MAHARSHI DAYANAND UNIVERSITY, ROHTAK

Department of Computer Science & Applications

NORMS FOR ADMISSION TO REGULAR MCA 2-YEAR PROGRAMME
AS PER THE LATEST GUIDELINES OF AICTE 2020-21
With effect from the Session 2020-21

Eligibility for Admission to MCA 2-year Programme:

a) Passed BCA/B.Sc.(Hons.) Computer Science/ B.E. or B.Tech.(CSE/IT)/ B.Voc.(Software Development/IT) or an equivalent degree with having at least 50% marks (45% for SC/ST candidates of Haryana only) in aggregate.

Or

b) Passed B.Sc/ B.Com/ B.A with Mathematics at 10+2 level or at Graduation level with having at least 50% marks(45% for SC/ST candidates of Haryana only) in aggregate, along with the students admitted with this eligibility will have to simultaneously undertake additional ****Bridge Course*** as prescribed by the University during the first semester.

Note: * It is compulsory for each student to pass out Bridge Course (three additional theory papers and one practical as prescribed in scheme of examination of Bridge Course) as per University norms during the 1st year of MCA-2 year course and the degree will be awarded after the completion of Bridge Course. However, these papers under Bridge Course will be taught only in the 1st semester of the course.

SCHEME OF EXAMINATIONS AND SYLLABUS
REGULAR MASTER OF COMPUTER APPLICATIONS 2- YEAR PROGRAMME
With effect from the Session 2020-21

Scheme of Examinations and Syllabus
for
Bridge Course to Regular MCA 2- year programme
With effect from the Session 2020-21

Programme Specific Outcomes:
The students upon completion of bridge course will be able to:

PSO1: To scale up the knowledge and understanding to be able to continue MCA 2-year programme.
PSO2: Apply knowledge of computing fundamentals for understanding problems that may be solved using computers.
PSO3: Analyze scenarios that require integrated solutions using one or more Programming Languages.
PSO4: Create basic computing skills to undertake more specialized courses offering emerging technologies with ease.
PSO5: Advance their career in the domain of computer science by acquiring higher order skills.

Course Code	Course Name	External Marks	Internal Marks	Total	Credits
20BCC11C1	Computer Fundamentals and Programming in C	80	20	100	4:0:0
20BCC11C2	C++ and Data Structures	80	20	100	4:0:0
20BCC11C3	Visual Basic & Database Systems	80	20	100	4:0:0
20BCC11CL1	Lab based on 20BCC11C1, 20BCC11C2 & 20BCC11C3	80	20	100	0:0:4
Total credits					16

Note: It is compulsory for each student to pass out Bridge Course (three additional theory papers and one practical as prescribed in scheme of examination of Bridge Course) as per University norms during the 1st year of MCA-2 year course and the degree will be awarded after the completion of Bridge Course. However, these papers under Bridge Course will be taught only in the 1st semester of the course.

Scheme of Examinations and Syllabus
for
MCA 2- year programme
With effect from the Session 2020-21

Programme Specific Outcomes:

The students upon completion of Regular **MCA 2-year Programme** will be able:

PSO1 To apply knowledge of computing fundamentals, computing specialization and domain knowledge for the abstraction and conceptualization of computing models from defined problems and requirements.

PSO2 To have the ability to understand and analyze a given real-world problem and propose feasible computing solutions. Also analyze customer requirements, create high level design, implement and document robust and reliable software systems.

PSO3 To transform complex business scenarios and contemporary issues into problems, investigate, understand and propose integrated solutions using emerging technologies.

PSO4 To use the latest technologies like IoT, AI, Machine Learning, Big Data Analytics, Cyber Security and modern hardware and software tools necessary for innovative software solutions and to possess leadership and managerial skills with best professional ethical practices and social concern

PSO5 To master fundamental project management skills, concepts and techniques, set attainable objectives and ensure positive results, meeting scope, time and budget constraints

PSO6 To recognize the need for self-motivation to engage in lifelong learning, the social, professional, cultural and ethical issues involved in the use of computer technology and give them due consideration in developing software systems

PSO7 To assess the need for innovation and initiate the process through entrepreneurship or otherwise and to work collaboratively as a member or leader in multidisciplinary teams

PSO8 To select their career after acquiring necessary eligibility requirement and the skill-set.

MCA First Year

Semester-I

Paper Code	Course	External Marks	Internal Marks	Total Marks	Credits
20MCA21C1	Object Oriented Programming Using JAVA	80	20	100	4:0:0
20MCA21C2	Compiler Design	80	20	100	4:0:0
20MCA21C3	Computer Graphics & Multimedia	80	20	100	4:0:0
20MCA21C4	Digital Design & Computer Architecture	80	20	100	4:0:0
20MCA21C5	Advance Data Structures Using C++/Java	80	20	100	4:0:0
20MCA21CL1	Software Lab -1 Based on 20MCA21C1, 20MCA21C2 & 20MCA21C3	100*	----	100	0:0:3
20MCA21CL2	Software Lab -2 Based on 20MCA21C4 & 20MCA21C5	100*	----	100	0:0:3
Total					**Credits 26**

Semester-II

Paper Code	Course	External Marks	Internal Marks	Total Marks	Credits
20MCA22C1	Advance Object Technology	80	20	100	4:0:0
20MCA22C2	Advance Database Systems & Data Warehouse	80	20	100	4:0:0
20MCA22C3	Operating Systems & Shell Programming	80	20	100	4:0:0
	Elective-I				
20MCA22DA1/	i) Theory of Computation	80	20	100	4:0:0
20MCA22DA2/	ii) Computer Networks & Distributed Systems	80	20	100	4:0:0
20MCA22DA3/	iii) Web Technologies	80	20	100	4:0:0
	Elective-II				
20MCA22DB1/	i) Cloud Computing	80	20	100	4:0:0
20MCA22DB2/	ii) Software Engineering	80	20	100	4:0:0
20MCA22DB3/	iii) Advance Computer Architecture & Quantum Computing	80	20	100	4:0:0
20MCA22CL1	Software Lab-3 Based on 20MCA22C1 & Elective I and/or II	100*	----	100	0:0:3
20MCA22CL2	Software Lab-4 Based on 20MCA22C2 & 20MCA22C3	100*	----	100	0:0:3
20MCA22C4	Industry Internship Report/ Project Report/Dissertation –I	100**	----	100	0:3:0
Total					**Credits 29**
	Foundation Electives (O)				
	To be Chosen from the pool of Foundation Electives provided by the university.				**2**

Total Credits= 31 Credits

*20 marks out of 100 will be based on the attendance, evaluation/assessment of the candidate in Test(s) and Assignment(s) during the semester, which will be forwarded by the Head of Dept./Director to the Examiner(s). Further, both practical exams of a semester may be conducted on the same day in 2 sittings each maximum of 3 hours.

**20 marks out of 100 will be based on evaluation/assessment of the candidate by the internal supervisor.

With effect from the Session 2021-22

MCA Second Year

Semester-III

Paper Code	Course	External Marks	Internal Marks	Total Marks	Credits
21MCA23C1	Data Mining & Big Data Analytics	80	20	100	4:0:0
21MCA23C2	Artificial Intelligence & Computational Intelligence	80	20	100	4:0:0
21MCA23C3	Android Mobile Application Development	80	20	100	4:0:0
	Elective-I				
21MCA23DA1/	i) Computer Vision	80	20	100	4:0:0
21MCA23DA2/	ii) Software Testing & Quality Assurance	80	20	100	4:0:0
21MCA23DA3/	iii) Mixed Reality & Wearable Computing	80	20	100	4:0:0
	Elective-II				
21MCA23DB1/	i) Network Programming	80	20	100	4:0:0
21MCA23DB2/	ii) Natural Language Processing & Speech Recognition	80	20	100	4:0:0
21MCA23DB3/	iii) Bioinformatics Computing	80	20	100	4:0:0
21MCA23CL1	Software Lab-5 Based on 21MCA23C1&21MCA23C3	100*	----	100	0:0:3
21MCA23CL2	Software Lab-6 Based on 21MCA23C2, Elective I & II	100*	----	100	0:0:3
Total					**Credits 26**
	Open Elective (O)				
	To be Chosen from the pool of Open Electives provided by the University (excluding the open elective prepared by the Department of Comp Sc. & Appls.)				**3**

Total Credits= 29 Credits

*20 marks out of 100 will be based on the attendance, evaluation/assessment of the candidate in Test(s) and Assignment(s) during the semester, which will be forwarded by the Head of Dept./Director to the Examiner(s). Further, both practical exams of a semester may be conducted on the same day in 2 sittings each maximum of 3 hours.

Semester-IV

Paper Code	Course	External Marks	Internal Marks	Total Marks	Credits
21MCA24C1	Advance Software Engineering	80	20	100	4:0:0
21MCA24C2	IoT & Sensor Networks	80	20	100	4:0:0
21MCA24C3	Web Development Using .NET Framework	80	20	100	4:0:0
	Elective-I				
21MCA24DA1/	i) Cyber Security & Blockchain Technology	80	20	100	4:0:0
21MCA24DA2/	ii) Edge and Fog Computing	80	20	100	4:0:0
21MCA24DA3/	iii)High Speed Networks	80	20	100	4:0:0
	Elective-II				
21MCA24DB1/	i) Machine Learning & Python Programming	80	20	100	4:0:0
21MCA24DB2/	ii) Web Development Using PHP	80	20	100	4:0:0
21MCA24DB3/	iii) Neural Networks & Deep Learning	80	20	100	4:0:0
21MCA24CL1	Software Lab-7 Based on 21MCA24C1, 21MCA24C2 & Elective II	100*	----	100	0:0:3
21MCA24CL2	Software Lab-8 Based on 21MCA24C3 & Elective I	100*	----	100	0:0:3
21MCA24C4	Industry Internship Report/ Project Report/ Dissertation –II	100**	----	100	0:3:0
Total					**Credits 29**
	Grand Total of 2 Years' Credits				**Credits 115**

*20 marks out of 100 will be based on the attendance, evaluation/assessment of the candidate in Test(s) and Assignment(s) during the semester, which will be forwarded by the Head of Dept./Director to the Examiner(s). Further, both practical exams of a semester may be conducted on the same day in 2 sittings each maximum of 3 hours.

**20 marks out of 100 will be based on evaluation/assessment of the candidate by the Internal Supervisor.

SYLLABUS FOR BRIDGE COURSE (MCA 2-Year Programme)

20BCC11C1: COMPUTER FUNDAMENTALS AND PROGRAMMING IN C

Course Outcomes:

By the end of the course the students will be able to:

CO1: Understand computer basics and role of operating system.

CO2: Learn about concept of computer network, Internet and social impacts of IT.

CO3: Gain understanding of PC Software Tools – Word, Excel and Power-Point.

CO4: Design an algorithm and draw flowchart for simple problems.

CO5: Develop C programs implementing all features of C.

Max. Marks: 100 (80+20) **Time: 3Hrs**

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one quest ion from each Unit.

UNIT-I

Computer Fundamentals: Concept of data and information, Historical evolution of computers, Block Diagram of Computer and working, Characteristics, Classification of Computers, Advantages and Limitations of Computer, Applications of Computer, I/O Devices, Memory and Storage Devices; **Computer Software:** System and Application Software.

Operating System: Characteristics, bootstrapping, types of Operating System, Operating System as resource manager. **Programming Languages**: Machine, Assembly, High Level Language, 4GL. Language Translator, System Utilities- Editor, Linker, Loader, File Manager.

Computer Network Concepts: Definition, Types of Network, Topology, Protocols, Intranet, Extranet, Internet, WWW, Search Engine, Web Browsers, Services of Internet. IT and Social Impacts of IT: Positive and Negative Impacts, Computer Crimes, Viruses and their remedial solutions.

UNIT-II

MS-Word: Introduction, Windows Interface, Customizing the Word Application, Document Views, Basic Formatting in MS Word, Advanced Formatting, Navigating through a Word Document, Performing a Mail Merge, A Quick Look at Macros, Printing Documents, Print Preview

MS-Excel: Introduction, Workbook, Worksheet, Formatting in excel, Advanced formatting in Excel, Working with formulas, Printing worksheets

MS-PowerPoint: Introduction, Creating a Presentation, Basic Formatting in PowerPoint, Advanced Formatting, Using Templates, Inserting charts, Inserting tables, Printing presentations.

UNIT-III

Problem Solving: Problem Identification, Analysis, Algorithms, Flowcharts, Pseudo codes, Decision Tables, Program Coding, Program Testing and Execution.

C Programming Fundamentals: Basic Concepts, Structure of a C program, Operators & Expressions; Library Functions, Decision making using if…else, Else If Ladder; Switch, break, Continue and Goto statements, Control Statements: Looping using while, do…while, for statements, Nested loops.

Arrays & Functions: Declaration and Initialization, Multidimensional Arrays, String: Operations of Strings, Functions: Defining & Accessing User defined functions, Function Prototype, Passing Arguments, Passing array as argument, Recursion, Use of Library Functions, Macro vs. Functions.

UNIT-IV

Pointers: Declarations, Operations on Pointers, Passing to a function, Pointers & Arrays, Array of Pointers, Array accessing through pointers, Pointer to functions, Function returning pointers, Dynamic Memory Allocations.

Structures and Union: Defining and Initializing Structure, Array within Structure, Array of Structure, Nesting of Structure, Pointer to Structure, Passing structure and its pointer to Functions, Unions: Introduction to Unions and its Utilities.

File Handling: Opening and closing file in C, Create, Read and Write data to a file, Modes of Files, Operations on file using C Library Functions, Working with Command Line Arguments, Program Debugging and types of errors.

Suggested Readings:

1. Gill Nasib Singh: Computing Fundamentals and Programming in C, Khanna Books Publishing Co., New Delhi.
2. Kenneth. A.: C problem solving and programming, Prentice Hall.
3. Gottfried, B.: Theory and problems of Programming in C, Schaum Series.
4. Gill, Nasib Singh: Handbook of Computers, Khanna Books Publishing Co., New Delhi.
5. Sanders, D.: Computers Today, Tata McGraw-Hill.
6. Rajender Singh Chhillar: Application of IT to Business, Ramesh Publishers, Jaipur.
7. Cooper, Mullish: The spirit of C, An Introduction to Modern Programming, Jaico Publ. House, New Delhi.
8. Kernighan & Ritchie: The C Programming Language, PHI.
9. Gottfried, B.: Theory and problems of Programming in C, Schaum Series.
10. E. Balaguruswamy: Programming in C, Tata McGraw Hill.
11. H. Schildt: C-The Complete Reference, Tata McGraw Hill.
12. Y. Kanetkar: Let us C, BPB Publication
13. Any other book(s) covering the contents of the paper in more depth.

Note: Latest and additional good books may be suggested and added from time to time.

20BCC11C2: C++ AND DATA STRUCTURES

Course Outcomes:
By the end of the course the students will be able to:
CO1: Understand concept of object oriented programming and its features.
CO2: Gain insights about C++ features and access specifiers.
CO3: Able to understand importance of polymorphism and inheritance.
CO4: Learn to analyze algorithms on basis of their performance.
CO5: Ability to use stack, queue and linked list data structures.

Max. Marks: 100 (80+20) **Time: 3Hrs**

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one quest ion from each Unit.

UNIT-I

Introduction to OOP: Concept of OOP, Procedural vs. Object oriented programming, Characteristics of OOP: Objects, classes, Encapsulation, Data Abstraction, Inheritance, Polymorphism, Dynamic Binding, and Message Passing.

C++ Programming: Data-types, Variables, Static Variables, Operators in C++, Arrays, Strings, Structure, Functions, Recursion, Control Statements.

Access Specifies: Private, Public and Protected, Member functions of the class, Constructor and Destructor, Parameterized Constructor, Copy Constructors.

UNIT-II

Inheritance: Reusability, Types of Inheritance: Single inheritance, Multiple, Multilevel, Hybrid Inheritance, Public, Private, and Protected Derivations.

Polymorphism: Function Overloading, Static Class Members, Static Member Functions, Friend Functions.

Operator Overloading: Unary and Binary Operator Overloading, Abstract class, Virtual function, pure virtual function, Overloading vs. Overriding.

Memory management: new, delete, object Creation at Run Time. **Exception handling:** Throwing, Catching, and Re-throwing an exception.

UNIT-III

Design and Analysis of Algorithm: Algorithm definition, comparison of algorithms. Top down and bottom up approaches to Algorithm design.

Introduction to Data Structures: Concept of Data Structure, Types of Data Structure: Primitive and non–primitive.

Arrays: Single and Multidimensional arrays. Address calculation using column and row major ordering. Various Operations on arrays. Applications of arrays.

Sorting: Selection sort, Insertion sort, Bubble sort, Quick sort, merge sort, Radix sort. Searching: Sequential and binary search, Indexed search, Hashing Schemes. Comparison of time complexity.

UNIT-IV

Stacks and Queues: Representation of stacks and queues using arrays and linked-list. Applications of stacks: Conversion from infix to postfix and prefix expressions, Evaluation of postfix expression using stacks.

Linked list: Singly linked list; operations on list, Linked stacks and queues. Polynomial representation and manipulation using linked lists. Circular linked lists, Doubly linked lists.

Applications of Stack, Queue and Linked List data structures.

Suggested Readings:

1. Herbert Schildt: C++ - The Complete Reference, Tata McGraw Hill Publications
2. E. Balaguruswamy: C++, Tata McGraw Hill Publications.
3. E. Balaguruswamy: Object Oriented Programming and C++, TMH.
4. Shah & Thakker: Programming in C++, ISTE/EXCEL.
5. Johnston: C++ Programming Today, PHI.
6. Olshevsky: Revolutionary Guide to Object Oriented Programming Using C++, SPD/WROX.
7. R.Rajaram: Object Oriented Programming and C++, New Age International.
8. Samanta: Object Oriented Programming with C++ & JAVA, PHI.
9. Subburaj: Object-Oriented Programming with C++, VIKAS Publishing House.
10. Any other book(s) covering the contents of the paper in more depth.

Note: Latest and additional good books may be suggested and added from time to time.

20BCC11C3: VISUAL BASIC & DATABASE SYSTEMS

Course Outcomes:

By the end of the course the students will be able to:

CO1: Design, create, build, and debug Visual Basic applications & explore Visual Basic IDE.

CO2: Implement syntax rules of different constructs/components in Visual Basic programs & connectivity with database.

CO3: Understand the concepts of database & its models.

CO4: Comprehend the concept of relational model and different forms of Normalization.

CO5: Get the knowledge of Transaction Management and concurrency control.

Max. Marks: 100 (80+20) **Time: 3Hrs**

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one quest ion from each Unit.

UNIT-I

Introduction to Visual Basic: VB IDE, An overview of VB project types, VB as event-driven & object-based language, Default Controls in Tool Box: Label Box, Text Box, Command Button, List Box, Combo Box, Picture & Image Box, Shape box, Timer, Option button, Check Box & Frames. Exploring Project Properties.

Programming with VB: Variables, Constants, Data types, Variable Scope, Arithmetic operations, String Operations, Built-in functions, I/O in VB, Branching & Looping statements, Procedures, Arrays, Collection.

UNIT-II

Working with Forms: Working with multiple forms; Loading, Showing and Hiding forms; Creating Forms at Run Time, Drag and Drop operation, MDI form, Arranging MDI Child Windows, Coordinating Data between MDI Child Forms.

Dialog Boxes and Menu: Using Common Dialog Box; Adding Menu, Modifying and Deleting Menu Items, Creating Submenus.

VB & Databases: The Data Controls and Data-Bound Controls; Using DAO, RDO, ADO.

UNIT –III

Database Management System: Introduction, Database System Applications, History of Database Systems, Database System Vs. File Processing System, View of Data, Data Abstraction, Instances and Schemas. DBMS Environment, Database languages, Database Models. **Database design and ER Model**: Physical, Conceptual and Logical Database design, ER Modelling, Conceptual design with ER Model

Relational Model: Introduction to the Relational Model, Integrity Constraint Over relations, Enforcing Integrity constraints, Querying relational data, View: Introduction to Views, Destroying / altering Views. **Relational Algebra and Calculus:** Relational Algebra & its operations, Relational calculus & its types, Power of Algebra and calculus.

Lab Problem(s): ***Creation and Querying relational data with SQL***

UNIT-IV

Normalization: Schema Refinement, Problems caused by redundancy, Decomposition & its properties; Normalization: FIRST, SECOND, THIRD Normal forms, BCNF, Multivalued Dependencies, Join Dependencies.

Transaction Management & Concurrency Control: ACID properties, Transactions and Schedules, Concurrent execution of transaction, Serializability and Recoverability, Lock based Concurrency control, Lock Management, Lock Conversion, Dealing with deadlocks, Concurrency without Locking

Suggested Readings:

1. Steven Holzner: Visual Basic 6 Programming: Black Book,Dreamtech PRESS.
2. EvangelosPetroutsos: Mastering Visual Baisc 6,BPB.
3. Julia Case Bradley & Anita C.:Millspaugh Programming in Visual Basic 6.0,Tata McGraw-Hill.
4. Michael Halvorson,:Step by Step Microsoft Visual Basic 6.0 Professional,PHI.
5. Scott Warner:Teach Yourself Visual basic 6, Tata McGraw-Hill Edition.
6. Elmasri & Navathe:Fundamentals of Database Systems,5th edition, Pearson Education.
7. Thomas Connolly, Carolyn Begg: Database Systems, Pearson Education.
8. C. J. Date: An Introduction to Database Systems, 8th edition, Addison Wesley N. Delhi.
9. Any other book(s) covering the contents of the paper in more depth.

Note: Latest and additional good books may be suggested and added from time to time.

SYLLABUS FOR MCA 2-YEAR PROGRAMME

MCA FIRST YEAR

20MCA21C1: OBJECT ORIENTED PROGRAMMING USING JAVA

Course Outcomes:

By the end of the course the students will be able to:

CO1: Use the characteristics of Java language in a program. Use variables and data types in program development.

CO2: Identify and implement arrays, String and Selection Statements.

CO3: Write Java programs using object-oriented programming techniques including classes, objects, methods, instance variables, interface.

CO4: Design and implementation programs of Exception handling, Packages.

CO5: Design and implementation programs of Multithreading Programming, Window based programs.

Max. Marks: 100 (80+20) **Time: 3Hrs**

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one quest ion from each Unit.

UNIT-I

Introduction: Genesis and Evolution of Java Language, Internet & Java, Byte-code, its Features, Java Program Structure and Java's Class Library, Data Types, Variables, and Operators, Operator Precedence; Selection Statements, Scope of Variable, Iterative Statement; Defining Classes & Methods, Creating Objects of a Class, Defining and Using a Class, Automatic Garbage Collection.

Arrays and Strings: Arrays, Arrays of Characters, String Handling Using String Class, Operations on String Handling Using, String Buffer Class.

UNIT-II

Classes and Inheritance: Using Existing Classes, Class Inheritance, Choosing Base Class, Multiple Levels of Inheritance, Abstraction through Abstract Classes, Using Final Modifier.

Packages: Understanding Packages, Defining a Package, Packaging up Your Classes, Adding Classes from a Package to Your Program, Understanding CLASSPATH, Standard Packages, Access Protection in Packages.

Interface Fundamentals: Creating an Interface, Implementing an Interface, Using Interface References, Implementing Multiple Interfaces, Constants in Interfaces, Interfaces can be extended, Nested Interfaces, Final Thoughts on Interfaces.

UNIT-III

Exception Handling: The concept of Exceptions, Types of Exceptions, Dealing with Exceptions, Exception Objects, Defining Your Own Exceptions.

Multithreading Programming: The Java Thread Model, Understanding Threads, The Main Thread, Creating a Thread, Creating Multiple Threads, Thread Priorities, Synchronization.

Input/Output in Java: I/O Basic, Byte and Character Structures, I/O Classes, Reading Console Input Writing Console Output, Reading and Writing on Files, Random Access Files, Storing and Retrieving Objects from File, Stream Benefits.

UNIT-IV

Applets in Java: Applet Basics, Applet Architecture, Applet Life Cycle, Simple Applet Display Methods, The HTML APPLET Tag Passing Parameters to Applets.

Working with Windows: AWT Classes, Window Fundamentals, Working with Frame, Creating a Frame Window in an Applet; Displaying Information within a Window.

Working with Graphics and Text: Working with Graphics, Working with Color, Setting the Paint Mode, Working with Fonts, Managing Text Output; Using Font Metrics, Exploring Text and Graphics, Working with AWT Controls, Layout Managers and Menus.

Suggested Readings:

1. The Complete Reference JAVA, TMH Publication.
2. Beginning JAVA, Ivor Horton, WROX Public.
3. JAVA 2 UNLEASHED, Tech Media Publications.
4. JAVA 2(1.3) API Documentations.
5. Any other book(s) covering the contents of the paper in more depth.

Note: Latest and additional good books may be suggested and added from time to time.

20MCA21C2: COMPILER DESIGN

Course Outcomes:

By the end of the course the students will be able to:

CO1: Elaborate concepts compilation process and apply in various fields of computer languages.

CO2: Explain the lexical and syntactical analysis phase of compilation.

CO3: Solve theoretical problems related to parsers and develop parsers.

CO4: Evaluate codes for generation of intermediate code and apply possible code optimizations.

CO5: Design and develop system programs as well as for compilers for varying needs.

Max. Marks: 100 (80+20) **Time: 3Hrs**

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one quest ion from each Unit.

UNIT-I

Evolution of Systems Programming: Introduction to System programs, Overview of Assemblers, Loaders, Linkers, Macros, Compilers. **System Software Tools:** Variety of software tools, Text editors, Interpreters and program generators, Debug Monitor, System Programming environment.

Loader Schemes: Compile and Go Loader, general loader schemes, Absolute Loader, Subroutine linkage, Reallocating Loader, Direct Linkage Loader, Binders, Linking loader, overlays.

UNIT-II

Compiler: Phases of Compiler, Compiler writing tools, Lexical Analysis, Finite Automata, Regular Expression, From a Regular expression to an NFA, NFA to DFA, Design of Lexical Analyzer. Syntax Analyzer, CFG, Role of the Parser, CFG, Top Down Parsing, Recursive Descent parsing, predictive Parsers, Bottom up Parsing, Shift reduce, Operator Precedence parsers, LR Parsers.

UNIT-III

Intermediate Code: Syntax directed definitions, Evaluation Orders of Syntax directed definitions; Intermediate Languages: Intermediate code generation, Syntax trees, Construction of Syntax trees, Three Address Code, Types and Declarations, Translation of Expressions, Type Checking, Postfix form. Symbol table: Contents of Symbol table, Data Structures for Symbol table; Runtime Storage Administration.

UNIT-IV

Code Optimization and Code Generation: Principal sources of optimization, loop optimization, DAG - Optimization of Basic Blocks, Global Data Flow Analysis – Efficient Data Flow Algorithm. Code Generation: Issues in code generation, Design of a simple Code Generator, Register allocation and Assignment, Peephole optimization.

System & Compiler programming: Developing system programs using C for basic OS commands apart from developing programs for lexical analysis, token counts, symbol table generator, memory storage requirement evaluator for identifiers for one or multiple declarative statements.

Suggested Readings:

1. Donovan: Systems Programming, Tata McGraw Hill.
2. Dhamdhere: System Software, Tata McGraw Hill.
3. Alfred V. Aho, Ravi Sethi, Jeffrey D. Ullman: Compilers Principles, Techniques and Tools, Addison Wesley.
4. Alfred V.Aho and Jeffrey D.Ullman: Principles of Compiler Design, Addison Wesley.
5. William M. Waite, Gerhard Goos: Compiler Construction.
6. Joseph Rodrix: Compiler Design With C/C++, Kindle Book, ASIN: B0727Q9NBK.
7. Torben Ægidius Mogensen: Basics of Compiler Design, ISBN 978-87-993154-0-6.
8. Bergmann, Seth D.: Compiler Design: Theory, Tools, and Examples.
9. Any other book(s) covering the contents of the paper in more depth.

Note: Latest and additional good books may be suggested and added from time to time.

20MCA21C3: COMPUTER GRAPHICS & MULITMEDIA

Course Outcomes:

By the end of the course the students will be able to:
CO1: Understand basic of computer graphics, display devices and graphics standards.
CO2: Learn about graphics primitives and their importance.
CO3: Understand 2D transformations and representation of 3D objects.
CO4: Learn about 3D transformations, hidden surfaces and color models.
CO5: Understand about multimedia authoring and create a multimedia project using Flash/Blender multimedia software.

Max. Marks: 100 (80+20) **Time: 3Hrs**

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one quest ion from each Unit.

UNIT-I

Basics of Computer Graphics: Computer Graphics, Classification, Applications of computer graphics, Display devices, Random and Raster scan systems, Graphics input devices, Graphics software and standards.

Graphics Primitives: Points, lines, circles and ellipses as primitives, scan conversion algorithms for primitives, Fill area primitives including scan-line polygon filling, inside-

outside test, boundary and flood-fill, character generation, line attributes, area-fill attributes, character attributers.

UNIT-II

2D Transformation and Viewing: Transformations (translation, rotation, scaling), matrix representation, homogeneous coordinates, composite transformations, reflection and shearing, viewing pipeline and coordinates system, window-to-viewport transformation, clipping including point clipping, line clipping (cohen-sutherland, liang- bersky, NLN), polygon clipping.

3D Concepts and Object Representation: 3D display methods, polygon surfaces, tables, equations, meshes, curved lies and surfaces, quadric surfaces, spline representation, cubic spline interpolation methods, Bazier curves and surfaces, B-spline curves and surfaces.

UNIT-III

3D Transformation and Viewing: 3D scaling, rotation and translation, composite transformation, viewing pipeline and coordinates, parallel and perspective transformation, view volume and general (parallel and perspective) projection transformations. **Modelling:** Wireframe and Solid.

Hidden Surfaces: Visible surface detection concepts, Back-face detection, Depth Buffer method, Illumination, Light sources, Illumination methods (ambient, diffuse reflection, specular reflection). **Color models:** properties of light, XYZ, RGB, YIQ and CMY color models. **Shading:** Flat, Gouraud and Phong.

UNIT-IV

Multimedia Basics: Concepts of Multimedia, Multimedia applications, Multimedia system architecture, Evolving technologies for multimedia, Defining objects for multimedia systems, Multimedia data interface standards, Multimedia databases. **Compression and decompression:** Data and file format standards, Multimedia I/O technologies, Digital voice and audio, Video image and animation, Full motion video, Storage and retrieval technologies.

Multimedia Authoring: Concept of Multimedia Authoring, Hypermedia messaging, Mobile messaging, Hypermedia message component, Creating hypermedia message, Integrated multimedia message standards, Integrated document management, Distributed multimedia systems.

Case Study (FLASH/ BLENDER): Drawing Basic Shapes, Modeling, Shading & Textures, Creating a multimedia project.

Suggested Readings:

1. Donald Hearn and M.Pauline Baker: Computer Graphics, PHI Publications
2. Plastock : Theory & Problem of Computer Graphics, Schaum Series.
3. Foley & Van Dam: Fundamentals of Interactive Computer Graphics, Addison-Wesley.
4. Newman : Principles of Interactive Computer Graphics, McGraw Hill.
5. Tosijasu, L.K. : Computer Graphics, Springer-Verlag.
6. S Gokul: Multimedia Magic, BPB Publication.
7. Bufford: Multimedia Systems, Addison Wesley.
8. Jeffcoate : Multimedia in Practice, Prentice-Hall.
9. Any other book(s) covering the contents of the paper in more depth.

Note: Latest and additional good books may be suggested and added from time to time.

20MCA21C4: DIGITAL DESIGN & COMPUTER ARCHITECTURE

Course Outcomes:

By the end of the course the students will be able to:

CO1: Implement digital functions in the form a digital logic and perform binary arithmetic operations

CO2: Identify and implement commonly used sequential and combinational circuits

CO3: Basic computer design and developing 8086/8088 A/L programs for small applications

CO4: Implement CPU design and Input/Output organization

CO5: Understand advanced computer architectural aspects and parallel designs

Max. Marks: 100 (80+20) **Time: 3Hrs**

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one quest ion from each Unit.

UNIT-I

Number System: Binary, Octal, Hexadecimal and Decimal, 1's and 2's Complements, Inter-conversion of numbers. Codes: Weighted and Non-weighted codes, BCD Codes, Gray codes, Self-complementing codes, Error-Detecting/Correcting codes, Alphanumeric Codes, Hamming Codes, Floating Point Numbers. Binary Arithmetic: Binary Addition and Subtraction, 2's Complement Arithmetic, Booth Coding, Binary Multiplication.

Logic Design: Logic Gates, Truth Tables, Boolean Algebra, Boolean Expressions-Variables and Literals, Boolean Expressions–Equivalent and Complement, Theorems of Boolean Algebra, Simplification Techniques, SOPs & POSs Boolean Expressions.

UNIT-II

Combinational Circuits: Combinational Logic, Arithmetic Circuits– Adder and Subtractor, BCD Adder, Code Converters, Magnitude Comparator, Parity Generators/Checkers, Multiplexers, Demultiplexers, Decoders, Encoders.

Sequential Circuits: Latches, R S Flip Flop, Level Triggered and Edge Triggered Flip Flops, JK Flip-Flop, Master-Slave Flip Flops, T Flip-Flop, D Flip-Flops.

Registers and Counters: Controlled Buffer Registers, Shift Registers, Applications of Shift-registers; Ripple Counter, Synchronous Counter, Modulus Counter, Binary Ripple Counters, Up/Down Counters, Decade and BCD Counters.

UNIT-III

Basic Computer Design: Computer Instructions and types, Instruction Set, Instruction Cycle, Instruction Formats, Addressing Modes, Computer Registers, Bus System, Register Transfer Language terminology.

Programming in 8086/8088 Assembly Language: A/L program structure, segments, registers, instructions, macros, A/L directives.

CPU Design: CPU Registers, Micro-operations and its types, Design of ALU. Control Unit Design- Microprograms, Control Unit of a basic computer–Timing and Control; Hardwired and Micro-programmed controlled unit. Architectures -RISC, CISC, Scalar, Superscalar and pipelined architectures.

UNIT-IV

Input/Output Organization: Peripheral Devices, Input-output Interface, Asynchronous Data Transfer, Mode of Transfer, Priority Interrupt, Direct Memory Access, Input-output Processor, Serial Communication.

Advance Architecture: Introduction to parallel processing– Pipelining, Parallel Computer structures, Architectural classification. Pipelining & Vector processing; Instruction and Arithmetic pipelines, Principles of designing pipelined processors, Structures for array processors: SIMD Array processor, SIMD Interconnection networks. Parallel Processing Applications.

SuggestedReadings:

1. Mano,M.M.:Digital Logic and Computer Design, Prentice-Hall of India.
2. Gill Nasib Singh and Dixit J.B: Digital Design and Computer Organisation, University Science Press (Laxmi Publications),New Delhi.
3. Stallings,William: Computer Organisation &Architecture.
4. Mano,M.M.:Digital Design, Prentice-Hall of India.
5. Anand Kumar:Fundamentals of Digital Circuits, PHI.
6. Kai Hwang: Advanced Computer Architecture, McGraw Hill International
7. Mano,M.M.:Computer System Architecture, Prentice-Hall of India.
8. Tokheim:Digital Electronics, TMH.
9. Any other book(s) covering the contents of the paper in more depth.

Note: Latest and additional good books may be suggested and added from time to time

20MCA21C5: ADVANCE DATA STRUCTURES USING C++/JAVA

Course Outcomes:

By the end of the course the students will be able to:

CO1: To learn about analyzing and designing algorithms to solve a problem and learn to find the asymptotic efficiency of an algorithm.

CO2: To study about binary tree and its applications.

CO3: To learn advanced data structures such as balanced search trees and heap hash operations.

CO4: To learn about graphs & its algorithms such as

CO5: To study various graph processing algorithms and Algorithm Design techniques

Max. Marks: 100 (80+20) **Time: 3Hrs**

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will

be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT-1

The Role of Algorithms in computing: Analyzing Algorithms, Time and Space Analysis of Algorithms, Big-Oh and Theta Notations, Average, Best and Worst case analysis. Designing Algorithms, Growth of functions. Asymptotic Notations, Divide and Conquer, Recurrences, Maximum sub-array problem, Stressan's Method, Substitution method, Recurrence tree method, The Master method, Floors and Ceilings.

UNIT-II

Trees : Binary tree traversal methods: Pre-order, In-order, Post-ordered traversal. Recursive Algorithms. Traversal methods. Representation of trees and its applications: Binary tree representation of a general tree. Conversion of forest into tree. Threaded binary trees. Binary search tree: Height balanced (AVL) tree, B-trees, Splay tree. Heap: Heap operations, Binomial heaps, Fibonacci heaps, Skew heaps, heap set.

UNIT-III

Graphs & Algorithms: Representation, Type of Graphs, Paths and Circuits: Euler Graphs, Hamiltonian Paths & Circuits; Cut-sets, Connectivity and Separability, Planar Graphs, Isomorphism, Graph Coloring, Covering and Partitioning, , Depth-and breadth-first traversals, Minimum Spanning Tree: Prim's and Kruskal's algorithms, Shortest-path Algorithms: Dijkstra's and Floyd's algorithm, Topological sort, Maxflow: Ford-Fulkerson algorithm, max flow –min cut.

UNIT-IV

Dynamic Programming: Backtracking Algorithms, Design Methodologies, Travelling salesperson problem, 0/1 Knapsack problem, multistage graphs, All Pair Shortest Path, 8-Queens problem Advanced String Matching Algorithms: Naïve string matching algorithm, Robin-Karp algorithm, string matching with finite automata, Knuth-Morris-Pratt algorithm.

P, NP and Approximation Algorithms: Basic Concepts, Non Deterministic algorithms, NP Complete and NP-hard classes, NP complete Problems.

Implementation of above mentioned data structures & algorithms through C++/Java programming.

Suggested Readings

1. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest: Introduction to Algorithms, PHI Learning Pvt. Ltd.
2. Gilles Brassard, Paul Bratley: Fundamentals of Algorithms, PHI Learning Pvt. Ltd, 2011.
3. Hubbard JR: Schaum's Outline of Data Structures with C++, Tata McGraw Hills, New Delhi.
4. R. Sedgewick: Algorithms in C++, Pearson Education Asia.
5. Y.Langsam, M.J.Augenstein and A.M.Tanenbaum: Data Structures Using C and C++, Prentice Hall of India.
6. R.Kruse, C.L.Tonodo and B.Leung: Data Structures and Program Design in C, Pearson Education. New Delhi
7. G.L. Heileman: Data Structutes: Algorithms and Object Oriented Programming,

Tata McGraw Hill, New Delhi
8. E. Horowitz, Sahni and D. Mehta: Fundamentals of Data Structures in C++, Galgotia Publication, New Delhi.
9. Any other book(s) covering the contents of the paper in more depth.

Note: Latest and additional good books may be suggested and added from time to time

20MCA22C1: ADVANCE OBJECT TECHNOLOGY

Course Outcomes:

By the end of the course the students will be able to:

CO1: Explain the use of DHTML and XML in data exchange.

CO2: Analyze and use various AWT controls and event handling for development of a Applet.

CO3: Use of Swing components for the web application development.

CO4: Develop applications using Servlets, parameter passing and concept of session maintenance.

CO5: Design and develop basic JSP applications.

Max. Marks: 100 (80+20) **Time: 3Hrs**

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one quest ion from each Unit.

UNIT-I

Introduction to Java Scripts, Objects in Java Script, Dynamic HTML with Java Script. XML: Document type definition, XML Schemas, Document Object model, Presenting XML, Review of Applets, Class, Event Handling, AWT Programming.

UNIT-II

Introduction to Swing, Differences between AWT Controls & Swing Controls, JApplet, Swing Button: JButton, JToggleButton, CheckBoxes, Radio Button, JComboBox, Text Boxes etc., Icons, Labels, JTabbed Pains, JScroll Pains, JList, JTrees, JTables Java Beans: Introduction to Java Beans, Advantages of Java Beans, BDK Introspection, Developing a Home page using Applet & Swing.

UNIT-III

Introduction to Servlets: Lifecycle of a Servlet, The Servlet API, The javax. Servlet Package, Reading Servlet parameters, Reading Initialization parameters; The javax.servlet HTTP package, Handling Http Request & Responses, Security Issues Introduction to JSP, Problem with Servlet. The Anatomy of a JSP Page, JSP Processing. JSP Application Design with MVC Setting Up and JSP Environment: Installing the Java Software Development Kit, Tomcat Server & Testing Tomcat.

UNIT-IV

JSP Application Development: Generating Dynamic Content, Using Scripting Elements Implicit JSP Objects, Conditional Processing – Displaying Values Using an Expression to Set an Attribute, Declaring Variables and Methods Error Handling and Debugging Sharing Data Between JSP pages, Requests, and Users Passing Control and Date between Pages – Sharing Session and Application Data – Memory Usage Considerations Introduction to struts framework, RMI, CGI programming.

Suggested Readings:

1. Dietel and Nieto: Internet and World Wide Web – How to program?, PHI/Pearson Education Asia.
2. Patrick Naughton and Herbert Schildt: The Complete Reference Java, Tata McGraw-Hill.
3. Hans Bergstan: Java Server Pages.
4. Bill Siggelkow, S P D O'Reilly: Jakarta Struts, Cookbook.
5. Murach: Murach's beginning JAVA JDK 5, SPD.
6. Wang-Thomson: An Introduction to Web Design and Programming.
7. Knuckles: Web Applications Technologies Concepts- John Wiley.
8. Sebesta: Programming world wide web, Pearson.
9. Building Web Applications-NIIT,PHI.
10. Bai/Ekedaw-Thomas: Web Warrior Guide to Web Programmming.
11. Jon Duckett: Beginning Web Programming, WROX.
12. Pekowsky, Java Server Pages, Pearson.
13. Any other book(s) covering the contents of the paper in more depth.

Note: Latest and additional good books may be suggested and added from time to time.

20MCA22C2: ADVANCE DATABASE SYSTEMS & DATA WAREHOUSE

Course Outcomes:

By the end of the course the students will be able to:

CO1: Understand the difference between ER and EER model.

CO2: Understand the concepts of OODBMS and ORDBMS.

CO3: Know about parallel and distributed database and Client-Server architecture.

CO4: Understand Emerging database based on the types of data.

CO5: Know about the concepts of data warehouse, its types, architecture and schema.

Max. Marks: 100 (80+20) **Time: 3Hrs**

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one quest ion from each Unit.

UNIT – I

Introduction to Advance Database Systems: Overview of advance database systems, their importance and Applications; **EER Model** -The ER model revisited, EER model: Super classes, Subclasses, Inheritance, Specialization and Generalization, Constraints and characteristics of specialization and Generalization, Category.

Object Model: Overview of Object-Oriented concepts, Object identity, Object structure, Type constructors, Encapsulation of operations, Methods, and Persistence, Type hierarchies and Inheritance, Complex objects, Schema design for OODBMS, OQL, Persistent

Programming language, OODBMS architectures and storage issues, Transaction and concurrency control.

Object Relational Database and Information Retrieval: Database design for an ORDBMS – Nested relations and collections; Storage and access methods, Query processing and Optimization, Advance Querying: User define data types, manipulating objects table, object views; Information Retrieval & ways to retrieve information.

UNIT - II

Parallel Database: Architectures for parallel databases, Inter and Intra Query parallelism, Inter and Intra Query operations, Parallelizing individual operations, Sorting, Joins, Pipelining.

Distributed Database: Architectures for Distributed Database, Data Fragmentation, Replication, and Allocation Techniques for Distributed Database Design, Query processing in Distributed Databases; Concurrency Control and Recovery in Distributed Databases.

Overview of Client Server Architectures: Centralized and Client-Server architectures, Server architectures.

UNIT-III

Enhanced Data Models for Advanced Applications: Active database- syntax and semantics (DB2, Oracle), applications, design principles for active rules, Temporal database concepts, Spatial databases, Deductive databases.

Emerging Database Technologies: Mobile databases, Multimedia Databases, Geographic Information systems (GIS); XML and Internet Databases: Structured, Semi-structured and Unstructured Data, Introduction to web databases and XML, Structure of XML data.

UNIT – IV

Data Warehouse and OLAP Technology: Need for data warehouse, Definition, Goals of data Warehouse, Challenges faced during Warehouse Construction, Advantages, Types of Warehouse: Data Mart, Virtual Warehouse and Enterprise Warehouse; Components of Warehouse: Fact data, Dimension data, Fact table and Dimension table, Designing fact tables; Pre-requisite Phases: Extract, Transform and load process; Warehouse Schema: star, snowflake and galaxy schemas; OLTP vs OLAP, Strengths of OLAP, Applications of OLAP.

Multidimensional data models: Data Cubes & Data Cuboids, Lattice; OLAP operations: Advantages, Types: Roll up, Drill down, Pivot, Slice & Dice operations, Applications; OLAP Server: Need, Types: ROLAP, MOLAP and HOLAP, Features; Data Warehouse Implementation, Introduction to Efficient computation of data cubes.

Suggested Readings:

1. Elmasri and Navathe: Fundamentals of Database Systems, Pearson Education.
2. Korth, Silberchatz, Sudarshan: Database System Concepts, McGraw-Hill.
3. Raghu Ramakrishnan, Johannes Gehrke: Database Management Systems, McGraw-Hill
4. Peter Rob and Coronel: Database Systems, Design, Implementation and Management, Thomson Learning.
5. C.J.Date, Longman: Introduction to Database Systems, Pearson Education

6. Thomas Connolly, Carolyn Begg: Database Systems, Pearson Education
7. W.H.Inmon: Building Data Ware House, John Wiley & Sons.
8. S . Anahory and D.Murray: Data warehousing, Pearson Education, ASIA.
9. Jiawei Han & Micheline Kamber: Data Mining - Concepts & Techniques: Harcourt India PVT Ltd. (Morgan Kaufmann Publishers).
10. Michall Corey, M.Abbey, I Azramson & Ben Taub: Oracle 8i Building Data Ware Housing, TMH.
11. A.K. Pujari: Data Mining Techniques, University Press.
12. Any other book(s) covering the contents of the paper in more depth.

Note: Latest and additional good books may be suggested and added from time to time.

20MCA22C3: OPERATING SYSTEMS & SHELL PROGRAMMING

Course Outcomes:

By the end of the course the students will be able to:

CO1: Understand basic concepts of Operating Systems and their structure.
CO2: Learn about concept of processes and process scheduling.
CO3 Understand about interprocess communication and role of semaphores.
CO4: Learn in detail about Deadlock, memory management and I/O management.
CO5: Understand Linux basics and Shell programming.

Max. Marks: 100 (80+20) **Time: 3Hrs**

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one quest ion from each Unit.

UNIT-I

Operating System Basics: Evolution, Objectives & Functions, Characteristics; Classification of Operating Systems, OS Services, System Calls, OS Structures, Concept of Virtual Machine.

Process Concepts: Definition, Process Relationship, Process states, Process State transitions, Process Control Block ,Context switching – Threads – Concept of multithreads , Benefits of threads – Types of threads.

Process Scheduling: Definition, Scheduling objectives, Types of Schedulers, Scheduling criteria. **Scheduling Algorithms:** Preemptive and Non-preemptive, FCFS–SJF–RR, **Multiprocessor scheduling:** Types, Performance evaluation of the scheduling.

UNIT-II

Interprocess Communication: Race Conditions, Critical Section, Mutual Exclusion, Hardware Solution, Strict Alternation, Peterson’s Solution, Producer Consumer Problem,

Semaphores, Event Counters, Monitors, Message Passing, Classical IPC Problems: Reader's & Writer Problem, Dinning Philosopher Problem.

Deadlocks - System Model, Deadlock Principles, Deadlock Characterization, Methods for Handling Deadlocks Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, and Recovery from Deadlock.

UNIT-III

Memory Management: Basic Memory Management, Logical and Physical address map, Memory allocation, Fragmentation and Compaction, Paging and its disadvantages, Virtual Memory, Locality of reference, Page Fault, Working Set , Demand paging concept, Page Replacement policies.

Input/Output Management: I/O devices, Device controllers , Direct memory access Principles of I/O Software: Goals of Interrupt handlers, Device drivers, Device independent I/O software, Secondary-Storage Structure: Disk structure, Disk scheduling algorithms.
File Management: File concept, Access methods, File types, File operation, Directory structure, File System structure, Allocation methods.

UNIT-IV

Linux Basics: Genesis of Linux, Architecture of Linux, Features of Linux, Introduction to vi editor, Linux commands. Linux Shells: Role, Types- Bourne Shell (sh), C Shell (csh), Korn Shell (ksh), Bourne Again Shell (bash).

Linux Utilities: File handling utilities, Security by file permissions, Process utilities, Disk utilities, Networking commands, Filters, Text Processing utilities and backup utilities.

Shell programming (With bash): Introduction, shell responsibilities, pipes and Redirection, Running a shell scripts, The shell as a programming language, Shell meta characters, File name substitution, Shell variables, Command substitution, Shell commands, The environment, Quoting, Test command, control structures, arithmetic in shell, shell script examples, interrupt processing, functions, debugging shell scripts.

Suggested Readings:

1. Silberschatz & Galvin: Operating System Concept, Wiley.
2. Milan Milenkovic: Operating Systems, Tata McGraw – Hill.
3. William Stallings: Operating Systems, PHI.
4. Yashawant Kanetkar: Unix Shell Programming, BPB.
5. Behrouz A. Forouzan, Richard F. Gilberg: Unix and shell Programming, Thomson
6. A.S. Tanenbaum: Modern Operating Systems, Pearson/PHI.
7. Dhamdhere: Operating Systems, Tata McGraw Hill.
8. Robert Love: Linux System Programming, O'Reilly, SPD.
9. Jason Cannon: Linux For Beginners,
10. William Shotts: T he Linux Command Line : A Complete Introduction.
11. Daniel J. Barrett: Linux Pocket Guide : Essential Commands
12. Any other book(s) covering the contents of the paper in more depth.

Note: Latest and additional good books may be suggested and added from time to time

20MCA22DA1: THEORY OF COMPUTATION

Course Outcomes:

By the end of the course the students will be able to:

CO1: Analyze and design finite automata, formal languages, and grammars.
CO2: Understand the basic concepts of DFA and NDFA.
CO3: Construct context free grammar for various languages.
CO4: Understand Turning Machine and recursive language.
CO5: Gain understanding about tractable and non-tractable problems.

Max. Marks: 100 (80+20) **Time: 3Hrs**

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one quest ion from each Unit.

UNIT-I

Review of Mathematical Terms and Theory: Basic Mathematical Notations And Set Theory, Logic Functions And Relations, Language Definitions, Mathematical Inductions and Recursive Definitions.

Finite Automata: Introduction, Alphabets, Strings and Languages, Kleen-closure; Deterministic Finite Automata (DFA) and Nondeterministic Finite Automata (NFA) -Formal definition, simpler notations (state transition diagram, transition table), Regular and Non-Regular Languages, Equivalence of NDFA & DFA, NDFA to DFA conversion, DFA minimization using Myhill-Nerode Theorem, Applications of Finite Automata, Finite automata with output (Moore and Mealy machines) and inter-conversion.

UNIT-II

Context Free Grammar: Introduction to CFG, CFG and Known Languages, Unions Concatenations and *'S Notations and CFL, Derivations of Trees and Ambiguity, Unambiguous CFG and Algebraic Expressions, Normal Forms and Simplified Forms.

Formal Grammar: Definition, Chomsky hierarchy of grammars, Construction of Context free, derivation, parse tree, ambiguity in grammars, Removal of null and unit production, Normal forms- CNF & GNF.

Pushdown Automata: Introduction to PDA, Types of PDA, Designing of PDA, CFG Corresponding to PDA, Introduction to CFL, Intersections and Complements of CFL, Decisions Problems and CFL, Equivalence of Pushdown Automata and CFL, Pumping Lemma for CFL, Applications.

UNIT-III

Turing Machines: Model of Computation and Church Turning Thesis, Definition of Turing Machine, Tm and Language Acceptors, Variations of Tm, Non- Deterministic Tm, Universal Tm, Tm & computers.

Recursive Language: Introduction, Enumerable and Language, Recursive and Non Recursive Enumerable, their properties.

PCP: Introduction to undecidability, undecidable problems about TMs, Post correspondence problem (PCP), Modified PCP.

UNIT-IV

Computation Functions, Measuring, Classifications and Complexity: Primitive Recursive Functions, Halting Problem, Recursive Predicates and Some Bounded Operations, Unbounded Minimizations and μ-Recursive Functions, Godel Numbering, Computable Functions and μ-Recursive, Numerical Functions.

Tractable and Intractable Problems: Growth Rate and Functions, Time and Speed Complexity, Complexity Classes, Tractable and Possibly Intractable Problems, P And NP Completeness, Reduction Of Time, Cook's Theorem, NP-Complete Problems.

Suggested Readings:

1. John C. Martin: Introduction to Language and theory of Computation, Mcgraw Hill.
2. John E. Hopcroft, Rajeev Motwani, Jeffrey D. Ullman: Introduction to Automata Theory Languages and Computation, Pearson Education
3. K. L. P Mishra, N. Chandrashekaran: Theory of Computer Science-Automata Languages and Computation, Prentice Hall of India, India.
4. K.Krithivasan and R.Rama: Introduction to Formal Languages, Automata Theory and Computation; Pearson Education.
5. Harry R. Lewis and Christos H. Papadimitriou: Elements of the Theory of Computation, Second Edition, Prentice-Hall of India Pvt. Ltd
6. Any other book(s) covering the contents of the paper in more depth.

Note: Latest and additional good books may be suggested and added from time to time.

20MCA22DA2: COMPUTER NETWORKS & DISTRIBUTED SYSTEMS

Course Outcomes:

By the end of the course the students will be able to:

CO1: Understand basic concepts data communication and computer networks.
CO2: Gain understanding about OSI model and TCP/IP.
CO3: Develop understanding about working of different layers of TCP/IP and OSI model.
CO4: Understand about concept Distributed Systems and Synchronization.
CO5: Learn about replication management, fault tolerance and security in Distributed Systems.

Max. Marks: 100 (80+20) **Time: 3Hrs**

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will

be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one quest ion from each Unit.

UNIT-I

Data Communication: Introduction to data communication; analog and digital signals; asynchronous and synchronous transmission; data encoding and modulation techniques, broadband and base band transmission, multiplexing, transmission medium.

Network Classification: Wired Network, Wireless Network, Internetworking Devices.

Network Reference Models: Layered architectures, protocol hierarchies, interface and services: ISO- OSI reference model, TCP/IP reference model; internet protocol stacks.

UNIT-II

Data Link Layer Functions and Protocols: Framing, error-control, flow-control; sliding window protocol; HDLC, Error detection and correction, Data link layer of internet.

Medium Access Sub-layer: CSMA/CD protocol, IEEE standards for LAN and MAN, X.25, frame relay, Narrowband and Broadband ISDN, Asynchronous Transfer Modes.

Network Functions & Protocols: Switching mechanism and its various types, routing and congestion control, Internetworking-TCP/IP, IP Packet, IP address, IPv6

Transport Layer: Design issues, Connection management (UDP, TCP and their Frame Format); **Application Layer:** File Transfer, Access and Management, E-Mail, Virtual Terminal, Public Network.

UNIT-III

Introduction to Distributed Systems: Introduction, Design Goals, Types of Distributed systems, System Architecture and Fundamental models, Middleware, Threads, Virtualization, Client-server model, multiple servers, proxy servers and caches, peer processes, code migration.

Communication Fundamentals: Basic concepts, Remote Procedure Call, Message Oriented Communication, Stream Oriented Communication, Multicast Communication**.**

Synchronization: Clock synchronization, Logical clocks, Mutual exclusion algorithms: centralized, decentralized, distributed and token ring algorithms, election algorithms.

UNIT-IV

Replication Management: Need for replication, Consistency models, Consistency protocols, Replica management.

Fault Tolerance: Basic concepts and failure models, Process resilience, Reliable client-server and group communication, Distributed commit recovery mechanisms.

Security in Distributed Systems: Secure channels, Access control, Security management, Cryptographic algorithms; Digital signatures; certificates, firewalls.

Naming: Flat naming, Structured naming, Name space and Resolution, Attribute- based naming, Directory services, LDAP, Decentralized implementations.

Case Studies: Needham-Schroeder, Kerberos, SSL.

Suggested Readings:

1. A.S. Tanenbaum: Computer Networks, Prentice-Hall of India.

2. W. Tomasi: Introduction to Data Communications and Networking, Pearson Education.
3. P.C. Gupta: Data Communications and Computer Networks, Prentice-Hall of India.
4. Behrouz Forouzan and S.C. Fegan: Data Communications and Networking, McGraw Hill.
5. L. L. Peterson and B. S. Davie: Computer Networks: A Systems Approach, Morgan Kaufmann.
6. William Stallings: Data and Computer Communications, Pearson Education.
7. George Coulouris, Jean Dollimore, Tim Kindberg: Distributed Systems-Concepts and Design, Pearson Education
8. Andrew S. Tanenbaum, Marten Van Steen: Distributed Systems-Principles & Paradigms, Pearson Education.
9. A. D. Kshemkalyani and M. Singhal: Distributed Algorithms: Principles, Algorithms, and Systems.
10. Any other book(s) covering the contents of the paper in more depth.

Note: Latest and additional good books may be suggested and added from time to time.

20MCA22DA3: WEB TECHNOLOGIES

Course Outcomes:
By the end of the course the students will be able to:
CO1: Understand web concepts and Markup Languages.
CO2: Learn client-side and server-side programming.
CO3: Learn to represent web data and XML document handling.
CO4: Understand AJAX and relevance.
CO5: Learn about web services and their development.

Max. Marks: 100 (80+20) **Time: 3Hrs**

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one quest ion from each Unit.

UNIT-I

Web Essentials: Clients, Servers, and Communication. Basic Internet Protocols, W3C, HTTP, Web Clients & Web Servers.

Markup languages-XHTML: Introduction to HTML, basics of XTHML, HTML elements, HTML tags, lists, tables, frames, forms, defining XHTML's abstract syntax, defining HTML documents.

CSS style sheets: Introduction, CSS core syntax, text properties, CSS box model, normal flow box layout, other properties like list, tables, DHTML, XML, XML documents & vocabulary, XML versions & declarations, Introduction to WML.

UNIT-II

Client-Side Programming: The JavaScript Language-History and Versions Introduction JavaScript in Perspective-Syntax-Variables and Data Types-Statements-Operators-Literals-Functions-Objects-Arrays-Built-in Objects-JavaScript Debuggers.

Host Objects: Browsers and the Document Object Model (DOM), Levels-Intrinsic Event Handling-Modifying Element Style-The Document Tree-DOM Event Handling-Accommodating Noncompliant Browsers Properties of window.

Server-Side Programming: Concept of server-side programming, Java Servlets revistited-Architecture -Overview-A Servlet-Generating Dynamic Content-Life Cycle- Parameter Data-Sessions-Cookies-URL Rewriting-Other Capabilities-Data Storage Servlets and Concurrency- Databases and Java Servlets.

UNIT-III

Separating Programming and Presentation: JSP Technology revisited - JavaBeans Classes and JSP-Tag Libraries and Files-Support for the Model-View-Controller Paradigm-Databases and JSP. Representing Web Data: XML-Documents and Vocabularies-Versions and Declaration-Namespaces- DOM based XML processing Event-oriented Parsing: SAX-Transforming XML Documents-Selecting XML Data: XPATH-Template based Transformations: XSLT-Displaying XML Documents in Browsers.

UNIT-IV

AJAX: Ajax Client Server Architecture-XML Http Request Object-Call Back Methods.

Web Services: JAX-RPC-Concepts-Writing a Java Web Service-Writing a Java Web Service Client-Describing Web Services: WSDL- Representing Data Types: XML Schema-Communicating Object Data: SOAP Related Technologies-Software Installation-Storing Java Objects as Files.

Suggested Readings:

1. Jackson: Web Technologies: A Computer Science Perspective, Pearson Education India.
2. Roger S Pressman, David Lowe: Web Engineering: A Practitioner's Approach, TMH.
3. Achyut Godbole,Atul Kahate: Web Technologies, McGraw-Hill Education.
4. Uttam K Roy: Web Technologies, Oxford University Press.
5. Chris Bates: Web Programming, Wiley.
6. Gertel Keppel, Birgit Proll, Siegfried Reich, Werner R.: Web Engineering, John Wiley& Sons Inc.
7. Berner's LEE, Godel and Turing: Thinking on the Web, John Wiley & Sons Inc.
8. Paul S.Wang Sanda S. Katila: An Introduction to Web Design Plus Programming, Thomson.
9. Robert W.Sebesta: Programming the World Wide Web, Third Edition, Pearson Education.
10. Thomas A.Powell: The Complete Reference HTML & XHTML, Fourth Edition, Tata McGraw Hill.
11. Abders Moller and Michael Schwartzbach: An Introduction to XML and Web Technologies, Addison Wesley.
12. Joel Sklar: Principles of Web Design, Thomson.
13. Joel Sklar: Web Design, Cengage Learning
14. Web Technologies: Black Book, Dreamtech Press

15. Raj Kamal: Internet and Web Technologies, Tata McGraw Hill.
16. Ralph Moseley and M. T. Savaliya: Developing Web Applications, Wiley-India.
17. Any other book(s) covering the contents of the paper in more depth.

Note: Latest and additional good books may be suggested and added from time to time.

20MCA22DB1: CLOUD COMPUTING

Course Outcomes:
By the end of the course the students will be able to:
CO1: Understand the various cloud computing service models.
CO2: To use various Cloud Services.
CO3: Perform service management in cloud computing.
CO4: Understand various security concepts in cloud computing.
CO5: Understand cloud functionality on the basis of various case-studies.

Max. Marks: 100 (80+20) **Time: 3Hrs**

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one quest ion from each Unit.

UNIT-I

Cloud Computing Fundamentals: Definition of Cloud Computing: Defining a cloud, Evolution of Cloud Computing cloud types-NIST model, cloud cube model, Deployment models, Service models, Cloud Reference model, Characteristics of Cloud, Cloud Computing Benefits and Limitations, Cloud Architecture: Introduction on Infrastructure, platforms, virtual appliances, communication protocols; Cloud computing vs. Cluster computing vs. Grid computing; Applications: Technologies and Process required when deploying Web services; Deploying a web service from inside and Outside of a Cloud. Services and Applications by Types: IaaS, PaaS, SaaS, IDaaS, and CaaS.

UNIT II

Virtualization: Objectives, Benefits of Virtualization, Emulation, Virtualization for Enterprise, VMware, Server Virtualization, Data Storage Virtualization, Load balancing and Virtualization, Improving Performance through Load Balancing, Hypervisors, Machine Imaging, Porting of applications in the cloud. Concept of Software-Defined Networking (**SDN**), Network-Function Virtualization (**NFV**) and Virtual Network Functions (**VNF**).

Use of Platforms in Cloud Computing: Concepts of Platform as a Service, Use of PaaS application frameworks; Use of Google, Amazon and Microsoft Web Services. Cloud vendors and Service Management:Amazon cloud, AWS Overview, Installation of AWS, Google app engine, azure cloud, salesforce.

UNIT - III

Cloud Management: Features of Network management system, Monitoring of an entire cloud computing deployment stack, lifecycle management of cloud services(six stages of lifecycle)

Service Management in Cloud Computing: Service Oriented Architecture: concepts of message-based transactions, Protocol stack for an SOA architecture, Event driven SOA, Enterprise Service bus, Service Catalogs, Service Level Agreements (SLAs), Managing Data: Looking at Data, Scalability & Cloud Services, Database & Data Stores in Cloud , Large Scale Data Processing.

UNIT - IV

Cloud Security Concepts: Cloud security challenges, Cloud security approaches: encryption, tokenization/ obfuscation, cloud security alliance standards, cloud security models and related patterns, Cloud security in mainstream vendor solutions, Mainstream Cloud security offerings: security assessment, secure Cloud architecture design, Authentication in cloud computing, Client access in cloud, Cloud contracting Model, Security Mapping, Identity Management.

Case Study on Open Source & Commercial Clouds: Eucalyptus, Microsoft Azure, Amazon EC2.

Suggested Readings:

1. Cloud Computing : A Practical Approach by Anthony T. Velte Toby J. Velte, Robert Elsenpeter, The McGraw-Hill.
2. Cloud Computing: SaaS, PaaS, IaaS, Virtualization and more. by Dr. Kris Jamsa.
3. Tim Mather, SubraKumaraswamy, ShahedLatif: Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance, O'ReillyMedia Inc.
4. Cloud Computing Bible, Barrie Sosinsky, Wiley-India.
5. Jason Venner,Pro: Hadoop,Apress.
6. Cloud Computing: Principles and Paradigms, Editors: Rajkumar Buyya, James Broberg, Andrzej M. Goscinski, Wiley.
7. Cloud Computing: Principles, Systems and Applications, Editors: Nikos Antonopoulos, Lee Gillam, Springer, 2012.
8. Cloud Security: A Comprehensive Guide to Secure Cloud Computing, Ronald L. Krutz, Russell Dean Vines, Wiley-India.
9. Any other book(s) covering the contents of the paper in more depth.

Note: Latest and additional good books may be suggested and added from time to time

20MCA22DB2: SOFTWARE ENGINEERING

Course Outcomes:

By the end of the course the students will be able to:

CO1: Understand basic concept of Software Engineering and the phases in a software project.

CO2: Comprehend fundamental concepts of requirements engineering and SRS document.

CO3: Know about software design process and design methodologies.

CO4: Learn various software testing level and software project management activities.

CO5: Learn software maintenance types and software configuration management activities.

Max. Marks: 100 (80+20) **Time: 3Hrs**

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one quest ion from each Unit.

UNIT-I

Introduction: Software and its Characteristics, Evolving Role of Software, Software Product, Software Processes, Software Crisis, 'Software Engineering' Evolution, Principles of Software Engineering, Programming-in-the-small vs. Programming-in-the-large, Software Components, Software Engineering Processes.

Software Life Cycle (SLC) Models: Water Fall Model, Prototype Model, Spiral Model, Evolutionary Development Models, Iterative Enhancement Models, Object Oriented Models and other latest Models.

Software Requirements: Functional and Non-Functional, User requirements, System requirements. Software Requirements Document – Requirement Engineering Process: Feasibility Studies, Requirements elicitation and analysis, requirements validation, requirements management.

UNIT-II

Software Design: Basic Concept of Software Design, Architectural Design, Low Level Design: Modularization, Design Structure Charts, Flow Charts, Coupling and Cohesion Measures; **Design Strategies:** Function Oriented Design, Object Oriented Design, Top-Down and Bottom-Up Design, User Interface Design, Programming practices and Coding standards.

Software Testing: Introduction, Verification vs. Validation, Software Reliability, Levels of Testing, Structural Testing (White Box Testing), Functional Testing (Black Box Testing).

UNIT-III

Software Quality: Attributes, Software Quality Assurance – plans & activities; Software Documentation.

Software Project Management: Project Management activities, Project Estimation, Project planning, Project scheduling.

Software Risk Management: Reactive versus Proactive Risk Strategies, Risk management activities; Software Risks (Risk Identification, Risk Projection, Risk Refinement, Risk Mitigation), Risks Monitoring and Management.

Software Measurement and Metrics: Process Metrics, Project metrics, Estimation – LOC, Halstead's Software Science, Function Point (FP), Cyclomatic Complexity Measures; Software Project Estimation Models- Empirical, Putnam, COCOMO I & II.

UNIT-IV

Software Maintenance: Need for Maintenance, Categories of Maintenance: Preventive, Corrective and Perfective Maintenance, Cost of Maintenance; Software Re- Engineering, Reverse Engineering, Software Documentation.

Software Configuration Management: SCM Activities, Change Control Process, Software Version Control; Software Reuse, Software Evolution.

CASE Computer Aided Software Engineering (CASE), CASE Tools.

Suggested Readings:

1. Rogers Pressman: Software Engineering, TMH.
2. Gill, Nasib Singh: Software Engineering, Khanna Book Publishing Co.(P) Ltd, New Delhi
3. Jalote, Pankaj: An Integrated Approach to Software Engineering, Narosa Publications.
4. Chhillar Rajender Singh: Software Engineering: Testing, Faults, Metrics, Excel Books, New Delhi.
5. Ghezzi, Carlo: Fundaments of Software Engineering, PHI.
6. Fairley, R.E.: Software Engineering Concepts, McGraw-Hill.
7. Lewis, T.G.: Software Engineering, McGraw-Hill..
8. Shere: Software Engineering & Management, Prentice Hall.
9. Deutsch, Willis: Software Quality Engineering: A Total Technical and Management Approach, Prentice Hall.
10. Any other book(s) covering the contents of the paper in more depth.

Note: Latest and additional good books may be suggested and added from time to time.

20MCA22DB3: ADVANCE COMPUTER ARCHITECTURE & QUANTUM COMPUTING

Course Outcomes:

By the end of the course the students will be able to:

CO1: Understand the principles of computer architecture, parallel computers and performance aspects.

CO2: Understand the program flow mechanisms, interconnect architectures and memory hierarchy design.

CO3: Understand multiprocessor and multicomputer architectures.

CO4: Comprehend concept of quantum computing and its essence.

CO5: Understand quantum search algorithms and quantum computing applications.

Max. Marks: 100 (80+20) **Time: 3Hrs**

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one quest ion from each Unit.

UNIT - I

Evolution of Computer Architecture: Introduction of computer architecture, Elements of Modern Computers, Evolution of Computer Architectures, Classification of parallel computers, System attributes to performance.

Program and Network Properties: Conditions of Parallelism - data and resource dependences, Bernstein's conditions, hardware and software parallelism. Program Flow Mechanisms - control flow versus data flow, data flow architecture, demand driven mechanisms, comparison of flow mechanisms.

UNIT – II

System Interconnect Architectures: Network properties and routing, Static connection Networks –Linear Array, Ring & Chordal Ring, Barrel Shifter, Fat Tree, Mesh & Torus, Systolic Arrays, Hypercubes; Dynamic connection Networks – Digital Buses, Switch modules, MINs, Omega-, Baseline-, Crossbar-Network.

Memory Hierarchy Design: Memory hierarchy, Inclusion, coherence & locality; memory capacity planning; Virtual Memory technology – Models, TLB, Paging and Segmentation; Cache Memory Organization - Cache basics & cache performance, cache addressing models & mapping, multilevel cache hierarchies, interleaved memory.

UNIT – III

Multiprocessor and Multicomputer Architectures: Multiprocessor System Interconnects – Hierarchical bus systems, Crossbar Switch and Multiport memory, Multistage and Combining networks; Symmetric shared memory architectures, distributed shared memory architectures, Cache coherence problem, Snoopy cache coherence protocol, directory-based protocols; Multicomputer Generations, Message passing mechanisms – message routing schemes, deadlock and virtual channels, flow control strategies, multicast routing algorithms.

UNIT – IV

Overview of Quantum Computing: Qubits, quantum gates, Hilbert spaces, Dirac's notation, Quantum Superposition and Entanglement, Classical computing vs. Quantum computing, Postulates of quantum mechanics, Quantum circuits, quantum parallelism, Quantum circuits, universal gates, Quantum Fourier transform, Shor's factoring algorithm, order finding and periodicity, Grover's quantum search algorithm, Quantum error correcting codes, Quantum cryptography, Applications of Quantum Computing.

Suggested Readings:

1. Kai Hwang & Naresh Jotwani: Advanced Computer Architecture; McGraw-Hill.
2. Kai Hwang: Advanced computer architecture; TMH.
3. D.Sima, T.Fountain, P.Kasuk: Advanced Computer Architecture-A Design space Approach, Addison Wesley.
4. M.J Flynn: Computer Architecture, Pipelined and Parallel Processor Design; Narosa Publishing.
5. D. A. Patterson and J. L. Hennessey: Computer organization and design, Morgan Kaufmann
6. J.P.Hayes: Computer Architecture and Organization, MGH.
7. Harvey G. Cragon: Memory System and Pipelined processors, Narosa Publication.
8. V.Rajaraman & C.S.R.Murthy: Parallel computer: Architecture & Programming, PHI.
9. Carl Hamacher, Zvonko Vranesic, Safwat Zaky: Computer Organization, 5th Edition, MGH.
10. Kai Hwang and Zu: Scalable Parallel computing, MGH.
11. P. Kaye, R. Laflamme, and M. Mosca: An Introduction to Quantum Computing. Oxford.
12. M. A. Nielsen and I. L. Chuang: Quantum Computation and Quantum Information, Cambridge University Press.
13. N.David: Quantum Computer Science: An Introduction.
14. Riley Tipton Perry: Quantum Computing from the Ground Up, World Scientific Publishing Ltd.
15. Scott Aaronson: Quantum Computing since Democritus, Cambridge.
16. P. Kok, B. Lovett: Introduction to Optical Quantum Information Processing, Cambridge.
17. Any other book(s) covering the contents of the paper in more depth.

Note: Latest and additional good books may be suggested and added from time to time.

MCA SECOND YEAR

21MCA23C1: DATA MINING & BIG DATA ANALYTICS

Course Outcomes:
By the end of the course the students will be able to:
CO1: Understand Data Mining Systems and Pattern Analysis.
CO2: Understand Classification and Clustering techniques.
CO3: Identify Big Data and relevance of Big Data Analytics.
CO4: Understand Map Reduce and its features.
CO5: Understand Hadoop and Hadoop Eco-System.

Max. Marks: 100 (80+20) **Time: 3Hrs**

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one quest ion from each Unit.

UNIT-I

Data Mining Concepts: Introduction to Data Mining Systems, Knowledge Discovery Process, Data Mining Techniques, Issues, Applications, Data Objects and Attribute types, Statistical description of data; Data Pre-processing – Cleaning, Integration, Reduction, Transformation and Discretization; Data Visualization, Data similarity and dissimilarity measures.

Frequent Pattern Analysis: Mining Frequent Patterns, Associations and Correlations; Mining Methods- Pattern Evaluation Method, Pattern Mining in Multilevel; Multi-Dimensional Space – Constraint Based Frequent Pattern Mining; Classification using Frequent Patterns.

UNIT-II

Classification and Clustering: Decision Tree Induction, Bayesian Classification, Rule Based Classification, Classification by Back Propagation, Support Vector Machines, Lazy Learners, Model Evaluation and Selection, Techniques to improve Classification Accuracy. Clustering Techniques: Cluster analysis, Partitioning Methods - Hierarchical Methods, Density Based Methods, Grid Based Methods; Evaluation of clustering, Clustering high dimensional data, Clustering with constraints, Outlier analysis-outlier detection methods.

WEKA Tool: Introduction to Datasets, WEKA sample Datasets, Data Mining Using WEKA tool.

UNIT-III

Overview of Big Data and Hadoop: Types of Digital Data, Overview of Big Data, Challenges of Big Data,Modern Data Analytic Tools, Big Data Analytics and Applications;Overview and History of Hadoop, Apache Hadoop, Analysing Data with Unix tools, Analysing Data with Hadoop, Hadoop Streaming, Hadoop Environment.

HDFS: Concepts of Hadoop Data File System, Design of HDFS, Command Line Interface, Hadoop file system interfaces, Data flow; Hadoop I/O: Compression and Serialization.

UNIT - IV

Map Reduce: Introduction, Map Reduce Features, How Map Reduce Works, Anatomy of a Map Reduce Job Run, Failures, Job Scheduling, Shuffle and Sort, Task Execution, Map Reduce Types and Formats.

Hadoop Eco System: Pig - Introduction to PIG, Execution Modes of Pig, Comparison of Pig with Databases. Hive: Hive Shell, Hive Services, Hive Metastore, Comparison with Traditional Databases, HiveQL, Tables, Querying Data and User Defined Functions. Hbase: HBasics, Concepts, Clients, Example, Hbase Versus RDBMS. Big SQL: Introduction.

Data Analytics with R: Introduction of R and Big R, Collaborative Filtering, Big Data Analytics with Big R.

Suggested Readings:

1. Jiawei Han & Micheline Kamber: Data Mining - Concepts & Techniques, Harcourt India PVT Ltd. (Morgan Kaufmann Publishers).
2. I.H. Whiffen: Data Mining, Practical Machine Learning tools & techniques with Java (Morgan Kanffmen)
3. A.K. Pujari: Data Mining Techniques, University Press.
4. Pieter Adriaans Dolf Zant inge: Data Mining, Addition Wesley.
5. David Hand, Heikki Mannila, and Padhraic Smyth: Principles of Data Mining, PHI Publication.
6. Michael Berthold, David J. Hand: Intelligent Data Analysis, Springer.
7. Tom White: Hadoop- The Definitive Guide, Third Edition, O'reilly Media.
8. Seema Acharya, Subhasini Chellappan: Big Data Analytics, Wiley.
9. Chris Eaton, Dirk DeRoos, Tom Deutsch, George Lapis, Paul Zikopoulos: Understanding BigData: Analytics for Enterprise Class Hadoop and Streaming Data, Mc Graw Hill publishing.
10. Anand Rajaraman and Jeffrey David Ullman: Mining of Massive Datasets, Cambridge University Press.
11. Bill Franks: Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streamswith Advanced Analytics, John Wiley &Sons.
12. Glenn J. Myatt: Making Sense of Data, John Wiley & Sons.
13. Pete Warden: Big Data Glossary, O'Reilly.
14. Zikopoulos, Paul, Chris Eaton: Understanding Big Data- Analytics for Enterprise Class Hadoop and Streaming Data, Tata McGraw Hill Publications.

Note: Latest and additional good books may be suggested and added from time to time.

21MCA23C2: ARTIFICIAL INTELLIGENCE & COMPUTATIONAL INTELLIGENCE

Course Outcomes:

By the end of the course the students will be able to:

CO1: Learn the concept of Artificial intelligence, problem solving and searching process.
CO2: Understand the concept of Expert system with its architecture and life cycle.
CO3: Understand the concepts of knowledge, Knowledge acquisition and various levels and schemes for knowledge representation.
CO4: Learn the concepts of computational intelligence evolutionary computation and neural networks.
CO5: Handle the uncertainty in knowledge using fuzzy logic and understand concepts of fuzzy logic.

Max. Marks: 100 (80+20) **Time: 3Hrs**

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one quest ion from each Unit.

UNIT-I

Introduction to Artificial Intelligence: Definition, history and applications of AI; Problem solving: Definingthe problem as state space search, Production System, Problem characteristics; Search techniques: Brute Force and Heuristic Search.

Expert System: Definition, role of knowledge, architecture and life cycle of Expert System.

UNIT-II

Knowledge &Its Representation: Types of knowledge, Knowledge acquisition and its techniques, Knowledge engineering, Cognitive behavior; Knowledge representation: Level of representation; Knowledge representation schemes: Formal logic, Inference Engine, Semantic net, Frame, Scripts.

Perception: Sensing, Speech recognition, Vision, Action.

UNIT-III

Computational Intelligence: Introduction to Computational Intelligence, Biological and Artificial Neural **N**etwork (ANN), artificial neural network models; learning in artificial neural networks; neural network and its applications.

Evolutionary Computation: Fundamentals of evolutionary computation, Design and Analysis of Genetic Algorithms, Evolutionary Strategies, comparison of GA and traditional search methods. Genetic Operators and Parameters, Genetic Algorithms in Problem Solving; Optimization: Particle Swarm Optimization, Ant Colony Optimization, Artificial Immune Systems; Other Algorithms: Harmony Search, Honey-Bee Optimization, Memetic Algorithms, Co-Evolution, Multi-Objective Optimization, Tabu Search,Constraint Handling.

UNIT-IV

Fuzzy Systems: Crisp sets, Fuzzy sets: Basic types and concepts, characteristics and significance of paradigm shift, Representation of fuzzy sets, Operations, membership functions, Classical relations and fuzzy relations, fuzzyfication, defuzzyfication, fuzzy reasoning, fuzzy inference systems, fuzzy control system, fuzzy clustering, applications of fuzzy systems.Neuro-fuzzy systems, neuro-fuzzy modeling; neuro-fuzzy control.

Applications: Pattern Recognition, Image Processing, Biological Sequence Alignment and Drug Design, Robotics and Sensors, Information Retrieval Systems, Share Market Analysis, Natural Language Processing.

Suggested Readings:

1. Rich Elaine and Knight Kevin : Artificial Intelligence, Tata McGraw Hill .
2. M. Mitchell: An Introduction to Genetic Algorithms, Prentice-Hall.
3. J.S.R.Jang, C.T.Sun and E.Mizutani: Neuro-Fuzzy and Soft Computing, PHI, Pearson Education.
4. Timothy J.Ross: Fuzzy Logic with Engineering Applications, McGraw-Hill.
5. Davis E.Goldberg: Genetic Algorithms: Search, Optimization and Machine Learning, Addison Wesley.
6. Any other book(s) covering the contents of the paper in more depth.

Note: Latest and additional good books may be suggested and added from time to time.

21MCA23C3: ANDROID MOBILE APPLICATION DEVELOPMENT

Course Outcomes:

By the end of the course the students will be able to:

CO1: Understand concepts of android application development process
CO2: Analyze algorithms for use in MVC model of development
CO3: Handle databases in Android applications.
CO4: Synthesize location and mapping related user interfaces in android applications.
CO5: Understand Playing and Recording of Audio and Video in application.

Max. Marks: 100 (80+20) **Time: 3Hrs**

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one quest ion from each Unit.

UNIT-I

Introduction: Mobile Applications, Characteristics and Benefits, Application Model,

Infrastructure and Managing Resources, Mobile Software Engineering, Frameworks and Tools, Mobile devices Profiles.

Application Design: Memory Management, Design patterns for limited memory, Work flow for Application Development, Techniques for composing Applications, Dynamic Linking, Plug-ins and rules of thumb for using DLLs, Concurrency and Resource Management.

UNIT-II

Google Android: Introduction, JDK & ADK, Android Application Architecture, Traditional Programming Model and Android, Activities, Intents, Tasks, Services.

Android Framework: GUI and MVC Architecture, Fragments and Multi-platform development, Creating Widgets: Layouts, Shadows, Gradients; Applications with multiple screens.

Development: Intents and Services, Storing and Retrieving data, Graphics and Multimedia, Telephony, Location based services, Packaging and Deployment.

UNIT-III

Android Applications: Working with Android, Various life cycles for applications, Building an User Interface: Blank UI, Folding and Unfolding a scalable UI, Making Activity, Fragment, Multiple layouts; Content Provider, Location and Mapping: location based services, Mapping, Google Maps activity, Working with Map View and Map Activity; Sensors and Near Field Communication; Native libraries and headers, Building client server applications.

UNIT-IV

Using Google Maps, GPS and Wi-Fi Integration, Android Notification, Audio manager, Bluetooth; Camera and Sensor integration, Sending SMS, Phone Calls. Runtime Environment for Applications, Callbacks and Override in application, Concurrency, Serialization, Application Signing, API keys for Google Maps, Publishing Android Application; Introduction to Flutter, Android features, UI, implementation.

Suggested Readings:

1. Zigurd Mednieks, Laird Dornin, G, BlakeMeike and Masumi Nakamura: Programming Android, O'Reilly Publications.
2. Wei-Meng Lee: Beginning iPhone SDK Programming with Objective-C, Wiley India Ltd.
3. James C.S: Android Application development, CENGAGE Learning.
4. Gargenta M., Nakamura M.: Learning Android, O'Reilly Publications.
5. Reto Meier: Professional Android 2 Application Development, WROX Publication-Wiley-India.
6. James Edward: J2ME: The Complete Reference, James Edward – Publication.
7. Chris Haseman: Android Essentials, Apress Publication.
8. Mark L Murphy: Beginning Android - Wiley India Pvt Ltd.
9. Sayed Y Hashimi and Satya Komatineni: Pro Android – Wiley India Pvt Ltd.
10. Lauren Darcey, Shane Conder: Android Wireless Application Development, 2nd edition –Pearson Education.
11. Any other book(s) covering the contents of the paper in more depth.

Note: Latest and additional good books may be suggested and added from time to time.

21MCA23DA1: COMPUTER VISION

Course Outcomes:

By the end of the course the students will be able to:

CO1: Implement fundamental image processing techniques required for computer vision.
CO2: Perform shape analysis and implement boundary tracking techniques.
CO3: Apply Hough Transform for line, circle, and ellipse detections.
CO4: Apply 3D vision techniques and implement motion related techniques.
CO5: Develop applications using computer vision techniques.

Max. Marks: 100 (80+20) **Time: 3Hrs**

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one quest ion from each Unit.

UNIT - I

Image Processing Foundations: Review of image processing techniques – classical filtering operations – thresholding techniques – edge detection techniques – corner and interest point detection – mathematical morphology – texture.

Shapes and Regions: Binary shape analysis – connectedness – object labelling and counting – size filtering – distance functions – skeletons and thinning – deformable shape analysis – boundary tracking procedures – active contours – shape models and shape recognition – centroidal profiles – handling occlusion – boundary length measures – boundary descriptors – chain codes – Fourier descriptors – region descriptors – moments.

UNIT - II

Hough Transform: Line detection – Hough Transform (HT) for line detection – foot-of-normal method – line localization – line fitting – RANSAC for straight line detection – HT based circular object detection – accurate center location – speed problem – ellipse detection – Case study: Human Iris location – hole detection – Generalized Hough Transform (GHT) – spatial matched filtering – GHT for ellipse detection – object location – GHT for feature collation.

UNIT - III

3D Vision and Motion: Methods for 3D vision – projection schemes – shape from shading – photometric stereo – shape from texture – shape from focus – active range finding – surface representations – point-based representation – volumetric representations – 3D object recognition – 3D reconstruction – introduction to motion – triangulation – bundle adjustment – translational alignment – parametric motion – spline-based motion – optical flow – layered motion.

UNIT - IV

Applications: Application: Photo album – Face detection – Face recognition – Eigen faces – Active appearance and 3D shape models of faces; Application: Surveillance – foreground-

background separation – particle filters – Chamfer matching, tracking, and occlusion – combining views from multiple cameras – human gait analysis; Application: In-vehicle vision system: locating roadway – road markings – identifying road signs – locating pedestrians.

SuggestedReadings:

1. D. L. Baggio et al.: Mastering OpenCV with Practical Computer Vision Projects‖, Packt Publishing.
2. E. R. Davies: Computer & Machine Vision‖, Fourth Edition, Academic Press.
3. Jan Erik Solem: Programming Computer Vision with Python: Tools and algorithms for analyzing images, O'Reilly Media.
4. Mark Nixon and Alberto S. Aquado: Feature Extraction & Image Processing for Computer Vision‖, Third Edition, Academic Press.
5. R. Szeliski: Computer Vision: Algorithms and Applications‖, Springer.
6. Simon J. D. Prince: Computer Vision: Models, Learning, and Inference‖, Cambridge University Press.
7. Any other book(s) covering the contents of the paper in more depth.

Note: Latest and additional good books may be suggested and added from time to time.

21MCA23DA2: SOFTWARE TESTING & QUALITY ASSURANCE

Course Outcomes:

By the end of the course the students will be able to:

CO1: Knowledge of various Software Testing techniques.

CO2: Apply Software Testing Strategies and Metrics for Software testing.

CO3: Implement Object Oriented Testing strategies.

CO4: Use of Software Quality Assurance.

CO5: Implement Quality management standards and methods.

Max. Marks: 100 (80+20) **Time: 3Hrs**

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one quest ion from each Unit.

UNIT-I

Testing Strategy and Environment: Minimizing Risks, Writing a Policy for Software Testing, Economics of Testing, Testing-an organizational issue, Management Support for Software Testing, Building a Structured Approach to Software Testing, Developing a Test Strategy Building Software Testing Process: Software Testing Guidelines, workbench concept, Customizing the Software Testing Process, Process Preparation checklist - Software

Testing Techniques: Dynamic Testing – Black Box testing techniques, White Box testing techniques, Static testing, Validation Activities, Regression testing.

UNIT-II

Software Testing Strategies: Approach, Issues; integration, incremental, System, alpha, Beta testing etc; Comparative evaluation of techniques: Testing tools; Dynamic analysis tools, test data generators, Debuggers, test drivers etc.

Technical Metrics for Software: Quality Factors, framework; Metrics for analysis, design, testing source code.

UNIT-III

Object Oriented Testing: Introduction to Object Oriented testing, Path Testing, State Based Testing, Class Testing, Testing Web Applications: Web testing, Functional Testing, User interface Testing, Usability Testing, Configuration and Compatibility Testing, Security Testing, Performance Testing, Database testing, Post Deployment Testing.

Rational Rose Software: Introduction, Features, Various types of software testing using Rational Rose.

UNIT-IV

Software Quality Assurance and Standards: Software Quality, Software QualityChallenges, Software Quality factors. Software Quality Assurance: concept, components, importance and essence; FTR, structured walk through technique etc. Software Quality Management Standards, Management and its role in Software Quality Assurance, Quality Standards: ISO 9000 and Companion ISO Standards, CMM, CMMI.

Suggested Readings:

1. Meyers, G.: The art of Software Testing, Wiley-Inter-Science.
2. Deutsch, Willis: Software Quality Engineering: A Total Technical and Management Approach, Prentice Hall.
3. Pressman : Software Engineering, TMH.
4. Gill, Nasib Singh: Software Engineering : Reliability, Testing and Quality Assurance, Khanna Book Publishing Co.(P) Ltd, N. Delhi
5. Ghazzi, Carlo: Fundaments of Software Engineering, PHI.
6. Chhillar Rajender Singh: Software Engineering: Testing, Faults, Metrics, Excel Books, New Delhi.
7. Jalote, Pankaj: An Integrated Approach to Software Engineering, Narosa Publications.
8. Doug Bell, Ian Murrey, John Pugh: Software Engineering-A Programming Approach, Prentice Hall.
9. Any other book(s) covering the contents of the paper in more depth.

Note: Latest and good books may be added from time to time.

21MCA23DA3: MIXED REALITY & WEARABLE COMPUTING

Course Outcomes:

By the end of the course the students will be able to:

CO1: Knowledge of wearable computing

CO2: Understanding of various devices used in wearable computing

CO3: Understand the hardware and software requirements of wearable computing

CO4: Understand the cybernetics and humanistic intelligence

CO5: Knowledge of Internet of Everything

Max. Marks: 100 (80+20) **Time: 3Hrs**

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one quest ion from each Unit.

UNIT-I

Introduction: History, Creative Coding Platforms, Open Source Platforms, PIC, Arduino, Sketch, Raspberry Pi, Iterative coding methodology. Python Programming - Mobile phones and similar devices, Arm Devices, Basic Electronics (circuit theory, measurements, parts identification)

Sensors and Software: Understanding Processing Code Structure, variables and flow control, Interfacing to the Real World.

UNIT-II

Software &Hardware Frameworks: Software-Open Frameworks as our IDE (C/C++) - Arduino Language (C/C++), Hardware- Desktop / Laptop / Raspberry Pi - How to approach a programming problem? Representing "reality" with computers. Digital vs. Analog circuits, audio, communication, etc. Analog to Digital Conversion (ADC) - Digital to Analog Conversion (DAC)– Microcontrollers - Communication – Serial & Parallel - Hardware to Hardware Communication - I2C/IIC (Inter-Integrated Circuit) - SPI (Serial Peripheral Interface) – Serial UART Communication.

UNIT-III

Cybernetics and Humanistic Intelligence Wearables: Augmented Reality – Mixed Reality. AR versus VR - IoT and Wearables: Smart Cites and Wearable Computing as a form of urban design - Advanced I/O – open Frameworks: Live Network feeds (push and pull) - Data persistence (saving data and preferences) - Database interface (MySQL, SQLite, XML, PHP/Web) - Arduino: Wired/Wireless Networking (hardware vs. USB proxy) - Software serial (RS-232).

UNIT-IV

Internet of Everything: Humanistic Intelligence; Wearable Computing and IoT (Internet of Things), Overview of Mobile and Wearable Computing, Augmented Reality, and Internet of Things. The fundamental axes of the Wearables + IoT + AR space - Free-roaming AR:

Wearable Computing, Wireless, Sensing, and Meta sensing with light bulbs Phenomenal Augmented Reality: Real world physical phenomena as the fundamental basis of mobile and wearable AR.

Suggested Readings :

1. Woodrow Barfield : Fundamentals of Wearable Computers and Augmented Reality, Second Edition.
2. Omesh Tickoo, Ravi Iyer : Making Sense of Sensors: End-to-End Algorithms and Infrastructure Design.
3. Josha Noble : Programming Interactivity, Second Edition.
4. Raspberry Pi: Getting Started with Python, second edition, 2016
5. Any other book(s) covering the contents of the paper in more depth.

Note: Latest and good books may be added from time to time.

21MCA23DB1: NETWORK PROGRAMMING

Course Outcomes:

By the end of the course the students will be able to:

CO1: Understand TCP/IP and Network Architecture.
CO2: Creating sockets and socket implementation.
CO3: Windows Socket API and their programming.
CO4: Web programming and implementing security.
CO5: Performing client side programming and server side programming.

Max. Marks: 100 (80+20) **Time: 3Hrs**

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one quest ion from each Unit.

UNIT- I

Introduction: Overview of UNIX OS, Environment of a UNIX process, Process control, Process relationships Signals, Interprocess Communication, Overview of TCP/IP, Network architecture, UUCP, XNS, IPX/SPX for LANs, TCP & IP headers, IPv4 & v6 address structures.

Socket Programming: Creating sockets, Posix data type, Socket addresses, Assigning address to a socket, Java socket programming, Thread programming, Berkeley Sockets: Overview, socket address structures, byte manipulation & address conversion functions, elementary socket system calls – socket, connect, bind, listen, accept, fork, exec, close, TCP ports (ephemeral, reserved), Berkeley Sockets: I/O asynchronous & multiplexing models,

select & poll functions, signal & fcntl functions, socket implementation (client & server programs), UNIX domain protocols.

UNIT- II

APIs & Winsock Programming: Windows socket API, window socket & blocking I/O model, blocking sockets, blocking functions, timeouts for blocking I/O, API overview, Different APIs & their programming technique, DLL & new API's, DLL issues, Java Beans.

UNIT- III

Web Programming & Security: Java network programming, packages, RMI, Overview of Javascript, WAP architecture & WAP services, Web databases, Component technology, CORBA concept, CORBA architecture, CGI programming, Firewall & security technique, Cryptography, Digital Signature.

UNIT- IV

Client Server Programming: Client side programming:- Creating sockets, implementing generic network client, Parsing data using string Tokenizer, Retrieving file from an HTTP server, Retrieving web documents by using the URL class. Server side programming:- Steps for creating server, Accepting connection from browsers, creating an HTTP server, Adding multithreading to an HTTP server.

SuggestedReadings:

1. W.Richard Stevens: Advanced Programming in the UNIX Environment, Addison Wesley.
2. W. Stevens, Bill Fenner, Andrew Rudoff: UNIX Network Programming -Volume 1 (The Sockets Networking API), Pearson Education/Prentice-Hall International.
3. Meeta Gandhi,Tilak Shetty and Rajiv Shah: The 'C' Odyssey Unix –The open Boundless C, BPB Publications.
4. Steven.W.R: UNIX Network Programming (Volume I& II), PHI.
5. Bobb Quinn and Dave Schutes: Window Socket Programming by
6. Davis.R.: Windows Network Programming, Addison Wesley.
7. Baner .P.: Network Programming With Windows Socket, Prentice Hall.
8. Any other book(s) covering the contents of the paper in more depth.

Note: Latest and additional good books may be suggested and added from time to time.

21MCA23DB2: NATURAL LANGUAGE PROCESSING & SPEECH RECOGNITION

Course Outcomes:

By the end of the course the students will be able to:

CO1: Understand Natural Language Processing, Probabilistic model of defining language and techniques.

CO2: Applying Hidden Markov model and Speech Recognition.

CO3: Application of context free grammar and language parsing.

CO4: Implement probabilistic and language parsing.

CO5: Differentiation of semantic and discourse in terms of NLP.

Max. Marks: 100 (80+20) **Time: 3Hrs**

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one quest ion from each Unit.

UNIT - I

Introduction to Natural Language Processing: NLP tasks in syntax, semantics, and pragmatics. Applications such as information extraction, question answering, and machine translation. The problem of ambiguity.

Regular Expressions: Regular Expressions, Automata, Similarity Computation: Regular Expressions, patterns, FA, Formal Language, NFSA, Regular Language and FSAs, Raw Text Extraction and Tokenization, Extracting Terms from Tokens, Vector Space Representation and Normalization, Similarity Computation in Text.

Morphology and Finite-State Transducers: Inflection, Derivational Morphology, Finite-State Morphological Parsing, The Lexicon and Morphotactics, Morphological Parsing with Finite State Transducers, Combining FST Lexicon and Rules, Lexicon-free FSTs: The Porter Stemmer, Human Morphological Processing.

UNIT - II

Matrix Factorization and Topic Modeling: Introduction, Singular Value Decomposition, Nonnegative Matrix Factorization, Probabilistic Latent Semantic Analysis, Latent Dirichlet Allocation

Computational Phonology and Text-to-Speech: Speech Sounds and Phonetic Transcription, The Phoneme and Phonological Rules, Phonological Rules and Transducers, Advanced Issues in Computational Phonology, Machine Learning of Phonological Rules, Mapping Text to Phones for TTS, Prosody in TTS .

Probabilistic Models of Pronunciation and Spelling: Dealing with Spelling Errors, Spelling Error Patterns, Detecting NonWord Errors, Probabilistic Models, Applying the Bayesian method to spelling, Minimum Edit Distance, English Pronunciation Variation, The Bayesian method, Pronunciation in Humans.

N-gram Language Models: The role of language models. Simple N-gram models. Estimating parameters and smoothing. Evaluating language models. Smoothing, Backoff, Deleted Interpolation, N-grams for Spelling and Pronunciation, Entropy.

UNIT - III

HMMs and Speech Recognition: Speech Recognition Architecture, Overview of Hidden Markov Models, The Viterbi Algorithm Revisited, Advanced Methods for Decoding, Acoustic Processing of Speech, Computing Acoustic Probabilities, Training a Speech Recognizer, Waveform Generation for Speech Synthesis, Human Speech Recognition.

Word Classes and Part-of-Speech Tagging: Tagsets for English, Part of Speech Tagging, Rule-based Part-of-speech Tagging, Stochastic Part-of-speech Tagging, Transformation-Based Taggin.

Context-Free Grammars for English: Context-Free Rules and Trees, Sentence-Level Constructions, The Noun Phrase, Coordination, Agreement and The Verb Phrase and Sub-

categorization, Auxiliaries, Spoken Language Syntax, Grammar Equivalence & Normal Form, Finite State & Context-Free Grammars, Grammars & Human Processing.

UNIT - IV

Parsing with Context-Free Grammars and Features and Unification: Parsing as Search, A Basic Top-down Parser, The Earley Algorithm, Finite-State Parsing Methods, Feature Structures, Unification of Feature Structures, Features Structures in the Grammar, Implementing Unification, Parsing with Unification Constraints, Types and Inheritance

Lexicalized and Probabilistic Parsing: Probabilistic Context-Free Grammars, Problems with PCFGs, Probabilistic Lexicalized CFGs, Dependency Grammars, Human Parsing, The Chomsky Hierarchy, How to tell if a language isn't regular, Natural Language Context-Free or not, Complexity and Human Processing.

Representing Meaning and Semantic Analysis: Computational Desiderata for Representations, Meaning Structure of Language, First Order Predicate Calculus, Some Linguistically Relevant Concepts, Alternative Approaches to Meaning, Syntax-Driven Semantic Analysis, Attachments for a Fragment of English, Integrating Semantic Analysis into the Earley Parser, Idioms and Compositionality, Robust Semantic Analysis

Text Sequence Modeling and Deep Learning: Statistical Language Models, Kernel Methods, Word-Context Matrix Factorization Models, Neural Language Models, Recurrent Neural Networks.

Suggested Readings:

1. Daniel Jurafsky and James H.Martin: Speech and Language Processing(2nd Edition),Prentice Hall:2 edition,2008.
2. Charu C.Aggarwal: Machine Learning for Text Springer,2018 edition
3. Christopher D.Manning and Hinrich Schuetze: Foundations of Statistical Natural Language Processing MIT press.
4. Steven Bird,Ewan Klein and Edward Loper: Natural Language Processing with Python,O'Reilly Media.
5. Roland R.Hausser: Foundations of Computational Linguistics:HumanComputer Communication in Natural Language,Paperback,MIT press..
6. Any other book(s) covering the contents of the paper in more depth.

Note: Latest and additional good books may be suggested and added from time to time.

21MCA23DB3: BIOINFORMATICS COMPUTING

Course Outcomes:

By the end of the course the students will be able to:

CO1: Understand bioinformatics computing and the need for Bioinformatics technologies.
CO2: Exposed to biomedical data analysis.
CO3: Be familiar with the modelling techniques.
CO4: Exposed to Pattern Matching and Visualization.
CO5: Learn microarray analysis.

Max. Marks: 100 (80+20) **Time: 3Hrs**

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV.

Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one quest ion from each Unit.

UNIT – I

Introduction: Bioinformatics computing, Bioinformatics technologies, Structural bioinformatics, Data format and processing, Secondary resources and applications, Role of Structural bioinformatics, Biological Data Integration System.

Data Warehousing and Mining in Bioinformatics: Bioinformatics data, Data warehousing architecture, data quality, Biomedical data analysis, DNA data analysis, Protein data analysis, Machine learning, Neural network architecture and applications in bioinformatics.

UNIT – II

Modelling for Bioinformatics: Hidden Markov modelling for biological data analysis, Sequence identification, Sequence classification, Multiple alignment generation, Comparative modelling, Protein modelling, Genomic modelling, Probabilistic modelling, Bayesian networks, Boolean networks, Molecular modelling, Computer programs for molecular modelling.

UNIT – III

Pattern Matching and Visualization: Gene regulation, motif recognition, motif detection, strategies for motif detection; Visualization – Fractal analysis, DNA walk models – one dimension, two dimension, higher dimension; Game representation of Biological sequences – DNA, Protein, Amino acid sequences.

UNIT – IV

Microarray Analysis: Microarray technology for genome expression study, image analysis for data extraction, pre-processing, segmentation, gridding, spot extraction, normalization, filtering, cluster analysis, gene network analysis; Compared Evaluation of Scientific Data Management Systems – Cost Matrix – Evaluation model - Benchmark – Tradeoffs.

Suggested Readings:

1. Yi-Ping Phoebe Chen (Ed): BioInformatics Technologies, Springer Verlag.
2. Bryan Bergeron: Bio Informatics Computing, Pearson Education.
3. Arthur M Lesk: Introduction to Bioinformatics, Oxford University Press
4. Stanley I. Letovsky: Bioinformatics: Databases and Systems.
5. SorinDraghici: Bioinformatics Databases- Design, Implementation, and Usage, Chapman & Hall/ CRC Mathematical Biology & Medicine.
6. Arthur M.Lesk: Database Annotation in Molecular Biology- Principles and Practices.
7. Any other book(s) covering the contents of the paper in more depth.

Note: Latest and additional good books may be suggested and added from time to time.

21MCA24C1: ADVANCE SOFTWARE ENGINEERING

Course Outcomes:

By the end of the course the students will be able to:

CO1: Learn about the emerging software engineering practices and their suitability.

CO2: Understand the concept of cleanroom software development and engineering web applications

CO3: Acquire understanding about agile software development and significance.

CO4: Understand the concept of scrum and agile requirements.

CO5: Learn about DevOps and its relevance in current scenario.

Max. Marks: 100 (80+20) **Time: 3Hrs**

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one quest ion from each Unit.

UNIT-I

Emerging Software Engineering Practices: Aspect Oriented Software Development, Agile Methods, Security Engineering, Client/Server Software Engineering, Software Engineering Aspects of Programming Languages. **Cleanroom Software Engineering:** Approach, functional specification, design and testing.

Component-Based Software Engineering: Software Component and its Elements, Component Models - Concepts and Principles, COTS Myths, CBSE process, domain engineering, component-based development, classifying and retrieving components, and economics of CBSE.

Engineering Web Applications: Web-based applications and their attributes, Web Engineering process, framework for Web Engineering, formulating, analysing web-based systems, design and testing for web-based applications.

UNIT-II

Agile Software Development: Basics and Fundamentals of Agile Process Methods, Values of Agile, Principles of Agile, stakeholders, Challenges.

Agile and Scrum Principles: Agile Manifesto, Twelve Practices of Extreme Programming (XP), Scrum Practices, Applying Scrum. Need of scrum, working of scrum, advanced Scrum Applications, Scrum and the Organization, scrum values.

Agile Requirements: User Stories, Backlog Management. **Agile Architecture:** Feature Driven Development. **Agile Risk Management:** Risk and Quality Assurance, Agile Tools.

Agile Testing: Agile Testing Techniques, Test-Driven Development, User Acceptance Test.

UNIT-III

Agile Management: Agile Metrics and Measurements, Agile approach to estimating and project variables, Agile Measurement. **Agile Control:** the 7 control parameters. Agile

approach to Risk, Agile approach to Configuration Management, Atern Principles, Atern Philosophy, Rationale for using Atern, Refactoring, Continuous integration, Automated Build Tools.

Scaling Agile for Large Projects: Scrum of Scrums, Team collaborations, Scrum, Estimate a Scrum Project, Track Scrum Projects, Communication in Scrum Projects, Best Practices to Manage Scrum.

UNIT-IV

DevOps: History of DevOps, DevOps vs Agile, Advantages and Disadvantages of DevOps, DevOps Stakeholders, Architecture, Components and features of DevOps, SDLC models of DevOps, Workflow and Principles of DevOps, DevOps tools, DevOps automation and automation tools, Pipeline and Methodology , Azure DevOps, AWS DevOps.

Laboratory Work: Exploring the tools related to Agile Development and DevOps, and developing small projects using this technology.

Suggested Readings:

1. Roger S. Pressman: Software Engineering a Practitioners Approach, McGraw-Hill, Latest Edition.
2. Robert C. Martin: Agile Software Development, Principles, Patterns, and Practices Alan Apt Series.
3. Cohen Mike: Succeeding with Agile : Software Development Using Scrum, Pearson.
4. Software Engineering for Embedded Systems: Methods, Practical Techniques, and Applications, Robert Oshana, Mark Kraeling, Newnes Publisher.
5. Kristin Runyan: Introduction to Agile Methods Sondra Ashmore, Addison-Wesley.
6. Pekka Abrahams, OutiSalo, Jussi Ronkainen and Juhani Warsta: Agile Software Development Methods: Review and Analysis.
7. Jim Highsmith, Agile Project Management: Creating Innovative Products, Second Edition, Addison-Wesley Professional.
8. James A. Crowder, Agile Project Management: Managing for Success, Shelli Friess, Springer.
9. Andrew Stellman, Jennifer Greene, Learning Agile: Understanding Scrum, XP, Lean, and Kanban, O Reilly
10. Sricharan Vadapalli, DevOps: Continuous Delivery, Integration, and Deployment with DevOp, Packt.
11. Janet Gregory, Lisa Crispin, More Agile Testing: Learning Journeys for the Whole Team, Addison Wesley.
12. http://agilemanifesto.org/
13. Any other book(s) covering the contents of the paper in more depth.

Note: Latest and additional good books may be suggested and added from time to time.

21MCA24C2: IoT & SENSOR NETWORKS

Course Outcomes:

By the end of the course the students will be able to:

CO1: To understand the concepts of IoT and its applications.

CO2: Describe the OSI Model for the IoT/M2M Systems.

CO3: Understand the architecture and design principles for IoT.

CO4: Learn the programming for IoT Applications.

CO5: Identify the communication protocols which best suits the WSNs.

Max. Marks: 100 (80+20) **Time: 3Hrs**

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one quest ion from each Unit.

UNIT-I

IoT Overview: Introduction to Internet of Things, IoT Applications, IoT Conceptual Framework, IoT Architectural View, Technology Behind IoT, Sources of IoT, M2M communication, Examples of IoT. Modified OSI Model for the IoT/M2M Systems, data enrichment, data consolidation and device management at IoT/M2M Gateway, web communication protocols used by connected IoT/M2M devices, Message communication protocols (CoAP-SMS, CoAPMQ, MQTT,XMPP) for IoT/M2M devices.

Architecture and Design Principles for IoT: Internet connectivity, Internet-based communication,IPv4, IPv6,6LoWPAN protocol, IP Addressing in the IoT, Application layer protocols: HTTP, HTTPS,FTP,TELNET and ports.

UNIT-II

Data Collection, Storage and Computing using a Cloud Platform: Introduction, Cloud computing paradigm for data collection, storage and computing, Cloud service models, IoT Cloud- based data collection, storage and computing services using Nimbits.

Prototyping and Designing Software for IoT Applications: Introduction, Prototyping Embedded device software, Programming Embedded Device Arduino Platform using IDE, Reading data from sensors and devices, Devices, Gateways, Internet and Web/Cloud services software development.

Programming MQTT clients and MQTT server.

IoT Security: Introduction to IoT privacy and security, Vulnerabilities, Security requirements and threat analysis, IoT Security Tomography and layered attacker model.

UNIT-III

Wireless Sensor Networks: Overview of WSNs, Challenges for Wireless Sensor Networks, Enabling Technologies for Wireless Sensor Networks.

Architectures: Single-Node Architecture - Hardware Components, Energy Consumption of Sensor Nodes, Operating Systems and Execution Environments, Network Architecture-Sensor Network Scenarios, Optimization Goals and Figures of Merit, Design principles for WSNs, Service interfaces of WSNs, Gateway Concepts.

UNIT-IV

Communication Protocols: Physical Layer and Transceiver Design Considerations, MAC Protocols for Wireless Sensor Networks, Low Duty Cycle Protocols And Wakeup Concepts - S-MAC, The Mediation Device Protocol, Wakeup Radio Concepts, Contention based protocols (CSMA,PAMAS), Schedule based protocols (LEACH, SMACS, TRAMA) Address and Name Management in WSNs, Assignment of MAC Addresses, Routing Protocols- Energy-Efficient Routing, Geographic Routing, Hierarchical Networks by Clustering.

Suggested Readings:

1. Raj Kamal: Internet of Things-Architecture and design principles, McGraw Hill Education.
2. Holger Karl & Andreas Willig: Protocols And Architectures for Wireless Sensor Networks , John Wiley.
3. Feng Zhao & Leonidas J. Guibas: Wireless Sensor Networks- An Information Processing Approach, Elsevier.
4. Kazem Sohraby, Daniel Minoli, & Taieb Znati: Wireless Sensor NetworksTechnology, Protocols, And Applications, John Wiley.
5. Anna Hac, Wireless Sensor Network Designs, John Wiley.
6. Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle: From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence, Academic Press.
7. Peter Waher, Learning Internet of Things, PACKT publishing, BIRMINGHAM – MUMBAI
8. Bernd Scholz-Reiter, Florian Michahelles: Architecting the Internet of Things, Springer.
9. Daniel Minoli: Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications, Willy Publications
10. C.S Raghavendra, Krishna M.Sivalingam, Taiebznati: Wireless Sensor Networks, Springer Science.
11. Any other book(s) covering the contents of the paper in more depth.

Note: Latest and additional good books may be suggested and added from time to time.

21MCA24C3: WEB DEVELOPMENT USING .NET FRAMEWORK

Course Outcomes:

By the end of the course the students will be able to:

CO1: Understand Web development and Visual Studio environment.

CO2: Understand important concepts of .NET Framework and Deployment.

CO3: Design, Develop and Create Applications with C#.

CO4: Develop, implement, and demonstrate Component Services, Threading, Remoting, Windows services.

CO5: Access Database using ADO.NET and use ASP.NET for Application Development and Secure Web Services.

Max. Marks: 100 (80+20) **Time: 3Hrs**

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one quest ion from each Unit.

UNIT-I

Overview of Web Development: Introduction, .NET Overview, Assemblies (monolithic vs. component-based applications), Execution Model, Client-Side vs. Server-Side Programming, Web Technologies, Development Environment Setup, IIS, SQL Server and Visual Studio.
Introduction to .NET Framework: Microsoft .NET Platform, Design, Goals and Overview, .NET Architecture, Console, Environment, IL, JIT, .NET framework Class library (System, Collections, I/O, Networking, Threading, Transactions, Exceptions), Common Language Runtime, CLR Execution, Common Type System, Common Language Specification, Managed and Unmanaged code.

C# Programming: Introduction to C#, program structure; Variables and Data types: Initialization of Variables, Variable Scope, Constants, Value Types and Reference Types, CTS Types. Operators. Conditional Statements, Loops. Arrays. Strings. S**tructures:** Defining Structs, Creating Structs, Creating Enums

UNIT-II

Object Oriented Programming -Objects and Classes, Methods and Properties, Constructors and Destructors. **Inheritance**: Introduction**,** Types of Inheritance**,** Implementation versus Interface Inheritance, Multiple Inheritance.

Polymorphism: Abstract Classes Implementing Polymorphism by Method Overloading & Method Overriding.

Interfaces: Defining and Implementing Interfaces, Derived Interfaces, Accessing Interfaces, Overriding Interfaces.

Exception Handling: Exception Classes, Standard Exceptions, User Defined Exceptions. **Delegates, Events and Attributes.**

UNIT-III

Building Windows Based Applications: Standard Controls - Components, Forms, Menus and Dialogues, Validating user inputs.

Databases and Data Access Using ADO.NET: Overview of ADO.NET, Accessing Data, Using Dataset Objects and Updating Data Binding, Viewing, and Filtering Data, Connecting with the Database.

UNIT-IV

ASP.NET: Introduction to ASP.NET, Configuring ASP.NET Applications, Programming Model.

ASP.NET Frameworks-Code Behind, Page Directives, Page Events, Post Back.

ASP.NET Controls: Basic Web Server Controls, Data List Web Server Controls**,** Web Server Controls: Calendar Control, Ad rotator Control, Validation Controls, Grid View Controls. **Performing Data Access:** Data bound Controls, List Controls, Tabular & Hierarchical Data bound Controls, Data source Controls.

State Management, Web Services: View State, Session, Cookies, Application, Hidden Field; Authentication & Authorization; Developing Secure Web Services.

Suggested Readings:

1. Jeffrey Richter, Francesco Balena: Applied .Net Framework Programming in MS VB.Net, TMH Publication.
2. Herbert Schildt: Complete Reference C#, TMH Publication.
3. Michael Halvorsan: Microsoft Visual Basic.NET step by step, PHI Publication.
4. G.Andew Duthie: Microsoft ASP.Net With C#.Net step by step, PHI Publication.
5. Daniel Geron: Programming for Beginners: This Book Includes: SQL, C++, C#, Arduino Programming, Daniel Geron.
6. Any other book(s) covering the contents of the paper in more depth.

Note: Latest and additional good books may be suggested and added from time to time

21MCA24DA1: CYBER SECURITY & BLOCKCHAIN TECHNOLOGY

Course Outcomes:

By the end of the course the students will be able to:

CO1: Become familiar with the concepts of cyber threats, cyber crime, cyber security and understand the vulnerability scanning.
CO2: Understand network defence tools and web application tools.
CO3: To learn about cyber crime, hacking attacks and cyber laws.
CO4: Understand the concepts of blockchain technology & its need and cryptocurrency.
CO5: Comprehend the applications of blockchain technology.

Max. Marks: 100 (80+20) **Time: 3Hrs**

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one quest ion from each Unit.

UNIT - I

Introduction to Cyber Security: Overview of Cyber Security, Internet Governance – Challenges and Constraints; Cyber Threats: Cyber Warfare, Cyber Crime, Cyber terrorism, Cyber Espionage; Need for a Comprehensive Cyber Security Policy.

Introduction to Vulnerability Scanning: Overview of vulnerability scanning, Open Port/Service Identification, Banner/Version Check, Traffic Probe, Vulnerability Probe, Vulnerability Examples, OpenVAS, Metasploit.

Network Vulnerability Scanning: Netcat, Socat; understanding Port and Services tools - Datapipe, Fpipe, WinRelay; Network Reconnaissance – Nmap, THC-Amap and System tools, Network Sniffers and Injection tools – Tcpdump and Windump, Wireshark, Ettercap, Hping, Kismet.

UNIT - II

Network Defense Tools: Firewalls and Packet Filters - Firewall Basics, Packet Filter Vs Firewall; Network Address Translation (NAT) and Port Forwarding; Basics of Virtual Private Networks, Linux Firewall, Windows Firewall.

Web Application Tools: Scanning for web vulnerabilities tools- Nikto, W3af; HTTP utilities - Curl, OpenSSL; and Stunnel, Application Inspection tools – Zed Attack Proxy, Sqlmap. DVWA, Webgoat; Password Cracking and Brute-Force Tools – John the Ripper, L0htcrack, Pwdump, HTCHydra.

UNIT - III

Cyber Crimes and Law: Introduction to Cyber Crimes, Types of Cybercrime, Hacking, Attack vectors, Cyberspace and Criminal Behavior, Digital Forensics, Realms of the Cyber world, Recognizing and Defining Computer Crime, Contemporary Crimes, Computers as Targets, Contaminants and Destruction of Data, Indian IT ACT 2000.

Cyber Crime Investigation: Firewalls and Packet Filters, password Cracking, Keyloggers and Spyware, Virus and Warms, Trojan and backdoors, Steganography, DOS and DDOS attack, SQL injection, Buffer Overflow, Attack on wireless Networks.

UNIT - IV

Blockchain Technology: Cryptography - Hash function, Digital Signature - ECDSA, Memory Hard Algorithm, Zero Knowledge Proof; **Blockchain Overview:** Introduction, Advantage over conventional distributed database, Blockchain Network, Mining Mechanism, Distributed Consensus, Merkle Patricia Tree, Gas Limit, Transactions and Fee, Anonymity, Reward, Chain Policy, Life of Blockchain application, Soft & Hard Fork, Private and Public blockchain.

Cryptocurrency: History, Distributed Ledger, Bitcoin protocols - Mining strategy and rewards, Ethereum - Construction, DAO, Smart Contract, GHOST, Vulnerability, Attacks, Sidechain, Namecoin.

Blockchain Applications: Internet of Things, Medical Record Management System, Domain Name Service and future of Blockchain.

Suggested Readings:

1. Mike Shema: Anti-Hacker Tool Kit, McGraw Hill
2. Nina Godbole and Sunit Belpure: Cyber Security Understanding Cyber Crimes, ComputerForensics and Legal Perspectives, Wiley.
3. Achyut S.Godbole: Data Communication and Networking, McGraw –Hill Education New Delhi.
4. Forouzan: Data Communication and Networking (Global Edition) 5/e, McGraw Hill Education India.

5. Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder: Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction, Princeton University Press.
6. Wattenhofer: The Science of the Blockchain.
7. Antonopoulos: Mastering Bitcoin - Unlocking Digital Cryptocurrencies.
8. Satoshi Nakamoto: Bitcoin: A Peer-to-Peer Electronic Cash System
9. Forouzan, B.A.: Cryptography & Network Security. Tata McGraw-Hill Education.
10. Kahate, A. Cryptography and Network Security. McGraw-Hill Higher Ed.
11. Peter Szor , The Art of Computer Virus Research and Defense, Symantec Press.
12. Markus Jakobsson and Zulfikar Ramzan, Crimeware, Understanding New Attacks and Defenses, Symantec Press, 2008, ISBN: 978-0-321-50195-0.
13. S. Shukla, M. Dhawan, S. Sharma, S. Venkatesan, 'Blockchain Technology: Cryptocurrency and Applications', Oxford University Press, 2019.
14. Josh Thompson, 'Blockchain: The Blockchain for Beginnings, Guild to Blockchain Technology and Blockchain Programming', CSI Publishing Platform, 2017.
15. Any other book(s) covering the contents of the paper in more depth.

Note: Latest and additional good books may be suggested and added from time to time

21MCA24DA2: EDGE AND FOG COMPUTING

Course Outcomes:

By the end of the course the students will be able to:

CO1: Become familiar with the concepts of Fog Computing and its characteristics.

CO2: Understand Fog computing services, its components and Fog protocols.

CO3: Understand privacy-preserving computation in Fog computing.

CO4: Comprehend self-aware fog computing and cyber physical systems.

CO5: Understand leveraging fog computing in Healthcare IoT and other important Case Studies.

Max. Marks: 100 (80+20) **Time: 3Hrs**

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one quest ion from each Unit.

UNIT - I

Evolution of Edge and Fog Computing: Introduction to Edge Computing, Cloud Computing analytics pipeline, Cloud databases, Coordination of Cloud Services, Geo-Distributed Computing, Edge Architectures, Edge Computing Applications. Concept of Fog Computing, Background and Motivation, Definition, Pros and Cons, Myths of Fog Computing, Characteristics, Issues, Application Scenarios, Fog Computing Services, Fog

Computing Components; Fog Computing vs Edge Computing vs Cloud Computing, Fog Resource Estimation and its challenges, Software architecture.

UNIT - II

Fog Protocols: Fog Protocol, Fog Kit, Proximity Detection Protocols- DDS/RTPS computing protocols

Fog Computing in Support of Hierarchical Emergent Behaviors: Introduction – Fog Computing – Hierarchical Emergent Behaviors, A Fresh Approach for ULSS - Two Autonomous Vehicles Primitives Case Study.

Privacy-Preserving Computation in Fog Computing: Introduction, Block Chain, Multi-Party Computation, Multi-Party Computation and Block Chain.

UNIT - III

Self-aware Fog Computing in Private and Secure Sphere: Cloud, Fog and Mist Computing Networks, Self-aware Data Processing.

Urban IoT Edge Analytics: Design challenges, Edge-assisted Architecture, Information Acquisition and Compression, Content-aware wireless networking, Information availability.

Cyber-Physical Energy Systems over Fog Computing: Power Grid and Energy Management, Energy Management Methodologies, Cyber-Physical Energy Systems, Internet-of-Things and Fog Computing, Control-as-a-Service, Residential Cyber-Physical Energy System.

UNIT - IV

Leveraging Fog Computing for Healthcare IoT: Introduction: Healthcare Services in the Fog Layer, Data management, Event Management, Resource Efficiency, Device management, Personalization, Privacy and Security, System Architecture of Healthcare IoT.

Case Studies: Wind Farm - Smart Traffic Light System, Wearable Sensing Devices, Wearable Event Device, Wearable System, Demonstrations, Post Application Example, Event Applications Example, Health monitoring – Patient Safety monitoring and training support – Smart house.

Suggested Readings:

1. Amir M. Rahmani ,PasiLiljeberg, Preden, Axel Jantsch: Fog Computing in the Internet of Things - Intelligence at the Edge‖, Springer International Publishing, 2018.
2. Amir Vahid Dastjerdi and Rajkumar Buyya: Fog Computing: Helping the Internet of Things Realize its Potential‖, University of Melbourne.
3. Zaigham Mahmood*:* Fog Computing: Concepts, Frameworks and Technologies, Kindle Edition.
4. Rahmani, A., Liljeberg, P., Preden, J.-S., Jantsch, A. (Eds.): Fog Computing in the Internet of Things - Intelligence at the Edge.
5. Assad Abbas, Samee U. Khan, Albert Y. Zomaya: Fog Computing – Theory and Practice, John Wiley & Sons, 2020.
6. Any other book(s) covering the contents of the paper in more depth.

Note: Latest and additional good books may be suggested and added from time to time

21MCA24DA3: HIGH SPEED NETWORKS

Course Outcomes:

By the end of the course the students will be able to:

CO1: Understand high-speed networks and their relevance.

CO2: Learn about network performance evaluation and their analysis.

CO3: Understand ATM traffic management and integrated services.

CO4: Learn about protocols for QoS.

CO5: Understand Internet routing and analysis.

Max. Marks: 100 (80+20) **Time: 3Hrs**

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one quest ion from each Unit.

UNIT - I

Frame Relay Network: Introduction, Packet-Switching Networks, Frame Relay Networks; **Asynchronous Transfer Mode:** ATM Protocol Architecture and Logical Connection, ATM Cells, ATM Service Categories, ATM Adaption Layer; **High Speed LANs:** Fast Ethernet LAN, Gigabit Ethernet, ATM LAN, Network Attached Storage (NAS), Wireless LAN and Wi-Fi, LAN Interoperability.

UNIT - II

Network Performance Evaluation Models: Introduction, Overview of Probability and Stochastic Processes, Queuing Analysis, Self-Similarity Network Traffic.

Congestion Management: Congestion – An Overview, Effects of Congestion, Congestion Control, Traffic Management, Frame Relay Congestion Control, Flow Control Techniques, Error Control Techniques; TCP Traffic and Congestion Control: TCP Flow control, TCP Congestion Control, Performance of TCP over ATM.

UNIT - III

ATM Traffic and Congestion Control: ATM Traffic and Congestion Control, Traffic Management Framework, ABR Traffic Management, GFR Traffic Management; **Integrated Services:** Integrated Service (IntServ) Model, Flow and Service Description, Queuing Discipline, Integrated Services in IP-ATM Networks; **Differentiated Services:** Differentiated Service Architecture, Scalability of DiffServ, DiffServ Functional Elements, Per-Hop Behavior (PHB), Models of DiffServ.

UNIT - IV

Protocols for Quality of Service (QoS) Support: Multicasting, Multicast Transport Protocol (MTP), Resource Reservation Protocol (RSVP), Real-Time Transport Protocol (RTP), Multiprotocol Label Switching (MPLS), Subnet Bandwidth Management (SBM), QoS Architectures, QoS Support for Multicast; **Internet Routing Basics and Design:** Basics of Graph Theory, Internet Routing Principles, Analysis of Shortest Route, Intra-Domain Routing Protocol, Border Gateway Protocol, Inter-Domain Routing Protocol (IDRP).

Suggested Readings:

1. Kaven Pahlavan and Prashant Krishnamoorthy: Principles of Wireless Network, Prentice Hall of India.
2. Adrian Farrel: The Internet And Its Protocols, Elsevier Publications.
3. Larry L. Peterson and Bruce S.Davie: Computer Networks, Elsevier Publications.
4. William Stallings: High-Speed Networks and Internets, Performance and Quality of Service, Pearson Publications.
5. Behrouz A. Forouzan: Data Communications and Networking, Fourth Edition, McGraw Hill.
6. B Muthukumaran: Introduction to High Performance Networks, Mcgraw-Hill
7. Douglas E. Comer: Internetworking with TCP/IP Volume – I, Principles, Protocols, and Architectures, Fourth Edition, Pearson Education.
8. Mahbub Hassan, Raj Jain: High Performance TCP/IP Networking, Concepts, Issues, and Solutions, Pearson Education.
9. Andrew S. Tanenbaum: Computer Networks, PHI.
10. James F. Kurose, Keith W. Ross: Computer Networking, A Top-Down Approach Featuring the Internet, Pearson Education.
11. Any other book(s)covering the contents of the paper in more depth.

Note: Latest and additional good books may be suggested and added from time to time.

21MCA24DB1: MACHINE LEARNING & PYTHON PROGRAMMING

Course Outcomes:

By the end of the course the students will be able to:

CO1: Understand the basic concept of Machine learning.

CO2: Understand supervised, unsupervised and reinforcement learning.

CO3: Familiar with Python environment, data types, operators used in Python.

CO4: Compare and contrast Python with other programming languages and Learn the use of control structures and functions in Python.

CO5: To understand the concepts of modules, packages, 2D & 3D visualization, database and concepts relating machine learning using Python

Max. Marks: 100 (80+20) **Time: 3Hrs**

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one quest ion from each Unit.

UNIT-I

Machine Learning: Introduction, various learning paradigms, perspective and issues, Version spaces, finite and infinite hypothesis spaces, PAC learning, Learning versus Designing, Training versus Testing, Predictive and descriptive tasks.

Supervised Learning: Decision trees- ID3, classification and regression trees; Regression-linear regression, Multiple linear regression, logistic Regression; Support Vector Machines-linear and non-linear, kernel functions, K-nearest neighbors.

UNIT - II

Ensemble Learning: Model combination Schemes, Voting, Error-correcting output codes; Bagging: Random Forest Trees; Boosting: Adaboost, Stacking.

Unsupervised Learning: Introduction to Clustering, Hierarchical: AGNES, DIANA; Partitional: K-means clustering, K-mode clustering, Expectation Maximization, Dimensionality Reduction, Feature Selection, PCA, factor analysis, manifold learning.

Reinforcement Learning: Value iteration; policy iteration; TD learning; Q learning; actor-critic

UNIT-III

Introduction to Python: History and Origin of Python Language, Features, Python, Two modes of using Python interpreter, variable and data types, operator and their precedence, Python string & slicing, Python lists, mutable and immutable types, Input from keyboard. Loops and Iterations, Functions, Strings & Lists.

Modules and Packages: Python Modules and Packages, Different ways to import Packages, File Input/Output ,The pickle module, Formatted Printing, Exception Handling.

Arrays and Matrices: The NumPy Module, Creating Arrays and Matrices, Copying, Arithmetic Operations, Cross product & Dot product , Saving and Restoring, Matrix inversion, Vectorized Functions.

UNIT-IV

2D & 3D Data Visualization: The Matplotlib Module, Multiple plots, Polar plots, Pie Charts, Plotting mathematical functions, Sine function and friends, Parametric plots, Astroid, Ellipse, Spirals of Archimedes and Fermat, Polar Rose, Power Series & Fourier Series, 2D plot using colors, Fractals, Meshgrids, 3D Plots, Surface Plots & Line Plots, Wire-frame Plots, Mayavi, 3D visualization; Files and Streams:File modes and permissions, Reading & Writing data from a file, Redirecting output streams to files, Working with directories, CSV files and Data Files.

Python and Databases: ODBC and Python, Working with database in MySQL.

Machine Learning: Getting started, Mean, median, Mode, Deviation, percentile, Data distribution, Scatter plot, Regression

Suggested Readings:

1. Ethem Alpaydin: Introduction to Machine Learning, MIT Press, PHI, 3rd Edition 2014.
2. M. Gopal: Applied Machine Learning, TMH.
3. Tom Mitchell: Machine Learning, McGraw Hill.
4. Mehryar Mohri, Afshin Rostamizadeh, Ameet Talwalkar: Foundations of Machine Learning, MIT Press, 2012.
5. Vinod Chandra and Anand Harindra: Artificial Intelligence and Machine Learning, PHI.
6. E. Alpaydin: Introduction to Machine Learning, Prentice Hall of India.
7. Ethem Alpaydin: Introduction to Machine Learning, PHI learning.
8. Pooja Sharma: Programming in Python", BPB Publications, 2017.

9. R. Nageswara Rao: Core Python Programming, Dreamtech.
10. Langley: Elements of Machine Learning, Morgan Kaufmann.
11. Hans Fangohr: Introduction to Python for Computational Science and Engineering(A beginner's guide).
12. Timothy A. Budd: Exploring Python, McGraw Hill Education
13. Mark Lutz: Learning Python 4th Edition, O'Reilly Publication
14. Jason Bell: Machine Learning: Hands-On for developers and Technical Professionals Wiley Publication, 2015
15. Any other book(s) covering the contents of the paper in more depth.

Note: Latest and additional good books may be suggested and added from time to time.

21MCA24DB2: WEB DEVELOPMENT USING PHP

Course Outcomes:

By the end of the course the students will be able to:

CO1: Understand regular expressions including modifiers, operators, and meta characters.
CO2: Create PHP programs that use various PHP library functions, and that manipulate files and directories.
CO3: Analyze and solve various database tasks using the PHP language.
CO4: Analyze and solve common Web application tasks by writing PHP programs.
CO5: Formulate, design and create PHP control structures, including selection and iterative structures

Max. Marks: 100 (80+20) **Time: 3Hrs**

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one quest ion from each Unit.

UNIT-I

Introduction to PHP: Evolution of PHP & its comparison with other web programming languages, Interfaces to External systems, Hardware and Software requirements.

Basic PHP Development: PHP Scripting, Working of PHP scripts, Basic PHP syntax, PHP data types, Operators, Variable manipulation, Dynamic variables, Variable scope, and Accessing variable with the global statement Static vs. Dynamic Optimization, Google Caffeine.

Control Statements: if( ) and else if( ) condition Statement, The switch statement, Using while ( ) Loop, The do while statement, Using the for ( ) Loop, Breaking out of loops, Nesting loops.

UNIT-II

String & Arrays: Formatting String for Presentation, Formatting String for Storage, Joining and Splitting String, Comparing String, Matching and replace Substring. Arrays: Anatomy of an Array, Creating index based and Associative array, Accessing array Elements, Looping with Index based array, Looping with associative array using each( ) and foreach( ) loops, Library functions.

Functions: Function definition, Creation, Returning values, User-defined functions, Dynamic function, Function calls with the static statement, default arguments, passing arguments to a function by value.

UNIT-III

Forms: Working with Forms, Super global variables, Super global array, Importing user input, Accessing user input, Handling Html Form With PHP, Using hidden fields, Redirecting the user.

Working with File and Directories: Understanding file & directory, Opening and closing a file, Copying ; renaming and deleting a file, Working with directories, Building a text editor, File Uploading & Downloading.
Generating Images with PHP: Basics computer Graphics, Creating Image , Manipulating Image , Using text in Image.

Object Oriented concept using PHP: Classes, Objects, Polymorphism, Inheritance, Interface, Abstraction, Constructor, Destructor.

UNIT-IV

PHP with MySQL: Creating Connection, Selecting Database, Perform Database (query), Use returned data, close connections, file handling in PHP – reading and writing from and to FILE.

Advance PHP Techniques: Introduction about FTP/SMTP server, Math functions, File upload, File Download, E-mail with PHP, PHP configuration file, Error tackling and debugging.

PHP Project Development: Exposure of Requirements analysis of a Project and its development.

Suggested Readings:

1. Matt Doyle: Beginning PHP 5.3, Willey Publishing.
2. Steve Suehring, JavaScript Step by Step, Microsoft Press, PHI.
3. Harwani: Developing Web Applications in PHP and AJAX, McGraw Hill
4. P.J. Deitel & H.M. Deitel: Internet and World Wide Web- How to Program, Pearson.
5. Web Technologies, Black Book, Dreamtech Press.
6. Steven Holzner: PHP- The Complete Reference, Tata McGraw Hill.
7. Kevin Tetroi: Programming PHP, O' Reilly
8. Any other book(s) covering the contents of the paper in more depth.

Note: Latest and additional good books may be suggested and added from time to time.

21MCA24DB3: NEURAL NETWORKS & DEEP LEARNING

Course Outcomes:

By the end of the course the students will be able to:

CO1: To cover the fundamentals of neural networks and deep learning.

CO2: To cover advanced topics such as recurrent neural networks, long short term memory cells.

CO3: To understand Recurrent neural network, convolutional neural network and theorem for Generative models.

CO4: To implement programming assignments related to neural network's topics.

CO5: To understand the concept of Deep reinforcement learning.

Max. Marks: 100 (80+20) **Time: 3Hrs**

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one quest ion from each Unit.

UNIT-1

Introduction: Biological neuron, Idea of Computational units, McCulloch-Pitts unit and Thresholding logic, Linear Perceptron, Perceptron Learning algorithm, Linear separability; Convergence theorem for Perceptron Learning algorithm.

Feedforward Networks: Empirical Risk Minimization, Regularizing a deep network, model exploration and hyper parameter tuning.

Deep Learning: Historical context and motivation for deep learning, Basic Supervised classification task, Optimizing logistic classifier using gradient descent, Stochastic gradient descent, Momentum, and adaptive sub-gradient method.

UNIT-II

Deep Neural Networks: Difficulty of training deep neural networks, Greedy layerwise training.

Better Training of Neural Networks: Newer optimization methods for neural networks (Adagrad, Adadelta, rmsprop, adam, NAG), second order methods for training, Saddle point problem in Neural network, Regularization methods.

Recurrent Neural Network: Bidirectional RNNs, Encoder-Decoder sequence to sequence architecture, Backpropagation through time, Long Short Term Memory (LSTM), Gated Recurrent Units, Bidirectional LSTMs, Deep Recurrent networks.

UNIT-III

Convolutional Neural Networks: Basics of convolutional neural networks, stacking, striding and pooling, Applications such as image and text classification, LeNet, AlexNet.

Generative Models: Restrictive Boltzmann Machines (RBMs), Introduction to MCMC and Gibbs Sampling, Gradient computations in RBMs, Deep Boltzmann Machines.

Recent Trends: Varitional Autoencoders (Undercomplete autoencoders, regularized autoencoders, sparse autoencoders, denoising autoencoders), Representational power, layer, size and depth of autoencoders, Stochastic encoders and decoders, Generative Adversarial Networks, Multi-Task Deep Learning, Multi-view Deep learning.

UNIT-IV

Deep Reinforcement Learning: Basic concepts of Deep Reinforcement Learning (DRL), DRL process and RL approaches, Algorithms of DRL(Value Learning, Policy Learning),Q-Learning algorithm and its implementation, Digging deeper into Q function, Deep Q Learning algorithm and its implementation with Tensorflow,Deep Q-Network, DRL Applications. Policy optimization: Introduction to policy-based methods, Policy Gradient; Model based RL, Recent Advances and Applications.

Suggested Readings:

1. Ian Goodfellow: Deep Learning, MIT Press.
2. Jeff Heaton: Deep Learning and Neural Networks, Heaton Research Inc.
3. Mindy L Hall: Deep Learning, VDM Verlag.
4. Li Deng, Dong Yu: Deep Learning: Methods and Applications (Foundations and Trends in Signal Processing), Now Publishers Inc.
5. Richard S. Sutton and Andrew G. Barto: Reinforcement Learning: An Introduction, Second Edition, MIT Press.
6. Wiering, Marco, and Martijn Van Otterlo: Reinforcement learning - Adaptation, Learning, and Optimization.
7. Russell, Stuart J., and Peter Norvig: Artificial Intelligence: AModern Approach, Pearson Education Limited.
8. Goodfellow, Ian, Yoshua Bengio, and Aaron Courville: Deep learning, MIT Press.
9. Any other book(s) covering the contents of the paper in more depth.

Note: Latest and additional good books may be suggested and added from time to time.

M.D.U., ROHTAK
W.E.F. 2018-19

A) Open Elective Courses

Students of all PG programmes under CBCS (w.e.f.2018-19) are required to study one open elective course in each of the 2nd and 3rd Semesters for 2-Years Programmes and in each of the 4th and 5th semesters for 3-Years Programmes. They may choose any one of the following courses (excluding the courses offered by the departments of their own subjects, if not stated otherwise).

Open Elective Courses of 2nd Semester:-

Sr. No.	Nomenclature of the course	Course Code	Offered by the Department
1.	Introduction to Bioinformatics	16BINO1	Bioinformatics
2.	Principles and Applications of Agriculture Biotechnology-I	16CBTO1	Biotechnology
3.	Principles and Applications of Biotechnology-I	16CBTO3	Biotechnology
4.	Basic Biochemistry	16BCHO1	Bio-Chemistry
5.	Plant Resource Utilization	16BOTO1	Botany
6.	Cyber Forensic & Security	16CSAO1	Computer Science & Applications
7.	National Security of India	16DSSO1	Defence & Strategic Studies
8.	Basics of Economics	16ECOO1	Economics
9.	Fundamental Aspects of Education	16EDUO1	Education
10.	Indian Literature in Translation - I	18ENGO1	English
11.	Environmental Issues	16ENVO1	Environmental Science
12.	Food Adulteration	16FTEO1	Food Technology
13.	Genetics & Society	16GENO1	Genetics
14.	Basics of Geoinformatics	16GEOO1	Geography
15.	Geography of India Systematic and Regional	16GEOO2	Geography
16.	Nationalism in India	16HISO1	History
17.	Front Office & Guest Services Management	18MHMCTO1	IHTM
18.	Fundamentals of Management	16IMSO1	IMSAR
19.	Media & Society	16JRMO1	Journalism
20.	Family Law	16LAWO1	Law
21.	General Principles of Criminal Law	18LAWO2	Law
22.	Academic Integrity & Plagiarism	16LISO1	Library & Information Science
23.	Mathematical Techniques and Applications	16MATO1	Mathematics
24.	Parametric & Non-Parametric Tests	16MATO2	Mathematics
25.	Principles of Medical Biotechnology I	16MBTO1	Medical Biotechnology
26.	Microbes and Environment	18MCBO1	Microbiology

27.	Sources of Energy-I	16PHYO1	Physics
28.	Administrative Literacy	16PUBO1	Public Administration
29.	Disaster Management - I	16POLO1	Political Science
30.	Ancient Indian Culture & Philosophy	18SKTO1	Sanskrit
31.	Understanding Sociology	16SOCO1	Sociology
32.	Quantitative Techniques	16STAO1	Statistics
33.	Sampling & Estimation Techniques	16STAO2	Statistics
34.	Computer Science Principles	16CSEO1	UIET (Comp. Sc. & Eng.)
35.	Software Engineering Practices	16CSEO2	UIET (Comp. Sc. & Eng.)
36.	Business skills for Biotechnologists	16MBTO1	UIET (Biotech)
37.	Operations Research	16MMEO1	UIET (Mech. Eng.)
38.	Multimedia Communication	16ECEO1	UIET(Electronics & Comm
39.	Applied Zoology	16ZOOO1	Zoology

CENTRE FOR BIOINFORMATICS

M. D. UNIVERSITY, ROHTAK

CBCS-SCHEME OF EXAMINATION (M.Sc. -Bioinformatics)-2016-17 onwards

Course Title: Introduction to Bioinformatics **Credit: 3 0 0**

Course Code: 16BINO1 **MM. Th 80+ IA 20** **Time: 3 Hours**

Note: In all 7 questions are to be set, Question No. 1 is compulsory and to be set covering entire Syllabus. 6 questions will be set with two questions from each unit. Students are required to attempt one compulsory question and 4 other questions, *i.e.*, selecting atleast one from each unit.

UNIT I

Overview of Bioinformatics and Information technology: History, scope and application, Internet and World Wide Web; Generation of computers; Concept of networking; Internet protocols – OSI model; TCP/IP models.

UNIT II

Bioinformatics resources: Biological databases, Basic classification – Sequence & Structure; Generalized & Specialized; Primary & Secondary, with example databases .

Omics science: Introduction to genomics, proteomics, metabolomics, interactomics.

UNIT III

Bioinformatics tools: Information retrieval system (Entrez, SRS); Sequence alignment tools (BLAST, FASTA, CLUSTAL-W/X, MUSCLE, TCOFFEE), Variants of BLAST (BLASTn, BLASTp, PSI-BLAST, PHI-BLAST, etc).

M.Sc Agriculture Biotechnology **Semester-II**

Course Title: Principles and Applications of Agriculture Biotechnology-I

MM. Th 80+IA 20

Time: 2 h

Course Code No. 16CBTO1

NOTE: There shall be seven questions in total. Question No.1 will be compulsory (short answer type) covering the entire syllabus and remaining six questions will be set two from each unit. Students are required to attempt four questions in all by selecting at least one from each unit.

Theory

UNIT I

Tools and techniques used in agriculture biotechnology, restriction digestion (restriction endonucleases, types and mechanism), ligases, alkaline phosphatases, polynucleotide kinase, SI nuclease, DNAse, RNAse, scoreable and selectable markers. PCR, C-DNA and genomic libraries.

UNIT II

Plant tissue culture and its application in crop improvement. Recombinant DNA technology and cloning vectors, Different methods of gene transfer in plants (*Agrobacterium* mediated transfers, microinjection, eletroporation, somatic cell hybridization).

UNIT III

Genetic and Molecular basis of Heterosis and Apomixis and their significance, Mutations and polyploidy in crop improvement, Molecular markers, Marker assisted breeding, QTL mapping, Origin, evolution and cultivation practices of the major crop plants. Improvement of crop plants: increase in iron, protein and amino acids, golden rice colours – anthocyanins, betalaines, crocin and crocetins. Flavours–capsaicin, vanillin, stevioside thaumatin. Developing vaccine and plantibodies, terminator technology and male sterility

Suggested readings:

1. Hou CT, Shaw JF (2009) – Biocatalysis and agricultural biotechnology, CRC Press, USA
2. Agricultural biotechnology, 1st edition, (2008) Rawat H, Oxford Book Co, India.
3. Agrobiotechnology and plant tissue culture, Bhojwani SS, Soh WY, Oxford & IBH Publ, India
4. Agricultural biotechnology, (2005), Kumar HD, Daya Publ House, India
5. Plant molecular breeding, (2009), Newbury HJ, John Wiley and Sons., USA.
6. Embryology of Angiosperms, (2009), S.S. Bhojwani and S.P. Bhatnagar, Vikas Publ House, India.
7. Ashwani Kumar, Shekhawat NS (2009) – Plant tissue culture and molecular markers: theor role in improving crop productivity (IK International) 8. Biotechnology, 4th edition, (2010), H K Das, Wiley India Pvt. Limited, India
8. Biotechnology, 4th edition, (2010), H K Das, Wiley India Pvt. Limited, India

M.Sc Biotechnology **Semester-II**
Course Title: Principles and Applications of Biotechnology-I

MM. Th 80+IA20
Time: 2 h

Course Code No. 16CBTO3
NOTE: There shall be seven questions in total. Question No.1 will be compulsory (short answer type) covering the entire syllabus and remaining six questions will be set two from each unit. Students are required to attempt four questions in all by selecting at least one from each unit.

UNIT I

Molecular cloning tools; Restriction modification systems: Types I, II and III. Mode of action and nomenclature, DNA modifying enzymes and their applications: DNA polymerases, DNA phosphatases, and DNA ligases; Cloning Vectors: Definition and Properties, Plasmid vectors: pBR and pUC series; Bacteriophage lambda and M13 based vectors, Cosmids, BACs, YACs, linkers and adaptors.

UNIT II

Protein expression vectors: *E. coli* lac and T7 promoter based vectors, yeast YIp, YEp and YCp vectors, Baculovirus based vectors, mammalian SV40 based expression vectors, Methods in Molecular Cloning, Transformation of DNA: Chemical method & Electroporation; Gene delivery: Microinjection, electroporation, biolistic method (gene gun), liposome and viral mediated delivery, Agrobacterium mediated delivery, in vitro culture of plant and animal cells

UNIT III

DNA Amplification and DNA sequencing; PCR, RT-PCR, Sanger's method of DNA Sequencing: traditional and automated sequencing, Introduction to next generation sequencing, Chromosome walking & jumping, shotgun sequencing. Preparation, uses and screening of Genomic and cDNA libraries; Colony hybridization and colony PCR applications of Recombinant DNA Technology; Products of recombinant DNA technology: Products of human therapeutic interest-insulin, antisense molecules, Applications of recombinant DNA in crop improvement, Gene therapy, Recombinant vaccines, Protein engineering, Site directed mutagenesis and Biosensor technology

Suggested readings:

1. Brown, TA (2010) Gene Cloning and DNA Analysis: An Introduction, Sixth Edition. A John Wiley & Sons, Ltd., Publication, Germany.
2. Clark DP, Pazdernik NJ (2009) Biotechnology: Applying the Genetic Revolution. Elsevier Academic Press, USA.
3. Primrose SB, Twyman RM (2006) Principles of Gene Manipulation and Genomics, 7th Edition. Blackwell Publishing, Oxford, U.K.
4. Wiley JM, Sherwood LM, Woolveron CJ (2008) Prescott, Harley and Klein's Microbiology. McGraw Hill Higher Education.
5. Primrose SB and Twyman RM (2008) Genomics: Applications in human biology. Blackwell Publishing, Oxford, U.K.

Open Elective papers offered by Department of Biochemistry

16BCHO1: Basic Biochemistry

Note: Question 1 will be compulsory and will cover the entire syllabus in the form of short questions. Question 2 to 7 will include three questions from each unit and candidate will have to attempt two questions from each unit. Overall, three questions to be attempted. All questions to carry equal marks(16).

MM. Th 80+IA 20

UNIT I:

*Cell***:** definition, general structure and size of some important cells, general functions of cell organelles, basic difference in prokaryotic and eukaryotic cells

Carbohydrates: Definition, classifications and sources of carbohydrates, occurrence and biological functions of monosaccharides, disaccharides, and polysaccharides

*Lipids***:** Introduction, classification and functions of lipids. Saturated and unsaturated fatty acids.Essential fatty acids.Triacylglycerides and their properties,

*Amino acids***:** Nutritionalclassification of amino acids and physical properties of amino acids.
*Proteins***:** Definition, types, sources, properties and biological significance of proteins,Primary, secondary, tertiary and quaternary structure of proteins.

UNIT 2:
Nucleic acids: Nucleotides & nucleosides, types of DNA and RNA, evidence that DNA is the genetic material, feature of DNA double helix, Size of DNA in prokaryotic and eukaryotic cells.
*Vitamins***:** Sources, examples and classification, important functions of fat soluble and water soluble vitamins
Enzymes: History, general characteristics, nomenclature and IUB classification of enzymes, holoenzyme, apoenzyme, coenzymes, prosthetic groups, cofactors, activators, inhibitors, active site, metalloenzymes and isozymes, Units of enzyme activity, examples of some clinically important enzymes

Factors affecting enzyme activity: pH, temperature, time of incubation, enzyme concentration and substrate concentration. Properties of allosteric enzymes and their significance.

Suggested Readings for 16BCHO1: Basic Biochemistry:

1. Lehninger Principles of Biochemistry 4th Ed ***By*** David L. Nelson and Michael M. Cox, WH Freeman and Company.
2. Principles of Biochemistry ***By*** Geoffrey Zubay. Publisher: McGraw Hill College.
3. Biochemistry: The Molecular Basis of Life ***By*** Trudy McKee and James R McKee. Publisher: McGraw-Hill Higher education.
4. Biochemistry: Biomolecules, Mechanisms of Enzyme Action and Metabolism Vol 1 ***By*** D Voet. John Wiley and Sons.
5. Biochemistry ***By*** U. S. Satyanarayana
6. Outlines of Biochemistry ***By*** Eric C Conn, PK Stumpf, G Bruening and Ray H. Doi. John Wiley & Sons.

DEPARTMENT OF BOTANY

Open Elective Paper: Plant Resource Utilization
Semester-II: Paper Code: 16BOTO1

MM. Th 80+IA 20
Time: 3 hrs.

Note: The examiner is required to set even questions in all. Question No. 1 will be compulsory and short answer type covering the entire syllabus. The remaining six questions will be set with two questions from each unit. The candidate will be required to attempt Question 1 and four more selecting at-least one from each unit.

UNIT-I

Origin of Agriculture, World Centres of Primary diversity of domesticated plants: Plant Introductions and Secondary Centres.
Botany, Cultivation, Harvesting and uses of Wheat and Rice.
Botany, Cultivation and uses of following fruits and vegetables: Mango, Apple, Banana, Potato, Alliums, Cabbage, Spinach and Tomato

UNIT-II

General Account of the Spices: Ginger, Turmeric, Cinnamon, Clove,
Beverage Plants: Source and general account of Tea and Coffee.
Legumes: Origin, Botany, Cultivation and uses of Pigeon pea, Chick pea, Cluster bean
Medicinal Plants: Plants as sources of drugs, parts used and uses.
Fibres: Types of fibres - Soft fibres, Hard fibres, Surface fibres, Brush fibres and Braiding fibres.

UNIT-III

Gums: Important commercial gums and their uses.
Tannins and Dyes: Sources and their uses.
Vegetable Oils and Fats: Distinction between fatty and essential oils. Drying (Soyabean and linseed), nondrying (Groundnut and Mustard oil) and Semi drying (cottonseed and Sunflower oil) oils and their uses.
Wood and its Uses: Soft woods and hard woods, wood as fuel, construction material
Genetic Resources and their conservation.

SUGGESTED READINGS

1. Anonymous. *National Gene Bank*: Indian Heritage on Plant Genetic resources (Booklet). National Bureau of Plant Genetic Resource, New Delhi. 1997.
2. Cobley, L.S. and W.M. Steels. *An Introduction to the Botany of Tropical Crop*

Plants.3rd Ed. The English Language Book Society and Longman, London. 1979.
3. Bole, P.V. and Y. Vaghani. *Filed Guide to Common Indian Trees.* Oxford University Press, Mumbai. 1991.
4. Chandel, K.P.S., G. Shukla and N. Sharma. *Biodiversity in Medicinal and Aromatic Plants in India: Conservation and Utilization.* National Bureau of Plant Genetic Resources, New Delhi. 1996.
5. Conway, G. and V.W.Rattan. *The Doubly Green Revolution. Food for all in the 21st Century*. Cornell Univ. Press. 1999.
6. Dastur, J.F. *Medicinal Plants of India and Pakistan.*3rd Ed. Meyerbooks. 1985.
7. Hill, A.F. *Economic Botany.* McGraw Hill Book Co. Inc., New York. 1986.
8. Kirtikar, K.R. & D.D. Basu. *Indian Medicinal Plants.* Vols. I & II. 2nd Ed. Lalit Mohan Basu, Allahabad. 1953.
9. Kochhar, S.L. *Economic Botany of the Tropics*.2nd Ed. MacMillan India Ltd., Delhi.
10. Leonard, W.H. & J.H. Martin. *Cereal Crops.* MacMillan Co., New York, USA. 824 pp. 1963.

DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS

OPEN ELECTIVE COURSE

CYBER FORENSIC AND SECURITY

Paper Code: 16CSAO1

MM. Th 80+IA 20

Time: 3Hrs.

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT-1

Introduction to Information Systems: Types of information Systems, Introduction to information security, Need for Information security, Threats to Information Systems, Information Security Investigations.

Security threats - Sources of security threats- Motives - Target Assets and vulnerabilities – Consequences of threats- E-mail threats - Web-threats - Intruders and Hackers, Insider threats, Security Threats to E-Commerce, Cyber-crimes.

UNIT-2

Cyber Forensics: Cyber Security, Cyber Security roles, Cyber Security Principles, Difference between information Security and Cyber Security, Types of Computer Forensics Technology, Types of Military Computer Forensic Technology, Types of Law Enforcement: Computer Forensic Technology, Types of Business Computer Forensic Technology, Specialized Forensics Techniques, Hidden Data and How to Find It, Spyware and Adware, Encryption Methods and Vulnerabilities, Protecting Data from Being Compromised Internet Tracing Methods, Security and Wireless Technologies, Avoiding Pitfalls with Firewalls Biometric Security Systems

UNIT-3

Ethical Hacking: Essential Terminology, Hacking windows – Network hacking – Web hacking – Password hacking, Malware, Scanning, Cracking. Digital Evidence in Criminal Investigations: The Analog and Digital World, Training and Education in digital evidence, Evidence Collection and Data Seizure: Why Collect Evidence, Collection Options Obstacles, Types of Evidence, The Rules of Evidence, Volatile Evidence, General Procedure, Collection and Archiving, Methods of Collection, Artifacts, Collection Steps, Controlling Contamination: The Chain of Custody, Reconstructing the Attack, The digital crime scene, Investigating Cybercrime, Duties Support Functions and Competencies.

UNIT-4

Cyber Crimes and Cyber Security Standards: Crime incident Handling Basics: Cyber activism, Tracking hackers, clues to cyber-crime, privacy act, search warrants, common terms, organizational roles, procedure for responding to incidents, reporting procedures, legal considerations, Information Technology Act 2000: Scope, jurisdiction, offense and

contraventions, powers of police, adjudication, Intellectual property issues in cyberspace, ISO, Copyright Act, Patent Law, Cyber Laws in India.

Reference Books:

1. V.K. Pachghare, "Cryptography and Information Security", PHI Learning Private Limited, India.
2. William Stallings and Lawrie Brown, "Computer Security: Principles and Practice", Prentice Hall.
3. Swiderski, Frank and Syndex, "Threat Modeling", Microsoft Press.
4. John W. Rittinghouse, William M. Hancock, "Cyber Security Operations Handbook", ElsevierPub.
5. Deborah G Johnson, "Computer Ethics", 4th Edition, Pearson Education Publication.
6. Earnest A. Kallman, J.P Grillo, "Ethical Decision making and IT: An Introduction with Cases", McGraw Hill Publication.
7. Dr. Surya Prakash Tripathi, RitendraGoyal, Praveen Kumar Shukla, "Introduction to Information Security and Cyber Law", WilleyDreamtech Press.
8. Kenneth J. Knapp, "Cyber Security and Global Information Assurance: Threat Analysis and Response Solutions", IGI Global.
9. Cahnder, Harish, "Cyber Laws and Its Protection", PHI Learning Private Limited,Delhi,India
10. Michael E. Whitman, Herbert J. Mattord, "Principles of Information Security", Cengage Learning Pub.
11. Charles P. Pfleeger, Shari LawerancePfleeger, "Analysing Computer Security", Pearson Education India.
12. Joseph M Kizza, "Computer Network Security", Springer Verlag.

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OPEN ELECTIVE OFFERED BY THE DEPARTMENT
Of
Defence and Strategic Studies

SEMESTER-II

PAPER CODE-16DSSO1

NATIONAL SECURITY OF INDIA

Maximum Marks: 100

Credits: 3:0:0 **Theory Marks: 80**

Time Allowed: 3 Hours **Internal Assessment Marks: 20**

INSTRUCTION FOR THE PAPER SETTERS

The Paper-Setters/Examiners will have to set Eight Question, selecting two from each out of Unit-I,II, III and IV. And one question consisting of Ten short answer type questions, without it any internal choice covering the entire syllabus be set in Unit V of the question Paper.

The Question Paper will consist of five units: I, II, III, IV and V. Unit-V will be compulsory. The first Four Units will contain two questions each from the respective syllabus and each question will carry 15 marks. Unit V of the question and will contain Ten short answer type question, with any internal choice and will cover the entire syllabus uniformly. Each short answer type question will carry Two marks. The Question Paper should be set strictly according to the syllabus. Separate marks for each question. Should be indicated in the question papers.

UNIT-I

1. **National Security Concepts:-**
   - a) **Definition of National Security, National Defence and National Interest.**
   - b) **Elements of National Security.**

UNIT-II

2. **National Security Structure:-**
   - a) **National Security Council and Cabinet Committee on Security affairs.**
   - b) **Armed Forces, Para-Military Forces.**

UNIT-III

3. Threats to Indian Security:-

a) Internal – Threats

b) External – Threats

UNIT-IV

4. India and Its Neighbours:-

a) India's Geo-Strategic Location

b) India's Relations with its neighbours

Books Recommended

1. Howard, Michael, "Theory and Practice of War"

2. Howard, Michael, "The Causes of War"

3. Bernard Black, L, "War and Its Causes"

4. Wright, Quincy, "A Study of War"

5. Mao-Tse-Tung, "Guerilla Warfare"

6. Legueur Walter, "Guerilla Warfare"

7. Robert E. Osgood, "Limited War – The Challenges to American Strategy".

8. Rees David, "Korea, the limited War"

9. Kitson Frank, "Low Intensity Operations, Subversion Insurgency, Peace keeping"

10. Osanka F.M., "Modern Guerilla Warfare"

11. Nasution, Abdul H., "Fundamentls of Guerilla Warfare"

12. Brodie, Bernard, "Strategy in the Missile Age"

13. Sampooraan Singh, "India and the Nuclear Bomb"

14. Tirpathi, K.S., "Evolution of Nuclear Strategy"

15. **Gupta, Rakesh, "Militarisation of outer-space"**

16. **Encyclopedia Britannica**

17. **Halperin Morton H., "Defence Strategies for the seventies"**

18. **Mir Publications, "Weaponary in Space, The Dilemma of Society"**

MA (Economics)

Semester-II

16ECOO1 - Basics of Economics (Open Elective Paper)

Max. Marks: 100 **Written Exam:80**

Time: 3 Hrs. **Internal Assessment: 20**

Unit -1

What is an Economy? Control problems f an Economy: What, how and for whom to produce, concept of production possibility function and opportunity cost.

Unit-II

Consumer's equilibrium – meaning of utility, marginal utility, conditions of consumer's equilibrium.

Unit-III

Demand, market demand, determinants of demand, demand schedule, price elasticity of demand, factors effecting price elasticity of demand.

Unit-IV

Cost and Revenue: Total cost, Total fixed cost, Total variable cost.
Average cost: Average fixed cost, average variable cost
Revenue- Total revenue and marginal revenue,-meaning their relationship

Note:

(A) Nine questions would be set in all.

(B) Question No. 1 based on the entire syllabus, would be compulsory. It would contain eight short answer questions of two marks each.

(C) There would be two questions (16 marks each) from each of four units.

(D) Candidates would be required to attend five questions (one compulsory and selecting one from each unit).

Reading List:

- D.N. Divedi: Principles of Economics, 2nd Edition, Vikas Publication House.
- R Dutta and K P M Sundaram: Indian Economy, S Chand
  A.N.Agarwal: Indian Economy, Problems of Development and Planning, New Age.
- Mishra and Puri: Indian Economy, Himalaya.

OPEN ELECTIVE - I (FUNDAMENTAL ASPCETS OF EDUCATION)
16EDUO1

Time: 3 Hours **Max. Marks: 100**
Credits: 03 **(Theory: 80, Internal: 20)**

NOTE FOR PAPER SETTER

I Paper setter will set 9 questions in all, out of which student will be required to attempt 5 questions

II Q. No. 1 will be compulsory and will carry 16 marks. It will comprise of 4 short answer type questions of 4 marks each to be selected from the entire syllabus.

III Two long answer type questions will be set from each of four units, out of which the students will be required to attempt one question from each unit. Long answer questions will carry 16 marks each.

IV All questions carry equal marks

COURSE OBJECTIVES:

After completing the course, the students will be able to:

understand nature and functions of education and philosophy and their relationship

explain the meaning, types and scope of educational technology

acquaint the learner with the process of development and assessment and its implication in teaching learning process

develop an understanding of different stages of growth and development.

understand the concept of educational sociology and sociology of education.

acquaint students with the basics of social organization and its concept.

develop an understanding of different factors influencing social organization-folkways, mores, institutions; values.

COURSECONTENTS

UNIT – I

Education and Philosophy

Concept of Education and Philosophy.

Nature of Education and Philosophy.

Relationship of Education and Philosophy.

Need of Philosophical Foundations of Education.

Branches of Philosophy; Metaphysics, Epistemology and Axiology, their implications for Education; Philosophical redirection of educational research in recent times.

UNIT–II

Educational Technology. Meaning, Nature, Approaches, Types, Scope And Significance Of Educational Technology

Programmed Instruction: Concept, Principles and Styles of Programmed Instruction Development of Programmed Instructional Material.

ICT In Education; Computer Assisted Instruction, Computer Managed Learning And Process of development of Computer based instructional material, Web Integrated Learning.

E-Learning and Virtual classrooms.

UNIT-III

Developmental Aspects of the Learner

Educational Psychology: Concept and scope

Concept of Teaching and learning

Role of Educational Psychology in the Teaching –learning process

Concept of Growth and development and principles' of development and its implications to teaching and learning process.

Genetic epistemology of Jean Piaget.

Motivation: Need, types and how can a teacher motivate students for learning.

Factors affecting Learning.

UNIT – IV

Concept of Educational Sociology and Sociology of Education

Social organization and its concepts.

Factor influencing social organization-folkways, mores, institutions; values.

Dynamic characteristics of social organization and its educational implications.

Education as an investment.

Brain drain: Concept, factors responsible for Brain drain, how to check brain drain from our country.

Suggested Readings:

Andrews, T.W. (1961).Methods in Psychology, New York: John Wiley and Sons, Inc.

Baller, Warren R., Don, C.(1962). The Psychology of Human Growth and Development, New York: Holt, Rinehart and Winston.

Banerjee A.C. & Sharma S.R. (1999) : Sociological and Philosophical issues in Education, Jaipur : Book Enclave.

Bhushan, A & Ahuja, M. (1992), Educational Technology, Meerut : Vikas Publication.

Bloom, B.S. (1972), Taxonomy of Educational Objectives. A Hand Book- I (Cognitive Domain), New York: Devid Mokeay Campo.

Chauhan S.S.(1978), A Textbook of Programmed Instruction, New Delhi : Sterling Publishers.

Das, R.C.(1993), Educational Technology: A Basic Text, New Delhi: Sterling Publishers.

Dave, R.H (1969). Taxonomy of educational objectives and achievement testing; development of educational testing vol. 1. London: University of London Press.

Mangal. S.K. (2009). Essentials of Educational Technology. New Delhi: Prentice Hall of India pvt. Ltd.

Sharma, Hemant Lata (2014). Innovative inputs in ICT. Jalandhar: Amit Prakashan.

Sharma, Hemant Lata & Sharma, Savita (2010). Learning to Learn With Love : Theory and Practices of Co-operative Learning, New Delhi : Gagandeep Publication.

Pnadey, K.P.(1983). Perspective in Social Foundation of Education, Amitash Prakashan, Ghaziabad.

Kamat, A.R.,(1985).Education and Social Change in India, Samaiya Publishing Co., Bombay.

Maunheim, K.et al.,(1962). An Introduction to Sociology of Education. Routledge and Kegam Paul,London.

Mossish , Loor., (1972). Sociology of Education: An introduction, George Allen and Unwin, Londo

Walia J.A., (2011): Philosophical, Sociological and Economic Bases of Education, Jalandhar: Ahim Paul Publishers

DEPARTMENT OF ENGLISH AND FOREIGN LANGUAGES
Semester II
Code: 18ENGO1

OPEN ELECTIVE COURSE -I
Nomenclature of the Course: Indian Literature in Translation - I

Total Marks: 100
External Marks: 80
Internal Marks: 20
Time : 3 hrs

Lectures 3 Tutorials 0
Total Credits: 3

Learning Objectives:

- To familiarise the students with contemporary Indian narratives written in regional languages

Learning Outcomes:

- Ability to comprehend and appreciate Indian literature with professional competence
- Humanizing the academic programmes of other disciplines particularly programmes offered by science departments

Unit I

Amrita Pritam: *Pinjar* (from *Pinjar: The Skeleton and Other Stories* trans. and adapted Khushwant singh)

Unit II

Indira Goswami: *The Blue-Necked God* (trans. Gayatri Bhattacharya)

Unit III

Shrilal Shukla: *Raag Darbari* (trans. Gillian Wright)

Instructions to the Paper-Setter and the students:

All questions are compulsory and carry equal marks.

Question 1 will comprise six short-answer type questions. There will be two questions from each Unit.

Students will be required to attempt any four (in about 200 words each) selecting at least one from each Unit.

Questions 2, 3 and 4 (with internal choice) will be long answer-type questions based on Units I, II, and III respectively.

The paper-setter will mention Units.

Suggested Reading:

Baker, Mona and Gabriela Saldanha, eds. *Routledge Encyclopedia of Translation Studies*.

Baker, Mona, ed. *Critical Readings in Translation Studies.*

---. In Other Words: *A Course Book on Translation*.

Gentzler, Edwin. *Contemporary Translation Theories.*

George, Rosemary Marangoly. *Indian English and the Fiction of National Literature.*

Gupta, Akhil. Red Tape: *Bureaucracy, Structural Violence, and Poverty in India.*

Mukherjee, Sujit. ed. *Translation as Recovery.*

---. *Translation as Discovery and Other Essays: On Indian Literature in English Translation*.

Rao,V. Pala Prasada , K. Nirupa Rani, Digumarti Bhaskara Rao. *India-Pakistan: Partition Perspectives in Indo-English Novels.*

Roy, Anjali Gera and Nandi Bhatia. *Partitioned Lives: Narratives of Home, Displacement, And Resettlement.*

Saint,Tarun K. *Witnessing Partition: Memory, History, Fiction.*

Subramanian, Shreerekha. *Women Writing Violence: The Novel and Radical Feminist Imaginaries.*

Tiwari,Shubha. *Indian Fiction in English Translation*.

Semester –II

Open Elective

16ENVO1: Environmental Issues

MM. Th 80+IA 20 Time : 3 Hours.

Note: 1. Seven questions will be set in all.
2. Question No. 1 will be objective covering the entire syllabus & compulsory. The remaining six questions will be set with two questions from each unit. The candidate will be required to attempt five in total, Question I and four by selecting at least one from each unit.

Unit-1

Global Environmental Issues: Green House effect – causes and associated hazards, Ozone layer depletion – causes and associated hazards, Deforestation, Human Population Growth. Environmental problems associated with urbanization, industrialization, modernization of agriculture

Unit-2

Regional Environmental Issues: Forest and Wildlife management, desertification, reclamation of degraded land; Human intervention on wetlands, siltation and eutrophication, reclamation of wetlands, Mining and Environment, Open cast mining, Oil exploration and transportation, Deforestation and their impact on environment.

Unit-3

Pollution: Air Pollution : Causes of air pollution, Some important pollutants of air (CO, SO_X, NO_X and HC and Particulates) – their sources and effects on living and non-living organisms. Water Pollution: Sources of pollution of surface and ground water, Types of water pollutants. Solid Waste – Sources, characterization, disposal and management. Soil Pollution sources of soil pollution, Pollution and residual toxicity from the application of insecticides, pesticides and fertilizers; Soil erosion.

List of Recommended Books

1. Fundamentals of Environmental Science: G. S. Dhaliwal, G. S. Sangha and P. K. Raina, Kalyani Publication
2. Environmental Chemistry : A. K. De
3. Environmental Chemistry : B.K. Sharma, and H. Kaur
4. Fundamentals of Ecology : E. P. Odum
5. Environmental Science (6th ed) (1997): Jr. G. T. Miller, Wadsworth Pub. Co.

Food Adulteration

PAPER CODE: 16FTEO1

There will be seven questions in all. The first question will be compulsory and short answer type covering the entire syllabus. The remaining six questions will be set with two questions from each unit. The candidate will be required to attempt question 1 and four more selecting atleast one from each unit.

MM. Th 80+IA 20

Time: 3h

Unit I

Basic food groups, Function of foods and its general composition.

Food Quality & Safety, various aspects of food quality & safety, challenges of food safety.

Food adulteration and contamination, common food contaminants & adulterants

Unit II

Food Adulteration: Nature of adulterants, methods of evaluation of food adulterants and toxic constituents in foods, common food adulterants & their detection on various foods like

a) Milk and Milk products
b) Oils and fats
c) Spice and condiments
d) Wheat and other flours
e) Sugar and Preserve
f) Fruit and Vegetable products
g) Beverages Alcoholic and Non-Alcoholic

Unit III

Food Laws and Regulation: Prevention of Food Adulteration Act 1954, Food Safety and Standards Act (2006), Food Safety and Standards Authority of India (FSSAI), BIS, FPO, APEDA.

Recommended Books:

1. Gould, W.A and Gould, R.W. (1998). Total Quality Assurance for the Food Industries, CTI Publications Inc. Baltimore.
2. Furia, T.E. Ed. 1980. Regulatory Status of Direct Food Additives. CRC Press, Florida.
3. Rekha S. Singhal , Pushpa R. Kulkarni, Dananesh V. Rege, (1997). Hand Book of Indices of food Quality and Authenticity, wood head Publishing Ltd.
4. Siva Kiran, R.R. (2012). Manual for Detection of Common Food Adulterants, First Edition, IAPEN.
5. Battershal, J.P. (2013). Food Adulteration & its detection, General Books LLC.
6. Prevention of Food Adulteration Act, 4th Edition, Ashoka Law House, 2002

Open Elective Paper (offered by Department of Genetics)

Paper Code: 16GENO1 **Genetics &Society** **Credits: 3**

Internal Assessment Marks: 20

Time: 3 Hrs **Max. Marks: 80**

Instructions

There will be a total of seven questions. Question No. 1 will be compulsory and shall contain eight to ten short answer type questions without any internal choice and it shall cover the entire syllabus. The remaining six questions will include two questions from each unit. The students will be required to attempt one question from each of the four units. The students will attempt four questions in all.

Unit I

Basic principles of inheritance of characters, Chromosomes and genes, pedigree-gathering family history symbols, construction of pedigree ; Consanguinity and its effects; Sex linked anomalies: Haemophilia, Colour blindness; Sex limited and sex influenced traits.Human Health and Disease: Common syndrome according to numerical and structural alteration: Klinefilter, Down's, Turner, Achondroplasia,; Inherited enzyme defects in man: Albinism, Galactosemia; Multifactorial disorders: Diabetes, Schizophrenia, Huntington's disease, Alzheimer's disease; Methods of genetic testing, Prenatal diagnosis, New born screening;DNA fingerprinting:Paternity testing, Individual Identification.

Unit II

GM World: Green revolution, Application r-DNA technology in agriculture: Transgenic crops, Gene gun, GM foods, Ht, Bt and others, Concerns about bio-safety of genetically modified organism (GMO) (Allergen, toxicity, impact on biodiversity etc.); Indian regulatory system for testing of GMOs in laboratory, field trials and commercial release of transgenic ;potential benefits of GMOs.

Unit III

Microbial innovations in pharmaceutical, health, agricultural and industrial sectors; Strategies for selection and improvement of industrial strains of microorganisms;

Stem cell research, Cloning designer babies, Organ banking, Transgenic animals, Creating transgenic animals, In vitro fertilization, Genetic counseling and reproductive decisions, Eugenics;

Role of Genetics for the improvement of Health,Agriculture and environment.

Suggested books:

1. Principles of Genetics by D. Peter Snustad and Michael J Simmons
2. Genes in the Environment- Rosie S. Hails, Wiley-Blackwell Publications
3. The Science of Genetics by Alan G. Atherly, Jack R. Girton, John F. McDonald
4. Principles and branches of Medical Genetics, Emery and Rimoih, Churchill Livingstone, Newyork, Vol-1-3.
5. Industrial Microbiology, G. Reed (editor), CBS Publishers (A VI Publishing Company).
6. Modern Microbial Genetics (2002)-Streips U. N. and Yasbin R.E., Wiley-Liss
7. Plant Biotechnology (2006) - B. D. Singh, Kalyani Publishers
8. Plant Biotechnology-The Genetic Manipulation of Plants (2003) Slater A. Scott N. & Fowler M., Oxford University Press Inc Nigel Jen,
9. Animal Cell Biotechnology:Methods and protocols, Humana Press.
10. Genetics in Medicine 7th Ed (2007) - Thompson and Thompson, Saunders
11. Primose SB, Molecular Biotechnology, Panima, 2001

M.A. Geography Semester-II Session 2016-17 onwards
Open Elective: 16GEOO1
BASICS OF GEOINFORMATICS

Credit: 03 (3+0+0)
End Semester Exam: 80 marks
Internal Assessment: 20 marks
Total: 100 marks Time: 3hrs

Learning Objectives

This course is designed to give students an exposure to basics of geospatial technologies. It offers to learn the techniques of generation and management of earth surface information. An inter and multi disciplinary approach has been used to make subject interesting and useful for students. Latest technology of GPS is included to understand use of modern day navigation and surveying.

Learning Outcomes

Students will be able to learn the use of latest geospatial technology. It will help them to understand the spatial phenomena in a better manner with availability of real time and accurate information. These technologies being modern and interdisciplinary in nature will enable the students to apply this knowledge in various fields of life**.**

Unit – I

Aerial Photography
Aerial photography: history and development, advantages and limitations; Classifications of aerial photographs; Geometry of an aerial photograph; Scale of an aerial photograph; Availability and procurement of aerial photographs in India; Aerial photograph vs map.

Unit – II

Remote Sensing.
Introduction to Remote Sensing; electromagnetic radiation; stages of remote sensing; energy interactions in atmosphere; energy interactions with earth surface features and spectral signatures. Remote Sensing applications in land use/land cover, urban, environment, forest and disaster studies.

Unit – III

Remote Sensing
Remote Sensing platforms: airborne and space borne; satellite orbits: geostationary and near polar; Image data characteristics: resolutions- spatial, spectral, radiometric and temporal; Sensors and their types; Satellite missions of ISRO .

Unit – IV

GIS and GPS
Geographic Information System (GIS): definition and applications; GIS and remote sensing integration; components and elements of GIS; representation of earth surface features in GIS; introduction to Global Positioning System; GPS satellites constellations; GPS segments; Applications of GPS.

Note (i): Open Elective to be chosen from the basket of Open Electives (OEs) provided by the University.

(ii) The question paper will have five units. First four units of question paper will contain two questions from each unit. Candidate(s) are required to attempt one question from each unit. Unit-V shall be compulsory and shall contain eight short answer type questions covering entire syllabus. All questions carry equal marks.

Recommended Readings:

Paul Wolf, Bon DeWitt, and Benjamin Wilkinson. Elements of Photogrammetry with Application in GIS. USA: Mc-Graw Hill Education.2014.

Avery, T.E., and G.L. Berlin. Fundamentals of Remote Sensing and Airphoto Interpretation, Macmillan, New York.1992.

Campbell, J.B. Introduction to Remote Sensing, Guilford, New York.1996.

Curran, Paul J. Principles of Remote Sensing, Longman, London & New York. 1985.

Joseph, G. Fundamentals of Remote Sensing, Universities Press Hyderabad. 2005.

Lillisand, T.M. and P. W. Kiefer. Remote Sensing and Image Interpretation, New York. John Wiley & Sons.1986.

Burrough, P.A. and McDonnell, R.A. Principles of Geographic Information System. Oxford: Oxford University Press. 1998.

Chang, Kang-tsung. Introduction to Geographic Information Systems. New Delhi: Tata McGraw-Hill.2006.

Doberstein, Dan. Fundamentals of GPS Receivers: A Hardware Approach. New York: Springer

MA GEOGRAPHY SEMESTER-II SESSION 2016-17 ONWARDS

Open Elective 16GEOO2

GEOGRAPHY OF INDIA: SYSTEMATIC AND REGIONAL

Credit: 03 (3+0+0)
Exam: 80 marks
Internal Assessment: 20 marks
Total: 100 marks
Time: 3 hrs

Learning Objectives

History, geography and culture have comprised to make India into a major force in South Asia. The course provides an insight into different aspects of India's regional vitality towards unity, stability and progress.

Learning Outcomes

The student will get familiarised with the geographic dimensions of India in terms of its political and administrative characteristics; aspects of its regional vitality; and formation of regions.

Unit-I

India: a historical-geographical expression; Size, location, and boundaries; Physical environment; Historical setting.

Unit-II

Unity in diversity of India: Unifying mechanism and divisive streaks; Evolution of the administrative map of India since Independence.

Unit-III

Regional vitality of India; multiculturalism in India; the Indian diaspora; India's cultural landscape.

Unit -IV

Regionalisation schemes of India: Physiographic (S.P. Chatterjee); Climatic (Koeppen and Trewartha); Agricultural (Jasbir Singh and C.B. Mamoria); and Industrial (B.N. Sinha).

Note (i): Open Elective to be chosen from the basket of Open Electives (OEs) provided by the University.

(ii) The question paper will have five units. First four units of question paper will contain two questions from each unit of the syllabus. Candidate(s) are required to attempt one question from each unit. The unit five shall be compulsory and shall contain eight short answer type questions covering entire syllabus. All questions carry equal marks.

Recommended Readings:

1. Ahmad, Aijazuddin. 1999. *Social Geography*. Rawat Publication, New Delhi.

2. Chandna, R.C. 2002. *Geography of Population.* 5th edn. Kalyani Publishers, Delhi.
3. Deshpande, C.D. 1992. *India: A Regional Interpretation,* ICSSR and Northern Book Center, New Delhi.
4. Hussain, M. 2014. *Geography of India.* 5th edn. McGraw Hill Education, New Delhi.
5. Singh, Jagdish. 2003. *India: A Comprehensive Systematic Geography.* Gyanodya Prakashan, Gorakhpur.
6. Spate O.H.K. & A.T.A. Learmonth. 1967. *Geography of India and Pakistan,* Methuen, London.
7. Sukhwal, B. L. 1971. *India: A Political Geography.* Allied Publishers, New Delhi.
8. Tirtha, Ranjit. 2000. *Emerging India.* Rawat Publications, Jaipur.
9. Tiwari, R.C. 1999. *Geography of India.* Prayag Publishers, Allahabad.
10. Wadia, D. N. 1953. *Geology of India.* Macmillan & Co., London.

HISTORY

Paper: **Nationalism In India**
Paper Code: 16HISO1

Max.Marks : 100
Theory : 80
I.A : 20
Time : 3 Hrs.

Note: Nine questions are to be set in all spreading into five units Each of the first four units shall contain two questions from each unit of the syllabus and Unit-V (Q. No. 9) which will be compulsory, shall contain eight short answer type questions (two marks each) covering the entire syllabus. The Candidates shall be asked to attempt five questions in all selecting one question from each unit including compulsory question. All questions shall carry equal marks.

Unit – I

1. Approaches to Indian Nationalism : Conceptual Debates.
2. Emergence of Organized Nationalism.

Unit-II

1. Trends till 1919
2. Gandhian Movements - Nature, Programme, Social Composition, Limitations and Challenges.

Unit-III

1. Revolutionary and Left Movements.
2. Subhash Bose and INA and Telengana.
3. States' Peoples' Movements.

Unit-IV

1. Working of Congress and Non-Congress Provincial Ministries.
2. Communal Politics and Partition.

Suggested Readings :

Desai, A.R.	:	Social Background of Indian Nationalism, Bombay, 1949
Tara Chand	:	History of the Freedom Movement Vol. I, II, III, IV (4 Vols.), Delhi, 1961
Majumdar, R.C.	:	History of Freedom Movement Vol. I, II, III, Calcutta, 1962-63
Chandra Bipan and others	:	Communalism in Modern India, New Delhi, 1987
"	:	Struggle for Independence of Indi, New Delhi, 1987
Dhankhar, Jaiveer S.	:	A Short History of Hindustan Socialist Republic an Association, Delhi, 2001
"	:	Prelude to Pakistan, Delhi, 2000
Mahrotra, S.R.	:	The Emergence of Indian National Congress, Delhi, 1971
Sarkar, S.	:	Modern India 1885-1947, New Delhi, 1983

Note : In addition, students are advised to consult the current Research Journals of History.

Front Office & Guest Services Management
18MHMCTO1

External Marks: 80
Internal Marks: 20
Credits: 3-0-0

Introduction to Travel and Tourism: Overview, Evolution and constituents of travel and tourism industry. Five A's of Tourism, Types of Tourism.
Introduction to Hospitality Industry: Concept, scope and constituents. Evolution and growth of hotel Industry in the world.

Unit-2

Classification of Hotels: Need and criteria for the classification of hotels. Emerging concepts in hotels. Global trends that will impact hotel industry.
Hotel Organization: Need of organization in hotels. Hotel Organization, Job description, Job specification and various departments and sub departments of a hotel.

Unit-3

Introduction to Front office: Overview, Layout and different sections of front office department. Organization of front office staff, qualities of front office staff.
Knowledge about Accommodation product: Types of guest rooms, Meal plans and types of room rates.

Unit-4

Hotel Guest and Guest Relation: Guest, Guest expectations, Guest Satisfaction, Guest dissatisfaction, and Guest Relation Management.
Guest Services: Guest services and its importance, handling guest mails and messages, paging, safe deposit facility and other services

FUNDAMENTALS OF MANAGEMENT
Course Code: 16IMSO1

MM: Th 80+IA 20

Time: 3 hours

Course Objective:
The objective of this course is to expose the students to basic concepts of management and to enable them to gain appreciation for emerging ideas, techniques, procedures and practices in the field of management.

Unit -I
Introduction: concept and nature of management; evolution of management thoughts – traditional, behavioural, system and contingency viewpoints

Unit -II
Planning, decision making and organizing: nature and elements of planning, planning types and models; strategic planning – an overview; basic issues in organizing – work specialization, chain of common delegation, decentralization, span of management, bases for departmentation

Unit -III
Leading: recognition of human factor, motivation models/approaches; leadership styles/behaviours, personal characteristics of effective leaders, leadership development

Unit -IV
Management control– concept and process, overview of control techniques, effective control system; evaluating corporate social performance; managing company ethics and social responsibility

Suggested Readings:

1. Robbins, S.P. and Decenzo, D.A. Fundamentals of Management , Pearson Education Asia, New Delhi
2. Hellreigel, Management, Thomson Learning, Bombay
3. Koontz, H and Wechrich, H; Management, Tata McGraw Hill
4. Stoner, J et. al, Management, New Delhi, PHI, New Delhi
5. Robbins & Coulter, Management, PHI, New Delhi
6. Satya Raju, Management – Text & Cases , PHI, New Delhi
1. Richard L. Daft, Management, Thomson South-Western

Instructions for External Examiner: The question paper shall be divided in two sections. **Section 'A'** shall comprise of eight short answer type questions from whole of the syllabus carrying two marks each, which shall be compulsory. Answer to each question should not exceed 50 words normally. **Section 'B'** shall comprise 8 questions (2 questions from each unit). The students will be required to attempt four questions selecting one question from each unit. All questions will carry equal marks.

Journalism and Mass Communication

(Open Elective) [for students of other Dept.)

16JRMO1

MEDIA & SOCIETY

2nd Semester

Marks: 100
Credits: 3:0:0 **Theory Marks: 80**
Time Allowed: 3 Hours **Internal Assessment Marks: 20**

Unit I

1. Media Definition
2. Relationship of Media in Society
3. Impact of Media on society- recent trends
4. Media and Social Development

Unit II

1. Media Literacy
2. Impact of Media on children and youth
3. Media and gender issues
4. Media and Rural Society

Unit III

1. Media and Violence
2. Media and Rising Crime
3. Media and Democracy
4. Media and development of Scientific temperament
5. Media and environmental issues

Unit IV

1. Media accountability

2. Media and Economic development
3. Media and Nation building
4. Popular culture and media

LL.M.

Open Elective (Family Law)

PAPER CODE: 16LAWO1

MM: Th 80+IA 20

Time: 3 hours

NOTE FOR EXAMINER/PAPER SETTER

The question paper of each course will be divided into Five sections, each of the First Four Sections of the Question Paper will contain 2 questions respectively from Unit-1 to Unit-4 of the syllabus. The students will be required to attempt one question from each section. Section 5 of the question paper shall contain 8 short answer type questions of 3 marks each(without any choice) covering the entire syllabus. As such Section 5 will be compulsory. The examiner will be free to set the questions in problem forms based on case law.

NOTE FOR STUDENTS(ON QUESTION PAPER)

Attempt four questions from sections 1 to 4, selecting at least one question from each section. These questions shall carry 14 marks each. Section 5 is compulsory and each question in this section shall carry 3 marks.

UNIT-I

Application of Hindu Law, Sources of Hindu, Schools of Hindu Law, Hindu Joint Family, Features of Mitakshra and Dayabhaga Joint Families, Coparcenary, Classification of Property, Karta of Joint Family, Position, Liabilities and Powers of Karta. Karta's powers of Alienation, Coparcener's Power of Alienation, Coparcener's Right to Challenge Improper Alienation, Alienee's Rights and Remedies

Leading Case: Harihar Prasad V Balmika Prasad AIR 1975 SC 733
K.S. Subhiah Pillai V Commissioner of IT AIR 1999 SC 1220

UNIT-II

The nature and concept of Hindu Marriage, Evolution of the Institution of Marriage, The Hindu Marriage Act, 1955, Essential Conditions for Valid Hindu Marriage, Ceremonies of Marriage, Registration of Hindu Marriages, Remedy of Restitution of Conjugal Rights, Void and Voidable Marriages, Judicial Separation and Divorce, Various Types of Grounds for Divorce and Judicial Separation, Fair Trial Rule, Legitimacy of Children, Jurisdiction, Bars to Matrimonial Remedies, Ancillary Reliefs, Permanent Alimony and Maintenance, Custody etc.

Leading Case: Kailishwati V Ayudhia Parkash AIR 1977 PLR 216
Naveen Kohli V Neelu Kohli, (2006) 4 SCC 558

UNIT-III

The Hindu Succession Act, 1956, Effects of the Hindu (Succession) Amendment, 2005, Rules of Succession to the Property of Hindu Male, Succession to the Property of Hindu Female, Succession to the Mitakshara Coparcener's Interest, General Rules of Succession, Partition, Subject Matter of Partition, Persons who have a Right to Partition & Right to Share, Persons who are entitled to Share, if, Partition takes place, Modes of Partition, How Partition is effected, Partial Partition, Reopening of Partition, Re-Union.

Leading Case: Raghuvamma V Chenchamma AIR 1964 SC 136
Commissioner of Income Tax V Chandersen, AIR 1986 SC 1753

UNIT-IV

The Hindu Minority and Guardianship Act, 1956, Concept of Minority and Guardianship, Natural Guardians and their Powers, Testamentary Guardian: Appointment and Powers, Certified Guardian, Defecto Guardian, Guardian By Affinity, The Hindu Adoption & Maintenance Act, 1956, Nature of Adoption, Essential Conditions for Valid Adoption, Effects of Adoption, Registration of Adoption, Maintenance As Personal Obligation, Maintenance of Dependents, Quantum of Maintenance, Maintenance As a Charge on Property

Leading Cases: G. Appaswami Chettiar V R.Sarangapani AIR 1978 SC 1051
Githa Hariharan V Reserve Bank of India(1999)2 SCC 228

BOOKS RECOMMENDED

Mulla	-	Principles of Hindu Law
Dr. Paras Diwan	-	Modern Hindu Law
Mayne's	-	Hindu Law and Usage
Dr. U.P.D.Kesari	-	Modern Hindu Law
Basant Kumar Sharma	-	Modern Hindu Law

LL.M. SECOND SEMESTER EXAMINATION
Open Elective (General Principles of Criminal Laws)

PAPER CODE: 18LAWO2
MM: Theory 80 + IA 20
Time: 3 hours
Credits: 3:0:0

NOTE FOR EXAMINER/PAPER SETTER:

The question paper of each course will be divided into Five sections, each of the First Four Sections of the Question Paper will contain 2 questions respectively from Unit-1 to Unit-4 of the syllabus. The students will be required to attempt one question from each section. Section 5 of the question paper shall contain 8 short answer type questions of 3 marks each (without any choice) covering the entire syllabus. As such Section 5 will be compulsory. The examiner will be free to set the questions in problem forms based on case law.

NOTE FOR STUDENTS (ON QUESTION PAPER):

Attempt four questions from sections 1 to 4, selecting at least one question from each section. These questions shall carry 14 marks each. Section 5 is compulsory and each question in this section shall carry 3 marks.

Unit-I

Offence, Bailable Offence, Non-bailable offence, Cognizable offence, Non-Cognizable offence, Complaint, Inquiry, Investigation

Unit-II

Jurisdiction, Types of Jurisdiction, Summon Cases, Warrant Cases, Types of Courts

Unit-III

FIR, Powers of Police, Charge, Hurt, Grievous Hurt, Kidnapping

Unit-IV

Bail, Anticipatory Bail, Cases in which bail can be granted and bail can be refused.

16LISO1: Academic Integrity and Plagiarism

MM: Th 80+IA 20
Time: 3Hrs.

Note
The paper is divided into 4 units. The candidates are required to attempt 5 questions in all selecting 1 question from each unit (out of two internal choices). Question 1 is compulsory consisting of 8 short answer type questions spread over the whole syllabus. All questions carry equal marks.

Objectives

to know about academic integrity;
to identify instances and types of plagiarism;
to get awareness about plagiarism;
to identify "fair use" applications to the use of someone else's materials;
to find information about the correct way to cite a reference;
to begin to develop your personal philosophy on academic integrity;
to be cautious enough to have deterrence strategies of plagiarism.

Outcomes
The course enables the students to get awareness about the nature and practice of academic integrity and its advantages. Further the completion of the course will guide the students and others to have deterrence policies and strategies to get away from plagiarism activities. After completion of the course, the learners will come to know, how citations are made properly. Over all awareness will be developed to maintain academic honesty with practical examples by the trainers.

Unit 1: Academic Integrity

Academic Integrity: meaning, definition and concept
Reasons: Individual reputation, personal integrity, professional competence, status or standing of the institution
Original writings and contribution to society
Writings and Impact: good and original writings bring credibility; good impact factors; writings meant for the readers and society

Unit 2:Plagiarism

Plagiarism basics: meaning, definition and concept
Plagiarism: concept, need and importance, definitions; types
Copyright and fair use
Hoes does it occur: intentional and unintentional; innocence vs. deception

Unit 3:Plagiarism Deterrence

Deterrence: avoidance, awareness
Guidelines: summarizing, paraphrasing, direct quotations, language and vocabulary
Citations: citation basics; citation styles: parenthetical and superscription
Style manuals : Chicago, APA, MLA, Harvard

Unit 4: Measures, initiative and university agencies

Research and Citation policies: formulation of research polices
Regular trainings & awareness; role of librarians; handling online resources
Anti-plagiarized software; Turnitin; I-authenticate; usefulness and limitations

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Suggested Readings

Cvetkovic, Vibiana Bowman & Anderson, Katie Elson (Eds.) (2010). *Stop plagiarism: a guide to understanding and prevention*. New York: Neel-Schuman.

Lampert, Lynn D. (2008). *Combating student plagiarism: an academic librarian's guide*. Oxford: Chandos.

Posner, Richard (2007). *The little book of plagiarism*. New York: Pantheon Books.

Roth, Lorie (1999). Educating the cut-paste generation. *Library Journal, 124*(18), pp.42-44.

Scalon, Patrick (2003). Student online plagiarism: how do we respond? College Teaching, *51*(4): pp. 161-65.

Swain, N.K. Publish or perish: What the Indian policy makers think about it? *University News*, 52.15 (April 14-20, 2014): pp. 23-28.

Open Electives to be offered by Department of Mathematics

Course Code	Title of the Course	Theory Marks	Internal marks	Practical Marks	Credits (L:T:P)
To be offered in 2nd Semester					
16MATO1	Mathematical Techniques and Applications	80	20	--	3:0:0
16MATO2	Parametric and Non-Parametric Tests	80	20	--	3:0:0

16MATO1: Mathematical Techniques and Applications
(To be offered in Even Semester)

Time: 03 Hours
MM. Th 80+IA 20
Time: 2 h
Credits : 3:0:0

Section - I

Idea of Real Number System, Sets, Relations and functions.
Solutions of linear and quadratic equations; Logrithms and Exponents. Trigonometric functions.

Section - II

Concepts of limit, Continuity and Differentiation. Slope of a straight line.
Increasing and Decreasing functions, Maxima and Minima.

Section - III

Integration - Simple techniques including integration by substitution and by parts for algebraic, exponential and logarithmic functions, Definite integrals. Differential Equation- Solution of first order linear differential equation.

Section - IV

Measures of Central Tendency and Dispersion. Linear Correlation and Regression.

Note : The question paper will consist of **five** units. Each of the first four units will contain **two** questions from unit **I , II , III , IV** respectively and the students shall be asked to attempt **one** question from each unit. Unit five will contain **eight to ten** short answer type questions without any internal choice covering the entire syllabus and shall be **compulsory**.

Books Recommended:

1. Maurice, Weir D., Hass J., Frank, Giordano R., Thomas' Calculus, Pearson.
2. Strang, G., Calculus, Wellesley-Cambridge Press.
3. Heinbockel, J.H., Introduction to Calculus, Vol - 1., http://www.math.odu.edu/~jhh/Volume-1.PDF
4. Goon, A.M, Gupta, M.K and Dasgupta, B, Basic Statistics, World Press.
5. Gupta, S.P, Statistical Methods, Sultan Chand & Sons, New Delhi.

16MATO2: Parametric and Non-Parametric Tests

(To be offered in Even Semester)

Time: 03 Hours
MM. Th 80+IA 20
Time: 2 h
Credits : 3:0:0

Section - I

Parameter and Statistic: Sampling distribution of a statistic, standard error and its utility. Tests of significance: Null and alternative hypotheses, Two types of error, Critical region and level of significance, One-tailed and two-tailed tests, Critical values, Procedure for testing of hypothesis.

Unit -II

Large Sample Tests: Tests of significance for single proportion and single mean, for difference of two proportions, two means and two standard deviations, related confidence intervals for population parameters. Chi-square tests for goodness of fit, Test of independence of attributes.

Unit -III

t-test for single mean, difference of means, F-test for equality of two population variances, related confidence intervals. Applications of ANOVA for one-way and two-way classified data.

Unit -IV

Non-parametric tests: Advantages and drawbacks of non-parametric tests over parametric tests, One sample and two sample sign tests, Median test, Wilcoxon-Mann-Whitney test, One sample runs test, Spearman rank correlation test.

Note : The question paper will consist of **five** units. Each of the first four units will contain **two** questions from unit **I , II , III , IV** respectively and the students shall be asked to attempt **one** question from each unit. Unit five will contain **eight to ten** short answer type questions without any internal choice covering the entire syllabus and shall be **compulsory**.

Books Recommended:

1. Mood, A. M., Graybill, F. A. and Boss, D. C., Introduction to Theory of Statistics, McGraw-Hill.
2. Goon, A. M., Gupta, M. K. and Das Gupta, B., Basic Statistics, World Press.
3. Gupta, S.C. and Kapoor, V. K., Fundamentals of Mathematical Statistics, S. Chand Pub., New Delhi.
4. C. R. Kothari, Research methodology, New Age International Publishers.

M.Sc. Medical Biotechnology Semester -II

Course Title: Principles of Medical Biotechnology-I

MM. Th 80 + IA 20 **Course Code: 16MBTO1** **Time: 3h**

NOTE: The examiner is required to set seven questions in all. Question No. 1 will be compulsory and short answer type covering the entire syllabus. The remaining six questions will be set with two questions from each unit. The candidate will be required to attempt Question 1 and four more selecting at-least one from each unit.

Theory

Unit -I

Innate and acquired immunity. Nature and Biology of antigens and super antigens. Antibody structure and function. Antigen - antibody interactions, ELISA, RIA, Western blot, Immunoprecipitation, Inflammation- Acute and chronic inflammation, Hypersenstivity. Blood group – ABO and Rh. Haemoglobin – Structure, biosynthesis and catabolism.

Unit -II

Different types of anaemia and their causes (Deficiency of iron, B12 and folic acid, hemolytic, aplastic and genetic disorders). Homeostasis – factors, mechanism, anticoagulants, procoagulants. Host microbe interactions, entry of pathogens, growth and multiplication of the pathogens, Endotoxins, Collection and transport of specimens for diagnosis

Unit -III

Methods of antimicrobial activity determination, types of epidemiology, tools of epidemiology, Recognition of an infectious disease in a population, types of epidemics, control of epidemics. General properties of viruses, viral multiplication, viral hemagglutination, Cultivation of viruses, Classification and nomenclature of viruses, host response to virus infection

Recommended Books

1. John E. Hall, Medical Physiology by Guyton, Saunders, 12th edition
2. Mims' Medical Microbiology By (author) Richard Goering, By (author) Hazel Dockrell, By (author) Mark Zuckerman, By (author)Ivan M. Roitt, By (author) Peter L. Chiodini Saunders (W.B.) Co Ltd.
3. Benjamin E. (1996), Immunology - A short course 3rd Edition, John Wiley, New York
4. Kuby J. (1997), Immunology, 3rd Edition, W.H. Freeman & Co., New York
5. Roitt, I.M. (1997), Essential Immunology, 9th Edition, Oxford Black Well Science, London
6. Tizard I.R. (1995), Immunology - An introduction, 4th Edition, Philadephia Sauders College press.

(SEMESTER-II)

Open Elective: 18MCBO1: Microbes and Environment

Time: 03 Hours

MM. Th 80+IA 20

Time: 2 h

Credits : 3:0:0

Note: The question paper will consist of 9 questions. Students will have to attempt 5 questions in total - Question no. 1 will comprise of short answer questions covering the entire syllabus and will be compulsory. Two questions to be set from each Unit and students will have to attempt one from each Unit.

Unit – I

Systematics&Biodiversity:Classification and nomenclature of microorganism.Salient featuresof different groups: Acellularmicroorganisms (Viruses,Viroids, Prions) and Cellular microorganisms (Bacteria, Algae, Fungi andProtozoa) in reference to their distribution and occurrence, morphology, mode ofreproduction and economic importance.

Unit – II

Characteristics of extremophiles:Thermophiles, Methanophiles, Alkalophiles, Acidophiles, Halophiles and Barophiles: Classification, habitats, ecological aspects andapplications.

Unit – III

Microbiological techniques:Preparation of culture media, Pure culture isolation; cultivation,maintenance and preservation/stocking of pure cultures; cultivation of anaerobicbacteria, and accessing non-culturable bacteria. Physical and Chemical methods for the control of microorganisms

Unit – IV

Scope of Microbiology:Role of microorganisms in Food industry, Pharmaceutical industry, Production ofIndustrial enzymes, Agriculture: bio-fertilizers, bio-pesticides. Environment:bioremediation, bioleaching

Suggested readings:

1. Brock TD., Milestones in Microbiology, Infinity Books.
2. Pelczar M.J., Chan E.C.S. & Kreig N.R., Microbiology: Concepts and Application.,Tata McGraw Hill.
3. Stainier RY, Ingraham JL, Wheelis ML & Painter PR General Microbiology, Publisher: MacMillan.
4. Madigan M.T., Martinko J.M. and Parker J., Brock Biology of Microorganisms: Prentice-Hall , Inc USA.
5. Atlas R.M., Principles of Microbiology, Wm C. Brown Publishers.
6. Vandenmark P.V. and Batzing B.L., The Microbes – An Introduction to their nature and Importance: Benjamin Cummings. Microbiology

M.Sc. Physics Semester II

Open Elective – I Sources of Energy – I

PAPER CODE: 16PHYO1

Theory Marks: 80
Internal Assessment: 20
Time: 3 hours

Unit I

Introduction

Limitation of conventional energy sources, need and growth of alternative energy sources, basic scheme and application of direct energy conservation.

Solar Cells:

Solar energy: Introduction, The characteristics of the sun, Definitions related to solar radiations, solar radiation geometry, Estimation of daily solar radiation. Theory of solar cells. Solar cell materials, solar drying, solar furnaces, Solar cooking, solar green house technology, solar thermal power generation, solar cell array.

Unit II

Solar Thermal Energy:

Solar radiations, flat plate collectors and their materials, applications and performance, focusing of collectors and their materials, applications and performance; solar thermal power plants, thermal energy storage for solar heating and cooling, limitations.

Unit III

Geothermal Energy:

Resources of geothermal energy, thermodynamics of geo-thermal energy conversion-electrical conversion, non-electrical conversion, environmental consideration, estimates of geothermal power, nature of geothermal fields, advantages & disadvantages of geothermal energy forms, applications of geothermal energy. Geothermal power plant.

Fuel Cells:

Principle, working of various types of fuel cells, performance and limitations.

Unit IV

Wind Energy:

Wind power and its sources: Principle of working of Wind Energy, performance and limitations of energy conversion systems. Site selection, criteria, momentum theory, wind characteristics.

Text / References Books:

1. John Twideu and Tony Weir, "Renewal Energy Resources" BSP Publications, 2006
2. M.V.R. Koteswara Rao, "Energy Resources: Conventional & Non-Conventional" BSP Publications, 2006.
3. D.S. Chauhan, "Non-Conventional Energy Resources" New Age International.
4. C.S. Solanki, "Renewal Energy Technologies: A Practical Guide for Beginners" PHI Learning.
5. Peter Auer, "Advances in energy system and Technology" Vol I & II Edited by Academic Press.
6. G.D. Rai, "Non-conventional Energy sources" Khanna Publishers
7. Raja A.K., "Introduction to Non-Conventional Energy Resources" Scitech Publications.

Fahrenbruch and Bube, "Fundamentals of Solar cells. Photovoltaic Solar Energy"

SYLLABUS : M.A.(P) Sem-II Open Elective

Paper Code- 16PUBO1

Administrative Literacy

Total Credit: 4+0+0 =4
L+T+P
Total Marks = 100
Semester End Exam = 80
Internal Assessment = 20
Time = 3 hrs.

Note:

The question paper will consist of 5 units containing 9 questions. The students are required to attempt one question from each unit. Question no 9 consisting of eight short answer questions covering entire syllabus, is compulsory.

Unit-I

Administrative Structure at Central Level – Office of President, Prime Minister's Office, Cabinet Secretariat & Central Secretariat

Unit-II

Administrative Structure at State Level – Office of Governor, Chief Minister's Office, State Secretariat & Chief Secretary

Unit-III

Administrative Structure at Division & District Level: Divisional Commissioner, Deputy Commissioner, Superintendent of Police, District Rural Development Agency, Haryana Urban Development Authority, District Development & Panchayat Officer

Unit-IV

Flagship Programmes of Central Government: Mahatma Gandhi National Rural Employment Guarantee Scheme, Rashtriya Swasthya Bima Yojana, Pradhan Mantri Kaushal Vikas Yojana, Mid-day Meal, Integrated Community Development Scheme,Targeted Public Distribution System.

Suggested Readings:

1. Maheshwari, S.R., Evolution of Indian Administration, New Delhi: Orient Longman, 1974.
2. Maheshwari, S.R., Indian Administration, New Delhi: Orient Longman.
3. Arora, R.K. and Rajni Goyal, Indian Public Administration, New Delhi: Wishwa, 1997..
4. Misra, B.B., The Central Administration of East India Company, London: Manchester Press, 1959..
5. Sarkar, J.N., Mughal Administration, Calcutta: M.C. Sarkar, 1935.
6. Ray, Anirudh , Some Aspects of Mughal Administration, New Delhi: Kalyani 1984.
7. Khosla, R.P., Administrative Structure of the Great Mughals, Delhi: Kanti Publications, 1991.
8. Prasad K. Nayak, S. Sen and G.S. Mansukhani (Eds.), Indian Administration, New Delhi: Unique Publishers, 2007
9. Fadia, B.L., Indian Administration, Agra: Sahitya Bhawan, 2007.
10. Chand Ashok, Indian Administration, London: Allen and Unvin, 1967.
11. Singh Hoshiar, Indian Administration Allahabad: Kitab Mahal, 1998.
12 Kataria, Surender , Indian Administration, Jaipur: RSBA
13 Maheshwari, S.R., State Governments in India, New Delhi: Macmillan, 2000.
14 Padhi, A .P. State Administration in India, Delhi: Uppal, 1998.
15 Sharma, Ashok, Bharat Mein Prashashnik Sansthan, Jaipur: RSBA, 2003.
16 Arora, Ramesh and Geeta Chaturvedi, Bharat Mein Rajya Prashashan, Jaipur, RSBA, 2001
17 Sharma, Harish Chander, State Administration in India (Hindi) Haipur: College Book Deport, 2002.

M.A. Political Science
Semester II
(16POLO1)

Paper: Disaster Management-I (Open Elective A)

Max. Marks : 100
Theory Paper : 80
Internal Assessment : 20
Time : 3 Hrs

Note:
The question paper will be divided into five units carrying equal marks i.e. 16 marks. Students shall be asked to attempt one out of two questions from each unit. Unit five shall contain eight short answer type questions without any internal choice and it shall be covering the entire syllabus. As such, all questions in unit five shall be compulsory.

UNIT I

Disaster Management: Meaning, Concepts, Principles, Scope, Objectives and Approaches
Elements of Disaster Management

UNIT II

Disaster Mitigation: Hazard Assessment, Vulnerability Assessment, Risk Assessment, Protective Measures and
Public Information

Disaster Preparedness: Disaster Plan, Damage Inspection, repair and Recovery procedures, Communication and Control Centers, Disaster Forecasting, Warning and Prediction

UNIT III

Disaster Relief: Rapid Damage As operations, Evacuation and Shelter, Media Coverage, Relief Aid, Maintain

UNIT IV

Reconstruction Planning: Meaning an Economic and Social Rehabilitation

Essential Readings:

1. Beatley, Timothy (1998). *The Vision Burby, Raymond (ed.)*, *Cooperating wi Hazards with Land-Use Planning*
   Washington, D.C., Joseph Henry Press.

2. David Godschalk, Timothy Beatley, Phil J. Kaiser (1998).
   Natural Hazard Mitigation: Recasting
   Island Press.

3. *FEMA* (2000). Planning for a Sustain Hazard Mitigation and Livability. *Washin*

4. *Godschalk, David R., Timothy Beatley, P Edward J. Kaiser*

SYLLABUS FOR OPEN ELECTIVE (SANSKRIT)

Semester- II **M.M-100**
Credit- 3 **Theory-80**
Course code-18SKTO1 **Internal Assessment-20**

Ancient Indian Culture and Philosophy
(प्राचीन भारतीय संस्कृति एवं दर्शन)

Unit I : General Study of Ramayana and Mahabharta 20
घटक एक : (रामायण व महाभारत का सामान्य अध्ययन)

(i) General Introduction (सामान्य परिचय)
(ii) Recenssions (संस्करण)
(iii) Society (समाज)
(iv) Family Relations (पारिवारिक सम्बन्ध)
(v) Education (शिक्षा)
(vi) Politics (राजनीति)
(vii) Economy (अर्थव्यवस्था)
(viii) Situation of Women (स्त्रियों की दशा)

Unit II : Verses related to, the following headings of the Nitishtak 20
Murkhaninda, Vidhyamhima, Sajjanprashansa,
Dhanamahima, Durjananinda, Propakarmahima,
Bhagyamahima, Karmamahima, Dhirpurushaprashansa

घटक दो : नीतिशतक के अधोलिखित शीर्षकों से

मूर्खनिंदा ,धनमहिमा ,सज्जनप्रशंसा ,विद्यामहिमा ,

दुर्जननिंदा ,धीरपुरुषप्रशंसा ,कर्ममहिमा , ,परोपकारमहिमा ,

Unit III :Śrimadbhagavad Gītā – II Chapter 20
घटक तीन श्रीमद्भगवद्गीता : द्वितीय अध्याय

Unit IV : Yoga Philosophy 20
घटक चार योग दर्शन

(i) General Introduction to Yoga – Citta, Vritti, Iśvara
योग दर्शन का सामान्य परिचय – चित्त, वृत्ति, ईश्वर
(ii) Yoga for Social Health – Maitri, Karunā, Muditā, Upekshā, Yama
योग एवं सामाजिक स्वास्थय – मैत्री, करुणा, मुदिता, उपेक्षा, यम
(iii) Yoga for physical health – Niyama, Āsana, Prānāyāma
योग एवं शारीरिक स्वास्थ्य – नियम, आसन, प्राणायाम
(iv) Yoga for mental health – Pratyāhāra, dhāranā, dhyāna, samādhi.
योग एवं मानसिक स्वास्थ्य – प्रत्याहार, धारणा, ध्यान, समाधि

Guidelines : Students will be required to attempt five questions of 16 marks each.

दिशा निर्देश –

Question no. 1 will comprise eight short answer type questions from all Units.

Guidelines for other Four questions are as under:

Unit I : One critical question out of two
Or
two shortnotes out of four. 16

Unit II : One critical question out of two
Or
two shortnotes out of four. 16

Unit III : One critical question out of two
Or
two shortnotes out of four. 16

Unit IV : One critical question out of two
Or
two shortnotes out of four. 16

Recommended Books (अनुशंसित ग्रन्थ) :

1. रामायण – गीता प्रेस गोरखपुर
2. महाभारत – गीता प्रेस, गोरखपुर
3. Srimad Valmikiya Ramayana with Commentaries in 6 Vols. भारतीय विद्या प्रकाशन, जवाहर नगर, दिल्ली – 7
4. Srimad Mahabharatam Ed. by T.R. Krishnacharya – Indian Book Centre, Sri Satguru Publications, 24/4, Shakti Nagar, Delhi.
5. Valmiki Ramayana me Varnit Arthik Jeevan – Kaveri Book Service
6. Valmiki Ka Rajdharma – Kaveri Book Service
7. श्रीराम के युग का तिथि निर्धारण : पुष्कर भटनागर, मोतीलाल बनारसी दास, दिल्ली
8. Politics and Ethics in Ancient India (As depicted in Mahabharta) : M. Jauhari – भारतीय विद्या प्रकाशन, जवाहर नगर, दिल्ली
9. Religion and Society in Ancient India : Om Parkash - भारतीय विद्या प्रकाशन, जवाहर नगर, दिल्ली
10. रामायणकालीन समाज एवं संस्कृति : जगदीश चन्द्र भट्ट – भारतीय विद्या प्रकाशन, जवाहर नगर, दिल्ली
11. सांक्षप्तनाार , संपादक प्राफसर सुरद्र कुमा -, प्रकाशक दवश पाब्लक -, नइ दि
12. श्रीमद्भगवद्गीता – गीता प्रेस, गोरखपुर
13. A Bhagavad Gita : Kappuswami – चौखम्बा आरियण्टालिया, दिल्ली
14. पात×जलयोगसूत्रम् (व्यासभाष्यम्) – व्या० ब्रह्मलीनमुनि
15. पात×जलयोगसूत्रम् – व्या० सुरेशचन्द्र श्रीवास्तव्य
16. पात×जलयोगसूत्रम् – व्या० हरिहरानन्द आरण्य
17. व्याख्याकारों की दृष्टि में पात×जलयोग दर्शन – विमला कर्णाटक
18. The Yoga System of Patanjali – J.H. Woods.
19. Essence of Yoga – Reflections on the Yoga Sutras of Patanjali by Bernard Bauan Chand – Indian Book Centre, Sri Satguru Publications, Delhi.
20. Meditative Yoga : Integrating Body, Breath and Mind by Are Holen and Terbojrn Hobbel : Motilal Banarsidass, Delhi.
21. The Art and Science of Raja Yoga by J. Donald Walters : Motilal Banarsidass, Delhi.

MA 2nd Semester (Open Elective Paper) to be chosen from the common pool of the University.

Sem.	Paper No	Code	Nomenclature of Paper	Contact hours/L+T+P	Marks			Credit
					Theory	I.A	Total	
II	Paper	16SOCO1	Understanding Sociology	4:0:0	80	20	100	3

Scheme of Examination:

It is decided to adopt the new scheme of Choice Based Credit System of examination whereby all the papers have four units comprising of 80 marks and the Internal Assessment component will be of 20 marks in all the Semesters. In the theory paper students will be asked to attempt four questions from the four units selecting at least one question from each unit and the 5th question shall be compulsory which will cover all units in the format of short answer type questions comprising of about 50 to 60 words. Thus, the total marks for all the five questions i.e. four from the units (16x4=64) and the 5th compulsory question of short answer numbering eight of 2 marks each i.e (8x2=16) thus making the total weight age to 80 marks. The detail of Internal Assessment of 20 marks has been prescribed by the University is given below:-

(a) One Class Test : 10 Marks
(b) One Assignment : 5 Marks
(c) Attendance : 5 Marks

Less than 65% : 0 Marks
Up to 70% : 2 Marks
Up to 75% : 3 Marks
Up to 80% : 4 Marks
Above 80% : 5 Marks

M.A.(Sociology)
Semester-II
Open Elective Paper- -16SOCO1
Understanding Sociology

Maximum Marks: 100
Theory: 80
Internal Assessment: 20
Time : 3 Hours

Note:

3. **Nine question would be set in all.**
4. **Question No. fifth shall be based on the entire syllabus and would be compulsory. It would contain eight short answer questions of two marks each.**
5. **There would be two questions (16 marks each) from each of the four units.**
6. **The candidate would be required to attempt four questions (one compulsory and other four questions selecting one from each unit).**

Unit-I

Sociology: Meaning and Definition, Beginning and Growth of Sociology; The Scope of Sociology; Relationship with History, Anthropology, Economics.

Unit-II

Society: Types of society; Community and its characteristics; Social Groups and their types; Social Control: Functions and forms.

Unit-III

Social Stratification: Its characteristics and Bases; Social Mobility: Meaning and its types, Socialization: Stages and agencies of socialization; Social Change: Meaning and factors.

Unit-IV

Family: concept, forms and changing pattern of families; Marriage: concept and forms; Kinship: terminology, usages and incest.

References:

MacIver, R.M. and C.H.Page (1985), ***Society***, New Delhi: Macmillan.
Giddens, Anthony, (1993), ***Sociology***. Cambridge: Polity Press.
Spencer, Metta (1976), ***Foundations of Modern Sociolog***y, New Jersey: Prentice-Hall
Johnson, H.M. (1983), ***Sociology: A Systematic Introduction***, New Delhi: Allied Publishers.
Haralambos, M. (1989), ***Sociology: Themes and Perspectives***, New Delhi: Oxford University
Press. Fichter, Joseph H. (1957), ***Sociology***, Chicago: The University of Chicago Press.
Bottomore, T.B. (1972), ***Sociology***, New York: Vintage Books.
Davis, K. (1949), ***Human Society***, New York: Macmillan.
Moore, Wilbert E. (1974), ***Social Change***, Englewood Cliffs: Prentice –Hall.
Rawat, H.K. (2013), ***Contemporary Sociology***, Jaipur: Rawat Publications. Singh,
J.P. (1999), ***Sociology: Concepts and Theories***, New Delhi: Prentice-Hall.

Quantitative Techniques **Paper Code: 16STAO1**
(2nd Semester)

Maximum Marks-80
Internal Assessment Marks—20
Time:-03 Hours
Credit: 03

Section –I

Classification of Data, variable and measurement scales. Presentation of Data. Measures of Central Tendancy and Dispersion, Skewness and Kurtosis. Measures of Association of Attributes. Correlation and Regression. Principle of Least Squares , Multiple and Partial correlation. Fitting of Polynomial and Exponential Curves.

Section –II

Random variables. Probability mass function, Probability density function and Commulative distribution function. Expectation and its properties. Moments, moment generating function and probability generating function. Discrete Probability distributions: Bernolli, Bionomial, Poisson, Negative Binomial, Geometric and Uniform. Continuous Probability distributions: Normal, Exponential, Log Normal and Uniform, Fitting of Bionomial, Poisson and normal distribution.

Section –III

Index numbers: Types, uses and their construction. Cost of living index numbers. Test of adequacy of Index numbers.

Time Series: Components and Models of time series. Measurements of trend and seasonal indices, Forcasting and Estimation.

Section –IV

Statistical Quality Control. Purposes and construction of control charts for variables and attributes using 3 sigma limits and 6 sigma limits. Single and double Sampling Inspection plans. Natural tolerance limit and modified control limits.

Vital statistics: Methods of obtaining Demographic data, Measurement of Mortality and Fertility. Complete Life and Abridged Life Tables.

Books Recommended

1. Goon, A.M., Gupta, M.K. and Dasgupta, B. : Outline of Statistics Volume-I & II
2. Goon, A.M., Gupta, M.K. and Dasgupta, B. : Fundamental of Statistics Volume-I &II
3. Rohtagi, V. K. and Md. Ehsanes Saleh, A. K. : An Introduction to Probability and Statistics
4. Mood, A.M., Graybill, F.A. and Boes, D.C. : An Introduction to Theory of Statistics
5. Croxton, F.E. and Cowden, D.J. : Applied General Statistics
6. Kendall S.M. and Stuart A. : The Advanced Theory of Statistics

Note: The examiner is to set the question paper into five units- A, B, C, D & E. In each unit A, B, C & D, he/she has to set two questions of 16 marks each from section I, II, III, & IV respectively and the candidate will attempt one question from each unit. In unit E, there will be 8 short answered questions of 2 marks each, covering the whole syllabus and the candidate has to attempt all the questions.

Sampling and Estimation Techniques

PAPER CODE: 16STAO2

Maximum Marks-80
Internal Assessment Marks—20
Time:-03 Hours
Credit: 03

Section –I

Population, sample, sampling distribution, standard error. Testing of Hypotheses: Simple and composite hypotheses, Null and alternative hypotheses, two types of errors, critical region and level of significance, one tailed test, two tailed test, Test of significance (Single and two samples problems) for normally distributed data. Goodness of fit test.

Section –II

Sample versus Complete Enumeration. Designing of Sample Surveys, Sources of Errors in Sample Surveys, Types of Non-Response Errors.
Probability and Non-probability Sampling: Simple Random Sampling with and without replacement for the estimation of Mean and Total, Determination of Sample Sizes of specified precision.

Section –III

Stratified Sampling: Proportional and Optimum Allocation, Estimation of gain due to stratification, Construction of strata, Determination of number of strata. Systematic, Cluster and Probability Proportional to Size Sampling. Comparison of stratified sampling with simple random sampling.

Section –IV

Analysis of Variance: one- way, two -way (with one and multiple but equal number of observations per cell). Completely Randomized Designs, Randomized Block Designs and Latin Square Designs.
Factorial Experiments: Definition, Estimation of factor's effect, Analysis of the factorial experiments, Confounding: complete and partial confounding.

Books Recommended

1. Mood A.M., Graybill, F.A. & Boes, D.C. : Introduction to the Theory of Statistics
2. Goon, A.M., Gupta, M.K. and Dasgupta, B. : Fundamental of Statistics, Vol-II
3. Singh D. & Chaudhary F.S. : Theory & Analysis of Sample Survey Designs
4. Mukhopadhyay, Primal : Theory and Methods of Survey sampling
5. Dass, M.N. and Giri, N.C : Design and Analysis of Experiments

Note: The examiner is to set the question paper into five units- A, B, C, D & E. In each unit A, B, C & D, he/she has to set two questions of 16 marks each from section I, II, III, & IV respectively and the candidate will attempt one question from each unit. In unit E, there will be 8 short answered questions of 2 marks each, covering the whole syllabus and the candidate has to attempt all the questions.

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M.D.UNIVERSITY, ROHTAK

16CSEO1 Computer Science Principles
(Open Elective)

MM:T80+IA20
Credit 3
Time: 3 Hr

Instructions for setting of paper: Nine questions are to be set in total. First question will be short answer question covering whole syllabus and will be compulsory to attempt. Next eight questions will comprise of two questions each from the four sections. Student will be required to attempt four more questions selecting one from each section. Each question will be of 20 marks

UNIT I

Fundamental of computer science and computational thinking: logical reasoning, problem solving, data representation, processing of data, abstraction, managing complexity, operation of computers and networks, effective Web searching, ethical, legal and social aspects of information technology.

UNIT II

HTML and XTML basics- LIST – unordered list – nested and ordered list – Basic HTML Tables – Intermediate HTML table and Formatting – basic HTML Forms and Formatting – More Complex HTML Forms – Frameset Element – Nested Frameset. Style Sheets and Graphics: Introduction to Style sheets – Formatting Text by Using Style Sheets – Formatting Paragraphs by Using Style Sheets, Java Script Basics.

UNIT III

Data Mining: Introduction: Motivation, Importance, Knowledge Discovery Process, KDD and Data Mining, Data Mining vs. Query Tools, Kind of Data mining, kind of data, Functionalities, interesting patterns, Classification of data mining systems, Major issues, from Data warehousing to data Mining.

UNIT IV

Computer Networks: Network fundamentals: Local Area Networks (LAN), Metropolitan Area Networks (MAN), Wide Area Networks (WAN), Wireless Networks, Inter Networks.
Reference Models: The OSI model, TCP/IP model.
Operating Systems: Main functions of operating systems. Multi Prograrnming, multiprocessing, and multitasking. Deadlock and CPU scheduling algorithms

TEXT BOOKS

1. Blown To Bits: Your Life, Liberty and Happiness After The Digital Explosion
by Hal Abelson, Ken Leeden and Harry Lewis, 2010
2. Thomas A. Powell, McGraw-Hill “HTML & CSS: The Complete Reference”, Fifth Edition (Complete Reference Series) Osborne Media; 5 edition, 2010.
3.Krzysztof J. Cios, Witold Pedrycz, Roman W. Swiniarski, “Data mining: a knowledge discovery approach”, Springer, 2007

16CSEO2 **Software Engineering Practices**
(Open Elective)

MM:T80+IA20
Credit 3
Time: 3 Hr

Instructions for setting of paper: Nine questions are to be set in total. First question will be short answer question covering whole syllabus and will be compulsory to attempt. Next eight questions will comprise of two questions each from the four sections. Student will be required to attempt four more questions selecting one from each section. Each question will be of 20 marks

UNIT I

Software Engineering-Software Process- Generic process model-Prescriptive process model-specialized, unified process-Agile development-Agile Process- Extreme Programming- Other agile Process models-Software engineering Knowledge-core Principles-Principles that guide each framework Activity,

UNIT-II

Requirements Engineering-Establishing the Groundwork-Eliciting Requirements-Developing use cases- Building the requirements model- Negotiating, validating Requirements- Requirements Analysis- Requirements Modeling Strategies.

UNIT III

Design Process- Design concepts: Abstraction, Architecture, patterns, Separation of Concerns, Modularity, Information Hiding, Functional Independence, Refinement, Aspects, Refactoring, Object Oriented Design Concepts, Design Classes- Design Model: Data, Architectural, Interface, Component, Deployment Level Design Elements, Software Quality-Software Quality Dilemma- Achieving Software Quality .

UNIT IV

Testing: Strategic Approach to software Testing- Strategic Issues- Testing: Strategies for Conventional Software, Object oriented software, Web Apps-Validating Testing- System Testing- Art of Debugging, Software Maintenance-Software Supportability- Reengineering-Business Process Reengineering- Software Reengineering- Reverse Engineering-Restructuring- Forward Engineering- Economics of Reengineering

TEXT BOOKS

1. Roger S. Pressman, “Software Engineering – A Practitioner’s Approach”, seventh edition, 2010.
2. Ian sommerville, “Software Engineering” Pearson Edu, 9th edition, 2010.
3. Hans Van Vliet “Software Engineering: Principles and Practices”, 2008.

16MBTO1 **Business skills for Biotechnologists**
(Open Elective)

MM:T80+IA20
Credit 3
Time: 3 Hr

Instructions for setting of paper: Nine questions are to be set in total. First question will be short answer question covering whole syllabus and will be compulsory to attempt. Next eight questions will comprise of two questions each from the four sections. Student will be required to attempt four more questions selecting one from each section. Each question will be of 20 marks

Unit - I

Introduction: Creativity & Entrepreneurial personality and Entrepreneurship in Biotechnology, Concept and theories of Entrepreneurship, Entrepreneurial traits and motivation, Nature and importance of Entrepreneurs, Government schemes for commercialization of technology (e.g. Biotech Consortium)

Unit - II

Project management: Search for a business idea, concept of project and classification, project identification, project formulation, project design and network analysis, project report, project appraisal.

Unit - III

Financial analysis: Ratio analysis, Investment process, Break even analysis, Profitability analysis, Budget and planning process.
Sources of finance: Source of development finance, Project financing, Institutional financing to Entrepreneurs, Financial institutions, Role of consultancy organizations.

Unit - IV

Marketing channels: Methods of marketing, marketing channels, Marketing institutions and assistance.
Biotech enterprises: Setting up Small, Medium & Large scale industry, Quality control in Biotech industries, Location of an enterprise, steps for starting a small industry, incentives and subsidies, exploring export possibilities.

Text/References:

1. Innovation and entrepreneurship in biotechnology: Concepts, theories & cases by D. Hyne & John Kapeleris, 2006.
2. The Business of Biotechnology: From the Bench of the Street: By Richard Dana Ono Published Butterworth- Heinemann, 1991.
3. Entrepreneurship in Biotechnology: Managing for growth from start-up By Martin Grossmann, 2003.
4. Best Practices in Biotechnology Education: By Yali Friedman, Published by Logos Press,2008.
5. Plant Development and Biotechnology: by Robert Nicholas Trigiano, Dennis John Gray; Published by CRC Press, 2004,
6. Dynamics of Entrepreneurial Development and Management, Vasant Desai, Himalaya Publishing House, 2005.
7. Projects: Planning Analysis, Selection, Implemantation & Review, Prasannan
8. Chandra, Tata Mc Graw-Hill Publishing Co.

16MMEO1 OPERATIONS RESEARCH

MM:T80+IA20

Credit 3

Time: 3 Hr

Instructions for setting of paper: Nine questions are to be set in total. First question will be short answer question covering whole syllabus and will be compulsory to attempt. Next eight questions will comprise of two questions each from the four sections. Student will be required to attempt four more questions selecting one from each section. Each question will be of 20 marks

Unit I

Introduction : Definition, role of operations research in decisionmaking, applications in industry. Concept on O.R.model building - Types & methods. Linear Programming (LP) : Programing definition, formulation, solution - graphical simplex Gauss Jordan reduction process in simplex methods, BIG-M methods computational, problem.

Unit II

Deterministic Model : Transportation model-balanced & unbalanced; orth west rule, Vogel's Method, Least cost or matrix minimal, Stepperg stone method, MODI methods, degeneracy, assignment, travelling salesman, problem.

Advanced Topic of LP : Duality, PRIMAL-DUAL, reactions-its solution, shadow price, economic interpretation, dual simplex, post-optimality & sensitivity analysis, problems.

Unit III

Waiting Line Models : Introduction, queue parameters, M/M/1 queue, performance of queuing systems, applications in indutries, problems. Unit VI Project Line Models : Network diagram, event activity, defects in network, PERT & CPM, float in network, variance and probability of completion time, project cost-direct, indirect, total optimal project cost by crashing of network, resources leveling in project problems. Coupling Principal Coordinates, Free Vibrations in Terms of Initial Conditions, Forced Harmonic Vibrations, Vibrations Absorber, Centrifugal Vibration Absorber, Vibration Damper.

Unit IV

Multi degrees of Freedom systems and Numerical Methods: Introduction Influence Coefficients, Stiffness Matrix, Flexibility Matrix, Naural frequancies and Normal Modes, Orthpgonality of Normal Modes, Dunkerley's Equation,Method of Matrix Iteration, The Holzer Type Problem Geared and Branched Systems, Beams.

Normal Mode Vibrations of Continuous System : Vibrating String, Longitudinal Vibrations of Rod, Torsional Vibrations of Rod, Lateral Vibrations of Beam.

Text Books :- 1. Theory of Vibration with Aplications W.T. Thomson, Prentice Hall of India.

2. Mechanical Vibration : G.K. Grover and S.P. Nigam, Nem Chand and Sons.

References Books : 1. Theory and Practice of Mecahnical Vibrations J.S. Rao and K. Gupta , Wiley Eastern Ltd.

2. Mecahnical Vibrations S.S. Raop, Addision - Wesley Publishing Company.

OPEN ELECTIVE COURSE

16ECEO1 MULTIMEDIA COMMUNICATION

MM:T80+IA20
Credit 3
Time: 3 Hr

Instructions for setting of paper: Nine questions are to be set in total. First question will be short answer question covering whole syllabus and will be compulsory to attempt. Next eight questions will comprise of two questions each from the four sections. Student will be required to attempt four more questions selecting one from each section. Each question will be of 20 marks

UNIT I

Multimedia & Information Representation Multimedia Introduction: multimedia networks, Telephone networks, Data networks, Broadcast television networks, Integrated services digital networks, Broadband multiservice networks, types of Multimedia Applications: Movie on Demand, Near Movie on Demand, communication modes, multipoint conferencing, network QOS, Application QOS. Multimedia Information Representation: Digitization principles, Encoder Design, Decoder Design, Unformatted Text, Formatted Text, Hypertext, Images: Graphics, Digitized documents, Digitized pictures; Audio: PCM speech, CD-quality audio, Synthesized audio; Video: Broadcast television, Digital video, PC video, video content.

UNIT II

Text and Image Compression Compression Principles & Text Compression: Compression Principles: Source encoders and Destination decoders, Lossless and lossy compression, Entropy encoding, Source encoding; Text Compression: Static Huffman coding, Dynamic Huffman Coding, Arithmetic Coding. Image Compression: Graphics Interchange Format, Tagged image file format, digitized documents, digitized pictures.

UNIT III

Audio and Video compression: Audio Compression: Differential Pulse Code Modulation, Adaptive Differential PCM, Adaptive predictive coding, Linear Predictive coding, Code excited LPC, Perceptual Coding, MPEG Audio coders, Dolby audio coders Video compression: video compression principles, Motion Pictures Expert Group (MPEG), MPEG1, MPEG2.

UNIT IV

INTERNET AND DESIGNING FOR THE WORLD WIDE WEB The internet and multimedia: The internet, Internetworking: Internet addresses, connections, The Bandwidth Bottleneck, Internet services, MIME-Types, The world wide web and HTML, Dynamic web pages and XML, multimedia on the web, Tools for the World Wide Web: web browsers, web servers, web page makers and site builders, plug-ins and delivery vehicles. Designing For The World Wide Web: Developing for the web: HTML is a Markup Language, The Desktop Workspace, The Small Device Workspace, nibbling, Text for the web: making columns of text, flowing text around images; images for the web: GIF and PNG Images, JPEG Images, Using Photoshop, Backgrounds, clickable buttons, Client side image maps, sound for the web, animation for the web.

Text Books:

1. Fred Halsall, Multimedia Communications , Pearson
2. Tay Vaughan, Multimedia, making it work Eighth edition, Tata McGraw-Hill Edition

Reference Books

1. Rao, Bojkovic & Milovanovic, Multimedia Comm. System: Technology , Std. &Network , PHI
2. JohnF. Koegel Bufod, Multimedia Systems , Addison Wesley, Edition. 2000

DEPARTMENT OF ZOOLOGY
M. Sc. ZOOLOGY

Course no.: 16ZOOO1
Semester- IICourse Title: Applied Zoology
MM:T80+IA20
Time: 3 Hr

Note: There shall be seven questions in total. One question will be compulsory (short answer type) covering the entire syllabus and remaining six questions will be set two from each unit. Students are required to attempt compulsory question and 04 more questions selecting at least selecting one from each unit.

Unit-I

Host – Definitive and intermediate, Parasitism, Symbiosis, Commensalism, Reservoir.
Transmission, prevention and control of diseases: Tuberculosis and Swine flu
Principles and applications of ECG, MRI, PET, and CAT.

Unit-II

Life history and pathogenesis of *Plasmodium* sp.
Life history, Medical importance and control of *Aedes* sp.
Life history, pathogenesis and control of *Taenia* sp.
Principles and applications of brain activity recording, and pharmacological testing.

Unit-III

Preservation of gametes in animal and artificial insemination.
Principles and management of Poultry.
Introduction and management of pisciculture
Genetic improvement in animals; Induced breeding in aquaculture.

***As per SOE Zoology**
**** Proposed maximum marks and subject to change in uniformity with other faculties of university**

List of Recommended Books

1. Dent, D. Insect Pest Management
2. Hill, D.S., Timber Press. Agricultural Entomology
3. David, B. V. & Ananthakrishnan. General and Applied Entom
4. ology . T. N., Tata McGraw-Hill Publishing.
5. Asa C. Chandler, Clark P. Read, Introduction to Parasitology, John wiley and Sons., Inc., New York.
6. Thomas W.M. Cameron, Parasites and Parasitism, Billing and Sons ltd. London,
7. Elmer R. Noble, Glenn A. Noble; Parasitology: The Biology of Animal Parasites, Lea and Febiger, Washington.
8. R.P. Hall, Protozoology, Prentice-Hall, Inc. Engtewood diffs. N.J. Charles E. Tuttle Company, Tokya
9. E.O. Wilson. The Diversity of Life (The College Edition), W.W. Northern & Co.
10. Molecular Biology of the Cell, B. Alberts, D. Bray, J. Lewis, M. Raff, K. Roberts and J.D. Watson. Garland Publishing Inc., New York.
11. Molecular Biology and Biotechnology. A comprehensive desk reference, R.A. Meyers (Ed.), VCH Publishers, Inc., New York.
12. Molecular Cloning: a Laboratory Manual, J. Sambrook, E.F. Fritsch and T. Maniatis, Cold Spring Harbor Laboratory Press, New York.
13. Gray's Clinical Neuroanatomy by Mancall **New** Medical Pharmacology at a Glance (7th Ed.)
14. Oxford Handbook of Neurology

M.D.U., ROHTAK
W.E.F.2018-19

A) Open Elective Courses

Students of all PG programmes under CBCS (w.e.f. 2018-19) are required to study one open elective course in each of the 2nd and 3rd Semesters for 2-Years Programmes and in each of the 4th and 5th semesters for 3-Years Programmes. They may choose any one of the following courses (excluding the courses offered by the departments of their own subjects, if not stated otherwise).

Open Elective Courses of 3rd Semester:-

Sr. No.	Nomenclature of the course	Course Code	Offered by the Department
1.	Computer Aided Drug Design	16BINO2	Bioinformatics
2.	Principles and Applications of Agriculture Biotechnology-II	16CBTO2	Biotechnology
3.	Principles and Applications of Biotechnology-II	16CBTO4	Biotechnology
4.	Human Health & Nutritional Disorders	16BCHO2	Bio-Chemistry
5.	Plants: Source of Food and Health	17BOTO2	Botany
6.	Fundamental of Income Tax	16COMO1	Commerce
7.	Study of War	16DSS22OE2	Defence & Strategic Studies
8.	Principles of Economics	16ECOO2	Economics
9.	Trends and Concerns of Teacher Education	16EDUO2	Education
10.	Indian Literature in Translation - II	18ENGO2	English
11.	Disaster Management	16ENVO2	Environmental Science
12.	Food Fundamentals	16FTEO2	Food Technology
13.	Forensic Science	16GENO2	Genetics
14.	Introduction of Geography	17GEOO1	Geography
15.	Sources of Geographical Data	17 GEOO2	Geography
16.	Bhartiya Sahitya	16HNDO1	Hindi
17.	Survey of Sources of Indian History	16HISO2	History
18.	Housekeeping & Interior Design	18MHMCTO2	IHTM
19.	Fundamentals of Marketing	16IMSO2	IMSAR
20.	New Media	18JRMO2	Journalism
21.	Constitutional Law	16LAWO2	Law
22.	Information Sources and Literacy	16LISO2	Library & Information Science
23.	Statistical Tools using SPSS	16MATO3	Mathematics
24.	MATLAB	16MATO4	Mathematics
25.	Principles of Medical Biotechnology II	16MBTO2	Medical Biotechnology
26.	Microbes for health and wealth	18MCBO2	Microbiology
27.	Sources of Energy-II	16PHYO2	Physics

28.	Environment Protection Administration	16PUBO2	Public Administration
29.	Natural and Manmade Disaster	16POLO2	Political Science
30.	Ancient Indian Ethics	18SKTO2	Sanskrit
31.	Indian Society	16SOCO2	Sociology
32.	Optimization Techniques	16STAO3	Statistics
33.	Wild Life and Conservation	16ZOOO2	Zoology

CENTRE FOR BIOINFORMATICS
M. D. UNIVERSITY, ROHTAK

CBCS-SCHEME OF EXAMINATION (M.Sc. -Bioinformatics)-2016-17 onwards

Course Title: Computer Aided Drug Design Credit: 3 0 0

Course Code: 16BINO2 MM. Th 80+ IA 20 Time: 3 Hours

Note: In all 7 questions are to be set, Question No. 1 is compulsory and to be set covering entire Syllabus. 6 questions will be set with two questions from each unit. Students are required to attempt one compulsory question and 4 other questions, *i.e.*, selecting atleast one from each unit.

UNIT I

Introduction to pharmacogenomics and pharmagenetics, clinical trials in pharmagenomics, polymorphism of CYP450 enzymes affecting drug response, role of SNP in pharmacogenomics, The multi Drug Resistance proteins: drug carriers affecting drug response.

UNIT II

Basis of Drug Pharmacokinetics and Pharmacodynamics, molecular descriptors, QSAR methodologies 3D QSAR. Structure based drug designing, Ligand based drug designing, Different docking methodologies, success stories in docking.

UNIT III

Pharmacophore modeling, Pharmacophore generation- (Hiphop and HypoGen theories). Combinatorial libraries, High thoughtput screening, Virtual screening, Lipinski's rule of five and its applications. Chemoinformatics: Introduction, Chemical Database(ACD,MDDR and WDI), Application of Chemoinformatics in CADD.

M.Sc Agriculture Biotechnology **Semester-III**

Course Title: Principles and Applications of Agriculture Biotechnology-II

MM. Th 80+IA 20

Time: 2 h

Course Code No. 16CBTO2

NOTE: There shall be seven questions in total. Question No.1 will be compulsory (short answer type) covering the entire syllabus and remaining six questions will be set two from each unit. Students are required to attempt four questions in all by selecting at least one from each unit.

Theory

UNIT I

Gene Cloning and DNA Analysis in Agriculture: Methods in Molecular Cloning, Transformation of DNA: Chemical method and Electroporation; Gene delivery: Microinjection, eletroporation, biolistic method (gene gun), liposome and virus mediated gene delivery, *Agrobacterium* mediated gene delivery.

UNIT II

Development of transgenics for abiotic & biotic stress tolerance, Plants that make their own insecticides - The δ-endotoxins of *Bacillus thuringiensis,* Herbicide resistant crops (roundup ready crops), Gene subtraction: RNA silencing, CRISPER technology.

UNIT III

Genetically modified Crops: safety, risks and public concerns: GM foods-merits and demerits, Safety tests on commercial GM crops (GM maize, GM potatoes, GM rice, GM cotton, peas), Allergenicity studies, Public concerns-global scenario, Consumer's attitude towards GM foods, GM foods: issues with respect to India. Traceability of GMOs in the food production chain, Environmental and Safety concerns with selectable markers, The terminator technology, The possibility of harmful effects on the environment and humans.

Suggested readings:

1. Hou CT, Shaw JF (2009) Biocatalysis and agricultural biotechnology, CRC Press, USA
2. Brown, TA (2010) Gene Cloning and DNA Analysis: An Introduction, Sixth Edition. A John Wiley & Sons, Ltd., Publication, Germany.
3. Bhojwani SS, Soh WY (2005) Agro biotechnology and plant tissue culture, Oxford Press.
4. Clark DP, Pazdernik NJ (2009) Biotechnology: Applying the Genetic Revolution. Elsevier Academic Press, USA.
5. Primrose SB, Twyman RM (2006) Principles of Gene Manipulation and Genomics, 7th Edition. Blackwell Publishing, Oxford, U.K.
6. Kumar HD (2005) Agricultural biotechnology, Daya Publ House, India
7. Newbury HJ (2009) Plant molecular breeding, John Wiley and Sons., USA.
8. Kumar A, Shekhawat NS (2009) Plant tissue culture and molecular markers: their role in improving crop productivity (IK International)
9. Das HK (2010) Biotechnology, 4th Edition, Wiley India Pvt. Limited, India
10. Bawa AS and Kumar A (2013) Genetically modified foods: safety, risks and public concerns. J Food Sci Technol. 50(6): 1035–1046.

M.Sc Biotechnology **Semester-III**

Course Title: Principles and Applications of Biotechnology-II

MM. Th 80+IA 20

Time: 2 h

CourseCode No. 16CBTO4

NOTE: There shall be seven questions in total. Question No.1 will be compulsory (short answer type) covering the entire syllabus and remaining six questions will be set two from each unit. Students are required to attempt four questions in all by selecting at least one from each unit.

UNIT I

Production of proteins from cloned genes: Cloning vectors and expression vectors, primer designing, open reading frame (ORF) and DNA Restriction pattern analysis, *E. coli* expression vectors, criteria for choosing different vectors, importance of different *E. coli* strains for expression, optimization of expression of recombinant proteins in *E. coli*, Codon optimization.

UNIT II

General problems with the production of recombinant proteins in *E. coli*, Dealing with insoluble proteins, Recombinant protein production in Eukaryotic cells. Processing, purification and characterization of recombinant proteins. Applications of recombinant protein production.

UNIT III

Study of Genomes: Genome annotation, identifying the genes in a genome sequence, determining the function of an unknown gene. Study of gene expression and regulation: identification of gene transcript, identifying protein binding sites on a DNA molecule: methods to study DNA protein interactions. Identification of promotor and control sequences, Analysing and comparing transcriptome, *in vitro* transcription, studying and comparing proteome: 2DE, MudPIT, LC-MS. Protein-Protein interactions (PPIs).

Suggested readings:

6. Brown, TA (2010) Gene Cloning and DNA Analysis: An Introduction, Sixth Edition. A John Wiley & Sons, Ltd., Publication, Germany.
7. Clark DP, Pazdernik NJ (2009) Biotechnology: Applying the Genetic Revolution. Elsevier Academic Press, USA.
8. Primrose SB, Twyman RM (2006) Principles of Gene Manipulation and Genomics, 7th Edition. Blackwell Publishing, Oxford, U.K.
9. Wiley JM, Sherwood LM, Woolveron CJ (2008) Prescott, Harley and Klein's Microbiology. McGraw Hill Higher Education.
10. Primrose SB and Twyman RM (2008) Genomics: Applications in human biology. Blackwell Publishing, Oxford, U.K.

16BCHO2 :Human Health and Nutritional Disorders

Note: Question 1 will be compulsory and will cover the entire syllabus in the form of short questions. Question 2 to 7 will include two questions from each unit and candidate will have to attempt one question from each unit. Overall, four questions to be attempted. All questions to carry equal marks i.e. 20.

MM. Th 80+IA 20

Unit I

*Food Physiology***:** Concept of balanced diet and energy content of foods; Basal and resting metabolism- influencing factors, Absorption of carbohydrates, lipids, proteins, nucleic acids, minerals and vitamins.

Common metabolic disorders: Diabetes mellitus, disorders of HDL-cholesterol, LDL-cholesterol, triglycerides, phenylketonuria, albinism.

Antioxidants: Free radicals: definition, formation in biological Systems. Natural anti-oxidants, defense against free radicals. Role of free radicals and antioxidants in health and disease.

Unit II

Vitamins: Dietary sources, biochemical functions and specific deficiency diseases associated with fat and water soluble vitamins; Hypervitaminosis symptoms of fat-soluble vitamins.

Minerals: Dietary sources and deficiency disorders of dietary calcium, phosphorus, magnesium, iron, iodine, zinc and copper.

Malnutrition and blood disorders: Etiology, clinical features, metabolic disorders and management of Marasmus and Kwashiorkor, Nutritional anemia - vitamin $B_{12,}$ folate and iron deficiency anemia; hemoglobinopathies and thalassemias.

Unit III

Obesity: Definition, classification and biochemical basis; Genetic and environmental factors leading to obesity; Obesity related diseases and management of obesity.

Cardiovascular disease: Diseases of Liver, Gall bladder & Pancreas-Hepatitis, (A, B, and C), alcoholic liver disease, Gall stones, pancreatitis, Prevention and dietary management.

Clinical significance of aspartate aminotransferase, alanine aminotransferase, lactate dehydro-genase, amylase, lipase and trypsin.Diagnosis of jaundice and clinical importance of bilirubin.

Suggested Readings for 16BCHO2: Human Health and Nutritional Disorders:

1. Textbook of Medical Biochemistry ***By*** MN Chatterjea and Rana Shinde, Jaypee Brothers.
2. Review of Medical Physiology (Lange Basic Science) (Paperback) ***By*** William F. Ganong. Publisher: McGraw-Hilll Medical
3. Clinical Biochemistry ***By*** Richard Luxton. Scion Publishing Ltd.
4. Principles of Medical Biochemistry: With STUDENT CONSULT Online Access (Paperback) ***By*** Gerhard Meisenberg and William H. Simmons. Publisher: Mosby.
5. Essentials of Food and Nutrition Vol I & II, ***By*** M. Swaminathan. Bangalore Printing and Publishing Co. Ltd.
6. Modern Nutrition in Health and Diseases, ***By*** Maurice E Shils and Vernon Robert Young, 7th Ed., Pub: Lea &Febiger.
7. Handbook of Nutrition and Food 2nd Ed., ***By*** Carolyn Berdanier, Johanna Dwyer and Elaine Feldman, CRC Press
8. Nutritional Biochemistry (Hardcover) ***By*** Tom Brody. Academic Press.
9. Nutritional Biochemistry (Paperback) ***By*** S Ramakrishnan and S. Venkat Rao. TR Publications
10. Nutritional Biochemistry and Metabolism: With Clinical Applications (Hardcover) ***By*** Maria C. Linder. Publisher: Appelton and Lange

DEPARTMENT OF BOTANY
OPEN ELECTIVE

M. Sc. Botany
(Semester-III)
Paper Code: 17BOTO2
Title of Paper: Plants: Source of Food and Health

Max. Marks:80
Internal Assessment: 20
Time: 3 hrs.

Note: The examiner is required to set even questions in all. Question No. 1 will be compulsory and short answer type covering the entire syllabus. The remaining six questions will be set with two questions from each unit. The candidate will be required to attempt four questions - Question 1 and three more questions selecting one from each unit.

Unit- I

Agriculture: origin, history, world centres of primary diversity of domesticated plants, shifting cultivation and consequential damage to forest ecosystem, benefits and adverse consequences of green revolution, emerging problems of agriculture sector of India and their possible solutions, concept of organic farming and sustainable agriculture

Unit- II

Horticulture: scope, classification and importance; Important commercial horticultural crops of India and Haryana, some underutilized fruits and vegetables of Haryana, Home gardening and their relevance in present time, Factors affecting horticulture in India, Issues in post harvest management of fruits and vegetables in India, National Horticultural mission

Unit- III

Medicinal Plant: Diversity and distribution, General account of local plants of medicinal importance, Drugs developed from traditional medicines, Bioprospection and biopiracy of medicinal plants, Indian initiatives for promoting the use of medicinal plants, Factors affecting medicinal plants diversity, conservation and management

(Open Elective Paper)
Fundamentals of Income Tax
Paper Code: 16COMO1

Maximum Marks: 100
Credits: 3:0:0 **Theory Marks: 80**
Time Allowed: 3 Hours **Internal Assessment Marks: 20**

Note: The examiner shall set nine questions in all covering the whole syllabus. Question No.1 will be compulsory covering all the units and shall carry 8 small questions of equal marks. The rest of the eight questions will be set from all the four units. The examiner will set two questions from each unit out of which the candidate shall attempt four questions selecting one question from each unit. All questions shall carry equal marks.

Unit-I

Introduction: Meaning of tax, scope, objectives, importance, Important terms-assessee, person, previous year, assessment year, income, gross total income, total/taxable income, casual income, agriculture income, company , tax evasion, tax avoidance, tax planning, tax management.

Unit-II

Determination of residential status and incidence of tax with reference to residential status of an individual; exempted incomes of an individual

Unit-III

Income from various heads (basic introduction only), clubbing of incomes, set of and carry forward of losses, Computation of gross total income and taxable income.

Unit-IV

Computation of tax liability of an individual; filling and filing of Income Tax Returns (ITR-I & II only).

Note:

1. The objective of this paper is to make the students familiar with the mechanism of Income Tax Law
2. The examiner is not required to ask the students to calculate income from various heads of an individual. The examiner is also required to give computed incomes from different heads in the question paper.
3. The actual amount of allowed deductions with section must be given clearly in the question.

Suggested Readings:

1. *Direct Taxes law & Practice – Dr. H.C.Mehrotra & Dr. S.P. Goyal, Sahitya Bhawan Publications, Agra.*
2. *Direct Taxes & Practice – Dr. V.K. Singhania Taxmann Publication.*
3. *Direct Taxes law & Practice – Dr. Bhagwati Prasad – Wishwa Prakashan, N.Delhi.*
4. *Simplified Approach to income Tax: Dr. Girish ahuja & Dr. Ravi Gupta – Sahitya Bhawan Publishes & Distributors, Agra.*

SEMESTER-III

PAPER CODE-16DSS22OE2

STUDY OF WAR

Maximum Marks: 100

Credits: 3:0:0 **Theory Marks: 80**

Time Allowed: 3 Hours **Internal Assessment Marks: 20**

INSTRUCTION FOR THE PAPER SETTERS

The Question Paper will consist of five units: I, II, III, IV and V. Unit-V will be compulsory. The first Four Units will consist two questions each from the respective unit **and each question will carry 16 marks. Unit V of the question paper will consist Eight short answer type questions, without any internal choice and will cover the entire syllabus uniformly. Each short answer type question will carry Two marks. The Question Paper should be set strictly according to the syllabus. Separate marks for each question** should **be indicated in the question paper.**

UNIT-I

1. Nature of War:-

- **a) Definition, Scope and Causes**
- **b) Evolution of War: - Feudal, Dynastic, Peoples and Modern War**
- **c) Cold War: - Definition, Concept, Historical Evolution**

UNIT-II

2.

- **a) Principal of War**
- **b) Feature of Modern Warfare**
- **c) Future of War**

UNIT-III

3. Strategy, Tactics and Logistics:-

- **a) Definition of Grand Strategy, Strategy and Tactics**
- **b) Distinction between Grand Strategy, Strategy and Tactics.**
- **c) Types of Strategy – Strategy of Indirect Approach, Strategy of Annihilation and Strategy of Exhaustion**

UNIT-IV

4.

- **a) Origin and Causes of World War-I**
- **b) Origin and Causes of World War-II**
- **c) Indo-Pak War-1971: Origin and Causes**

Recommended Books:-

1. **Howard, Micheal, "Theory and Practice of War".**
2. **Howard, Micheal, "The Causes of War".**
3. **Bernard Black, L., "War its Causes".**
4. **Wright, Quincy, "A Study of War, University of Chicago Press, Chicago, USA. 1965.**
5. **Brodie, Bernard, "Strategy in the Missile age".**
6. **Pees David, "Korea the Limited War".**
7. **Carlvon Clasewitz (ed), "Principles of War", Army Publishers, Delhi-6, 1968.**
8. **Lt. Gen. K.K. Nanda, "Indo-Pak War-1971" (Hindi), Parbhat Publications, Asaf Ali Road, New Delhi.**

Semester-III

16ECOO2- Principles of Economics (Open Elective Paper)

Max. Marks: 100 Written Exam:80
Time: 3 Hrs. Internal Assessment: 20

Unit -1

Why study economics? The scope and method of economics; scarcity and choice; questions of what, how and for whom to produce and how to distribute output.

Unit-II

Indian Economy on the eve of Independence, British rule and its impact on Indian Economy, Emergence and development of Planning exercise in India – historical debates.

Unit-III

Trends and patterns in structure of population over time – growth rate, gender, rural-urban, literacy, regional; Structure and trends of Poverty and Inequality (interpersonal and regional); Inflation – trends, structure and causes; Unemployment – trends, structure and types.

Unit-IV

Trends in Agricultural Production and Productivity; Land Reforms – Genesis, Progress and current status; Green Revolution – Measures and its effects. Trends and Patterns of Industrial Sector; Changes in the structure of Indian Industry.

Note:

(A) Nine questions would be set in all.
(B) Question No. 1 based on the entire syllabus, would be compulsory. It would contain eight short answer questions of two marks each.
(C) There would be two questions (16 marks each) from each of four units.
(D) Candidates would be required to attend five questions (one compulsory and selecting one from each unit).)

Reading List:

- D.N. Divedi: Principles of Economics, 2nd Edition, Vikas Publication House.
- R Dutta and K P M Sundaram: Indian Economy, S Chand A.N.Agarwal: Indian Economy, Problems of Development and Planning, New Age.
- Mishra and Puri: Indian Economy, Himalaya.
- Planning Commission: Twelfth Five Year Plan, Vol I, II and III, Academic Foundation.
- Government of India: Economic Survey (latest issue)

.**M.Ed. (2016-18)**

16 EDU02
OPEN ELECTIVE - II (TRENDS AND CONCERNS OF TEACHER EDUCATION)

Time: 3 Hours **Max. Marks: 100**
Credits: 3 **(Theory: 80, Internal: 20)**

NOTE FOR PAPER SETTER

Paper setter will set 9 questions in all, out of which student will be required to attempt 5 questions

Q. No. 1 will be compulsory and will carry 16 marks. It will comprise of 4 short answer type questions of 4 marks each to be selected from the entire syllabus.

Two long answer type questions will be set from each of four units, out of which the students will be required to attempt one question from each unit. Long answer questions will carry 16 marks each.

All questions carry equal marks

COURSE OBJECTIVES:

After completing the course, the students will be able to:

Develop an idea about the structure of secondary education in India.

Understand the recommendations of different education commissions regarding secondary & Senior Secondary education commissions.

Acquaint the students with the need, scope and purpose of educational management in terms of national needs.

make aware of the importance of making right choices in life, education, vocation etc.

develop and promote understanding of basic principles, areas, importance of guidance and counseling.

make students conversant with the practices of guidance and vocational choices.

understand the concept of teacher education along with its need and scope

understand the objectives of teacher education at elementary, secondary and higher education

develop understanding about the structure, curriculum and modes of pre- service teacher education and needs of innovation in pre-service teacher education programmes describe the need, concept and scope of teacher education and historical development with special emphasis on different documents.

develop in students an understanding of the concept and philosophy of inclusive education in different contexts

develop in students an understanding of the nature and types of diverse learners

enable students to analyze the trends and issues in inclusive education

COURSECONTENTS

UNIT- I

Introduction to Secondary & Senior Secondary Education

Meaning, Aims & Objectives of Secondary & Senior Secondary Education

Secondary Education in India- Historical perspectives, pre & post Independence

Recommendations of various committees and commissions: Secondary Education Commission, Kothari Commission, Programme of Action 1992, NPE 1986, Ramamurti Review Committee, Janardhan Reddy Committee, Yashpal Committee, RMSA & NCF-2005

Educational Management

Meaning, Concept & need for Educational Management at Secondary to Senior Secondary School Level

Management at Nation: MHRD,CABE, NCERT

UNIT – II

Introduction to Guidance

Guidance Movement in India: Pre & Post Independence.

Concept, Principles & Functions of Guidance.

Types of Guidance: Educational, Vocational, Social& Personal Guidance.

Group Guidance: Meaning, Objectives, Characteristics, Advantages, Problems, Principles & Techniques.

Contemporary Models of Guidance; Mathewson Model, Sholen's Model, Chapman Model & Hoyt's Model.

Introduction to Counseling

Concept, Principles, Techniques & Procedure of Counselling.

Approaches of Counseling: Directive, Non-Directive, Eclectic Counselling.

Theories of Counseling: Freud's Psychoanalytic, Behaviouristic, Gestalt

Skills of Counseling: Building Trust, Listening, Observation & Empathy

Counselor: Characteristics, Functions &Ethics

UNIT-III

Teacher Education Introduction to Teacher Education

Concept, Need and Scope of Teacher Education.

Historical Development of Teacher Education

Aims and Objectives of Teacher Education at:

i) Elementary Level.
ii) Secondary Level.
iii) Higher Level.

Pre- Service Teacher Education: Concept, Nature, Objectives and Scope.

In-service Teacher Education; concept, Need, Objectives and areas of Professional development.

Quality Assurance in Teacher Education

UNIT – IV

Inclusive Education for Children with Diverse needs

a) **Introduction to Inclusive Education**: Definition, concept and importance of Inclusive Education.

Concept of Access, Equity, Diversity, Human Rights & Social Justice.

Readiness of School, Principles and Models of Inclusion

b) Children with Diverse Needs

Definition and characteristics of children with sensory (hearing, visual and physically challenged) intellectual (gifted, talented and children mentally challenged children), developmental disabilities (autism, cerebral palsy, learning disabilities), social and emotional problems, scholastic backwardness, under-achievers, slow learners and other marginal groups.

Suggested Readings:

Aggarwal, J.C. (2008). Education in the Emerging Indian Society. Delhi: Shipra Publication.

Chauhan, S. (2012). Educational Management. New Delhi: Pearson Publication.

Sharma, R.A.(2009). Educational Administration & Management. Meerut:R Lal Book Depot.

Vashist, S.R. (2008). Educational Administration in India. New Delhi:Anmol Publication Pvt. Ltd.

Aggarwal, R. (2010). Elementary Guidance and Counselling , New Delhi: Shipra Publication.

Bala, Rajni.(2007). Guidance and Counselling: Modern Review, New Delhi: Afa Publication.

Chandra, R.(2009). Career information and Guidance and Counselling, Delhi:Isha Books.

Gibson, R. L. &Mitchell, M. (2008). Introduction Counselling and Guidance, New Delhi: PHI Learning Pvt. Ltd.

Kottler, J. A. & Shepard, D. S.(2008). Counselling Theories & Practices, Cenage Learning:1st Edition.

Rao, S N.(2006). Counselling and Guidance ,Delhi :McGraw hill Publication.

Rao, S. N.& Hari, H. S.(2004). Guidance and Counselling,New Delhi:Discovery Pub. House.

Saxena, A. (2006). Organization of Guidance Service ,Delhi: Rajat Publications.

Shrivastava, K.K. (2003). Principles of Guidance &Counselling , New Delhi : Kanishka Publishers. Singh, R. (2002). Educational & Vocational Guidance , New Delhi : Commonwealth
Publishers

Yadav, R.H. (2012). Guidance & Counselling , New Delhi: APH Publishing Corporation

National Curriculum Framework for Teacher Education; Towards Preparing Professional and Humane Teachers, (2009) NCTE. New Delhi.

Mangla, S. (2000). Teacher Education: Trends and Strategies. New Delhi : Radha Publishing.

MHRD (1986). National Policy of Education and Program of Action. New Delhi, Govt. of India.

MHRD (1992). Program of Action. New Delhi, Department of Education, Govt. of India.

Govt. of India (1992). Report of C.A.B.E... New Delhi: Committee Department of Education.

Kohli, V.K. (1992). Teacher Education in India, Ambala: Vivek Publishers.

N.I.E.P.A. (1984). Report on Status of Teachers, New Delhi.

Sharma, R.A. (2005). Teacher Education, Meerut: Loyal Book Depot.

Udyaveer (2006). Modern Teacher Training, New Delhi: Anmol Publications

Ahuja. A; Jangira, N.K. (2002). Effective Teacher Training; Coop erative Learning Based Approach. New Delhi National Publishing house.

Bartlett, L. D. and Weisentein, G. R. (2003). Successful Inclusion on for Educational Leaders . New Jersey: Prentice Hall.

Daniels, H. (1999). Inclusive Education. London: Koegan.

Gore, M. C. (2004). Successful Inclusion Strategies for Secondary and Middle School Teachers, Crowin Press: Sage Publications.

Hegarthy, S. & Alur, M. (2002). Education of Children with Special Needs : from Segregation to Inclusion, Corwin Press: Sage Publishers.

Jha, M. M. (2002). School without Wal ls: Inclusive Education for All. Oxford: Heinemann Education.

Karten, T. J. (2007). More Inclusion Strategies that Wor k . Corwin Press, Sage Publications.

Panda, K. C. (1997). Education of Exceptional Children. New Delhi: Vikas Publications.

Rayner, S. (2007). Managing Special and Inclusive Education , Sage Publications.

Sharma P.L (2003). Planning Inclusive Education in Small Schools, R.I E. Mysore

DEPARTMENT OF ENGLISH AND FOREIGN LANGUAGES

Semester III

OPEN ELECTIVE COURSE -II

Nomenclature of the Course:
Indian Literature in Translation -II

Total Marks: 100
External Marks: 80
Internal Marks: 20
Time : 3 hrs

Lectures 3 Tutorials 0
Total Credits: 3

Learning Objectives:

- To familiarise the students with contemporary Indian dramatic and poetic texts written in regional languages

Learning Outcomes:

- Ability to comprehend and appreciate Indian literature with professional competence
- Humanizing the academic programmes in the context of inter-disciplinary studies

Unit I	Vijay Tendulkar:	*Sakharam Binder*
Unit II	Javed Akhtar:	"The Journey of a Pawn"
		"Mother Teresa"
		"Before the Riot"
		"Perplexity"
		"Defeat"
		"Crime And Punishment"
		(from *Quiver: Poems and Ghazals* by Javed Akhtar)
Unit III	Kabir:	"Of Remembering God" (nos. 1,3,4,6)
		"Of Words Sans Deeds"(nos.1,2)
		"Of Exhortations"(nos.1,2,3,5,6)
		"Of Faith"(nos.1,2,4)
		"Of Potence"(nos.1,3,4,5,)
		"Of Vainglory"(nos.1,2)
		(from *Kabir: Selected Couplets From The Sakhi In Transversion* by Mohan Singh Karki)

Instructions to the Paper-Setter and the students:

All questions are compulsory and carry equal marks.

Question 1 will comprise six short-answer type questions. There will be two questions from each Unit. Students will be required to attempt any four (in about 200 words each) selecting at least one from each Unit.

Questions 2, 3 and 4 (with internal choice) will be long answer-type questions based on Units I, II and III respectively.

The paper-setter will mention Units.
Suggested Reading

Agarwal, Purushotam. *Kabir: Sakhi aur Shabad.*

Hess, Linda. *The Bijak of Kabir*.

Kothari,Rita. *Translating India*.

Kumar, Nand. *Indian English Drama: A Study in Myth.*

Myles, Anita. *Contemporary Indian English Drama: An Overview.*

Prasoon, Shrikant. *Knowing Sant Kabir*.

Vaudeville, Charlotte. *A Weaver Named Kabir: Selected Verses, with a Detailed*.

Biographical and Historical Introduction (French Studies in South Asian Culture and Society)

Wadikar ,Shailaja B. Vijay *Tendulkar A Pioneer Playwright.*

Semester –III
Open Elective

16ENVO2: Disaster Management Time : 3 Hours.
MM. Th 80+IA 20

Note: 1. Seven questions will be set in all.

2. Question No. 1 will be objective covering the entire syllabus & compulsory. The remaining six questions will be set with two questions from each unit. The candidate will be required to attempt five in total, Question I and four by selecting at least one from each unit.

UNIT- I

Disaster- Causes and phases of disaster, Rapid onset and slow onset disasters. Nature and responses to geo-hazards, trends in climatology, meteorology and hydrology. Seismic activities. Changes in Coastal zone, coastal erosion, beach protection. Coastal erosion due to natural and manmade structures.

UNIT- II

Floods and Cyclones: causes of flooding, Hazards associated with flooding. Flood forecasting. Flood management, Integrated Flood Management and Information System (IFMIS), Flood control. Water related hazards- Structure and nature of tropical cyclone, Tsunamis – causes and physical characteristics, mitigation of risks.

UNIT- III

Earthquakes: Causes and characteristics of ground-motion, earthquake scales, magnitude and intensity, earthquake hazards and risks, Volcanic land forms, eruptions, early warning from satellites, risk mitigation and training, Landslides.

Mitigation efforts: UN draft resolution on Strengthening of Coordination of Humanitarian Emergency Assistance, International Decade for Natural Disaster Reduction (IDNDR), Policy for disaster reduction, problems of financing and insurance.

Reference Books:

1. Bolt, B.A. Earthquakes , W. H. Freeman and Company, New York. 1988
2. Carter, N,W. Disaster Management: A Disaster Manager's Hand Book, Asian Development Bank, Manila. 1992
3. Gautam Ashutosh. Earthquake: A Natural Disaster, Ashok Publishing House, New Delhi. 1994
4. Sahni, P.and Malagola M. (Eds.).Disaster Risk Reduction in South Asia, Prentice-Hall of India, New Delhi. 2003.
5. Sharma, V.K. (Ed.). Disaster Management, IIPA, New Delhi. 1995.
6. Singh T. Disaster management Approaches and Strategies, Akansha Publishing House, New Delhi. 2006
7. Sinha, D. K. Towards Basics of Natural Disaster Reduction, Research Book Centre, New Delhi. 2006
8. Smith, K. Environmental Health, Assessing Risk and Reduction Disaster, 3rd Edition, Routledge, London. 2001 21

17FTEO2

Food Fundamentals

There will be seven questions in all. The first question comprising of short answer type questions covering the entire syllabus will be compulsory. The remaining eight questions will comprise of a set of two questions from each unit and the candidate will be required to attempt question 1 and four more questions selecting at least one from each unit.

MM: Th 80+IA 20
Time: 3h

Unit I. Food nutrients and balanced diets

Characteristics of basic food groups and their contribution to the diet, Food functions, Nutrients**:** macronutrient (vitamins, carbohydrates, proteins), micronutrients (minerals)**,** balanced diet: definition, factors affecting balanced diet

Unit II. Food processing and preservation

Objectives of cooking food and cooking methods: different cooking methods, effect of different methods of cooking on nutritive value of food. Food preservatives: chemical preservatives, salt, sugar, oil as food preservative. Food preservation by drying, dehydration, cooling/freezing and thermal processing including sterilization, blanching, pasteurization.

Unit III. Food packaging and labeling

Food packaging and its functions, food packaging & labeling, packaging types, understanding labelling rules & regulations, nutritional labeling: serving sizes, daily values, health claims etc., labelling requirements for pre-packaged foods

Recommended readings:

1. Potter, N.N and Hotchkiss, J.H. Food Science. CBS Publishers and distributors
2. Vieira, E.R. Elementary Food Science. Chapman and Hills publication
3. McWilliams, M. Food Fundamentals. Pearson India Education Services (Indian edition)
4. Training manual for food safety regulators, Volume I. Food safety and Standards Authority of India.

Open Elective Paper (offered by Department of Genetics)

Paper Code: 16GENO2 **FORENSIC SCIENCE** **Credits: 3**

Internal Assessment Marks: 20

Time: 3hrs **Max. Marks: 80**

Instructions

There will be a total of seven questions. Question No. 1 will be compulsory and shall contain ten short answer type questions without any internal choice and it shall cover the entire syllabus. The remaining six questions will include two questions from each unit. Students will be required to attempt one question from each unit.

Unit –I

Forensic Science: Definition of Forensic Science, Role of the Forensic Laboratory, History and Development of Forensic Science in India, Branches of Forensic Science. Administration and Organizational Setup: Brief introduction to DFSS, CFSL, GEQD, SFSL, RFSL, MFSL, FPB, NICFS, CDTS, NCRB and BPR&D. Educational qualifications and employment in Forensic Science Laboratory.

Unit –II

Forensic Evidences: Concise of Forensic Physical, Biological, Chemical and Psychological Sciences, types of cases and evidences involved. Laws and Principles of Forensic Science: Law of Exchange (Locard), Law of Individuality, Law of Comparison, Law of Progressive Changes and Law of Probability. Criminalistics: Definition, Securing & Searching methods, Documentation of crime scene. Methods of collection of forensic evidences, Role of Police at the Crime scene, scientific help at crime scene, handling of various types of crime scenes by police.

Unit –III

Basics of signature and handwriting comparison, fake currency note examination. Classification of Fingerprint patterns, cases involved methods of development and comparison of fingerprints. Forensic expert, Admissibility of Forensic testimony in Court of law, Frye and Daubert standards, Cross Examination, Ethics in Forensic Science. Accreditation of Forensic laboratories by NABL.

Suggested Books:

1. James, S.H and Nordby, J.J. (2003) Forensic Science: An introduction to scientific and investigative techniques CRC Press,
2. Saferstein : Criminalistics (1976) Prentice Hall Inc., USA.
3. Sharma, B.R. (1974) Forensic Science in Criminal Investigation and Trials, Central Law Agency, Allahabad, 1974.
4. J A Siegel, P.J Saukko (2000) Encyclopedia of Forensic Sciences Vol. I, II and III, Acad. Press

M.A. Geography Semester-III Session 2017-18 Onwards

17GEOO1: INTRODUCTION TO GEOGRAPHY

Credit: 03 (2+1+0)
End Semester Exam: 80 marks
Internal Assessment: 20 marks
Total: 100 marks
Time: 3 hrs.

Learning Objectives:

The course on **Introduction to Geography** will discuss the basic concepts in geography. It is specifically designed to give an exposure of geographical concepts to students other than formal students of geography.

Learning Outcomes:

Student will be able to understand the geographical concepts which are relevant in day to day life.

Unit-I

Solar system , solar and lunar eclipse; Earth- shape, movements, formation of day/nights and seasons ; location-latitude-longitude, longitude and time zones.

Unit-II

Interior of earth; vulcanism and earthquakes; plate tectonics; weathering and erosion; brief introduction to major landforms.

Unit-III

Weather and climate: factors affecting and distribution; composition and structure of atmosphere; atmospheric pressure and global winds; introduction to Monsoon.

Unit-IV

Relief of oceans; oceanic salinity; circulation of oceanic water; currents of Atlantic, Pacific and Indian Oceans.

Note (i): Open Elective to be chosen from the basket of Open Electives (OEs) provided by the University.

(ii) The question paper will have five units. First four units of question paper will contain two questions from each unit of the syllabus. Candidate(s) are required to attempt one question from each unit. The unit five shall be compulsory and shall contain eight short answer type questions covering entire syllabus. All questions carry equal marks.

Recommended Readings:

Leong, Goh Cheng.,2015, *Certificate Physical and Human Geography*, Oxford University Press, New Delhi.

Getis Arthur and Bjelland Mark and Getis Victoria., 2014,*Introduction to Geography*, McGraw Hill Education.

Singh, Savinder., 2006, Physical Geography, *Pravalika Publications*, Allahabad.

Strahler Alan and Strahler Aurthur., 2005, *Introducing Physical Geography*, John Wiley & Sons, Inc.

M.A. Geography Semester-III Session 2017-18 onwards

17GEOO2: SOURCES OF GEOGRAPHICAL DATA

Credit: 03(2+1+0)
End Semester Exam: 80 marks
Internal Assessment: 20 marks
Total: 100 marks
Time: 3 hrs.

Learning Objectives:

The objective of the course is to apprise the students about the various sources of geographical data and its importance in the field of geography.

Learning Outcomes:

Students shall learn about the significance of geographical data, various sources related to physical and cultural environments, households, population, assets, facilities, building materials and policy interventions.

Unit - I

Nature and Main Sources of Geographical Data: Place Names, Census of India, Field Studies.

Unit - II

Place Names (Based on Physical and Cultural Environments).

Census of India: Primary Census Abstract: (Number of Households, Population, Sex, 0-6 Years Population, Scheduled Castes and Scheduled Tribes Population, Literate, Workers, Main Workers, Marginal Workers (Cultivators, Agricultural Labourers, HHI, Other Workers and Non -Workers and Non- Workers in respect of Total, Rural and Urban Population).

Unit-III

Census of India: Household Data: Condition of Household, Availing Banking Services, Availability of various Assets, Pre- dominant materials of Roof, Wall and Floor, Sources of Drinking Water and Location, Lighting, Availability of Latrine Facility, Types of fuel for Cooking.

Unit-IV

Census of India: Village Directory (Area. Population, Availability of Educational, Medical, Postal, Drinking Water, Communication Facilities, Land Use Pattern.

Note (i): Open Elective to be chosen from the basket of Open Electives (OEs) provided by the University.

(ii) The question paper will have five units. Each of the first four units of question paper will contain two questions from each unit of the syllabus. Candidate(s) are required to attempt one question from each unit. The unit five shall be compulsory and shall contain eight short answer type questions covering entire syllabus. All questions carry equal marks.

Recommended Readings:

Census of India (2011): Instruction Manual for House Listing and Housing Census, Ministry of Home Affairs, Government of India, New Delhi.

Census of India (2011): Primary Census Abstract, India, CD, New Delhi.

Census of India (2011): Village Directory, District Census, CD, New Delhi.

ऑपन इलेक्टिव

भारतीय साहित्य – ।।।

Paper Code: 16HNDO1

समय : 3 घण्टे

पूर्णांक : 100 अंक
आंतरिक मूल्यांकन : 20 अंक
लिखित परीक्षा : 80 अंक

खण्ड क

भारतीय साहित्य की सैद्धांतिक अवधारणा

भारतीय साहित्य का स्वरूप

भारतीय साहित्य के अध्ययन की समस्याएं

खण्ड ख

पाठ्य विषय

दीवान–ए–गालिब, संपा0–अली सरदार जाफरी, राजकमल प्रकाशन, नई दिल्ली।

(i) निर्धारित गजलें :

ये न थी हमारी किस्मत	21
कोई उम्मीद बर नहीं आती	162
दिले नादां तुझे हुआ क्या है	163
हजारों ख्वाहिशें ऐसी	220

(ii) रवीन्द्रनाथ की कहानियाँ (खण्ड ।), अनु0–रामसिंह तोमर, साहित्य अकादमी, नई दिल्ली

पाठ्यक्रम में निर्धारित कहानियॉ–
पोस्टमास्टर, काबुलीवाला, नष्टनीड़

(iii) 'खामोश अदालत जारी है' (नाटक) : विजय तेंदुलकर

(iv) संस्कार (उपन्यास) : यू0 आर0 अनंतमूर्ति

खण्ड ग

आलोच्य विषय

ग़ालिब की ग़ज़लों का काव्य–सौष्ठव

रवीन्द्रनाथ टैगोर की कहानियॉ–पाठ्यक्रम में निर्धारित कहानियों की मूल संवेदना एवं चरित्र चित्रण पर आधारित प्रश्न

'खामोश अदालत जारी है' : नाटक की मूल संवेदना, प्रमुख पात्रें का चरित्र–चित्रण, पितृसत्तात्मक व्यवस्था पर व्यंग्य, रंगमंच की दृष्टि से नाटक

संस्कार : उपन्यास का मूल प्रतिपाद्य, नामकरण, प्रमुख पात्रें का चरित्र चित्रण, उपन्यास का शिल्प–पक्ष

सहायक ग्रंथ :

1 बंगला साहित्य की कथा : हिंदी साहित्य – सुकुमार सेन, हिंदी साहित्य सम्मेलन प्रयाग सं0 2009
2 रवीन्द्र कविता कानन – सूर्यकांत त्रिपाठी निराला, राजकमल प्रकाशन, नई दिल्ली–1955
3 बंगला साहित्य का इतिहास, सुकुमारसेन, साहित्य अकादमी, नई दिल्ली–1970
4 फोर्ट विलियम कॉलेज, लक्ष्मीसागर वार्ष्णेय, इलाहाबाद विश्वविद्यालय, इलाहाबाद–1948
5 मध्यकालीन धर्म साधना, हजारीप्रसाद द्विवेदी साहित्य भवन, इलाहाबाद सं0 1013

निर्देश

1. खंण्ड क एवं ग में से छह आलोचनात्मक प्रश्न पूछे जाएंगे जिनमें से परीक्षार्थी को किन्हीं तीन प्रश्नों का उत्तर देना अनिवार्य है । प्रत्येक प्रश्न 20 अंक का होगा। (20x3 = 60)

2. खण्ड ख में चार अवतरणों में से परीक्षार्थियों को किन्हीं दो अवतरणों की संदर्भ सहित व्याख्या करनी होगी। प्रत्येक व्याख्या के लिए 10 अंक निर्धारित है। (10x2=20)

Paper: Survey of Sources of Indian History
Paper Code: 17HISO2

Max.Marks : 100
Theory : 80
I.A : 20

Note: Nine questions are to be set in all spreading into five units Each of the first four units shall contain two questions from each unit of the syllabus and Unit-V (Q. No. 9) which will be compulsory, shall contain eight short answer type questions (two marks each) covering the entire syllabus. The Candidates shall be asked to attempt five questions in all selecting one question from each unit including compulsory question. All questions shall carry equal marks.

Unit – I

Sources of Ancient India-I

a) Archaeological Sources

Stone Tools, Pottery, Coins & Inscriptions

b) Literary Sources

Vedic Literature, Epics (Ramayan & Mahabharat), Buddhist and Jain Sources

Unit-II

Sources of Ancient India-II

a. Harsacharita, Rajtaringini
b. Megasthanes, Al Beruni
c. Arthashastra

Unit-III

Sources of Medieval India

a. Ziauddin Barani: Fatwa-i-Jahandari
c. Babur : Tuzak-i-Baburi
d. Abul Fazal : Akbar Nama (3 Vols)

Unit-IV

Sources of Modern India

a. Archival Records
b. Private Papers: Officials and Non-Officials
c. Newspapers and Periodicals

Suggested Readings:

Sankalia, H.D.	:	Stone Age Tools, their Techniques and Uses (Pune, 1964)
Sircar, D.C.	:	Indian Epigraphy, (Delhi, 1965)
Puri, B.N.	:	India as Described by Early Greek Writers
Majumdar, R.C.	:	Classical Accounts of India, (Calcutta, 1960)
Pargiter, F.E.	:	Ancient Indian Historical Tradition, (London, 1922)
Winternitz, M.	:	History of Indian Literature 3 Vols, (New Delhi-1963-67)
Law, B.C.	:	India as Described in the Early Texts of Buddhism and Jainism
Birani, Ibn-i-Hasan	:	Maqalat-i-Barani-Karachi, (N.D.)
Akbar S. Ahmed	:	Discovering Islam: Making Sense of Muslim History and Society, (New Delhi, 1990.)
Elliot, Sir H.M. & J. Dowson	:	History of India as Told by its Own Historians, 8 vols., London, (1867-77)
Rosenthal, F.	:	History of Muslim Historiography, (Leiden, 1952)
Sarkar, Jagdish Narayan	:	History of History Writings in Medieval India, (Calcutta,1977)
Grewal, J.S.	:	Muslim Rule in India, The Assessment of British Historians, (Calcutta, 1970)
"	:	Medieval India: History and Historians, (Amritsar, 1975)
Ibn, Khaldum	:	Muqaddiman: An Introduction to History, Eng. Tr. Ero Franz Rosenthal, (London, 1958)
S.P.Sen (Ed.)	:	Historians and Historiography in Modern India, (Bombay, 1970)
Mukhia, Harban	:	Historians and Historiography During the Reign of Akbar, (New Delhi,1976)
Philips,C.H.(ed.)	:	Historians of India, Pakistan and Ceylon, (London,1961)
Publication Division, Ministry of I&B, Govt. of India	:	Gazetteer of India Vol.II (History & Culture)

Housekeeping & Interior Design

18MHMCTO2

External Marks: 80
Internal Marks: 20
Credit: 3-0-0

Unit-1

Introduction: Meaning and importance of Housekeeping, Responsibility of the Housekeeping department, career in the Housekeeping department. Housekeeping Department: Organizational framework of the Department (Large/Medium/Small Hotel), Attributes and Qualities of the Housekeeping staff - skills of a good Housekeeper

Unit-2

Cleaning Science: Characteristics of a good cleaning agent, Types of cleaning agent, Cleaning Equipment: Types of Equipment,Characteristics of Good equipment (Mechanical and Manual)

Unit-3

Interior Decoration-: Importance, Definition & Types, Classification, Principles of Design: Harmony, Rhythm, Balance, Proportion, Emphasis, Elements of Design: Line, Form, Colors, Texture. Colours: Color Wheel, Importance & Characteristics, Classification of colors, Color Schemes. Floor Coverings & Finishing, Ceilings &their Maintenance, Wall Coverings, Windows, Lighting: Classification, Types &Importance, Applications.

Unit-4

Flower Arrangement: Concept & Importance, Types & Shapes, Principles. Emerging trends and innovations in Hotel housekeeping.

FUNDAMENTALS OF MARKETING
Course Code: 16IMSO2

MM: Th 80+IA 20

Time: 3 hours

Course Objective:
This course is designed to promote understanding of concepts, philosophies, processes and techniques of managing marketing operation and to develop a feel of the market place.

Unit -I
Nature and scope of marketing: corporate orientation towards marketplace; building and delivering customer value and satisfaction; retaining customers; marketing environment

Unit -II
Analyzing consumer markets and buyer behaviour; market segmentation, positioning and targeting; tools of product differentiation; marketing strategies in the different stage of the product life cycle

Unit -III
New product development process; product mix and product line decisions; branding decisions; pricing strategies; managing marketing channels; wholesaling and retailing

Unit -IV
Advertising and sales promotion; public relations; personal selling; evaluation and control of marketing effort; web marketing; green marketing

Suggested Readings:

1. Kotler Philip and Keller; Marketing Management; PHI, New Delhi
2. Kotler, Philip, Kevin Keller, A. Koshy and M. Jha, Marketing Management in South Asian Perspective, Pearson Education, New Delhi
3. Kerin, Hartley, Berkowtz and Rudelius, Marketing, TMH, New Delhi
4. Etzel, Michael J, Marketing: Concepts and Cases, TMH, New Delhi
1. Dhunna, Mukesh, Marketing Management – Text and Cases, Wisedom Publications, New Delhi

Instructions for External Examiner: The question paper shall be divided in two sections. **Section 'A'** shall comprise of eight short answer type questions from whole of the syllabus carrying two marks each, which shall be compulsory. Answer to each question should not exceed 50 words normally. **Section 'B'** shall comprise 8 questions (2 questions from each unit). The students will be required to attempt four questions selecting one question from each unit. All questions will carry equal marks.

DEPT. OF JOURNALISM & MASS COMMUNICATION

SEMESTER – III

OPEN ELECTIVE-NEW MEDIA

Time allowed : 3 Hours **Total Marks : 100**

Max. Marks : 80

Internal Assessment : 20

Credit : 3

Note : The question paper will be divided into Five Units carrying equal marks i.e. 16 marks for each question. Each of the First Four Units will contain two questions and the students shall be asked to attempt one question from each unit. Unit Five shall contain eight short answer type questions without any internal choice and it shall be covering the entire syllabus. As such, all questions in Unit five shall be compulsory.

Unit I

1.1 New Media- Introduction, Definition, Concept and Scope
1.2 Characteristic Features of New Media.
1.3 New Media and ICT (Information & Communication Technology), Convergence of Media.
1.4 Applications of New Media, New Media & Society, Digital learning.

Unit II

2.1 Internet as a medium of mass communication
2.2 History & Development of Internet, World Wide Web (WWW)
2.3 Computer-mediated – communication (CMC), Multimedia Web Search Engines – functions and uses.
2.4 Application of the Internet, especially in Journalism & Mass Communication; e-newspapers, e-magazines

Unit III

3.1 Online Journalism- Definition, meaning, concept brief history
3.2 Basic Elements of Online Journalism, Characteristic features
3.3 Status of Online Journalism, Challenges & New Trends
3.4 Open Source Journalism, Wikipedia, Wiki leaks, Online News Portals

Unit IV

4.1 Impact of New media, Internet, and Online Journalism
4.2 Social media – Definition, important social media platforms (Facebook, Twitter Instagram, You Tube, Linkedin), Uses and applications
4.3 Citizen Journalism, Participatory Journalism, Blogging as a form of Online Journalism
4.4 Reliability, Truth and Credibility factors on new media/Social Media, Fake News, Trolling on Social media, and Values & Ethics in New Media.

INSTRUCTIONS FOR THE PAPER-SETTER

Note: The question paper will be divided into Five Units carrying equal marks i.e. 16 marks for each question. Each of the First Four Units will contain two questions and the students shall be asked to attempt one question from each unit. Unit Five shall contain eight short answer type questions without any internal choice and it shall be covering the entire syllabus. As such, all questions in Unit five shall be compulsory.

Note 1 : The Criteria for awarding internal assessment of 20 marks shall be as under:

A. Class test	:	10 marks.
B. Assignment & Presentation	:	5 marks
C. Attendance	:	5 marks

LL.M. SECOND SEMESTER EXAMINATION w.e.f. Session 2016-17

Open Elective (Constitutional Law)

PAPER CODE: 16LAWO2

MM: Th 80+IA 20

Time: 3 hours

NOTE FOR EXAMINER/PAPER SETTER

The question paper of each course will be divided into Five sections, each of the First Four Sections of the Question Paper will contain 2 questions respectively from Unit-1 to Unit-4 of the syllabus. The students will be required to attempt one question from each section. Section 5 of the question paper shall contain 8 short answer type questions of 3 marks each(without any choice) covering the entire syllabus. As such Section 5 will be compulsory. The examiner will be free to set the questions in problem forms based on case law.

NOTE FOR STUDENTS(ON QUESTION PAPER)

Attempt four questions from sections 1 to 4, selecting at least one question from each section. These questions shall carry 14 marks each. Section 5 is compulsory and each question in this section shall carry 3 marks.

UNIT-I

Preamble, Citizenship, Definition of State Under Art, 12. Rules of Interpretation under Art. 13
Leading Case: Mohmmad Raza V State of Bombay AIR 1966 , SC 1436

UNIT-II

Right to Equality(Art.14), Special Provision for Weaker Sections of the Society, Reservation Polity, Fundamental Freedoms under Art.19, Freedom of Press.
Leading Case: Indira Sawhney v Union of India, AIR 1993, SC 477

UNIT-III

Protection in respect of conviction of offcence (Act-20), Right to Life and Personal Liberty Article 21), Protection against Arrest and Detention (Art 22), Right against Exploitation (Art-23 & 24), Right to Religion (Art 25-28).
Leading Cases:Maneka Gandhi v Union of India, AIR 1978, SC 597

UNIT-IV

Cultural & Educational Rights of Minorities (Art.29 & 30), Right to Constitutional Remedies (Art, 32), Directive Principles of State Policy, Fundamental Duties.
Leading Case: T.M.A. Pai Foundation V State Karanataka AIR 2003 SC 355

BOOKS RECOMMENDED

Seervai, H.M.	: Constitutional Law of India
Hidayatullah, M.	: -do-
Tope, T.R.	: -do-
Shukla, V.N.	: -do-
Jain, M.P.	: Constitutional Law
Chander Pal	: Centre State Relations and Indian Cooperative Federalism
Chander Pal	: State Autonomy in Indian Federation: Emerging Trends
J.N.Pandey	: Constitutional Law of India

16LISO2: Information Sources and Literacy

MM: Th 80+IA 20
Time: 3Hrs.

Note
The paper is divided into 4 units. The candidates are required to attempt 5 questions in all selecting 1 question from each unit (out of two internal choices). Question 1 is compulsory consisting of 8 short answer type questions spread over the whole syllabus. All questions carry equal marks.

Objectives

to provide knowledge regarding information sources;
to impart practical knowledge to the students about the evaluation of reference and information sources; and
to make students aware about information literacy and search strategies

Outcomes
Through this course the students will come to know about the various types of information sources in print and electronic form. The students will have knowledge of various types of databases and how to evaluate them. After completion of the course, the students will know the importance of information literacy and various search strategies.

Unit 1:Information Sources

Information sources and types : documentary and non-documentary
Print information sources: primary, secondary, tertiary
Electronic information sources: primary, secondary, tertiary
Books: concept, parts: front matter, body, back matter; types
Journals: concept, types, impact factor, h-index
Theses: concept, parts

Unit 2:Databases

Full text databases: Science Direct, Emerald
Abstracting and indexing databases: Medline
Citational databases: Scopus, Web of Science
Theses databases: NDLTD, Shodhganga
Open access resources: DOAJ, DOAB

Unit 3: Evaluation of Information Sources

Evaluation criteria
Evaluation of following information sources (print and electronic): dictionary: Oxford groups; encyclopedia: International Encyclopedia of Social Science, McGraw Hill Encyclopedia of Science & Technology ; biographical sources: International Who's Who; yearbook: World of Learning ;statistical sources: Census of India
Evaluation of internet resources

Unit 4: Information Literacy

Information literacy: meaning, definition
Information literacy and lifelong learning
Nature of information requirement
Literature search
Search strategies and techniques

Suggested Readings

Eisenberg, Michael. *Information literacy: Essential skills for the information age*. 2nd ed. Westport Publ.: Libraries Unlimited, 2005.

Gates, Jean Key. (1988). *Guide to the use of Libraries and Information Sources* (6thed). New York: McGraw-Hill.

Katz, William A. (2002). *Introduction to Reference Work: Basic Information Services*. *Introduction to Reference Work:* V1. 8thed. New York: McGraw-Hill, 2002.

Katz, William A. (2002). *Introduction to Reference Work: Reference Services and Reference Processes*. V2. 8thed. New York: McGraw-Hill.

Open Electives to be offered by Department of Mathematics

To be offered in3rd Semester					
16MATO4	MATLAB	40	--	60	1:0:2
16MATO3	Statistical Tools using SPSS	50	--	50	2:0:1

16MATO3: Statistical Tools using SPSS

Time: 03 Hours ***Max Marks : T50+P50***
Credits : 2:0:1

Unit – I

Data: Qualitative and Quantitative Data, Cross-Sectional and Time series data, Univariate and Multivariate data. Scales of measurement of Data.
Frequencies, Bar charts, Pie Charts, Line Graphs, histograms, Measures of central tendency, dispersion, Skewness, Kurtosis, Box plots.

Unit – II

Concepts of Linear Correlation and Regression, Multiple Regression, Normality tests, t-tests, Chi Square tests, F-test, One way and Two way ANOVA.

Unit – III

SPSS Data File: Opening a data file in SPSS, SPSS Data Editor, Creating a data file, Editing and Manipulating data, Missing Values, Editing SPSS Output, Copying SPSS output, Printing from SPSS, Importing Data.
Charts and Graphs with SPSS: Frequencies, Bar charts, Pie Charts, Line Graphs, histograms,

Unit – IV

Descriptive Statistics with SPSS: Measures of central tendency, dispersion, Skewness, Kurtosis, Box plots.
Statistical tests using SPSS, Correlation and Regression using SPSS, Factor analysis using SPSS.

Note : The question paper will consist of **five** units. Each of the first four units will contain **two** questions from unit **I , II , III , IV** respectively and the students shall be asked to attempt **one** question from each unit. Unit five will contain **eight to ten** short answer type questions without any internal choice covering the entire syllabus and shall be **compulsory**.

Books Recommended:

1. Kothari, C.R., Research Methodology
2. Gupta, S.L. and Gupta, Hitesh, SPSS for Researchers, International Book House Pvt. Ltd.
3. Field, A., Discovering Statistics using SPSS, SAGE Publications.
4. Gupta, V., SPSS for Beginners, VJ Books Inc.
5. Rajathi, A. and Chandran, P., SPSS for you, MJP Publishers

Part-B (Practical)

Time: 03 Hours ***Max Marks : 50***

There will be a separate practical paper based on the above theory paper. All practicals are required to be done using SPSS.

16MATO4: MATLAB

Time: 03 Hours ***Max Marks : T40+P60***
Credits : 1:0:2

Section - I

Introduction to MATLAB Programming: Basics of MATLAB programming, Anatomy of a program, variables and assignments, data types, operators, working with complex numbers, mathematical operations, functions for input and output, good programming style.

Section - II

Introduction to vectors in Matlab: Defining a Vector, Accessing elements within a vector, Basic operations on vectors, strings, string functions, cell array, creating cell array, Introduction to Matrices in Matlab: Defining Matrices, Matrix functions, Matrix operations, vector functions

Section - III

Loops: for loops, while loops, Branching (conditional statements) - if statement, if else statement, else if statement, Executable files, subroutines, Built in functions and user-defined functions, function handles, function handles in m-files, inline functions.

Section - IV

Data files: Saving and recalling data, saving a session as text, C style read/write, Graphs and plots- Polar plot, plot3, mesh, contour, contourf, Using built-in algorithms: optimization and numerical integration (areas), Root-finding.

Note : The question paper will consist of **five** units. Each of the first four units will contain **two** questions from unit **I , II , III , IV** respectively and the students shall be asked to attempt **one** question from each unit. Unit five will contain **eight to ten** short answer type questions without any internal choice covering the entire syllabus and shall be **compulsory**.

Books Recommended:

1. MATLAB An Introduction With Applications 5ed, Author: Amos Gilat. Publisher: Wiley, ISBN13:. 978-1118629864.
2. Insight Through Computing: A Matlab Introduction to Computational Science and Engineering by C. F. Van Loan and K.-Y. D. Fan. SIAM Publication, 2009, ISBN: 978-0-898716-91-7.
3. MATLAB Programming, Y.Kirani Singh, B.B. Chaudhari, PHI Learning, 2007, ISBN 8120330811, 9788120330818.
4. An Introduction to Matlab, Krister Ahlersten, Bookboon.com, ISBN: 978-87-403-0283-7

M.Sc. Medical Biotechnology Semester -III

Course Title: Principles of Medical Biotechnology II

MM. Th 80 + IA 20 **Course Code: 16MBTO2** **Time: 3h**

NOTE: The examiner is required to set seven questions in all. Question No. 1 will be compulsory and short answer type covering the entire syllabus. The remaining six questions will be set with two questions from each unit. The candidate will be required to attempt Question 1 and four more selecting at-least one from each unit.

Theory

Unit – I

Cloning vectors- Plasmid, cosmid, phagemid,phasmid, bacteriophages YAC, BAC, HAC; Shuttle vectors; Recombinant – production, identification and selection; Restriction endonucleases, Ligases; Hybridization; Linkers and adaptors; DNA Transformation and transfection methods; Cell expression system; Human genome project

Unit – II

PCR and its variant; Blotting- Southern, northern & western; Genomic and cDNA library;; DNA Footprinting ; Gene therapy, Gene knockout, Tissue engineering.

Animal Cell Culture: Introduction and Application of animal cell culture. Equipments, materials, culture vessels for animal cell culture, Primary and established cell line cultures

Unit – III

Basic biology of stem cells; Types & sources of stem cells, Blood cell formation from Bone marrow stem cells, Isolation & characterizations of stem cells, Cancer stem cells, Induced pluripotent stem cells, Stem cell banking, Therapeutic application of stem cells.

Recommended Books

1. R. Lanza, J. Gearhart et al (Ed), Essential of Stem Cell Biology, Elsevier Academic press.

2. R. Lanza, I. Weissman, J. Thomson, and R. Pedersen, Handbook of Stem Cells, TwoVolume, Volume 1-2: Volume 1-Embryonic Stem Cells; Volume 2-Adult & Fetal Stem Cells, 2012, Academic Press.
3. Culture of Animal Cells- A manual of basic techniques by R.I. Freshney
4. Animal Cells Culture and Media, D.C.Darling and S.J.Morgan, 1994. BIOS Scientific Publishers Limited.
5. Gene cloning and DNA analysis – An Introduction (2006) 5th edition, T.A Brown, Blackwell publisher.
6. Essential genes (2006), Benzamin Lewin, Pearson education international.
7. Genome-3 (2007) T.A Brown. Garland science, Taylor & Francis, NewYork.
8. Principles of gene manipulation and Genomics (2006) 7th edition, S.B Primose and R.M Twyman, Blackwell publishing.
9. Principles of Genetic Engineering (2009), Mousumi Debnath, pointer publisher, Jaipur.
10. Molecular Biotechnology-Principles and Applications of Recombinant DNA (2003) 3rd edition, Bernard R Glick and Jack J pasternak. ASM press, Washington.
11. Human Molecular Genetics (2004) 3rd edition, Tom Strachan & Andrew P Read, Garland science.

(SEMESTER-III)

Open Elective: 18MCBO2 : Microbes for health and wealth

Time: 03 Hours
MM. Th 80+IA 20
Time: 2 h
Credits : 3:0:0

Note: The question paper will consist of 9 questions. Students will have to attempt 5 questions in total - Question no. 1 will comprise of short answer questions covering the entire syllabus and will be compulsory. Two questions to be set from each Unit and students will have to attempt one from each Unit.

Unit I

Commercial Microbial Products; Introduction to bioprocess development- upstream development, downstream process, Preservation and improvement of industrially important microorganisms, Strain development by mutagenesis, protoplast fusion and Genetic engineering.

Unit II

Raw materials and media formulation for microbial culture; batch, fed batch and continues mode of bioprocess, Types of Bioreactors and their applications: Stirred tank bioreactor & Specialized bioreactors.

Unit III

Downstream process, Choice of bioprocess plant location; Methods of estimation of Capital Cost and Operational costs of bioprocess plant, Good Lab Practices (GLP) and Good Manufacturing Practices (GMP).

Unit IV

Introduction to Bioentrepreneurship; Factors necessary for Entrepreneurship; Attributes in an Entrepreneur; Market Assessments; Managing Technology transfer and Intellectual property in biotechnology in India, Licensing of Biotechnological invention, Funding agencies in India, Basics of Patents- Types of patents; Filing of a patent application.

Suggested readings:

1. Handbook of Bioentrepreneurship by **Patzelt**, Holger, **Brenner**, Thomas (Eds.) Publisher:
2. SpringerBiotechnology. A Textbook of Industrial Microbiology, by W. Crueger and A. Crueger. Publisher: Sinauer Associates.
3. Industrial microbiology by G. Reed, Publishers: CBS
4. Bioprocess Engineering Principles by P. Doran. Publisher: Academic Press.

Biochemical Engineering Fundamentals by J.E. Baily and D.F. Ollis. Publisher: McGraw Hill

M.Sc. Physics Semester III

Open Elective – II

Sources of Energy –II

PAPER CODE: 16PHYO2

Theory Marks: 80
Internal Assessment: 20
Time: 3 hours

Unit I

Bio-mass:

Introduction of biogas, Availability of bio-mass and its conversion theory, classification of biogas plants, principle & working of floating drum plant & fixed dome type plant- advantages & disadvantages. Biogas from plant waste, community biogas plants, utilization of biogas.

Unit II

Ocean Thermal Energy Availability, theory and working principle, performance and limitations.

Wave and Tidal Wave:

Principle, working, performance and limitations.

Unit III

Petroleum and Coal energy

Petroleum, origin, composition, production, extraction, octane number, kerosene, LPG, lubricants natural gas, physical properties and uses of coal, generis of coal, molecular structure, determination of fixed carbon content, coal for generation of electricity, zero emission power plants, coal reserves and mining.

Unit IV

Nuclear Energy

Nucleus and its constituents, charge mass, isotopes, isobars, mass defect, binding energy and nuclear stability, radiation and nuclear reactions.

Nuclear fission, chain reaction, U^{235}, U^{238}, controlled nuclear fission and nuclear reactors, fast breeder reactor, nuclear fusion, condition for nuclear fusion reaction, Hydrogen bomb, Nuclear bomb

Text / References Books:

1. John Twideu and Tony Weir, "Renewal Energy Resources" BSP Publications, 2006
2. M.V.R. Koteswara Rao, "Energy Resources: Conventional & Non-Conventional" BSP Publications, 2006.
3. D.S. Chauhan, "Non-Conventional Energy Resources" New Age International.
4. C.S. Solanki, "Renewal Energy Technologies: A Practical Guide for Beginners" PHI Learning.
5. Peter Auer, "Advances in energy system and Technology" Vol I & II Edited by Academic Press.
6. Raja A.K., "Introduction to Non-Conventional Energy Resources" Scitech Publications.
7. G.D. Rai, "Non-conventional Energy sources" Khanna Publishers

Semester-III **Open Elective**

Paper code 17PUBO2
Environment Protection Administration
w.e.f. 2017-18

Total Credit: 4+0+0 =4
L+T+P
Total Marks = 100
Semester End Exam = 80
Internal Assessment = 20

Note:

The question paper will consist of 5 units containing 9 questions. The students are required to attempt one question from each unit. Question no 9 consisting of eight short answer questions covering entire syllabus, is compulsory.

Unit-I
Environment: Meaning, definition, scope and significance
Environment Ethics
Environment Challenges in India

Unit-II
Environment Protection: Meaning, Definition and Significance.
Environment Protection Act, 1986
Bio-Diversity and its Conservation
Bio-Diversity Conservation Act, 2002
Unit-III
Environment Pollution, Meaning, causes, effects and control mechanism
Types of pollution, Environment Education, Air Pollution (Prevention and Control) Act, 1981
Water Pollution (Prevention and Control) Act, 1974

Unit-IV
Environmental Issues:
People's Participation in Environment Protection
Role of NGO and Panchayats in Environment Protection
Environment Management

Suggested Readings:

1. Murthy,D.B.N. Environmental Awareness & Protection : A Base Book on EVS, New Delhi: Deep & Deep, 2004
2. Radha , S. & A.S. Sankhyan, Environment Challenges of the 21st Century, New Delhi : Deep & Deep, 2004.
3. Tiwari, A.K., Environmental Planning and Management, New Delhi : Deep &

Deep, 2006.
4. Murthy,D.B.N., Environmental Planning and Management, New Delhi : Deep & Deep, 2005
5. Garg, Bansal and Tiwari, Enviornment Pollution & Protection, New Delhi, Deep & Deep, 2006
6. Verma S.B. and S.K. Singh, Environment Protection and Development, New Delhi : Deep & Deep 2005
7. Singh, P.P. & S. Sharma, Teaching of Environemtn, New Delhi: Deep & Deep, 2004
8. Tiwari, K.L. and S.K. Jadhav, Paryavaran Vigian, New Delhi: I.K. International, 2009.
9. Chatterjee, Benimadhab , Environmental Laws: Implementation Problems and Perspectives, New Delhi, Deep & Deep, 2002.
10. Venkat, Aruna , Environmental Law and Policy, New Delhi, PHI Learning, 2011.
11. Upadhayay, Jai Jai Ram , Pryavaran Vidhi, Allahabad, Central Law Agency, 2013.
12. Sengar, Dharmendra S., Environmental Law, New Delhi, PHI, 2012.

13. Tiwari K.L and S.K. Jadhav, Paryavaran Vigian, New Delhi, I.K. Internation, 2009.
14. Ganesamurthy, V.S., Enviornmental Status and Policy in India, New Delhi: New Century Publications, 2011.

Department of Political Science

Semester- III 2017-18

Open Elective: *Natural and Manmade Disaster* 17POL01

Max. Marks: 80
Internal Assessment: 20

Note: The question paper will be divided into five units carrying equal marks i.e. 16 marks. Students shall be asked to attempt one out of two questions from each unit. Unit five shall contain eight short answer type questions without any internal choice and it shall be covering the entire syllabus. As such, all questions in unit five shall be compulsory.

UNIT- I

i. Classification of Disasters; Conceptualizing the interface between environmental degradation and disasters

ii. Natural Disasters I: Earthquakes & Tsunamis; Volcanic Eruptions; Landslides and Avalanches

UNIT- II

iii. Natural Disasters II: Cyclones; Forest-fires; Droughts and Desertification; Floods

UNIT- III

iv. Human Induced Disasters I: Nuclear Disasters; Chemical Disasters; Soil and Water Pollution

UNIT- IV

v. Human Induced Disasters II: Global warming; Biological

Disasters: Epidemics

Essential Readings

1. Ahmed, Shaik Iftikhar (2008). *Disaster Management in the Wake of a Flood*, Twenty First Century Publications, Patiala.
2. Bryant Edwards (2005). Natural Hazards, Cambridge University Press, U.K.
3. Carter, W. Nick (1991). Disaster Management, Asian Development Bank, Manila.
4. Central Water Commission (1987). Flood Atlas of India, CWC, New Delhi.
5. Central Water Commission (1989). Manual of Flood Forecasting, New Delhi.
6. Government of India (1997). Vulnerability Atlas of India, New Delhi.

   Kapur, A. (2010). Vulnerable India: A Geographical Study of Disasters, Sage Publications, New Delhi.
7. Kapur, A. (2005). Disasters in India: Studies of Grim Reality, Rawat Publications, Jaipur.
8. Sahni, Pardeep et al. (eds.) (2002). Disaster Mitigation Experiences and Reflections, Prentice Hall of India, New Delhi.

Further Readings:

1. Bilham, R. (2009). The seismic future of cities. Bulletin of Earthquake Engineering, 7, pp. 839-887.

2. Bureau of Indian Standards (2002). Indian Standards: Criteria for Earthquake Resistant Design of Structures, Part I, Fifth Revision.

3. Government of India (1997). Vulnerability Atlas of India (New Delhi: Building Materials and Technology Promotion Council, Ministry of Housing & Urban Poverty Alleviation).

SYLLABUS FOR OPEN ELECTIVE (SANSKRIT)

Semester- III **M.M-100**
Credit- 3 **Theory-80**
Course code-18SKTO2 **Internal Assessment-20**

Ancient Indian Ethics
प्राचीन भारतीय नीतिशास्त्र

घटक – I	तैत्तिरीय उपनिषद्– शिक्षावल्ली	20
घटक – II	श्रीमद्भगवद्गीता अध्याय–6	20
घटक – III	श्रीमद्भगवद्गीता अध्याय–16,17	20
घटक – IV	हितोपदेश (मित्रलाभ)	20

Guidelines : Students will be required to attempt five questions of 16 marks each.

दिशा निर्देश –

Question no. 1 will comprise eight short answer type questions from all Units.

Guidelines for other Four questions are as under:

Unit I :	One critical question out of two Or two shortnotes out of four.	16
Unit II :	One critical question out of two Or two shortnotes out of four.	16
Unit III :	One critical question out of two Or two shortnotes out of four.	16
Unit IV :	One critical question out of two Or two shortnotes out of four.	16

अनुशंसित ग्रन्थ –

1. तैत्तिरीय उपनिषद्, गीता प्रैस गोरखपुर
2. भर्तृहरि : शतकत्रयम्, नाग पब्लिशर्स, दिल्ली
3. नीतिशतकम् (भर्तृहरि कृत), भारतीय विद्या प्रकाशन, दिल्ली
4. संस्कृत के लोक विश्रुत नीतिकाव्य, चौखम्बा ओरिण्टालिया, दिल्ली
5. श्रीमद्भगवद्गीता, गीता प्रैस, गोरखपुर
6. हितोपदेश, नारायण पांडेत

MA 3rd Semester (Open Elective Paper)

Sem	Paper No	Code	Nomenclature of Paper	Contact hours/L +T+P	Marks			Credit
					Theory	I.A	Total	
III	Paper	16SOCO2	Indian Society	4:0:0	80	20	100	3

Scheme of Examination:

It is decided to adopt the new scheme of Choice Based Credit System of examination whereby all the papers have four units comprising of 80 marks and the Internal Assessment component will be of 20 marks in all the Semesters. In the theory paper students will be asked to attempt four questions from the four units selecting at least one question from each unit and the 5th question shall be compulsory which will cover all units in the format of short answer type questions comprising of about 50 to 60 words. Thus, the total marks for all the five questions i.e. four from the units (16x4=64) and the 5th compulsory question of short answer numbering eight of 2 marks each i.e (8x2=16) thus making the total weight age to 80 marks.
The detail of Internal Assessment of 20 marks has been prescribed by the University is given below:-

(a) One Class Test : 10 Marks
(b) One Assignment : 5 Marks
(c) Attendance : 5 Marks

Less than 65%	:	0 Marks
Up to 70%	:	2 Marks
Up to 75%	:	3 Marks
Up to 80%	:	4 Marks
Above 80%	:	5 Marks

M.A.(Sociology)
Semester-III
Open Elective Paper- 16SOCO2
Indian Society

Maximum Marks: 100
Theory: 80
Internal Assessment: 20
Time : 3 Hours

Note:

3. **Nine question would be set in all.**
4. **Question No. fifth shall be based on the entire syllabus and would be compulsory. It would contain eight short answer questions of two marks each.**
5. **There would be two questions (16 marks each) from each of the four units.**
6. **The candidate would be required to attempt four questions (one compulsory and other four questions selecting one from each unit).**

Unit – I

Indian Society: Evolution of Indian Society: Socio- Cultural Dimensions; Unity in Diversity: Cultural, Linguistic, Religious and Tribal.

Unit – II

Social Stratification: Social Differentiation and Stratification. Forms of Stratification: Caste, Class and Gender.

Unit – III

Social Change: Development and Social Change, Processes of Change: Sanskritization,Westernization and globalization.

Unit – IV

Contemporary Issues: Status of Women: Demographic, Social, Cultural, Economic and Political Dimensions; Adverse Sex Ratio: Causes and Consequences.

References:

Ahlawat, S.R and Neerja Ahlawat (2015) (ed.) Crises of Social Transformation in India, Rawat Publication, Delhi

Ahlawat, Neerja (2012) "Political Economy of Haryana's Khaps", "Economic and Political Weekly, Vol - XLVII No. 47-48, December 01.

Ahlawat, Neerja (2013), "Dispensable Daughters and Indispensable Sons: Discrete family Choice", Social Change, 43(3) PP-365-376

Ahuja, Ram (2003) Society in India, Rawat Publications, Delhi

Desai, Neera and Maithreyi Krishna Raj. (1987). Women and Society in India, New Delhi: Ajanta Publishers.

Dube, S.C. (1967). The Indian Village. New Delhi: National Book Trust.
Ghurye, G.S. (1957). Caste and Race in India, Bombay: Popular Book Depot.
Karve, Irawati (1961). Hindu Society: An Interpretation, Poona: Deccan College.
Prabhu, P.H (1979): Hindu Social Organization, Popular Prakashan.
Sharma, K.L. (2011). Indian Social Structure and Change, New Delhi: Rawat Publications. Srinivas, M.N. (1960). India's Villages. Bombay: Asia Publishing House.
Srinivas, M.N. (1970). Social Change in Modern India, Berkeley, California: University Srinivas, M.N. (1991), India: Social Structure, Delhi: Chaman offset Printers.

Optimization Techniques (3rd Semester)

PAPER CODE: 16STAO3

Maximum Marks: 80
Internal Assessment Marks: 20
Time: 3 Hours
Credit: 03

Section –I

Linear Programming Problems: Formulation and their Solution by Simplex and Artificial Variable Techniques. Resolution of Degeneracy in LPP. Duality in LPP: Solution of Primal-Dual Problems by Dual Simplex Method and Economic Interpretation of Duality. Solutions of Integer Programming Problems (IPP).

Section –II

Transportation Problems: Mathematical Formulation and their Optimal Solution. Assignment Problems: Mathematical Formulation and their Solution by Hungarian Assignment Method.
Theory of Games: Characteristic of Games, Minimax (Maximin) Criterion and Optimal Strategy. Solution of Games with (or without) Saddle Point. Solution of mxn Games by Linear Programming Method. Principle of Dominance.

Section-III

Markov Chains: Classification of States and Chains. Higher Transition Probabilities. Elementary Idea of Birth and Death Processes. Queuing Theory: Description of Queuing Problems, Notations, Measures of Effectiveness and Characteristics. Queuing Systems: M/M/1, M/M/C, M/M/1/R, M/G/1 and G/M/1 Models with Waiting Time Distribution and their Steady State Solutions.

Section –IV

Inventory Problems**:** Classification and Cost involved in Inventory Problems. Solution of Deterministic and Probabilistic Inventory Models. Job Sequencing Problems: Processing of N Jobs through Two, Three and M Machines. PERT and CPM Techniques. Labeling Time Estimate and Determination of Critical Path on Network Analysis.

Books Suggested:

1. Gass, S.I. : Linear Programming (Methods and Applications)
2. Kambo, N.S : Mathematical Programming Techniques
3. Hadely,G. : Linear Programming
4 Medhi, J. : Stochastic Processes (New Age International)
5. Donal, Gross & Carl, M. Hariss : Fundamentals of Queuing Theory (Wiley)
6. Kashyap, B.R.K & Chaudhary, M.L. : An Introduction to Queuing Theory (A.A.Publications)
7. Churchman : Introduction to Operations Research (J. Wiley)
8. Sharma, S.D. : Operation Research (Kedar Nath Ram Nath, India)

Note: The examiner is to set the question paper into five units- A, B, C, D & E. In each unit A, B, C& D, he/she has to set two questions of 16 marks each from section I, II, III, & IV respectively and the candidate will attempt one question from each unit. In unit E, there will be 8 short answered questions of 2 marks each, covering the whole syllabus and the candidate has to attempt all the questions.

DEPARTMENT OF ZOOLOGY
M. Sc. ZOOLOGY

Course Title: Wild Life And Conservation

Semester- III

Course no.: 16ZOOO2
MM:T80+IA20

Time: 3 Hr

Note: There shall be seven questions in total. One question will be compulsory (short answer type) covering the entire syllabus and remaining six questions will be set two from each unit. Students are required to attempt question 1 and 4 more selecting at least one from each unit.

Unit-I

Wildlife: Definition, significance and wildlife zones of the world and India, Protected Area Systems, Present status of National PA-Systems. Theory and Practice of Biosphere Reserves of the world: Biosphere Reserves of India. Natural Heritage sites, Wildlife and livelihood; Wildlife and illegal trade & control.

Unit-II

Wildlife Damage, electric fences for wildlife damage control, Basic electric fence design, Trench design, line trapping, Mist netting, Rocket netting Chemical capture: Equipment, Drugs, Plan of operation. Poaching: Its implications, conducting anti-poaching operations.

Unit-III

Wildlife conservation techniques, role of WWF, IUCN, UNEP, Red Data Book; Categories of Endangered Wildlife Species. National Projects: Project Tiger, Project elephant, Project Rhinoceros, Project Crocodiles.

***As per SOE Zoology**

****proposed maximum marks and subject to change in uniformity with other faculties of university**

List of Recommended Books

1. Techniques for wildlife Census in India by W.A. Rogers (A field mannual); Wildlife Institute of India, Dehradun.
2. Wildlife Wealth of India by T.C. Majupuria; Tecpress Services, L.P., 487/42-SOL Wattenslip,Pratunam Bangkok, 10400, Thailand
3. Ali, S. Ripley S.D. Handbook of Birds of India, Pakistan 10-Vols. Oxford University Press, Bombay.
4. The Book of Indian Animals by S.H. Prater, BNHS-Publication, Bombay.
5. Wildlife in India by V.B. Saharia Natraj Publishers, Dehradun.
6. E.P. Gee, The Wildlife of India.

M.D.U., ROHTAK

Session 2018-19

A) Foundation Elective Courses

Students of all PG programmes under CBCS (w.e.f. 2018-19) are required to study one foundation elective course in 2nd semester for 2 years Programmes and in 4th Semester for 3 years Programmes. They may choose any one of the following courses (excluding the courses offered by the departments of their own subjects, if not stated otherwise).

Sr. No.	Nomenclature of the course	Course Code	Offered by the Department of
1	Basics of Accounting	16COMF1	Commerce
2	Basics of E-Commerce	16COMF2	Commerce
3	Elements of Banking	16COMF3	Commerce
4	Computer Fundamentals	16CSAF1	Computer Science & Application
5	Appreciation of Short Stories	16ENGF1	English & Foreign Languages
6	Appreciation of Poetry & Prose	16ENGF2	English & Foreign Languages
7	Appreciation of Fiction	16ENGF3	English & Foreign Languages
8	Appreciation of Drama	16ENGF4	English & Foreign Languages
9	Moral Education	16GENF1	Genetics
10	Geography in Everyday Life	16GEOF1	Geography
11	Hindi language and Communication Skill	16HNDF1	Hindi
12	Food of India	18MHMCTF1	IHTM
13	Food & Dining Services	18MHMCTF2	IHTM
14	Entrepreneurship Development	16IMSF1	IMSAR
15	Communication and Soft Skills	16IMSF2	IMSAR
16	Introduction to Mass Media	17JRMO1	Journalism
17	Media law	16LAWF1	Law
18	Appreciation of Indian Music	16MUSF1	Music
19	Psychology for Everyday Living	16PSYF1	Psychology
20	Electronics Engineering	16 ECE F1	UIET (Electronics & Communication)

(Foundation Elective Paper)
Basics of Accounting
Paper Code: 16COMF1

Total Marks: 50
External Marks: 40
Internal Marks: 10

Time: 3 Hours
Credits = 02

Note: The examiner shall set nine questions in all covering the whole syllabus. Question No.1 will be compulsory covering all the units and shall carry 8 small questions of equal marks. The rest of the eight questions will be set from all the four units. The examiner will set two questions from each unit out of which the candidate shall attempt four questions selecting one question from each unit. All questions shall carry equal marks

Unit-I

Meaning of Accounting, Accountancy and Book Keeping, Objectives of Accounting, Scope of Accounting, Types of Accounting, Limitations, Basic Accounting Terms, Double Entry System of Book Keeping, GAAP (Generally Accepted Accounting Principal), Basic accounting Equations

Unit-II

Journalizing: Classification of Accounts, Personal, Real and Nominal; Recording & posting of simple transactions only.

Unit-III

Preparation of Subsidiary Books: Cash Book(single column cash book) Purchase Book, Sales Book, Purchase Return, Sales Return Book, B/R and B/P Book.

Unit-IV

Preparation of Trial Balance, Preparing the Financial Statements Trading Account, Profit and Loss Account and Balance Sheet of sole proprietary business (Without Adjustment).

Suggested Readings:

1. D.K. Goyal: Financial Accounting, Arya Publications Pvt Ltd.
2. S.N. Maheshwari : An introduction to Accounting, Vikas Publishing House Pvt. Ltd.
3. Nishat Azmat and Andy Lymer: Basic Accounting: The step-by-step course in elementary accountancy, Kindle Edition
4. Anthony, R.N., a n d J.S. Reece, “Accounting Principles", Richard D. Irwin, Inc.
5. M onga, j.R., "Financial Accounting: Concepts and Applications", Mayoor Paper Backs, New Delhi.
6. Shukla, M.C., T.S. Grewal and S.C.Gupta, "Advanced Accounts", Vol-I, S.Chand & Co., New Delhi.

7. Gupta, R.L. and M. Radhaswamy, “Advanced Accountancy", Vol-I, Sultan C hand & Sons, New Delhi.

(Foundation Elective Paper)
Basics of E-Commerce
Paper Code: 16COMF2

Total Marks: 50
External Marks: 40
Internal Marks: 10
Time: 3 Hours **Credits = 02**

Note: The examiner shall set nine questions in all covering the whole syllabus. Question No.1 will be compulsory covering all the units and shall carry 8 small questions of equal marks. The rest of the eight questions will be set from all the four units. The examiner will set two questions from each unit out of which the candidate shall attempt four questions selecting one question from each unit. All questions shall carry equal marks

Unit-I

E-Commerce: Meaning, Concept, Definitions, Origin and Development, Categories of E-Commerce: B2B, B2C, B2G, G2G,G2C; The Constitution of the E-Commerce: Portal of the Network, Customer Relationship Management, Supply Chain Management, Logistic Management, Decision Support; Supporting Environment for E-Commerce: Technical Environment, Legal Environment, Credit Environment and Financial Environment.

Unit-II

M-Commerce: The Origin of M-Commerce, M-Commerce Components, The Development of M-Commerce, The Application of M-Commerce

Unit-III

Payment Technologies for E-Commerce: Online Bank, E-Payment Tools: E-Payment System, Intelligent Card, E-check, E-wallet, E-Cash

Unit-IV

Electronic Commerce: Influence on Marketing: Product, Physical Distribution, Price, Promotion, Marketing Communication, Common e-Marketing Tools

(Foundation Elective Paper)
Elements of Banking
Paper Code: 16COMF3

Total Marks: 50
External Marks: 40
Internal Marks: 10 **Time: 3 Hours**

Credits = 02

Note: The examiner shall set nine questions in all covering the whole syllabus. Question No.1 will be compulsory covering all the units and shall carry 8 small questions of equal marks. The rest of the eight questions will be set from all the four units. The examiner will set two questions from each unit out of which the candidate shall attempt four questions selecting one question from each unit. All questions shall carry equal marks

Unit-I

Introduction to Banking: Meaning, Concept, History of Banking, Business of Banking, Functions of Banking, Banker Customer Relationship, Recent Developments in Banking Industry: Corporate Banking, Retail Banking, International Banking, Rural Banking, Non-Banking Financial Intermediaries

Unit-II

Structure of Commercial Banks in India: Structure of Indian Banking System, Reserve Bank of India, Commercial Banks, Public Sector Banks, Private Sector Banks, Foreign Banks, Indian Banks vs. Foreign Banks.

Unit-III

Structure of Co-operative Banks in India: Co-operative Banks: Meaning, Definitions, Commercial vs. Co-operative Banks, Regional Rural Banks

Unit-IV

Structure of Apex Banking Institution in India: Meaning, Definitions, National Bank for Agriculture and Rural Development (NABARD), National Housing Bank (NHB), Small Industries Development Bank of India (SIDBI), Export Import Bank of India (EXIM Bank)

DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS

FOUNDATION COURSE

(16CSAF1)

COMPUTER FUNDAMENTALS

Total Marks: 50
External Marks: 40
Internal Marks: 10

Time: 3Hrs.

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

Unit-I

Historical Evolution of Computing Systems: Overview of Data Processing, History of Computing, Computer Generations; Characteristics of Computer, Anatomy of Computer, Classification of Computers.

Number Systems and Codes: Introduction, Number Systems and its types, and inter-conversion of Number Systems; ASCII and EBCDIC codes.

Input and Output Devices: Concept of Input/Output, Types of Input Devices; Output Devices – Printers, Plotters and Monitors.

Unit-II

Memory and Storage Devices: Characteristics of memory systems, memory hierarchy, Types of Memory – RAM, ROM, etc.; Magnetic Disks, Magnetic Tapes, Optical Disks; Concept of Cache Memory and Virtual Memory.

Software and Operating System Concepts: Introduction, Software Types, Language translators, System Utility Software, Application Software; Operating System – Characteristics, its functions, and its classification; User Interfaces – CUI and GUIs. DOS and Windows operating systems.

Unit-III

Working with Office Tools:

Using Word Processing: Opening and Closing of documents, Text creation and Manipulation, Moving Around in a Document, Formatting of text, Table handling, Spell check, language setting and thesaurus, Handling Multiple Documents, Printing of word document.

Using Spreadsheet tool: Basics of Spreadsheet; Manipulation of cells, Formulas and Functions, Editing of Spread Sheet, Page setups, header and footer, printing of Spread Sheet.

Using Slide Presentation Tool: Basics of powerpoint, Preparation and Presentation of Slides, Slide Show, Formatting and Clip Arts, Taking printouts of presentation / handouts.

Unit-IV

Communication and Networks: Data Communication, Transmission Modes, Basics of
Computer networks, types of computer network - LAN, MAN, WAN; Network Topologies and
Applications of Computer
Networks.

Internet Basics: Concept of Internet, Application of Internet, WWW, Web-sites and URLs, Search Engine, Using Electronic mails, Instant Messaging, Web Browsing software, Surfing the Internet.

Social Concern: Positive and Negative Impacts of Computer Technology, Computer Crimes, Computer Virus: Definition, Types of viruses, Characteristics of viruses, anti-virus software.

Computer Applications: Data Analysis, Sports, Research, Education, Business, Medicines & Health Care, Weather Forecasting, Military.

Suggested Readings:

1. Nasib Singh Gill: Handbook of Computer Fundamentals, Khanna Books Publishing
   Co.(P) Ltd., New Delhi, 2016.
2. P.K Sinha: Computer Fundamentals, BPB Publications.
3. Nasib Singh Gill: Computing Fundamentals and Programming in C, Khanna Books
   Publishing Co.(P) Ltd., New Delhi.
4. V. Rajaraman: Fundamentals of Computers, PHI
5. Microsoft Office – Complete Reference – BPB Publication
6. Norton Peter: Introduction to Computer, McGraw-Hill.
7. Leon, Alexis & Leon, Mathews: Introduction to Computers, Leon Tech World.
8. C.S. French: Data Processing and Information Technology, BPB Publications.

DEPARTMENT OF ENGLISH AND FOREIGN LANGUAGES
FOUNDATION COURSES
Odd Semester

Course Code: 16ENGF1

Nomenclature of the Course: Appreciation of Short Stories

Total Marks: 50
External Marks: 40 Lectures 2
Internal Marks: 10 Total Credits: 2
Time: 3 hrs

Prescribed Texts

William Carlos Williams:	"The Use of Force"
James Thurber:	"The Catbird Seat"
Ernest Hemingway:	"In Another Country"
John Henry Noyes Collier:	"Wet Saturday"
Dylan Thomas:	"The Enemies"

[**Prescribed Book**: Brooks, Cleanth, John Thibaut Purser, and Robert Penn Warren. *An Approach to Literature.* 5th ed.]

Instructions to the Paper-Setter:

In Question 1, students will be required to explain one passage, out of the two given, with reference to the context. 8

In Question 2, students will be required to answer any four questions, out of the given six, in about 150 words each. 4 x 3 = 12

Questions 3 and 4 will be essay type questions. Both these questions carry 10 marks each.

Suggested Reading:

Currie, Gregory. *Narratives and Narrators.*

Davis, Robert Marry. Ed. *The Novel: Modern Essays in Criticism.*

Dietrich, R.F. and Roger H. Sundell. *The Art of Fiction.*

Miller, J. Hillis. *On Literature.*

Nayar, Pramod. K. *Studying Literature: An Introduction to Fiction and poetry.*

Scholes, Robert, and H. Klaus and Michael Silverman. *Elements of Literature.*

DEPARTMENT OF ENGLISH AND FOREIGN LANGUAGES
FOUNDATION COURSES
w. e. f. 2016-17 (Under CBCS)
Odd Semester

Course Code: 16ENGF2

Nomenclature of the Course: Appreciation of Poetry and Prose

Total Marks: 50
External Marks: 40 Lectures 2
Internal Marks: 10 Total Credits: 2
Time: 3 hrs

Unit I

Poetry

Wallace Stevens: "The Emperor of Ice-Cream"

Thomas Hardy: "Last Words to a Dumb Friend"

Ben Jonson: "To the Memory of my Beloved, the Author, Mr. William Shakespeare"

William Shakespeare: "Sonnet 66"

Geoffrey Chaucer: "The Prioress" (From *The Prologue*)

Robert Browning: "My Last Duchess"

[**Prescribed Book**: *Inside Poetry* by James Reeves and Martin Seymour-Smith]

Unit II

Essays

Charles Lamb: "The Two Races of Men"

Virginia Woolf: "The Death of the Moth"

Frances Bacon: "Of Studies"

Joseph Addison: "Female Orators"

Samuel Johnson : "Singularities Censured" (*Adventurer No. 131. Tuesday, February 5, 1754.*)

[Prescribed Book: *Elements of Literature* by Robert Scholes, H. Klaus and Michael Silverman]

Instructions to the Paper-Setter:

In Question 1, students will be required to explain one passage with reference to the context.

There will be one passage from each Unit.

8

In Question 2, students will be required to answer any four questions in about 150 words each.

There will be three questions from each unit.

4 x 3 = 12

In Questions 3 and 4 based on Units I and II respectively, students will be required to attempt critical appreciations. Both these questions carry 10 marks each.

DEPARTMENT OF ENGLISH AND FOREIGN LANGUAGES
FOUNDATION COURSES
Even Semester

Course Code: 16ENGF3

Nomenclature of the Course: Appreciation of Fiction

Total Marks: 50
External Marks: 40 Lectures 2
Internal Marks: 10 Total Credits: 2
Time: 3 hrs
Prescribed Texts

Unit I

Leo Tolstoy: *The Death of Ivan Ilych.*

(**Prescribed Book**: Kennedy, X.J. *An Introduction to Fiction.* Harper Collins, 1991).

Unit II

D.H. Lawrence: *The Man Who Died*

(**Prescribed Book**: *Interpreting Literature* (Fifth Edition) by K.L. Knickerbocker and H. Willard Reninger, Hold, Rinehart and Winston, Inc.1974).

Instructions to the Paper-Setter:

In Question 1, students will be required to answer any five questions in about 150 words each.

There will be four questions from each unit.

5 x 4 = 20

In Questions 2 and 3 based on Units I and II respectively, students will be required to attempt critical appreciations. Both these questions carry 10 marks each.

Suggested Reading:

Currie, Gregory. *Narratives and Narrators*.

Davis, Robert Murray.Ed. *The Novel: Modern Essays in Criticism.*

Dietrich, R.F. and Roger H. Sundell. *The Art of Fiction.*

Hudson, W.H. *An Introduction to The Study of English Literature.*

Miller, J. Hillis. *On Literature.*

Nayar, Pramod. K. *Studying Literature: An Introduction to Fiction and Poetry.*

Scholes, Robert, and H. Klaus and Michael Silverman. *Elements of Literature.*

DEPARTMENT OF ENGLISH AND FOREIGN LANGUAGES
FOUNDATION COURSES
Even Semester

Course Code: 16ENGF4
Nomenclature of the Course: Appreciation of Drama

Total Marks: 50
External Marks: 40
Internal Marks: 10 Total Credits: 2
Time : 3 hrs
Prescribed Text

William Shakespeare: *The Tempest*

Instructions to the Paper-Setter:

In Question 1, students will be required to explain one passage, out of the two given, with reference to the context. 8

In Question 2, students will be required to answer any four questions, out of the given six, in about 150 words each. 4 x 3 = 12

Questions 3 and 4 will be essay type questions. Both these questions carry 10 marks each.

Suggested Reading:

Interpreting Literature (Fifth Edition) by K.L. Knickerbocker and H. Willard Reninger, Hold, Rinehart and Winston.

Kennedy, X.J. *An Introduction to Fiction* by X. J. Kennedy.

Viva Modern Critical Interpretations of Shakespeare's The Tempest

Foundation course run by Department of Genetics.

(Foundation course)

MORAL EDUCATION

PaperCode:16GENF1

Total Marks: 50
External Marks: 40
Internal Marks: 10

Time: 2.00 Hours

Instructions

There will be a total of five questions. Question No. 1 will be compulsory and shall contain eight to ten short answer type questions without any internal choice and it shall cover the entire syllabus. The remaining four questions will include two questions from each unit. The students will be required to attempt one question from each unit. The students will attempt three questions in all.

UNIT I

Guiding principles for life

Ethics

a. Guidelines set by society
b. Changes according time and place

Morals

c. Guidelines given by the conscience
d. Always constant

Ethics in the workplace

a. Respect for each other
b. Obedience to the organization
c. Dignity of labour
d. Excellence in action

UNIT II

Concept of Trusteeship

a. Everything belongs to society
b. Man is only a caretaker
c. Our responsibility to ensure welfare of all

Importance of service

a. Responsibility of an individual
b. Man is only a caretaker
c Our responsibility to ensure welfare of all

MA Geography Semester-II
Foundation Course: 16GEOF1
GEOGRAPHY IN EVERYDAY LIFE

16GEOF1

Total Marks: 50
External Marks: 40
Internal Marks: 10

Learning Objectives

With spatial turn in the other social sciences and humanities and cultural turn in geography the spatial structure has begun to be seen not merely as an arena in which social life unfolds but rather as a medium through which social relations are produced and reproduced. All this has strengthened geography as a multidisciplinary and interdisciplinary discipline. Geography deepens understanding of many contemporary issues and challenges - climate change, food security, energy choices – that cannot be understood without a geographical perspective. It serves vital educational goals: thinking and decision making with geography helps us to live our lives as knowledgeable citizens, aware of our own local communities in a global setting. What we need is a global sense of the local, a global sense of place.

Learning Outcome

On completion of the course a student should be able to understand how geography permeates each and every aspect that concerns our living on this earth. They would know how Geography can use its versatility and multi-factor approach, co-existence between physical and human aspects, construction of ideas around space which are politically and administratively relevant, to its best advantage.

Unit I

Geography and Environment; Geography and Social Sciences; Geography and Development; Geography and Planning

Unit II

Geography and Governance; Geography and Globalization; Geography and Disasters; Geography and Cartography

Note: (i) The question paper will have three units. First two units of question paper will contain two questions from each unit of the syllabus. Candidate(s) are required to attempt two questions in all selecting one from each unit. Unit III shall be compulsory and shall contain five short answer type questions covering entire syllabus in which candidates will be required to attempt any five out of eight questions. All questions carry equal marks.

(ii) Internal Assessment of 10 marks will be 'Map Filling' about the location of important places, landforms, and geographical features in India and the world. The unit three shall be compulsory and shall contain five short answer type questions covering entire syllabus.

Recommended Readings

Daniels, Peter, Michael Bradshaw, Denis Shaw, and James Sidaway. 2012. An Introduction to Human Geography. 4th edition. Pearson Education Ltd. Harlow, England.

Herod, Andrew. 2009. Human Geography: the basics, Routledge, New York.

Hopper, Paul. 2012. Understanding Development: Issues and Debates, Polity Press. Cambridge, UK,.

Kant, Surya and Nina Singh ed. 2015. Geography Development Public Policy: Select Essays of Gopal Krishan. RK Books, New Delhi.

Kapur, Anu. 2010. Vulnerable India, Sage Publications, New Delhi.

Knox, Paul. 2014. Atlas of Cities. Princeton University Press.

Oxford Atlas of the World. 2015. 22nd edition. Oxford University Press.

फाउंडेशन
हिन्दी भाषा एवं सम्प्रेषण कौशल

16HNDF1

समय : 3 घण्टे

पूर्णांक : 50 अंक
आंतरिक मूल्यांकन : 10 अंक
लिखित परीक्षा : 40 अंक

(क) हिन्दी भाषा

1. भाषा की परिभाषा, प्रकृति एवं विविध रूप
2. हिन्दी भाषा की विशेषताएँ : संज्ञा, सर्वनाम, विशेषण क्रिया एवं अव्यय संबंधी।
3. हिन्दी की वर्ण–व्यवस्था : स्वर एवं व्यंजन।
4. स्वर के प्रकार – ह्रस्व, दीर्घ तथा प्लुत।
5. व्यंजन के प्रकार : स्पर्श, अन्तस्थ, ऊष्म, अल्पप्राण, महाप्राण, घोष तथा अघोष।
6. वर्णों का उच्चारण स्थान : कण्ठ्य, तालव्य, मूर्द्धन्य, दन्तय, ओष्ठ्य तथा दन्तोष्ठ्य।
7. बलाघात, संगम, अनुतान तथा संधि।
8. हिन्दी वाक्य रचना। वाक्य भेद।

(ख) संप्रेषण कौशल

1. संप्रेषण की अवधारणा और महत्त्व
2. संप्रेषण के प्रकार
3. संप्रेषण के माध्यम
4. भाषा संप्रेषण के चरण : श्रवण, अभिव्यक्ति, वाचन तथा लेखन।
5. साक्षात्कार, भाषण कला एवं रचनात्मक लेखन।
6. भावार्थ और व्याख्या, आशय लेखन, विविध प्रकार के पत्र लेखन।

निर्देश :–

खंड क तथा ख में से चार–चार प्रश्न पूछे जाएंगे। परीक्षार्थी को प्रत्येक खंड से दो–दो प्रश्नों का उत्तर देना होगा। प्रत्येक प्रश्न 20 अंक का होगा।

18MHMCTF1
Food of India

Course Code: 16MHMCTF1

Total Marks: 50
External Marks: 40
Internal Marks: 10
Credits: 2-0-0

Objective
Main aim of the course is to make students familiar with the fascinating Indian cuisine. Students will learn about regional specialties of all corners of our country.

Unit – 1
Indian Food: Introduction, Key Features & Factors that affect eating habits in different parts of the country i.e. geographic location, historical background, available ingredients, equipments, staple foods. Essentials of Indian Food: Spices, Herbs etc.
Food of Northern India (Kashmir, Punjab, Haryana, Delhi, Himachal, Uttar Pradesh): Introduction, geographic location, historical background, available ingredients, equipments, staple foods & Regional specialities.

Unit – 2
Western India (Rajasthan, Gujarat, Maharashtra) & Madhya Pradesh: Introduction, geographic location, historical background, available ingredients, equipments, staple foods & Regional specialities.

Unit – 3
Food of Eastern India (West Bengal, Orissa, Bihar and North-Eastern States): Introduction, geographic location, historical background, available ingredients, equipments, staple foods & Regional specialities.

Unit – 4
Food of South India (Andhra Pradesh, Tamil Nadu, Karnataka & Kerala) & Goa: Introduction, geographic location, historical background, available ingredients, equipments, staple foods & Regional specialities.

Practical
- Students shall perform practicals in food production lab regarding regional specialities of India. The dishes will be decided by the concerned faculty member.

Suggested Readings:

- Theory of Cookery, Krishna Arora, Frank Bros. & Co.
- Food Production Operations: Parvinder S Bali, Oxford University Press
- Modern Cookery (Vol- I & II) By Philip E. Thangam, Publisher: Orient Longman
- Practical Cookery By Kinton & Cesarani
- Theory of Catering By Kinton & Cesarani
- Professional Chef: The Art of Fine Cooking by Arvind Saraswat
- Prashad by J Inder Singh & Pradeep D Gupta
- Dawaat by J Kalra

18MHMCTF2 FOOD AND DINING SERVICES

Total Marks : 50
External Marks: 40
Internal Mars: 10
Credits: 2-0-0

UNIT-1 Food Service Industry

- Introduction and growth of the catering industry in India.
- Types of F&B operations.
- Classification of Commercial and Non-residential catering industry.
- Issues, challenges and current trends in catering industry.
- Careers in food service industry.

UNIT-2 Organization structure and Food service methods:

- Organization structure of food service staff in different hotels
- Duties and responsibilities of food service staff
- Food Service Methods- Introduction, importance, types, sequence.
- Rules for laying of table and waiting.
- Brief overview of Beverages -Introduction, types, service and storage.
- Food and beverage order taking

UNIT 3 Food and beverage service equipments-

- Flatware, Cutlery and Hollowware-Introduction, types, size, uses and storage.
- Glassware- Introduction, types, uses, full capacity, serving capacity and storage.
- Crockery - Introduction, types, size, uses and storage.
- Different types of restaurant linen
- Use of miscellaneous equipments like Baine Marie, plate warmer, hot plates, microwave oven, ice cream machine, coffee machine, ice cube machine, side boards, dish washing machine, glass washing machine. Nut cracker, grape scissors, Oyster service, caviar, lobsters, snails, cheese. Cigar cutters, wine bottle openers, gueridon equipment.

UNIT 4 Dining Etiquettes and Menu

- Dining etiquettes- Introduction, importance and rules to follow when you are dining at a restaurant.
- Menu- Introduction and types.
- French classical menu- Brief Overview

ENTREPRENEURSHIP DEVELOPMENT

Total Marks: 50
External Marks: 40
Internal Marks: 10

Course Code: 16IMSF1

Course Objective:
This course aims to acquaint the students with challenges of starting new ventures and enable them to investigate,
understand and internalize the process of setting up a
business.

Unit-I
Entrepreneurship: Concept, knowledge and skills requirement; characteristics of successful entrepreneurs; role of entrepreneurship in economic development; entrepreneurship process; factors impacting emergence of entrepreneurship

Uniti-II

Starting the venture: generating business idea – sources of new ideas, methods of generating ideas, opportunity recognition; environmental scanning, competitor and industry analysis; feasibility study – market feasibility, technical/operational feasibility, financial feasibility: drawing business plan

Unit -III
Functional plans: marketing plan – marketing research for the new venture, steps in preparing marketing plan, contingency planning; organizational plan – form of ownership, designing organization structure; financial plan – cash budget, working capital

Unit -IV
Sources of finance: debt or equity financing, commercial banks, venture capital; financial institutions supporting entrepreneurs; legal issues – intellectual property rights patents, trademarks, copyrights, trade secrets, licensing

Suggested Readings:

1. Hisrich, Robert D., Michael Peters and Dean Shephered, Entrepreneurship, Tata McGraw Hill, New Delhi
2. Barringer, Brace R., and R. Duane Ireland, Entrepreneurship, Pearson Prentice Hall, New Jersy (USA)
3. Lall, Madhurima, and Shikha Sahai, Entrepreneurship, Excel Books, New Delhi
4. Charantimath, Poornima, Entrepreneurship Development and Small Business Entreprises ,
5. Pearson Education, New Delhi

6. Kuratko, Donand and Richard Hodgetts, Entrepreneurship, Cengage Learning India Pvt. Ltd., New Delhi

Instructions for External Examiner: The question paper shall be divided in two sections. **Section 'A'** shall comprise of eight short answer type questions from whole of the syllabus carrying one mark each, which shall be compulsory. Answer to each question should not exceed 50 words normally. **Section 'B'** shall comprise 8 questions (2 questions from each unit). The students will be required to attempt four questions selecting one question from each unit. All questions will carry equal marks

COMMUNICATION AND SOFT SKILLS
Course Code: 16IMSF2

Total Marks: 50
External Marks: 40
Internal Marks: 10

Time Allowed: 3 Hours

Course Objective:
The objective of this course is to expose the students to basic communication and soft skills and to familiarize them with behavioral skills and business etiquettes.

Unit -I
Communication Skills - Concept, characteristics and process of communication; 7C's of communication; listening skills, verbal communication, non-verbal communication, body language, art of meeting and greeting, making effective conversation

Unit -II
Presentation Skills - Difference between speech and presentation, handling of presentation audience questions, holding meetings, group discussion and interviews; structuring a presentation, delivering the presentation; situational presentation

Unit -III
Behavioral Skills - Positive altitude, self-management, problem solving skills, time management skills, anger management, coping skills, assertiveness team building skills

Unit -IV
Business Etiquette - Business dress and grooming, office courtesies, etiquette for special occasions, meeting etiquette, dining etiquette

Suggested Readings:

1. Kaul, Asha, The Effective Presentation, Response Books, New Delhi
2. Fox, She, Business Etiquette for Dummies, Wiley Publishing inc.
3. Chaney, Lillian and Janette Martin, The Essential Guide to Business Etiquette, Praeger, London
4. Sanghi, Seema, Towards Personal Excellence, Response Books, New Delhi
5. Sherfield, Robert M, R J Montgomery and Patricia G Moody, Developing Soft Skills, Pearson Education, New Delhi
6. Chancy, Lillian and Janelte Martin, The Essential Guide to Business Etiquette, Praeger, Londonson Edueation, New Delhi

Instructions for External Examiner: The question paper shall be divided in two sections. **Section 'A'** shall comprise of eight short answer type questions from whole of the syllabus carrying two marks each, which shall be compulsory. Answer to each question should not exceed 50 words normally. **Section 'B'** shall comprise 8 questions (2 questions from each unit). The students will be required to attempt four questions selecting one question from each unit. All questions will carry equal marks.

DEPT. OF JOURNALISM AND MASS COMMUNICATION

SEMESTER –II

Foundation Elective- Introduction to Mass Media

Time allowed: 3 Hours **Total Marks:50**

Theory Marks: 40

Internal Assessment: 10

Credit: 02

Note: The question paper will be divided into Five Units carrying equal marks i.e. 08 marks for each question. Each of the First Four Units will contain two questions and the students shall be asked to attempt one question from each unit. Unit Five shall contain eight short answer type questions without any internal choice and it shall be covering the entire syllabus. As such, all questions in Unit five shall be compulsory.

Unit 1

1.1 Mass Media: Definition, Meaning & Concept

1.2 Types of Mass Media

1.3 Traditional & Folk Media- Characteristic Features

1.4 Print Media, Electronic Media, New Media- Characteristic Features

Unit 2

2.1 Print Media- Brief History, Evolution from early times

2.2 Print Media in India- Role in freedom struggle, growth of print media after independence

2.3 Important newspapers and magazines of India, noted journalists; current role and Importance of print media

2.4 Emergence of Regional Print Media, Challenges before Print Media, Emerging trends of Print Media

Unit 3

3.1 Origin and Development of Radio in India; role and importance of radio as a medium

3.2 A.I.R, Private FM, Community Radio;, Current status of Radio in India

3.3 Origin and Development of Television in India

3.4 Public and Commercial Television; role and importance of Television as a medium; Present status of Television industry in India

Unit 4

4.1 Brief History and Development of Cinema in India

4.2 Cinema as a medium if mass communication- role and importance; Emerging trends in Indian Cinema

4.3 New Media- salient features, social media, social sharing to social activism- new media as a medium of mass communication

4.4 Current status of New Media, especially Web Journalism; Emerging trends & challenges

Internal Assessment **Total Marks : 10**

Note : The Break up of 10 marks for Internal Assessment (Theory Paper) is as under :

1. House Test	05 Marks
2. Assignment	05 Marks

Internal Assessment **Total Marks : 20**

Note : The Break up of 20 marks for Internal Assessment (Theory Paper) is as under :

1. House Test	10 Marks
2. Class Attendance	05 Marks
3. Term Paper/Assignment	05 Marks

LL.M. SECOND SEMESTER EXAMINATION

(Media Law)

16LAWF1

Total Marks: 50
External Marks: 40
Internal Marks: 10

Time Allowed: 3 Hours

The question paper of each course will be divided into two sections A & B, Section A consists of Eight Small answer type questions (without internal choice) carrying 3 marks each covering the entire syllabus. This section as such will be compulsory. Section-B shall again consist eight questions carrying 14 marks each covering the entire syllabus. However, the candidate shall be required to attempt any four questions from this section.

NOTE FOR STUDENTS

Attempt all questions in Section A and Four Questions from Section B. Each Question in Section A carries 3 marks and each question in Section B carries 14 marks.

Unit: I. Introduction: Evolution of Media; Types of media: Print, Electronic; E-Media free flow of Information beyond boundaries and barriers; Difference between Visual and non-Visual Media- impact on People

Unit: II. Freedom of Speech and Expression- Article 19 (1) (a): An Introduction to Freedom of expression; Evolution of Freedom of Press; Restrictions under Constitution: Article 19 (2), Government power to legislate0- Article 246 read with the Seventh Schedule.; Power to impose Tax- licensing and licence fee; Advertisement & Ethics: Misleading Advertisement vis-à-vis Consumers rights.

Unit: III. Law of defamation and obscenity: Defamation; Libel, Slander; Obscenity; Sedition

Unit: IV. Development of laws relating to Mass Media via a vis International regime: Censorship of films; Censorship under Constitution; Censorship under the Cinematograph Act; Pre- censorship of films.

Select Bibliography:

- M.P. Jam, Constitutional Law of India (1994) Wadawa, Nagpur
- H.M. Seervai, Constitutional Law of India 2002 Vol. 1 Universal
- John B. Howard, "The Social Accountability of Public Enterprises" in Law and Community Controls in New Development Strategies (International Center for law in development 1980)
- Bruce Michael Boys, Film Censorship in India: A Reasonable Restriction on Freedom of Speech and Expression" 14 J.I.L.l 501 (1972)
- Rajiv Dhavan "On the Law of the Press in India" 26J.l.L.l 288(1984)
- Rajeev Dhavan "Legitimating Government Rhetoric: Reflections on Some Aspects of the Second Press Commission" 26 J.l.L.I 391 (1976)
- Soli Sorabjee, Law of Press Censorship in India (1976)
- Justice E.S. Venkaramiah, Freedom of Press: Some Recent Trends (1984)
- D.D. Basu, The Law of Press of India (1980)

Semester-2(Music)
Appreciation of Indian Music
16MUSF1

Paper Code	Core	Nomenclature of Papers	Maximum Marks	Internal Assessment Marks	Total Marks	Credit
16MUSF1	Foundation Elective	Appreciation of Indian Music	40	10	50	2

Structure of LTP

Lecture	Tutorials	Practical
3	1	0

Unit-I

- The study of sound and concept of Naad/swar
- Brief history of Indian Music
- Study of Technical terms of Indian Music
- An instroduction to Raga

Classification of Raga

Component/technical terms & structure of presentation of Raga

Unit-II

- Rhythm & Music

Laya & Taal

Writing of basic taalas-teental, ektaal, rupak, jhaptaal

- Writing an essay of 1000 words on relationship between Music and the subject belongs to you
- Music therapy and its impact on human body
- Different kind of compositional forms and their evolution
- Understanding music through Rag Mala painting

Department of Psychology

PAPER- (16PSYF1)

Psychology for Everyday Living

Credits : 2 (2Credit Theory:2 hrs/week

Total Marks: 50
External Marks: 40
Internal Marks: 10

Time Allowed: 3 Hours

Note:

a) *Nine questions would be set in all. Candidates would be required to attempt five questions.*
b) *There would be two questions (8 marks each) from each of the four Units. Candidates would attempt one question from each Unit.*
c) *Question No. IX would be compulsory. It shall be based on the entire syllabus and would contain eight short answer questions of one marks each*

Unit I

Science of Psychology: Definition, Goals, Basic and Applied areas of Psychology.

Self: Nature of self, Self-Regulation and Personal Growth.

Unit II

Intelligence: Definition; Theories: Theory of multiple intelligences, Triarchic theory, Emotional Intelligence.

Administration: Any one test of Intelligence/Emotional Intelligence.

Unit III

Personality: Definition;Theories: Trait and Type: Eysenck; Psychoanalytical: Freud; Humanistic: Maslow.

Administration: Any one objective test of Personality.

Unit IV

Stress and Coping: Nature of Stress; Sources; Stress reactions; Factors that influence reactions to stress.

Coping with stress: Modifying environment; Altering lifestyle.

Recommended Books:

Khatoon, N. (2012). General Psychology. Pearson: Delhi.

Baron, R.A. and Misra, G. (2016). Psychology. Pearson: Delhi.

Ciccarelli, S.K. and Meyer, G.E. (2006). Psychology. Pearson: Noida

FOUNDATION ELECTIVE COURSE

16ECEF1 ELECTRONICS ENGINEERING

		Marks	Credits
Exams	:	100	2
Sessionals	:	50	
Total	:	150	2
Duration of Exam	:	3 hrs.	

Instructions for setting of paper: Nine questions are to be set in total. First question will be short answer question covering whole syllabus and will be compulsory to attempt. Next eight questions will comprise of two questions each from the four sections. Student will be required to attempt four more questions selecting one from each section. Each question will be of 20 marks

UNIT 1

SEMICONDUCTOR DIODE : P-N junction and its V-I Characteristics, P-N junction as a rectifier, Switching characteristics of Diode. Diode as a circuit element, the load-line concept, half-wave and full wave rectifiers, clipping circuits, clamping circuits, filter circuits, peak to peak detector and voltage multiplier circuits.

UNIT 2

TRANSISTOR: Bipolar junction transistor : operation, characteristics, Ebers-moll model of transistor, CE, CB, CC configurations.
TRANSISTOR BIASING :Operating point, bias stability, collector to base bias, self-bias, emitter bias, bias compensation, thermistor & sensistor compensation.

UNIT 3

FIELD EFFECT TRANSISTORS: Junction field effect transistor, pinch off voltage, volt-ampere characteristics, small signal model, MOSFET Enhancement & Depletion mode, V-MOSFET. Common source amplifier, source follower, biasing of FET, applications of FET as a voltage variable resistor (V V R).

UNIT 4

DIGITAL ELECTRONICS: Binary, Octal and Hexadecimal number system and conversions, Boolean Algebra, Truth tables of logic gates (AND, OR, NOT) NAND, NOR as universal gates, Difference between combinational circuits and sequential circuits, Introduction to flip-flops (S-R & J-K).

TEXT BOOK :

1.Integrated Electronics: Millman & Halkias ; McGrawHill
2.Modren Digital Electronics: R.P. Jain; McGraw-Hill

REFERENCE BOOKS:

1.Electronics Principles: Malvino ; McGrawHill
2.Electronics Circuits: Donald L. Schilling & Charles Belove ; McGrawHill
3.Electronics Devices & Circuits: Boylestad & Nashelsky ; Pearson.