SGGS INSTITUTE OF ENGINEERING AND TECHNOLOGY
VISHNUPURI- NANDED

DEPARTMENT OF INFORMATION TECHNOLOGY

REVISED SYLLABI OF SECOND YEAR FOR ACADEMIC YEAR 2010-11

Sr. No	Name of the course	Credits	Load per week	
			Lectures	Practical
MA-201	Mathematics	4	4	-
IT-201	Digital System Design	4	3	2
IT-202	Data Communication	3	3	-
IT-203	Data Structures	4	3	2
IT-204	Object Oriented Programming with C++	4	3	2
IT-205	Computer Laboratory-I (C & C++)	1	2	2
IT-206	Mini Project - I	1	-	2
	Total for Part-I	**21**	**18**	**10**
IT-207	Mathematics-IV	4	4	-
IT-208	Information Systems	3	3	-
IT-209	Microprocessors and Interfacing	4	3	2
IT-210	Core Java	4	3	2
IT-211	Discrete Mathematics	3	3	-
HU-202	Communication Skills	1	-	2
IT-212	Computer Laboratory-II (Visual Basic)	1	2	2
IT-213	Mini Project - II	1	-	2
	Total for Part-II	**21**	**18**	**10**
	Total for Part-I and Part-II	42	36	16

(Dr. Ravindra C. Thool)
Chairman BOS
Information Technology

SEMESTER I

MA-201: ENGINEERING MATHEMATICS-III

(Total Credits:4, Lectures/Week:4, Practicals/Week:0)

1. **Second order differential Equations :** Homogeneous linear differential equation for real and complex roots. Modeling: free oscillations, Euler- Cauchy equations , Existents and Uniqueness theorem (without proof) and Wronskian , non-homogeneous equations, solutions by undetermined coefficient and variation of parameter methods. Modeling : Forced oscillations , resonance and electrical circuits , system of differential equations.

2. **Laplace Transform** : Definition, existence theorem , linearity property of Laplace Transform , Laplace Transforms of standard functions, theorems on Laplace Transform. Inverse Laplace Transform (ILT) , convolution theorem, unit step function, impulse function , Laplace Transform of periodic function, application to initial and boundary value roblems.

3. **Fourier Series** : Periodic functions , Fourier theorem , Fourier series, Euler's formulas for the Fourier coefficients , Convergence of Fourier series , Change of interval , even and odd functions , half range series.

4. **Partial Differential Equations** : Separation of variables , Vibrations of string, One dimensional heat equations .

Reference Books.
1. Erwin Kreyszig, Advanced Engineering mathematics, John Wiley & sons, 8th edition 1999
2. R.K. Jain, S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publication House
3. Elementary Differential Equations and boundary value problems by Boycs and DiPrima John Wiley & sons, 7th edition
4. Calculus by Thomos and Finney , Ninth Edition.

IT-201: DIGITAL SYSTEM DESIGN

(Total Credits:4, Lectures/Week:3, Practicals/Week:2)

1. **Combinational logic design:** Switching algebra, Combinational circuit analysis, combinational circuit synthesis, and Combinational circuit minimization, K-Map of three, four, five variable functions, Minimizing SOP and POS expressions. Quine McClusky minimization, other minimization methods, timing hazards, designing hazard free circuits, circuit timing, Combinational PLDs, PLAs, PLA devices, Generic array logic devices, design of encoders, decoders, tristate devices, multiplexes, comparators, Arithmetic circuits- Half and full adders, ripple adders, subtractors, Carry look ahead adders, combinational multipliers, Examples- Barrel shifter, floating point encoder etc.
2. **Sequential logic design:** Latches and flip flops, edge triggered and Master slave flip flops (SR, JK, D, T etc), Clocked synchronous state machine analysis and design, designing state machines using state diagrams, state machine synthesis using transition lists, decomposing state machines, feedback sequential circuit design, sequential PLDs, Counters and shift registers, synchronous design methodology, clock skew, gating the clock, asynchronous inputs
3. **Designing using VHDL**: Introduction to VHDL, Modeling styles, Data flow, behavioral, structural and mixed, VHDL description of combinational networks, modeling flip flops using VHDL, VHDL models for multiplexur, compilation and simulation of VHDL code, modeling a sequential machine, variables, signals and constants, arrays, VHDL operators, VHDL functions, VHDL procedures, attributes, multilevel logic and signal resolution
4. **Counters and shift Registers:** Asynchronous counters, Synchronous counters, MOD counters, presentable counters, shift- counters, Up-down counters, Ripple counters, Shift Registers, Serial in Serial out, Serial in parallel out, Parallel in Serial out, and Parallel in Parallel out shift Registers.

Term Work:

Term work shall consist of performing minimum Ten Experiments based on above syllabus or as directed by the concerned staff.

Reference Books:
1. J. F. Wakerly, Digital design- Principles and practices, PH International Pearson India, Third edition
2. J. Bhasker, VHDL primer, Pearson Education Asia, third edition
3. W. I. Fletcher, An Engineering approach to digital design, PHI
4. Samuel C. Lee, Digital circuits and logic design, PHI
5. C. H. Roth Jr., Digital systems design using VHDL, PWS publishing company Kevin Skahill, VHDL for programmable logic, Addison Wesley

IT-202: DATA COMMUNICATION

(Total Credits:3, Lectures/Week:3, Practicals/Week:0)
1. Introduction to data communications, Network models .

2. 2 Data and Signals ,Digital Transmission , Analog Transmission , Bandwidth Utilization: Multiplexing and Spreading, Transmission Media , Switching , Using Telephone and Cable Networks for Data Transmission

3. Error Detection and Correction ,Data Link Control , Multiple Access , Wired LANs: Ethernet , Wireless LANs

Recommended books:
1. Data and Computer Communications by William Stallings 7th Edition, Eastern Economy Edition publication
2. Data Communication and Networking, Third Edition, Behrouz A. Forouzan, Tata McGraw Hill

IT-203:DATA STRUCTURES

(Total Credits:4, Lectures/Week:3, Practicals/Week:2)
1. **Introduction to Data Structures:** Concepts of data and algorithms, Data object, Data type, Storage of data in memory, Arrays and Representation of Arrays.
2. **Stack and Queues:** Stack Definition and concepts, operation on stack, Stacks and Expression Evaluation, Stacks and Recursion, Definition of Queue operations, Stack and Queue implementation, Simulation.
3. **Linked Lists:** Linked Linear Lists, Operations on linear Lists using singly linked storage Structures, Circularly Linked lists, Doubly Linked linear lists, applications of linear lists, Polynomial manipulation, multiprecision arithmetic, linked stacks and Queues, Sparse matrices.
4. **Trees:** Definition and concepts, operation on Binary trees, Storage representation and manipulation of Binary trees, Linked storage Representation of Binary tree, conversion of general trees to binary trees, sequential and other representation of trees, applications of trees, Manipulation of Arithmetic expressions, set representations, decision tree and game tree.
5. **Graphs:** Graph definition and concepts, graph representation, Matrix representation of graph, List structures and other representation of graph, Breadth first search and depth first search, spanning trees and applications of graph.
6. **Searching and Sorting:** Linear search, Binary search, tree searching, hashing. Bubble sort, quick sort, insertion sort, selection and tree sorting.
7. **File Organization:** Queries, index techniques, File organization, sequential organization, Random Organization, Linked organization, Inverted files.

Term Work:
The term work shall consist of minimum 10 to 15 programs based on above syllabus.

Practical Examination shall be of three hours duration and consists of one program and the oral based on the syllabus and term work.

Reference Books:
1. Horowitz and Sahani, "Fundamentals of Data Structures".

2. Tenenbaum, Langsam & Angenstein, "Data Structures using C", PHI
    3. Tremblay and Sorenson, "An Introduction to Data Structures with Application", McGraw Hill.

IT-204:OBJECT ORIENTED PROGRAMMING
(Total Credits:4, Lectures/Week:3, Practicals/Week:2)

Introduction to OOPS: Differences with Procedural Languages, Tour of C++:
        Types and declarations, Expressions and statements.
            Decision making and loops
            Pointers, arrays and structures.
            Functions
Object Oriented Concepts:
        Data abstraction, Classes and objects, References, Inheritance, Polymorphism, Function and operator overloading, Virtual functions, Templates, Exception handling, file handling, Name spaces

Term Work:
Term work shall consist of performing minimum Fifteen experiments based on above syllabus. Students also need to develop a mini project in C++ Programming language.

Reference Books:
1. B. Stroustroup, "C++ Programming Language"
2. Balguruswamy, "Programming in C++"
3. Venugopal, "Programming in C++"

IT-205:COMPUTER LAB – I
(Total Credits:1, Lectures/Week:2, Practicals/Week:2)

Students should carry minimum 5 projects in C and Minimum 5 projects in C++ by using advanced concepts.

IT-206:MINI PROJECT– I
(Total Credits:1, Lectures/Week:0, Practicals/Week:2)

Students should develop a mini project based on the syllabus in either C/C++.

SEMESTER II

IT-207: MATHEMATICS-IV

(Total Credits:4, Lectures/Week:4, Practicals/Week:0)

Probability and Statistics:
Mean, Median, Mode and standard Deviation, moments. Sample Space, Probability axioms, combinatorics, Conditional probability and Bayes theorem, Independence of events. Random Variables, Probability Distribution of random a variable, Discrete and continuous random variable. Distributions: uniform, normal, exponential, Poisson, Binomial.
Linear Algebra: Algebra of matrices, system of linear equations, LU decomposition, Eigenvalues and Eigenvectors.

Reference Books:
1. Brown and Churchil, *Complex Variables and its applications,* McGraw-. Hill, 1996.
2. Erwin Kreyszig, *Advanced Engineering Mathematics,* 8th ed., John Wiley & Sons, 1999.
3. V. K. Rohatgi, A. K. Md. Ehsanes Saleh, *An Introduction to Probability and Statistics,*
   2nd ed., John Wiley & Sons, 2001.
4. H. Anton and C. Rorrers, *Elementary Linear Algebra (applications version),*
   9th ed., Willey India Pvt. Ltd., 2009.
5. Hogg R. and C. Craig, *Introduction to Mathematical Statistics*, Prentice Hall.
6. Serge Lang, *Introduction to Linear Algebra,* 2nd ed. Springer, 2005.

IT-208: INFORMATION SYSTEMS

(Total Credits:3, Lectures/Week:3, Practicals/Week:0)

1. Organization, Management and Networked Enterprise: Managing the Digital Firm, Information system in the enterprise, Information system, Organizations, Management and Strategy
2. Information Technology Infrastructure: Managing Hardware Assets, managing software assets, Managing Data resources, Telecommunications and Networks, The internet and new Information technology Infrastructure.
3. Building Information System in Digital Firm: Redesigning the organization with information systems, Understanding the business value of systems and managing change, case study (one)
4. Management and Organizational Support system for the Digital Firm: Managing Knowledge, Knowledge work and artificial intelligence, Enhancing Management Decision Making, Designing an enterprise Information Portal
5. Managing Information System in the Digital Firm: Information system Security and control, ethical and social Impact of information system, managing International Information system.

Reference Books:
1. Information system , by Keneth C. laudon and Jane P.Louden, Seventh edition , Prentice hall of India Publications.
2. Management Information System : David PHI Publications

IT-203: MICROPROCESSORS AND INTERFACING

(Total Credits:4, Lectures/Week:3, Practicals/Week:2)

1. **Introduction Microprocessors:** Basic microprocessor system concepts, Basic microprocessor, Architecture and Operation, control unit, Internal registers, Arithmetic and logic unit, The Microprocessor's state.

2. **The 8085A Microprocessor Basics**: Architecture, Pin configuration, The 8085A timing diagrams, State diagram, Memory and I/O synchronization, logic levels, Loading and Buffering, The 8085 Instruction set, Interrupt structure of 8085.

3. **Assembly Language Programming**: Concepts of program assembly and testing, simple programs with and without loops, Arithmetic problems, stacks and subroutines, Delay subroutines, floating point formats and arithmetic routines.
4. **Memory Interfacing with 8085A** : Memory mapped I/O and I/O mapped I/O, memory system Design, Exhaustive and Partial decoding, Design Examples.
5. **Fundamental of I/O Interfacing: :**Data transfer schemes, Programmable Interfacing Chips: 8155/56, 8355, 8755, 8255 & 8279, A to D and D to A Conversion Methods, Interfacing of ADCs and DACs with 8085

Term Work:
Term work shall consist of 15 experiments based as the above syllabus. Typically the experiments to be done should be for applications where the concept of each chapter is to be used.

Practical examination shall be of 3 hours duration and shall consist of an experiment and the oral based on the Syllabus.

Reference Books:
1. Kenneth L. Short , " Microprocessors and Programmed Logic" PH I.
2. B.RAM, " Microprocessors and Microcomputers", Dhanpat Rai Publications.
3. Kulkarni U.V. Sontakke T.R., "The 8085A Basics, Programming and Interfacing", Sadhusudha Prakashan.
4. Hall D.V., " Microprocessors and Digital Systems", Mcgraw-Hill Book Company.
   5. Gaonkar Ramesh, "Microprocessor, Interfacing and Applications"

IT-210:CORE JAVA

(Total Credits:4, Lectures/Week:3, Practicals/Week:2)

1. **An Introduction to Java :** Java as a Programming Tool, Advantages of Java, The Java "White Paper" Buzzwords, Java and the Internet.
2. **The Java Programming Environment :** Installing the Java Software Development Kit, Development Environments, Using the Command Line Tools, Using an Integrated Development Environment, Compiling and Running Programs from a Text Editor, Graphical Applications,Applets
3. **Fundamental Programming Structures in Java :** A Simple Java Program, Comments,Data Types, Variables, Assignments and Initializations , Operators, Strings., Control Flow, Big Numbers, Arrays
4. **Objects and Classes.:** Introduction to Object-Oriented Programming, Using Existing Classes, Building Your Own Classes, Static Fields and Methods, Method Parameters, Object Construction, Packages, Documentation Comments, Class Design Hints,
5. **Inheritance:** Extending Classes,Object: The Cosmic Superclass, The Class Class, Reflection, Design Hints for Inheritance,
6. **Interfaces and Inner Classes:** Interfaces, Object Cloning, Inner Classes, Proxies,
7. **Graphics Programming :** Introduction to Swing, Creating a Frame, Frame Positioning, Displaying Information in a Panel, 2D Shapes, Colors, Text and Fonts, Images,
8. **Event Handling :** Basics of Event Handling, The AWT Event Hierarchy, Semantic and Low-Level Events in the AWT, Low-Level Event Types , Actions, Multicasting, The Event Queue,
9. **User Interface Components with Swing:** The Model-View-Controller Design Pattern, An Introduction to Layout Management, Text Input, Making Choices, Menus, Sophisticated Layout Management, Dialog Boxes,
10. **Applets:** Applet Basics, The Applet HTML Tags and Attributes, Multimedia, The Applet Context, JAR Files
11. **Exceptions and Debugging :** Dealing with Errors, Catching Exceptions, Some Tips on Using Exceptions, Debugging Techniques, Using a Debugger
12. **Streams and Files :** Streams, The Complete Stream Zoo, ZIP File Streams Putting Streams to Use Object Streams, File Management

Reference Books:

1."JAVA: Complete Reference" by Herbet Schildt, TMH, India.
2.Core Java, Sun Publication, India.
3."Java How to program", Deital and Deital, Pearson Education.

IT-211:DISCRETE MATHEMATICS
(Total Credits:3, Lectures/Week:3, Practicals/Week:0)

1. **The Foundations**: Logic, sets and Functions. Logic, Propositions and Prepositional equivalences, Predicates and quantifiers, sets and set operations, Functions, Sequences and summations, the growth of functions.
2. **Number Theory**: The integers and division, division algorithm, greatest Common divisions and least common multiples, modular arithmetic, Applications Of congruence, cryptology, Euclidean algorithm, Representations of integers, applications of numbers Theory, linear congruence, Chinese remainder theorem, computer arithmetic with large integers, Pseudo primes, Public Key Cryptography, RSA encryption and RSA decryptions.
3. **Mathematical Reasoning**: mathematical induction, Recursively defined Functions Recursively defined sets, Recursive algorithms; methods of proof, methods of proving theorems, Theorems and Quantifiers.
4. **Counting**: The basics of counting, the pigeonhole principle, Permutations and Combinations, Discrete Probability, Probability theory, Generalized Permutations and Combinations, Generating Permutations and Combinations.
5. **Advanced Counting Techniques**: Recurrence Relations, Solving Recurrence Relations, Divide and Conquer Relations, Inclusion- Exclusion, and Applications of inclusion and Exclusion.
6. **Relations**: Relations and their properties, n-ary relations and their applications, Representing relations, closures of Relations, Equivalence relations, and Partial orderings.
7. **Graph Theory**

Reference Books:
1.Kenneth H. Rosen, "Discrete Mathematics and its applications", 3rd Ed., McGraw Hill.
2.C.L. Liu, "Elements of Discrete Mathematics", McGraw Hill.
3.John Truss, "Discrete Mathematics for computer Scientists", Addison Wesley.

HU-202:COMMUNICATION SKILL
(Total Credits:1, Lectures/Week:2, Practicals/Week:2)

1. **Objective:** The main objective of this course is to prepare the engineering students for future career, further studies through development of listening, reading writing and speaking skills.
2. **Methodology:** The course may be dealt with in following ways: -
   i.Discussion by tutor about theoretical nature of different aspects of Communication Skill.
   ii.Practice of it by the students as pronunciation, public speaking and organizing meeting etc.
   iii.Intervention by the tutor for corrective measures.
   iv.Understanding and grasping and then reporting by the students.

1. What is communication- need, importance, types, and objectives. Communication process, barriers. Principles of effective communication.
2. Modes of communication.
3. Practice of effective communication through eye contact, voice modulation, audience awareness, presentation plan and non-verbal language.
4. Face to face conversation- self-analysis.
5. Understanding guidelines for telephonic conversation, making and receiving calls, telephone message.
6. Interviews for employment – Preparing self and reporting for sample questions on educational background, co-curricular activities, extra curricular activities, experience, and general knowledge, miscellaneous.
7. Data Collection- Role of communication in organizations around and experience sharing by the students.

8. Meetings: understanding role and importance of procedure, chairmanship, participation, and physical arrangements, rules for successful meeting- experience sharing and reporting.
9. Group Discussions, Seminars and Conferences- Understanding different aspects-experience sharing and reporting.
10. Practice of public speaking with use of audio – Visual and Graphic aids, experience sharing and reporting.
11. Paragraph writing – Understanding principles, general hints writing and analyzing paragraph writing on 3-5 topics.
12. Understanding the principles and practice of – office drafting, circular, notices, memos, and telex/telegraph/email messages.
   -Application resumes, sales enquiry, reply order, complaint.
   -Reports, feasibility report, analytical report, progress report, project report, inspect of damage and losses etc.
13. Preparation of notices, agenda, minutes etc.
14. Language Grammar –Concept, units of expression and meaning- Graphemes, and phonemes, Morphemes, words, phrases, clauses sentences, sentence elements etc.
15. Oral Skills – Articulation of sounds structure of syllable stress, rhythm, connected speech, intelligibility, clarity and pitch.
16. Use of integrated skills of communication.

Term Work:
Students will have to submit Report containing minimum 10-12 exercises based on separate topics as mentioned in the syllabus. Regular assessment will be made by the concerned teacher. Teacher should also arrange quizzes, elocution and group discussions amongst the students to improve the communication skills.

Reference Books:
   1.Developing Communication Skill by Krishna Mohan and Meera Banerjee,
   2.McMillan Publishers. Communication Skill – B.V. Pathak,
   3.Nirali Prakashan. Writing Correct English – Readers Digest Publication.
   4.GRE by Baron Audio Cassettes by Baron

IT-212:COMPUTER LABORATORY-II

(Total Credits:1, Lectures/Week:2, Practicals/Week:2)

Selected Language: Visual Basics 6.0 & Ms Access database
Students are expected to perform minimum 15 experiments in VB and MS Acess.

IT-213:MINI PROJECT– II

(Total Credits:1, Lectures/Week:0, Practicals/Week:2)

Students should develop a mini project based on the syllabus in either C/C++/Java/VB and ACCESS.2