Integral University Lucknow
Study & Evaluation Scheme
B. Tech. (Computer Science & Engg.)

YEAR II, Semester- IV

S. No.	Subject Code	Category	Subject	Periods				Evaluation Scheme				Subject Total
								Sessional			Exam.	
				L	T	P	C	CT	TA	Total	ESE	
1	CS-211	DC	Software Engineering	3	1	0	4	25	15	40	60	100
2	MT-206	ESA	Mathematical Analysis	3	1	0	4	25	15	40	60	100
3	CS-212	DC	Data Base Management System	3	1	0	4	25	15	40	60	100
4	CS-213	DC	Computer Organization	3	1	0	4	25	15	40	60	100
5	ES-202/ CS-203	ESA	Disaster management/ Cyber Law & Information Security	2	1	0	3	25	15	40	60	100
6		DE	Departmental Elective 2	3	1	0	4	25	15	40	60	100
7	CS-216	DE	Computer Organization Lab	0	0	2	1	30	30	60	40	100
8	CS-217	DC	Software Engineering Lab	0	0	2	1	30	30	60	40	100
9		DE	Departmental Elective 3	0	0	2	1	30	30	60	40	100
10	CS-220	DC	DBMS Lab	0	0	2	1	30	30	60	40	100
			Total	**17**	**6**	**8**	**27**	**270**	**210**	**480**	**520**	**1000**

L-Lecture   **T-T**utorial   **P-**Practical   **C-**Credits   **CT-**Class Test   **TA-**Teacher Assessment

Sessional Total (CA) = Class Test + Teacher Assessment

Subject Total = Sessional Total (CA) + End Semester Examination (ESE)

DC- Departmental Core
DE- Departmental Elective
ESA- Engineering Sciences & Arts (Foundation Course & Engineering Courses)

Departmental Elective 2
1. Advance Computer Programming (CS-214)
2. Core Java (CS-215)

Departmental Elective 3

1. Advance Computer Programming Lab (CS-218)   [Co-requisite CS-214]
2. Core Java Lab (CS-219)   [Co-requisite CS-215]

Integral University, Lucknow
Department of Computer Science & Engineering
B.Tech (CSE) , 2nd Year/4th Semester
Subject Name: Software Engineering, Subject Code: CS-211
SYLLABUS REVISED-2016
w.e.f. July-2016

L T P C
3 1 0 4

UNIT 1
Introduction to Software Engineering: Types of Software, Software Characteristics, Quality of a Good Software, Software Myths, Software Components, Software Crisis, **Software Engineering:** Definition, Challenges, Software Engineering Processes, Similarity and Differences from Convential Engineering Processes.
Software Development Life Cycle Models: Build and Fix Models, Waterfall Model, Prototyping Model, RAD Model Iterative Enhancement Model, Evolutionary Development Model and Spiral Model, WINWIN Spiral Model, Fourth Generation Techniques.   [8]

UNIT 2
Planning a Software: Process Planning, Effort Estimation: Uncertainities in Effort Estimation, Building Effort Estimation Models, A Bottom-Up Estimation Approach, COCOMO Model, Project Scheduling & Staffing: Overall Scheduling, Detailed Scheduling, Team Structure, Software Configuration Management(SCM): - Baselines, Version Control, Change Control & Configuration Audit, Risk Management: Reactive and Proactive Risk Strategies, Software Risks, Risk Analysis, Identification, Projection, Assessment, Monitoring and Managing the Risk, RMMM Plan.   [8]

UNIT 3
Software Requirements Analysis and Specification: Software Requirements: Need for SRS, Requirement Process, Problem Analysis: Informal & formal Approaches, Data Flow Modeling, Object Oriented Modeling, Prototyping, Requirements Specifications: Characteristics of an SRS, Components of SRS, Specification Language, Structure of Requirement Document: IEEE Standards for SRS, Validation, Metrics.
Designing and Coding: Designing: Function Oriented Design: Design Principles: Problem Partitioning and Hierarchy, Abstraction, Modularity, Top Down and Bottom-Up Strategies, Module Level Concepts: Coupling, Cohesion; Structure Design Methodology, Verification, Introduction to Object Oriented Design & User Interface Design, Software Measurement Metrics: Various Size Oriented Measures- Halestead's Software Science, Function Point (FP) Based Measures, Cyclomatic Complexity Measures: Control Flow Graphs.   [8]

UNIT 4
Coding: Programming Principles and Guidelines: Common Coding Errors, Structured Programming, Information Hiding, Programming Practices, Coding Standards, Coding Process, Refactoring, Verification: Code Inspection, Static Analysis, Proving Correctness, Combining Different Techniques, Metrics.

Testing:
Testing Fundamentals: Error Fault and Failure, Test Oracles, Test Cases and Test Criteria, Test Case Execution and Analysis, Unit Testing, Integration Testing: : Top Down and Bottom up, Acceptance Testing: Alpha and Beta Testing., Regression Testing, functional and non-functional

testing. Testing Techniques: White Box: Logic Coverage, Path Coverage, Loop Coverage, Data Flow Testing. Black Box Testing: Boundary Value Analysis, Equivalence Class Testing, state Table Based Testing, Decision Table Based Testing.   [8]

UNIT 5
Computer Aided Software Engineering (CASE): CASE Tools, Scope, Benefits of CASE Tool, support in Software Life Cycle, Architecture of CASE Environment, Types of CASE Tools, Software Reliability and Quality Management: -Software Quality Management: Quality Concepts, Software Quality Assurance, Software Reviews, Formal Technical Reviews, and Statistical Quality Assurance. Software Reliability, ISO 9000 Quality Standards, CMM Levels.
[8]

REFERENCES
1. Software Engineering: A Practitioner's Approach by Roger S. Pressman, McGraw-Hill International edition.
2. An Integrated Approach to Software Engineering, by Pankaj Jalote, Narosa   Publishing House.
3. Software Engineering by K.K. Agarwal.
4. Software Engineering by Ian Sommerville, Addison-Wesley.
5. Fundamentals of Software Engineering by Rajib Mall, PHI.

Integral University, Lucknow
Department of Computer Science & Engineering
B.Tech (CSE) , 2ⁿᵈ Year/4ᵗʰ Semester
Subject Name: Mathematical Analysis, Subject Code: MT-206
SYLLABUS REVISED-2016
w.e.f. July-2016

L T P C
3 1 0 4

Unit-I
Errors: Error and their analysis, Computer Arithmetic, Floating-Point Number Operation, Normalization & their consequences.
Statistics: Correlation and Regression analysis, Binomial Distribution, Poisson Distribution, Normal Distribution. [8]

Unit-II
Algebraic & Transcendental Equations:
Bisection Method, Iteration Method, False Position Method, Secant method, Newton-Raphson Method, Lin-Bairstow's Method. Rate of Convergence of Methods. Solution of system of linear equations by LU decomposition method and Gauss Seidel Method.
[8]

Unit-III
Interpolation: Finite differences, Newton's forward & backward Formula, Gauss, Stirling and Bessel's Formula for Equal Interval. Lagrange's Formula and Newton's Divided Difference Formula for Unequal Interval, Numerical Differentiation. [8]

Unit-IV
Numerical Integration & Solution of Ordinary Differential Equations:
Numerical Integration by Trapezoidal Rule, Simpson's 1/3 Rule, Simpson's 3/8 Rule, Boole's & Weddle's Rule, Euler-Maclaurin's Formula.
Taylor's Series Method, Euler's Method, Modified Euler's Method, Runge-Kutta Method.
[8]

Unit-V
Integral Transform & Complex Analysis:
Introduction to Fourier Transform, Sine and Cosine transforms, Z-transform.
Analytic functions, C-R equations and harmonic functions, Cauchy's integral theorem, Cauchy's integral formula for derivatives of analytic functions, Conformal mapping and bilinear transformations. [10]

References:
1. Sastry, Introductory method of Numerical Analysis, PHI
2. Balaguruswamy, Numerical method, TMH
3. Jain, Iyengar, Jain, Numerical Methods for Scientific & Engineering Computations, New Age International
4. P. Kandasamy, Numerical methods, S. Chand & Company
5. H.K. Dass, Advanced Engineering Mathematics, S. Chand & Company
6. B.S. Grewal, Higher Engineering Mathematics, Khanna Pub.

Integral University, Lucknow
Department of Computer Science & Engineering
B.Tech (CSE) , 2nd Year/4th Semester
Subject Name: Database Management System, , Subject Code: CS-212
SYLLABUS REVISED-2016
w.e.f. July-2016

L T P C
3 1 0 4

UNIT 1
Introduction: An Overview of Database Management System, Database System Vs File System, Database System Concepts and Architecture, Data Models Schema and Instances, Data Independence and Data Base Language and Interfaces, Data Definitions Language, DML, Overall Database Structure.
Data Modeling Using the Entity Relationship Model:
ER Model Concepts, Notation for ER Diagram, Examples based on E-R diagram, Mapping Constraints, Keys, Concepts of Super Key, Candidate Key, Primary Key, Generalization, Aggregation, Reduction of an ER Diagrams to Tables, Extended ER Model, Relationships of Higher Degree. [8]

UNIT 2
Relational Data Model and Language: Relational Data Model Concepts, Integrity Constraints: Entity Integrity, Referential Integrity, Keys Constraints, Domain Constraints, Relational Algebra, Relational Calculus, Tuple and Domain Calculus.
Introduction to SQL: Characteristics of SQL. Advantage of SQL. SQL Data Types and Literals. Types of SQL Commands. SQL Operators and Their Procedure. Tables, Views and Indexes. Queries and Sub Queries. Aggregate Functions. Insert, Update and Delete Operations. Joins, Unions, Intersection, Minus, Cursors in SQL.
Queries based on above concepts. [8]

UNIT 3
Data Base Design & Normalization:
Functional Dependencies, Normal Forms, First, Second, Third Normal Forms, BCNF, Inclusion Dependences, Loss Less Join Decompositions, Normalization using FD, MVD, and JDs, Alternative Approaches to Database Design.
Storage and File Structure, Overview of Physical Storage Media, File Organization, Organization of Records in File, Data Dictionary Storage. [8]

UNIT 4
Indexing & Hashing: Basic Concepts, B+ Tree Index Files, B- Tree Index Files, Static Hashing, Dynamic Hashing.
Transaction Processing Concepts: Transaction System, Testing of Serializability, Serializability of Schedules, Conflict & View Serializable Schedule, Recoverability, Recovery from Transaction Failures, Log Based Recovery, Checkpoints, Deadlock Handling. [8]

UNIT 5
Concurrency Control Techniques: Concurrency Control, Locking Techniques for Concurrency Control, Time Stamping Protocols for Concurrency Control, Validation Based Protocol, Multiple Granularity, Multi Version Schemes, Recovery with Concurrent Transaction. [8]

REFERENCES

1. Korth, Silbertz, Sudarshan, "Data base concepts", McGraw-Hili
2. Elmasari, Navathe, "Fundamentals of Database Systems", Addison Wesley
3. Date C.J., "An Introduction to Database Systems", Addison Wesley

Integral University, Lucknow
Department of Computer Science & Engineering
B.Tech (CSE) , 2nd Year/4th Semester
Subject Name: Computer Organization, Subject Code: CS-213
SYLLABUS REVISED-2016
w.e.f. July-2016

L T P C
3 1 0 4

Unit 1
Digital Computer: Elements of Digital Computer, Computer Types and Classifications, Functional Units and their Interconnections, Buses, Bus Architecture, Types of Buses And Bus Arbitration, Register, Bus And Memory Transfer.
Micro Operations: Register Transfer, Bus & Memory Transfer, Bus Architecture, Arithmetic, Logic & Shift Micro Operations.
Data Representation: Fixed Point & Floating Point Representation, IEEE Standard

[08]

Unit 2
Central Processing Unit: CPU Organization: General Register Organization, Stack Organization, Addressing Modes, Arithmetic And Logic Unit (ALU).
Computer Arithmetic's: Addition And Subtraction of Signed Numbers, Look Ahead Carry Adders.
Multiplication: Signed Operand Multiplication, Booths Algorithm and Array Multiplier. Division and Logic Operations. [08]

Unit 3
Control Unit: Instruction Types, Formats, Instruction Cycles and Sub Cycles (Fetch and Execute etc), Micro-Operations, Execution of a Complete Instruction.
Hardwire And Micro Programmed Control: Micro Program Sequencing, Wide Branch Addressing, And Microinstruction With Next Address Field, Pre-Fetching Microinstructions, Concept of Horizontal and Vertical Microprogramming. [09]

Unit 4
Memory Organization: Memory Basic Concept, Memory Hierarchy**,** Semiconductor RAM Memories, 2d & 2 1/2d Memory Organizations. ROM Memories.
Cache Memory: Cache Design and Performance, Cache Addressing Mapping and Replacement Policy. **Auxiliary Memories:** Magnetic Disk, Magnetic Tape and Optical Disks, **Virtual Memory:** Concept Implementation. [07]

Unit 5
I/O Organization: Peripheral Devices, Input/output Interface, **Interrupts:** Interrupt Hardware, Types of Interrupts And Exceptions.
Mode of Data Transfer: Strobe Programmed I/O, Interrupt Initiated I/O and Direct Memory Access, I/O Channels and Processors.
Serial Communication: Synchronous & Asynchronous Communication, Standard Communication Interfaces. [08]

References
1. "Computer System Arch." By- Morris Mano, Prentice Hall India, New Delhi.
2. "Computer Organization." By- Vranesic & Hamacher, Tata Mgraw Hill, New Delhi
3. "Computer Organization and Arch." By- J P Hayes. Tata Mgraw Hill, New Delhi
4. "Computer Organization and Architecture Design And Performance" By- William Stallings, Prentice Hall India, New Delhi.

Integral University, Lucknow
Department of Computer Science & Engineering
B.Tech (CSE) , 2nd Year/4th Semester
Subject Name: Advanced Computer Programming, Subject Code: CS-214
SYLLABUS REVISED-2016
w.e.f. July-2016

L T P C

3 1 0 4

Unit-1
Dynamic memory allocation: The process of Dynamic memory allocation, DMA functions: Malloc(),calloc(),realloc(), Sizeof(),free(),creating singly linked list by DMA
Pointers: Function returning pointers, pointers to functions, typedef with function pointers. Parameter passing mechanism using Call by –(value, reference, name ,copy restore, need), **C program based on above concept.**   [08]

Unit-2
Introduction to File handling,:-File structure, File handling function, File types, Streams, Text, Binary, File system basics, The file pointer, Opening a file, Closing a file, Writing reading character, words, line Using fopen(), getc(), putc(), and fclose(), Using feof(). Working with string fputs() and fgets(), Standard streams in C, Flushing a stream, Using fread() and fwrite(), Direct access file, fseek() and random access I/O, fprintf() and fscanf(),**C program based on above concept.**   [07]

Unit-3
The C preprocessor, # define, defining functions like macros, # error, #include, creating header files, include user defined header files. Conditional compilation directives i.e. # if, # else, # elif and #ifdef &undef, using defined, #line, #pragma, the #&## preprocessor Error handling in C: types of errors, handling errors, debugging tools, **C program based on above concept.**
                                              [08]

Unit-4
Graphics on your PC: Graphics and Text mode, Video Adapter, Initialize Graphics Mode and resolution, header file graphics.h. Functions used In Graphics - Drawing a Point on Screen, Drawing – lines, rectangle, circles, arcs, polygon. Functions to fill colors. Display Text in Graphics mode, outtext(), outtextxy(), justifying text, **C program based on above concept.**
                                              [8]

Unit-5
Singly Linked list and its operations (insert, delete, search and traverse)
Standard C libraries- Header files, library function, Operations on bits- One's complement operator, right shift operator, left shift operator, bitwise AND, OR, XOR operator, show bits() operator, hexadecimal numbering system. C under Windows, and Linux, Internet Programming, **C programs based on above concepts.**   [9]

References:
1. Expert C prog..by Peter Van Der Linden PHI,
2. Programming in 'C' by 'E Balagurusamy'.-TMH Publication.
3. Pointers in 'C' by 'Yashwant Kanitkar'-BPB Publication.
4. The C Programming Essentials by Dey- Pearson Publication.
5. Pointers on C by Reek Kenneth PHI

Integral University, Lucknow
Department of Computer Science & Engineering
B.Tech (CSE) , 2nd Year/4th Semester
Subject Name: Core Java, Subject Code: CS-215
SYLLABUS REVISED-2016
w.e.f. July-2016

L T P C
3 1 0 4

UNIT 1
Introduction: History of Web. Growth of the Web, Internet and www, HTML Basics and Tags, Web Applications, Creating Websites for Individual and Corporate World, Introduction to Cyber Laws of India. International Cyber Laws. Web Development Strategies: Web Projects, Writing Web Project, Identification of Objects, Target Users, Web Team, Planning & Process Development, Early Planning, Contents, Technical & Production Planning, Communication Issues, Browsers, URL, File on the Web, Transmission, Compression.

[9]

UNIT 2
Communication with Clients, Communication Breakdowns, Development of Multi-Departmental & Large Scale Sites, Quality Assurance & Testing, Study of Technological Advances and Impact of Web Teams. Design Strategies for Ecommerce Site Developments:- Basic Foundation in E-commerce System, Creating Forms. Managing Data Base through Web, HTML, XML, and Scripting: Lists, Tables, Images, Forms, Frames, XML Schemes, Presenting XML Processes. Introduction to Java Script, Dynamic HTML with Java Script.

[7]

UNIT 3
Java Programming: Introduction, Operator, Control Statements, Arrays, Data type, Variables, Methods and Classes, Multi threaded Programming, I/O.   [8]

UNIT 4
Java Applets. Exception Handling, Java Library: String Handling, Input / Output Exploring Java.io, Networking, Applets Classes, Event Handling, RMI.   [8]

UNIT 5
Introduction to AWT, Working with Window, Graphics, AWT Controls, Layout Manager and Menus, Images, Additional Packages, Introduction to Java Beans, Java Swing, Java Servlets; Javascript Basics, Image Menu, LJavatron Applets, Scrabblets, JSP, Database Connectivity & Introduction to Struts Framework.   [8]

REFERENCES:
1. Sharma & Sharma ,"Developing E-commerce sites",Addison Wesley
2. Burdman, "Collaborative Web Development," Addison Wesley
3. Joel Sklar,"Principle of\Veb Design," Vikas & Thomson Learning
4. Ramesh "Multimedia and vVeb Technology" Laxmi Publication
5. Herbert Schildt,"The Complete Reference:Java",TMTT