

AL-FALAH UNIVERSITY

**DEPARTEMENT OF COMPUTER SCIENCE &
ENGINEERING**

SYLLABUS

B. Tech 4th Semester

**Choice Based Credit System Scheme
(CBCS)**



(Session 2015-16)

Al-Falah University, Faridabad-121004

Department of Computer Science & Engineering

AL-FALAH UNIVERSITY
Scheme of Studies & Examination
Bachelor of Technology (Computer Science & Engineering)

Semester – IV

S. No.	Course No.	Course Type	Subject	Teaching Schedule				Examination Schedule (Marks)				Credits
				L	T	P	Total	Marks of Class work	Theory	Practical	Total	
1	MGT-301	C.S	Principles of Economics and Management	3	1	-	4	60	90	-	150	3
2	CSE-202	PC-1	Introduction to Database Systems	3	1	-	4	60	90	-	150	3
3	CSE-204	PC-2	Object Oriented Programming using C++	3	1	-	4	60	90	-	150	3
4	CSE-206	PC-3	Advanced Internet Technologies	3	1		4	60	90	-	150	3
5	CSE-208	PC-4	Computer Architecture & Organisation	3	1	-	4	60	90	-	150	3
6	CSE-210	PC-5	Operating Systems		-	3	3	60	90	-	150	3
7	CSE-212	Lab-1	DBMS Lab	-	-	2	2	60	-	40	100	2
8	CSE-214	Lab-2	OOPS Lab	-	-	2	2	60	-	40	100	2
9	CSE-216	Lab-3	OS Lab	-	-	3	3	60	-	40	100	1
			TOTAL	18	7	6	30	540	540	120	1200	23

- PC – Program Core
- PE – Program / Departmental Elective
- OE – Open Elective
- C.S – Compulsory Subject

MGT-301: PRINCIPLES OF ECONOMICS AND MANAGEMENT

L T P
3 1 0

Credits: 3

Internal: 60 Marks
External: 90 Marks
Total: 150 Marks

Duration of Exam: 2½ Hrs.

NOTE: The question paper will have nine questions in all. Question number-1 will be compulsory and will be of conceptual nature covering the entire syllabus. There after there will be four sections and each section will have two questions. Candidates will be required to attempt at least one question from each section. All questions carry equal marks and the duration of examination will be 2.30 hrs.

COURSE OBJECTIVES:

The objective of the course is to acquaint the students with the basics economics concepts and their operational significance to stimulate them to watch and update changes that occur constantly in economy. And also familiarize the students with the basic knowledge an understanding of the managerial functions and their practical application in decision making.

Unit-I

Definition of Economics- Various Definitions, Nature of Economics Problems, Production possibility curve, Relation between Science, Engineering, Technology and Economics.

Utility-Concepts and Measurement of utility, Law of Diminishing Marginal Utility, Law of Equi-marginal utility- its practical application and importance.

Unit-II

Demand-Meaning, Determinants of demand, Individual and Market demand schedule, Law of Demand, Elasticity of demand- Determinants of elasticity of demand, practical importance and applications of elasticity of demand.

Supply-Meaning, Law of Supply, Role of demand and supply in price determination.

Unit-III

Introduction– Meaning Nature and Functions of Management, basic managerial roles and skills, Nature of managerial work;
Approaches to management–Classical, Human Relations and Behavioral, Systems and Contingency Approaches.

Planning–Concept, Purpose and Process of Planning, Strategic Planning, Tactical Planning and Operational Planning.

Decision making–Nature and Process, Behavioral aspects of Decision-making.

Unit-IV

Staffing – Meaning of Staffing- Job analysis, Job evaluation- Manpower Planning– Selection and Recruitment, Training and Development.

Organization– Organization structure- Organization chart- Formal and Informal Organization.

Directing – Meaning of Directing, Leadership – Definition – Types of Leadership.

Controlling – Meaning and Process of Controlling- Management control Technique.

Text Book:

1. Principles and Practice of Management - R.S. Gupta, B.D. Sharma, N.S. Bhalla. (Kalyani Publishers)
2. Organization and Management - R.D. Aggarwal (Tata Mc-Graw Hill)
3. Principles & Practices of Management – L.M. Prasad (Sultan Chand & Sons)
4. R Jain, V K Ohri, Economics for Engineers. V K Global, New Delhi
5. J P Goel, Namita Goel, Economics, Saraswati House, New Delhi

CSE-202: INTRODUCTION TO DATABASE SYSTEMS

L T P
3 1 0

Credits: 3

Duration of Exam: 2½ Hrs.

Internal: 60 Marks

External: 90 Marks

Total: 150 Marks

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COURSE OBJECTIVES:

- a) To understand the concepts related to data systems and services.
 - b) To understand the basics of data models used in industry.
 - c) To understand the concepts of Normalisation.
 - d) To understand the concept of transactions and processing in DBMS.
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Unit-I

Overview of Database System: Purpose of database systems, View of data, Importance of Data Models, Introduction to Database Languages, Database users, Advantages of DBMS over file processing systems, Responsibility of Database Administrator.

Database design and ER diagram: Introduction to Client/Server architecture, three levels architecture of Database Systems.

Entity-Relationship model: Basic concepts, Design process, constraints, Keys, Design issues, E-R diagrams, weak entity sets, Reduction to ER database schema into tables.

Unit-II

File organization: Sequential Files, Index sequential files, Direct files and Hashing.

Relational model: Structure of relational databases, Domains, Relations,

Relational algebra: Introduction, Selection and projection, set operations, renaming, Joins, Division, syntax, semantics. Operators, grouping and ungrouping, relational comparison.

Calculus: Tuple relational calculus, Domain relational Calculus.

Unit-III

Query processing and Query optimization: Overview, Query by Language (QBE), Structured query language (SQL: data definition, aggregate function, Null Values, nested sub queries, Joined relations, Triggers.)

Relational database design: Features of good relational database design, atomic domain, integrity constraints, Functional dependency and Normalization (1NF, 2NF, 3NF, BCNF).

Unit-IV

Database Systems: Overview, Distributed Database systems, Parallel Database systems, Data mining & Data warehousing.

Transaction Management & Concurrency control: Introduction to transaction, ACID properties of transaction and life cycle of transaction.

Introduction to concurrency control, need of concurrency control, problems in concurrent transactions, Serializability, Lock based concurrency control.

Text Book:

- Database System Concepts by A. Silberschatz, H.F. Korth and S. Sudarshan, 3rd edition, 1997, McGraw-Hill,
- Introduction to Database Management system by Bipin Desai, 1991, Galgotia Pub.
- Fundamentals of Database Systems by R. Elmasri and S.B. Navathe, 3rd edition, Addison-Wesley.
- An Introduction to Database Systems by C.J. Date, 7th edition, Addison-Wesley, Low Priced Edition, 2000.

CSE-204: OBJECT ORIENTED PROGRAMMING USING C++

L T P
3 1 0

Credits: 3

Duration of Exam: 2½ Hrs.

Internal: 60 Marks

External: 90 Marks

Total: 150 Marks

NOTE: The question paper will have nine questions in all. Question number-1 will be compulsory and will be of conceptual nature covering the entire syllabus. There after there will be four sections and each section will have two questions. Candidates will be required to attempt at least one question from each section. All questions carry equal marks and the duration of examination will be 2.30 hrs.

COURSE OBJECTIVES:

- a) To understand the concepts related to object oriented programming.
 - b) To understand the basics of data structures used in 'C++' language.
 - c) To understand the concepts of classes, inheritance and polymorphism.
 - d) To understand the concept of exception handling.
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Unit-I

C++ Standard Library, C++ Environment, Pre-processors Directives, Header files, Namespaces and library files. Introduction to Objects and Object Oriented Programming, Encapsulation (Information Hiding).

Access Modifiers: Controlling access to a class, method, or variable (public, protected, private, package), Polymorphism: Overloading, Inheritance, Overriding Methods, Abstract Classes, Reusability and Class's Behaviors.

Unit-II

Class Scope and Accessing Class Members, Separating Interface from Implementation, Controlling Access Function And Utility Functions, Initializing Class Objects: Constructors, Using Default Arguments With Constructors, Using Destructors, Classes: Const (Constant) Object And Const Member Functions.

Object as Member of Classes, Friend Function and Friend Classes, Use of This Pointer, Dynamic Memory Allocation with New and Delete, Static Class Members, Proxy Classes, Function overloading.

Unit-III

Operator Overloading, Restrictions On Operators Overloading, Operator Functions as Class Members vs. as Friend Functions, Overloading <<, >> Overloading of Unary and Binary Operators.

Introduction to Inheritance, Base Classes and Derived Classes, Protected Members, Using Member Functions, Overriding Base Class Members in a Derived Class, Public, Protected and Private Inheritance.

Use of Constructors and Destructors in derived Classes, Implicit Derived –Class Object To Base-Class Object Conversion, Composition Vs. Inheritance. Introduction to Virtual Functions, Polymorphism, New Classes, Dynamic Binding, Virtual Destructors, Dynamic Binding.

Unit-IV

Files and Streams, Creating a Sequential Access File, Reading and updating data from a Sequential File, Random Access Files, Creating, Reading and Writing Data to a Random Access File. Stream Input/Output Classes and Objects, Stream input /Output, Unformatted I/O (with read and write), Stream Manipulators.

Function Templates, Overloading Template Functions, Class Template, Class Templates and Non-Type Parameters, Templates and Inheritance, Templates and Friends, Templates and Static Members. Basics of C++ Exception Handling: Try Throw, Catch, Throwing an Exception, Catching an Exception, Rethrowing an Exception, Exception specifications, Processing Unexpected Exceptions, Constructors, Destructors and Exception Handling.

Text Books:

Object Oriented Programming in Turbo C++ by Robert Lafore.

Programming with C++ by D Ravichandran, 2003, T.M.H

Reference books:

Object oriented Programming with C++ by E Balagurusamy, 2001, Tata McGraw-Hill.

CSE-206: ADVANCED INTERNET TECHNOLOGIES

L T P
3 1 0
Credits: 3

Internal: 60 Marks
External: 90 Marks
Total: 150 Marks

Duration of Exam: 2½ Hrs.

NOTE: The question paper will have nine questions in all. Question number-1 will be compulsory and will be of conceptual nature covering the entire syllabus. There after there will be four sections and each section will have two questions. Candidates will be required to attempt at least one question from each section. All questions carry equal marks and the duration of examination will be 2.30 hrs.

COURSE OBJECTIVES:

- a) To understand the concepts web servers.
 - b) Study of search engines and web crawlers.
 - c) Analysis of client side scripting.
 - d) Study of AJAX and jQuery.
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Unit-I

Web Servers and Browsers: Web server configuration issues, Web server architectures and case study of web servers, Secure Socket layer, Secure HTTP, Next generation web browsing, anatomy of hypertext and hypermedia, MIME types, WWW proxies, plugins and helper applications, Internet standards and RFC, web server threats and countermeasures.

Unit-II

Web Search Engines: Introduction to searching techniques, architectures of search engines, search tools, search engine optimization, accessing web directory files, Meta search engine and their architecture.

Web crawlers: Introduction to web crawler and architecture, crawling policy, Types of web crawler: General purpose web crawler, Focused crawler, Incremental crawler, Parallel crawler, Adaptive crawler, Distributed crawler.

Unit-III

Client side scripting: Introduction to client side scripting, JavaScript basics: variables, statements, data types, operators, conditional statements, loops, events, objects, user define functions, arrays, Event handling and forms implementation, document object model.

Page and site design considerations issues in client side scripting, CGI, Internal and external CSS.

Unit-IV

Advance web technologies: Introduction to AJAX, Popular AJAX frameworks, JSON, AJAX applications.
Basics of jQuery, syntax and selectors of jQuery, jQuery effects, jQuery event methods, jQuery and HTML.

Text Book:

- Learning PHP, MySQL & JavaScript with j-Query, CSS & HTML5
- Web Technologies By Achyut S Godbole , Atul Kahate, 2003, T.M.H
- Internet and Intranet by Minoli & Minoli Engineering, McGraw-Hill Education (India) Pvt Limited

CSE-208: COMPUTER ARCHITECTURE & ORGANISATION

L T P
3 1 0

Credits: 3

Duration of Exam: 2½ Hrs.

Internal: 60 Marks

External: 90 Marks

Total: 150 Marks

NOTE: The question paper will have nine questions in all. Question number-1 will be compulsory and will be of conceptual nature covering the entire syllabus. There after there will be four sections and each section will have two questions. Candidates will be required to attempt at least one question from each section. All questions carry equal marks and the duration of examination will be 2.30 hrs.

COURSE OBJECTIVES:

- a) To understand the basic concepts of digital electronic components.
 - b) To understand the basics of memory hierarchy.
 - c) To understand the concepts of CPU architecture.
 - d) To understand the concept of parallelism in hardware.
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Unit-I

Digital system and binary numbers: Signed binary numbers, binary codes, cyclic codes, error detecting and correcting codes, hamming codes.

Boolean algebra and Logic gates, Gate-level minimization: The K-map method, NAND and NOR implementation, Quine Mc-Clusky method (Tabular method)

Unit-II

Combinational logic blocks (Adders, Multiplexers, Encoders, and decoder); Sequential logic blocks (Latches, Flip-Flops, Registers, and Counters), PLA, CPLD, FPGA and PAL

Multilevel viewpoint of a machine: Digital logic, micro architecture, Instruction set architecture, structured organization; CPU, caches, main memory, secondary memory units & I/O; Performance metrics; MIPS, MFLOPS. Flynn's classification of computers (SISD, MISD, MIMD), Instruction set based classification of processors (RISC, CISC, and their comparison); addressing modes.

Unit-III

CPU Architecture types (accumulator, register, stack, memory/ register), detailed data path of a typical register based CPU, Fetch-Decode-Execute cycle, microinstruction sequencing (Hardwired and micro programmed), CPU-Memory Interaction.

Memory hierarchy (Locality of reference principle, Memory hierarchy in practice: Cache, main memory and secondary memory, Memory parameters: access/ cycle time, cost per bit); Main memory (Semiconductor RAM & ROM organization, memory expansion, Static & dynamic memory types); Cache memory (Associative & direct mapped cache organizations).

Unit-IV

Goals of parallelism ; Amdahl's law; Instruction level parallelism; Processor level parallelism (Multiprocessor systems overview). Instruction codes, computer register, computer instructions, timing and control, instruction cycle, type of instructions,

Basics of Logic Design, accumulator logic, Control memory, address sequencing, micro-instruction formats, micro-program sequencer, Stack Organization, Instruction Formats, and types of interrupts.

Text Books:

- Computer Architecture and Organization, 3rd Edi, by John P. Hayes, 1998, TMH.
- Computer System Architecture by M. Mano, Prentice-Hall. Computer Architecture- Nicholas Carter, T.M.H.

Reference Books:

- Computer Organisation & Architecture: Designing for performance by W. Stallings, 4th edition, Prentice-Hall

CSE-210: OPERATING SYSTEMS

L T P

3 1 0

Credits: 3

Duration of Exam: 2½ Hrs.

Internal: 60 Marks

External: 90 Marks

Total: 150 Marks

NOTE: The question paper will have nine questions in all. Question number-1 will be compulsory and will be of conceptual nature covering the entire syllabus. There after there will be four sections and each section will have two questions. Candidates will be required to attempt at least one question from each section. All questions carry equal marks and the duration of examination will be 2.30 hrs.

COURSE OBJECTIVES:

- a) To understand the basic concepts of operating systems.
 - b) To understand the basics of process management.
 - c) To understand the concepts of memory management.
 - d) To understand the concept of file system in OS.
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Unit-I

Introduction to Operating System: Architecture of OS, objectives and functions of OS, Interaction of OS & hardware architecture.

Evolution of operating systems: Batch system, Multiprogramming, Multitasking, Multiuser, Parallel, Distributed & Real time OS, System calls, Operating system shell, Linux Shell commands and Shell programming.

Unit-II

Process management: Introduction to Process description, Process states, Process control block, Threads. Scheduling algorithms: FCFS, SJF, Priority, Round Robin, Multi-level feedback queue scheduling, Thread Scheduling.

Process synchronization: Readers-Writers Problem, Producer Consumer Problem, Dining Philosopher problem. Deadlock: Principles of deadlock, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection.

Unit-III

Memory Management requirements, Memory partitioning: Fixed, dynamic, partitioning, Memory allocation Strategies (First Fit, Best Fit, Worst Fit), Fragmentation, Swapping, Segmentation, Paging.

Virtual Memory, Demand paging, Page Replacement Policies (FIFO, LRU, Optimal) and Thrashing.

Unit-IV

File System: Different types of files, organization and their access methods, Directory structures, various allocation methods, Disk Scheduling, management and its associated algorithms. Comparative study of Windows and UNIX/LINUX file system.

Operating System Design issues, Computer security & protection: Security Threats, Attacks and assets, Intruders, Malicious software, I/O Hardware, Application I/O Interface and Kernel.

Reference Books:

1. Operating System: Abraham Silberschatz, Peter Galvin, Greg Gagne, 7th Ed. (Wiley Pub.)
2. System Programming & OS: D.M. Dhamdhare (Tata McGraw-Hill Education)
3. Red Hat Bible Core Fedora Linux: Christopher Negus (Wiley Pub.)
4. Modern Operating System: Andrew Tanenbaum (Pearson Education)

CSE-212: DBMS LAB

L T P C
0 0 2 2

Internal: 60 Marks
External: 40 Marks
Total: 100 Marks

Duration of Exam: 2 Hrs.

List of Practicals

- Design a Database and create required tables. For e.g. Bank, College Database.
- Apply the constraints like Primary Key, Foreign key, NOT NULL to the tables.
- Write a SQL statement for implementing ALTER, UPDATE and DELETE.
- Write queries to implement the joins.
- Write queries for implementing the following functions: MAX (), MIN (), AVG (), COUNT ().
- Write queries to implement the concept of Integrity constraints.
- Write queries to create the views.
- Perform the queries for triggers.
- Perform the following operation for demonstrating the insertion, updation and deletion using the referential integrity constraints

Note: At least 10 exercise to be given by the teacher concerned for additional practice.

TEXT BOOK:

SQL/ PL/SQL, The programming language of Oracle, Ivan Bayross, 4th Edition BPB Publications

CSE-214: OOPS LAB

L T P C
0 0 2 2

Internal: 60 Marks
External: 40 Marks
Total: 100 Marks

Duration of Exam: 2 Hrs.

List of Practicals:

- Write a C++ program to calculate factorial of a number using recursion.
- Write a C++ program having main function to implement class Rectangle having data members length, breadth and member function getdata and area.
- Write a C++ program to demonstrate use on inline function using class and without class.
- Write a C++ program to demonstrate use of scope resolution operator.
- Write a C++ program to demonstrate the use of friend function.
- Write a C++ program to overload * operator to compute product of two objects of complex type (class).
- Write a C++ program to demonstrate multiple inheritances.
- Write a C++ program to demonstrate concepts of void pointer, null pointer, pointer to pointer, dangling pointer, pointer to function, constant pointer, pointer constant and pointer to object.
- Write a program in C++ to demonstrate constructor and destructor.
- Write a C++ program to demonstrate function templates (ex sum function).
- Write a C++ program to calculate square and cube by using function pointer to demonstrate dynamic binding.
- Write a C++ program to demonstrate class templates (ex Array class for various operations of array).
- Write a C++ program to demonstrate use of virtual function.
- Write a C++ program to overload pre increment and post increment operator.
- Write a program to read and display content of a text file.
- Write a program to read content from two text files and write that content into a third file.

Note: At least 10 exercise to be given by the teacher concerned.

CSE-216: OS LAB

L T P C
0 0 2 2

Internal: 60 Marks
External: 40 Marks
Total: 100 Marks

Duration of Exam: 2 Hrs.

The objective of conducting shell scripting in operating system lab is to familiarize the students with shell basics. Students should be able to perform scripting tasks in environment of Unix/Linux. Practical file must enclose outputs along with shell script code.

Note * - : Students need to perform under mentioned shell programs in Unix/Linux OS Lab.

Program List

- Write a Program to add, subtract, multiply and divide two numbers (initialize & user define).
- Write a Shell Script to convert Distance in feet to meter.
- Write a Shell Script to convert temperature in Fahrenheit to Celsius.
- Write a Shell Script to calculate simple interest. Input values are Principal, rate and time.
- Write a Shell Script to demonstrate if-else condition in Shell Programming.
- Write a Shell Script to test a given number for odd and even condition.
- Write a Shell Script to calculate Area & Perimeter of Rectangle (User Define).
- Write a Shell Script to find the greatest among three distinct integers A, B and C.
- Write a Shell Script to find the aggregate and % percentage of marks.
- Write a Shell Script to generate a series of natural number.
- Write a Shell Script to find whether $A > B$ or $B > A$, $A = B$.

* (Additional programs should be provided by teacher for practice purpose)

Virtualization Concepts

The objective of conducting virtualization in operating system lab is to familiarize the students with virtual environment & the techniques involved in optimizing hardware resources using virtualization. Students should be able to run multiple operating systems using virtualization tools. Operating system virtualization is the use of software to allow a piece of hardware to run multiple operating system images at the same time.

Note * - : Students need to perform under mentioned practical using any Virtualization tool in OS Lab. Any activity related to this should be included with proper screenshots.

- Installation of any Linux operating system of your choice using a Virtualization tool (With screenshots).