

CENTURION UNIVERSITY OF TECHNOLOGY & MANAGEMENT
ODISHA-761211, INDIA,
Web Site: -www.cutm.ac.in



Centurion

University

B.Tech Programme in Engineering & Technology – New Regulation
(2012 – 13 Admitted Batch onwards)

Branch: Computer Science & Engineering

CENTURION UNIVERSITY OF TECHNOLOGY & MANAGEMENT: ODISHA
B.TECH PROGRAMME IN ENGINEERING & TECHNOLOGY –New Regulations

(2012-13 Admitted Batch onwards)

COMPUTER SCIENCE AND ENGINEERING:: B.TECH II YEAR

3 rd Semester				4 th Semester			
Theory				Theory			
Code	Subject	L-T-P	Credits	Code	Subject	L-T-P	Credits
BTMA 2101	Discrete Mathematics	3-1-0	4	BTCH 2101	Environmental Science (Common to all branches)	3-1-0	4
PCCS 2102	C Programming Project	3-1-0	4	PCCS 2202	Object oriented Programming using Java	3-1-0	4
PCCS 2103	Computer Organization	3-1-0	4	PCCS 2203	Computer Networks	3-1-0	4
PCCS 2104	Database Engineering	3-1-0	4	PCCS 2204	Design and Analysis of Algorithm	3-1-0	4
	Management Core - I	3-1-0	4		Management Core - II	3-1-0	4
Theory Credits		15-5-0	20	Theory Credits		15-5-0	20
Practical/Sessional				Practical/Sessional			
PLCS 2106	Applying Data Structures Laboratory	0-0-3	2	PLCS 2206	Object oriented Programming using Java Laboratory	0-0-3	2
PLCS 2107	Computer Organization Laboratory	0-0-3	2	PLCS 2207	Computer Networks Laboratory	0-0-3	2
PLCS 2108	Database Engineering Laboratory	0-0-3	2	PLCS 2208	Design and Analysis of Algorithms	0-0-3	2
BLHU 2109	Corporate Readiness Lab	0-0-3	2	PLCS 2209	Mathematical Thinking Laboratory	0-0-3	2
BLHU 2110	Life Skills Development*	0-0-2	1*	BLHU 2210	Life Skills Development*	0-0-2	1*
Practical/Sessional Credits		0-0-14	8	Practical/Sessional Credits		0-0-14	8
TOTAL SEMESTER CREDITS			28	TOTAL SEMESTER CREDITS			28
TOTAL CUMULATIVE CREDITS			84	TOTAL CUMULATIVE CREDITS			112
TOTAL CONTACT HOURS			34	TOTAL CONTACT HOURS			34
* Not to be counted for CGPA computations							

3rd SEMESTER

BTMA 2101 DISCRETE MATHEMATICS (3-1-0) CREDITS: 4

MODULE-I (15 Hrs)

Propositional Logic, Propositional Equivalence, Predicates and Quantifiers, Rules of Inference, Sequences and Summations, Mathematical Induction, Recursive definition, Solution to recurrence relation, Generating function, Inclusion and exclusion Principle and its Applications, Relation and its properties, Representation of Relation, Closure of a Relation, Equivalence Relations and Partitions, Partial Ordering, POSet, Chain and Anti-chain.

MODULE-II (15 Hrs)

Algebraic System, Lattice, Basic properties of Lattices, Distributed and Complemented Lattices, Boolean Lattice and Boolean Algebra, Boolean Functions and Boolean Expressions, Disjunctive and Conjunctive Normal Forms.

Semi groups, Monoids, Groups, Subgroups, Cosets, Lagrange's theorem, Normal subgroup, Homomorphism, Isomorphism, Rings, Integral Domain and Field.

MODULE-III (15 Hrs)

Introduction to Graph Theory, Graph terminology, Representation of graphs, Graph Isomorphism, Connectivity, Euler and Hamiltonian Paths, Planar graph, Graph Coloring, Introduction to Trees, Application of trees.

Text Books:

1. Discrete Mathematics and its Applications by K.H.Rosen Publisher: TMH, Sixth Edition Chapters:1(1.1,1.2,1.3,1.5) ; 2 (2.4) ; 4 (4.1 to 4.3) ; 6 (6.1, 6.2, 6.4 to 6.6) ; 7; 8(8.1 to 8.5, 8.7, 8.8) ; 9(9.1,9.2)
2. Elements of Discrete Mathematics by C.L.liu & D.P. Mohapatra Publisher: TMH, Third Edition Chapters : 10 (10.1 to 10.5, 10.8 to 10.10) ; 11 (11.1 to 11.5, 11.7)

Reference Books:

1. Discrete and Combinatorial Mathematics by R.P.Grimaldi Publisher: Pearson
2. Discrete Mathematics and Applications by Thomas Koshy Publisher: Elsevier
3. Discrete Mathematical Structures by B. Kolman, R.C. Busby & S. Ross Publisher: PHI

PCCS 2102 C PROGRAMMING PROJECT (3-1-0) CREDITS: 4

Course Objective: Computer Science graduates must be extremely good in programming. To enable this, by the end of first year, they should be confident programmers, so software development capability is not a bottleneck when they do computer science courses like databases, operating systems or computer networks in subsequent semesters.

Pre-requisite: C in Use course, taught in First semester

Constraints: It is assumed that all students who begin doing this course will not have equal confidence in programming. At one end, there will be students who are merely aware of programming basics; at the other end, we will have confident programmers who can write decent programs with array, functions, strings, structures and pointers.

Scope and Syllabus: Same as 'C in Use' course

Teaching Methodology: The teaching methodology will take into account the varying confidence level and capability of students in programming. The course will be run in project mode, thus:

1. At the beginning of the semester, 50 programming projects will be announced. These 50 projects will be categorized thus:
 - a. Simple: 25 programs.
 - The simple programs will each be of simple functionality, each illustrating one or two simple attributes of C programming. The range of the 25 programs will be such that all aspects of C will be understood when one does all 25.

- String manipulation, Simple numerical problems, Reading and manipulating data into arrays of structures, Using pointers, will be some of the programs in Simple.
 - b. Meaningful: 17 programs.
 - These programs are of medium complexity, and each will achieve something meaningful. Sorting student records, matrix multiplication, or finding a word in a dictionary, are examples of Meaningful programs
 - c. Complex: 8 programs.
 - These are “difficult” problems, and the output can be useful in some ways to build other programs. Each program will ensure thinking up a good algorithm.
2. Students who are not confident will begin with Simple programs. But confident students will be encouraged straightaway to jump to Meaningful.
 3. Lectures will focus on common problems of students. Tutorials will be focused on doubt clearing. It is not mandatory to attend lectures and tutorials if one has graduated to Meaningful programs, or if one has got O grade (the highest grade) in the C in Use course.
 4. **Evaluation:** One gets 1 point for completing one simple program, 5 for completing a Meaningful program, and 15 for completing a Complex program. Points get added at the end of the course. Minimum 40 points are needed to pass. Minimum two complex programs must be delivered to qualify for the highest grade.
 5. All students will be advised that they need to complete all 50 programs (on their own) before they move into 3rd Year. Faculty guidance will be provided for this.
 6. The programs at Meaningful and Complex level will change from time to time to ensure students write original programs.
 7. Vivas are necessary to ensure students have not copied.

PCCS 2103 COMPUTER ORGANIZATION (3-1-0) CREDITS: 4

MODULE-I (18 Hrs)

Basic structures of Computers: Functional units, operational concepts, Bus structures, Software, Performance, Computer Architecture vs Computer Organization, RISC and CISC architecture.

Machine Instruction and Programs: Memory location and addresses, Big-endian and Little-endian representation. Memory Operations, Instructions and instruction Sequencing, Addressing modes, Basic Input/output operations, subroutine, additional Instructions.

MODULE-II (14 Hrs)

Arithmetic : Addition and subtraction of signed Numbers, Design of Fast Adders, Multiplication of positive Numbers, Signed-operand multiplication , Fast multiplication, Integer Division, Floating- point Numbers, (IEEE754 s...) and operations.

MODULE-III (18 Hrs)

Basic Processing units: Fundamental concepts, execution of complete Instructions, Multi bus organization, Hardwired control, Micro programmed control.

Memory System: Basic Concepts, cache Memory, Cache memory mapping policies, Cache updating schemes, performance consideration, Virtual memory management, Paging and Page replacement policies.

Pipelining: Basic concepts, Data Hazard, structural hazard, Control Hazard.

Text Books:

1. Computer Organization: Carl Hamacher, Zvonkovic, SafwatZaky, McGraw Hill, 5th Ed
2. Computer Organization and Design Hardware/ Software Interface: David A. Patterson, John L. Hennessy, Elsevier, 4th Edition.

Reference Book :

1. Computer Architecture and Organization: William Stallings, Pearson Education.
2. Computer system Architecture: Morris M. Mano PHI NewDelhi.
3. Structured Computer Organization: A.S. Tanenbum, PHI

PCCS 2104 DATABASE ENGINEERING (3-1-0) CREDITS: 4

MODULE-I: (16 Hrs)

Introduction to database Systems; Basic concepts & Definitions; Data Dictionary, DBA, Fileoriented system vs. Database System, Database Language.

Database System Architecture-Schemas, Sub Schemas & Instances, 3-level database architecture, Data Abstraction, Data Independence, Mappings, Structure, Components & functions of DBMS, Data models, Mapping E-R model to Relational, Network and Object Oriented Data models, types of Database systems.

MODULE-II: (16 Hrs)

Relational Algebra, Tuple & Domain Relational Calculus, Relational Query Languages: SQL and QBE.

Database Design:-Database development life cycle (DDLC), automated design tools, Functional dependency and Decomposition, Dependency Preservation & lossless Design, Normalization, Normal forms: 1NF, 2NF, 3NF, and BCNF, Multi-valued Dependencies, 4NF & 5NF.

Query processing and optimization: Evaluation of Relational Algebra Expressions, Query optimization.

MODULE-III: (16Hrs)

Transaction processing and concurrency control: Transaction concepts, concurrency control, locking and Timestamp methods for concurrency control.

Database Recovery System: Types of Data Base failure & Database Recovery, Recovery techniques.

Advanced topics: Object-Oriented & Object – Relational Database, Parallel & Distributed Database. Introduction to Data warehousing & Data Mining.

Text Books:

1. Database Systems by Thomas Connolly and Carolyn Begg-Pearson Education-3rd , edition (Chapters: 1-2, 4,6,7, 9.1-9.3,13,20,19.1-19.3,22.1-22.3,25.1-25.4,30.1-30.3, 32)
2. Fundamentals of Database System By Elmasari&Navathe- Pearson Education-5th , Edition.(Chapters: 1,2,3,5,6,7.1,8,10,11,15,17,18,19,20,22,25,28,29)

Reference Books:

1. An introduction to Database System – Bipin Desai, Galgotia Publications
2. Database System: concept, Design & Application by S.K.Singh (Pearson Education)
3. Database management system by Leon&Leon (Vikas publishing House). 1
4. Database Modeling and Design: Logical Design by Toby J. Teorey, Sam S. Lightstone, and Tom Nadeau, “”, 4th Edition, 2005, Elsevier India Publications, New Delhi
5. Fundamentals of Database Management System – Gillenson, Wiley India
6. Database System Concepts by Sudarshan, Korth (McGraw-Hill Education)

MANAGEMENT CORE -I (3-1-0) CREDITS:4

Common to all Branches. Syllabus as prescribed by School of Management. Refer Annexure -I for list of subjects and syllabus

PLCS 2106 APPLYING DATA STRUCTURES LABORATORY (0-0-3) CREDITS: 2

Course Objective: Computer Science graduates must be extremely good in programming. Data Structures and Algorithms are the twin pillars on which stands the foundation of programming. The objective of this lab course is to ensure students are confident with data structures, before they drive into the fast lanes of computer science.

Pre-requisite: Data Structures course, taught in Second semester

Constraints: It is assumed that all students who begin doing this course will not have equal confidence in programming. At one end, there will be students who are merely aware of programming basics; at the other end, we will have confident programmers who are proficient with the common data structures.

For this lab course to be effective, students should be able to work at their own pace.

Scope and Syllabus: Lab work based on the Data Structures course. At the end of the course, the student is expected to achieve the following:

1. Proficiency in programming with Trees and tree traversal: height of a tree, balancing a tree; infix, postfix and prefix notations.
2. Comfort with a variety of Sort: Merge sort, Quick sort, and any one more sort, apart from bubblesort.
3. Programming with Stacks, queues, circular queues, multi-linked lists. Hash lists.
4. Ability to select the right data structures, and program, given a problem.

Teaching Methodology: The aim of the course is to make the student proficient in a variety of data structures. Eight problems will constitute the scope of the course, and at least four will need to be completed, to qualify for pass grade in this course.

Programming Problems:

1. Chessboard problems: Eight Queen, Knight's Tour
2. Sparse matrix arithmetic
3. Representing a dictionary as a tree. And another data structure.
4. Sorting large numbers of names. And numbers.
5. Representing a network of cities and distances, to find shortest path. (Add complexity for the bright student: throw in timing issues on different routes to find shortest route.)
6. Maxflow algorithm.
7. Best fit, first fit, and Buddy algorithms.
8. Multi-server problems, with multiple clients and varying priorities.

Evaluation: Minimum pass grade will need programming of trees, queues, stacks, and at least two types of sort. Any students who can comfortably do all of above eight items will be eligible for the highest grade. Vivas are necessary to ensure students have not copied.

PLCS 2107 COMPUTER ORGANIZATION LABORATORY (0-0-3) CREDITS: 2

1. Study of various components of PC and Dismantling and assembling a PC.
2. Some experiments using CPU trainer kits.
3. Study Anatomy of SMPS and Some experiments using SMPS trainer kits.
4. Some experiments using printer trainer kits.
5. Study Anatomy of BIOS and Some experiments using HDD trainer kit .
6. Simulation of simple fundamental units like half adder, full adder using VHDL code.
7. Simulation of simple fundamental units like multiplexer, de-multiplexer using VHDL code.
8. Simulation of simple fundamental units like Arithmetic logic Unit using VHDL code.
9. Simulation of simple fundamental units like Simple processor (CPU) using VHDL.
10. Projects:
 1. Design of Ripple Carry Adder.
 2. Carry Look Ahead Adder.
 3. Combinational Multipliers
 4. Design of ALU
 5. Design Of Computer

PLCS 2108 DATABASE ENGINEERING LABORATORY (0-0-3) CREDITS: 2

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

BLHU 2109 CORPORATE READINESS LABORATORY
(0-0-3) CREDITS:2

Common to all Branches. Students to conduct projects offered / identified which are oriented towards corporate awareness and requirements. The list of exercises are dynamic and shall be changed by the instructors incharge taking into consideration regional / national / global changes and requirements.

BLHU 2110 LIFE SKILLS DEVELOPMENT LABORATORY

Common to all Branches. Will be conducted from 1st to 6th Semesters for all branches. No credits added but the students are required to get qualified as prescribed by the T & P cell for being able to and considered for placement. The exercises to be carried out shall be decided as per the industry's requirements from time to time.

4th SEMESTER

BTCH 2101 ENVIRONMENTAL SCIENCE (3-1-0) CREDITS: 4

(Common to all branches)

MODULE-I (15 Hrs)

Environment and its multidisciplinary nature; Need for public awareness; Renewable and non-renewable resources – forest, water, mineral, land, food and energy resources; Structure and function of ecosystems of forest, grass land, desert and aquatic types;

MODULE-II (16 Hrs)

Biodiversity and its conservation; Biodiversity at global, national and local levels; Threats to biodiversity-Habitat loss; wild life poaching and man-wildlife conflicts; Endangered and endemic species; conservation measures.

Causes, effects and control measures of pollution, air, water, marine thermal and noise pollution; Nuclear hazards; solid-waste management – Causes, effects and control measures; Management of disasters due to natural causes of floods, earthquakes, cyclones and landslides.

MODULE-III (16 Hrs)

Social issues and the environment; Sustainable environment, Water conservation measures; Rain water harvesting; Resettlement and rehabilitation of people; Climate change and global warming; Acid rain; Ozone layer depletion; water land reclamation; Consumerism and waste products;

Features of Environment Protection Act, Air pollution and Control of Pollution Acts; Water Pollution and its Control Act. Effects of Pollution explosion on environment and public health; Need for value education to Protect environment and resources.

Text Book:

Anubhav Kaushik & C.P. Kaushik : Environmental Studies - New age International Publishers

Reference Books:

1. Benny Joseph : Environmental Studies - Tata Mac Graw Hill
2. E. Bharucha : Text book of Environmental Studies for Under graduate courses – Universities Press. (Book prepared by UGC Committee.

PCCS 2202 OBJECT ORIENTED PROGRAMMING USING JAVA (3-1-0) CREDITS: 4

MODULE-I: (15 Hrs)

Introduction to object oriented programming: object oriented concepts (Class, object, Abstraction, Encapsulation, Inheritance, polymorphism). Introduction to Java and Java programming Environment, A sample Java Program.

Fundamental Programming Structure: Data Types, variable, Typecasting, Arrays, Operators and their precedence.

Control Flow: Java's Selection, Iteration and Jump statements

Classes: Concept of Objects and Classes, using methods, Local variables and Instance variables, constructor, overloading constructor, overloading methods, Garbage collection, the finalize method, static, final & this keyword,

Inheritance: Basics, the super keyword, Method overriding, dynamic method Dispatch, Using Abstract Classes, Inner classes

MODULE-II: (15 hrs)

String Handling: String, String Buffer, String Builder.

Packages: Packages, Access Protection, Importing package, User-defined Package

Interfaces: Interface, Implementing Interfaces

Exception Handling: Fundamentals, Checked and Unchecked exceptions, Using try & catch, Multiple catch, throw, throws, finally, Java's Built in exceptions, user defined exception.

Multi-Threading: Java Thread Life cycle Model, Thread Priorities, Synchronization, Creating threads, using different Thread Methods, Wrapper Classes, clone (java.lang), Vectors (java.util), Networking

MODULE-III: (15 Hrs)

Remote Method Invocation

Exploring java.io: I/O streams, Serialization

Applets: Introduction to Applets, Life cycle, methods

Event Handling: Delegation Event model, Event Classes, Event Listener Interfaces, Adapter classes.

AWT : AWT Classes, window fundamental, component, container, panel, Window, Frame , Canvas, Creating a frame window in an Applet , working with Graphics, Control Fundamentals, Layout managers, Handling Events by Extending AWT components. Core java API packages.

Text Books:

1. Java, The complete Reference, 7th Edition, Herbert Schildt, TMH

Reference Books:

1. Programming with JAVA, Balguruswamy, TMH.
2. Sun Certified Programmer for Java 6 Study Guide, Kathy Sierra, Bert Bates, TMH
3. Head First Java, 2nd Edition, Kathy Sierra, Bert Bates, and O'Reilly Media

PCCS 2203 COMPUTER NETWORKS (3-1-0) CREDITS: 4

MODULE-I (16 Hrs)

Introduction to Computer Network, Network Topology, OSI model, TCP/IP protocol suit.

Physical Layer: Analog and Digital, Analog Signals, Digital Signals, Analog versus Digital, Data Rate Limits.

Transmission Media: Guided Media, Unguided media (wireless)

Switching: Circuit switching and Packet Switching

MODULE-II (16 Hrs)

Data Link Layer

Error Detection and correction: Types of Errors, Detection, Error Correction, Data Link Control and Protocols, Flow and Error Control, Stop-and-wait ARQ, Go-Back-N ARQ, Selective Repeat ARQ, HDLC.

Point-to -Point Access: PPP, Point -to- Point Protocol, PPP Stack, Multiple Access Random Access, Controlled Access, Channelization.

Local area Network: Ethernet, Traditional Ethernet, Fast Ethernet, Gigabit Ethernet. Token bus, token ring

Wireless LANs: IEEE 802.11, Bluetooth virtual circuits: Frame Relay and ATM.

MODULE-III (18 Hrs)

Network Layer:

Host to Host Delivery: Internetworking, addressing and Routing Network Layer Protocols: ARP, IPV4, ICMP, IPV6 and ICMPV6 Transport Layer: Process to Process Delivery: UDP; TCP congestion control and Quality of service.

Application Layer: Client Server Model, Domain Name System (DNS), Electronic Mail (SMTP) and file transfer (FTP) HTTP and WWW.

Text Books:

1. Data Communications and Networking: Behrouz A. Forouzan, Tata McGraw-Hill, 4th Ed
2. Computer Networks: A. S. Tannenbum, D. Wetherall, Prentice Hall, Imprint of Pearson 5th Ed

Reference Books: .

1. Computer Networks: A system Approach: Larry L, Peterson and Bruce S. Davie, Elsevier, 4th Ed
2. Computer Networks: Natalia Olifer, Victor Olifer, Willey India 35
3. Data and Computer Communications: William Stallings, Prentice Hall, Imprint of Pearson, 9th Ed.

4. Data communication & Computer Networks: Gupta, Prentice Hall of India
5. Network for Computer Scientists & Engineers: Zheng, Oxford University Press
6. Data Communications and Networking: White, Cengage Learning

PCCS 2204 DESIGN AND ANALYSIS OF ALGORITHM (3-1-0) CREDITS: 4

MODULE-I (15 Hrs)

Introduction to design and analysis of algorithms, Growth of Functions (Asymptotic notations, standard notations and common functions), Recurrences, solution of recurrences by substitution, recursion tree and Master methods, worst case analysis of Merge sort, Quick sort and Binary search, Design & Analysis of Divide and conquer algorithms.

MODULE-II (15 Hrs)

Heapsort : Heaps, Building a heap, The heapsort algorithm, Priority Queue, Lower bounds for sorting. Dynamic programming algorithms (Matrix-chain multiplication, Elements of dynamic programming, Longest common subsequence)

Greedy Algorithms - (Assembly-line scheduling, Activity- selection Problem, Elements of Greedy strategy, Fractional knapsack problem, Huffman codes).

MODULE-III (18 Hrs)

Data structure for disjoint sets:- Disjoint set operations, Linked list representation, Disjoint set forests.

Graph Algorithms: Breadth first and depth-first search, Minimum Spanning Trees, Kruskal and Prim's algorithms, single- source shortest paths (Bellman-ford and Dijkstra's algorithms), All-pairs shortest paths (Floyd – Warshall Algorithm). Back tracking, Branch and Bound. String matching (Rabin-Karp algorithm),

NP - Completeness (Polynomial time, Polynomial time verification, NP - Completeness and reducibility, NP-Complete problems (without Proofs), Approximation algorithms (Vertex-Cover Problem, Traveling Salesman Problem).

Text Book:

1. T.H. Cormen, C.E. Leiserson, R.L. Rivest, C.Stein : Introduction to algorithms -2nd edition, PHI,2002. Chapters: 1,2,3,4 (excluding 4.4), 6, 7, (7.4.1), 8 (8.1) 15 (15.1 to 15.4), 16 (16.1, 16.2, 16.3), 21 (21.1,21.2,21.3), 22(22.2,22.3), 23, 24(24.1,24.2,24.3), 25 (25.2), 30,32 (32.1, 32.2) 34, 35(35.1, 35.2)
2. AnanyLevitin ,Introduction to the Design and Analysis of Algorithm –Second Edition ,Pearson Education.

Reference Books:

1. Algorithms – Berman, Cengage Learning
2. Computer Algorithms: Introduction to Design & Analysis, 3rd edition-by Sara Baase,
3. Allen Van Gelder, Pearson Education
4. Fundamentals of Algorithm-by Horowitz & Sahani, 2nd Edition, Universities Press.
5. Algorithms By Sanjay Dasgupta, Umesh Vazirani – McGraw-Hill Education 5. Algorithm Design – Goodrich, Tamassia, Wiley India

MANAGEMENT CORE - II (3-1-0) CREDITS:4

Common to all Branches. Syllabus as prescribed by School of Management. Refer Annexure -I for list of subjects and syllabus

PLCS 2206 OBJECT ORIENTED PROGRAMMING USING JAVA LABORATORY (0-0-3)

CREDITS: 2

1. JDK Installation Procedure and Simple Java Programs.
2. Java Programs with control statements and using Arrays.
3. Write java programs using concept of Constructors.
4. Write java programs using concept of Inheritance.
5. Write java programs using concept of Interfaces.
6. Write java programs using concept of String handling.
7. Write java programs using concept of Package.
8. Write java programs using concept of Exception Handling.
9. Write java programs using concept of Multithreading.
10. Write a java program using concept of Networking.
11. Write a java program using concept of RMI.
12. Write java programs using concept of Applets.
13. Write java programs using concept of AWT & Event Handling.

PLCS 2207 COMPUTER NETWORKS LABORATORY (0-0-3) CREDITS: 2

1. Some Network protocol simulation using NetSim, NS2, etc. for
 - a Analysing number of transmitting nodes vs. collision count, mean delay for Ethernet LAN .
 - b Analysing bus vs. star-switch with respect to number of collisions (for a fixed number of transmitting nodes) for Ethernet LAN
 - c Analysing performance of token ring with number of nodes vs. response time, mean delay using NetSim.
 - d Comparing the throughput and normalized throughput for token ring and token bus for different transmitting nodes.
 - e Comparing the CSMA/CD vs. CSMA/CA protocols (for a fixed number of transmitting nodes).
 - f Analysing the difference between unicast and broadcast transmission (for a fixed number of transmitting nodes).
 - g Verification of stop-and-wait protocol.
 - h Verification of Go-back-N protocol.
 - i Verification of Selective repeat protocol.
 - j Verification of distance vector routing algorithm.
 - k Verification of link state routing algorithm.
2. Some programming techniques in socket programming.

PLCS 2208 DESIGN AND ANALYSIS OF ALGORITHMS LABORATORY (0-0-3) CREDITS: 2

1. Using a stack of characters, convert an infix string to postfix string.(1 class)
2. Implement insertion, deletion, searching of a BST. (1 class)
3. Implement binary search and linear search in a program
4. Implement a heap sort using a max heap.
 - a. Implement DFS/ BFS for a connected graph.
 - b. Implement Dijkstra's shortest path algorithm using BFS.

5. Write a program to implement Huffman's algorithm.
6. Implement MST using Kruskal/Prim algorithm.
 - a. Write a program on Quick sort algorithm.
 - b. Write a program on merge sort algorithm.
 - c. Take different input instances for both the algorithm and show the running time.
 - d. Implement Strassen's matrix multiplication algorithm.
 - e. Write down a program to find out a solution for 0 / 1 Knapsack problem.
 - f. Using dynamic programming implement LCS.
7. Find out the solution to the N-Queen problem.
8. Implement back tracking using game trees.

PLCS 2209 MATHEMATICAL THINKING LABORATORY (0-0-3) CREDITS: 2

Course Objective: Computer Science graduates must be extremely good in problem solving. Today neither structured thinking nor problem solving is formally taught. This course will be a formal overview of formal thinking tools, and mathematical problem solving techniques. The experience from this course will be of lifelong importance

Pre-requisite: Willingness to exercise the grey cells

Scope and Syllabus: We will teach thinking techniques from essentially four sources:

1. Mathematical methods listed by Polya in his famous book.
2. Easiest to use TRIZ tools
3. Disruptive Innovation concepts of Christensen
4. Tools for systems thinking

Examples of tools to be taught:

1. Mathematical Problem Solving techniques: Analogy, Can you check the result, Can you derive the result differently, Can you use the result, Carrying out, Condition, Corollary, Decomposing and recombining, Diagnosis, Did you use all the data, Examine your guess, Figures, Generalization, Heuristic reasoning, Induction and mathematical induction, Look at the unknown, Notation, Problem related to yours and solved before, Reductio ad absurdum and indirect proof, Restate the problem, Rules of discovery, Rules of style, Separate the various parts of the condition, Setting up equations, Symmetry, Test by dimension, Wisdom of proverbs, Working backwards
2. Idea generation tools: 9-Windows, Ideal Final Result, Resources, Size Time Cost, Disruptive Innovation
3. Systems thinking: Efficiency Breeds Vulnerability, Entropy, Multiplier Effect, Seeing the Big Picture, Seeing Yourself Through Alien Eyes, Spiral and the Pendulum, Trend Countertrend,

Teaching Methodology: Provide problems, solve with given tools. Then provide more problems and ask students to find answers by applying the tools learnt.

Text Books: How to Solve It by George Polya

Reference Books:

1. FutureThink: How to Think Clearly in a Time of Change, Edie Weiner and Arnold Brown
2. And Suddenly the Inventor Appeared, Altshuller
3. How would you move Mount fuji? By William Pounstone.

Evaluation: Must solve at least 5 mathematical problems and three ideation problems to pass. Vivas are necessary to ensure students have not copied.

BLHU 2210 LIFE SKILLS DEVELOPMENT LABORATORY (0-0-3) CREDITS:1

Common to all Branches. Will be conducted from 1st to 6th Semesters for all branches. No credits added but the students are required to get qualified as prescribed by the T & P cell for being able to and considered for placement. The exercises to be carried out shall be decided as per the industry's requirements from time to time.

CENTURION UNIVERSITY OF TECHNOLOGY & MANAGEMENT: ODISHA
B.TECH PROGRAMME IN ENGINEERING & TECHNOLOGY –New Regulations

(2012-13 Admitted Batch onwards)

COMPUTER SCIENCE AND ENGINEERING:: B.TECH III YEAR

5th Semester				6th Semester			
Theory				Theory			
Code	Subject	L-T-P	Credits	Code	Subject	L-T-P	Credits
PCCS 3109	Operating Systems	3-1-0	4	PCCS 3201	Internet and Web Technology	3-1-0	4
PCCS 3110	Advanced Java Programming	3-1-0	4	PCCS 3202	Compiler Design	3-1-0	4
PCCS 3111	Theory of Computing	3-1-0	4	PCCS 3203	Software Engineering	3-1-0	4
	Free Elective-I	3-1-0	4		Free Elective-II	3-1-0	4
	Management Core - III	3-1-0	4		Management Core - IV	3-1-0	4
Theory Credits			20	Theory Credits			20
Practical/Laboratory				Practical/Laboratory			
PLCS 3106	Operating Systems Laboratory	0-0-3	2	PLCS 3206	Internet and Web Technology Laboratory	0-0-3	2
PLCS 3107	Advanced Java Programming Laboratory	0-0-3	2	PLCS 3207	Software Engineering Laboratory	0-0-3	2
PLCS 3108	Custom Project 1	0-0-3	2	PLCS 3208	Compiler Design Laboratory	0-0-3	2
PLCS 3109	Technology Seminar	0-0-3	2	PLCS 3209	Custom Project 2	0-0-3	2
BLHU 3109	Life Skills Development*	0-0-2	1*	BLHU 3210	Life Skills Development*	0-0-2	1*
Practical / Sessional Credits			8	Practical / Sessional Credits			8
TOTAL SEMESTER CREDITS			28	TOTAL SEMESTER CREDITS			28
TOTAL CUMMULATIVE CREDITS			140	TOTAL CUMMULATIVE CREDITS			168
TOTAL CONTACT HOURS/WEEK			32	TOTAL CONTACT HOURS/WEEK			32
* Not to be counted for CGPA computations				* Not to be counted for CGPA computations			

5th SEMESTER

PCCS 3109 OPERATING SYSTEMS (3-1-0) CREDITS:4

MODULE-I (16 Hrs)

INTRODUCTION TO OPERATING SYSTEM:

What is an Operating System? Simple Batch Systems, Multiprogramming and Time Sharing systems .Personal Computer Systems, Parallel Systems, Distributed Systems and Real time Systems.

Operating System Structures: Operating System Services, System components, Protection system, Operating System Services, system calls

PROCESS MANAGEMENT:

Process Concept, Process Scheduling, Operation on Processes, Interprocess communication, Examples of IPC Systems, Multithreading Models, Threading Issues, Process Scheduling Basic concepts, scheduling criteria, scheduling algorithms, Thread Scheduling.

MODULE-II (18 Hrs)

PROCESS COORDINATION:

Synchronization: The Critical section problem, Peterson's solution, Synchronization hardware, Semaphores, Classical problems of synchronization, Monitors.

Deadlocks: System model, Deadlock Characterization Methods for Handling Deadlocks, Deadlock Prevention, Deadlock avoidance, Deadlock Detection, recovery from Deadlock.

MEMORY MANAGEMENT: Memory Management strategies, Logical versus Physical Address space, swapping, contiguous Allocation, Paging, Segmentation.

Virtual Memory: Background, Demand paging, performance of Demand paging, Page Replacement, Page Replacement Algorithms. Allocation of frames, Thrashing, Demand Segmentation.

MODULE-III (16 Hrs)

STORAGE MANAGEMENT:

File System Concept, Access Methods, File System Structure, File System Structure, File System Implementation, Directory implementation, Efficiency and Performance, Recovery, Overview of Mass Storage Structure, Disk Structure, Disk Scheduling, Disk Management, Swap-Space Management, I/O System Overview, I/O Hardware, Application I/O Interface, Kernel I/O Subsystem, Transforming I/O Request to Hardware Operation.

CASE STUDIES: The LINUX System, Windows XP, Unix system.

Text Books:

1. Operating System Concepts – Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, 8th edition, Wiley-India, 2009.
2. Modern Operating Systems – Andrew S. Tanenbaum, 3 Edition, PHI
3. Operating Systems: A Spiral Approach – Elmasri, Carrick, Levine, TMH Edition

Reference Books:

1. Operating Systems – Flynn, McHoes, CengagLearning
2. Operating Systems – Pabitra Pal Choudhury, PHI
3. Operating Systems – William Stallings, Prentice Hall
4. Operating Systems – H.M. Deitel, P. J. Deitel, D. R. Choffnes, 3 Edition,

PCCS 3110 ADVANCED JAVA PROGRAMMING (3-1-0) CREDITS:4

MODULE-I (14 Hrs)

Introduction to JDBC:JDBC Drivers & Architecture. Database Programming using JDBC. Studying Javax.sql.* package ,Accessing a Database .

Java Beans: Introduction to Java Beans, Java Beans API

Introduction to J2EE, J2EE Overview, Why J2EE? J2EE Architecture, J2EE APIs, J2EE Containers

MODULE-II:(16 Hrs)

Web Servers and Servlets: Tomcat web server, Web Application Basics, Architecture and challenges of Web Application.

Introduction to Servlets: Lifecycle of a Servlet, The Servlet API, The javax.servlet Package, Initializing a Servlet, Reading Servlet parameters, Reading Initialization parameters.

Developing and Deploying Servlets: Exploring Deployment Descriptor (web.xml).

The javax.servlet HTTP package, Handling Http Request & Responses, Session Tracking & Management, Dealing with cookies. Filtering Request and Response, ProgrammingFilter, FilterMapping, Servlet Listeners

MODULE-III:(16 Hrs)

Java Server Pages: Basic JSP Architecture, Life Cycle of JSP, JSP Tags and Expressions, Role of JSP in MVC-2, JSP with Database, JSP Implicit Objects, Tag Libraries, JSP Expression Language (EL), Using Custom Tag, JSP Capabilities, Exception Handling, Session Management, Directives, JSP with Java Bean

Framework: Introduction to the web MVC *framework*/Struts/Spring etc

Reference Books

1. Ed Roman, "Mastering Enterprise Java Beans", John Wiley & Sons Inc., 1999. (UNIT III and UNIT V)
2. Web reference: <http://java.sun.com>.
3. J2EE The Complete Reference
4. Server Programming , Black Book

PCCS 3111 THEORY OF COMPUTING (3-1-0) CREDITS:4

MODULE-I (16 Hrs)

Alphabet, languages and grammars. Production rules and derivation of languages. Chomsky hierarchy of languages. Regular grammars, regular expressions and finite automata (deterministic and nondeterministic). Closure and decision properties of regular sets. Pumping lemma of regular sets. Minimization of finite automata. Left and right linear grammars.

MODULE-II (16 Hrs)

Context free grammars and pushdown automata. Chomsky and Greibach normal forms. Parse trees, Cook, Younger, Kasami, and Early's parsing algorithms. Ambiguity and properties of context free languages. Pumping lemma, Deterministic pushdown automata, closure properties of deterministic context free languages.

MODULE-III (18 Hrs)

Turing machines and variation of Turing machine model, Turing computability , Type 0 languages.

Linear bounded automata and context sensitive languages. Primitive recursive functions. Cantor and Godel numbering. Ackermann's function, mu-recursive functions, recursiveness of Ackermann and Turing computable functions. Church Turing hypothesis. Recursive and recursively enumerable sets. Universal Turing machine and undecidable problems. Valid and invalid computations of Turing machines.

Text Books:

1. Introduction to Automata Theory, Languages and Computation: J.E. Hopcroft and J.D Ullman, Pearson Education, 3rd Edition.
2. Introduction to the theory of computation: Michael Sipser, Cengage Learning
3. Theory of computation by Saradhi Varma, Scitech Publication

Reference Books:

1. Introduction to Languages and the Theory of Computation: Martin, Tata McGraw Hill, 3rd Edition
2. Introduction to Formal Languages, Automata Theory and Computation: K. Kirthivasan, Rama R, Pearson Education.
3. Theory of computer Science (Automata Language & computations) K.L. Mishra N.
4. Chandrashekhar, PHI.
5. Elements of Theory of Computation: Lewis, PHI
6. Theory of Automata and Formal Languages: Anand Sharma, Laxmi Publication
7. Automata Theory: Nasir and Srimani , Cambridge University Press.
8. Introduction to Computer Theory: Daniel I.A. Cohen, Willey India, 2nd Edition.

FREE ELECTIVE - I (3-1-0) CREDITS:4

Refer Annexure - II for list of Free Electives and the syllabus

MANAGEMENT CORE – III (3-1-0) CREDITS:4

Common to all Branches. Syllabus as prescribed by School of Management. Refer Annexure -I for list of subjects and syllabus

PLCS 3106 OPERATING SYSTEM LABORATORY THROUGH UNIX/LINUX (0-0-3) CREDITS:2

1. Detail anatomy of Operating System.
2. Basic UNIX / LINUX commands and its Use.
3. Study of different editors in LINUX (vi, gedit, etc.)
4. Detail study of File Access Permission in LINUX.
5. Detail study of UNIX/LINUX Shell Programming.
6. Advance Shell Programing.
7. Programs on process creation and synchronization, inter process communication including shared memory, pipes and messages.(Dinning Philosopher problem / Cigarette Smoker problem / Sleeping barber problem).
8. Programs on UNIX System calls.
9. Simulation of CPU Scheduling Algorithms. (FCFS, RR, SJF, Priority, Multilevel Queuing).
10. Simulation of Banker's Algorithm for Deadlock Avoidance.
11. Program for FIFO, LRU, and OPTIMAL page replacement algorithm.
12. Program for Disk Scheduling algorithm.

PLCS 3107 ADVANCED JAVA PROGRAMMING LABORATORY (0-0-3) CREDITS:2

1. Familiarisation with Eclipse (Installing and Running the application server) and develop static HTML pages.
2. JDBC Driver Architecture and Programs to access Database.
3. Understanding the Bean API, Creating and Packaging own Java Bean.
4. Creating Java Bean to connect to the database, issue SQL commands on a Database.
5. Writing a simple web service.
6. Web Server configuration and Understand HTTP Request-Response.
7. Writing Servlet Programs and Understand Deployment Descriptor.
8. Understand Session Tracking and State Information Maintenance with Cookies.
9. Working with Filters and Listeners.
10. Working with JSP on MVC architecture.
11. Working with JSP Implicit Objects and Tag Libraries.
12. Working with EJB embedded in JSP.
13. Working with Advanced Frameworks such as Struts/Spring/Hibernate

PLCS 3108 CUSTOM PROJECT 1 (0-0-3) CREDITS: 2

Syllabus is dynamic. Students will be assigned projects based on industry requirements.

PLCS 3109 TECHNOLOGY SEMINAR (0-0-3) CREDITS: 2

BLHU 3109 LIFE SKILLS DEVELOPMENT LABORATORY (0-0-3) CREDITS:1

Common to all Branches. Will be conducted from 1st to 6th Semesters for all branches. No credits added but the students are required to get qualified as prescribed by the T & P cell for being able to and considered for placement. The exercises to be carried out shall be decided as per the industry's requirements from time to time.

6th semester

PCCS 3201 INTERNET AND WEB TECHNOLOGY (3-1-0) CREDITS: 4

Module –I (Lecture Hour 16)

The Internet and WWW :Understanding the WWW and the Internet, Emergence of Web, Web Servers, Web Browsers, Protocols, Building Web Sites

HTML: Planning for designing Web pages, Model and structure for a Website, Developing Websites, Basic HTML using images links, Lists, Tables and Forms, Frames for designing a good interactive website

Module –II (Lecture Hour 16)

JAVA Script:Programming Fundamentals, Statements, Expressions, Operators, Popup Boxes, Control Statements, Try.... Catch Statement, Throw Statement, Objects of Javascript: Date object, array object, Boolean object, math object

CSS: External Style Sheets, Internal Style Sheets, Inline Style, The class selector, div & span tag

DOM: HTML DOM, inner HTML, Dynamic HTML (DHTML), DHTML form, XML DOM

Module –III (Lecture Hour 18)

CGI/PERL: Introduction to CGI, Testing & Debugging Perl CGI Script, Using Scalar variables and operators in Perl Java Applet: Introduction to Java, Writing Java Applets, Life cycle of applet

Textbooks

1. Web Warrior Guide to Web Design Technologies, Don Gosselin, Joel Sklar& others, CengageLearning

Reference Books

1. Web Programming: Building Internet Applications, Chris Bates, Wiley Dreamtech
2. Programming the World Wide Web, Robert W Sebesta, Pearson
3. Web Technologies, Uttam K Roy, Oxford
4. Web Technology: A developer perspective, Gopalan&Akilandeswari, PHI

PCCS 3202 COMPILER DESIGN (3-1-0) CREDITS: 4

Module – 1(Lecture hours: 16)

Introduction: Overview and phases of compilation.

Lexical Analysis: Non-deterministic and deterministic finite automata (NFA & DFA), regular grammar, regular expressions and regular languages, design of a lexical analyser as a DFA, lexical analyser generator.

Syntax Analysis:Role of a parser, context free grammars and context free languages, parse trees and derivations, ambiguous grammar.

Top Down Parsing: Recursive descent parsing, LL(1) grammars, non-recursive predictive parsing, error reporting and recovery.

Bottom Up Parsing: Handle pruning and shift reduces parsing, SLR parsers and construction or SLR parsing tables, LR(1) parsers and construction of LR(1) parsing tables, LALR parsers and construction of efficient LALR parsing tables, parsing using ambiguous grammars, error reporting and recovery, parser generator.

Module – 2(Lecture hours: 18)

Syntax Directed Translation: Syntax directed definitions (SDD), inherited and synthesized attributes, dependency graphs, evaluation orders for SDD, semantic rules, application of syntax directed translation.

Symbol Table: Structure and features of symbol tables, symbol attributes and scopes.

Intermediate Code Generation: DAG for expressions, three address codes - quadruples and triples, types and declarations, translation of expressions, array references, type checking and conversions, translation of

Boolean expressions and control flow statements, back patching, intermediate code generation for procedures.

Module – 3 (Lecture hours: 16)

Run Time Environment: storage organizations, static and dynamic storage allocations, stack allocation, handlings of activation records for calling sequences.

Code Generations: Factors involved, registers allocation, simple code generation using stack allocation, basic blocks and flow graphs, simple code generation using flow graphs.

Elements of Code Optimization: Objective, peephole optimization, concepts of elimination of local common sub-expressions, redundant and un-reachable codes, basics of flow of control optimization.

Text Book:

1. Compilers – Principles, Techniques and Tools , Authors: Alfred V. Aho, Monica S. Lam, Ravi Sethi and Jeffrey D. Ullman Publisher: Pearson

PCCS 3203 SOFTWARE ENGINEERING (3-1-0) CREDITS: 4

Module –I (16 Hrs)

Evolution and impact of Software engineering. Software Crisis, Issues in software development, Software Processes.

Software Process models: Waterfall Model, Iterative Waterfall Model, ‘V’ Shaped Model, Spiral Model, Prototyping Model, and Evolutionary Model.

Requirement analysis and specification: Feasibility study, Requirement gathering and analysis. Functional and Non-functional requirements, Software Requirement Specification (SRS).

Software Design: Basic issues in software design, Design approaches: function-oriented software design and Object Oriented Design.

Structured Analysis: Data Flow Diagrams (DFD): DFD symbols, Levels of DFD, Balancing a DFD.

Structured Design: Modularity, cohesion, coupling and layering, Structure Chart, Mapping DFD into Structure Chart.

Module – II (18 Hrs)

Object Oriented Analysis & Design: Use-Case Modeling, Use-Case Realization, Types of Classes: Identification of Classes, Relationships, Attributes and Methods. Defining System Boundary, Identification of Subsystems, Principles of Class Design, and Types of Design Classes.

Unified Modeling Language (UML): UML Basics, Use Case Diagram, Class diagram, Object diagram, Sequence diagram, Collaboration Diagram, Activity diagram, State diagram, Component Diagram, and Deployment Diagram.

Module III (16 Hrs)

User interface design. Coding standards and Code review techniques: Code Walk through, Code inspection.

Testing: Fundamentals of testing, Verification & Validation, White-box, and black-box testing, Unit Testing, Integration Testing, System Testing, Object Oriented Testing, Usability Testing. Test coverage analysis and test case design techniques.

Software Quality and Reliability, Computer aided software engineering (CASE), Software Re-engineering and Reverse Engineering, and Software Maintenance.

Text Book:

1. Rajib Mall, "Fundamentals of Software Engineering", (PHI-3rd Edition), 2009.

References:

1. Ian Sommerville, "Software Engineering", 8th Edition, 2007, Pearson Education.
2. Roger S. Pressman, "Software Engineering: A Practitioner's Approach", 7th International Edition, McGraw-Hill Education (Asia), Singapore.

FREE ELECTIVE - II (3-1-0) CREDITS:4

Refer Annexure - II for list of Free Electives and the syllabus

MANAGEMENT CORE – IV (3-1-0) CREDITS:4

Common to all Branches. Syllabus as prescribed by School of Management. Refer Annexure -I for list of subjects and syllabus

PLCS 3206 INTERNET & WEB TECHNOLOGY LABORATORY (0-0-3) CREDITS: 2

1. Introduction to major internet protocol- HTTP, FTP, SMTP
2. Study of Web Browser- Microsoft Internet Explorer and Netscape Navigator.
3. Their Network options, security features, Cookies, file caching, temporary files etc.
4. HTML- Basics of HTML., text, image, other MIME types, lists, tables,
5. 4.HTTP methods, forms.
6. Multimedia on the Web- Embedding audio and video files in HTML
7. Java Script- Introduction to Java Script for client side validation.
8. Server side scripting – Introduction to fundamentals concepts of ASP or JSP or PHP (any one platform depending on instructor).
9. 8.Basics of CGI scripting using Perl or C.
10. Simple examples of request/ response objects.
11. Basic introduction to web solutions architecture.

PLCS 3207 SOFTWARE ENGINEERING LABORATORY (0-0-3) CREDITS: 2

1. Develop requirements specification for a given problem (The requirements specification should include both functional and non-functional requirements. For a set of about 20 sample problems, see the questions section of Chap 6 of Software Engineering book of Rajib Mall)
2. Develop DFD Model (Level 0, Level 1 DFD and data dictionary) of the sample problem (Use of a CASE tool required)
3. Develop structured design for the DFD model developed
4. Develop UML Use case model for a problem (Use of a CASE tool any of Rational rose, Argo UML, or Visual Paradigm etc. is required)
5. Develop Sequence Diagrams
6. Develop Class diagrams
7. Develop code for the developed class model using Java
8. Use testing tool such as Junit
9. Use a configuration management tool
10. Use any one project management tool such as Microsoft Project or Gantt Project, etc.

PLCS 3208 COMPILER DESIGN LABORATORY (0-0-3) CREDITS: 2

1. A Program to Design Lexical Analyzer. And Implement the Lexical Analyzer Using Lex Tool.
2. Write a program to compute FIRST of non-terminals.
3. Write a program to check whether a string belongs to the grammar or not.
4. Write a program to find leading terminals.
5. Write a program to implement shift reduce parser.
6. Write Program to remove Left Recursion from a given Grammar.
7. Program using LEX to count the number of characters, words, spaces and lines in a given input file. Program using LEX to count the numbers of comment lines in a given C program. Also eliminate them and copy the resulting program into separate file.

8. Program using LEX to recognize whether a given sentence is simple or compound.
9. Program using LEX to recognize and count the number of identifiers in a given input file. YACC program to recognize a valid arithmetic expression that uses operators +, -, * and /.
10. YACC program to recognize a valid variable, which starts with a letter, followed by any number of letters or digits.
11. Write a C program to implement the syntax-directed definition of “if E then S1” and “if E then S1 else S2”.
12. Write a yacc program that accepts a regular expression as input and produce its parse tree as output.
13. A Program to Generate Machine Code.

PLCS 3209 CUSTOM PROJECT 2 (0-0-3) CREDITS: 2

Syllabus is dynamic. Students will be assigned projects based on industry requirements.

BLHU 3210 LIFE SKILLS DEVELOPMENT LABORATORY (0-0-3) CREDITS:0

Common to all Branches. Will be conducted from 1st to 6th Semesters for all branches. No credits added but the students are required to get qualified as prescribed by the T & P cell for being able to and considered for placement. The exercises to be carried out shall be decided as per the industry’s requirements from time to time.

ANNEXURE - I MANAGEMENT CORE (3-1-0) CREDITS:4

List of Management Core subjects

(Students are required to choose one subject out of the four in 3rd, 4th, 5th and 6th semesters.)

Sl. No.	Semester	Course Code	Course Title
1	3 rd /4 th / 5 th / 6 th	MGGM1104	Essential Economics for Management
2		MGFM1101	Accounting for Managers
3		MGGM1206	Organizational Behavior
4		MGOM1201	Production & Operations Management

SYLLABUS OF MANAGEMENT CORE SUBJECTS

MGGM1104 ESSENTIAL ECONOMICS FOR MANAGEMENT (3-1-0)

Course Objective:

In today's dynamic economic environment, effective managerial decision making requires timely and efficient use of information. The basic purpose of this course is to provide students with a basic understanding of the economic principles, methodologies and analytical tools that can be used in business decision making problems. It provides an understanding of the economic environment and its impact on strategy formulation. The course also focuses on the impact of economic policies on managerial decision-making by providing an understanding of fiscal policy, and national and global economic issues affecting business.

The language of science (and all analytical thinking) is mathematics. Since economics is a social science, use of some mathematical tools, basically the constrained and un-constrained optimization techniques will help in measuring and solving the basic economic problems and thus improves decision-making. It becomes difficult and totally un-practicable to solve business (economic) problems logically and systematically without use of mathematics. The basic objective is to solve problems mathematically and interpret the results economically.

Module-1: Introduction & Micro Economics .

Introduction to economics- Scarcity, Choice and Efficiency, Circular Flow of Economic Activity, Fundamental issues of what, how and for whom to produce to make the best use of economics, Economic Role of Government.

Basic Concepts: Marginalism and Incrementalism, Functional Relationships: Total, Average and Marginal. General and partial equilibrium, Opportunity cost

Demand for a commodity: Law of demand, Demand schedule and demand curve, Individual and market demand, Change in demand

Consumer behavior: Analysing law of demand through Marshalian utility analysis and

Indifference curve technique. Consumer Surplus

Elasticity of Demand

Price Elasticity of demand : Estimation, Types, Elasticity and revenue, Factors affecting price elasticity of demand

Income elasticity , Cross elasticity, Uses of different concepts elasticity in business decisions.

Analysis of Supply: Law of Supply, Supply schedule and supply curve, Change in supply, Price elasticity of supply,

Equilibrium of demand and supply: Equilibrium with demand and supply curves, Effect of a shift of demand and supply curves, Rationing of prices, Impact of tax on prices and quantity, Prices fixed by law (Minimum floors and Maximum ceilings)

Demand Estimation: Approaches to demand estimation, Demand Estimation by Regression Analysis.

Demand Forecasting: Sources of Data (Expert opinion, Surveys, Market experiments), Timeseries Analysis (trend projection and Exponential smoothening), Barometric Forecasting, Forecasting with input and output model.

Production Function: Production function with one variable input, Production function with two variable inputs, optimal combination of inputs, Returns to scale

Cost Theory: Types of costs, Production and cost, Short-run cost functions, Long-run cost functions, Economies of scale and scope, Learning curve, Cost-Volume-profit Analysis

Perfect Competition: Characteristics, Equilibrium price determination under both short run and long run, Evaluation of perfect competition

Monopoly: Characteristics, Profit maximizing price determination under both short run and long run, Allocative efficiency and income redistribution, Relevance of perfect competition and monopoly

Monopolistic Competition: Characteristics, Profit maximizing price determination under both short run and long run, Evaluation of Monopolistic competition

Oligopoly: Characteristics, Price Rigidity(Kinked demand curve model), Interdependence (The Cournot model) and Cartels and Collusion, Price Leadership, Cost-plus Pricing, Multiple Product Pricing, Price Skimming, Penetration Pricing, Transfer Pricing and Price Discrimination

Module-2: Macro Economics .

National Income Accounting: Concept, Eight variants of national product aggregates, Measurement (Income, Value Added and Expenditure), Real and Nominal GNP, Difficulties in measuring the national income, Uses of National income statistics

Environmental Income Accounting, Green GDP, Sustainable Development, National income and social welfare

Consumption and Investment functions: Concept, Determinants, Multiplier and Accelerator

Demand for Money: Classical and Keynesian theories on demand for money

Supply of Money: Components of money supply, The process of Deposit Creation, Balance Sheet of the Central Bank.

Aggregate Demand: The Goods Market and the IS Curve, The Money Market and the LM Curve, Form IS-LM model to the Aggregate Demand.

Aggregate Supply

Explaining macro-economic equilibrium through Aggregate Demand and Aggregate Supply,

Monetary Policy: Objectives, Instruments, Monetary Policy in The AD- AS Framework,

Crowding-Out Controversy, Monetary policy in an open economy

Fiscal Policy: Objectives, Instruments, Impact of Structural Deficits, Government Debt and Economic Growth.

Interaction between monetary and Fiscal Policy

Features of The Business Cycle, Definition Of Inflation, Price Indices, Prices in the AD-AS

Framework, The Economic Impacts of Inflation, The Phillips Curve, Anti-Inflationary Policy

Unemployment: Types, Okun's Law, Impact of Unemployment, Economic Interpretation Of

Unemployment

International Trade: Economic Basis For International Trade, Gains from International Trade Balance of Payment (BoP): Meaning, BoP Account, Disequilibrium in BoP, Measures to correct disequilibrium in BoP

Foreign Exchange: The Determination of Foreign Exchange Rates, Floating Exchange Rate and Fixed Exchange Rates, Mundell-Fleming Model,

Books & Reference:

1. Managerial Economics in a Global Economy, by D. Salvatore, Sixth Edition, OUP, 2008
2. Managerial Economics, Truett&Truett, Wiley Publication.
3. Managerial Economics, by Petersen Craig H. Cris Lewis and S.K. Jain, Pearson, 2007
4. Modern Micro Economics, , Koutsoyiannis, (1975) , A, Macmillan Press
5. Managerial Economics, Mehta, P. L (1999), Sultan Chand & Sons
6. Principles of Microeconomics, Mankiw, N. G (2006), Cengage Learning
7. Macroeconomics, Mankiw, N. G, (2009), Worth Publishers
8. Macroeconomics, Theory and Policy, Dwivedy, D.N (2007), Tata McGraw Hill
9. Macroeconomics, D'Souza, E (2008), Pearson Education
10. Macroeconomic Analysis, Shapiro, E (2003), Galgotia Publications
11. Environmental Economics in Theory and Practice – Hankey N, Shogren J F, and White B – 1999 – Macmillan Indian Limited
12. Indian Economy, Mishra &Puri (2011), Himalaya Publishing House

MGFM1101 ACCOUNTING FOR MANAGERS (3-1-0)

Course Objective:

This course 'Accounting for Managers' has been designed to enable the students to acquire the skills necessary to prepare, use, interpret and analyze financial information.

Module 1 (12)

Accounting Environment of business, Corporate Entities: Salient Features, GAAP: Concepts, Conventions, Assumptions, Accounting Equation: Tool to understand business decisions, Financing Decisions/Investment Decisions/Operating Decisions, Accounting Equation Financial Statements, Balance Sheet/Income Statement/Cash Flow Statement, Financing Decisions and Financial Statement,

Module 2 (12)

Equity Instruments: Equity and Preference Capital, Debt Instruments: Debentures/ Bonds/ Loans, Dividend and Interest payment, Investment Decision and Financial Statements, Fixed Assets:/Inventory Valuation/Investment , Operating Decisions and Financial Statements, Revenue Recognition, Expenses, Profit: Gross Profit/PBDITA/PBIT/PBT/PAT, Interrelationship between Financial statements

Module 3 (12)

Financial Statement Analysis: common size statements, ratio analysis, Du pont analysis, Inter-firm and intra-firm comparison, reading CFS

Module 4 (12)

Cost Concepts and decision making, Overheads, CVP analysis. Preparation of Cost Sheets using excels, Budgeting and Budgetary Control, Variance analysis, Activity based costing (ABC), cost & pricing A group project work will be given to students to analyse an industry and track market price movement.

Books & Reference:

1. Financial Accounting -- A managerial Perspective, R. Narayanswamy, PHI
2. Cost Accounting- A managerial Emphasis by Horn green, Dater and Foster.
3. Khan & Jain – Management Accounting, TMH.
4. Horngren ,Datar, Foster- Cost Accounting, Pearson.
5. Financial Accounting, Jain/Narang/Agrawal, Kalyani.
6. Basic Financial Accounting for Management, Shah, Oxford.

MGGM1206 ORGANIZATIONAL BEHAVIOUR (3-1-0)

Introduction to the Course :

Organizational Behavior (OB) is a field of study that investigates the impact that individuals, groups, and structure have on behavior within an organization. Then it applies that knowledge to make organizations work more effectively.

Course Objective :

This course will expose students to gain knowledge on the diversified behavioral science theories and its applications in organizations.

Pedagogy

Class room lectures will be substantiated by Case Analysis, assignment and viva-voce, Demo Exercises, Movie Analysis, Games, role playing Comprehensive Course Outline :

Module – 1 (12)

Concept and models of OB, OB Systems- The Synergy

Module - 2(Individual System)(12)

Perception, Learning and Behaviour Modification, motivation, attitude and Values, personality, emotion and stress.

Module – 3(Social System) (12)

Communication, Group Dynamics, Conflict , Leadership

Module - 4(Organizational systems) (12)

Organizational power and politics, Organizational culture and climate, Organizational Change and development, International Dimensions of OB, Managing Diversity.

Recommended Text :

- Robins & Sanghii, Organisational Behaviour, Pearson
- Aswathappa, Organization Behavior, Himalaya
- Luthans ,F. Organisational Behaviour - TMH
- Udai Pareek , Understanding Organisational Behaviour, Oxford
- Prasad, L.M. Organization Behavior, S.Chand.
- Greenberg and Baron, Behavior in organization, Prentice hall.

MGOM1201 PRODUCTION AND OPERATIONS MANAGEMENT (3-1-0)

Course Objective:

The course is designed to acquaint the students with decision making in planning, scheduling and control of production and operation functions in both manufacturing and services. Course Content:

Module:1 (12)

Operations Management- An Introduction Primary topics in Operations Management, Operations Function, and Transformation process and Competitiveness.

Operations Strategy

Strategic Decisions in Operations, Strategy Deployment, and Vertical Integration, Service

Operation, Service strategy, Manufacturing Strategy and Mass customization;

Product Development and Service Design

New Product design, Product life cycle, Process design, Process life cycle, Form design,

Functional design, Production design, Concurrent design, Technological design and Service design process.

Module:2 (14)

Facilities Location & Layout Planning

Location - Principles and Factors; Location Analysis techniques- Factor Rating, Centre of

Gravity Technique, Brown & Gibson Model. Layout – Concept & Basic Principles, Process

Layout (Block Diagramming,

Relationship Diagram, Computerized Layout Solutions, Service Layout); Product Layout – Process Layout;

Fixed Position Layout. Hybrid Layouts – Cellular, FMS (Flexible Manufacturing System)

Project Management and Scheduling

Project planning, , project control, project scheduling Models Project Network, Critical path Method

(CPM), Programme Evaluation Review Technique(PERT) , Project crashing and Time cost Trade-Off; Objective of Scheduling, Sequencing, Gantt charts, Advanced Planning and Scheduling System. Strategies for Managing Demand, Strategies for Managing Supply Production planning control, Aggregate planning costs and strategies. Gantt chart, Sequencing model. "n" jobs 1 machine, "n" jobs 2 machines, "n" jobs "m" machine

Module:3 (12)

Inventory Management

Concept of inventory with independent demand: Inventory cost structure Deterministic inventory model - EOQ models, instantaneous receipt, Inventory model with discounts, delivery over a period of time, Periodic review and continuous review inventory model; Selective Inventory Control - ABC and VED.

Quality Management

Concept of quality; Quality of design, Conformance & performance; Cost of poor process performance and quality. Statistical Quality Control - Process Control (X, R & P chart), Product control-acceptance sampling and OC curve. Concept of TQM.

Module:4 (10)

Just in Time and Lean Production

Basic element in JIT, Pull system, Push system, Kanban production control system , Benefits of JIT, Jit implementation in Learning Organization, JIT in Services. topics.

Books

1. Chase, Jacobs, Aquilano, Agarwal, - “Operations Management”, TMH
2. Aswathappa& Sridhar Bhat, - “Production and Operations Management”, HPH **Reference:**
1. Krajewski,Ritzman,Kansal, - “Operations Management”, Pearson
2. Everette. Adam Jr., Ronald J. Ebert, - “Production and Operations Management”, PHI
3. Roberta S. Russell & Bernard W. Taylor III, - “Operations Management”, Pearson/ PHI
4. Gaither, Frazier- Operations Management