

B TECH in INFORMATION TECHNOLOGY

Year	THIRD SEMESTER						FOURTH SEMESTER					
II	Sub. Code	Subject Name	L	T	P	C	Sub. Code	Subject Name	L	T	P	C
	MAT 2155	Engineering Mathematics - III	2	1	0	3	MAT 2256	Engineering Mathematics - IV	2	1	0	3
	ICT 2153	Data Structures	3	1	0	4	ICT 2255	Computer Network Protocols	4	0	0	4
	ICT 2154	Digital Systems	3	1	0	4	ICT 2256	Computer Organization and Microprocessor Systems	3	0	0	3
	ICT 2155	Object Oriented Programming	3	1	0	4	ICT 2257	Design and Analysis of Algorithms	3	1	0	4
	ICT 2156	Principles of Data Communication	3	1	0	4	ICT 2258	Operating Systems	3	1	0	4
	ICT 2162	Data Structures Lab	0	1	3	2	*** **	Open Elective - I				3
	ICT 2163	Digital Systems Lab	0	1	3	2	ICT 2263	Algorithms Lab	0	0	3	1
	ICT 2164	Object Oriented Programming Lab	0	0	3	1	ICT 2264	Microprocessor Systems Lab	0	0	3	1
							ICT 2265	Operating Systems Lab	0	0	3	1
			14	7	9	24			15	3	9	24
	Total Contact Hours (L + T + P)		30			Total Contact Hours (L + T + P) + OE			27 + 3 = 30			
III	FIFTH SEMESTER						SIXTH SEMESTER					
	HUM 3152	Essentials of Management	2	1	0	3	HUM 3151	Engg. Economics and Financial Management	2	1	0	3
	ICT 3156	Cyber Security	3	0	0	3	ICT 3253	Data Warehousing and Data Mining	3	0	0	3
	ICT 3157	Database Systems	3	0	0	3	ICT 3254	Distributed Systems	3	0	0	3
	ICT 3158	Embedded Systems	3	1	0	4	ICT ****	Program Elective - I	3	0	0	3
	ICT 3159	Software Engineering	3	1	0	4	ICT ****	Program Elective –II	3	0	0	3
	*** **	Open Elective - II				3	*** **	Open Elective - III				3
	ICT 3163	Database Systems Lab	0	1	3	2	ICT 3264	Advanced Technology Lab	0	0	3	1
	ICT 3164	Embedded Systems Lab	0	0	3	1	ICT 3265	Data Warehousing and Data Mining Lab	0	1	3	2
	ICT 3165	Network Programming and Simulation Lab	0	0	3	1	ICT 3266	Internet Tools and Technology Lab	0	1	3	2
		14	4	9	24			14	3	9	23	
	Total Contact Hours (L + T + P) + OE		27 + 3 = 30			Total Contact Hours (L + T + P) + OE			26+3 = 29			
IV	SEVENTH SEMESTER						EIGHTH SEMESTER					
	ICT ****	Program Elective - III	3	0	0	3	ICT 4298	Industrial Training	0	0	0	1
	ICT ****	Program Elective - IV	3	0	0	3	ICT 4299	Project Work / Practice School	0	0	0	12
	ICT ****	Program Elective- V	3	0	0	3	ICT 4296	Project Work (Only for B.Tech honour Students)				20
	ICT ****	Program Elective- VI	3	0	0	3						
	ICT ****	Program Elective- VII	3	0	0	3						
	*** **	Open Elective - IV				3						
		15	0	0	18			0	0	0	13	
	Total Contact Hours (L + T + P) + OE		15 + 3 = 18									

THIRD SEMESTER

MAT 2155: ENGINEERING MATHEMATICS-III [2 1 0 3]

Boolean Algebra: Partial ordering relations, Poset, Lattices, Basic Properties of Lattices. Distributive and complemented lattices, Boolean lattices and Boolean Algebra. Propositional and Predicate Calculus: Well-formed formula, connectives, quantifications, Inference theory of propositional and predicate calculus. Elementary configuration: Permutations and Combinations, Generating function, Principle of inclusion and exclusion Partitions, compositions. Ordering of permutations: Lexicographical and Fikes. Graph theory: Basic definitions, Degree, regular graphs, Eulerian and Hamiltonian graphs, Trees and Properties, Center, radius and diameter of a graph, Rooted and binary trees, Matrices associated with graphs, Algorithms for finding shortest path, Group theory: Semi groups, Monoids, Groups-subgroups, Normal Subgroups, Cosets, Lagrange's Theorem, Cyclic groups.

References:

1. Liu C.L., Elements of Discrete Mathematics (2e), McGraw Hill, New Delhi, 2007.
2. Trembaly J.P. and Manohar R, Discrete Mathematics Structures with application to computer Science, Tata McGraw Hill, 2012.
3. Page E.S. and Wilson L.B., An Introduction to Computational Combinatorics, Cambridge Univ. Press, 1979.
4. Narasingh Deo, Graph theory with Applications to computer science, PHI, 2012.

ICT 2153: DATA STRUCTURES [3 1 0 4]

Introduction, Programming fundamentals, Stacks, Queues and their applications, Sparse Matrix, Pointers and dynamic memory allocation, Linked Lists: Singly linked lists, Dynamically Linked Stacks and Queues, Polynomial representation and polynomial operations using singly linked list, Singly Circular Linked List, Doubly Linked Lists, Trees: Binary trees, Heaps, Binary Search Trees, Threaded binary trees, Graphs: Depth First Search, Breadth First Search, Connected components, Spanning trees, Sorting and searching Techniques.

References:

1. Horowitz E., Sahni S., Mehta D., Fundamentals of Data Structures in C++ (2e), Golgotha Publications, 2008.
2. Weiss M. A., Data Structures and Algorithm Analysis in C++ (3e), Pearson Education, 2009.
3. Michael T. Goodrich, Tamassia R., Mount D., Data Structures and Algorithms in C++ (2e), John Wiley & Sons, 2011.
4. Horowitz E., Sahni S., Anderson-Freed S., Fundamentals of Data structures in C (2e), Silicon Press, 2008.

ICT 2154: DIGITAL SYSTEMS [3 1 0 4]

Introduction, Simplification of Boolean functions - K-map and tabulation method, NAND and NOR implementation, Combinational logic- Design of Adders/Subtractors, Binary Parallel adder[7483], Carry Look ahead Adder [74182], Multiplier using 7483, BCD adder, Magnitude Comparator [7485], Decoder [74138,7442], Combinational logic circuit design using decoders, Encoder [74148], Multiplexers [74157, 74153], Combinational logic circuit design using multiplexers, De Multiplexers, ROMs and Programmable Logic Arrays, Sequential logic – Asynchronous and Synchronous counters, Synchronous counter design, Shift registers, Shift register counters, Analysis and design of clocked sequential circuits, Memory Devices - RAM, ROM, PROM, EPROM, EEPROM, PLD.

References:

1. Mano M.R., Kime C.R., Martin T., Logic & Computer Design Fundamentals (5e), Prentice Hall India, 2015.
2. Tocci R.J., Widmer N.S., Gregory L.M., Digital Systems: principles and Applications(12e), Pearson Education India, 2017.
3. Wakerly J.F., Digital Design Principles and Practices(4e), Pearson Education, 2014.

ICT 2155: OBJECT ORIENTED PROGRAMMING [3 1 0 4]

Introduction to the java programming language, Importance of Java in the internet, Data types, Variable and arrays, Type conversion and casting, Operators and control statements, Classes and inheritance, Packages and interfaces, Collections Framework - array list, vector and dictionary, String handling, Exception handling, Thread concepts – synchronization, inter thread communication, Input/output – File:file input stream, File output stream, Random access files, Reader, Writer, Serialization, Serializable, Object input stream, Object output stream, Swings - swing fundamentals, Introduction to event handling.

References:

1. Schildt H., Java-The Complete Reference (9e), Tata McGraw-Hill 2014.
2. Horstmann C. S. & Cornell G., Core Java Volume I – Fundamentals (9e), Prentice Hall 2013.
3. Horstmann C. S. & Cornell G., Core Java Volume II– Advanced Features(9e), Prentice Hall 2013.

ICT 2156: PRINCIPLES OF DATA COMMUNICATION [3 1 0 4]

Introduction to Data Communication, Signals, Basic properties of data communication system, Nyquist rate, Shannon Capacity, Signal encoding and Tx and Rx models, Modulation schemes. Properties of Media and digital transmission systems, wired and wireless medium, Error detection and correction, Block codes, CRC, Hamming code, Stop and wait flow control, Sliding window flow control, ARQs, HDLC, Multiplexing, Media Access Sublayer and LAN, Approaches to sharing transmission medium, Random access protocols, Token passing protocols, IEEE LAN standards, Bridges, MAN, FDDI.

References:

1. Stallings W., Data & Computer Communications (9e), Pearson Education Inc., Noida, 2017.
2. Forouzan B., Introduction to data communication & networking (4e), Tata McGraw Hill, New Delhi-2014.
3. Garcia A. L., Widjaja I., Communication Networks (2e), Tata McGraw Hill, 2011.

ICT 2162: DATA STRUCTURES LAB [0 1 3 2]

Application using arrays, String operations, Class concepts: Creation, Initialization using constructors, Applications of stacks, Arithmetic expression conversion and evaluation using stack, queues, Sparse matrix representation, Transpose of a sparse matrix, Singly linked lists and applications, Circular linked lists, Doubly linked lists, polynomial addition and multiplications using circular linked lists, Binary Tree: creation, deletion and traversal techniques, Binary search tree operations, sorting and searching techniques.

References:

1. Horowitz E, Sahni S., Mehta D., Fundamentals of Data Structures in C++ (2e), Golgotha Publications, 2008.
2. Weiss M. A., Data Structures and Algorithm Analysis in C++ (3e), Pearson Education, 2009.
3. Horowitz E., Sahni S., Anderson-Freed S., Fundamentals of Data structures in C (2e), Silicon Press, 2008.

ICT 2163: DIGITAL SYSTEMS LAB [0 1 3 2]

Verification of Boolean algebra and De Morgan theorems, Simplification of Boolean expressions using K-maps, Combinational logic circuit implementation – Binary parallel adder [7483], BCD adder, Multiplier, Code converter, Comparator, 3 to 8 decoder [74138], Magnitude comparator [7485], Multiplexers [74151, 74153, 74157] ICs, Sequential logic circuits- Flip flops, Conversion of flip-flops, Analyzing timing diagram using output waveforms, Asynchronous and Synchronous counters [7490, 7493, 74193 ICs], Shift registers, Shift register counters, Sequence generators, Sequence detectors.

References:

1. Mano M.R., Kime C.R., Martin T., Logic & Computer Design Fundamentals (5e), Prentice Hall India, 2015.
2. Tocci R.J., Widmer N.S., Gregory L.M., Digital Systems: Principles and Applications (12e), Pearson Education India, 2017.
3. Wakerly J.F., Digital Design Principles and Practices (4e), Pearson Education, 2014.

ICT 2164: OBJECT ORIENTED PROGRAMMING LAB [0 0 3 1]

Programs based on the following concepts: Data types, Type conversions, Operators, Control statements, Classes, Inheritance, Polymorphism, Threads, Interfaces and abstract classes, Collections: arraylist and vector, String handling, File handling, Swings.

References:

1. Schildt H., Java-The Complete Reference (9e), Tata McGraw-Hill 2014.
2. Horstmann C. S. & Cornell G., Core Java Volume I – Fundamentals (9e), Prentice Hall 2013.
3. Horstmann C. S. & Cornell G., Core Java Volume II– Advanced Features (9e), Prentice Hall 2013.

FOURTH SEMSTER**MAT 2256: ENGINEERING MATHEMATICS-IV [2 1 0 3]**

Basic Set theory, Axioms of probability, Sample space, conditional probability, total probability theorem, Baye's theorem One dimensional and two dimensional random variables, mean and variance, properties, Chebyshev's inequality, correlation coefficient, Distributions, Binomial, Poisson, Normal and Chi square. Functions of random variables: One dimensional and Two dimensional, F & T distributions, Moment generating functions, Sampling theory, Central limit theorem, Point estimation, MLE, Interval estimation, Test of Hypothesis: significance level, certain best tests; Chi square test.

References:

1. P.L. Meyer, Introduction to probability and Statistical Applications, (2e), Oxford and IBH Publishing, 1980.
2. Miller, Freund and Johnson, Probability and Statistics for Engineers, (8e), PHI, 2011.

3. Hogg and Craig, Introduction to mathematical statistics, (6e), Pearson education, 2012.
4. Ross Sheldon M, Introduction to Probability and Statistics for Engineers and Scientists, Elsevier, 2010.

ICT 2255: COMPUTER NETWORK PROTOCOLS [4 0 0 4]

Introduction to Computer Networks: Definition, Network Layer, Network Layer services, Interfacing - Bridges, IP addressing, Subnetting and Supernetting, IPv6 addressing, Delivery, Forwarding, and Routing of IP Packets, Internet Protocol - Datagram, Fragmentation, Options, Checksum, Introduction to Routing Protocols, Interior and Exterior routing, Dynamic IP Routing Protocols - RIP, RIP Version 2, OSPF, Routing between peers – BGP, ARP and RARP, Internet Control Message Protocol, User Datagram Protocol, Transmission Control Protocol and Introduction to application layer, Domain Name System (DNS), DHCP, FTP, SNMP.

References:

1. Forouzan B. A., TCP/IP Protocol Suite (4e), Tata McGraw Hill 2017.
2. Tanenbaum A. S., Computer Network (5e), Prentice Hall of India Pvt Ltd 2013.
3. Forouzan B. A., Data Communications and Networking (5e), Tata McGraw Hill 2013.
4. Garcia L., Widjaja, Communication Networks (2e), Tata McGraw Hill 2004.

ICT 2256: COMPUTER ORGANIZATION AND MICROPROCESSOR SYSTEMS [3 0 0 3]

Microprocessor 8086 Architecture, Pin diagram, Modes of operation, Segmentation and memory addressing, Addressing modes, Assembler directives, Assembly language development tools, Instruction set, Stacks and subroutine, Macros and procedures, Assembly language programming, Interrupts, BIOS and DOS interrupts, Basic IO interfacing- 8255 Programmable Peripheral Interface, 8254 Programmable Interval Timer, 8259 Programmable Interrupt Counter, Computer Organization: Introduction, Execution Unit - Combinational shifter design, Adders, Arithmetic and Logic Unit design, Multiplication algorithms, Division algorithms., Control Unit- Introduction, Basic concepts, Hardwired and Micro programming approach, Memory Unit, Input & Output.

References:

1. Hall D.V., Microprocessors and Interfacing: Programming and Hardware (2e), Tata McGraw Hill, 2006,
2. Brey B.B., The Intel Microprocessors: 8086 to Pentium Pro - Architecture, Programming and Interfacing (8e), Prentice Hall of India, 2012
3. Udaykumar K, Umashankar B.S., Advanced microprocessors and IBM –PC assembly language programming, McGraw Hill Education, 2017.
4. Rafiquzzaman M and Rajan C., Modern computer Architecture, Galgotia Publications Pvt. Ltd, 2012.

ICT 2257: DESIGN AND ANALYSIS OF ALGORITHMS [3 1 0 4]

Introduction, Graphs: Representation of graphs & Digraphs, Graph Search Methods: Breadth First Search, Depth First Search, Shortest path algorithms, Algorithm Design Techniques: The Greedy Method, Divide and Conquer, Dynamic Programming, Tree-Binary search trees, Heap Trees, Height Balanced Tree, B Trees, B+ trees. Hashing: hash functions, collision resolution techniques, Heaps and priority queues, P, NP, NP-Complete and NP hard problems, Approximation Algorithms.

References:

1. Cormen T H., Leiserson C. E., Rivest R. L., Stein C., Introduction to Algorithms (3e), Prentice-Hall India, 2009.
2. Sahni S., Data Structures, Algorithms and Applications in C++ (2e), Silicon Press, 2005.
3. Weiss M., Data Structures and Algorithm Analysis in C (3e), Pearson Education, 2009.

ICT 2258: OPERATING SYSTEMS [3 1 0 4]

Introduction to Operating systems - Operating System Services, Operating system Structure, System calls, Process management - Process concept, Threads, Inter-process communication, CPU Scheduling, Process synchronization, Handling deadlocks – Deadlock Characterization, Deadlock Detection, Prevention, Avoidance and Recovery, Memory management - Main memory, Swapping, Contiguous Memory Allocation, Paging, Segmentation, Virtual memory – Demand Paging, Page Replacement, Thrashing, Allocating Kernel Memory, Storage Management- File management, Disk scheduling, Case study on Unix based Operating system – Design Principles, Kernel Modules, Basic concepts of Real time operating systems – Classification of Real Time Systems, Microkernels, Scheduling.

References:

1. Silberschatz A., Galvin P.B. & Gagne G., Operating System Concepts (9e), Wiley, 2012.
2. Stallings W., Operating Systems: Internals and Design Principles (9e), Pearson, 2017.
3. Laplante P.A. & Ovaska S.J., Real time systems design and analysis (4e), Wiley, 2013.
4. Mall R., Real time systems: Theory and Practice (2e), Pearson, 2009.

ICT 2263: ALGORITHM LAB [0 0 3 1]

Graphs: Finding a Path, cycle. Greedy Method: 0/1 Knapsack Problem, Dijkstra's Algorithm, Minimum spanning tree using Prim's/Kruskal's Algorithm. Divide and Conquer Method: Merge Sort, Quick Sort, Strassen's Matrix multiplication method, Binary Search, Closest Pair of points. Dynamic Programming: Matrix Multiplication Chain Problem, 0/1 Knapsack problem, All pairs shortest path. Backtracking/Branch and Bound: Travelling sales person problem, 0/1 Knapsack Problem. Approximation Algorithm: Travelling sales person problem, Vertex cover problem.

References:

1. Cormen T. H., Leiserson C. E., Rivest R. L., Stein C, Introduction to Algorithms (3e), Prentice- Hall India, 2009.
2. Sahni S., Data Structures, Algorithms and Applications in C++ (2e), Silicon Press, 2005.

ICT 2264: MICROPROCESSOR SYSTEMS LAB [0 0 3 1]

Assembly language programs related to memory access – Block transfer, Addition, Subtraction, Multiplication, Division, Unpacked BCD arithmetic, Packed BCD arithmetic, Sorting, Searching, Code conversion, GCD, LCM, Recursive functions, Programs using DOS and BIOS interrupts to input from keyboard and display, Programs using string instructions, Menu driven programs, Programs using Video RAM.

References:

1. Hall D.V., Microprocessors and Interfacing: Programming and Hardware (2e), Tata McGraw Hill, 2006.
2. Brey B.B., The Intel Microprocessors: 8086 to Pentium Pro -

Architecture, Programming and Interfacing (8e), Prentice Hall of India, 2012.

3. Udaykumar K, Umashankar B.S., Advanced microprocessors and IBM –PC assembly language programming, McGraw Hill Education, 2017.
4. Rafiquzzaman M and Rajan C., Modern computer Architecture, Galgotia Publications Pvt. Ltd, 2012.

ICT 2265: OPERATING SYSTEMS LAB [0 0 3 1]

UNIX based operating system commands, executing shell scripts, inter process communication using system calls, implementing CPU scheduling algorithms, memory and deadlock management.

References:

1. Blum R. & Bresnahan C., Linux Command Line Shell Scripting Bible (3e), Wiley, 2015.
2. Silberschatz A., Galvin P.B. & Gagne G., Operating System Concepts (9e), Wiley, 2012.

FIFTH SEMSTER**HUM 3152 : ESSENTIALS OF MANAGEMENT [2 1 0 3]**

Definition of management and systems approach, Nature & scope. The functions of managers. Corporate social responsibility. Planning: Types of plans, Steps in planning, Process of MBO, How to set objectives, Strategies, policies & planning premises. Strategic planning process and tools. Nature & purpose of organising, Span of management, Factors determining the span, Basic departmentation, Line & Staff concepts, Functional authority, Art of delegation, Decentralisation of authority. HR planning, Recruitment, Development and training. Theories of motivation, Special motivational techniques. Leadership- leadership behaviour & styles, Managerial grid. Basic control process, Critical control points & standards, Budgets, Non-budgetary control devices. Profit & loss control, Control through ROI, Direct, Preventive control. Managerial practices in Japan & USA, Application of Theory Z, The nature & purpose of international business & multinational corporations, Unified global theory of management. Entrepreneurial traits, Creativity, Innovation management, Market analysis, Business plan concepts, Development of financial projections

References:

1. Harold Koontz & Heinz Weihrich., Essentials of Management, McGraw Hill, New Delhi, 2012.
2. Peter Drucker., Management: Tasks, Responsibilities and Practices, Harper and Row, New York, 1993.
3. Peter Drucker., The Practice of Management, Harper and Row, New York 2004.

ICT 3156: CYBER SECURITY [3 0 0 3]

Introduction to Computer Security, Toolbox: Authentication, Access Control and Cryptography, Programming Insights- Non-malicious programs, Malicious Programs, Viruses, Worms, Trojans, Countermeasures, Hacking- Basics of hacking, Phishing, Brute Force Attack, Denial of Service, Distributed Denial of Service Attacks, Penetration Testing, Bots and Botnets, Attacks on The Web, Operating Systems and Networks, Security Countermeasures- Browser Encryption, Onion Routing, IP Security Protocol Suite (IPsec), Virtual Private Networks, Firewalls, Intrusion Detection and Prevention Systems, Network Management, Incidents, Ethics, Case Studies on Cyber Crime and Cyber Terrorism.

References:

1. Pfleeger C. P., Pfleeger S. L. and Margulies J., Security in Computing (5e), Prentice Hall, 2015.
2. Akhgar B., Staniforth A. and Bosco F., Cyber Crime and Cyber Terrorism Investigator's Handbook (1e), Syngress Publishing, 2014.
3. Hubbard D. W. and Seiersen R., How to Measure Anything in Cybersecurity Risk, John Wiley & Sons, 2016.
4. Mitnick K. D. and Simon W. L., Art of Intrusion, Wiley Publishing Inc. 2005.
5. Singer P. W. and Friedman A., Cybersecurity and Cyber war- What Everyone Needs to Know, Oxford.

ICT 3157: DATABASE SYSTEMS [3 0 0 3]

Introduction to database system, Database users, Database architecture, Relational database, Keys, Schema, Formal relational query language, SQL basics, Constraints, Intermediate SQL, Joins, Nested queries, Advanced SQL, Functions, Procedures, Triggers, High level data modelling using entity relationship model, Relational database design, Notion of functional dependencies, Normalization, Transaction management, ACID properties, Serializability, Concurrency control, Locking, Deadlock handling, Unstructured database, Introduction to NoSQL, Basics of document-oriented database, MongoDB.

References:

1. Silberschatz A., Korth H. F., Sudarshan S., Database system concepts (6e), McGraw-Hill, 2013.
2. Elmasri, Ramez, Navathe S., Fundamentals of database systems (7e), Pearson, 2016.
3. Molina, Hector, Ullman J. D., Widom J., Database systems, The Complete Book (2e), Pearson Prentice Hall, 2013.
4. Chodorow K., MongoDB: The definitive guide (2e), O'Reilly, 2013.

ICT 3158: EMBEDDED SYSTEMS [3 1 0 4]

An overview of ARM-Cortex- M Architecture, CISC versus RISC, The RISC and ARM design philosophy, ARM addressing modes, Data transfer instructions, Arithmetic and logical instructions, Shift and rotate instructions, Branch and conditional branch instructions, Function call and return, Stack, Recursive functions, Conditional execution, Assembly language programming, Input/output I/O) programming, Timer/counter programming, I/O interfacing - LED, LCD, Keyboard, Stepper motor, ADC, and DAC, PWM, UART, Hardware and software synchronization, Multithreading, Nested Vectored Interrupt Controller (NVIC), External hardware interrupts, IO interrupts, SysTick interrupts.

References:

1. Jonathan W.V., Embedded systems: Real-time interfacing to ARM Cortex-M microcontrollers (4e), Create space Independent Publishing Platform, June 2014.
2. Wilmshurst T., Fast and Effective Embedded System Design applying the ARM mbed, Elsevier, 2017.
3. Jonathan W.V., Embedded systems: Introduction to ARM(r) Cortex-M Microcontrollers (5e), Create space Independent publishing platform, June 2017.
4. UM10360, LPC 176x/5x User Manual, NXP Semiconductors, Rev. 3.1, 2014.
5. Joseph V., A definitive Guide to ARM Cortex-M3 and Cortex-M4 processors (3e), Elsevier, 2014.

ICT 3159: SOFTWARE ENGINEERING [3 1 0 4]

Introduction to Software Engineering, Process Models- Agile Process Model, Requirement Engineering, Requirement Modeling- Scenario and Class based modeling, Design models and methodologies, Architectural and Design Patterns, Software Testing Strategies and Testing Techniques, Software Configuration Management and Risk Management, Introduction to Project Management- basics of product metrics, planning and scheduling.

References:

1. Pressman R. S., Software Engineering A practitioner's approach (8e), McGraw Hill, 2014.
2. Booch G., Rumbaugh J., Jacobson I., The Unified Modeling Language User Guide (2e), Pearson, 2015.
3. Sommerville I., Software engineering (10e), Pearson Education, 2017.

ICT 3163: DATABASE SYSTEMS LAB [0 1 3 2]

Basics of Visual C# for GUI design and control, Data Definition Language, Basic database query operations, Nested subqueries, Join Operations, Views, Stored procedures, Functions, Trigger, Cursors, Transaction control queries, Data Access from Visual C#, Introducing NoSQL-MongoDB ,Design and development of application based on database concepts.

References:

1. Ivan B., SQL, PL/SQL: The Programming Language of Oracle (4e), BPB Publications, 2010.
2. Ken C., Csharp, Available: <https://www.homeandlearn.co.uk/csharp/csharp.html> [Online]
3. JavaTPoint, Oracle-tutorial, Available : <https://www.javatpoint.com/oracle-tutorial> [Online]
4. W3Schools, SQL Tutorial, Available : <https://www.w3schools.com/sql/> [Online]
5. MongoDB, MongoDB Tutorials, Available : <https://docs.mongodb.com/manual/tutorial/> [Online]

ICT 3164: EMBEDDED SYSTEMS LAB [0 0 3 1]

Familiarization of data transfer from code segment to data segment and from data segment to data segment, Arithmetic operations, Logical instructions, Branch instructions, Code conversion from hexadecimal to decimal and decimal to hexadecimal, Packing and unpacking of ASCII digits, Sorting using selection sort and bubble sort techniques, Searching using linear and binary search techniques, Recursion, I/O interfacing of LEDs, LCD, keyboard, 7 segment display, Stepper motor, DAC and ADC, PWM. In addition to the above list of experiments, students are required to develop a mini project.

References:

1. Jonathan W.V., Embedded systems: real-time interfacing to ARM Cortex-M microcontrollers (4e), Createspace Independent Publishing Platform, June 2014.
2. Wilmshurst T., Fast and Effective Embedded System Design applying the ARM mbed, Elsevier, 2017.
3. Jonathan W.V., Embedded systems: Introduction to ARM(r) Cortex-M Microcontrollers (5e), Createspace Independent publishing platform, June 2017.

4. UM10360, LPC 176x/5x User Manual, NXP Semiconductors, Rev. 3.1, 2014.
5. Joseph V., A definitive Guide to ARM Cortex-M3 and Cortex-M4 processors (3e), Elsevier, 2014.

ICT 3165: NETWORK PROGRAMMING AND SIMULATION LAB [0 0 3 1]

Socket programming, Simulation of Ethernet LAN protocol, token bus and token ring protocols, implementation of distance vector algorithm, link state routing algorithm and finding shortest path using packet tracer.

References:

1. Stevens R., Stephen A. R., Advanced Programming in the UNIX Environment (2e), Pearson Education, 2013.
2. Jesin A Packet Tracer Network Simulator (1e), Packt Publishing, 2014.

SIXTH SEMESTER

HUM 3151: ENGINEERING ECONOMICS AND FINANCIAL MANAGEMENT [2 1 0 3]

Nature and significance, Micro & macro differences, Law of demand and supply, Elasticity & equilibrium of demand & supply. Time value of money, Interest factors for discrete compounding, Nominal & effective interest rates, Present and future worth of single, Uniform gradient cash flow. Bases for comparison of alternatives, Present worth amount, Capitalized equivalent amount, Annual equivalent amount, Future worth amount, Capital recovery with return, Rate of return method, Incremental approach for economic analysis of alternatives, Replacement analysis. Break even analysis for single product and multi product firms, Break even analysis for evaluation of investment alternatives. Physical & functional depreciation, Straight line depreciation, Declining balance method of depreciation, Sum-of-the-years digits method of depreciation, Sinking fund and service output methods, Introduction to balance sheet and profit & loss statement. Ratio analysis - Financial ratios such as liquidity ratios, Leverage ratios, Turn over ratios, and profitability ratios.

References:

1. Prasanna Chandra., Fundamentals of Financial Management, Tata Mc-Graw Hill Companies, New Delhi, 2005.
2. James L Riggs, David D Bedworth and Sabah U Randhawa., Engineering Economics, Tata McGraw – Hill Publishing Company Ltd, New Delhi, 2004.
3. T. Ramachandran., Accounting and Financial Management, Scitech Publications Pvt. Ltd. India, 2001.
4. Eugene F. B. & Joel F. H., Fundamentals of Financial Management (12e), Cengage Learning Publisher, 2009.
5. M. Y. Khan & P. K. Jain., Financial Management (5e), Tata McGraw Hill Publication, New Delhi, 2008.
6. Thuesen G.J., Engineering Economics Prentice Hall of India, New Delhi, 2005.
7. Blank Leland T. Tarquin Anthony J. Engineering Economy, McGraw Hill, Delhi, 2002.
8. Chan S. Park, Fundamentals of Engineering Economics, (3e) Pearson Publication, 2013.

ICT 3253: DATA WAREHOUSING AND DATA MINING [3 0 0 3]

Introduction to Data mining- Technologies, applications, Major issues in data mining, Data objects & attribute types, Statistical descriptions of data, Data visualization, Data pre-processing-data cleaning, data integration, data transformation, data reduction, data discretization, Data warehouse modeling, Data warehouse design and usage, Data

warehouse implementation, Association rule mining techniques- Apriori algorithm, Partition algorithm, Pincer Search algorithm, FP Tree Growth algorithm, PC tree algorithm, Dynamic Itemset Counting algorithm, Multilevel association rules, Classification and prediction techniques- Decision Tree Induction, Bayes Classification Methods, Techniques to Improve Classification Accuracy, Clustering techniques- Partitioning Methods, Hierarchical Methods, Density-Based Methods, Outlier detection, Web mining.

References:

1. Han J. and Kamber M., Data Mining: Concepts and Techniques (3e), Morgan Kaufmann Publishers, 2011.
2. Pujari A. K., Data Mining Techniques (4e), Orient Blackswan, 2016.
3. Pang-N. T., Steinbach M., Anuj K., Vipin K., Introduction to Data Mining, Pearson Education (2e), Pearson 2018.
4. Bing L., Web Data Mining: Exploring Hyperlinks, Contents, and Usage Data (2e), Springer, Second Edition, 2011.

ICT 3254: DISTRIBUTED SYSTEMS [3 0 0 3]

Introduction, Distributed Systems Models, Challenges, Processes and Communication, External data representation, Case study - Unix inter process communication, Distributed objects, Remote procedure call, Case study: Java RMI, SUN RPC, Distributed File System, Naming Systems, Directory and discovery services, Case study: SUN NFS / GNS, Distributed Shared Memory, DSM implementation algorithms, Time and Global States, Logical and vector clocks, Coordination and agreement, Distributed transactions, Consistency and Replication Management, Fault Tolerance, Case Study - Google.

References:

1. George Coulouris, Jean Dollimore, Tim Kindberg, Gordon Blair, Distributed Systems Concepts and Design (5e), Pearson Education, 2017.
2. Andrew Tanenbaum S., Distributed Systems: Principles and Paradigms (2e), Pearson Education Asia, 2016.
3. Singhal M., Shivaratri N., Advanced Concepts in Operating Systems (2e), McGraw Hill Education, 2017.
4. Andrew Tanenbaum S., Modern Operating System (3e), Pearson Education International, 2016.

ICT 3264: ADVANCED TECHNOLOGY LAB [0 0 3 1]

Introduction to the emerging technology (android, react native, etc.) used in the software industries, Understand the tools and techniques used to application development, Application user interface design, Backend database design, Implementation of mini project.

References:

1. McConnell S., Code Complete: A Practical Handbook of Software Construction (2e), Microsoft Press, Re-print 2015.
2. Horton J., Android Programming for Beginners, Packt Publishing Ltd, 2015.
3. Griffiths D., Head First Android Development (1e), O'Reilly Media, Inc., 2015.
4. Holmes E. and Bray T., Getting Started with React Native, Packt Publishing Ltd, 2015.