SCHEME OF INSTRUCTION AND EVALUATION
I - VIII SEMESTER OF B.TECH. DEGREE PROGRAMME

Branch-Information Technology

First Year Engineering

First Semester								
	Theory					Practical		
Code	Course Name	Hours/ Week L/T	Credit Theory	University Marks	Internal Evaluation	Hours/ Week L/T	Credit Practical	Marks
BS	Mathematics-I	3-1	4	100	50	-	-	-
BS	Chemistry/ Physics	3-0	3	100	50	2	1	50
ES	Basics of Electronics / Basic Electrical Engineering	3-0	3	100	50	2	1	50
ES	Mechanics/ Thermodynamics	3-0	3	100	50			
ES	Programming in 'c"	3-0	3	100	50	2	2	50
HS	English Communication Skill	3-0	2	100	50	2	1	50
ES	Engineering Workshop/ Engineering Drawing					4	2	100
Total		16	18	600	300	18	7	300
Total Marks: 1200								
Total Credits: 25								

Second Semester								
	Theory					Practical		
Code	Course Name	Hours/ week L/T	Credit Theory	University marks	Internal Evaluation	Hours/ Week L/T	Credit Practical	Marks
BS	Mathematics-II	3-1	4	100	50	-	-	-
BS	Chemistry/ Physics	3-0	3	100	50	2	1	50
ES	Basics of Electronics / Basic Electrical Engineering	3-0	3	100	50	2	1	50
ES	Mechanics/ Thermodynamics	3-1	3	100	50			
ES	Data Structure Using 'C"	3-0	3	100	50	2	2	50
HS	Business communication	3-0	2	100	50	2	1	50
ES	Engineering Workshop/ Engineering Drawing					4	2	100
MC	NSS/NCC	-	-	-	-			
Total		17	18	600	300	14	7	300
Total Marks: 1200								
Total Credits: 25								

Second Year Engineering

Third Semester

	Theory					Practical		
Code	**Course Name**	**Hours/ week L/T**	**Credit Theory**	**University Marks**	**Internal Evaluation**	**Hours/ Week L/T**	**Credit Practical**	**Marks**
PC	Switching Theory & Logic Design	3-0	3	100	50	2	1	50
PC	Object Oriented Programming using JAVA	3-0	3	100	50	2	1	50
PC	Introduction to 3D Technology	3-0	3	100	50	2	1	50
PC	Software Engg.	3-0	3	100	50	2	1	50
PC	Discrete Structures	3-1	4	100	50			
HS	Engineering Economics/ Organizational Behavior	2-1	3	100	50			
Total		19	19	600	300	8	4	200
Total Marks: 1100								
Total Credits: 23								
For Honours and Minor Specialization		4	4	100	50			

Fourth Semester

	Theory					Practical		
Code	**Course Name**	**Hours/ week L/T**	**Credit Theory**	**University Marks**	**Internal Evaluation**	**Hours/ Week L/T**	**Credit Practical**	**Marks**
HS	Purely Applied Mathematics for Specific Branch of Engineering	3-0	3	100	50			
PC	Computer Organization & Architecture	3-0	3	100	50	2	1	50
PC	Design & Analysis of Algorithms	3-0	3	100	50	2	1	50
PC	Database System	3-0	3	100	50	2	1	50
PC	Formal Language & Automata Theory	3-0	3	100	50	2	1	50
HS	Engineering Economics/ Organizational Behavior	2-1	3	100	50			
	*Skill Project and Hands on					6	3	100
Total		18	18	600	300	14	7	300
Total Marks: 1200								
Total Credits: 25								
For Honours and Minor Specialization		4	4	100	50			

- *College should conduct at least one NSDC program under this category.

Third Year Engineering

Fifth Semester								
	Theory					Practical		
Code	**Course Name**	**Hours/week L/T**	**Credit Theory**	**University Marks**	**Internal Evaluation**	**Hours/week L/T**	**Credit Practical**	**Marks**
PC	Operating system	3-0	3	100	50	2	1	50
PC	Advanced JAVA Programming	3-0	3	100	50	2	1	50
PC	E-Commerce & ERP	3-0	3	100	50	2	1	50
PE	Computer Graphics/Internet of Things/Software testing/Parallel Algorithms	3-1	4	100	50			
OE	Cloud Computing/Data Mining & Data Warehousing/Computer Vision/Information Retrieval	3-1	4	100	50			
PC	Advance Lab-I					8	4	200
Total		17	17	500	250	14	7	350
Total Marks: 1100								
Total Credits: 24								
For Honours and Minor Specialization		4	4	100	50			

Sixth Semester								
	Theory					Practical		
Code	**Course Name**	**Hours/week L/T**	**Credit Theory**	**University Marks**	**Internal Evaluation**	**Hours/week L/T**	**Credit Practical**	**Marks**
PC	Computer Network & Data Communication	3-0	3	100	50	2	1	50
PC	Internet & Web Technology	3-0	3	100	50	2	1	50
PE	Compiler Design/Digital Image Processing/ Requirement Engg./Natural Language Processing/Wireless Sensor Networks/Beg Data Analytics	3-1	4	100	50			
PE	Pattern Recognition/ Machine Learning/Object Oriented Software Engg.	3-1	4	100	50			
MC & GS	Environmental Science & Engineering	3-0	3	100	50			
OE	Industrial Lecture #					3	1	50
HS	Presentation Skill & Skill for Interview # #	2-0	1		50	4	2	100
MC	Yoga					2	1	50
Total		19	18	500	300	13	6	300
Total Marks: 1100								
Total Credits: 24								
For Honours and Minor Specialization		4	4	100	50			

To be conducted by the Training & Placement department by inviting experts from the industry. No academician to be called. Record may be asked by the University for verification. Evaluation to be done by the TPO.

To be conducted by the Training & Placement department of the College.

Final Year Engineering

Seventh Semester								
	Theory					Practical		
Code	**Course Name**	**Hours/week L/T**	**Credit Theory**	**University Marks**	**Internal Evaluation**	**Hours/week L/T**	**Credit Practical**	**Marks**
GS	Nano Science & Bio Technology	3-1	4	100	50			
PE	Cryptography & Network Security/Usability Engg./Service Oriented Architecture/Social Networks	3-1	4	100	50			
PE	Mobile Computing/Software Project Management/Algorithm for Bioinfomatics/Experts Systems	3-1	4	100	50			
OE	Soft Computing */Other subjects	3-1	4	100	50			
PC	Advance Lab-II/ Project					8	4	200
	Projects on Internet of Things					8	4	200
Total		16	16	400	200	16	8	400
Total Marks: 1000								
Total Credits: 24								
For Honours and Minor Specialization		4	4	100	50			

*Student can choose from any department but subject must be running in that semester.

Eighth Semester						
	Training cum Project				Evaluation Scheme	
Code	**Course Name**	**Hours/week L/T**	**Credit Theory**	**Total Marks**		**Marks**
	Industrial Training cum Project/ Entrepreneurship Training cum Project / Stratup Training cum Project	30	20	1000	Evaluation by the Industry / Training Organisation	500
					Evaluation by the Institute (Report & Institute Viva)	500
Total		30	20	1000		1000
Total Marks:1000						
Total Credits:20						

Note- Minimum Pass Mark from Industry Evaluation is 300 (i.e. 60%).

Distribution of Credit Semester wise:

Semester	Credit
First	25
Second	25
Third	23
Fourth	25
Fifth	24
Sixth	24
Seventh	24
Eighth	20
Total	190

Internal Evaluation Scheme

Attendance & Class Interaction	05
Assignment	05
Surprise Test	05
Quiz	05
Class Test I & II	30
Total	50
Class Test Time(Hrs.): 1	

Pass Mark in Internal is 50% of total marks i.e. 25

External Evaluation Scheme

University Semester Examination of 3 Hours duration.

Pass mark will be 35% which means students have to score 35 out of 100.

Practical/Sessional Evaluation Scheme

Pass mark will be 50% which means students have to score 25 out of 50.

Evaluation Scheme

Attendance & Daily Performance	-10
Lab Record	- 10
Lab Quiz	- 05
Final Experiments & Viva	– 25

Total=50

All Lab examinations are to be completed one week before the end semester examination and marks are to be displayed on the college notice board.

III-VII SEMESTER DETAILED SYLLABUS

OF

B.TECH. DEGREE PROGRAMME

for

ADMISSION BATCH 2015-16

BRANCH- INFORMATION TECHNOLOGY

Second Year Engineering									
Third Semester									
Theory							**Practical**		
Subject Code	**Category**	**Course Name**	**Hours/ week L/T**	**Credit Theory**	**University Marks**	**Internal Evaluation**	**Hours/ Week L/T**	**Credit Practical**	**Marks**
PCS3I101	PC	Switching Theory & Logic Design	3-0	3	100	50	2	1	50
PCS3I102	PC	Object Oriented Programming using JAVA	3-0	3	100	50	2	1	50
PCS3I103	PC	Introduction to 3D Technology	3-0	3	100	50	2	1	50
PCS3I104	PC	Software Engg.	3-0	3	100	50	2	1	50
PCS3I001	PC	Discrete Structures	3-1	4	100	50			
PEK3E001/ POB3E002	HS	Engineering Economics/ Organizational Behavior	2-1	3	100	50			
Total			19	19	600	300	8	4	200
Total Marks: 1100									
Total Credits: 23									
PCS3D001	Honours	Artificial Intelligence	4	4	100	50			

Semester : 3rd

1.	PIT3D001	Honours(CP)	Artificial Intelligence	4-0-0	4
2.	PEK3E001	HS(O1)	Engineering Economics	3-0-0	3
3.	POB3E002	HS(O1)	Organizational Behavior	3-0-0	3
4.	PIT3G001	Minor(CP)	Software Engineering	4-0-0	4
5.	PIT3I001	PC(CP)	Discrete Structures	4-0-0	4
6.	PIT3I101	PC(CP)	Switching Theory & Logic Design	3-0-1	4
7.	PIT3I102	PC(CP)	Object Oriented Programming using JAVA	3-0-1	4
8.	PIT3I103	PC(CP)	Introduction to 3D Technology	3-0-1	4
9.	PIT3I104	PC(CP)	Software Engineering	3-0-1	4

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PIT3I101 SWITCHING THEORY AND LOGIC DESIGN

Theory L/T (Hours per week): 3/0, Credit: 3

Introduction: Logic design, transistors as switches, CMOS gates, sequential circuits,some examples.

Digital Systems: Representation of numbers, binary codes, Gray code, error-detecting and error-correcting codes, registers, binary logic, basic logic gates.

Boolean Algebra: Boolean operations, Boolean functions, algebraic manipulations, minterms and maxterms, sum-of-products and product-of-sum representations, two-input logic gates, functional completeness.

Minimization of Boolean Functions: Karnaugh map, don't-care conditions, prime implicants, Quine–McCluskey technique, Logic gates, NAND/NOR gates, Universal gates.

Combinational Circuits: Adder, subtractor, multiplier, comparator, decoders, encoders, multiplexers, demultiplexers, MUX Realization of switching functions, Parity bit generator, Code-converters, Hazards and hazard free realizations

Synchronous Sequential Circuits: Finite-state machines, latches and flip-flops (SR, D, JK, T), synthesis of clocked sequential circuits, Steps in synchronous sequential circuit design. Design of modulo-N Ring & Shift counters, Serial binary adder.

Registers and Counters: Registers and shift registers, sequential adders, binary and BCD ripple counters, synchronous counters

Algorithmic State Machines: Salient features of the ASM chart-Simple examples-System design using data path and control subsystems-control implementations-examples of Weighing machine and Binary multiplier.

Text Book:

1. Digital Design – Morris Mano, PHI, 3rd Edition, 2006.
2. Digital Electronics by G.K. Kharate, Oxford University Press

References:

1. Switching & Finite Automata theory – Z. Kohavi, TMH,2nd Edition.
2. An Engineering Approach To Digital Design – Fletcher, PHI.
3. Fundamentals of Logic Design – Charles H. Roth, Thomson Publications, 5th Edition, 2004.
4. Digital Logic Applications and Design – John M. Yarbrough, Thomson Publications, 2006

SWITCHING THEORY AND LOGIC DESIGN LAB

1. Digital Logic Gates: Investigate logic behavior of AND, OR, NAND, NOR, EX-OR, EX-NOR, Invert and Buffer gates, use of Universal NANDGate.
2. Gate-level minimization: Two level and multi level implementation of Booleanfunctions.
3. Combinational Circuits: design, assemble and test: adders and subtractors, comparators.
4. Design and Implementation of code converters, gray code to binary and BCD to seven segment display.
5. Design and Implementation of a function using MUX/ DEMUX.
6. Design of functions using encoder, decoder.
7. Flip-Flop: assemble, test and investigate operation of SR, D & J-Kflip-flops.
8. Shift Registers: Design and investigate the operation of all types of shift registers with parallelload.
9. Counters: Design, assemble and test various ripple and synchronous counters - decimal counter, Binary counter with parallelload.
10. Design of Binary Multiplier.
11. Verilog/VHDL simulation and implementation of Experiments listed at Sl. No. 1 to 10.
12. C/C++ implementation of Experiments listed at Sl. No. 1 to 10.

PIT3I102 OBJECT ORIENTED PROGRAMMING USING JAVA

Module1:-

Chapter 1-: An introduction to programming.
Different types of programming languages, Description of Compiler and Interpreter, Advantage of Object Oriented Programming, Object Oriented Programming, Features of Object Oriented Programming.
Chapter 2-: Introduction to Java.
What is Java?, Why Java?, History behind Java, Different versions of Java, Difference between C/C++ and Java, Features of Java, First Java Program, Prerequisites Before start writing a java program, Writing the program, Compiling the program, How Java program compiles?, Executing the program, How Java program executes?, What is JVM and its significance in executing a program?, Architecture of JVM.
Chapter 3-: Understanding First Program and a step forward, Understanding every term of the program, Java Tokens, Datatypes, Operators, What are Operators?, Different types of Operators, Typecasting, Control Structures and Arrays, Different types of control structures, Conditional Statements, Loops/ Iterators, Jumping Statements, Java Arrays, Multidimensional Arrays, Taking Input from keyboard, Command Line Arguments, Using Scanner Class, Using Buffered Reader class.

Module 2: -

Chapter 1-: Introduction to Classes and Objects.
Classes, Methods, Objects, Description of data hiding and data encapsulation, Constructors, Use of static Keyword in Java, Use of this Keyword in Java, Array of Objects, Concept of Access Modifiers (Public, Private, Protected, Default).
Chapter 2-: Inheritance
Understanding Inheritance, Types of Inheritance and Java supported Inheritance, Significance of Inheritance, Constructor call in Inheritance, Use of super keyword in Java, Polymorphism, Understanding Polymorphism, Types of polymorphism, Significance of Polymorphism in Java, Method Overloading, Constructor Overloading, Method Overriding, Dynamic Method Dispatching.
Chapter 3-: String Manipulations.
Introduction to different classes, String class, String Buffer, String Builder, String Tokenizer, Concept of Wrapper Classes, Introduction to wrapper classes, Different predefined wrapper classes, Predefined Constructors for the wrapper classes. Conversion of types from one type (Object) to another type (Primitive) and Vice versa, Concept of Auto boxing and unboxing.
Chapter 4:- Data Abstraction
Basics of Data Abstraction, Understanding Abstract classes, Understanding Interfaces, Multiple Inheritance Using Interfaces, Packages, Introduction to Packages, Java API Packages, User-Defined Packages, Accessing Packages, Error and Exception Handling, Introduction to error and exception, Types of exceptions and difference between the types, Runtime Stack Mechanism, Hierarchy of Exception classes, Default exception handling in Java, User defined/Customized Exception Handling, Understanding different keywords (try, catch, finally, throw, throws), User defined exception classes, Commonly used Exceptions and their details.

Chapter 5:- Multithreading
Introduction of Multithreading/Multitasking, Ways to define a Thread in Java, Thread naming and Priorities, Thread execution prevention methods. (yield(), join(), sleep()), Concept of Synchronisation, Inter Thread Communication, Basics of Deadlock, Demon Thread, Improvement in Multithreading, Inner Classes, Introduction, Member inner class, Static inner class, Local inner class, Anonymous inner class.

Module 3: -

Chapter 1:- IO Streams (java.io package)
Introduction, Byte Stream and Character Stream, Files and Random Access Files, Serialization, Collection Frame Work (java.util), Introduction, Util Package interfaces, List, Set, Map etc, List interfaces and its classes, Setter interfaces and its classes.

Chapter 2:-Applet
Introduction, Life Cycle of an Applet, GUI with an Applet, Abstract Window Toolkit (AWT), Introduction to GUI, Description of Components and Containers, Component/Container hierarchy, Understanding different Components/Container classes and their constructors, Event Handling, Different mechanisms of Event Handling, Listener Interfaces, Adapter classes.

Module 4: -

Chapter 1:- Swing (JFC)
Introduction Diff b/w awt and swing, Components Hierarchy, Panes, Individual Swings Components JLabel, JButton, JTextField, JTextArea.

Chapter 2:-JavaFX
Getting started with JavaFX, Graphics, User Interface Components, Effects, Animation, and Media, Application Logic, Interoperability, JavaFX Scene Builder 2, Getting Started with scene Builder.
Working with scene Builder.
Text Book:-

1. Programming in Java. Second Edition. OXFORD HIGHER EDUCATION. (SACHIN MALHOTRA/SAURAV CHOUDHARY)
2. CORE JAVA For Beginners. (Rashmi Kanta Das), Vikas Publication

Reference Book:-

1. JAVA Complete Reference (9th Edition) HerbaltSchelidt.

JAVA PROGRAMMING LAB

JAVA programs on:

1. Introduction, Compiling & executing a java program.
2. Data types & variables, decision control structures: if, nested if etc.
3. Loop control structures: do, while, for etc.
4. Classes and objects.
5. Data abstraction & data hiding, inheritance, polymorphism.
6. Threads, exception handlings and applet programs
7. Interfaces and inner classes, wrapper classes, generics

PIT3I104 **SOFTWARE ENGINEERING**

Theory L/T (Hours per week): 3/0, Credit: 3

Software Process Models:

Software Product, Software crisis, Handling complexity through Abstraction and Decomposition, Overview of software development activities, Process Models, Classical waterfall model, iterative waterfall model, prototyping mode, evolutionary model, spiral model, RAD model, Agile models: Extreme Programming, and Scrum.

Software Requirements Engineering:

Requirement Gathering and Analysis, Functional and Non-functional requirements, Software Requirement Specification(SRS), IEEE 830 guidelines, Decision tables and trees.

Structured Analysis & Design: (10Hrs)

Overview of design process: High-level and detailed design, Cohesion and coupling, Modularity and layering, Function–Oriented software design: Structured Analysis using DFD Structured Design using Structure Chart, Basic concepts of Object Oriented Analysis & Design. User interface design, Command language, menu and iconic interfaces.,

Coding and Software Testing Techniques:

Coding, Code Review, documentation. Testing: - Unit testing, Black-box Testing, White-box testing, Cyclomatic complexity measure, coverage analysis, mutation testing, Debugging techniques, Integration testing, System testing, Regression testing.

Software Reliability and Software Maintenance:

Basic concepts in software reliability, reliability measures, reliability growth modeling, Quality SEI CMM, Characteristics of software maintenance, software reverse engineering, software reengineering, software reuse.

Emerging Topics:

Client-Server Software Engineering, Service-oriented Architecture (SOA), Software as a Service (SaaS),

Text Book:

1. Fundamentals of Software Engineering, RajibMall , PHI, 2014.

Reference Books:

1. Software Engineering, A Practitioner's Approach, Roger S. Pressman ,TMG Hill.
2. Software Engineering, I. Sommerville, 9th Ed. , Pearson Education.

SOFTWARE ENGINEERING LABORATORY

Experiment1: Develop requirements specification for a given problem(The requirements specification should include both functional and non-functional requirements. For a set of about 20 sample problems, see the questions section of Chap 6 of Software Engineering book of Rajib Mall)

Experiment 2: Develop DFD Model (Level 0, Level 1 DFD and data dictionary) of the sample problem (Use of a CASE tool required)

Experiment 3: Develop structured design for the DFD model developed

Experiment 4: Develop UML Use case model for a problem (Use of a CASE tool any of Rational rose, Argo UML, or Visual Paradigm etc. is required)

Experiment 5: Develop Sequence Diagrams.

Experiment 6: Develop Class diagrams.

Experiment 7: Develop code for the developed class model using Java.

Experiment 8: Use testing tool such as Junit.

Experiment 9: Use a configuration management tool.

Experiment 10: Use any one project management tool such as Microsoft Project or Gantt Project, etc.

PIT3I001 DISCRETE STRUCTURES

Module-1.(15 Hours)

Sets and Propositions: Principle of Inclusion and Exclusion, Mathematical induction, Propositions, Logical Connectives, Conditionals and Biconditionals, Logical Equivalences, Predicate Calculus, Quantifiers, Theory of inference, Methods of proof.Relations and Functions: properties of binary relations, Closure of relations, Warshall's algorithm, Equivalence relations, Partial ordering relations and lattices, Chains and antichains, Functions, Composition of Functions, Invertible Functions, Recursive Functions, Pigeonhole principle.

Module-2. (5 Hours)

Numeric Functions and Generating Functions: Discrete Numeric functions, Generating Functions, Recurrence Relations and Recursive Algorithms:Recurrence relations, Linear recurrence relations with constant coefficients, Solution of recurrence relations by the method of generating functions, Divide and conquer algorithms,

Module-3.(10 Hours)

Groups and Rings: groups and subgroups, Cosets and Lagrange's theorem, Codes and Group codes, Error detection and correction using Group codes, Isomorphism, Homomorphism and normal subgroups, Rings, Integral domains and Fields, Boolean Algebras: Lattices and algebraic systems, Principle of duality, Distributive and complemented lattices, Boolean functions and Boolean expressions, Simplification of logic expressions using Karnaugh Map, Design and Implementation of Digital Networks, Switching Circuits.

Module-4.(10 Hours)

Graphs and Trees: Basic terminology, Diagraphs and relations, representation of Graphs, operations on graphs, paths and circuits, graph traversals, shortest path in weighted graphs, Eulerian paths and circuits, Hamiltonian paths and circuits, Traveling sales person's problem, Planar graphs, Graph Coloring, Trees, Rooted trees, Binary search trees, Spanning trees, Minimum spanning trees, Kruskal's Algorithm, Prim's Algorithm.

Text Book:

1. C. L. Liu, D. P. Mohapatra, Elements of Discrete Mathematics: A computer Oriented Approach, McGraw Hill Education (India) Private Limited, 4th Edition, 2013.

Reference Books:

1. R.K.Bisht, and H.S.Dhami, Discrete Mathmatics, Oxford University Press, First Edition, 2015
2. Kenneth H. Rosen, Discrete Mathematics and its Applications, Tata McGraw Hill, 5thed, 2003.
3. J. P. Tremblay and R. Manohar, Discrete Mathematical Structures with Applications, to Computer Science, TataMc-Graw Hill, 2001.
4. Joe L. Mott, A. Kandel, and T. P. Baker, Discrete Mathematics for Computer Scientists & Mathematics, Prentice Hall of India, 2nd Edition, 2006.
5. N. Deo, Graph Theory with applications to Engineering & Computer Science, Prentice Hall of India, 2006.
6. S. Lipschutz, Discrete Mathematics, Tata McGraw Hill, 2005

PEK3E001 ENGINEERING ECONOMICS

Theory L/T (Hours per week):2/1, Credit: 3

Module I (12 hours)

Engineering Economics- Nature, Scope, Basic problems of an economy, Micro Economics and Macro Economics.

Demand- Meaning of demand, Demand function, Law of Demand and its exceptions, Determinants of demand, Elasticity of demand & its measurement (Simple numerical problems to be solved), Supply-Meaning of supply, Law of supply and its exception, Determinants of supply, Elasticity of supply, Determination of market equilibrium (Simple numerical problems to be solved).

Production-Production function, Laws of returns: Law of variable proportion, Law of returns to scale

Module II (12 hours)

Cost and revenue concepts, Basic understanding of different market structures, Determination of equilibrium price under perfect competition (Simple numerical problems to be solved), Break Even Analysis-linear approach (Simple numerical problems to be solved).

Banking -Commercial bank, Functions of commercial bank, Central bank, Functions of Central Bank.

Inflation-Meaning of inflation, types, causes, measures to control inflation.

National Income-Definition, Concepts of national income, Method of measuring national income.

Module III (12 hours)

Time value of money- Interest - Simple and compound, nominal and effective rate of interest, Cash flow diagrams, Principles of economic equivalence.

Evaluation of engineering projects-Present worth method, Future worth method, Annual worth method, Internal rate of return method, Cost benefit analysis for public projects .

Depreciation- Depreciation of capital assert, Causes of depreciation, Methods of calculating depreciation (Straight line method, Declining balance method), After tax comparison of project.

Text Books

1. Riggs, Bedworth and Randhwa, “Engineering Economics”, McGraw Hill Education India
2. Principles of Economics, DevigaVengedasalam; KarunagaranMadhavan, Oxford University Press.
3. Engineering Economy by William G.Sullivan, Elin M.Wicks, C. PatricKoelling, Pearson
4. R.PaneerSeelvan, “ Engineering Economics”, PHI
5. Ahuja,H.L., “Principles of Micro Economics” , S.Chand& Company Ltd
6. Jhingan,M.L., “Macro Economic Theory”
7. Macro Economics by S.P.Gupta, TMH

POB3E002 **ORGANIZATIONAL BEHAVIOUR**

Credit- 3 Class Hours - 40

Objectives:

1. To develop an understanding of the behavior of individuals and groups inside organizations
2. To enhance skills in understanding and appreciating individuals, interpersonal, and group process for increased effectiveness both within and outside of organizations.
3. To develop theoretical and practical insights and problem-solving capabilities for effectively managing the organizational processes.

Unit	Contents	Class Hours
01	**Fundamentals of OB**: Definition, scope and importance of OB, Relationship between OB and the individual, Evolution of OB, Theoretical framework (cognitive), behavioristic and social cognitive), Limitations of OB.	6
02	**Attitude:** Importance of attitude in an organization, Right Attitude, Components of attitude, Relationship between behavior and attitude, Developing Emotional intelligence at the workplace, Job attitude, Barriers to changing attitudes. **Personality and values:** Definition and importance of Personality for performance, The Myers-Briggs Type Indicator and The Big Five personality model, Significant personality traits suitable to the workplace (personality and job – fit theory), Personality Tests and their practical applications. **Perception:** Meaning and concept of perception, Factors influencing perception, Selective perception, Attribution theory, Perceptual process, Social perception (stereotyping and halo effect). **Motivation:** Definition & Concept of Motive & Motivation, The Content Theories of Motivation (Maslow's Need Hierarchy & Herzberg's Two Factor model Theory), The Process Theories (Vroom's expectancy Theory & Porter Lawler model), Contemporary Theories – Equity Theory of Work Motivation.	10
03	**Foundations of Group Behavior:** The Meaning of Group & Group behavior& Group Dynamics, Types of Groups, The Five – Stage Model of Group Development. **Managing Teams:** Why Work Teams, Work Teams in Organization, Developing Work Teams, Team Effectiveness & Team Building. **Leadership:** Concept of Leadership, Styles of Leadership, Trait Approach Contingency Leadership Approach, Contemporary leadership, Meaning and significance of contemporary leadership, Concept of	9

transformations leadership, Contemporary theories of leadership, Success stories of today's Global and Indian leaders.

04	**Organizational Culture** : Meaning & Definition of Organizational Culture, creating & Sustaining Organizational Culture, Types of Culture (Strong vs. Weak Culture, Soft Vs. Hard Culture & Formal vs. Informal Culture), Creating Positive Organizational Culture, Concept of Workplace Spirituality.	**8**
05	**Organizational Change:** Meaning, Definition & Nature of Organizational Change, Types of Organizational Change, Forces that acts as stimulants to change. Implementing Organizational Change : How to overcome the Resistance to Change, Approaches to managing Organizational Change, Kurt Lewin's-Three step model, Seven Stage model of Change & Kotter's Eight-Step plan for Implementing Change, Leading the Change Process, Facilitating Change, Dealing with Individual & Group Resistance, Intervention Strategies for Facilitating Organizational Change, Methods of Implementing Organizational Change, Developing a Learning Organization.	**7**

Reference Books

1. Understanding Organizational Behaviour, Parek, Oxford
2. Organizational Behaviour, Robbins, Judge, Sanghi, Pearson.
3. Organizational Behaviour, K. Awathappa,HPH.
4. Organizational Behaviour, VSP Rao, Excel
5. Introduction to Organizational Behaviour, Moorhead, Griffin, Cengage.
6. Organizational Behaviour, Hitt, Miller, Colella, Wiley

HONOURS SUBJECT

PIT3D001 ARTIFICIAL INTELLIGENCE

Module 1 (12Hrs)

What is Artificial Intelligence? AI Technique, Level of the Model,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.Heuristic Search Techniques: Generate-and-Test, Hill Climbing, Best-first Search, Problem Reduction, Constraint Satisfaction, Means-ends Analysis,**Knowledge Representation:** Representations and Mappings, Approaches to Knowledge Representation, **Using Predicate Logic**: Representing Simple Facts in Logic, Representing Instance and ISA Relationships, Computable Functions and Predicates, Resolution, Natural Deduction.**Using Rules**: Procedural Versus Declarative Knowledge, Logic Programming, Forward Versus Backward Reasoning, Matching, Control Knowledge.**Symbolic Reasoning Under Uncertainty**: Introduction to Nonmonotonic Reasoning, Logics for Nonmonotonic Reasoning, Implementation Issues, Augmenting a Problem-solver, Depth-first Search, Breadth-first Search.**Weak and Strong Slot-and-Filler Structures**: Semantic Nets, Frames, Conceptual DependencyScripts, CYC.

Module 2(10Hrs)

Game Playing: The Minimax Search Procedure, Adding Alpha-beta Cutoffs, Iterative Deepening.**Planning**: The Blocks World, Components of a Planning System, Goal Stack Planning, Nonlinear Planning Using Constraint Posting, Hierarchical PlanningOther Planning Techniques.**Understanding**: What is Understanding, What Makes Understanding Hard?, Understanding as Constraint Satisfaction.**Natural Language Processing**: Introduction, Syntactic Processing, Semantic Analysis, Discourse and Pragmatic Processing, Statistical Natural Language Processing, Spell Checking.

Module 3 (8Hrs)

Learning: Rote Learning, Learning by Taking Advice, Learning in Problem-solving, Learning from Examples: Induction, Explanation-based Learning, Discovery, Analogy, Formal Learning Theory, Neural Net Learning and Genetic Learning. **Expert Systems**: Representing and Using Domain Knowledge, Expert System Shells, Explanation, Knowledge Acquisition.

Text Book:

1. Elaine Rich, Kevin Knight, &Shivashankar B Nair, Artificial Intelligence, McGraw Hill, 3rd ed.,2009

References:

1. Introduction to Artificial Intelligence & Expert Systems, Dan W Patterson, PHI.,2010
2. S Kaushik, Artificial Intelligence, Cengage Learning, 1st ed.2011

PIT3I103 INTRODUCTION TO 3D TECHNOLOGY

(Will be uploaded soon)

PIT3G001 **SOFTWARE ENGINEERING**

(will be uploaded soon)

Fourth Semester								
	Theory					Practical		
Code	**Course Name**	**Hours /week L/T**	**Credit Theory**	**University Marks**	**Internal Evaluation**	**Hours /Week L/T**	**Credit Practical**	**Marks**
HS	Applied Mathematics III	3-0	3	100	50			
PC	Computer Organization & Architecture	3-0	3	100	50	2	1	50
PC	Design & Analysis of Algorithms	3-0	3	100	50	2	1	50
PC	Database System	3-0	3	100	50	2	1	50
PC	Formal Language & Automata Theory	3-0	3	100	50	2	1	50
HS	Engineering Economics/ Organizational Behavior	2-1	3	100	50			
	*Skill Project and Hands on					6	3	100
Total		18	18	600	300	14	7	300
Total Marks: 1200								
Total Credits: 25								
Honours	Data Analytics	4	4	100	50			

Semester : 4th

1.	PIT4D001	Honours(CP)	Data Analytics	4-0-0	4
2.	PIT4E001	HS(CP)	Applied Mathematics III	3-0-0	3
3.	PEK4E002	HS(O1)	Engineering Economics	3-0-0	3
4.	POB4E003	HS(O1)	Organizational Behavior	3-0-0	3
5.	PIT4G001	Minor(CP)	Data Analytics	4-0-0	4
6.	PIT4I101	PC(CP)	Computer Organization & Architecture	3-0-1	4
7.	PIT4I102	PC(CP)	Design & Analysis of Algorithms	3-0-1	4
8.	PIT4I103	PC(CP)	Database System	3-0-1	4
9.	PIT4I104	PC(CP)	Formal Language & Automata Theory	3-0-1	4
10.	PIT4I201	PC(CP)	Skill Project and Hands on	0-0-3	3
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PIT4I101 COMPUTER ORGANIZATION AND ARCHITECTURE

Module – I (06 Hrs)

Basic structures of Computers: Computer Architecture vs. Computer Organization, Functional units, Operational concepts, Registers, Bus and Bus organization, Memory location and addresses, Big-endian and Little-endian representation.

Module – II (14 Hrs)

Basic Processing Units: Fundamental concepts, Instruction format, Instruction set, Addressing modes. Instruction Sequencing, Execution cycle, Hardwired control, Micro programmed control.

Memory System: Basic Concepts, Memory hierarchy, Main Memory, Secondary storage, Cache memory.

Module – III (8 Hrs)

Arithmetic: Addition and Subtraction of signed and unsigned numbers, Multiplication of signed and unsigned numbers, Booth Multiplier, Array Multiplier, Integer Division, Floating- point Numbers and operations.

Module – IV (12 Hrs)

Microprocessors, Instruction set, Assembly Language Programming, Stack, Subroutine, Interrupt, Accessing I/O devices, Standard I/O Interfaces- RS-232C, IEEE-488, USB, Data Transfer techniques.

Text Books:

1. Computer Organization: Carl Hamacher, Zvonkovranesic, Safwat Zaky, McGraw Hill
2. Computer system Architecture: Morris M. Mano PHI.

Reference Book:

1. Computer Architecture: Parhami, Oxford University Press
2. Computer Architecture and Organization: William Stallings, Pearson Education.
3. Computer Architecture and Organization: John P. Hayes McGraw Hill.
4. Computer Architecture and Organization: An Integrated Approach, Murdocca, Heuring Willey India.
5. Computer Organization and Design Hardware/ Software Interface: David A. Patterson, John L. Hennessy, Elsevier.

PIT4I104 FORMAL LANGUAGE AND AUTOMATA THEORY

Module – I (10 Hrs)

Mathematical preliminaries: Alphabet, String, Languages, Grammars, Strings and operations on strings.
Finite Automata: Definition, Basic model, Types of Finite Automata, NFA vs. DFA, NFA to DFA conversion, Eliminating ε-transitions from NFA, NFA as a language acceptor, Minimization of Finite Automata, Design of DFA.

Module – II (10 Hrs)

Regular Expressions: Operators in Regular expressions, Building Finite Automata from Regular expression, Arden's theorem, Building Regular expression from Finite Automata, Pumping Lemma for Regular languages, Closure properties of Regular languages.CYK algorithm.
Context Free Grammars: Derivation and Parse Trees, Ambiguity, Elimination of Ambiguity, Simplification of a CFG, Chomsky and Greibach Normal Forms. Closure and Decision Properties of CFL, Pumping Lemma for CFL.

Module – III (12 Hrs)

Push Down Automata: Basic Model, Components, Moves of a PDA, ID of a PDA, Design of a PDA, PDA to CFG and CGA to PDA conversion.
Turing Machines: Model, Components, move of a TM, ID of TM, design of a TM, Recursively Enumerable Languages, Variation of Turing Machine model, Universal Turing Machine and Undecidable problems, Undecidability of Post correspondence problem.
Linear Bounded Automata and Context Sensitive Languages, Chomsky's Hierarchy of Languages.

Module – IV (08 Hrs)

Primitive Recursive functions: μ- Recursive functions, Cantor and Godel numbering, Ackermann's function, Excursiveness of Ackermann and Turing computable functions. Church Turing hypothesis, Recursive and Recursively Enumerable sets, NP Completeness: P and NP, NP complete and NP Hard problems.

Text Books:

1. Introduction to Automata Theory, Languages and Computation: J. E. Hopcroft, J. D Ullman, Pearson Education.
2. Formal Language and Automata Theory, C. K. Nagpal, Oxford University Press.

Reference Books:

1. Introduction to Formal Languages, Automata Theory and Computation, K. Kirthivasan, Rama R, Pearson Education.
2. Introduction to Languages and the Theory of Computation, Martin, Tata Mc-Graw Hill.
3. Theory of Computation, V. Kulkarni, Oxford University Press.
4. Elements of Theory of Computation, Lewis, PHI.
5. Introduction to the theory of computation, Michael Sipser, Cengage Learning.

PIT4I102 DESIGN AND ANALYSIS OF ALGORITHM

Module- I (10 Hours)

Introduction, Definition, Chrematistics of algorithm, Growth of Functions, Asymptotic analysis, Amortized analysis, standard notations and common functions, Recurrences, solution of recurrences by substitution, recursion tree, induction method, and Master methods, Algorithm design techniques, worst case analysis of Merge sort, Quick sort and Binary search, Design & Analysis of Divide and conquer algorithms.

Module – II (10 Hours)

Heapsort mechanism, Heaps, Building a heap, The heapsort algorithm, Priority Queue, Lower bounds for sorting. Dynamic programming methodology, Elements of dynamic programming, Matrix-chain multiplication, Longest common subsequence, Greedy Algorithms, Elements of Greedy strategy, Assembly-line scheduling, Activity selection Problem, Fractional knapsack problem, Huffman codes).

Module – III (10 Hours)

Data structure for disjoint sets, Disjoint set operations, Linked list representation, path compression, Disjoint set forests. Graph Algorithms and their characteristics, Breadth first search and depth-first search, Minimum Spanning Trees, Kruskal algorithm and Prim's algorithms, single- source shortest paths (Bellman-ford algorithm and Dijkstra's algorithms), All-pairs shortest paths (Floyd – Warshall Algorithm).

Module – IV (10 Hours)

Back tracking, Branch and Bound, Eight Queen problem, string matching algorithms, naïve string matching algorithm, Rabin-Karp algorithm,Knuth–Morris–Pratt algorithm, NP - Completeness (Polynomial time, Polynomial time verification, NP - Completeness and reducibility, NP-Complete problems (without Proofs), Approximation algorithms characteristics, Traveling Salesman Problem.

Text Book:

1.T.H. Cormen, C.E. Leiserson, R.L. Rivest, C.Stein : Introduction to Algorithms, 2nd Edition, PHI Learning Pvt. Ltd.

2. H. Bhasin: Algorithms, Design and Analysis, First Edition, Oxford Higher Education.

Reference Books:

3. Sanjay Dasgupta, Umesh Vazirani: **Algorithms**, McGraw-Hill Education.
4. Horowitz & Sahani: **Fundamentals of Algorithm**, 2nd Edition, Universities Press.
5. Goodrich, Tamassia: **Algorithm Design**, Wiley India.

DESIGN AND ANALYSIS OF ALGORITHMS LAB

1. Using a stack of characters, convert an infix string to postfix string (1 class)

2. Implement insertion, deletion, searching of a BST. (1 class)

3. (a) Implement binary search and linear search in a program
   (b)Implement a heap sort using a max heap.

4. (a) Implement DFS/ BFS for a connected graph.
   (b)Implement Dijkstra's shortest path algorithm using BFS.

5. (a) Write a program to implement Huffman's algorithm.
   (b)Implement MST using Kruskal /Prim algorithm.

6. (a) Write a program on Quick sort algorithm.
   (b)Write a program on merge sort algorithm.
   Take different input instances for both the algorithm and show the running time.

7. Implement Strassen's matrix multiplication algorithm.

8. Write down a program to find out a solution for 0 / 1 Knapsack problem.

9. Using dynamic programming implement LCS.

10. (a) Find out the solution to the N-Queen problem.
    (b)Implement back tracking using game trees.

- *College should conduct at least one NSDC program under this category.

PIT4I103

DATABASE SYSTEM

Module I: **(10 Hours)**

Introduction to database Systems, advantages of database system over traditional file system, Basic concepts & Definitions, Database users, Database Language, Database System Architecture, Schemas, Sub Schemas, & Instances, database constraints, 3-level database architecture, Data Abstraction, Data Independence, Mappings, Structure, Components & functions of DBMS, Data models.

Module II: **(10 Hours)**

Entity relationship model, Components of ER model, Mapping E-R model to Relational schema, Network and Object Oriented Data models, Storage Strategies**:** Detailed Storage Architecture, Storing Data, Magnetic Disk, RAID, Other Disks, Magnetic Tape, Storage Access, File & Record Organization, File Organizations & Indexes, Order Indices, B+ Tree Index Files, Hashing Data Dictionary

Module III: **(10 Hours)**

Relational Algebra, Tuple & Domain Relational Calculus, Relational Query Languages: SQL and QBE. Database Design :-Database development life cycle (DDLC), Automated design tools, Functional dependency and Decomposition, Join strategies, Dependency Preservation & lossless Design, Normalization, Normal forms:1NF, 2NF,3NF, and BCNF, Multi-valued Dependencies, 4NF & 5NF. Query processing and optimization: Evaluation of Relational Algebra Expressions, Query optimization, Query cost estimation.

Module IV: **(10 Hours)**

Transaction processing and concurrency control: Transaction concepts, properties of transaction, concurrency control, locking and Timestamp methods for concurrency control schemes. Database Recovery System, Types of Data Base failure & Types of Database Recovery, Recovery techniques. fundamental concepts on Object-Oriented Database, Object relational database, distributed database, Parallel Database, Data warehousing & Data Mining and Big data and NoSQL.

Text Books:

1. Sudarshan, Korth: **Database System Concepts**, 6th edition, McGraw-Hill Education.

References Books:

1. Elmasari &Navathe: **Fundamentals of Database System**, Pearson Education.
2. Ramakrishnan: **Database Management Systems**, McGraw-Hill Education.
3. Andrew S. Tanenbaum: **Modern Operating Systems**, 3rd Edition, Pearson Education.
4. Terry Dawson, Olaf Kirch: **Linux Network Administrator's Guide**, 3rd Edition, O'Reilly Medi

DATABASE ENGINEERING LAB

1. Use of SQL syntax: insertion, deletion, join, updation using SQL. (1 class)
2. Programs on join statements and SQL queries including where clause. (1 class)
3. Programs on procedures and functions. (1 class)
4. Programs on database triggers. (1 class)
5. Programs on packages. (1 class)
6. Programs on data recovery using check point technique. (1 class)
7. Concurrency control problem using lock operations. (1 class)
8. Programs on ODBC using either VB or VC++. (1 class)
9. Programs on JDBC. (1 class)
10. Programs on embedded SQL using C / C++ as host language. (1 class)

PIT4D001 DATA ANALYTICS

(Will be uploaded soon)

PIT4E001 Applied Mathematics - III

Module-I

Complex Analysis:

Analytic function, Cauchy-Riemann equations, Complex integration: Line integral in the complex plane, Cauchy's integral theorem, Cauchy's integral formula, Derivatives of analytic functions, Taylor's series, Maclaurin's series, Laurent's series, Singularities and zeros.

Module-II

Complex Analysis:

Residue integration method, evaluation of real integrals

Numerical Methods:

Errors of numerical results, error propagation,., Lagrange Interpolation, Newton divided difference interpolation, Newton's forward and backward interpolation, Spline interpolation.

Module-III

Numerical Methods:

Numerical integration: The trapezoidal rule, The Simpson's rules, Gauss Integration formulas.

Solution of ordinary differential equation: Euler's method, Improvement of Euler's method, Runge-Kutta methods, multi step methods, Methods for system and higher order ordinary differential equations.

Module-IV

Probability Theory and Its Applications: Probability, Random variables, Probability distributions, Mean and variance; Features of Probability Distribution: Binomial, Poisson, Uniform and Normal distribution, Distribution of several random variables.

Statistical Techniques and Its Applications: Scope of Statistics, Random sampling, Sampling Distribution, Correlation analysis, Regression Analysis, Fitting Straight Lines, Estimation of Parameters, Statistical Hypothesis.

Text books:

1. E. Kreyszig," Advanced Engineering Mathematics:,Tenth Edition, Wiley India
2. S.Pal and S.C. Bhunia, "Engineering Mathematics" Oxford University Press
3. Jay L. Devore, "Probability and Statistics for Engineering and Sciences", Seventh Edition, Thomson/CENGAGE Learning India Pvt. Ltd

Reference books:

1. E.B. Saff, A.D.Snider, "Fundamental of Complex Analysis", Third Edition, Pearson Education, New Delhi
2. P. V. O'Neil, "Advanced Engineering Mathematics", CENGAGE Learning, New Delhi

Third Year Engineering

Fifth Semester								
	Theory					Practical		
Code	**Course Name**	**Hours/week L/T**	**Credit Theory**	**University Marks**	**Internal Evaluation**	**Hours/week L/T**	**Credit Practical**	**Marks**
PC	Operating system	3-0	3	100	50	2	1	50
PC	Advanced JAVA Programming	3-0	3	100	50	2	1	50
PC	E-Commerce & ERP	3-0	3	100	50	2	1	50
PE	Computer Graphics/Internet of Things/Software testing/Parallel Algorithms	3-1	4	100	50			
OE	Cloud Computing/Data Mining & Data Warehousing/Computer Vision/Information Retrieval	3-1	4	100	50			
PC	Advance Lab-I					8	4	200
Total		17	17	500	250	14	7	350
Total Marks: 1100								
Total Credits: 24								
For Honours and Minor Specialization		4	4	100	50			

Semester : 5th

1.	PIT5D001	Honours(CP)	Real Time Systems	4-0-0	4
2.	PIT5G001	Minor(CP)	Real Time Systems	4-0-0	4
3.	PIT5H001	OE(O2)	Cloud Computing	4-0-0	4
4.	PIT5H002	OE(O2)	Data Mining & Data Warehousing	4-0-0	4
5.	PIT5H003	OE(O2)	Computer Vision	4-0-0	4
6.	PIT5H004	OE(O2)	Information Retrieval	4-0-0	4
7.	PIT5I101	PC(CP)	Operating Systems	3-0-1	4
8.	PIT5I102	PC(CP)	Advanced JAVA Programming	3-0-1	4
9.	PIT5I103	PC(CP)	E-Commerce & ERP	3-0-1	4
10.	PIT5I201	PC(CP)	Advance Lab - I	0-0-4	4
11.	PIT5J001	PE(O3)	Computer Graphics	4-0-0	4
12.	PIT5J002	PE(O3)	Internet of Things	4-0-0	4
13.	PIT5J003	PE(O3)	Software Testing	4-0-0	4
14.	PIT5J004	PE(O3)	Parallel Algorithms	4-0-0	4
					28

PIT5J001COMPUTER GRAPHICS

Module – I (12 hours)

Overview of Graphics System: Video Display Units, Raster-Scan and Random Scan Systems, Graphics Input and Output Devices.
Output Primitives: Line drawing Algorithms: DDA and Bresenham's Line Algorithm, Circle drawing Algorithms: Midpoint Circle Algorithm and Bresenham's Circle drawing Algorithm.
Two Dimensional Geometric Transformation: Basic Transformation (Translation, Rotation, Scaling) Matrix Representation, Composite Transformations, Reflection, Shear, Transformation between coordinate systems.

Module – II (12 hours)

Two Dimensional Viewing: Window-to- View Port Coordinate Transformation.
Line Clipping (Cohen-Sutherland Algorithm) and Polygon Clipping (Sutherland-Hodgeman Algorithm)
Aliasing and Antialiasing, Half Toning, Thresholding, Dithering.
Polygon Filling: Seed Fill Algorithm, Scan line Algorithm.
Two Dimensional Object Representations: Spline Representation, Bezier Curves, B-Spline Curves.
Fractal Geometry: Fractal Classification and Fractal Dimension.

Module – III (8 hours)

Three Dimensional Geometric and Modeling Transformations: Translation, Rotation, Scaling, Reflections, shear, Composite Transformation.
Projections: Parallel Projection, Perspective Projection.
Visible Surface Detection Methods: Back-Face Detection, Depth Buffer, A- Buffer, Scan- Line Algorithm, Painters Algorithm.

Module – IV (8 hours)

Illumination Models: Basic Models, Displaying Light Intensities.
Surface Rendering Methods: Polygon Rendering Methods: Gouraud Shading, Phong Shading.
Computer Animation: Types of Animation, Key frame Vs. Procedural Animation, Methods of Controlling Animation, Morphing.
Introduction to Virtual Reality and Augmented Reality.

Textbook:

1. Computer Graphics, D. Hearn and M.P. Baker (C Version), Pearson Education.

Reference Books:

1. Computer Graphics Principle and Practice, J.D. Foley, A. Dam, S.K. Feiner, Addison Wesley.
2. Procedural Elements of Computer Graphics, David Rogers, TMH.
3. Computer Graphics: Algorithms and Implementations, D.P Mukherjee, D. Jana, PHI.
4. Computer Graphics, Z. Xiang, R. A. Plastock, Schaum's Outlines, McGrow Hill.
5. Computer Graphics, S. Bhattacharya, Oxford University Press.

PIT5G001REAL TIME SYSTEMS

(Will be uploaded soon)

PIT5J004PARALLEL ALGORITHMS

Module – I (10 Hrs)

Introduction: Need for High Performance Computer, Motivation for Parallelism, Methods to achieve High Performance, Parallel Programming Platforms- Control structure of parallel platform, Pipelining, Superscalar Architecture, Super Pipelined Architecture, VLIW Architecture, Pipelining vs. Parallelism.

Module – II (10Hrs)

Interconnection Networks for Parallel Computer: Static Interconnection Networks, Network Topologies, Evaluation of Static Network, Dynamic Interconnection Networks, Evaluation of Dynamic Network, Routing Mechanism for Interconnection Network.

Module – II (10 Hrs)

Designing Parallel Algorithms: Temporal Parallelism, Data Parallelism, Task Decomposition, Concurrency, Granularity selection, Inter-Task Dependency, Dependency Graph, Parallel Algorithm Models, Models of Computation, Performance Metrics of Parallel Algorithm, Amdahl's Law.

Module – II (10 Hrs)

Parallel Programming: Sorting, Searching, Matrix Multiplication, Data dependency and Loop Optimizations, Message Passing Programming, Shared Memory Programming, Data Parallel Programming, Performance evaluation of Parallel Computer.

Text Book

1. A. Grama, A. Gupta, G. Karypis, V. Kumar, Introduction to Parallel Computing, Pearson.
2. V. Rajaraman, C. S. R. Murthy, Parallel Computers Architecture and Programming, PHI.

References:

1. M. J. Quinn, Designing Efficient Algorithms for Parallel Computers, McGraw-Hill
2. W. P. Petersen, P. Arbenz, Introduction to Parallel Computing, Oxford University Press.
3. B. Wilkinson, M. Allen, Parallel Programming, Pearson.
4. H. Attiya, J. Welch, Distributed Computing Fundamentals, Simulations and Advanced Topics, Wiley.
5. T. G. Lewis, Parallel Programming: A Machine-Independent Approach, IEEE Computer Society Press.
6. M. R. Bhujade, Parallel Computing, New Age.

PIT5I101OPERATING SYSTEM

MODULE-I (10 Hours)

Overview Operating System, Simple Batch Processing Systems, Multiprogramming and Time Sharing systems. Personal Computer Systems, Parallel Systems, Distributed Systems and Real- time Systems. OperatingSystem Structures: Operating System Services, System components, Protection system, Operating System Services, system calls, Process Concept, Process Scheduling, Operation on Processes, Inter-process communication, Examples of IPC Systems, Multithreading Models, Threading Issues, Process Scheduling Basic concepts, scheduling criteria, scheduling algorithms, Thread Scheduling.

MODULE-II (12 Hours)

Process Coordination, Synchronization, Critical section problem, Synchronization hardware, Semaphores, Classical problems of synchronization, Monitors. Deadlocks, System model, Deadlock Characterization, Handling Deadlocks, Deadlock Prevention, Deadlock avoidance, Deadlock Detection, recovery from Deadlock. Memory Management strategies, Logical versus Physical Address space, swapping, contiguous Allocation, Paging, Segmentation. Virtual Memory: Background, Demand paging, performance of Demand paging, Page Replacement, Page Replacement Algorithms. Allocation of frames, Thrashing, Demand
Segmentation.

MODULE-III (08 Hours)

Recovery, Overview of Mass Storage Structure, Disk Structure, Disk Scheduling, Disk Management, Swap-Space Management, I/O System Overview, I/O Hardware, Application I/O Interface, Kernel I/O Subsystem, Transforming I/O Request to Hardware Operation.

MODULE-IV (10 Hours)

File system, file structure, Directory Structure, Allocation Methods, Basic concepts of Linux system, administration requirements, setting up Linux multi-server setup, setting up of local network services, domain name systems, Virtualization concepts, classification, VM ware and Hypervisor concepts.

TEXT BOOK:

1. Abraham Silberschatz, Peter Baer Galvin, Greg Gagne: **Operating System Concepts,** 8th edition, Wiley-India, 2009.
2. Dhamdhare: **Operating Systems: A Concept**, 3rd Edition, Tata McGraw Hill Education India

REFERENCE BOOK:

1. Naresh Chouhan**: Principles of Operating System,** Oxford University Press.
2. William Stallings: **Operating Systems,** PHI Learning Pvt. Ltd.
3. H.M. Deitel, P. J. Deitel, D. R. Choffnes: **Operating Systems,** 3rdEdition, Pearson Education.
4. Andrew S. Tanenbaum: **Mordern Operating Systems,** 3rdEdition, PHI Learning Pvt. Ltd.

OPERATING SYSTEM LABORATORY

1. Basic UNIX Commands.
2. Linux Administrative commands.
3. UNIX Shell Programming.
4. Programs on process creation and synchronization, inter process communication including shared memory, pipes and messages. (DinningPhilosopher problem / Cigarette Smoker problem / Sleeping barber problem)
5. Programs on UNIX System calls.
6. Simulation of CPU Scheduling Algorithms. (FCFS, RR, SJF, Priority, Multilevel Queuing)
7. Simulation of Banker's Algorithm for Deadlock Avoidance, Prevention
8. Program for FIFO, LRU, and OPTIMAL page replacement algorithm.
9. Android Programming for mobile application.

PIT5H001CLOUD COMPUTING

(Will be uploaded soon)

PIT5H002DATA MINING AND DATA WIRE HOUSING

(Will be uploaded soon)

PIT5H003COMPUTERVISION

(Will be uploaded soon)

PIT5H004INFORMATION RETRIVAL

(Will be uploaded soon)

PIT5I001OPERATING SYSTEMS

(Will be uploaded soon)

PIT5I201ADVANCE LAB-I

(Will be uploaded soon)

PIT5I102ADVANCED JAVA PROGRAMMING

(Will be uploaded soon)

PIT5J002INTERNET OF THINGS

(Will be uploaded soon)

PIT5J003SOFTWARE TESTING

(Will be uploaded soon)

PIT5I103E Commerce and ERP

(Will be uploaded soon)

Sixth Semester								
	Theory					Practical		
Code	**Course Name**	**Hours/week L/T**	**Credit Theory**	**University Marks**	**Internal Evaluation**	**Hours/week L/T**	**Credit Practical**	**Marks**
PC	Computer Network & Data Communication	3-0	3	100	50	2	1	50
PC	Internet & Web Technology	3-0	3	100	50	2	1	50
PE	Compiler Design/Digital Image Processing/ Requirement Engg./Natural Language Processing/Wireless Sensor Networks/Beg Data Analytics	3-1	4	100	50			
PE	Pattern Recognition/ Machine Learning/Object Oriented Software Engg.	3-1	4	100	50			
MC & GS	Environmental Science & Engineering	3-0	3	100	50			
OE	Industrial Lecture #					3	1	50
HS	Presentation Skill & Skill for Interview # #	2-0	1		50	4	2	100
MC	Yoga					2	1	50
Total		19	18	500	300	13	6	300
Total Marks: 1100								
Total Credits: 24								
For Honours and Minor Specialization		4	4	100	50			

Semester : 6th

1.	PIT6D001	Honours(CP)	Embedded Systems	4-0-0	4
2.	PIT6E101	HS(CP)	Business Communication & Skill for Interview	1-0-2	3
3.	PIT6G001	Minor(CP)	Embedded Systems	4-0-0	4
4.	PIT6H301	OE(CP)	Industrial Lecture #	0-0-1	1
5.	PIT6I101	PC(CP)	Computer Network and Data Communication	3-0-1	4
6.	PIT6I102	PC(CP)	Internet & Web Technology	3-0-1	4
7.	PIT6J001	PE(O1)	Compiler Design	4-0-0	4
8.	PIT6J002	PE(O1)	Digital Image Processing	4-0-0	4
9.	PIT6J003	PE(O1)	Requirement Engineering	4-0-0	4
10.	PIT6J004	PE(O1)	Natural Language Processing	4-0-0	4
11.	PIT6J005	PE(O1)	Wireless Sensor Networks	4-0-0	4
12.	PIT6J006	PE(O1)	Beg Data Analytics	4-0-0	4
13.	PIT6J007	PE(O2)	Pattern Recognition	4-0-0	4
14.	PIT6J008	PE(O2)	Machine Learning	4-0-0	4
15.	PIT6J009	PE(O2)	Object Oriented Software Engineering	4-0-0	4
16.	PIT6L101	^SE(CP)		3-0-1	4
					28

PIT6I101 COMPUTER NETWORK AND DATA COMMUNICATION

Module – I (12 Hrs)

Overview of Data Communication Networks, Protocols and standards, OSI Reference model, TCP/IP Protocol.

Physical Layer: Analog Signals, Digital Signals, Data Rate Limits, Transmission Impairment, Data rate limit, Digital Transmission: Digital-to-Digital conversion, Analog-to-Digital conversion, Transmission modes, Analog Transmission: Digital-to-Analog conversion, Analog-to-Analog conversion, Multiplexing: Frequency Division Multiplexing (FDM), Wave Division Multiplexing (WDM), Time Division Multiplexing (TDM), Transmission Media: Guided Media (Twisted-Pair Cable, Coaxial Cable and Fiber-Optic Cable) and unguided media (wireless), Switching: Circuit Switched Network, Datagram Network, Virtual-Circuit Network , Telephone Network, Dial-up Modems and Digital Subscriber Lines.

Module – II (10 Hrs)

Error Detection and correction: Types of Errors, Error Detection mechanism (Linear codes, CRC, Checksum), Error Correction mechanism: Hamming Encoding.

Data Link Control and Protocols: Flow and Error Control, Stop-and-Wait ARQ. Go-Back-N ARQ, Selective Repeat ARQ, HDLC and Point-to-Point Protocol

Multiple Access: Random Access (ALOHA, CSMA, CSMA/CD, CSMA/CA), Controlled Access (Polling, Reservation, Token Passing), Channelization (FDMA, TDMA, CDMA).

Wired LANs (Ethernet): Traditional Ethernet, Fast Ethernet, Gigabit Ethernet.

Module – III (10 Hrs)

Wireless LANs: IEEE 802.11 and Bluetooth.

Connecting Devices: Passive Hub, Repeater, Active Hub, Bridge, Two layers Switch, Router, Three layers Switch, Gateway.

Virtual Circuit Networks: Frame Relay, Architecture & layers, ATM: Design goals, Architecture & layers.

Network Layer: IPV4 addresses, IPV6 addresses, Internet Protocol: Internetworking, IPV4 datagram, IPV6 packet format and advantages. Network Layer Protocols: ARP, RARP, IGMP and ICMP. Routing: Unicast Routing Protocols and Multicast Routing Protocols.

Transport Layer: Process to Process Delivery, User Datagram Protocol (UDP) and Transmission Control Protocol (TCP).

Module – IV (08Hrs)

Domain Name System (DNS): Name Space, Domain Name Space, DNS in Internet, Resolution and Dynamic Domain Name System (DDNS), Remote logging, Electronic Mail (SMTP) and file transfer (FTP), WWW: Architecture & Web document, HTTP: Transaction & Persistent vs. Nonpersistent connection.

Introduction to Wi-Fi and Li-Fi Technology.

Text Books:

1. Data Communications and Networking, Behrouz A. Forouzan, Tata McGraw-Hill.
2. Computer Networks, A. S. Tannenbum, D. Wetherall, Prentice Hall, Imprint of Pearson.

Reference Book:

1. Network for Computer Scientists & Engineers, Zheng, Oxford University Press.
2. Computer Networks A system Approach, Larry L, Peterson and Bruce S. Davie, Elsevier.
3. Computer Networks, Natalia Olifer, Victor Olifer, Willey India.
4. Data and Computer Communications, William Stallings, Prentice Hall, Imprint of Pearson.

PIT6I001COMPILER DESIGN

Module – I (16 Hrs)

Introduction: Overview and Phases of compilation.
Lexical Analysis: Non-Deterministic and Deterministic Finite Automata (NFA & DFA), Regular grammar, Regular expressions and Regular languages, Design of a Lexical Analyzer as a DFA, Lexical Analyzer generator.
Syntax Analysis: Role of a Parser, Context free grammars and Context free languages, Parse trees and derivations, Ambiguous grammar.
Top Down Parsing: Recursive descent parsing, LL (1) grammars, Non-recursive Predictive Parsing, Error reporting and Recovery.
Bottom Up Parsing: Handle pruning and shift reduces Parsing, SLR parsers and construction or SLR parsing tables, LR(1) parsers and construction of LR(1) parsing tables, LALR parsers and construction of efficient LALR parsing tables, Parsing using Ambiguous grammars, Error reporting and Recovery,Parser generator.

Module – II (08 Hrs)

Intermediate Code Generation: DAG for expressions, Three address codes - Quadruples and Triples, Types and declarations, Translation of Expressions, Array references, Type checking and Conversions, Translation of Boolean expressions and control flow statements, Back Patching, Intermediate Code Generation for Procedures.

Module – III (08 Hrs)

Code Generation: Factors involved, Registers allocation, Simple code generation using STACK Allocation, Basic blocks and flow graphs, Simple code generation using flow graphs.
Code Optimization: Objective, Peephole Optimization, Concepts of Elimination of local common sub-expressions, Redundant and un-reachable codes, Basics of flow of control optimization.

Module – IV (08 Hrs)

Run Time Environment: Storage Organizations, Static and Dynamic Storage Allocations, STACK Allocation, Handlings of activation records for calling sequences.
Syntax Directed Translation: Syntax Directed Definitions (SDD), Inherited and Synthesized Attributes, Dependency graphs, Evaluation orders for SDD, Semantic rules, Application of Syntax Directed Translation.
Symbol Table: Structure and features of symbol tables, symbol attributes and scopes.

Text Book:

1. Compilers – Principles, Techniques and Tools, A. V. Aho, M. S. Lam, R. Sethi, J. D. Ullman, Pearson.
2. Compiler Design, S. Chattopadhyay, PHI.

Reference Books:

1. Modern Compiler Design, D. Galles, Pearson Education.
2. Advanced Compiler Design & Implementation, S. S. Muchnick, Morgan Kaufmann.
3. Compiler Design in C, A. I. Holub, PHI

PIT6D001EMBEDDED SYSTEMS

(Will be uploaded soon)

PIT6E101PRESENTATION SKIL FOR INTERVIEW

(Will be uploaded soon)

PIT6H301INDUSTRIAL LECTURE

(Will be uploaded soon)

PIT6J001DIGITAL IMAGE PROCESSING

(Will be uploaded soon)

PIT6J003NEURAL LANGUAGE PROCESSING

(Will be uploaded soon)

PIT6J004WIRELESS SENSOR NETWORKS

(Will be uploaded soon)

PIT6J005INTERNET AND WAVE TECHNOLOGY

(Will be uploaded soon)

PIT6J006PATTERN RECOGNITION

(Will be uploaded soon)

PIT6J007MACHINE LEARNING

(Will be uploaded soon)

PIT6J006Beg Data Analytics
(Will be uploaded soon)

PIT6J003 REQUIREMENT ENGINEERING
(Will be uploaded soon)

PIT6J009 Object Oriented Software Engineering
(Will be uploaded soon)

Final Year Engineering

Seventh Semester								
	Theory					Practical		
Code	**Course Name**	**Hours/week L/T**	**Credit Theory**	**University Marks**	**Internal Evaluation**	**Hours/week L/T**	**Credit Practical**	**Marks**
GS	Nano Science & Bio Technology	3-1	4	100	50			
PE	Cryptography & Network Security/Usability Engg./Service Oriented Architecture/Social Networks	3-1	4	100	50			
PE	Mobile Computing/Software Project Management/Algorithm for Bioinfomatics/Experts Systems	3-1	4	100	50			
OE	Soft Computing */Other subjects	3-1	4	100	50			
PC	Advance Lab-II/ Project					8	4	200
	Projects on Internet of Things					8	4	200
Total		16	16	400	200	16	8	400
Total Marks: 1000								
Total Credits: 24								
For Honours and Minor Specialization		4	4	100	50			

Semester : 7th

1.	PIT7C001	GS(CP)	Nano & Bioscience	4-0-0	4
2.	PIT7D001	Honours(CP)	Computational Number Theory	4-0-0	4
3.	PIT7G001	Minor(CP)	Advanced Operating System	4-0-0	4
4.	PIT7H001	OE(O4)	Soft Computing	4-0-0	4
5.	PIT7H002	OE(O4)	Other subjects	4-0-0	4
6.	PIT7H201	FE(CP)	Projects on Internet of Things	0-0-4	4
7.	PIT7I201	PC(O3)	Advance Lab - II	0-0-4	4
8.	PIT7I202	PC(O3)	Project	0-0-4	4
9.	PIT7J001	PE(O1)	Cryptography & Network Security	4-0-0	4
10.	PIT7J002	PE(O1)	Usability Engineering	4-0-0	4
11.	PIT7J003	PE(O1)	Service Oriented Architecture	4-0-0	4
12.	PIT7J004	PE(O1)	Social Networks	4-0-0	4
13.	PIT7J005	PE(O2)	Mobile Computing	4-0-0	4
14.	PIT7J006	PE(O2)	Software Project Management	4-0-0	4
15.	PIT7J007	PE(O2)	Algorithm for Bioinformatics	4-0-0	4
16.	PIT7J008	PE(O2)	Expert Systems	4-0-0	4
					28

PIT7H001 SOFT COMPUTING

MODULE – I (8 hours)

Basic tools of soft Computing: Fuzzy logic, Neural Networks and Evolutionary Computing, Approximations of Multivariate functions, Non – linear Error surface and optimization.

MODULE – II (8 hours)

Fuzzy Logic Systems: Basics of fuzzy logic theory, Crisp and fuzzy sets; Basic set operations; Fuzzy relations, Composition of Fuzzy relations, Fuzzy inference, Zadeh's compositional rule of inference; Defuzzificaiton ; Fuzzy logic control; Mamdani and Takagi and Sugeno architectures. Applications to pattern recognition.

MODULE—III (16 hrs)

Neural networks: Single layer networks, Perceptron; Activation functions; Adalinc- its training and capabilities, weights learning, Multilayer perceptrons; error back propagation, generalized delta rule; Radial basis function networks and least square training algorithm, Kohenen self – organizing map and learning vector quantization networks; Recurrent neural networks, Simulated annealing neural networks; Adaptive neuro-fuzzy information; systems (ANFIS),

MODULE—IV (08 hrs)

Evolutionary Computing: Genetic algorithms: Basic concepts, encoding, fitness function, reproduction. Differences of GA and traditional optimization methods. Basic genetic, basic evolutionary programming concepts Applications, hybrid evolutionary algorithms.

ADDITIONAL MODULE (Terminal Examination-Internal)

Applications to Different Engineering problems.

Text Books

1) *F. O. Karry and C. de Silva, "Soft Computing and Intelligent Systems Design – Theory, Tools and Applications". Pearson Education. (Printed in India).*

Reference Books

1) J. S. R. Jang. C. T. SUN and E. Mizutani, "Neuro-fuzzy and soft-computing". PHI Pvt. Ltd., New Delhi.

2) Fredric M. Ham and Ivica Kostanic, "Principle of Neuro Computing for Science and Engineering", Tata McGraw Hill.

3) S. Haykins, "Neural networks: a comprehensive foundation". Pearson Education, India.

4) V. Keeman, "Learning and Soft computing", Pearson Education, India.

5) R. C. Eberhart and Y. Shi, "Computational Intelligence Concepts to Implementation". Morgan Kaufmann Publishers (Indian Reprint).

PIT7J005MOBILE COMPUTING

Module - I **(10 Hours)**

Introduction to Personal Communications Services (PCS): PCS Architecture, mobility management, Networks signalling, Global System for Mobile Communication (GSM) System overview: GSM Architecture, Mobility management, Network signalling. General Packet Radio Services (GPRS): GPRS Architecture, GPRS Network Nodes, Mobile Data Communication; WLANs (Wireless LANs) IEEE 802.II standard, Mobile IP.

Module - II **(12 Hours)**

Wireless Application Protocol (WAP): The Mobile Internet standard, WAP Gateway and Protocols, wireless mark-up Languages (WML), Wireless Local Loop (WLL): Introduction to WLL Architecture, wireless Local Loop Technologies. Third Generation (3G) Mobile Services: Introduction to International Mobile Telecommunications 2000 (IMT 2000) Vision, Wideband Code Division Multiple Access (W-CDMA), and CDMA 2000

Module - III **(10 Hours)**

Global Mobile Satellite Systems; case studies of the IRIDIUM, ICO and GLOBALSTAR systems. Wireless Enterprise Networks: Introduction to Virtual Networks, Blue tooth technology, Blue tooth Protocols. Server-side programming in Java, Pervasive web application architecture, Device independent example application.

Module - IV **(08 Hours)**

Mobile Device Operating System, Commercial mobile operating systems, Software development kit, iOS, Android, Windows phones, M-Commerce, Mobile transaction system, related security issues, 4G technology, fundamental concepts of mobile cloud computing and different application instances.

Text Books:

1. P.K. Patra, S.K. Dash: **Mobile Computing**, Scitech Publications.
2. Rajkamal: **Mobile Computing**, Oxford University Press.
3. J. Schiller: **Mobile Communication**, Pearson Education

Reference Books:

1. Burkhardt: **Pervasive Computing**, Pearson Education.
2. Hansmann, Merk: **Principles of Mobile Computing**, 2nd Edition, Springer.
3. P. Stavronlakis: **Third Generation Mobile Telecommunication Systems**, Springer.
4. Sandeep Singhal: **The Wireless Application Protocol**, Pearson Education.

PIT7C001NANO AND BIOSCIENCES

(Will be uploaded soon)

PIT7D001COMPUTATIONAL NUMBER THEORY

(Will be uploaded soon)

PIT7H002OTHER SUBJECTS

(Will be uploaded soon)

PIT7H201PROJECTS ON INTERNET OF THINGS

(Will be uploaded soon)

PIT7I201ADVANCE LAB-II

(Will be uploaded soon)

PIT7I202PROJECT

PIT7J001CRYPTOGRAPHY AND NETWORK SECURITY

(Will be uploaded soon)

PIT7J002USABILITY ENGINEERING
(Will be uploaded soon)

PIT7J003 SERVICE ORIENTED ARCHITECTURE
(Will be uploaded soon)

PIT7J004SOSIAL NETWORKS

PIT7J006SOFTWARE PROJECT MANAGEMENT

(Will be uploaded soon)

PIT7J007ALGORITHM FOR BIOINFORMATICS

(Will be uploaded soon)

PIT7J008EXPERT SYSTEMS

(Will be uploaded soon)

PIT7G001ADVANCE OPERATING SYSTEMS
(Will be uploaded soon)