

**PROPOSED CURRICULA AND SYLLABI
FOR**

**(Second Year)
B.Tech (Computer Science & Engineering)**

w.e.f.
Academic Year 2010-2011 and onwards



SGGS I E & T, Nanded

Department of Computer Science and Engineering
Shri Guru Gobind Singhji Institute of Engineering & Technology
Vishnupuri, Nanded- 431606

[May 2010]

**SHRI GURU GOBIND SINGHJI INSTITUTE OF ENGG & TECHNOLOGY,
VISHNUPURI, NANDED.**

(Academic Year 2010-2011 and Onwards)

Second Year B.Tech. (Computer Science and Engineering)

| Sr. No. | Name of the course | Total No. of credits | Lectures/ week | Tutorials/ week | Practical/ week |
|--------------------|---|----------------------|----------------|-----------------|-----------------|
| I Semester | | | | | |
| MA201 | Engineering Mathematics -III | 4 | 3 | 1 | - |
| CSE201 | Discrete Mathematics | 4 | 4 | - | - |
| CSE202 | Digital System Design | 4 | 3 | - | 2 |
| CSE203 | Principles of Communication Engineering | 4 | 3 | - | 2 |
| CSE204 | Microprocessors and Interfacing | 5 | 4 | - | 2 |
| CSE205 | Communication Skills | 1 | - | - | 2 |
| | Total | 22 | 17 | 1 | 8 |
| II Semester | | | | | |
| MA202 | Engineering Mathematics-IV | 4 | 4 | - | - |
| CSE206 | Data Structures | 4 | 3 | - | 2 |
| CSE207 | Object Oriented Programming with Java | 5 | 4 | - | 2 |
| CSE208 | Computer Organization and Architecture | 4 | 3 | - | 2 |
| CSE209 | Numerical and Scientific Computing | 4 | 3 | - | 2 |
| CSE210 | Introduction to Web programming | 1 | - | - | 2 |
| | Total | 22 | 17 | - | 10 |

(Semester-I)

MA201 Engineering Mathematics-III (L-3, T-1, P-0, CR-4)

Second Order Linear Differential Equation: Homogenous linear differential equations for real and complex roots. Modeling: free oscillations, Euler-Cauchy equation, Existence and Uniqueness theorem (with out proof) and Wronskian, non-homogenous equations, solutions by undetermined coefficients and variation of parameter methods. Modeling: forced oscillations, resonance and electrical circuits, system of differential equations.

Laplace Transform (LT): Definition, existence theorem, linearity property of LT, LT of standard functions, theorems on LT, Inverse Laplace transforms (ILT), convolution theorem, unit step function, impulse function, LT of periodic functions, applications to initial and boundary value problems.

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 Fourier Series.

Partial Differential Equations: Separation of variables, Vibrations of string, One-dimensional Heat Equation.

Reference Books:

- E. Kreyszig, *Advanced Engineering Mathematics*, 8th ed., John Wiley & Sons, 1999.
- R. K. Jain and S. R. K. Iyengar, *Advanced Engineering Mathematics*, 2nd ed., Narosa Publication House.
- Boyce W. E. and DiPrima R. C., *Elementary Differential Equations and Boundary Value Problems*, 7th ed. John Wiley and Sons, Inc, New York, 2001.
- Thomas and Finney, *Calculus*, 9th ed., Addison-Wesley Pub.

CSE201 Discrete Mathematics (L-4, T-0, P-0, CR-4)

The Foundations: Logic sets and Functions. Logic, Propositions and Propositional equivalences, Predicates and quantifiers, sets and set operations, Functions, Sequences and summations, the growth of functions.

Number Theory: Introduction, Complexity of Algorithms, basic properties, divisibility theory, Congruence and its applications.

Mathematical Reasoning: Mathematical induction, Recursively defined Functions Recursively defined sets, Recursive algorithms, methods of proof, methods of proving theorems, Theorems and Quantifiers.

Counting: The basics of counting, the pigeonhole principle, Permutations and Combinations, Discrete Probability, Probability theory, Generalized Permutations and Combinations, Generating Permutations, Combinations and advanced counting techniques.

Relations: Relations and their properties, n-ary relations and their applications, Representing relations, closures of Relations, Equivalence relations, and Partial orderings.

Group Theory: Introduction, Binary operations, Group, Groupoid, Semigroup and Monoid, Sub-Group, Cyclic Group, Permutation Group, Homomorphism and Isomorphism of Groups.

Rings and Fields: Introduction, Ring, Sub-ring and Ring Homomorphism.

Graphs: Graph Terminology, Representing Graphs and Graph Isomorphism, Connectivity, Euler and Hamilton Paths, Shortest Path Problems, Planar Graphs, Graph Coloring.

Trees: Introduction, Applications of Trees, Tree Traversal, Trees and Sorting, Spanning Trees, Minimum Spanning Trees.

Reference Books:

- L. Lovasz J. Pellikan K. Vesztergombi, *Discrete Mathematics*, Springer, 2003.
- Kenneth H. Rosen, *Discrete Mathematics and its applications*, 3rd ed., McGraw Hill, 1995.
- John Truss, *Discrete Mathematics for computer Scientists*, 2nd ed., Addison Wesley, 1999.

CSE 202 Digital System Design (L-3, T-0, P-1, CR-4)

Number Systems and Codes: Binary, octal, decimal and hexadecimal number Systems and their conversion, Binary arithmetic, BCD, Octal & Hexadecimal codes, Excess-3, Binary and other BCD codes, parity in codes, error detection and correction codes, gray code, display codes, encoding and decoding for security.

Boolean algebra and Logic gates: Theorems and properties of Boolean algebra, Boolean Functions, canonicals and standard forms, other Logic operations. Digital Logic gates, IC digital logic families and Logic design examples.

Simplification of Boolean functions: Algebraic method, the K-map method, 2, 3 & 4 variable maps, five and six variable Maps, Quine-McCluskey method, simplification and NAND-NOR Realization.

Combinational Logic design: Adders, subtractors, Code converters, Binary parallel adders
Decimal adders, magnitude comparators, decoders, multiplexers, demultiplexers, signed magnitude numbers and its arithmetic implementation.

Sequential Logic Design: Flip-flops, triggering, analysis of clocked sequential circuits, excitation tables of flip-flops and their applications.

Counters: Asynchronous counters, Synchronous counters, mod-3, Counters, mod-5 counters, presettable counters, shift- counters, Up-down counters, Ripple counters.

Shift Registers: Shift Registers, Serial in Serial out, Serial in parallel out, Parallel in Serial out, and Parallel in Parallel out shift Registers, Introduction to Semiconductor memories.

Reference Books:

- M. Moriss Mano, *Digital Logic & Computer Design*, PHI, 2004.
- A. Malvino and D. Leach, *Digital Principles and application*, 2nd ed., TMH, 2006.
- R.P. Jain, *Modern Digital Electronics*, 2nd ed., TMH, 2006.
- Louis Nesklesky, *Introduction to Digital Technology*, John willer & Saw.
- Williams H. Gothman, *Digital Electronics*, PHI.

CSE203 Principles of Communication Engineering (L-3, T-0, P-1, CR-4)

Basic Communication Systems: Basic block diagram of communication systems, types of communication channels and their characteristics, Frequency / Spectrum allocations and their application areas, International standards for communication systems and frequency assignment, Wireless communication systems, Satellite communication systems, Optical fiber communication systems.

Spectrum and Noise: Fourier transforms, properties, energy and power density spectrum and applications, Sources of noise – Active and passive device noise, Noise parameters like S/N ratio, Noise factor, Noise figure, Noise factor of cascaded network, Noise temperature, and Noise bandwidth of system.

Amplitude and Frequency Modulation – their generation and detection Bandwidth requirements Low Power and High Modulators and Modulated amplifiers. Superheterodyne detection. Signal to Noise ratio of A.M. , F.M. and P.M. transmission.

Pulse Modulation Techniques: Sampling and quantization of band-limited signals, Shannon's sampling theorem, PAM, PWM, PPM and PCM and their generation and detection. Digital Modulation: ASK, FSK, PSK performance evaluation with block diagram and waveforms.

Multiplexing Techniques: FDM and FDMA, TDM and TDMA, Standard FDM and TDM systems (only block diagrams and waveforms), Applications in satellite communication, optical communication and wireless communication.

Modems Error control and coding: Channel capacity, Data Transmission synchronization, Data protection, error detection and correlation, elements of Satellite Communication tracking and control.

Reference Books:

- Taub H. and Shilling D. L., *Principles of Communication Systems*, 3rd ed., TMH, 2007.
- Carlson R. B., *Communication Systems*, 4th ed., Mc.Graw Hill, 2002.
- Haykin S. S., *An Introduction to Analog and Digital Communication Systems*, Wiley Eastern, 1989.
- Lathi B. P., *Modern Digital and Analog Communication Systems*, 3rd, Oxford University press, 2007.
- Kennedy, *Electronic Communication Systems*, 4th ed., TMH, 1999.
- John G. Proakis, Masond Saleim, *Communication systems engineering*, Pearson education.

CSE204 Microprocessors and Interfacing (L-4, T-0, P-1, CR-5)

Introduction: Internal architecture and pin diagram of 8086/8088 microprocessor, Minimum and maximum mode, Timing Diagrams, Address decoding, even and odd memory banks, Accessing memory and I/O ports.

Programming with 8086/8088: Addressing Modes, Instruction set, Instruction encoding format, Assembler directives, 8086 programming examples, String operations, File I/O processing, Far and Near procedures, Macros, Timing and delay loops, '.EXE' and '.COM' file structures, BIOS calls: INT 10H calls, DOS calls: INT 21H calls, TSRs.

Interrupt Structure: 8086 interrupt structure, 8259 priority interrupt controller, interfacing and programming.

Interfacing with 8086/8088: Memory interfacing, Programmable parallel ports, Intel 8255, Block diagram and interfacing, Modes and initialization, Keyboard/Display Controller 8279: block diagram, system connections and programming, Serial communication: Asynchronous and synchronous communication, RS-232C protocol, 8251 USART Interfacing and programming, 8257 Direct memory Access (DMA) Interfacing and programming, 8254 Timer, Interfacing and programming.

Reference Books:

- Douglas V. Hall, *Microprocessors and Interfacing, Programming and Hardware*, 2nd ed., TMH, 1991.
- Y. Liu, G. Gibson, *Microcomputer Systems: The 8086/8088 Family, Architecture, Programming and Design*, 2nd ed., Prentice-Hall of India, 1986.
- A. Ray, K. M. Bhurchandi, *Advanced Microprocessors and Peripherals: Architecture, Programming and Interfacing*, Tata McGraw-Hill, 2000.
- J. Uffenbeck, *80x86 Family: Design, Programming, and Interfacing*, Prentice Hall, 2003.
- Barry B. Brey, *The Intel Microprocessors: 8086/8088, 80186, 80286, 80386, 80486, Pentium, Pentium Pro, and Pentium II*, 5th ed., Prentice-Hall, 2001.
- Uday kumar, *Advanced Microprocessors -Intel 8086/8088 architecture, programming and interfacing*, TMH.

CSE205 Communication Skills (L-0, T-0, P-1, CR-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.

Methodology: The course may be dealt with in following ways: -

1. Discussion by tutor about theoretical nature of different aspects of Communication Skill.
2. Practice of it by the students as pronunciation, public speaking and organizing meeting etc.
3. Intervention by the tutor for corrective measures.
4. Understanding and grasping and then reporting by the students.

Contents: What is communication- need, importance, types, and objectives. Communication process & barriers. Principles of effective communication, Personality Development, SOWT Analysis, Stress Management, Building Positive Attitude, etc

1. Modes of communication.
2. Practice of effective communication through eye contact, voice modulation, audience awareness, presentation plan and verbal & non-verbal Communication.
3. Face to face conversation with body language.
4. Understanding guidelines for telephonic conversation, making and receiving calls, telephonic messages.
5. Interviews Skills for employment – Preparing -Group Interview, Lunch / Dinner Interview, Telephonic Interview, self and reporting for sample questions on educational background, co-curricular activities, extra curricular activities, experience, and general knowledge, miscellaneous.
6. Technical Guidelines for Communication- Hyphenated words, Use of Apostrophe, Abbreviations, Units, etc.
7. Meetings: understanding role and importance of procedure, chairmanship, participation, and physical arrangements, rules for successful meeting- experience sharing and reporting.
8. Group Discussions, Seminars and Conferences- Understanding different aspects-experience sharing and reporting.

-
9. Practice of public speaking with use of audio – Visual and Graphic aids, experience sharing and reporting.
 10. Paragraph writing – Understanding principles, general hints writing and analyzing (practising paragraph writing on 3-5 topics)
 11. 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.
 12. Preparation of notices, agenda, minutes etc.
 13. Grammar – Articles, Tenses, The Preposition, Choice of Words and Phrases, Words commonly Misspelt, Confusing words and Expressions, etc.
 14. Phonetics – Pronunciation, Articulation of sounds structure of syllable stress, rhythm, connected speech, intonation, clarity and pitch.
 15. Use of integrated skills of communication.

Term work and Reporting:

Term work will be in the form of Report containing minimum 10-12 exercises based on separate topics as mentioned in the syllabus.

The assessment will be made by the concerned teacher or an internal examiner appointed by the Principal of the College.

Reference Books:

- Krishna Mohan and Meera Banerji, *Developing Communication Skill*, McMillan Publishers.
- B.V. Pathak, Nirali Prakashan, *Communication Skill*.
- *Writing Correct English* – Readers Digest Publication.
- Sunita Mishra, C. Murlikrishna, *Communication Skills for Engineers*, Pearson Education.
- Alok Jain, P S Bhatia & A M Shiekh, *Professional Communication Skills*, S. Chand, 2005.
- 1. Rajesh K. Lidiya, *Communicative Grammar and Composition*, Oxford University Press.

Note: Exercises on Chapter No. 1, 2, 3 and 7 are desirable and one each on other topic is essential.

(Semester II)

MA202 Engineering Mathematics-IV (L-4, T-0, P-0, CR-4)

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:

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

CSE206 Data Structures (L-3, T-0, P-1, CR-4)

Introduction to Data Structures: Concepts of data and algorithms, Data object, Data type, Storage of data in memory, Arrays and Representation of Arrays.

Stack and Queues: Stack Definition and concepts, operations on stack, Stacks and Expression Evaluation, Stacks and Recursion, Definition of Queue operations, Stack and Queue implementation, Simulation.

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.

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.

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.

Searching and Sorting: Linear search, Binary search, tree searching, hashing, Bubble sort, quick sort, insertion sort, selection and tree sorting.

File Organization: Queries, index techniques, File organization, sequential organization, Random Organization, Linked organization, Inverted files.

Reference Books:

- Tremblay and Sorenson, *An Introduction to Data Structures with Application*, TMH, 2006.
- Tenenbaum, Langsam and Angenstein, *Data Structures using C and C++*, 2nd ed., PHI, 2002.
- Balaguruswamy, *C and Data Structures*, TMH, 2003.

CSE207 Object Oriented Programming with Java (L-4, T-0, P-1, CR-5)

Fundamentals of Object oriented Programming: Introduction, Differences with Procedural Languages, Object Oriented Paradigm: Objects and classes, Data abstraction and Encapsulation, Inheritance and Polymorphism, Function overloading, Exceptions.

Java Evolution: Features of java, Java Environment, Java Virtual Machine. Constants, variables and Data Types, Arrays, Stings and vectors, Operators & Expressions and Control Structures.

Java Classes, Objects and methods: Abstract classes, Static methods, Inner classes, Packages, Wrapper classes, Interfaces: Multiple Inheritance, Putting Classes together.

Exception handling: Exception as objects, Exception hierarchy, Try catch finally Throw, throws

IO package: Input streams, Output streams, Object serialization, Deserialization, Sample programs on io files, Filter And Pipe Streams.

Multi Threading: Thread life cycle, Multi threading advantages and issues, Simple thread program, Thread synchronization.

Reference Books:

- E. Balagurusamy, *Programming with Java A Primer*, TMH, 1998.
- Herbert schildt, *The Complete Reference JAVA2*, 2nd ed., TMH, 2002.
- Horstmann, Cornell, *Core Java 2: Volume 1-Fundanmentals*, Pearson Education, 2000.

CSE208 Computer Organization and Architecture (L-3, T-0, P-1, CR-4)

Introduction: organization and architecture, structure and function, a brief history of computers, designing for performance

The computer system: computer components and function, interconnection structures, bus interconnection, peripheral component interconnect, computer memory system overview, semiconductor main memory, cache memory, cache organization, advanced DRAM organization, external memory and input/output

The central processing unit: the arithmetic and logic unit, integer representation, integer arithmetic, floating point representation, floating point arithmetic, processor organization, register organization, instruction cycle, instruction pipelining, Pentium processor, instruction execution characteristics, use of a large register file, compiler-based register optimization, reduced instruction set architecture, RISC pipelining, RISC versus CISC controversy

The control unit: micro-operations, control of the processor, hardwired implementation, basic concepts of the micro-programmed control, microinstruction sequencing and execution and applications of microprogramming

Multiprocessors: Programming multiprocessors, single bus and network oriented multiprocessors, clusters, and network topologies.

Reference Books:

- David A. Patterson, John L. Hennessy, *Computer Organization and Design: The Hardware/Software Interface*, 2nd ed., Morgan-Kaufman publisher, 2002.
- William Stallings, *Computer organization and architecture*, 6th ed., Pearson Education, 2003.
- Randal Bryant and David, O'Hallaron *Computer Systems: A Programmer's Perspective (CS: APP)*, Prentice Hall, 2002.

CSE209 Numerical and Scientific Computing (L-3, T-0, P-1, CR-4)

Introduction: introduction to Scientific Computing.

Review of matrices and linear systems: Matrices and Matrix Operations, vectors in 2D and 3D, Linear Transformations of Euclidean n-Spaces with applications in Computer Graphics and Cryptography, Eigenvalues and Eigenvectors, diagonalization, orthogonal diagonalization, Linear Least Squares.

Iterative Methods: Successive Bisection, Method of False position, Newton Rampson Method, Comparison of Iterative Methods, Solution of Polynomial Equations and Solution of Non Linear Equations.

Interpolation, Numerical integration and Differentiation: Solving Initial and Boundary Value Problems for Ordinary Differential Equations. Throughout the course implementation of the various methods and their comparisons with professionally written software such as Matlab, Scilab, LINPACK, Mathematica, will be emphasized with the understanding of various data structures, storage schemes etc.

Reference Books:

- Samuel Conte and Carl De Boor, *Elementary Numerical Analysis*, McGraw Hill International Edition.
- V.Rajaraman, *Computer Oriented Numerical Methods*, PHI, 1994.
- H. Anton and C. Rorrers, *Elementary Linear Algebra (applications version)*, 9th ed., Willey India Pvt. Ltd., 2009.
- W. Press, W. Vetterling, B. Flannery, S. Teukolsky, *Numerical recipes in C: The Art of Scientific Computing*, 2nd ed., Cambridge University Press, 1992.
- Gilbert Strang, *Linear Algebra and its applications*, Wellesley-Cambridge Press, 2003.
- Ralph G. Stanton, *Numerical Methods for Science and Engineering*, PHI.

CSE210 Introduction to Web Programming (L-0, T-0, P-1, CR-1)

Introduction to web design: Web page & web site, Web Publishing. Introduction to HTML: **Structure tags:** <html>, <head>, <title>, <body> **Block level tags:** Headings, Paragraph, Comments, Breaks, Center, Division, Preformatted, Text alignment and font size. **Text level tags:** Bold, Italic, Underlined, Strike-through, superscript, subscript.

Horizontal Rules Colours in web page: Background colour, Text colour, Link colour. **Lists:** Ordered Lists, Unordered Lists, Definition List, Nesting lists. Linking HTML Documents.

URLs Types of URLs: Absolute URLs, Relative URLs. **Linking HTML Documents:** The Anchor tag, Linking to document in same folder, Linking to document in Different folder, Linking to document on the web, Linking to specific location within document. **Inserting E-mail links Including Images: Image formats Linking HTML Documents:** The Anchor tag, Linking to document in same folder, Linking to document in Different folder, Linking to document on the web, Linking to specific location Within document.

Inserting E-mail links tables, Forms, Frames: **Tables:** Creating Tables, Editing of rows and columns of table, rowspan, colspan, formatting tables using attributes border, Border colour, back ground, align, width, cell spacing, cell height. **Forms:** Creating Forms, Forms controls: text controls, Password fields, Radio Buttons, Check boxes, Reset and Submit buttons. The <TEXTAREA>, <SELECT> and <OPTION> tags.

Frames: Introduction to frames, Advantages and disadvantages of frames, creating basic frames Frame targeting. Style sheets: **Adding style sheet to document:** Linking to a Style sheet, Embedding style sheet, Using inline Style sheet Building a small web site

JavaScript: Introduction to JavaScript, difference between Java and JavaScript, JavaScript syntax, variables and their types, JavaScript operators, arrays and array methods, Program flow: Control statements, exercise, Built-in objects in JavaScript, Array, String, Math, Date objects, documents forms and form elements window location, History object.

Reference Books:

- Castro, *HTML 4 for World Wide Web*, 3rd ed. Pearson education, 1998.
- Barrett, *Essential JavaScript for web professionals*, Pearson Education, 2000.

