**پوهنتون دنیا**

**معاونیت علمی**

**پوهنځی کمپیوترساینس**

**نصاب درسی (Curriculum)**

**سال 1395**

|  |
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| B.C.S Computer Science 4 years Program |

**Course Contents:**

**Year 1**

**Semester 1**

**CS101 Introduction to Computer Science:**

Introduction and Evolution of Computing

Computer Systems and its Components

Computer Hardware and Software

Binary Numbers and Logic Operations

Operating Systems J

Word Processing and Desktop Publishing

Spreadsheets, Developing Presentations

Introduction to Algorithms

Software Development Methodologies

Arrays, Computer Networks

Internet Services

Graphics, Images and Animations

Intelligence Systems in computing

Data Management, Database Software

Cyber Crime

Social Implications of Computing

The Future of Computing

**MTH101 Mathematics-I**

Logic

Truth Table

Logic Equivalence

Laws of the Algebra of Propositions

Translating Word Statements to Symbolic Notation & Vice Versa

Bi-Conditional Statements and their Equivalence

Arguments, Valid and In Valid arguments

Sets

Venn diagram and Membership Table

Operations on sets

Venn Diagrams for operations on sets

Ordered Pairs

Relations and Matrix Representation of a matrix

Types of relations and Directed graph

Ir-reflexive and anti-symmetric relations and partially ordered relations

Functions, Domain Codomain and Range, Types of function

Sequence, Arithmetic and Geometric Sequence, Series , Sum of Arithmetic and Geometric Series

**ENG101 English Composition:**

Reading and Dictionary

Pronunciation

Reading for Main Idea 4.Reading: Topic, Main Idea

Reading: References and Reading Skills

Reading and Vocabulary 8.Word Formation- Prefixes

Reading: Description, Locating Information

Reading: Word Forms 11.Reading: Understanding Reading

Reading: Making Inferences and Reading: Assessing the Text

Reading: Assessing Texts

Evaluating Texts: Interpreting Visual Data

Reading: Evaluating Texts

Reading: Cloze for Comprehension

Reading: Skimming and Scanning

Reading: Scanning and Language Functions

Reading: Classifying, Cause and Effect Relationship

Reading: Presenting Information Graphically

Writing: Sentence Types

Writing: Effective Sentences: Unity, Coherence and Emphasis

Writing: Identifying Sentence Errors and Writing: Revising Sentence Errors

Subject Verb Agreement, Writing, Word Choice and Punctuation

Writing: Paragraphs: Structural Parts

Writing: Paragraph and Writing: Essay Writing

Writing: Essay Outlines

Writing: Selecting and Researching an Essay Topic

Writing: Ways of Organizing Texts: Linear

Writing: Summary Writing

Grammar and Usage: Tenses and Passive Sentences

Grammar and Usage: Word Order: Adverbs and Grammar and Usage: Articles

Language Functions: Language Forms and Functions

**CS102 MS MOUS:**

Exploring Excel 2013

Organize workbook content

Format cells and cell contents

Prepare a worksheet for printing

Populate a worksheet by using formulas

Accessing data from other applications

Building formulas

Changing reference types

Ensuring valid data

Generate data by using functions

Create and modify a table

Create and modify a chart

Present data visually

Add graphics to a workbook

Customize Excel functionality

Create and print a functional workbook

Working in Word 2013

Explore a document and create a report

Populate a document

Format text

Enhance a document by adding graphics

Replace text and formatting

Present content in lists

Present content in tables

Insert bookmarks and hyperlinks

Format a document for printing and presentation

Save a document in multiple formats

Populate a document by using content objects

Add references to a document

Customize the program window and create a macro

Work in PowerPoint 2013

Create and save a presentation

Modify slide content

Change the order of slides and add transitions

Add and format a slide image

Modify shapes on a slide

Add a business diagram to a slide

Add a table and chart to a slide

Add a soundtrack and movie to a presentation

Animate images on slides

Modify a presentation theme

Track and review changes in multiple presentations

Configure a slide show and Finalize a presentation

**CS103 Introduction to Web Engineering:**

Introduction to the Internet

Creating a Web Page

Attributes, Lists and Tables

Links and Images

Cascading Style Sheets Introduction

Type, Values, Common Properties

CSS - Common Properties (Cont'd), Directory Structure, Some Common Tags

Web Page Layout Techniques

Introduction to Dreamweaver

More Features of Dreamweaver

CSS Improvement - Typography, Imagery

CSS Tips & Tricks

JavaScript Introduction

Definition, utilities And Limitations

Function Calling and Alert Box, Confirmation etc

CSS AND EVENT HANDLING THROUGH JS: Examples: Block change.

Open Close Block.

Change inner HTML

On mouse over change image src

On mouse over image height and width.

Variable, If-Else, Switch

Operators, Popups, Functions, Loops

Forms, Events, and Event Handling

**HT101 Afghanistan History:**

**Semester 2**

**CS201 Database-I:**

Introduction to Basic Database Concepts

Database Architecture

Database Planning and Conceptual Database Design

Logical Database Design, Transforming E-R Design to Relational Design

Data Definition Languages, Data Manipulation Languages

Normalization and De normalization, Physical Database Design

Database Tools

Structured Query Language (SQL)

Data Storage Concepts

Indexes and Views

Transaction Management

Concurrency Control

**CS202 Introduction to Programming:**

Introduction, Software Categories / History of C / IDE, Starting to 'C'

Expressions and Operators

Decisions,

Repetition Structures

Loops and Operators

Switch Statement, Functions

Arrays

Pointers

Strings

String Manipulation Functions

File Handling

Structure

Bit Manipulation

Pre-processor Directives and Macros

Dynamic Memory Allocation using C

Structured Programming

Classes and Objects

Memory Allocation in C++

Friend Functions

**PHY 201 Physics:**

Introduction to Physics

Kinematics, Force and Newton s laws

Applications of Newton’s laws-I, Applications of Newton’s laws-II

Work & Energy, Conservation of energy

Momentum & Collision, Rotational kinematics

Physics of many particles, Angular momentum, Equilibrium of rigid bodies

Oscillations-I, Oscillations-II, Physics of materials

Physics of fluids, Physics of sounds, Wave motion, Gravitation

Electrostatics-I, Electrostatics-II, Electric potential

Capacitors & Currents, Current & Circuits, The magnetic field

Electromagnet induction, Alternating current, Electromagnetic waves

Physics of light, Interaction of light with matter, Interference & diffraction

The particle nature of light, Geometric optics

Heat-I, Heat-II, Heat-III

Special Relativity-I, special Relativity-II

Matter as waves

Quantum mechanics

Introduction to atomic Physics

Introduction to nuclear Physics and Physics of the Sun

**ENG201 Business and Technical English Writing:**

Introduction of Business and Technical English

Oral Communication

Reader-Centered Writing

Audience Analysis

Effective Communication

Defining Objectives

The Seven C’s of Effective Communication

Planning Business Messages and Composing Business Messages

Revising Business Messages

Memorandums, Meeting Documents and Proposals

Letters

Writing Direct Requests

Writing Routine, Good-News and Goodwill Messages

Writing Bad-News Messages

Writing Persuasive Messages and Writing Short Reports

Planning Long Reports and Writing Long Reports

General Reports and Empirical Research Report

Feasibility Reports and Progress Reports

Proposals and Instructions

Using Visual Aids and Creating Twelve Types of Visual Aids

Writing Specifications and Analysis Reports

How to Avoid Common Writing Problems

Language Review: The Paragraph and Language Review: Sentences

Language Review: Words and Punctuation and Language Review: Mechanics

Listening and Interviewing and Planning Interviews and Conducting Meetings

Giving Speeches and Oral Presentations

Review Written Communication

**ISL201 Islamic Studies**

Faith

Taqwa (Fear of Allah)

Obedience of God and Obedience of Prophets and executive authority

Sincerity (IKHLAAS) and Morality of the Prophet (S.A.W)

Practical Law (Ibadat) and Islamic Practices

Knowledge and its Islamic concept and Knowledge and its Islamic concept

The Islamic social system and The manners of meeting and talking

Respect of parents and Brotherhood

Honesty and Obligation

Forgiveness

**MTH201 Mathematics-II:**

Sets, Real Numbers

Complex Numbers

Functions

Quadratic Functions

Permutations and Combinations

Binomial theorem

Graphs and Functions

Straight Lines and Circles

Trigonometry

Limits

Integrations

**Semester 3**

**CS301 Digital Logic and Design:**

An overview and number systems

Number systems and codes

Logic gates and Digital circuits and operational characteristics

Boolean algebra and logic simplification

Karnaugh map and Boolean expression simplification

BCD adder and 16-bit ALU

The 74xx138 3-to-8 decoder

2-input 4-bit multiplexer, De multiplexer

Flip-Flops and the 555 Timer

Up-Down counter

Digital Clock

Shift Registers and Memory, Analog to Digital Converters

**MTH301 Discrete Mathematics:**

Logic

Sets & Operations on sets

Relations & Their Properties

Functions, Sequences & Series

Recurrence Relations

Mathematical Induction

Loop Invariants

Loop Invariants

Combinatory

Probability

Graphs and Trees

**CS302 Data Structure:**

Introduction to Data Structure

Types of Data Structures

Arrays

Lists

Stacks

Stack Frames

Recursion

Recursive Functions

Factorial

Searching

Sequential Searches

Binary Search

Trees

Complexity

Queues

Priority Queues

Heaps

Sorting

Bubble

Heap

Quick

Radix

**CS303 Data Communication:**

Data communication networks and open system standards

ISO Standards

Open Systems

The electrical interface

Transmission media

Attenuation and distortion

Signal propagation delay

Public carrier circuits

Analog PSTN

Modulation

Digital circuits

Multiplexing

Data transmission

Asynchronous and Synchronous transmissions

Error detection/correction methods

Data compression

Data Link Layer Protocols

Idle RQ

Sliding Window (Go Back N, Selective Repeat)

Framing

Link management

Ethernet

Fast Ethernet

Wireless LANs

Connecting devices

Hubs/Repeaters

Switches

Bridges

Routers

**MTH301 Advance Calculus:**

Limits

continuity and Partial Derivatives of Multivariable Function

Vectors

Directional derivative

Tangent Planes and Normal Lines to the Surfaces

Maxima And Minima of Functions of two variables

Applications of Extrema of Functions

Double Integration in rectangular and polar coordinates

Vector Valued Function

Integration of Exact differentials

Vector fields

Volume and Surface integrals

**CS304 Database-II:**

Conceptual Data Modeling & Entity Relationship Diagram (ERD) Review

Introduction to Oracle 11g on Cloud

SQL Recap

PL/SQL Concepts

General Programming Language Fundamentals of PL/SQL

SQL in PL/SQL

Conditional Control – I

Conditional Control – II

Iterative Control – I

Iterative Control – II

Cursor

Error Handling & Built-in Exceptions

User Defined Exceptions

Advance Exceptions

M-Collection

Records

Functions

Triggers

Package

**Semester 4:**

**PHY401 Circuit Theory:**

System of units, Ohm’s law

Types of circuits

Resistors-inductors-capacitors and their series parallel combinations

Current divider and voltage divider

Current and voltage sources

Kirchhoff’s Laws, Nodal analysis and Loop or Mesh analysis

Superposition theorem and Source Transformation

Semiconductors

Doped semiconductor

PN Junction Diode and Terminal characteristics of the Junction diodes

Analysis of diode circuits and Transformers

Diode Characteristic and Types

Bipolar Junction Transistor (BJT) Characteristic of Transistor

Transistor in Circuits and its applications

**CS401 Object Oriented Programming (OOP):**

Introduction

Abstraction & Inheritance

Introduction to Generalization & Specialization

Multiple Inheritance & Associations

Object-Oriented Modeling

Introduction to Objects and Classes

Constructors, Destructor

Functions & this Pointer

Constant data members & Static Variables

Constant data members & Static Variables& Array of objects

New Operator & Getter and Setter

Composition, Composition& Aggregation

Friend Functions

Operator overloading

Inheritance, Access Specifiers

Copy Constructor &Assignment Operator

Overriding, Types of Inheritance

Polymorphism, Abstract

Concrete Classes, Polymorphism – Case Study,

Multiple Inheritance, Generic Programming

Templates and Friends Techniques for Error Handling

Exception Handling

**CS402 Microprocessor and Assembly Language:**

Basic Computer Architecture

Intel IAPX88 Architecture

Register Architecture

Addressing Modes

Address Wraparound

Branching

Conditional Jumps

Unconditional Jump

Bit Manipulation

Multiplication Algorithm

Shifting and Rotation

Extended Operations

Masking Operations

Subroutines and Stack

Parameter Passing through Stack

Display Memory, Display Memory Formation

Screen Location Calculation

String Instructions STOS, LODS, SCAS, MOVS, CMPS

**CS403 Analysis of Algorithms:**

Introduction

Sorting Algorithms

Asymptotic notations

Problem solving

Divide and Conqueror Approach

Recursions

Dynamic Programming

Greedy Algorithms

Advance Heap

**CS404 Computer Network-I:**

Define Computer Networks name uses of Computer Networks and list the basic components of a Network system

Hardware and software which make networks more efficient, faster, transmit several simultaneous messages, and able to interconnect with other networks

Understand the basic technical concepts of Computer Networks

Be familiar with the various types of network configurations

Describe the circuits that are available for voice and data networks, their transmission speeds (bandwidth), and how they are packaged for commercial use

Understand the importance of adapting a Computer Networks offering to meet the changing and challenging networking needs of organizations

Understand how to design networks by using manual or hand calculations

Define the differences between protocols, software, and network architecture

Define the concept of local area networks and describe their use. Describe how a local area network is installed, its typologies and protocols

Understand why networks need security and control, what errors might occur, and how to control network errors

**MTH401 Linear Algebra:**

Systems of Linear Equations

Row Reduction and Echelon Forms

Vector Equations

The Matrix Equation

Solution Sets of Linear Systems

Linear Independence

Linear Transformations

The Matrix of a Linear Transformation

Matrix Algebra

Iterative Solutions of Linear Systems

Determinants, Cramer’s Rule and Linear Transformations

Vector Spaces and Subspaces, Null Spaces, Column Spaces and Linear Transformations

**Semester 5**

**CS501 Theory of Automata:**

Introduction to languages

Alphabets

Strings

Defining Languages

Kleen star Clousure

Recursive definition of languages

Regular Expressions

Recursive definition of Regular Expressions

Equivalent Regular Expressions

Finite automata

Transition Graphs

Generalize Transition Graphs

Kleene’s Theorem

Nondeterministic Finite Automaton

Conversion of NFA to DFA

Finite Automaton with output

Moore machine

Mealy machine

Equivalent machines

**CS502 E-Commerce:**

E-Commerce and its types, Internet and WWW Basics

Data communication on internet and Domain name system

Networking devices – Bridges, Switches, Routers

Role of ISP’s on Internet, Getting Domain name

Understanding electronic mail

Client side & server side processing and Cookies

Security issues on the internet, Firewalls, Proxy Server, and Virtual Private Network

Cryptography and Public key infrastructure (PKI)

Certification Authorities and Digital Certificates

Digital signatures Technology

Electronic Payment Systems – Virtual Pin payment system

Centralized account system, Electronic

Check, E-Cash, SSL and SET based payment systems

E-business– advantages/disadvantages, Paper and electronic catalogues

Electronic Data Interchange (EDI)

E-business models

Internet marketing

Data mining and knowledge discovery Process, OLAP, Types and business application of data mining

E-business strategy, supply chain/value chain analysis and Porter’s model

Role of e-commerce in competitive strategy

E-banking and ERP

**CS503 Advance Computer Architecture:**

Distinction between Computer Architecture

Organization and design

Levels of abstraction in digital design

Perspectives of different people about computers

General operation of a stored program digital computer

The Fetch – Execute process

Concept of an ISA

Taxonomy of computers and their instructions

Instruction set features

Addressing Modes

RISC and CISC architectures

Measures of performance

Introduction to the ISA and instruction formats

Coding examples and Hand assembly

Using Behavioral RTL to describe the SRC

Implementing Register Transfers using Digital Logic Circuits

**CS504 Software Engineering – I:**

Software Engineering Concepts and Principles

Introduction

Software Process Models

Software Process Management

Functional Oriented Software Engineering

System Engineering

Analysis Concepts and Principles

Analysis Modeling

Design Concepts and Principles

**CS505 Network II:**

Overview

Introduction to network programming

Direct link networks

Packet switching

Internetworking

End-to-end protocols

Congestion control and resource allocation

End-to-end data

Applications

Performance analysis and queuing theory

**CS506 Advance Database management system:**

Introduction

Export/Import and Data Movement

Using the Flashback Table feature to save session

SQL\*Plus Grows Up; a tinny but powerful DBA tool

Automatic Storage Management

The Resource Manager (RMAN)

Auditing Tells All

Wait Interface

Materialized Views

Enterprise Manager 10g

Virtual Private Database

Segment Management

Transportable Table spaces

Automatic Shared Memory Management

ADDM and SQL Tuning Advisor

Scheduler

**Semester 6**

**CS601 Operating System:**

Introduction

Single-user systems and Operating system components and services

Operating system structures and Process concept

Inter-process communication (IPC) and process synchronization

UNIX/Linux IPC tools and associated system calls

Use of FIFOs in a program and Thread models

Schedulers, Dispatcher and Algorithm evaluation

Process synchronization

The Critical Section Problem

The Bakery Algorithm and Deadlock and Starvation

Deadlock handling and Detections and Recovery

Memory management and Paging and Memory Management in Intel 80386

Virtual Memory, Demand Paging and Page Fault

Thrashing and File Concept and Directory Structure

File System, Mounting and File Sharing and Protection

Space Allocation Techniques

Disk Structure and Scheduling

Free Space Management

**CS602 Compiler Construction:**

Introduction

Front End and Back End

Phases of Compiler

Lexical Analysis

How to Describe Tokens

Running the Scanner

Parsing

Syntactic Analysis

Semantics Analysis

Parse Trees

Ambiguous Grammars

Context-Free Grammars

Parsing Techniques

Top-Down Parser

Non-recursive Predictive Parsing

Bottom-UP Parser

Shift-Reduce Parsing

Semantic Analyzer

Intermediate code Representation

Machine code

Error Handling

Symbol Table

**CS603 Visual Programming I:**

Operating Systems History and overview

Basic C Language Concepts

Windows Basics

Windows Creation and Message Handling

Architecture of Standard Win32 Application

User Interfaces, Window Classes

Graphics Device Interface

Painting and Drawing

Windows Management

Input Devices, Resources, String and Menu Resource

Dialogs and Windows Controls

Common Controls ,Dynamic Link Libraries

Threads and Synchronization

Network Programming

**CS604 Software Engineering II**

Design Methods

Software Testing

Object Oriented Software Engineering

Object Oriented Concepts and Principles

Object Oriented Analysis

Object Oriented Design

Object Oriented Testing

Technical Metrics for Object Oriented Systems

Case Studies with Functional-Oriented and Object-Oriented Software Engineering

Practical work in CASE Tools Like Visio, Rational rose, and MS-Project.

**STA601 Statistics and Probability:**

Introduction to Statistics

Frequency distribution

Diagrams (Bar + Pie + Histogram)

Averages

Measure of Dispersion

Skewnes

Index Numbers

Regression line and Correlation

Probability

Random Variable

**CS605 Computer Graphics:**

Introduction to Computer Graphics

Graphics Systems I

Graphics Systems II

Point

Line Drawing Techniques

Circle Drawing Techniques

Ellipse and Other Curves

2D Transformations I and II

Drawing Example

Clipping-I and II

3D Concepts

3D Transformations I and II

**Semester 7:**

**CS701 Advance Visual Programming:**

Introduction

Introduction to Events

Event-driven programming

Introduction to C#

Basic C#l anguage constructs

Object oriented programming in C#

Properties, interfaces, and indexers and Delegates

C# events, exception handling, Attributes, enums and operator overloading

Reading and writing XML, Working with files and directories

Introduction to WPF and XAML, Property elements and type converters

Markup extensions, XAML and procedural code and Logical and visual trees

Dependency properties, Attached properties and element display

Transforms and Panels, Grid Panel and Content Overflow

Panel composition, Input events, Touch manipulation events

WPF Commands, Deploying & Installing, Navigation-base apps

XAML Browser apps, Resources, Data binding and Collection View

Framework, Touch events, Blocks and Grand Central Dispatch

**CS702 Web Designing and Development**

Evaluation of PHP

Basic Syntax

Defining variable and constant

Php Data type

Operator and Expression

Embedding PHP in HTML

Adding Dynamic Content

Accessing Form Variables

Capturing Form Data

Dealing with Multi-value filed

Generating File uploaded form

Redirecting a form after submission

Storing and retrieving data

Opening a file

Writing a File

Closing a File

Reading from a File

Making Decisions

Doing Repetitive task with looping

Mixing Decisions and looping with Html

What is a function?

Define a function

Call by value and Call by reference

Recursive function

Creating and accessing String

Searching & Replacing String

Formatting String

String Related Library function

Anatomy of an Array

Creating index based and Associative array

Accessing array Element

Looping with Index based array

Looping with associative array using each() and foreach()

Some useful Library function

Using require () and include ()

Parameters

Understanding file& directory

Opening and closing a file

Coping, renaming and deleting a file

working with directories

Building a text editor

File Uploading & Downloading

Using query string(URL rewriting)

Using Hidden field

Using cookies

Using session

What is regular expression

Pattern matching in Php

Replacing text

splitting a string with a Regular Expression?

Basics of computer Graphics

Creating Image

Manipulating Image

Using text in Image

Introduction to RDBMS

USING MY SQL

Designing your web database

Relational Database Concepts

How to Design Your Database

Web Database Architecture

Creating your web database

Creating Databases and Users

Introduction to MySQL’ Privilege System

Setting Up a User for the Web

Creating Database Tables

Working with your MySQL database

Inserting Data in to the Database

Retrieving Data from the Database

Updating Records in the Database

Altering Tables after Creation

Accessing your MySQL Database from the web with PHP

How Web Database Architectures Work

Checking and Filtering Input Data

Setting Up a connection

Querying the Database

Advanced MySQL

Making Your MySQL Database Secure

Speeding Up Queries with Indexes

Different Table Types

Backing Up Your MySQL Database

E-COMMERCE AND SECURITY

Running a E-commerce site

Types of Commercial Web Sites

Risks and Threats

Deciding on a Strategy

E-commerce security issues

Security Threats

Creating a Security Policy

Encryption Basics

Digital Signatures

Implementing Authentication with PHP and MySQL

Implementing Access Control

Basic Authentication

Using Basic Authentication in PHP

Creating Your Own Customer Authentication

Implementing secure transactions with PHP and MySQL

**CS703 Elective I(Management Information System):**

Defining Needs

Areas Covered

Organization & Information Requirements

Unique Attributes of Organization

Effect of Changes in Environment

Systems vs. Procedures

Types of Systems

What are Systems?

Infrastructure

Support Systems

Data Mart

CBIS from Functional View Point

Organizational Structure

Marketing

Decision Making

**CS704 Network Security and Encryption:**

IT security Introduction

History of Cryptography

The Three Foundations of IT Security

Basic security terminology

Employee and ex-employee threats

Traditional external attackers

The Threat Environment: Attackers & Their Attacks

Definitions & concepts

Steganography

Types of ciphers: substitution and transposition

Block and stream ciphers

Symmetric vs. asymmetric algorithms

Message integrity (one way hash)

Digital signatures

PKI

Key management

Email security (S/MIME, PGP)

Quantum cryptography

Internet security

Secure shell (SSH)

IPSEC

Enterprise network architecture

Firewalls

Intrusion detection & prevention systems (IDPS/IPS)

System & server security

Web application security

Database security

Vulnerability assessment & penetration testing

NAC, DLP, 2FA, & other security measures

**CS705 Software Project I:**

Introduction and Overview to Software Development Process

Software Process Models

Project Management Concepts

Function Point Analysis

Software Process and Project Metrics

Software Project Planning

Risk Analysis and Management

Project Schedules and Tracking

**Semester 8:**

**CS801 Software Project Management:**

Introduction to Project Management

Goals of Project management

Project Characteristics

Project Dimensions

Project Life Cycle

Costs and Cost Management

Project vs. Program Management

Trade-Off Triangle

Project Management Skills

PM’s Knowledge Areas

Team leader

Leaders and Managers

Project Organization

Software Development Fundamentals

Management Fundamentals

Technical Fundamentals

Software Process vs. Software Engineering

PM Process Groups

Planning Process Tasks

Project Planning Steps

The Software Development Plan (SDP).

Estimation

Decomposition Techniques

Estimation Tools

Work Breakdown Structure

Scheduling and Risk and Change Management

Software Quality

Application Tools (Microsoft Project 2000)

**CS802 Artificial Intelligence:**

Introduction

Problem Solving

Genetic Algorithms

Knowledge Representation and Reasoning

Handling uncertainty with fuzzy systems

Introduction to learning

Planning

Computer vision

Robotics

Clustering

**CS803 Wireless Network:**

Introduction to Wireless Communication

Wired vs. Wireless Communication

Electromagnetic Signal

Time-Domain Concepts

Frequency-Domain Concepts

Channel Capacity, Signal-to-Noise Ratio

EM Spectrum, Design Challenges

Wireless Transmission

Signal Encoding and Modulation

Categories of Noise

Attenuation and other Impairments

Multiplexing

Transmission Mediums

Propagation Modes

Multipath Propagation

Types of Fading

Error Detecting and Correcting Techniques

Multiple Access Techniques

CSMA and Spread Spectrum

Evolution of Wireless Networks

1G, 2G, 3G, 4G Cellular Networks,

Issues, QoS, Security, Multimedia Services and Applications

Convergence of Cellular and WLAN, Billing Issue, WLANS(IEEE802.11)

WiMAX (IEEE802.16), Wireless PAN(IEEE802.15))

Fundamentals of Cellular Concepts(Cellular Concept

AMPS Architecture, Frequency Reuse, Locating co-channel cells

Channel Assignment Strategies

Handoff Strategies, Prioritizing Handoff, Practical Handoff Considerations

Co-channel Interference and Capacity, Adjacent Channel Interference and Capacity

Channel Planning for Wireless System, Trunking and Grade of Service, Measuring Traffic Intensity

Trunked Systems, Erlang Charts, Improving Coverage and Capacity

Cell Splitting, Sectoring, Repeaters for Range Extension

Microcell Zone Concept), Analog Mobile Phone System (Introduction

Architecture, System Overview, Call Handling, Air Interface, Supervisory Signals, N-AMPS)

GSM: Global System for Mobile Communication (Introduction, System Architecture, Network Areas

Specifications, Subscriber Services, Mobility

Identifiers in GSM Network) Identifiers in GSM Network

Call Routing in GSM,

GPRS: General Packet Radio Service

Introduction, Architecture, Registration and Session Management

Routing Scenario in GPRS, Channels Classification, Protocol Architecture

Air Interface, Data Routing and Mobility

Uplink Data Transfer, Downlink Data Transfer

QoS in GPRS, EDGE Airlink), IS-136, IS-136 Channels and Specifications

CDMA One / IS-95 (Advantages and Drawbacks of CDMA Cellular

Mobile Wireless CDMA Design Considerations, IS-95 CDMA Forward Channel

Walsh Codes, IS-95 Reverse Link, EDGE

**CS804 Elective-II (Java Technologies):**

Introduction to Java

Object Oriented Programming,

Classes

Inheritance

Polymorphism

Collections

Exceptions

Streams

Abstract Classes and Interfaces

Graphical User Interface

Event Handling

Database Connectivity

Meta Data Graphics

Applets

Socket Programming

Serialization

Multithreading

**CS805 Software Project II:**

Software Quality Assurance

Formal Review techniques

The ISO 9000 Quality Standard

The CMM

Software Configuration Management

Requirement Management Processes

Verification and Validation

Software Re-engineering

Software Re-factoring

Capability Maturity Model Integration (CMMI)