Syllabi of Courses which Address Crosscutting Issues

(Computer Science)

1.3.1 Courses which address cross cutting issues relevant to Gender, Environment and Sustainability, Human Values and Professional Ethics into the Curriculum

Sl.No	Name of the Course	Course Code	Name of the Programme	Specify the issue(s) dealing with
1.	Computer Organisation and Architecture	CSS1C05	MSc.Computer Science	Environment and sustainability
2.	Computer Networks	CSS2C08	MSc.Computer Science	Professional Ethics
3.	Advanced Database Management system	CSS2C11	MSc.Computer Science	Environment and sustainability
4.	Principles of Software Engineering	CSS2C10	MSc.Computer Science	Human Values

Course : MSc Computer Science

Programme: **CSS2C08 – COMPUTER NETWORKS**

Course Outline

Unit I:Introduction to Computer networks - introduction - topology - categories of networks Internetwork - Internet - network modes- layered model - OSI and TCP/IP Models Transmission media - Wired and unwired media. Computer networks and Internet – the network edge - the network core - network access - delay and loss - protocol layers and services - history of computer networking and Internet.

Unit II: Application layer protocols – principles – the web and HTTP – FTP – Email in Internet – DNS. Socket programming – building a Web server - content distribution.

Unit III: Transport layer services – introduction – relationship between Transport and Network layer – UDP – reliable data transfer – TCP - congestion control - Network layer services – routing – IP - routing in Internet - router - IPV6 - multicast routing – mobility.

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Unit IV: Link layer services - error detection and correction - multiple access protocols – LAN address – ARP – Ethernet – hubs – bridges – switches - wireless links – PPP - ATM.

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Unit V: Security in Networks – Principles of Cryptography – Authentication – Integrity –Key Distribution and Certification – Firewalls – Attacks and Counter Measures.

Programme: **CSS2C10 – PRINCIPLES OF SOFTWARE ENGINEERING**

Course Outline

Unit I:Introduction – problem domain - software engineering challenges – approaches –software process and development models – agile models – SDLC - software process.

Unit II: Software requirements analysis & specification - feasibility study - types of feasibility – software requirements - problem analysis – requirement specification –functional specification – metrics. Software design – outcome – cohesion and coupling –layered arrangement of modules –

approaches to software design - structured analysis – DFD – extending DFD technique for applying to real-time systems – structured design – detailed design - object oriented modelling – use case model – class diagram – interaction diagram -activity diagram - data diagram – state chart diagram - ER diagram.

Unit III: User Interface (UI) design – characteristics – basic concepts – types –fundamentals of component-based GUI Development – UI design methodology – process planning – cost estimation – project scheduling – configuration management – risk management - software coding – review – documentation – software testing - software testing basics - steps involved in test plan - software testing strategies.

Unit IV: Managing project – time management – setting aims and objectives – techniques for generating ideas – literature survey – types of information sources – writing literature survey.

Unit V: Project story preparation – key deliverables – communicating with experts – forms of communication – presenting ideas – common problems faced by a research scholar –

Programme: CSS3C11 – ADVANCED DATABASE MANAGEMENT SYSTEM

Course Outline

Unit I: Introduction - purpose of database systems, views of data - data abstraction, instances and schemas, data independence, data models - hierarchical data model, network data model, relational data model, ER d&tg9,mg9lei. Database languages - DDL, DML, transaction anagement, storage management, database administrator, database users, overall system structure. Relational data model - relational model concepts, keys, integrity constraints - domain constraints, key constraints, entity integrity constraints, referential integrity constraints. ER data model - basic concepts, constraints, keys, design issues, entity relationship diagram, weak entity sets, extended ER features, design of an ER database schema, reduction of an ER schema to tables. Relational algebra and calculus – relational algebra - selection and projection, set operations, renaming, joins, division. Relational calculus - tuple relational calculus, domain relational calculus. Expressive power of algebra and calculus.

Unit II: Relational database design - anomalies in a database - functional dependency -lossless join and dependency- preserving decomposition - normalization - normal forms -first, second and third normal form - Boyce Codd normal form - multivalued, dependency - fourth normal form - join dependency - project join normal form - domain key normal form.

Unit III: Relational database query languages - basics of QBE and SQL. Data definition in SQL data types, creation, insertion, viewing, updation, deletion of tables, mo difying the structure of the tables, renaming, dropping of tables. Data constraints - I/O constraints, primary key, foreign

key, unique key constraints, ALTER TABLE command database manipulation in SQL - computations done on table data - SELECT command, logical operators, range searching, pattern matching, grouping data from tables in SQL, GROUP BY, HAVING clauses. Joins - joining multiple tables, joining a table to it. DELETE - UPDATE. Views - creation, renaming the column of a view, destroys view. Program with SQL - data types Using SET and SELECT commands, procedural flow, IF, IF /ELSE, WHILE, GOTO, global variables. Security - locks, types of locks, levels of locks. Cursors - working with cursors, error handling, developing stored procedures, CREATE, A LTER and
DROP, passing and returning data to stored procedures, using stored procedures within queries, building user defined functions, creating and calling a scalar function, implementing triggers, creating triggers, multiple trigger interaction (Use MySQL as the RDBMS).

Unit IV: Transaction management, concurrency control and query processing- concept,definition and states of transactions, ACID properties - concurrency control, serializability - conflict serializability, view serializability, recoverability-recoverable schedules, noncascading schedules, strict schedules. Concurrency control schemes - locking- two phase locking, deadlock, granularity, timestamp ordering protocol. Basics of query processing.

Unit V: Object Oriented Database Management Systems (OODBMS) - concepts, need for OODBMS, composite objects, issues in OODBMSs, advantages and disadvantages of OODBMS. Distributed databases - motivation - distributed database concepts, types of distribution, architecture of distributed databases, the design of distributed databases, distributed transactions, commit protocols for distributed databases.