book Publishing, 2018. (*Chapters: 1, 3 to 6*)

[2] Dr. Tirthajyoti Sarkar and Shubhadeep Roychowdhury, *Data Wrangling with Python,* U.K: Packt Publishing Ltd.,2019.(*Chapter: 4*)

[3] Joel Grus, *Data Science from Scratch*, USA: O'Reilly Media, Inc., 2015.(*Chapters: 8 to 10*)

Reference Books:

[1] Dinesh Kumar, *Business Analytics*, New Delhi: Wiley, 2017.

[2] Cathy O'Neil and Rachel Schutt, *Doing Data Science, Straight Talk from The Frontline*, USA: O'Reilly, 2013.

[3] Jure Leskovek, Anand Rajaraman and Jeffrey Ullman, *Mining of Massive Datasets v2.1,* U.K.: Cambridge University Press, 2014.

[4] Pratap Dangeti, *Statistics for Machine Learning,* U.K: Packt Publishing Ltd., 2017.

Course Research Papers: Research papers (Journal/Conference papers) relevant to the course content will be posted by the course faculty in CourseWeb page.

Course Patents: Patents relevant to the course content will be posted by the course faculty in CourseWeb page.

Course Projects: Course project is an independent project carried out by the student during the course period, under the supervision of course faculty. Course faculty will post few course projects titles in CourseWeb page. Students are encouraged to come up and experiment with the ideas that interest them.

Course Learning Outcomes(COs):

On completion of this course, students will be able to…

CO1: *describe basic concepts of data science and compare different statistical techniques*

CO2: *choose appropriate encoding and data collection and analysis techniques suitable for pre-processing of data*

CO3: *apply various data wrangling techniques for the preprocessing of data*

CO4: *apply gradient descent to find the values of parameters of a function that minimizes a cost function*

Course Articulation Matrix: U18IT802A DATA SCIENCE

CO		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	U18IT802A.1	1	1	1	1	-	-	-	-	1	1	-	-	1	1	-
CO2	U18IT802A.2	2	2	2	1	1	-	-	-	1	1	-	1	1	1	-
CO3	U18IT802A.3	2	2	2	1	1	-	-	-	1	1	-	1	1	1	-
CO4	U18IT802A.4	1	1	1	1	1	-	-	-	1	1	-	1	1	1	1
U18IT802A		**1.5**	**1.5**	**1.5**	**1**	**1**	**-**	**-**	**-**	**1**	**1**	**-**	**1**	**1**	**1**	**1**

U18IT802B PREDICTIVE ANALYTICS

Class: B.Tech. VIII–Semester **Branch:** Information Technology

Teaching Scheme:

L	T	P	C
3	-	-	3

Examination Scheme:

Continuous Internal Examination	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LO):

This course will develop students' knowledge in/on

LO1: statistical measures and various characteristic functions
LO2: matrix relationships and linear modeling and regression
LO3: nonlinear modeling and time-series analysis
LO4: data preparation, variable selection, model goodness measure and optimization methods

UNIT–I (9)

Properties of Statistical Distributions: Fundamental distributions, Central limit theorem, Estimate of mean, Variance, Skewness, and Kurtosis from sample data, Estimate of the standard deviation of the sample mean, (Pseudo) Random number generators, Transformation of a distribution function, Distribution of a function of random variables, Moment generating function, Cumulant generating function, Characteristic function, Chebyshev's inequality, Gram-Charlier series, Edgeworth expansion, Cornish-Fisher expansion, Copula functions

UNIT–II (9)

Important Matrix Relationships: Pseudo-Inverse of a matrix, A lemma of matrix inversion, Identity for a matrix determinant, Inversion of partitioned matrix, Determinant of partitioned matrix, Matrix sweep and partial correlation, Singular value decomposition (SVD), Diagonalization of a matrix, Spectral decomposition of a positive semi-definite matrix, Normalization in vector space, Conjugate decomposition of a symmetric definite matrix, Cholesky decomposition, Cauchy–Schwartz inequality, Relationship of correlation among three variables

Linear Modeling and Regression: Properties of maximum likelihood estimators, Linear regression, Fisher's linear discriminant analysis, Principal component regression (PCR), Factor analysis, Partial least squares regression (PLSR), Generalized linear model (GLM)

UNIT–III (9)

Linear Modeling and Regression: Logistic regression: binary, Logistic regression: multiple nominal, Logistic regression: proportional multiple ordinal, Fisher scoring method for logistic regression, Tobit model: a censored regression model

Nonlinear Modeling: Naive Bayesian classifier, Neural network, Segmentation and tree models, Additive models, Support vector machine (SVM), Fuzzy logic system, Clustering

Time Series Analysis: Fundamentals of forecasting, ARIMA models, Survival data analysis, Exponentially weighted moving average (EWMA) and GARCH (1, 1)

UNIT–IV (9)

Data Preparation and Variable Selection: Data quality and exploration, Variable scaling and transformation, How to bin variables, Interpolation in one and two dimensions, Weight of evidence (WOE) transformation, Variable selection overview, Missing data imputation, Stepwise selection methods, Mutual information, KL distance, Detection of multicollinearity

Model Goodness Measures: Training, Testing, Validation, Continuous dependent variable, Binary dependent variable (Two-Group Classification), Population stability index using relative entropy

Optimization Methods: Lagrange multiplier, Gradient descent method, Newton–Raphson method, Conjugate gradient method, Quasi-Newton method, Genetic algorithms (GA), Simulated annealing, Linear programming, Nonlinear programming (NLP), Nonlinear equations, Expectation-maximization (EM) algorithm, Optimal design of experiment

Text Book:

[1] James Wu, Stephen Coggeshall, *Foundations of Predictive Analytics*, CRC Press Taylor & Francis Group Chapman & Hall/CRC, 2019.

Reference Books:

[1] U Dinesh Kumar, *Business Analytics: The Science of Data-Driven Decision making*, 2nd ed. Wiley India Pvt. Ltd., 2020.

[2] Trevor Hastie, Robert Tibshirani, Jerome Friedman, *The Elements of Statistical Learning Data Mining, Inference, and Prediction*, 2nd ed., New York: Springer Verlag, 2009.

Course Research Papers: Research papers (Journal/Conference papers) relevant to the course content will be posted by the course faculty in CourseWeb page.

Course Patents: Patents relevant to the course content will be posted by the course faculty in CourseWeb page

Course Projects: Course project is an independent project carried out by the student during the course period, under the supervision of course faculty. Course faculty will post few course projects titles in CourseWeb page. Students are encouraged to come up and experiment with the ideas that interest them.

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: illustrate different statistical measures and describe and various characteristic functions

CO2: analyze various regression models using matrix operations and linear methods

CO3: apply nonlinear modeling and time series analysis to solve for a given problem

CO4: identify relevant variables and analyze model goodness

Course Articulation Matrix: U18IT802B PREDICTIVE ANALYTICS																
CO		**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**	**PSO 3**
CO1	U18IT802B.1	1	1	-	-	-	-	-	-	1	1	-	1	1	-	-
CO2	U18IT802B.2	2	2	1	1	1	-	-	-	1	1	-	1	2	1	-
CO3	U18IT802B.3	2	2	2	2	1	-	-	-	1	1	-	1	2	2	1
CO4	U18IT802B.4	2	2	2	2	1	-	-	-	1	1	-	1	2	2	2
U18IT802B		**1.75**	**1.75**	**1.66**	**1.66**	**1**	**-**	**-**	**-**	**1**	**1**	**-**	**1**	**1.75**	**1.66**	**1.5**

U18IT802C CYBER SECURITY

Class: B.Tech. VIII–Semester **Branch:** Information Technology

Teaching Scheme:

L	T	P	C
3	-	-	3

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):

This course will develop students' knowledge in/on…

LO1: security, cryptography, encryption, firewalls, virtualization

LO2: source of vulnerabilities, fraud techniques and threat infrastructure

LO3: various types of attacks, race conditions and web exploit tools

LO4: malicious code and defense & analysis techniques

UNIT – I (9)

Cyber Security Fundamentals: Network and security concepts, Information assurance fundamentals, Basic cryptography, Symmetric encryption, Public key encryption, The domain name system, Firewalls, Virtualization, Microsoft windows security principles-Windows token

UNIT – II (9)

Attacker Techniques and Motivations: How hackers cover their tracks, How and why attackers use proxies, Types of proxies, Detecting the use of proxies, Tunneling techniques-HTTP, DNS, Detection and prevention, Fraud techniques-Phishing, Smishing and mobile malicious code, Rogue antivirus, Click fraud, Threat infrastructure-Botnets, Fast-Flux

UNIT – III (9)

Exploitation: Techniques to gain foothold-Shellcode, Integer overflow vulnerabilities, Stack-based buffer overflows, Format string vulnerabilities, SQL Injection, Malicious PDF files-PDF file format, Creating malicious PDF files, Reducing the risks of malicious PDF files, Race conditions, Web exploit tools-Features of hiding, Commercial web exploit tools and services, DoS conditions, Brute force and dictionary attacks, Misdirection reconnaissance and disruption methods-DNS amplification attacks

UNIT – IV (9)

Malicious Code: Self-replicating malicious code, Evading detection and elevating privileges-Obfuscation, Virtual machine obfuscation, Persistent software techniques, Rootkits-User mode root kits, Spyware, Token kidnapping

Defense and Analysis Techniques: Memory forensics-Why memory forensics is important, Capabilities of memory forensics, Finding hidden process, Honeypots, Automated malicious code analysis systems

Text Book:

[1] James Graham, Ricard Howard, Ryan Olson, *Cyber Security Essentials*, USA: CRC Press Taylor & Francis Group, 2011.

Reference Books:

[1] Nina Godboles, Sumit Belapure, *Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal perspectives*, New Delhi: Wiley India (P). Ltd., 2011.

[2] Charles J.Brooks, Christopher Grow, Philip Craig, Donald Short, *Cyber Security Essentials,* USA: John Wiley & Sons, USA, 2018.

[3] Nilakshi Jain, Ramesh Menon, *Cyber Security and Cyber Laws*, New Delhi: Wiley India (P) Ltd., 2019.

Course Research Papers: Research papers (Journal/Conference papers) relevant to the course content will be posted by the course faculty in CourseWeb page.

Course Patents: Patents relevant to the course content will be posted by the course faculty in CourseWeb page.

Course Projects: Course project is an independent project carried out by the student during the course period, under the supervision of course faculty. Course faculty will post few course projects titles in CourseWeb page. Students are encouraged to come up and experiment with the ideas that interest them.

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: describe the fundamentals of security concepts and crypt analysis

CO2: illustrate types of proxies, attacking and fraud techniques used by the attackers

CO3: analyze SQL injections, malicious PDF files using web exploit tools

CO4: analyze the impact of malicious code to software application and categorize various defense & analysis techniques

Course Articulation Matrix: U18IT802C CYBER SECURITY															
CO		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	U18IT802C.1	1	1	-	-	-	-	-	-	1	1	-	-	1	-	-
CO2	U18IT802C.2	2	2	1	1	-	-	-	-	1	1	-	1	1	1	-
CO3	U18IT802C.3	2	2	2	2	-	-	-	-	2	1	-	2	2	2	1
CO4	U18IT802C.4	2	2	2	2	-	-	-	-	2	1	-	2	2	2	2
U18IT802C		**1.75**	**1.75**	**1.66**	**1.66**	**-**	**-**	**-**	**-**	**1.5**	**1**	**-**	**1.66**	**1.5**	**1.66**	**1.5**

U18OE803A - OPEARTIONS RESEARCH

Class: B. Tech.VIII – Semester **Branch(s):** ME, CSE, IT, CE, EEE, ECE, EIE

Teaching Scheme:

L	T	P	C
3	–	–	3

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives:

This course will develop students' knowledge in/on

LO1: concepts to solve linear programming problems which arise in real life using various methods and their advantages

LO2: *applications of linear programming namely transportation and assignment problems which arise in different engineering fields.*

LO3: *non-linearity in optimization problems, direct search techniques and iterative methods.*

LO4: *various queuing systems and their practical relevance.*

UNIT – I(9)

Linear Programming Problem (LPP): Mathematical models and basic concepts of linear programming problem; Solution of linear programming problem - Graphical method, Simplex method, Artificial variable techniques (Big-M and Two-phase method), Duality in linear programming, dual simplex method.

UNIT – II (9)

Special types of LPP: Mathematical model of transportation problem, Methods of finding initial basic feasible solution, optimal solution of transportation problem, Degeneracy in transportation problem; Exceptional cases in transportation problem- Unbalanced transportation problem, Maximization transportation problem; Assignment problem- Mathematical formulation of the problem, Hungarian method to solve an assignment problem, Special cases in assignment problem- Maximization assignment problem.

UNIT – III (9)

Non-linear Programming Problem (NLPP): Classical method of optimization using Hessian matrix; Iterative methods - Random search methods-Random jump method, Random walk method, Steepest decent method and Conjugate gradient method; Direct methods - Lagrange's method, Kuhn-Tucker conditions.

UNIT – IV (9)

Queueing Theory: Queueing system- Elements and operating characteristics of a queuing system; Probability distributions in queueing systems- Distribution of arrivals (Pure Birth Process); Classification of queueing models; Poisson queueing systems- Study of various characteristics of single server queuing model having infinite population $\{(M/M/1):(\infty/FIFO)\}$ and single server queuing model having finite population $\{(M/M/1):(N/FIFO)\}$, Generalized model (Birth-Death process).

Text Books:

[1]. Kanti swarup et.al, *Operations Research*, 16th ed., New Delhi: S. Chand & Sons, 2013. (Unit-I, Unit-II, Unit-IV)

[2]. Singiresu S. Rao, *Engineering Optimization Theory and Practice*, 4th ed., Hoboken, New Jersey: John Wiley & Sons, Inc, 2009 (Unit-III)

Reference Books:

[1]. Hamdy. A. Taha, *Operations Research*, 7th ed., New Delhi: Prentice Hall of India Ltd, 2002.

[2]. J.C. Pant, *Introduction to Optimization*, 7th ed., New Delhi*: Jain* Brothers, 2012.

Course Research Papers: Research papers (Journal/Conference papers) relevant to the course content will be posted by the course faculty in CourseWeb page

Course Patents: Patents relevant to the course content will be posted by the course faculty in CourseWeb page

Course Projects: Course project is an independent project carried out by the student during the course period, under the supervision of course faculty. Course faculty will post few course projects titles in CourseWeb page. Students are encouraged to come up and experiment with the ideas that interest them.

Course Learning Outcomes (COs):

On completion of this course, the students will be able to…

CO1: model engineering real time problems and solve them using various LPP techniques

CO2: obtain the optimal solution of transportation, assignment problems and their real time applications

CO3: optimize the engineering problems using NLPP techniques

CO4: differentiate various queueing models and their practical relevance

Course Articulation Matrix: U18OE803A - OPEARTIONS RESEARCH																
CO		**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**	**PSO 3**
CO1	U18OE803A.1	2	2	-	-	-	-	-	-	-	1	-	1	1	-	-
CO2	U18OE803A.2	2	2	-	-	-	-	-	-	-	1	-	1	-	1	-
CO3	U18OE803A.3	2	2	-	-	-	-	-	-	-	1	-	1	1	-	-
CO4	U18OE803A.4	2	2	-	-	-	-	-	-	-	1	--	1	-	1	-
U18OE803A		**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**1**	**1**	**1**	**-**

U18OE803B MANAGEMENT INFORMATION SYSTEMS

Class: B.Tech.VIII - Semester **Branch(s):** CSE & IT

Teaching Scheme:

L	T	P	C
3	-	-	3

Examination Scheme:

Continuous Internal Evaluation	40 Marks
End Semester Exam	60 Marks

Course Learning Objectives (LOs):

This course will develop students' knowledge in/on…

LO1: basic concepts and challenges of management information systems
LO2: e-business and decision support systems techniques
LO3: development process and design of management information systems
LO4: different applications of management information systems

UNIT – I (9)

Management Information Systems: Systems: An Overview : Introduction, Need for management information systems, Management information systems: A concept, MIS: A definition, Management information system and Information technology, Nature and scope of MIS, MIS characteristics, Structure of MIS, Types of MIS, Role of MIS in global business, Challenges of managing information systems, IT Infrastructure and Emerging Technology

UNIT - II (9)

Business Applications of Information Systems:

E-Commerce, E-Business and E-Governance: Introduction, E-commerce, E-commerce sales life cycle, E-commerce infrastructure, E-commerce applications, E-commerce payment systems, Management challenges and opportunities, E-business, E-governance

Decision Support Systems: Introduction, Decision-Making: A concept, Simon's model of decision-making, Types of decisions, Methods for decision-making, Decision support techniques, Decision-making and role of MIS, Decision support systems, Business intelligence, Knowledge management systems

UNIT - III (9)

Development process of MIS : Development of long range plans of the MIS, Ascertaining the class of information, Determining the information requirement, Development and implementation of the MIS, Management of information quality in the MIS, Organisation for development of MIS, MIS: Development process mode

Strategic Design of MIS : Strategic management of the business, Why strategic design of MIS, Balance score card, Score card and Dash board, Strategic design of MIS, Development process steps for strategic design (SD) of MIS, Illustrating SD of MIS for big bazaar, Strategic management of business and SD of MIS, Business strategy determination, Business strategy implementation

UNIT - IV (9)

Management of Global Enterprise : Enterprise management system, Enterprise resource planning (ERP) System, ERP model and modules, Benefits of the ERP, ERP product evaluation, ERP implementation, Supply chain management (SCM), Information management in SCM, Customer relationship management (CRM), Management of global enterprise, EMS and MIS

Applications in Manufacturing Sector: Introduction, Personnel management (PM), Financial management (FM), Production management (PM), Raw materials management (RMM), Marketing management, Corporate overview.

Text Books:

[1] D.P.Goyal, Vikas, *Management Information Systems–Managerial Perspective*, 4th ed. Addison-Wesley, 2014. *(Unit 1)*

[2] Waman S. Jawadekar, *Management Information Systems Text and Cases: a Global Digital Enterprise Perspective,* 5th ed. McGraw Hill, 2014 *(Unit 2,3,4)*

Reference Books:

[1] Kenneth C. Laudon & Jane P. Laudon, *Management Information Systems,12th ed.* Prentice Hall, 2012.

[2] S. Sadagopan, *Management Information Systems,2nd ed.*, PHI Learning, 2014.

Course Learning Outcomes (COs):

On completion of this course, students' will be able to…

CO1: explain the structure and importance of management information systems

CO2: analyze management information systems for decision making

CO3: explain the methodology to design and develop a management information system

CO4: describe different applications of management information systems in various manufacturing sectors

Course Articulation Matrix (CAM): U18OE803B MANAGEMENT INFORMATION SYSTEMS															
Course Outcomes		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	U18OE803B.1	2	2	1	1	1	-	-	-	-	1	-	1	2	1	2
CO2	U18OE803B.2	2	2	2	1	1	-	-	-	-	1	-	1	2	1	2
CO3	U18OE803B.3	2	2	2	3	1	-	-	-	-	1	-	2	2	1	2
CO4	U18OE803B.4	2	2	3	3	1	-	-	-	-	1	-	2	3	1	3
U18OE803B		**2**	**2**	**2**	**2**	**1**	**-**	**-**	**-**	**-**	**1**	**-**	**1.5**	**2.25**	**1**	**2.25**

U18OE 803C ENTREPRENEURSHIP DEVELOPMENT

(Open Elective-IV)

Class: B. Tech. VIII- Semester **Branch(s):** ME, CSE, IT, CE, EEE, ECE, EIE

Teaching Scheme:

L	T	P	C
3	-	-	3

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):

This course will develop students' knowledge in/on

LO1: various characteristics of entrepreneur and his role in development of the nation

LO2: creativity and business plan

LO3: functions of various managements/managers in industry

LO4: legal issues in entrepreneurship and intellectual property rights

UNIT –I (9)

Entrepreneurship: Definition, role of entrepreneurship in economic development, characteristics and types of an entrepreneur, Forms of business organizations; agencies dealing with entrepreneurship and small scale Industries; Case studies of successful entrepreneurs- identification of business opportunities in various branches of engineering

UNIT-II (9)

Creativity and Business Idea: Sources of new ideas, methods of generating ideas and creative problem solving, concepts of innovation and incubation.

Business Plan: definition, scope and value of business plan, market survey and demand survey.

Feasibility studies: Technical feasibility, financial viability and social acceptability; Preparation of preliminary and bankable project reports;

UNIT-III (9)

Project Planning: Product planning and development process, Sequential steps in executing the project.

Plant layout: Principles, types and factors influencing layouts,

Material Management: Purchase procedures, Issues of Materials -LIFO, FIFO, HIFO and Base stock.

Fundamentals of Production Management: Production Planning and Control (PPC)- Concepts and functions, Long & short run problems.

Marketing Management: Definition, functions and market segmentation.

UNIT-IV (9)

Financial Management: Introduction, Sources of finance-internal and external.

Human Resource Management: Introduction, importance, selection, recruitment, training,placement, development

Legal Issues in Entrepreneurship: Mechanisms for resolving conflicts; Industrial laws- Indian Factories Act, Workmen Compensation Act; Intellectual Property Rights (IPR) – patents, trademarks, and copyrights

Text Books:

1) Robert D.Hisrich, Michael P. Peters, "Entrepreneurship", *Tata McGraw-Hill*, 9th Edition 2014 (*Chapters 1,2,4,5,6,7,8,11 and13*).

Reference Books

1) David H. Holt, "Entrepreneurship New venture creation" *Prentice Hall of India*.2004.
2) Handbook for "New Entrepreneurs", *Entrepreneurship Development Institute of India*, Ahmadabad.
3) T.R. Banga, "Project Planning and Entrepreneurship Development", *CBS Publishers*, New Delhi,1984.
4) Personnel efficiency in Entrepreneurship Development-"A Practical Guide to Industrial Entrepreneurs", *S. Chand & Co.*, New Delhi.

Course Learning Outcomes (COs):

Upon completion of this course, students will be able to…

CO1: *describe characteristics of entrepreneur and his role in economic development*
CO2: *apply creative problem solving methods to real time situations*
CO3: *explain the functions of production and marketing managements*
CO4: *identify the legal issues in entrepreneurship and explain intellectual property rights*

Course Articulation Matrix (CAM): U18OE 803C ENTREPRENEURSHIP DEVELOPMENT														
CO	**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**	**PSO 3**
U18OE803C.1	-	-	1	-	-	2	2	1	2	2	2	1	1	-	-
U18OE803C.2	-	2	1	-	-	2	2	1	2	2	2	1	1	2	-
U18OE803C.3	-	-	1	-	-	2	2	1	2	2	2	1	1	-	-
U18OE803C.4	-	-	1	-	-	2	2	1	2	2	2	1	1	2	1
U18OE803C	**-**	**-**	**1**	**-**	**-**	**2**	**2**	**1**	**2**	**2**	**2**	**1**	**1**	**2**	**1**

U18OE803D FOREX & FOREIGN TRADE

Class: B.Tech VIII Semester

Branch(s): ME, CSE, IT, CE, EEE, ECE, EIE

Teaching Scheme :

L	T	P	C
3	-	-	3

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Exam	60 marks

Course Learning Objectives (LO):

This course will develop students' knowledge in/on…..

LO1: business, business system, objectives and types of companies

LO2: fundamentals of foreign trade and EXIM procedure

LO3: foreign exchange rate and methods of payments

LO4: foreign exchange control

UNIT–I (9)

Business: Nature and scope, Classification of business activities, Functions of commerce and trade.

Business System: Characteristics and components of business system, objectives of business, classification of business objectives; Types of Business.

UNIT-II (9)

Foreign Trade: Introduction of International Trade, Reasons for External Trade, Special problems of Foreign Trade; EXIM-objectives, roles of EXIM in Foreign Trade, Stages in Import procedure, Stages in export procedure-bill of lading, mate's receipt, certificate of origin.

Corporations Assisting Foreign Trade: State Trading Corporation of India, Export Credit and Guarantee Corporation, Minerals and Metals Trading Corporation of India.

UNIT–III (9)

Foreign Exchange Rate: Meaning and importance of Foreign exchange rate, Methods of foreign payments; Exchange rates- Spot, Forward and Cross Rates; Demand and supply of foreign exchange rate, Equilibrium rate of foreign exchange, Theories of determining foreign exchange rate, International Parity condition - Balance of payments.

Foreign Exchange Markets: Functions of exchange markets, Components and Players in Exchange Markets; FEMA-objectives and its role in Foreign Trade.

UNIT–IV (9)

Foreign Exchange Control: Objectives, characteristics, advantages and disadvantages, Methods: intervention, exchange restriction, multiple exchange rates, exchange clearing agreements, method of operation, exchange clearing agreements in practice, payments agreements, transfer moratoria; indirect methods.

Course Learning Outcomes (CO):

Upon completion of the course, the student will be able to…

CO1: evaluate the objectives and types of industries and companies.

CO2: assess the procedure in imports and exports

CO3: analyze the foreign exchange rate and methods of foreign payments

CO4: adapt the methods of exchange control

Text Books:

1. C.B. Guptha, *Business Organization & Management,* 15th ed. New:SultanChand & Sons,2015(*Units 1,5*)
2. M.L. Seth, *Macro Economics,* 22nd ed. New Delhi; Lakshmi Narayan Agarwal Publishers, 2014.
3. M.C. Vaish, Ratan Prakashan Mandir, *Monetary Theory,* 16th ed. New Delhi: Vikas Publications,2016

Reference Books:

1. Y.K.Bhushan, "Business Organization and Modern Management" *Sultan & Sons Publishers, NewDelhi. 15/e,* 2014.
2. S.A. Sherlekhar "Business Organization and Management", *Himalaya Publishing House, 2000.*
3. K.P.M. Sundaram, "Money Banking, Trade & Finance ", *Sultan & Sons Publishers, New Delhi.*
4. P.N.Chopra, "Macro Economics", *Kalyani Pubnlishers, 1/e, Ludhiana*

Course Articulation Matrix (CAM): U18OE803D FOREX AND FOREIGN TRADE															
CO	**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**	**PSO 3**
U18OE803D.1	-	-	-	-	-	-	-	-	-	2	2	-	1	1	-
U18OE803D.2	-	-	-	-	-	-	-	-	-	2	2	-	-	1	-
U18OE803D.3	-	-	-	-	-	-	-	-	-	2	2	-	-	-	-
U18OE803D.4	-	-	-	-	-	-	-	--	-	2	2	--	1	--	1
U18OE803D	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**2**	**-**	**1**	**1**	**1**

U18IT804 MAJOR PROJECT WORK PHASE-II

Class: B.Tech. VIII - Semester **Branch:** Information Technology

Teaching Scheme: **Examination Scheme:**

L	T	P	C
-	-	14	7

Continuous Internal Evaluation	60 marks
End Semester Examination	40 marks

Course Learning Objectives (LOs):

The major project work will develop students' knowledge on /in…

LO1: *real-world complex engineering problems, literature review, problem formulation; and experimental and data analysis techniques*

LO2: *design/development of solutions to real-world engineering problems; conduct of investigations of complex problems; modern tool usage to design, build and test a prototype; impact of solution in society, environment and sustainability contexts*

LO3: *ethics, team work and project management skills such as budgeting, scheduling*

LO4: *oral, written and multimedia communication skills; self-directed independent learning and life-long learning*

1. **Major project work shall be continued in 8th semester as major project *phase-II*:** All the major project teams shall take the *phase -I* work forward and complete the remaining work as *Phase-II* in the 8th semester.

2. Final Year Major Project work represents the culmination of study towards the B. Tech degree. **Major project offers an opportunity to integrate the knowledge acquired from various courses and apply it to solve real-world complex engineering problems**. The **student learning assessment process** (SLAP) shall include good number of presentations, demonstration of work undertaken, submission of a project report, writing project paper in scientific journal style & format, preparing project poster and creating video pitch on the complete project

3. Activities of major project SLAP shall be planned in such a way to ensure that the students acquire the essential knowledge, skills and qualities (KSQ) of a professional engineer.

4. Team work: Major project work is a team work

(i) The students of a project team shall work together to achieve a common objective.

(ii) Every student of a project team is expected to function effectively as an individual, and also with others as a team member in an ecosystem of team having knowledge diversity, gender diversity, social and cultural diversity among its members.

5. Every student is expected to put approximately **168 hours of work** into the major project *phase-II* course over the 12 weeks of 8th semester.

6. Major project work *Phase-II*: 8th semester

(i) The convener DPEC shall release complete schedule of *phase-II* CIE during last week of 7th semester (*well in advance before start of 8th semester*), immediately after completion of progress presentation-I, so that student teams would complete the scheduled works during inter-semester break and get ready with informative,

confident and comfortable presentation for progress presentation-II.

(ii) **The project supervisors**: The project supervisors are expected to guide the students to systematically continue the *phase-I* work, useful work during inter-semester break, meeting the deadlines as proposed in project timeline.

(iii) **The project supervisors shall ensure students focus on the project objectives and expected deliverables**

(iv) **The project supervisors shall ensure students have sufficient resources for successful project completion.**

(v) **The project supervisors shall continue guiding students on**

(a) *Knowledge, skills and qualities (KSQ) of a professional engineer to be acquired* to propose solutions and design the systems to the identified real-world problems.

(b) *Problem analysis* - to identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences

(c) *Applying engineering knowledge* - to apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems

(d) *Design/development of solutions* - to design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental Considerations

(e) *Conduct investigations of complex problems* - to use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions

(f) *Modern tool usage* – to create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations

(g) *Engineering and society* – to apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice

(h) *Environment and sustainability* – to understand the impact of the professional engineering solutions in societal and environmental contexts, demonstrate the knowledge of, and need for sustainable development

(i) *Ethics* – to apply ethical principles and commit to professional ethics, responsibilities, and norms of the engineering practice

(j) *Individual and team work* – to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings

(k) *Communication* – to communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions

(l) *Project management and finance* – to demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments

(m) *Life-long learning* – to recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change

(vi) The project supervisors are also expected to continuously emphasize and guide the students on

(a) **Following project timeline**: completing the tasks as planned in project timeline

(b) **Meeting Cadence:**

i. **Regular meetings with supervisor:** Short and frequent meetings increase a team's work momentum. Regular meetings with supervisor to review the status of project are very essential. All students of the team shall participate in discussions and take notes.

ii. **Meeting Frequency: Semi-weekly cadence,** i.e., the meeting frequency shall be **twice a week.** Due weightage will be given to meeting cadence and considered for evaluation during presentations, i.e., number of planned meetings and number attended by students

(c) **Project Log Book:** The activity journaling in project log book is very important for a successful project.

i. Project log book is a written record showing the daily project activity on project goals from the very first thing like starting the project (an introduction statement what the project is all about), to the completion of the work (including the final results, and whether project met the core objectives / outcomes, etc.).

ii. In project log book, the activities like regular meetings with project supervisor, and work carried out on daily/weekly basis are to be recorded. This ensures that the student progress is being monitored well.

iii. The project supervisor shall regularly check the log book of every student of project team and endorse each and every activity by affixing his signature with date. With this, the number of planned meetings and number attended by the students will be also monitored.

iv. Log books are to be shown during all presentations and will be graded along with the project.

v. At the conclusion of the project work *phase-II*, the supervisor shall specifically comment, in the project log book, on whether the project team met each of the project work outcomes and to give evidence which describes the quality of work. For project teams, this also serves as self-assessment.

(d) **Writing down whatever is done and making notes of whatever is read**. Writing down the procedures / models followed, designs made, experiments conducted, simulations carried out, intermediate results obtained, ***difficulties faced and how they were fixed*** are very important. This kind of documenting the whole process as we go with project implementation is a very effective way and will help preparing a well-documented report having original content. Note down and include information about all the resources that you used, magazines, Journals, patents, books, and so on. This information will be needed for the

bibliography in your project report. On the other hand, documenting a report ***on the spur of the moment*** would end up copying things from other sources resulting in a plagiarized document.

(e) The relevant knowledge, skills and qualities (**KSQ**) an engineering graduate should possess, which can be specially acquired by participating in major project work

(f) **Good and sufficient literature review**: Literature review is a description and analysis of information related to the topic of project work. Reading good number of review articles, research articles published in recent issues of peer reviewed journals, technical magazines, patents, reference books on the topics of potential interest, will help one understand what has already been discovered and what questions remain to identify gaps in the literature.

(g) Completing the proposed work by the end of *phase-II*

(h) Right conduct of research to promote academic integrity, honesty and time management

(i) Preparing a well-documented overall project report in proper format, covering the complete work carried out during both the phases (*phase-I and phase-II*).

(j) Consequences of plagiarism, and use of anti-plagiarism software to detect plagiarism in the report

(k) Submission of major project work report within acceptable plagiarism levels, as per the ***Anti-plagiarism policy-2020 of our institute***

(l) **Video pitch on complete project work**: Capturing short videos, photos, screenshots on experiments conducted, simulations carried out, prototype / working model / process / software package / system developed during course of project execution, photos showing interaction with supervisor for creating a short video pitch on the complete work done during both phases (*phase-I and phase-II*).

(m) **Project Paper**: Writing a technical paper at the end of *phase-II* based on the solution(s) proposed, results obtained and prototype / working model / process / software package / system developed, for submission to a reputed non-predatory conference/non-paid peer reviewed journal.

(n) **Project poster**: At the end of phase-II, the project teams shall have to present their project in the form of posters, at the time of demonstration of complete porotype / working model / software package / system developed.

(vii) Phase – II evaluation: There shall be only Continuous Internal Evaluation (CIE) for major project work *phase-I* with following components

(a) **Progress Presentation -II** *(during third / fourth week of 8th semester):* The progress presentation-II shall include the identified problem, objective(s), literature review, expected outcome(s), results of work done as per project plan timeline.

i. **Following project timeline**: The project timeline shall be meticulously followed and the tasks shall be completed as planned in project timeline.

ii. 80-85% of work is expected to be completed
iii. Project teams shall compulsorily show the following as part of their progress presentation-II
    1. *The slides on project timeline and*
    2. *A table showing targeted tasks as per timeline and status – whether tasks accomplished?*

iv. **Project log book**: Every student of the Project team shall compulsorily show the activity journaling in the log book (with due signatures of project supervisor) during presentations

(b) **Final Presentation** *(during penultimate week of 8th semester):* **Project supervisor shall ensure that the project team has accomplished 100% of work proposed**. The project team shall
i. **Follow project timeline**: The project timeline shall be meticulously followed and the tasks shall be completed as planned in project timeline.
ii. compulsorily show the following as part of their final presentation
    1. *The slides on project timeline and*
    2. *A table showing targeted tasks as per timeline and whether all the identified tasks accomplished?*

iii. **show project log book**: Every student of the Project team shall compulsorily show the complete activity journaling in the log book (*with due signatures of project supervisor*)
iv. present complete results & analysis
v. **demonstrate the completed project**: working model / process / software package / system developed
vi. demonstrate the completed project with the **project poster presentation**

(viii) Evaluation for Major project phase-II:

There shall be continuous internal evaluation (CIE) and end semester examination (ESE). The evaluation for *phase-II* shall be as given below:

Assessment	Weightage
A. CIE **(i) Supervisor Assessment (10%)** **(ii) DPEC Assessment (50%)** *(a) Progress presentation-II (10%)* *(b) Final presentation (10%)* *(c) Working model / process / software package / system developed (20%)* *(d) Project video pitch (5%)* (e) *Project paper (5%)*	**60%**
B. ESE *(i) Well-documented project report (15%)* *(DPEC shall evaluate the project reports, as per the rubrics, well before the ESE. At the time of ESE, evaluated project report marks shall be posted in the award list, along with the ESE oral presentation marks. Students shall appear for Viva-Voce with project report)* *(ii) Oral presentation with PPTs and viva-voce (15%)* *(iii) Project poster (5%)* *(DPEC shall evaluate the project poster, as per the rubrics, well before the ESE. At*	**40%**

the time of ESE, evaluated project poster marks shall be posted in the award list. Students shall appear for Viva-Voce with project poster)	
Total Weightage	**100%**

(d) **Working Model:** Every project team shall be required to develop a working model/ process/software package/system, on the chosen work. The completed working model/ process/software package/system shall be demonstrated during final presentation at the end of *phase-II*.

(e) **Video pitch**: Every project team shall be required to create a pitch video, which is a video presentation on their major project work *phase-I & phase-II*. The project team shall present the produced video pitch during Final presentation. The produced video pitch should

a. be 3 to 5-minute-long video (no longer than 5 minutes)
b. be concise and to the point, on the problem, proposed solution and its salient features.
c. show project timeline and sample page of log book
d. highlight the various stages during project implementation with the help of short videos / photos / screenshots on experiments conducted, simulations carried out, prototype / working model / process / software package / system developed as part of proposed solution and also photos showing team interactions with supervisor and the team working in the lab on project.
e. discuss the impact of proposed solution in *ethical, environmental, societal and sustainable development contexts.*
f. emphasize key points about *business idea, potential market for the proposed solution*

(f) **Project poster**: At the end, the project teams shall present their project in the form of posters (A2 size). The teams shall have to present their work during the poster presentation session scheduled at the end of the 8th semester, at the time of demonstration of complete porotype / working model / software package / system developed.

(g) **Well-documented plagiarism-cleared project report**: Every project team shall be required to submit a well-documented project report on the work carried out, as per the format specified by the DPEC. The report should clear plagiarism check as per the anti-plagiarism policy-2020 of the institute. The following shall compulsorily be included in the Results-Chapter of the project report

(i) Photos / screen shots taken at various stages during the development of working model/ process/software package/system as part of Results-Chapter
(ii) Snapshot of final working model/ process/software package/system developed
(iii) Pictures of the team working in the lab, the team discussing with the project supervisor, working on creative project, or an event they are attending for work.
(iv) All these photos / screen shots shall be properly referred in the project report by assigning figure numbers

(h) **Tangible outcomes of project work in Conclusions - Chapter:** These are the lessons learnt from doing a project work. The students have to describe in their own words what they learnt from the project work experience. They have to describe what specific KSQs are acquired by them, with reference to the expected COs, after successful completion of major project work. Finally, a table depicting

systematic mapping of what they have learnt and the expected major project work COs, is to be shown in the conclusions chapter.

(i) **Student feedback on major project in Conclusions - Chapter:** To gather information on whether project work was useful and gave practical experience on chosen field of interest, and other learning, a well-defined feedback questionnaire (*made available by the dept*) with closed and open questions shall be kept in the conclusions chapter of the project report.

(ix) It is mandatory for

(d) every student of the team to appear for ESE oral presentation and viva-voce, to qualify for course evaluation

(e) every project team to write a technical paper based on the solution(s) proposed, results obtained and prototype / working model / process / software package / system developed, for submission to a reputed non-predatory conference/non-paid peer reviewed journal

(f) every project team shall be required to create a pitch video, which is a video presentation on their major project work *phase-I & phase-II*

(g) every project team shall present their project in the form of a poster, during the demonstration of complete porotype / working model / software package / system developed

(xi) The student has to register for the Major project work *phase-II* as supplementary examination in the following cases:

(a) he/she is absent for oral presentation and viva-voce as part of ESE presentation

(b) he/she fails to fulfill the requirements of Major project work *phase-II* evaluation as per specified guidelines

(xii) Supplementary examination for Major project work *phase-II*

(a) The CoE shall send the list of students, registered for supplementary examination, to the HoDs concerned

(b) The DPEC, duly constituted by the HoD, shall conduct Major project *phase-II* supplementary exam and send the award list to the CoE within the stipulated time

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Course Learning Outcomes (COs):
Upon completion of the major project work, students will be able to…

CO1: *review research literature, formulate problem, apply knowledge of mathematics, sciences, engineering fundamentals, experimental and data analysis techniques; synthesize technical knowledge and innovative approaches to generate suitable solutions for real-world complex engineering problems* **(Technical skills)**

CO2: *design a system or product based on product/customer specifications; develop, analyze, and critically evaluate the design alternatives in order to justify the solutions to a real-world problem guided by ethical, environmental, societal and sustainable development considerations; use modern engineering and IT tools to design, build and test a prototype within specified project timeline and budget* **(Problem solving and critical thinking skills)**

CO3: *apply project management and organizational skills; demonstrate integrity, leadership, creativity, professional and ethical responsibilities as an individual and as a member or leader to produce time-sensitive deliverables in a multi-disciplinary team* (**Ethics and teamwork**)

CO4: *collate the results, compare performance of prototype to design specifications and present clearly and effectively the proposed solution, conclusions and/or recommendations in written (report, poster, technical paper), oral (presentations) and multimedia formats (video pitch) and engage in self-directed independent learning and life-long learning demonstrating the KSQ of a professional engineer* (**Communication skills and life-long learning**)

	Course Articulation Matrix (CAM) : U18IT804 MAJOR PROJECT WORK PHASE-II															
CO	**CO Code**	**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**	**PSO 3**
CO1	**U18IT804.1**	2	2	2	2	-	-	-	3	-	2	-	3	2	2	1
CO2	**U18IT804.2**	1	2	2	-	2	2	2	3	-	-	-	3	2	2	2
CO3	**U18IT804.3**	-	-	-	-	-	-	-	3	2	-	2	3	-	1	1
CO4	**U18IT804.4**	-	-	2	2	-	-	-	3	-	2	-	3	2	2	2
U18IT804		**1.5**	**2**	**2**	**2**	**2**	**2**	**2**	**3**	**2**	**2**	**2**	**3**	**2**	**1.75**	**1.5**