BIT 233

MINI PROJECT - I

Instruction 3 Periods per week
Sessional 25 Marks

The Student is required to take one of larger projects listed in the suggested reading under project exercises, implement and submit report.

During the mini project, Personal Software Process Principles should be applied and the workbooks and project report should be evaluated.

SCHEME OF INSTRUCTION AND EXAMINATION

B.E. IInd YEAR (REGULAR)

INFORMATION TECHNOLOGY

SEMESTER - II

Sl. No.	Syllabus Ref. No.	Subject	Scheme of Instruction		Scheme of Examination		
			Periods per Week		Duration in Hrs	Maximum Marks	
			L	D/P		Univ. Exam	Sessionals
		THEORY					
1	BIT 251	Probability & Random Processes	4	-	3	75	25
2	BIT 252	Signals & Systems	4	-	3	75	25
3	BIT 253	Electronic Communication Techniques	4	-	3	75	25
4	BIT 254	Computer Organization & Microprocessors	4	-	3	75	25
5	BIT 255	OOP using JAVA	4	-	3	75	25
6	BIT 256	Software Engineering	4	-	3	75	25
		PRACTICALS					
1	BIT 281	Microprocessor Lab.	-	3	3	50	25
2	BIT 282	Java Programming Lab.	-	3	3	50	25
3	BIT 283	Mini Project - II	-	3			25
		Total	**24**	**9**	**-**	**550**	**225**

BIT 251

PROBABILITY & RANDOM PROCESSES

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

UNIT-I

The meaning of Probability : Introduction, The definitions, Probability and Induction, Causality versus Randomness.

The Axioms of Probability : Set theory, Probability Space, Conditional Probability.

Repeated Trials : Combined Experiments, Bernoulli Trials, Bernoulli's theorem, and games of chance.

UNIT-II

The Concept of a Random Variable : Introduction, Distribution and Density functions, Specific Random Variables, Conditional Distributions, Asymptotic Approximations for Binomial Random Variables.

Functions of One Random Variable : The Random Variable g(x), The Distribution of g(x), Mean and Variance, Moments, Characteristic Functions.

UNIT-III

Two Random Variables : Bivariate Distributions, One Function of Two Random Variables, Two Functions of Two Random Variables, Joint Moments, Joint Characteristic Functions, Conditional Distributions, Conditional Expected Values.

UNIT-IV

Random Processes : Definitions, Basic concepts and examples. Stationarity and ergodicity, Second order processes, Weakly stationary processes, Covariance functions and their properties, Spectral representation Weiner-Kinchine theorem.

UNIT-V

Linear operations, Gausian processes, Poisson processes, Low pass and Band pass noise representations

Suggested Reading :

1. Papoulis : *Probability, Random Variables and Stochastic processes,* 4th Edition, Tata McGraw Hill, 2002.

References :

1. Davenport : *Probability and Random processes for Scientists and Engineers,* McGrawHill.
2. E.Wang : *Introduction to Random process,* Springer Verlag Publication.
3. H. Stark and J Woods : Probability, *Random Processes and Estimation theory For Engineers,* Prentice Hall.

BIT 252

SIGNALS & SYSTEMS

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

UNIT – I

Introduction to signals, Real functions – Continuous time function, Common functions.

Signals – definition, classification, Time scaling, Time shifting, and Limits of signals, Signals defined on intervals, Signals as sum of sinusoids.

Fourier Series– introduction to Fourier series, Three representations, Computational formulas,

UNIT – II

Fourier transforms— Definition, properties, generalized Fourier transform, Inverse Fourier transform.

Spectral content of a signal – Amplitude and phase spectra, Energy and power signals, Energy spectral density, Power spectral density, power calculations of periodic signals

Laplace Transform – Definition, properties, partial fraction expansion, solution to differential equations, and relationship to Fourier transforms, Inverse Laplace transform.

UNIT – III

Discrete Time Signals – Introduction, sampling, coding and quantization, Reconstruction of signal from samples, aliasing, Nyquist sampling theorem, zero-order hold, Representation, Classification, Discrete time energy and Power Signals, Transformation of independent variable (time), Addition, Multiplication and Scaling of Sequences.

UNIT – IV

Convolution and Correlation of discrete time signals – Discrete convolution, Graphical interpretation, Convolution properties. Auto and cross correlation and their graphical interpretation. Properties of correlations integrals.

Z-transform – Definition, properties. Region of convergence. Z – plane and S-plane correspondence. Inverse Z-Transforms, Solution of linear difference equations.

UNIT – V

Systems – Introduction to systems, Definition, representation, examples.

System representation - Transfer function, Convolution representation, Fourier transfer function, Block diagram, Block diagram reduction, Properties of System.-Linearity, Time-invariance, Causality, BIBO Stability. Introduction to Discrete- Time systems and Digital filters.

Suggested Reading:

1. Douglas K. Lindner – *Introduction to Signals and Systems* – McGraw Hill 1999.

References:

1. Rodger E. Ziemer, William H Trenter, D. Ronald Faninn – *Signals & Systems* – 4th Edition, Pearson 1998.
2. A.V.Oppenheim, A.S. Willsky *Signals & Systems* – 2nd Edition, Printice Hall.
3. Lath, B.P. *Signals and Systems*, John Wiley & Sons, 1967.

BIT 253

ELECTRONIC COMMUNICATION TECHNIQUES

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

UNIT – I

Introduction to Electronic Communications – Modulation and demodulation, electro magnetic spectrum, Bandwidth & Information capacity. Frequency Division Multiplexing, Time Division Multiplexing. Transmission Modes. Mixing, Noise Analysis.

UNIT – II

Amplitude Modulation transmission: Principle of Amplitude modulation, AM modulator circuits, AM transmitters.

Amplitude modulation reception: Receiver parameters, AM receivers circuits Single-sideband communication systems, Single-sideband generation, Single-sideband transmitters, Single-side-band receivers.

UNIT – III

Angle modulation transmission: Angle modulation, FM & PM waveforms, noise and angle modulation, Frequency and phase modulators. Direct and indirect FM transmitters, FM versus PM.

Angle modulation receivers: FM demodulators, PLL - capture range, Lock range, Slope detector, Foster-Seeley discriminator, Ratio detector, PLL demodulator.

UNIT – IV

Pulse modulation systems: Noisy communication channels, Sampling theorem: Low pass signals band pass signals, Pulse amplitude modulation, Channel bandwidth for a PAM signal, Natural sampling, Flat top sampling, Signal recovery through holding.

UNIT – V

Quantization of signals, Quantization error, Pulse code modulation, Electrical representation of binary digits, The PCM system : Encoder, decoder companding, Differential pulse code modulation, Delta modulation : Hunting, slope overload in linear delta modulation, Adaptive delta modulation : Continuously variable slope delta modulation (CVSD).

Frequency shift keying, phase shift keying, differential phase shift keying, probability of error and bit error rate.

Suggested Reading:

1. Wayne Tomasi – *Electronic Communication Systems – Fundamentals through advanced*, 4th Edition, Prentice Hall – 2001.
2. *Principles of Communication System* Taub & Schilling - 2nd Edition, TMH – 2003.

References.

1. Simon Haykin, *Communication Systems* – 3rd edition, Wiley – 1995.
2. Kennedy, *Electronic Communications System* – 4th Edition – TMH.
3. Calson AB, Ruttledge J, Crilly P, *Communication Systems* – 4th Edition, TMH – 2002.

BIT 254

COMPUTER ORGANIZATION & MICROPROCESSORS

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

UNIT – I

Basic Structure of Computers : Computer Types, Functional Units, Basic Operational concepts, Bus Structures, Software, Performance, Multiprocessors and Multicomputers, Historical Perspective.

Input/Output Organization : Accessing I/O Devices, Interrupts, Processor Examples, Direct Memory Access, Buses, Interface Circuits, Standard I/O Interfaces.

UNIT – II

The Memory System : Basic Concepts, Semiconductor RAM memories, Read-Only Memories, Speed, Size and Cost, Cache Memories, Performance Considerations, Virtual Memories, Memory Management Requirements, Secondary Storage.

UNIT – III

Arithmetic : Addition & Subtraction of Signed numbers, Design of Fast adders, Multiplication of Positive numbers, Signed-operand multiplication, Fast multiplication, Integer division, Floating-point numbers and operation.

Basic Processing Unit : Some fundamental concepts, Execution of a complete instruction, Multiple-bus organization, Hardwired Control, Microprogrammed Control.

UNIT – IV

8086 Architecture : CPU architecture, Internal operation, Machine language instructions, Instruction execution timing, The 8088.

Assembly Language Programming : Assembler Instruction Format, Data Transfer Instructions, Arithmetic Instruction, Branch Instructions, Loop Instructions, NOP and HLT instructions, Flag manipulation instructions,

gical Instructions, Shift and Rotate Instructions, Directive and Operators, Assembly Process, Translation of Assembler Instructions.

UNIT – V

Modular Programming : Linking and Relocation, Stacks, Procedures, Interrupts and Interrupt Routines, Macros, Program Design and its example.

I/O Programming : Fundamental I/O considerations, Programmed I/O, Interrupt I/O, Block Transfers and DMA, I/O Design example.

Suggested Reading:

1. Carl Hamacher, Zvonko Vranesic, *Safwat Zaky, Computer Organization,* Fifth edition, McGraw Hill, 2002.
2. Yu-Cheng Liu, Glenn A. Gibson, *Microcomputer Systems : The 8086 / 8088 Family, Architecture, Programming and Design,* Second edition, PHI, 2006.

References :

1. Pal Chouduri, *Computer Organisation and Design,* Prentice Hall of India, 1994.
2. M. M. Mano, *Computer System Architecture,* Third Edition, Prentice Hall of India, 1994.
3. Barry B. Brey, *The Intel Microprocessors,* PHI, 1995.

BIT 255

OOP USING JAVA

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

UNIT – I

Object Oriented System Development: Understanding Object Oriented Development, Understanding Object Oriented Concepts, Benefits of Object Oriented Development.

Java Programming Fundamentals: Introduction, Overview of Java, Data types, Variables and Arrays, Operators, Control Statements, Classes, Methods, Inheritance, Packages and Interfaces..

UNIT – II

Exceptional Handling, Multithreaded Programming, I/O basics, Reading console input and output, Reading and Writing Files, PrintWriter Class, String Handling.

UNIT – III

Exploring java.lang, Collections Overview, Collections Interfaces, Collection Classes, Iterators, Random Access Interface, Maps, Comparators, Arrays, Legacy classes and Interfaces, String tokenizer, BitSet, Date, Calendar, Observable, Timer.

UNIT – IV

Java I/O classes and Interfaces, Files, Stream and Byte classes, Character Streams, Serialization.

UNIT – V

GUI and Event Driven Programming: Applet Class, Event Handling, Delegation event model, event classes, event listener Interfaces

Customizing Frame Windows, GUI Programming Basics, Text Related GUI Components, Layout Managers, Effective use of Nested panels, Other GUI components, Menus and Handling Mouse Events.

Suggested Reading:

1) Herbert Schildt *"The Complete Reference Java"*, 7th Edition, Tata McGraw Hill 2005.

2) C Thomas Wu *"An Introduction to Object Oriented Programming with Java"*, Fourth Edition, Tata McGraw Hill, 2006.

3) James M Slack *"Programming and Problem Solving with JAVA"* Thomson Learning 2000.

BIT 256

SOFTWARE ENGINEERING

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

UNIT-I

Introduction to Software Engineering :

A generic view of Process : Software Engineering, Process Framework, CMM, Process Patterns, Process Assessment, Personal and Team Process Models, Process Technology, Product and Process.

Process Models : Prescriptive models, Waterfall Model, Incremental Process Models, Evolutionary Process Models, Specialized Process Models, The Unified Process.

An Agile view of Process : What is Agility. What is an Agile Process, Agile Process Models.

UNIT-II

Software Engineering Practice : SE practice, Communication practices, Planning practices, Modeling practices, Construction Practice, Deployment.

System Engineering : Computer-based Systems, The System Engineering Hierarchy, Business Process Engineering, Product Engineering, System Modeling.

Requirements Engineering : A bridge to Design and Construction, Requirements Engineering Tasks, Initiating Requirements Engineering Process, Eliciting Requirements, Developing Use-Cases, Building the Analysis Model, Negotiating Requirements, Validating Requirements.

UNIT-III

Building the Analysis Model :Requirements Analysis, Analysis Modeling Approaches, Data Modeling Concepts, Object-Oriented Analysis, Scenario-based Modeling, Flow-Oriented Modeling, Class-based Modeling, Creating a Behavioral Model.

Design Engineering : Design within the context of SE, Design Process and Design Quality, Design Concepts, The Design Model, Pattern-based Software Design.

UNIT-IV :

Creating an Architectural Design : Software architecture, Data Design, Architectural Styles and Patterns, Architectural Design, Assessing Alternative Architectural Designs, Mapping Data Flow into a Software Architecture.

Modeling Component-Level Design :What is a Component. Designing Class-based Components, Conducting Component-level Design, Object Constraint Language, Designing Conventional Components.

Performing User Interface Design : The Golden rules, User Interface Analysis and Design, Interface Analysis, Interface Design Steps, Design Evaluation.

UNIT-V :

Testing Strategies : A strategic approach to software testing, Strategic issues, Test strategies for O-O software, Validation testing, System testing, the art of debugging.

Testing Tactics : SW testing fundamentals, Black-box and White-box testing, Basis path testing, Control Structure testing, O-O testing methods, Testing methods applicable on the class level, Inter class test case design, Testing for Specialized environments, architectures, and applications. Testing patterns.

Product Metrics : SW quality, A framework for Product metrics, Metrics for the analysis model, Metrics for the Design model, Metrics for source code, Metrics for testing, Metrics for maintenance.

Suggested Reading :

1. Roger S. Pressman, *Software Engineering: A Practitioner's Approach*, 6th Edition, Tata McGraw Hill, 2005.
2. Pankaj Jalote, *"An Integrated Approach to Software Engineering"*, 3rd edition, Narosa Publishing House, 2005.
3. James F. Peters, Witold Pedrycz, *Software Engineering- An Engineering Approach*, John Wiley Inc., 2000.

BIT 281

MICROPROCESSOR LABORATORY

Instruction	3	Periods per week
Duration of University Examination	3	Hours
University Examination	50	Marks
Sessional	25	Marks

Using 8085 kit perform the following experiments.

1. Tutorials on 8085 Programming.
2. Fixed - Point Addition and Subtraction.
3. Floating – Point Addition and Subtraction.
4. Fixed – Point Multiplication and Division.
5. Floating – Point Multiplication and Division.
6. String Operations.
7. Wave form generating program.
8. Screen and Keyboard Processing.
9. A/D and D/A converter interface.
10. Creative COM program and Debugging.
11. File Operations.

Note : Programs 2 to 11 on 8086, or MASM.

BIT 282

JAVA PROGRAMMING LABORATORY

Instruction	3	Periods per week
Duration of University Examination	3	Hours
University Examination	50	Marks
Sessional	25	Marks

1. A program to illustrate the concept of class with constructors, methods and overloading.
2. A program to illustrate the concept of inheritance and dynamic polymorphism
3. A program to illustrate the usage of abstract class.
4. A program to illustrate multithreading.
5. A program to illustrate thread synchronization.
6. A program using StringTokenizer
7. A program using Linkedlist class
8. A program using TreeSet class
9. A program using HashSet and Iterator classes.
10. A program using Map classes.
11. A program using Enumeration and Comparator interfaces.
12. A program to illustrate the usage of Filter and Buffered I/O streams
13. A program to illustrate the usage of Serialization
14. An application involving GUI with different controls, menus and event handling.
15. A program to implement an applet.

BIT 2

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BIT 283

MINI PROJECT - II

Instruction	3	Periods per week
Sessional	25	Marks

Software Engineering Project development for any business application.

Or

Development of any Controller Circuits using CPLDs or FPGAs.

Or

Micro Processor Based Project.

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