

SCHEME AND SYLLABUS
For
BCA (Industry Integrated) Course
(Specialization: Data Science)
(w.e.f Session 2019)



FACULTY OF ENGINEERING AND TECHNOLOGY
YMCA UNIVERSITY OF SCIENCE AND TECHNOLOGY
FARIDABAD

विद्या परमं भूषणम्

SYNOPSIS OF
SCHEME OF STUDIES &
EXAMINATIONS 3 YEARS
BCA (Industry Integrated: Data Science)

SEMESTER I-VI

Total Credits: 142

Total Theory Subjects (including Environment Science):27

Total MOOC Subject: 01

Total Audit Subject: 01

Total General Elective: 04

Total Labs (including Presentations and Group Discussions): 26

Industrial Training (I & II): 02

Total Marks:

| | | |
|----------------------------|-----------------|--------------|
| Sessional/Internals | End Term | Total |
| 1500 | 3050 | 4550 |

Itemized Break-up:

| | No. | Hours/week/subject | Marks | Credits |
|-------------------------------|------------|---------------------------|-------------------|------------------|
| Theory Subjects | 26 | 3(26*3) | 2600 | 78 |
| MOOC Subject | 1 | 4 | QUALIFYING | 4 |
| Environmental Studies | 1 | 3 | QUALIFYING | NO CREDIT |
| Audit Course | 1 | 2 | QUALIFYING | NO CREDIT |
| Labs | 14 | 4(14*4) | 1050 | 28 |
| General Elective | 4 | 3(4*3) | 400 | 12 |
| Presentation | 6 | 2(6*2) | 150 | 6 |
| Group Discussion | 6 | 2(6*2) | 150 | 6 |
| Industrial Training-I | 1 | | 100 | 4 |
| Industrial Training-II | 1 | | 100 | 4 |
| Total | 61 | 179 | 4550 | 142 |

CHOICE BASED CREDIT SYSTEM SCHEME

Discipline Core Courses (DCC)

| S. No. | Name of the subject | No. of Lectures + Tutorials | No. of Credits |
|--------|---|-----------------------------|----------------|
| 1 | Programming in C | 3 | 3 |
| 2 | Internet and Web Fundamentals | 3 | 3 |
| 3 | Computer Fundamentals and Organization | 3 | 3 |
| 4 | Algebra and Calculus | 3 | 3 |
| 5 | Self-Guided Improvement | 3 | 3 |
| 6 | Introduction to Database Management Systems | 3 | 3 |
| 7 | Introduction to Data Structures | 3 | 3 |
| 8 | Introduction to Data Science | 3 | 3 |
| 9 | Professional English | 3 | 3 |
| 10 | Fundamentals of Management | 3 | 3 |
| 11 | Python Programming | 3 | 3 |
| 12 | Probability and Statistics | 3 | 3 |
| 13 | Principles of Operating Systems | 3 | 3 |
| 14 | Data Warehouse and Data Mining | 3 | 3 |
| 15 | Artificial Intelligence | 3 | 3 |
| 16 | Programming in Java | 3 | 3 |
| 17 | Scientific R Programming | 3 | 3 |
| 18 | Computer Networks | 3 | 3 |
| 19 | Organizational Behavior | 3 | 3 |
| 20 | Big Data - I | 3 | 3 |
| 21 | Machine Learning - I | 3 | 3 |
| 22 | Intellectual Property and Rights | 3 | 3 |
| 23 | Big Data - II | 3 | 3 |
| 24 | Machine Learning - II | 3 | 3 |
| 25 | Employability Skills | 3 | 3 |
| 26 | Bio Informatics | 3 | 3 |

List of General Elective Courses

Semester III (General Elective I)

| Sr. No. | Code | Name of the Subject | Internal | External | No. of Credits |
|---------|----------|------------------------------------|----------|----------|----------------|
| 1 | GEC-DS-1 | Discrete Structures | 25 | 75 | 3 |
| 2 | GEC-DS-2 | Principles of Software Engineering | 25 | 75 | 3 |
| 3 | GEC-DS-3 | Computer Organization-I | 25 | 75 | 3 |

Semester IV (General Elective –II)

| Sr. No. | Code | Name of the Subject | Internal | External | No. of Credits |
|---------|----------|--------------------------|----------|----------|----------------|
| 1 | GEC-DS-4 | Operation Research | 25 | 75 | 3 |
| 2 | GEC-DS-5 | Software Testing | 25 | 75 | 3 |
| 3 | GEC-DS-6 | Computer Organization-II | 25 | 75 | 3 |

Semester V (General Elective –III)

| Sr. No. | Code | Name of the Subject | Internal | External | No. of Credits |
|---------|----------|-------------------------------|----------|----------|----------------|
| 1 | GEC-DS-7 | Multimedia Technologies | 25 | 75 | 3 |
| 2 | GEC-DS-8 | Principles of Accounting | 25 | 75 | 3 |
| 3 | GEC-DS-9 | Management Information System | 25 | 75 | 3 |

Semester VI (General Elective –IV)

| Sr. No. | Code | Name of the Subject | Internal | External | No. of Credits |
|---------|-----------|---------------------|----------|----------|----------------|
| 1 | GEC-DS-10 | MATLAB | 25 | 75 | 3 |
| 2 | GEC-DS-11 | Business Economics | 25 | 75 | 3 |
| 3 | GEC-DS-12 | E-Business | 25 | 75 | 3 |

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Mandatory Audit Course (MAC) (Mandatory to Qualify)

| S. No. | Code | Name of Subject | No. of Contact Hours |
|--------|--------|--|----------------------|
| 1 | AUD-1 | German 1 | 2 |
| 2 | AUD-2 | German 2(with German 1 as pre requisite) | 2 |
| 3 | AUD-3 | French 1 | 2 |
| 4 | AUD-4 | French 2(with French 1 as pre requisite) | 2 |
| 5 | AUD-5 | Sanskrit 1 | 2 |
| 6 | AUD-6 | Sanskrit 2(with Sanskrit 1 as pre requisite) | 2 |
| 7 | AUD-7 | Personality Development | 2 |
| 8 | AUD-8 | Interview and Group Discussion Skills | 2 |
| 9 | AUD-9 | Yoga and Meditation | 2 |
| 10 | AUD-10 | Art of Living / Living Skills | 2 |
| 11 | AUD-11 | Contribution of NSS towards Nation / Role of NSS | 2 |
| 12 | AUD-12 | Physical Education | 2 |

MOOC Subject (List is provided by the Svayam Portal of UGC)

| Paper Code | Course | Course Requirement (Hrs) | Credits | University Exams | Internal Assessment | Total | Course Type |
|------------|--------|--------------------------|---------|------------------|---------------------|-------|-------------|
| | MOOC* | 4 | 4 | | | | |

Note: Any one subject from the list of MOOC subject is to be *qualified during the Semester-1 to Semester-V* through Svayam Portal of UGC. For this subject, the Institute or the Department concerned will appoint a coordinator to track the activities of the student and will ensure that all students of the programme have qualified the MOOC subject in the specified time period.

| LABS AND PROJECTS | | | |
|--------------------------|---------------------------------|----------------------|---------|
| Sr. No. | Name of the Lab | No. of Contact Hours | Credits |
| 1 | C Programming Lab | 4 | 2 |
| 2 | Internet Fundamentals lab | 4 | 2 |
| 3 | PC Software Lab | 4 | 2 |
| 4 | Data Structures Lab | 4 | 2 |
| 5 | Database Management Systems Lab | 4 | 2 |
| 6 | Language Lab | 4 | 2 |

| | | | |
|----|-------------------------|---|---|
| 7 | Python Lab | 4 | 2 |
| 8 | Operating Systems Lab | 4 | 2 |
| 9 | Java Programming Lab | 4 | 2 |
| 10 | R Programming Lab | 4 | 2 |
| 11 | Big Data I Lab | 4 | 2 |
| 12 | Machine Learning I Lab | 4 | 2 |
| 13 | Big Data II Lab | 4 | 2 |
| 14 | Machine Learning II Lab | 4 | 2 |

Industrial Training:

Note: Student has to undergo Industrial Training of 20 working days after 2nd Semester and 30 working days after 4th Semester. He / She has to present the Project completed in the said duration, for which Marks and Credits will be given.



YMCA University of Science and Technology, Faridabad
BCA Scheme of Studies / Examination
Semester – I

| Course No. | Course Title | Schedule | | | | Sessional Marks/ Internal | Marks for End Term Examination | | Total Marks | Credits |
|------------|--|----------|---|---|-----------|------------------------------|--------------------------------|------------|-------------|-----------|
| | | L | T | P | Total | | Theory | Practical | | |
| BCA-DS-101 | Programming in C | 3 | - | - | 3 | 25 | 75 | - | 100 | 3 |
| BCA-DS-102 | Internet and Web Fundamentals | 3 | - | - | 3 | 25 | 75 | - | 100 | 3 |
| BCA-DS-103 | Computer Fundamentals and Organization | 3 | - | - | 3 | 25 | 75 | - | 100 | 3 |
| BCA-DS-104 | Algebra and Calculus | 3 | - | - | 3 | 25 | 75 | - | 100 | 3 |
| BCA-DS-105 | Self-Guided Improvement | 3 | - | - | 3 | 25 | 75 | - | 100 | 3 |
| BCA-DS-106 | C Programming Lab | - | - | 4 | 4 | 25 | - | 50 | 75 | 2 |
| BCA-DS-107 | Internet Fundamentals Lab | - | - | 4 | 4 | 25 | - | 50 | 75 | 2 |
| BCA-DS-108 | PC Software Lab | - | - | 4 | 4 | 25 | - | 50 | 75 | 2 |
| BCA-DS-109 | Presentation | - | - | 2 | 2 | 25 | - | - | 25 | 1 |
| BCA-DS-110 | Group Discussion | - | - | 2 | 2 | 25 | - | - | 25 | 1 |
| | Total | | | | 31 | 250 | 375 | 150 | 775 | 23 |

Note: Exam duration will be as under

- (a) Theory exams will be of 3 hours duration
- (b) Practical exams will be of 3 hours duration

BCA-DS-101: PROGRAMMING IN C
BCA I Semester

No. of Credits: 3
L T P Total
3 0 0 3

Sessional: 25 Marks
Theory: 75 Marks
Total : 100 Marks
Duration of Exam: 3 Hours

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

COURSE OBJECTIVES:

1. To understand the major components of computer system, programming languages and networking concepts.
2. To understand the basic building blocks of C language like variables, data types, managing I/O etc.
3. To understand the different statements like sequential, decision making, iterative such as if-else, loops and derived data types like arrays, structures etc.
4. To learn about the concept of Pointers and understand functions and file handling.

SYLLABUS

UNIT - I

Overview of C: History of C, Importance of C, Elements of C: C character set, identifiers and keywords, Data types, Constants and Variables, Assignment statement, Symbolic constant, Structure of a C Program, printf(), scanf() Functions, Operators.

Expression: Arithmetic, relational, logical, bitwise, unary, assignment, shorthand assignment operators, conditional operators and increment and decrement operators, Arithmetic expressions, evaluation of arithmetic expression, type casting and conversion, operator hierarchy & associativity.

UNIT - II

Decision making & branching: Decision making with IF statement, IF-ELSE statement, Nested IF statement, ELSE-IF ladder, switch statement, go to statement.

Decision making & looping: For, while, and do-while loop, jumps in loops, break, continue statement, Nested loops.

UNIT - III

Functions: Standard Mathematical functions, Input/output: Unformatted & formatted I/O function in C, Input functions viz. getch(), getche(), getchar(), gets(), output functions viz., putch(), putchar(), puts(), string manipulation functions.

User defined functions: Introduction/Definition, prototype, Local and global variables, passing parameters, recursion.

UNIT - IV

Arrays, strings and pointers: Definition, types, initialization, processing an array, passing arrays to functions, Array of Strings. String constant and variables, Declaration and initialization of string, Input/output of string data, Introduction to pointers. Storage classes in C: auto, extern, register and static storage class, their scope, storage, & lifetime. Algorithm development, Flowcharting and Development of efficient program in C.

COURSE OUTCOMES:

The student will learn:

1. To formulate simple algorithms for arithmetic and logical problems.
2. To translate the algorithms to programs (in C language).
3. To test and execute the programs and correct syntax and logical errors.
4. To implement conditional branching, iteration and recursion.
5. To decompose a problem into functions and synthesize a complete program using divide and conquer approach.
6. To use arrays, pointers and structures to formulate algorithms and programs.
7. To apply programming to solve matrix addition and multiplication problems and searching and sorting problems.

Text Books/ Reference Books:

1. Gottfried, Byron S., Programming with C, Tata McGraw Hill
2. Gill Nasib Singh: Computing Fundamentals and Programming in C, Khanna Books Publishing Co., New Delhi.
3. Balagurusamy, E., Programming in ANSI C, 4E, Tata McGraw-Hill.
4. Jeri R. Hanly & Elliot P. Koffman, Problem Solving and Program Design in C, Addison Wesley.
5. Yashwant Kanetker, Let us C, BPB.
6. Rajaraman, V., Computer Programming in C, PHI.
7. Yashwant Kanetker, Working with C, BPB.

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

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BCA-DS-102: Internet and Web Fundamentals
BCA I Semester

No. of Credits: 3
L T P Total
3 0 0 3

Sessional: 25 Marks
Theory: 75 Marks
Total : 100 Marks
Duration of Exam: 3 Hours

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

COURSE OBJECTIVES:

1. This course is intended to teach the basics involved in publishing content on the World Wide Web.
2. This includes the 'language of the Web' – HTML, the fundamentals of how the Internet
3. and the Web function, a basic understanding of graphic production with a specific stress on creating graphics for the Web, and a general grounding introduction to more advanced topics such as programming and scripting.
4. This will also expose students to the basic tools and applications used in Web publishing.

SYLLABUS

Unit 1

Electronic Mail and Internet: Introduction, advantages and disadvantages, Userids, Pass words, e-mail addresses, message components, message composition, mailer features, E-mail inner workings, E-mail management, Mime types, Newsgroups, mailing lists, chat rooms. Introduction to networks and internet, history, Working of Internet, Internet Congestion, internet culture, business culture on internet. Collaborative computing & the internet. Modes of Connecting to Internet, Internet Service Providers(ISPs), Internet address, standard address, domain name, DNS, IP.v6.Modems and time continuum, communications software; internet tools.

UNIT 11

World Wide Web: Introduction, Miscellaneous Web Browser details, searching the www: Directories search engines and meta search engines, search fundamentals, search strategies, working of the search engines, Telnet and FTP.

Browser: Introduction to Browser, Coast-to-coast surfing, hypertext markup language, Web page installation, Web page setup, Basics of HTML & formatting and hyperlink creation, Using FrontPage Express, Plug-ins.

UNIT 111

Languages: Basic and advanced HTML, java script language, Client and Server Side Programming in java script. Forms and data in java script, XML basics.

Introduction to Web Servers: PWS, IIS, Apache; Microsoft Personal Web Server. Accessing & using these servers.

UNIT IV

Privacy and security topics: Introduction, Software Complexity, Encryption schemes, Secure Web document, Digital Signatures, Firewalls.

COURSE OUTCOMES:

At the end of the course/session the student would be able to

1. Understand the basics of internet & search engines.
2. Have a hands on HTML
3. Learn the need and basics of CSS
4. Learn the concepts of client side and server side scripting.

Text Book/ Reference Books:

1. Fundamentals of the Internet and the World Wide Web, Raymond Greenlaw and Ellen Hepp – 2001, TMH
2. Internet & World Wide Programming, Deitel, Deitel & Nieto, 2000, Pearson Education
3. Complete idiots guide to java script, Aron Weiss, QUE, 1997
4. Network firewalls, Kironjeetsyan -New Rider Pub.
5. Alfred Gkossbrenner-Internet 101 Computing MGH, 1996

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



BCA-DS-103: COMPUTER FUNDAMENTALS AND ORGANIZATION
BCA I Semester

No. of Credits: 3
L T P Total
3 0 0 3

Sessional: 25 Marks
Theory: 75 Marks
Total : 100 Marks
Duration of Exam: 3 Hours

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part I

COURSE OBJECTIVES:

1. Describe the organization and operation of a computer processor, primary and secondary memory, peripheral devices and to give computer specifications;
2. Explain the representation of data and information in computer systems, use standard word, and spreadsheets, graphics generation packages,

SYLLABUS

UNIT-I

Computer Fundamentals: Generations of Computers, Definition, Block Diagram along with its components, characteristics & classification of computers, Limitations of Computers, Human-Being VS Computer, Applications of computers in various Fields, I/O devices, definition of software.

UNIT- II

Memory: Flynn's classification of computers (SISD, MISD, MIMD), Concept of primary & secondary memory, RAM, ROM, types of ROM, Cache Memory, flash memory, Secondary storage devices: Sequential & direct access devices viz. magnetic tape, magnetic disk, optical disks i.e. CD, DVD, virtual memory, Memory Hierarchy, Need for memory hierarchy.

UNIT-III

Computer Languages: Analogy with natural language, machine language, assembly language, high-level languages, fourth generation languages, compiler, interpreter, assembler, Linker, Loader, characteristics of a good programming language, Planning the Computer Program: Concept of problem solving, Problem definition, Program design, Debugging, Types of errors in programming, Documentation, Structured programming concepts, Programming methodologies viz. top-down and bottom-up programming, Advantages and disadvantages of Structured programming.

UNIT-IV

Instruction Set Architecture: Instruction set based classification of processors (RISC, CISC, and their comparison); addressing modes: register, immediate, direct, indirect, indexed; Operations in the instruction set; Arithmetic and Logical, Data Transfer, Control Flow.

Overview of Networking:

What is networking? Introduction to LAN, MAN and WAN.

COURSE OUTCOMES:

After completion of this course, student will be able to

1. Understand the fundamentals of computer.
2. Understand about different types of memory and the need of memory hierarchy.
3. Learn the basics of networking.
4. Learn basic approaches of Programming

Text Books/ Reference Books:

1. Gill Nasib Singh: Computing Fundamentals and Programming in C, Khanna Books Publishing Co., New Delhi.
2. Balagurusamy E, Computing Fundamentals and C Programming, Tata McGraw Hill.
3. Norton, Peter, Introduction to Computer, McGraw-Hill
4. Leon, Alexis & Leon, Mathews, Introduction to Computers, Leon Tech World
5. Rajaraman, V., Fundamentals of Computers, PHI
6. Ram, B., Computer Fundamentals, Architecture & Organization, New Age International(P) Ltd.
7. Chhillar, Rajender Singh: Application of IT to Business, Ramesh Publishers, Jaipur.
8. Gill, Nasib Singh: Essentials of Computer and Network Technology, Khanna Books Publishing Co., New Delhi

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



BCA-DS-104: ALGEBRA AND CALCULUS
BCA I Semester

| | | |
|-------------------|-------------------|-----------|
| No. of Credits: 3 | Sessional: | 25 Marks |
| L T P Total | Theory: | 75 Marks |
| 3 0 0 3 | Total : | 100 Marks |
| | Duration of Exam: | 3 Hours |

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

COURSE OBJECTIVES

1. Learn the general concept of function and its applications to real-world situations.
2. Learn to work with exponential, logarithmic and trigonometric functions and their applications in applied problems.
3. Learn the concepts of the derivative and its underlying concepts such as limits and continuity.
4. Learn to calculate derivative for various type of functions using definition and rules.
5. Apply the concept of derivative to completely analyze graph of a function.
6. Learn about various applications of the derivative in applied problems.

SYLLABUS

UNIT I

MATRICES: Symmetric – Skew-Symmetric - Orthogonal and Unitary matrices - Rank of a Matrix - Consistency - Characteristic equation – Eigen values and Eigen vectors - properties –Cayley, Hamilton's Theorem (proof not needed) - Simple applications.

UNIT II

THEORY OF EQUATIONS: Partial Fractions- Theory of equations- Polynomial Equations with real coefficients -Irrational roots - Complex roots - Symmetric functions of roots - Transformation of equation by increasing or decreasing roots by a constant - Reciprocal equations.

UNIT III

DIFFERENTIAL CALCULUS: Rules of differentiation - Derivative of implicit function - Successive differentiation nth derivatives - Leibnitz theorem (without proof) and applications - maxima and minima of functions of two variables - Partial differentiation - Euler's Theorem.

UNIT IV

INTEGRAL CALCULUS: Integration of rational functions - algebraic expressions involving only one irrational quantity-rational functions of $\sin x$ and $\cos x$ - Trigonometric substitutions - Bernoulli's formula for integration by parts - reduction formulae - properties of definite integral -Evaluation of double and triple integrals.

COURSE OUTCOMES:

After completing this course, student will be able:

1. Plot points and equations and interpret information using the rectangular coordinate system.
(This would include finding equations of lines, parallel lines, and perpendicular lines.)
2. Solve linear and rational equations in one variable.
3. Use mathematical equations to model real-life problems.
4. Perform operations with real and complex numbers.
5. Solve quadratic equations by factoring, completing the square, and by the quadratic formula.
6. Use function notation and identify the domain and range.
7. Solve systems of linear equations in two or three variables.
8. Learning outcomes of Calculus:
9. Understand the relationship between the derivative and the definite integral as expressed in both parts of the Fundamental Theorem of Calculus.
10. Locate the x and y intercepts, any undefined points, and any asymptotes.
11. Determine asymptotes for rational expressions
12. Determine if there is any symmetry to aid in the graphing process.
13. Determine the point(s) of intersection of pairs of curves.

Text Books/Reference Books:

1. Narayanan, S. and Manicavachagom Pillay, T.K. (2015) Calculus Vol. I,II&III S.Viswanathan (Printers & publishers) Pvt. Ltd., Chennai.
2. Venkataraman, M.K., "Higher Mathematics for Engineering and Science", Third Edition, The National Publishing Co., Madras, 1986.
3. Kandasamy P, K. Thilagavathi and K. Gunavathy- Allied Mathematics aper-I, First semester, 1/e, S. Chand & Co., New Delhi, 2003
4. Stewart J - Single Variable Calculus (4th edition) Brooks / Cole, Cenage Learning 2010.
5. Tom M. Apostol - Calculus, Vol. I (second edition) John Wiley and Sons, Inc., Jan 2007.
6. Burnside W.S. and A.W. Panton - The Theory of Equations, Dublin University Press, 1954.
7. MacDuffee, C.C. - Theory of Equations, John Wiley & Sons Inc., 1954.
8. Ushri Dutta, A.S.Muktibodh and S.D. Mohagaonkar: Algebra and Trigonometry, PHI India, 2006

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

BCA-CC-105: SELF GUIDED IMPROVEMENT
BCA I Semester

No. of Credits: 3
L T P Total
3 0 0 3

Sessional: 25 Marks
Theory: 75 Marks
Total : 100 Marks
Duration of Exam: 3 Hours

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

COURSE OBJECTIVES/OUTCOMES:

1. Developing and implementing a sound self-improvement program.
2. Setting appropriate life and career goals.
3. Accepting new ideas, as it can bring positivity in life.
4. Making or creating not only self but to others also as a team.

SYLLABUS

UNIT I

SELF ANALYSIS: SWOT Analysis, Who am I, Attributes, Importance of Self Confidence, Self Esteem, What is personality? Why does it matter? How do personalities develop?

UNIT-II

PERSONALITY AND CAREER CHOICE: Matching your career and personality, why it matters, Self-efficacy, Basic Personality Traits: Values, Beliefs, Interactions, Experiences, Environmental influences, The big five dimensions, Changing Your Personality, Can personalities change? Being yourself, being adaptable, Positive attitude, Individuality, Controlling emotions

UNIT III

CREATIVITY AND PERSONAL GROWTH: Out of box thinking, Lateral Thinking, Personal Growth: Ways you can try to improve, Helpful tools and exercises, setting goals, focusing on positives.

ATTITUDE AND MOTIVATION: Factors influencing Attitude, Challenges and lessons from Attitude, Etiquette, Factors of motivation, Self-talk, Intrinsic & Extrinsic Motivators.

UNIT IV

GOAL SETTING: Wish List, SMART Goals, Blue print for success, Short Term, Long Term, Life Time Goals. Time Management: Value of time, Diagnosing Time Management, Weekly Planner, To do list, Prioritizing work.

Text Books / Reference Books:

1. Covey Sean, Seven Habits of Highly Effective Teens, New York, Fireside Publishers, 1998.
2. SOFT SKILLS, 2015, Career Development Centre, Green Pearl Publications.
3. Carnegie Dale, How to Win Friends and Influence People, New York: Simon & Schuster, 1998.
4. Thomas A Harris, I am ok, You are Ok , New York-Harper and Row, 1972
5. Daniel Coleman, Emotional Intelligence, Bantam Book, 2006

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



BCA-DS-106: C PROGRAMMING LAB
BCA I Semester

No. of Credits: 2
L T P Total
0 0 4 4

Sessional: 25 Marks
Practical: 50 Marks
Total : 75 Marks
Duration of Exam: 3 Hours

List of Programs:

Data Types, Expression and Operators:

1. Write a program to add, subtract, multiply and divide two numbers.
2. Write a program to find the average male height & average female heights in the class (input is in the form of gender code, height).
3. Write a program to calculate area of triangle using Heron's formula

Decision Making and Branching:

4. Write a program to check entered number is even or odd.
5. Write a program to find the number entered is positive or negative.
6. Write a program to find the largest of three numbers. (if-then-else).
7. Write a program to find roots of a quadratic equation using functions and switch statements.

Decision making & looping:

8. Write a program to find the largest of ten numbers. (While loop)
9. Write a program to calculate sum of n numbers using do-while loop.
10. Write a program to print the table of any entered Integer (For loop).
11. Write a program to print even series numbers.
12. Write a program to print odd series numbers.

Function and Recursion:

13. Write a program to find the sum of two numbers using function without arguments and with no return type.
14. Write a program to find the sum of two numbers using function with arguments and with no return type.
15. Write a program to find the sum of two numbers using function with arguments and with return type.
16. Write a program to swap two integers entered by the user using call by value.
17. Write a program to swap two integers entered by the user using call by Reference.
18. Write a program to find factorial of a number using function.

19. Write a program to calculate a^b using function.
20. Write a program to print Fibonacci series using recursion.
21. Write a program to generate a series of 10 Fibonacci numbers with using recursion

Arrays and String:

22. Write a program to find the sum of enter elements (Using Array)
23. Write a program using arrays to find the largest and second largest number out of given 50 numbers.
24. Write a program to add and subtract two matrices.
25. Write a program to multiply two matrices.
26. Write a program to transpose a given matrix.
27. Write a program to find length, reverse, concatenate, compare, copy, change case of a string with using string library functions. (7 programs).
28. Write a program to find length, reverse, concatenate, compare, copy, change case of a string without using string library functions (7 programs).
29. Write a program to check that the input string is a palindrome or not.

Pointers and file handling:

30. Write a program to print the value and address of a pointer variable.
31. Write a program to swap two integers entered by the user.
32. Write a program to print the value and address of a pointer of pointer variable.
33. Write a program to open a file using File Handling.
34. Write a program to copy text from a file to another file using File Handling.

BCA-DS-107: INTERNET FUNDAMENTALS LAB
BCA I Semester

No. of Credits: 2
L T P Total
0 0 4 4

Sessional: 25 Marks
Practical: 50 Marks
Total : 75 Marks
Duration of Exam: 3 Hours

List of Programs:

1. Sending and receiving mails.
2. Chatting on the net.
3. Using FTP and Tel net server.
4. Using HTML Tags (table, form, image, anchor etc.).
5. Write a program to create various types of list.
6. Write a program to create chess board and time table using table tag.
7. Write a program to create frames.
8. Write a program to use various tags in HTML.
9. Write a program to use CSS in HTML.
10. Making a Web page of your college using HTML tags

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

BCA-DS-108: PC SOFTWARE LAB
BCA I Semester

No. of Credits: 2
L T P Total
0 0 4 4

Sessional: 25 Marks
Practical: 50 Marks
Total : 75 Marks
Duration of Exam: 3 Hours

List of Programs:

1. To prepare your CV using MS Word.
2. Create a mail merge letter using MS Word.
3. Create a macro for inserting a picture and formatting the text.
4. Create a simple presentation to list simple dos commands, hardware and software using MS Power Point.
5. Add text, pictures, sounds, movies, and charts to your presentations.
6. Set up slide shows and rehearse timings for your slides.
7. Create a worksheet with 4 columns, enter 10 records and find the sum of all columns using MS Excel.
8. Create a student result sheet.
9. Create a simple bar chart to highlight the sales of a company for 3 different periods.
10. Create, record and use macro in MS Excel.
11. Sorting and filtering of data
12. Create pivot tables and pivot charts.

YMCA University of Science and Technology, Faridabad
BCA Scheme of Studies / Examination
Semester – II

| Course No. | Course Title | Schedule | | | | Sessional Marks/ Internal | Marks for End Term Examination | | Total Marks | Credits |
|------------|--|----------|---|---|-----------|------------------------------|--------------------------------|------------|-------------|-----------|
| | | L | T | P | Total | | Theory | Practical | | |
| BCA-DS-111 | Introduction to Database Management System | 3 | - | - | 3 | 25 | 75 | - | 100 | 3 |
| BCA-DS-112 | Introduction to Data Structures | 3 | - | - | 3 | 25 | 75 | - | 100 | 3 |
| BCA-DS-113 | Introduction to Data Science | 3 | - | - | 3 | 25 | 75 | - | 100 | 3 |
| BCA-DS-114 | Professional English | 3 | - | - | 3 | 25 | 75 | - | 100 | 3 |
| BCA-DS-115 | Fundamentals of Management | 3 | - | - | 3 | 25 | 75 | - | 100 | 3 |
| BCA-DS-116 | Data Structures Lab | - | - | 4 | 4 | 25 | - | 50 | 75 | 2 |
| BCA-DS-117 | Database Management Systems Lab | - | - | 4 | 4 | 25 | - | 50 | 75 | 2 |
| BCA-DS-118 | Language Lab | - | - | 4 | 4 | 25 | - | 50 | 75 | 2 |
| BCA-DS-119 | Presentation | - | - | 2 | 2 | 25 | - | - | 25 | 1 |
| BCA-DS-120 | Group Discussion | - | - | 2 | 2 | 25 | - | - | 25 | 1 |
| | Total | | | | 31 | 250 | 375 | 150 | 775 | 23 |

Note: Exam duration will be as under

(a) Theory exams will be of 3 hours duration

(b) Practical exams will be of 3 hours duration

BCA -DS-111: INTRODUCTION TO DATABASE MANAGEMENT SYSTEM
BCA II Semester

| | | |
|-------------------|---|-------|
| No. of Credits: 3 | | |
| L T | P | Total |
| 3 0 | 0 | 3 |

| | |
|-------------------|-----------|
| Sessional: | 25 Marks |
| Theory : | 75 Marks |
| Total : | 100 Marks |
| Duration of Exam: | 3 Hours |

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

COURSE OBJECTIVES:

1. To understand the different issues involved in the design and implementation of a database system.
2. To study the physical and logical database designs, database modeling, relational, hierarchical, and network models.
3. To understand and use data manipulation language to query, update, and manage a Database
4. To develop an understanding of essential DBMS concepts such as: database security, integrity, concurrency, distributed database, and intelligent database, Client/Server (Database Server), Data Warehousing.
5. To design and build a simple database system and demonstrate competence with the fundamental tasks involved with modelling, designing, and implementing a DBMS.

SYLLABUS

UNIT – I

Basic Concepts: Data, Information, Records and files. Traditional file-based Systems, File Based Approach-Limitations of File Based Approach, Database Approach-Characteristics of Database Approach, advantages and disadvantages of database system, components of database system, Database Management System (DBMS), Components of DBMS Environment, DBMS Functions and Components, DBMS users, Advantages and Disadvantages of DBMS, DBMS languages.

Roles in the Database Environment - Data and Database Administrator, Database Designers, Applications Developers and Users.

UNIT – II

Database System Architecture –Three Levels of Architecture, External, Conceptual and Internal Levels, Schemas, Mappings and Instances.

Data Independence–Logical and Physical Data Independence, Classification of Database Management System, Centralized and Client Server architecture to DBMS.

Data Models: Records- based Data Models, Object-based Data Models, Physical Data Models and Conceptual Modeling.

UNIT – III

Entity-Relationship Model: Entity Types, Entity Sets, Attributes Relationship Types, Relationship Instances and ER Diagrams, abstraction and integration.

Basic Concepts of Hierarchical and Network Data Model, Relational Data Model - Brief History, Relational Model Terminology-Relational Data Structure, Database Relations, Properties of Relations, Keys, Domains, Integrity Constraints over Relations.

UNIT – IV

Relational algebra, Relational calculus, Relational database design:

Functional dependencies, Modification anomalies, 1st to 3rd NFs, BCNF, 4th and 5th NFs, computing closures of set FDs, SQL: Data types, Basic Queries in SQL, Insert, Delete and Update Statements, Views, Query processing: General strategies of query processing, query optimization, query processor, concept of security, concurrency and recovery.

COURSE OUTCOMES:

After completion of this course, students will be able to

1. Write relational algebra expressions for given query and optimize the developed expressions.
2. Design the databases using given specifications.
3. Construct the SQL queries for Open source and Commercial DBMS –MYSQL and ORACLE.
4. Understand the concept of Query Optimization and Normalization.
5. Understand the concept of Serializability.

Text Books/ Reference Books:

1. Elmasri & Navathe, “Fundamentals of Database Systems”, 5th edition, Pearson Education.
2. Thomas Connolly Carolyn Begg, “Database Systems”, 3/e, Pearson Education.
3. C. J. Date, “An Introduction to Database Systems”, 8th edition, Addison Wesley N. Delhi.

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

BCA-DS-112: INTRODUCTION TO DATA STRUCTURES
BCA II Semester

| | | | |
|-------------------|---|---|-------|
| No. of Credits: 3 | | | |
| L | T | P | Total |
| 3 | 0 | 0 | 3 |

| | |
|-------------------|-----------|
| Sessional: | 25 Marks |
| Theory : | 75 Marks |
| Total : | 100 Marks |
| Duration of Exam: | 3 Hours |

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

COURSE OBJECTIVES:

1. To impart the basic concepts of data structures and algorithms.
2. To understand concepts about searching and sorting techniques
3. To understand basic concepts about stacks, queues, lists, trees and graphs.
4. To enable them to write algorithms for solving problems with the help of fundamental data structures

SYLLABUS

UNIT-I

Introduction: Elementary data organization, Data Structure definition, Data type vs. Data structure, Categories of data structures, Data structure operations, Applications of data structures, Algorithms complexity and time-space tradeoff, Big-Oh notations.

Strings: Introduction, Storing strings, String operations, Pattern matching algorithms, Linear search, binary search.

UNIT – II

Arrays: Introduction, Linear arrays, Representation of linear array in memory, address calculations, Traversal, Insertions, Deletion in an array, Multidimensional arrays.

Linked List: Introduction, Array vs. linked list, Representation of linked lists in memory, Traversal, Insertion, Deletion, searching in a linked list, Header linked list, Circular linked list, Two-way linked list, Threaded lists, Garbage collection, Applications of linked lists.

UNIT – III

Stack: Introduction, Array and linked representation of stacks, Operations on stacks, Applications of stacks: Polish notation, Recursion.

Queues: Introduction, Array and linked representation of queues, Operations on queues, Deques, Priority Queues, Applications of queues.

UNIT – IV

Trees: Introduction, Definition, Representing Binary tree in memory, Traversing binary trees, Traversal algorithms using stacks, Minimum cost Spanning tree, Prim's and Kruskal's Algorithm.

Graph: Introduction, Graph theory terminology, Sequential and linked representation of graphs, Warshall's algorithm for shortest path, Dijkstra algorithm for shortest path, Operations on graphs, Traversal of graph.

COURSE OUTCOMES:

1. For a given algorithm student will able to analyze the algorithms to determine the time and computation complexity and justify the correctness.
2. For a given Search problem (Linear Search and Binary Search) student will able to implement it.
3. For a given problem of Stacks, Queues, linked list and Tree, student will able to implement it and analyze the same to determine the time and computation complexity.
4. Student will able to write an algorithm Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort and compare their performance in term of Space and Time complexity.
5. Student will able to implement Graph search and traversal algorithms and determine the time and computation complexity.

Text Books/ Reference Books:

1. Seymour Lipschutz, "Data Structure", Tata-McGraw-Hill
2. Horowitz, Sahni& Anderson-Freed, "Fundamentals of Data Structures in C", Orient Longman.
3. Trembley, J.P. And Sorenson P.G., "An Introduction to Data Structures With Applications", Mcgraw- Hill International Student Edition, New York.
4. Mark Allen Weiss Data Structures and Algorithm Analysis In C, Addison- Wesley, (An Imprint Of Pearson Education), Mexico City.Prentice- Hall Of India Pvt. Ltd., New Delhi.
5. Yedidyan Langsam, Moshe J. Augenstein, and Aaron M. Tenenbaum, "Data Structures Using C", Prentice- Hall of India Pvt. Ltd., New Delhi.

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

BCA-DS-113: INTRODUCTION TO DATA SCIENCE
BCA II Semester

| | | |
|-------------------|---|---|
| No. of Credits: 3 | | |
| L | T | P |
| 3 | 0 | 0 |

| | |
|-------------------|-----------|
| Sessional: | 25 Marks |
| Theory : | 75 Marks |
| Total : | 100 Marks |
| Duration of Exam: | 3 Hours |

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

COURSE OBJECTIVES:

1. An understanding of how the nature of the data collection, the data itself, and the analysis processes relate to the kinds of inferences that can be drawn
2. Understand the limitations of data sets based on their contents and provenance
3. Knowledge of data organization, management, preservation, and reuse
4. Knowledge of what statistical analysis techniques to choose, given particular demands of inference and available data
5. Knowledge of general linear models and cluster analysis methods for statistical analysis
6. Skills and knowledge in preparing data for analysis, including cleaning data, manipulating data, and dealing with missing data
7. Skills in actually analyzing data using open source data analysis tools

SYLLABUS

UNIT-I

Data Science Concept

Data science:- definition of data, data types, meaning of variables, wholeness of data analytics, data processing chain, data distributions, Paths to data science, data mining, data warehousing, difference between database and data warehouse, advices for new data scientists, introduction to cloud, artificial intelligence, Machine learning, applications in real world, learning approaches: supervised, unsupervised.

UNIT-II

Introduction to data science tools

A day in the life of a data science person, R versus Python, Data science tools and technology, Regression.

Data Science in Business

Companies start in data science, real world examples and applications, Tips for recruiting data science people, "The Final Deliverable", "The Report Structure", Data science careers and additional case studies.

UNIT-III

Big data:-Introduction to Big data, big data technologies, management of big data.

Data Science People

Things data science people say, "What Makes Someone a Data Scientist?", Data Visualization- Basic principles, ideas and tools for data visualization, types of charts: line graph, pie chart, scatter plot, bar graphs, create your own visualization of a complex dataset.

UNIT-IV

Data Science and Ethical Issues

Discussions on privacy, security, ethics A look back at Data Science, Next-generation data scientists.

COURSE OUTCOMES:

1. Students will learn how to explore new data sets.
2. Implement a comprehensive set of machine learning algorithms from scratch.
3. Master all the components of a predictive model, such as data preprocessing, feature engineering, model selection, performance metrics and hyper parameter optimization.

Text Books/Reference Books:

1. Dr. Anil Maheshwari, "Data Analytics", McGraw Hill Education (India) Private Limited.
2. Jake Vander Plas "python data science handbook",Oreilly
3. Allen B. Downey "Think Python",Oreilly
4. Hadley Wickham "Advanced R",CRC Press

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



BCA-DS-114: PROFESSIONAL ENGLISH
BCA II Semester

No. of Credits: 3
L T P Total
3 0 0 3

Sessional: 25 Marks
Theory : 75 Marks
Total : 100 Marks
Duration of Exam: 3 Hours

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

COURSE OBJECTIVES:

The course focuses on the following aspects:

1. professional attitude and behavior;
2. clarity, correctness and concision in writing, as well as detailed proof-reading skills;
3. the acquisition of a varied and accurate contemporary professional vocabulary;
4. teamwork and cross-cultural awareness; and
5. discussion activities and presentations (both impromptu and formal).

SYLLABUS

UNIT-I

BASICS OF COMMUNICATION: Introduction to basics of communication: communication and its various definitions, paths of communication, process of communication, barriers to effective communication, Myths and realities about Communication, Communication Noise, 7 C's of effective Communication, corporate Communication, impact of social media on communication.

UNIT – II

VERBAL AND NON-VERBAL COMMUNICATION: Verbal Communication and its types, principles for effective oral and written communication, listening process, effective listening, Presentation skills, presentation aids, non-verbal communication - posture–gestures-eye contact–handshaking-voice modulations–sign language- proxemics- communication skills for the interviews and group discussions, soft skills.

UNIT – III

GRAMMAR: Synonyms/antonyms, one word substitutions, tenses, conjunctions, auxiliaries, prepositions, spotting errors.

BUSINESS WRITING: Business letter–Layout of a business letter-sales letter- letters of enquiries- orders- complaint-, notice and tenders, circulars, memos, e-mails, agendas, minutes of Meeting, letters of application and résumé writing.

UNIT – IV

PROFESSIONAL PROPOSALS AND REPORTS: Writing business proposals- characteristics and structure- Process and mechanics of report writing - types of reports -project reports - characteristics-structure-performance appraisal reports, -product appraisal reports- progress

reports, brochures, newsletters, taking official notes, Event report, Technical Articles, Editing Strategies for effective report writing, Professional writing style and language.

COURSE OUTCOMES:

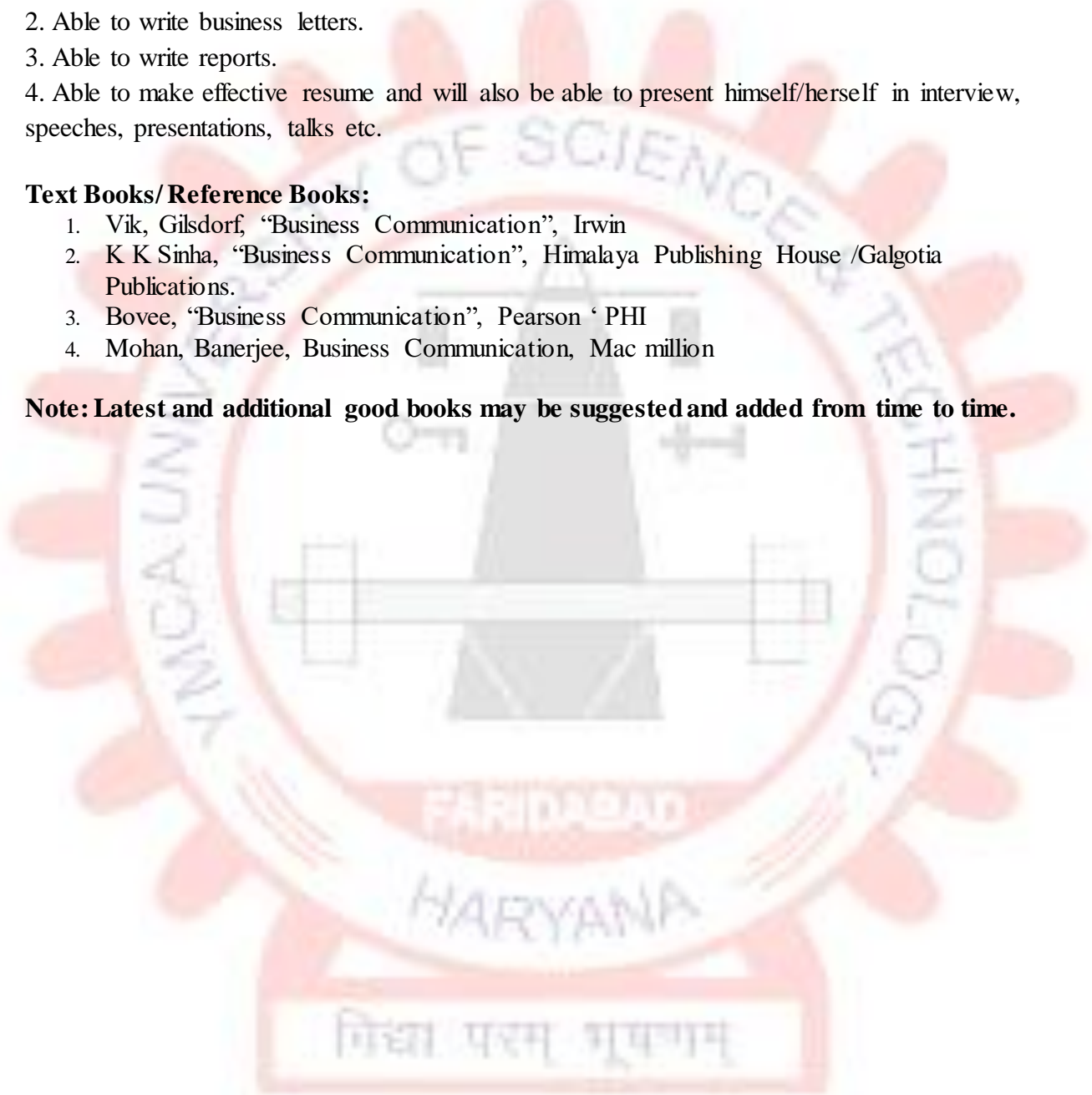
After completion of the course student will be able to:

1. Understand the concept of soft skills including communication skills, listening skills, positive thinking and also will be able to enhance own personality.
2. Able to write business letters.
3. Able to write reports.
4. Able to make effective resume and will also be able to present himself/herself in interview, speeches, presentations, talks etc.

Text Books/ Reference Books:

1. Vik, Gilsdorf, "Business Communication", Irwin
2. K K Sinha, "Business Communication", Himalaya Publishing House /Galgotia Publications.
3. Bovee, "Business Communication", Pearson ' PHI
4. Mohan, Banerjee, Business Communication, Mac millan

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



BCA-DS-115: FUNDAMENTALS OF MANAGEMENT
BCA II Semester

| | | | |
|-------------------|---|---|-------|
| No. of Credits: 3 | | | |
| L | T | P | Total |
| 3 | 0 | 0 | 3 |

| | |
|-------------------|-----------|
| Sessional: | 25 Marks |
| Theory : | 75 Marks |
| Total : | 100 Marks |
| Duration of Exam: | 3 Hours |

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

COURSE OBJECTIVES

1. Enables the students to develop an understanding of management and organization.
2. The course focuses on important management functions such as planning, organizing, leading and controlling for successful managerial activities.
3. The students will learn how successful managers use organizational resources through organizational functions in order to effectively and efficiently achieve organizational objectives.

SYLLABUS

UNIT 1

Introduction: Meaning of management, Definitions of Management, Characteristics of management, Management Vs. Administration. Management-Art, Science and Profession. Importance of Management. Development of Management thoughts. Principles of Management. The Management Functions, Inter-relationship of Managerial functions. Nature and Significance of staffing, Personnel management, Functions of personnel management, Manpower planning, Process of manpower planning, Recruitment, Selection; Promotion- Seniority Vs. Merit. Training - objectives and types of training.

UNIT II

Production Management: Definition, Objectives, Functions and Scope, Production Planning and Control; its significance, stages in production planning and control. Brief introduction to the concepts of material management, inventory control; its importance and various methods.

UNIT III

Marketing Management: Definition of marketing, Marketing concept, objectives & Functions of marketing. Marketing Research - Meaning; Definition; objectives; Importance; Limitations; Process. Advertising - meaning of advertising, objectives, functions, criticism.

UNIT IV

Financial Management: Introduction of Financial Management, Objectives of Financial Management, Functions and Importance of Financial Management. Brief Introduction to the concept of capital structure and various sources of finance.

COURSE OUTCOMES:

After completion of the course student will be able to understand:

1. How organization adapt to uncertain environment.
2. Develop the process of management's 4 functions: planning, organizing, leading and controlling.
3. Evaluate leadership styles to anticipate consequences of each leadership style.
4. Identify and evaluate social corporate responsibility and ethical issues involved in business situations.

Text Books/ Reference Books:

1. Principles and Practice of Management - R.S. Gupta, B.D.Sharma, N.S. Bhalla. (Kalyani Publishers)
2. Organisation and Management - R.D. Aggarwal (Tata Mc Graw Hill)
3. Principles & Practices of Management – L.M. Prasad (Sultan Chand & Sons)
4. Management – Harold, Koontz and CyroDonell (Mc.Graw Hill).
5. Marketing Management – S.A. Sherlikar (Himalaya Publishing House, Bombay).
6. Financial Management - I.M. Pandey (Vikas Publishing House, New Delhi)
7. Management - James A.F. Stoner & R.Edward Freeman, PHI.

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



BCA-DS-116: DATA STRUCTURES LAB
BCA II Semester

No. of Credits: 2
L T P Total
0 0 4 4

Sessional: 25 Marks
Practical : 50 Marks
Total : 75 Marks
Duration of Exam: 3 Hours

List of Programs:

1. Stack

Write a program to perform various operations like Push and Pop on Stack.

2.Linear Queue

Write a program to perform Insertion and deletion operations on Linear Queues.

3.Linked List

Write a program to perform various operations on Linked List.

4.Sorting Techniques

Write a program to implement various sorting techniques like Bubble sort, selection sort, Insertion sort, Quick sort.

5.Searching Techniques

Write a program to implement Linear Search and Binary Search.

6.Minimum Spanning Trees

Write a program to implement Prim's and Kruskal Algorithms.

विद्यया परमं भूषणम्

**BCA-DS-117: DATA BASE MANAGEMENT SYSTEMS
LAB**

BCA II Semester

No. of Credits: 2
L T P Total
0 0 4 4

Sessional: 25 Marks
Practical : 50 Marks
Total : 75 Marks
Duration of Exam: 3 Hours

List of Programs:

1. Introduction to SQL.
2. Write a program to create a table in SQL.
3. Write a program to perform various operations like Drop, Alter and Truncate on a table.
4. Write a program to perform various queries in SQL.
5. Write a program to perform Selection, Projection and Join Operations on tables.



BCA-DS-118: LANGUAGE LAB
BCA II Semester

No. of Credits: 2
L T P Total
0 0 4 4

Sessional: 25 Marks
Practical : 50 Marks
Total : 75 Marks
Duration of Exam: 3 Hours

Corporate Interaction & Communication

1. Listening Comprehension
2. Pronunciation, Intonation, Stress and Rhythm
3. Common Everyday Situations: Conversations and Dialogues
4. Communication at Workplace
5. Interviews
6. Formal Presentations



YMCA University of Science and Technology, Faridabad
BCA Scheme of Studies / Examination
Semester – III

| Course No. | Course Title | Schedule | | | | Sessional Marks/ Internal | Marks for End Term Examination | | Total Marks | Credits |
|-------------------|--|----------|---|---|-----------|---------------------------|--------------------------------|------------|----------------------------------|-----------|
| | | I | T | P | Total | | Theory | Practical | | |
| BCA-DS-201 | Python Programming | 3 | - | - | 3 | 25 | 75 | - | 100 | 3 |
| BCA-DS-202 | Probability and Statistics | 3 | - | - | 3 | 25 | 75 | - | 100 | 3 |
| BCA-DS-203 | Principles of Operating Systems | 3 | - | - | 3 | 25 | 75 | - | 100 | 3 |
| BCA-DS-204 | Data Warehouse and Data Mining | 3 | - | - | 3 | 25 | 75 | - | 100 | 3 |
| As per list above | General Elective - I | 3 | - | - | 3 | 25 | 75 | - | 100 | 3 |
| BCA-17-204(B) | Environmental Science(No credit just qualifying) | 3 | - | - | 3 | | 50 | | Marks will not be added in total | No Credit |
| BCA-DS-205 | Python Programming Lab | - | - | 4 | 4 | 25 | - | 50 | 75 | 2 |
| BCA-DS-206 | Operating Systems Lab | - | - | 4 | 4 | 25 | - | 50 | 75 | 2 |
| BCA-DS-207 | Presentation | - | - | 2 | 2 | 25 | - | - | 25 | 1 |
| BCA-DS-208 | Group Discussion | - | - | 2 | 2 | 25 | - | - | 25 | 1 |
| BCA-DT-201 | Industrial Training - I | | | | | 50 | | 50 | 100 | 3 |
| | Total | | | | 30 | 275 | 375 | 150 | 800 | 24 |

Note: Exam duration will be as under

(a)Theory exams will be of 3 hours duration

(b)Practical exams will be of 3 hours duration

BCA-DS-201: PYTHON PROGRAMMING
BCA III Semester

| | | | |
|-------------------|---|---|-------|
| No. of Credits: 3 | | | |
| L | T | P | Total |
| 3 | 0 | 0 | 3 |

| | |
|-------------------|-----------|
| Sessional: | 25 Marks |
| Theory : | 75 Marks |
| Total : | 100 Marks |
| Duration of Exam: | 3 Hours |

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

COURSE OBJECTIVES:

1. Create and execute Python programs
2. Understand the concepts of file I/O
3. Be able to read data from a text file using Python
4. Plot data using appropriate Python visualization libraries

SYLLABUS

UNIT-I

Introduction to Python: Installation and Working with Python, Understanding Python Variables Python Basic Operators, Python Data Types Declaring and using Numeric data types: int, float, complex Using string data type and string operations,

Decision and Loop Control Statements: Basic decision making statements like if, else and elif , Simple for loops in python For loop using ranges, string, list and dictionaries, Use of while loops in python, Loop manipulation using pass, continue, break and else, Programming using Python conditional and loops block

UNIT-II

Functions in Python: Introduction to functions, Syntax and Basics of Functions, Parameters and Arguments in Function, Local and Global scope of a variable, return statement, Recursive functions, Lambda function.

Python List, Tuple Sets and Dictionary Manipulations: Introduction to Lists, creating Lists, Accessing the elements of Lists, List Slicing, Python Inbuilt functions for Lists, passing Lists to a Function, Returning Lists from a function, Introduction to Tuples, Creating Tuples, Tuples Indexing and Slicing, Inbuilt functions for Tuples, Introduction to Sets, Creating Sets, Set in and Not in Operator, Python set Classes, Set operations, Introduction to Dictionaries, Creating a dictionary, Adding and replacing values in Dictionary, Formatting Dictionaries, Deleting items from Dictionaries, Simple Programs on Dictionary.

UNIT-III

Object Oriented Programming in Python: Defining Classes, The Self-parameter and Adding methods to a Class, Accessibility, The `__init__` Method(Constructor Method), `__del__` Method(Destructor Method), Method Overloading in Python, Inheritance, Types of Inheritance

Importing Modules: Introduction to Modules, Math module, Random module.

Graphics Programming in Python: Getting Started with the Turtle Module, Moving Turtle in any Direction, The color, bgcolor, circle and speed method of Turtle, Drawing basic shapes using Iterations, Changing color dynamically using List.

UNIT IV

Image processing in Python: Basic libraries for image processing in python such as **OpenCV, Numpy and Scipy libraries, Python Imaging Library (PIL)**. Various functions in Image processing using these libraries like `open()` and `show()` image, `Convert and Save()` Image, `Resize-thumbnails()`, `Converting to grayscale image – convert()`, **Scaling an Image , Rotating an image , Translating an Image, Edge detection in an Image.**

File Handling in Python: Introduction to File Handling, Opening and closing a file, Writing Text and number to a file, Reading Text and number from a file, The `seek()` function, Binary files, Reading from and Writing into Binary files.

COURSE OUTCOMES:

After completion of course, students would be able to:

1. Write programs efficiently in python
2. Effectively use numerical analysis libraries of python

Textbooks/Reference Books:

1. Martin C. Brown, Python: The Complete Reference, Tata McGraw-Hill Education.
2. Kamthane Kamthane, Programming and Problem Solving with PYTHON, Tata McGraw-Hill Education.

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

BCA-DS-202: PROBABILITY AND STATISTICS
BCA III SEMESTER

| | | | |
|-------------------|---|---|-------|
| No. of Credits: 3 | | | |
| L | T | P | Total |
| 3 | 0 | 0 | 3 |

| | |
|-------------------|-----------|
| Sessional: | 25 Marks |
| Theory : | 75 Marks |
| Total : | 100 Marks |
| Duration of Exam: | 3 Hours |

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

COURSE OBJECTIVES:

1. To Apply probability theory to set up tree diagrams
2. To Apply probability theory via Bayes' Rule
3. To Describe the properties of discrete and continuous distribution functions
4. To Use method of moments and moment generating functions
5. To Assess the consistency, efficiency and unbiasedness of estimators
6. To Apply method of maximum likelihood estimation
7. To Apply the Central Limit Theorem
8. To Use statistical tests in testing hypotheses on data

SYLLABUS

UNIT I

RANDOM VARIABLES AND DISTRIBUTION FUNCTIONS: Discrete and continuous random variables - distribution function and its properties - probability mass function and probability density function - discrete and continuous probability distributions - Binomial, Geometric, Poisson, Uniform, Exponential and Normal distributions.

UNIT II

MOMENTS AND MOMENT GENERATING FUNCTIONS: Expectation of a random variable – probability generating function – properties - moment generating function.

TWO DIMENSIONAL RANDOM VARIABLES: Joint, marginal and conditional distribution functions - independence of random variables.

UNIT III

DESCRIPTIVE STATISTICS: Types of data - primary and secondary data - classification and representation of data - formation of frequency distribution - various measures of central tendency, dispersion - and their merits and demerits - concept of skewness and kurtosis.

UNIT IV

CORRELATION AND CURVE FITTING: Correlation coefficient and regression - rank correlation - curve fitting by least square methods, fitting a straight line, parabola, power curve and exponential curves. (no derivation, numerical problems only)

COURSE OUTCOMES:

After completing this course, students will be able:

1. Appreciate the importance of probability and statistics in computing and research.
2. Develop skills in presenting quantitative data using appropriate diagrams, tabulations and summaries.
3. Use appropriate statistical methods in the analysis of simple datasets.
4. Interpret and clearly present output from statistical analyses in a clear concise and understandable manner.

Text Books/ Reference Books:

1. Richard Arnold Johnson, Irwin Miller, John E. Freund, Miller & Freund's Probability and Statistics for Engineers, Prentice Hall, 2011.
2. Dr. P. Kandaswamy, Dr. K. Thilagavathy and Dr. K. Gunavathy, Probability and Queuing Theory, Revised edition, S. Chand Publishing, 2013.
3. T. Veerarajan, Probability, Statistics and Random Processes, Tata McGraw Hill, 2nd edition.
4. Goon, A.M., M. K. Gupta and B. Das Gupta Fundamentals of Statistics- Vol. I, World Press Ltd, Kolkata, 2002.
5. Gupta, S.C. and V.K. Kapoor, Fundamentals of Mathematical Statistics, Sultan Chand & Sons, New Delhi, 2002.
6. Hogg, R.V. and A. Craig, Introduction to Mathematical Statistics, McMillan Publishing co., Inc. 1978.
7. Mood A.M., F.A. Graybill and D.C. Boes, Introduction to Theory of Statistics McGraw Hill Book Co., 1974.
8. Sheldon M. Ross, Introduction to Probability and Statistics for Engineers and Scientists, Fourth Edition, Elsevier.

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

विद्यया परमं भूषणम्

BCA-DS-203: INTRODUCTION TO OPERATING SYSTEM
BCA III Semester

| | | | |
|-------------------|---|---|-------|
| No. of Credits: 3 | | | |
| L | T | P | Total |
| 3 | 0 | 0 | 3 |

| | |
|-------------------|-----------|
| Sessional: | 25 Marks |
| Theory : | 75 Marks |
| Total : | 100 Marks |
| Duration of Exam: | 3 Hours |

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

COURSE OBJECTIVES:

1. To learn the fundamentals of Operating Systems.
2. To learn the mechanisms of OS to handle processes, threads and their communication.
3. To know the components and management aspects of concurrency management viz. Mutual exclusion algorithms, deadlock detection algorithms and agreement protocols.
4. To learn the mechanisms involved in memory management in contemporary OS.
5. To gain knowledge on Input/ Output management aspects of Operating systems.

SYLLABUS

UNIT – I

Fundamentals of Operating system: Introduction to Operating System, its need and operating System services, early systems, Structures - Simple Batch, Multi programmed, timeshared, Personal Computer, Parallel, Distributed Systems, and Real-Time Systems. Process Management: Process concept, Operation on processes, Cooperating Processes, Threads, and Inter-process Communication.

UNIT-II

CPU Scheduling: Basic concepts, scheduling criteria, scheduling algorithms: FCFS, SJF, Round Robin & Queue Algorithms.

Deadlocks: Deadlock characterization, Methods for handling deadlocks, Banker's Algorithm.

UNIT-III

Memory Management: Logical versus Physical address space, Swapping, Contiguous allocation, Paging, Segmentation.

Virtual Memory: Demand paging, Performance of demand paging, Page replacement, Page replacement Algorithms, Thrashing.

UNIT-IV

File management: File system Structure, Allocation methods: Contiguous allocation, Linked allocation, Indexed allocation, Free space management: Bit vector, Linked list, Grouping, Counting.

Device Management: Disk structure, Disk scheduling: FCFS, SSTF, SCAN, C-SCAN, LOOK, C-LOOK.

COURSE OUTCOMES:

After the completion of the course, the students will be able to:

1. Create processes and threads.
2. Develop algorithms for process scheduling for a given specification of CPU utilization, Throughput, Turnaround Time, Waiting Time, and Response Time.
3. For a given specification of memory organization, develop the techniques for optimally allocating memory to processes by increasing memory utilization and for improving the access time.
4. Design and implement file management system.
5. For a given I/O device and OS (specify), develop the I/O management functions in OS as part of a uniform device abstraction by performing operations for synchronization between CPU and I/O controllers.

Text Books/ Reference Books:

1. Abraham Silberschatz, Peter B. Galvin, "Operating System Concepts", Addison Wesley publishing. Co., 7th. Ed., 2004.
2. Nutt Gary, "Operating Systems", Addison Wesley Publication, 2000.
3. Andrew S. Tannenbaum, "Modern Operating Systems", Pearson Education Asia, Second Edition, 2001.
4. William Stallings, "Operating Systems, Internals and Design Principles", 4th Edition, PH, 2001.
5. Ekta Walia, "Operating Systems Concepts", Khanna Publishes, New Delhi, 2002.

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

BCA-DS-204: DATA WAREHOUSE AND DATA MINING
BCA III Semester

| | | | |
|-------------------|---|---|-------|
| No. of Credits: 3 | | | |
| L | T | P | Total |
| 3 | 0 | 0 | 3 |

| | |
|-------------------|-----------|
| Sessional: | 25 Marks |
| Theory : | 75 Marks |
| Total : | 100 Marks |
| Duration of Exam: | 3 Hours |

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

COURSE OBJECTIVES:

1. Be familiar with mathematical foundations of data mining tools.
2. Understand and implement classical models and algorithms in data warehouses and data mining.
3. Characterize the kinds of patterns that can be discovered by association rule mining, classification and clustering.
4. Master data mining techniques in various applications like social, scientific and environmental context.
5. Develop skill in selecting the appropriate data mining algorithm for solving practical problems.

SYLLABUS

UNIT-I

Data warehousing, Definition, usage and trends. DBMS vs data warehouse, Data marts, Metadata, Multidimensional data mode, Data cubes, Schemas for Multidimensional Database: stars, snowflakes and fact constellations.

Data warehouse process & architecture, OLTP vs OLAP, ROLAP vs MOLAP, types of OLAP, servers, 3-Tier data warehouse architecture, distributed and virtual data warehouses, data warehouse manager.

UNIT II

Data warehouse implementation, computation of data cubes, modeling OLAP data, OLAP queries manager, data warehouse back end tools, complex aggregation at multiple granularities, tuning and testing of data warehouse.

Data mining definition & task, KDD versus data mining, data mining techniques, tools and applications.

UNIT-III

Data mining query languages, data specification, specifying knowledge, hierarchy specification, pattern presentation & visualization specification, data mining languages and standardization of data mining.

Data mining techniques: Association rules, Clustering techniques, Decision tree knowledge discovery through Neural Networks & Genetic Algorithm, Rough Sets, Support Vector Machines and Fuzzy techniques.

UNIT-IV

Mining complex data objects, Spatial databases, Multimedia databases, Time series and Sequence data mining Text Databases and mining Word Wide Web.

COURSE OUTCOMES:

1. The students will be able to understand basic concepts of data warehouse and data mining, techniques and applications
2. The students will be able to understand the techniques to extract patterns from transactional database using Association and Apriori algorithms
3. The students will be able to understand different clustering techniques and will be able to cluster data sets
4. The students will be able to classify data set into different classes and acquire the knowledge to make predications based on classified data
5. The students will be able to understand and analyze time series data
6. The students will be able to understand types of web mining viz. content, structure and usage mining. Web content mining in detail.
7. The students can extend the Graph mining algorithms to Web mining
8. Students will understand advance applications of data mining

Text Books/References:

1. Data Warehousing In the Real World; Sam Anahory& Dennis Murray; 1997, Pearson
2. Data Mining- Concepts & Techniques; Jiawei Han &MichelineKamber- 2001, Morgan Kaufmann.
3. Data Mining Techniques; ArunPujar; 2001, University Press; Hyderbad.
4. Data Mining; Pieter Adriaans&DolfZantinge; 1997, Pearson,
5. Data Warehousing, Data Miniing and OLTP; Alex Berson, 1997, Mc Graw Hill.
6. Data warehousing System; Mallach; 2000, Mc Graw Hill.
7. Building the Data Warehouse; W.H. Inman, 1996, John Wiley & Sons.
8. Developing the Data Warehouses; W.H Ionhman,C.Klelly, John Wiley & Sons.
9. Managng the Data Warehouses; W.H.Inman, C.L.Gassey, John Wiley & Sons.

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

BCA-17-204 (B): ENVIRONMENT SCIENCE
BCA III Semester

| | | |
|-------------------|-------------------|-------------|
| No. of Credits: 0 | Sessional: | NIL |
| L T P Total | Theory : | 50 Marks |
| 3 0 0 3 | Total : | 50 Marks |
| | Duration of Exam: | 3 Hours |

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 10 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 10 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

COURSE OBJECTIVES:

The prime objective of the course is to provide the students a detailed knowledge on the threats and challenges to the environment due to developmental activities. The students will be able to identify the natural resources and suitable methods for their conservation and sustainable development. The focus will be on awareness of the students about the importance of ecosystem and biodiversity for maintaining ecological balance. The students will learn about various attributes of pollution management and waste management practices. The course will also describe the social issues both rural and urban environment and environmental legislation.

SYLLABUS

UNIT-I

The Multidisciplinary Nature of Environmental Studies: Definition, scope and importance. Need for public awareness. Natural Resources: Renewable and Non-Renewable Resources: Natural resources and associated problems: Forest resources, Water resources, Mineral resources, Food resources, Energy resources, Land resources, Role of an individual in conservation of natural resources.

UNIT-II

Ecosystems: Concept of an ecosystem. Structure and function of an ecosystem, Producers, consumers and decomposers, Energy flow in the ecosystem, Ecological succession, Food chains, food webs and ecological pyramids. Introduction, types, characteristic features, structure and function of the following ecosystem: a) Forest ecosystem b) Grassland ecosystem c) Desert ecosystem d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).

Biodiversity and its Conservation: Introduction–Definition: genetic, species and ecosystem diversity, bio geographical classification of India, India as a mega-diversity nation, Hot-spots of biodiversity, threats to biodiversity, Conservation of biodiversity: in situ and ex-situ conservation of biodiversity.

UNIT-III

Environmental Pollution: Definition, Causes, effects and control measures of: Air pollution b) Water pollution c) Soil pollution d) Marine pollution e) Noise pollution f) Thermal pollution g) Nuclear hazards.

Solid waste Management: Causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution. Pollution case studies. Disaster management: floods, earthquake, cyclone and landslides.

UNIT-IV

Social Issues and the Environment: From Unsustainable to Sustainable Development Urban problems related to energy. Water conservation, rain water harvesting, watershed management. Resettlement and rehabilitation of people; its problems and concerns. Case studies.

Environmental ethics: Issues and possible solutions. Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies. Wasteland reclamation. Consumerism and waste products.

COURSE OUTCOMES:

After completion of this course, student will be able to

1. Understand core concepts and methods from ecological and physical sciences and their application in environmental problem solving.
2. Appreciate the ethical, cross cultural, and historical context of environmental issues and the links between human and natural systems.
3. Understand about the disaster management and various natural calamities.
4. Understand the usage of Renewable and Non Renewable Resources.
5. Understand the Environmental Ethics and his/her responsibility towards environment.

Text Books/ Reference Books:

1. Perspectives in Environmental Studies by A. Kaushik and C. P. Kaushik, New age international publishers.
2. Environmental Studies by Benny Joseph, Tata McGraw Hill Co, New Delhi.
3. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHI Learning Private Ltd. New Delhi.
4. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela 2008 PHI Learning Pvt Ltd.

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

BCA-DS-205: PYTHON PROGRAMMING
BCA III Semester

No. of Credits: 2
L T P Total
0 0 4 4

Sessional: 25 Marks
Practical : 50 Marks
Total : 75 Marks
Duration of Exam: 3 Hours

LIST OF PROGRAMS:

1. Write a Python program which accepts the radius of a circle from the user and compute the area.
2. Write a Python program to get the largest number from a list.
3. Write a Python program to display the first and last colors from the following list.
color_list = ["Red", "Green", "White", "Black"].
4. Write a Python program to calculate the sum of three given numbers, if the values are equal then return thrice of their sum.
5. Write a Python program to find whether a given number (accept from the user) is even or odd, print out an appropriate message to the user.
6. Write a Python script to add a key to a dictionary.
7. Write a Python script to check if a given key already exists in a dictionary.
8. Write a Python function to sum all the numbers in a list.
9. Write a Python script to make calculator using Tkinter.
10. Write a program to implement file handling in python.
11. Write a Python script to perform various functions on Images.

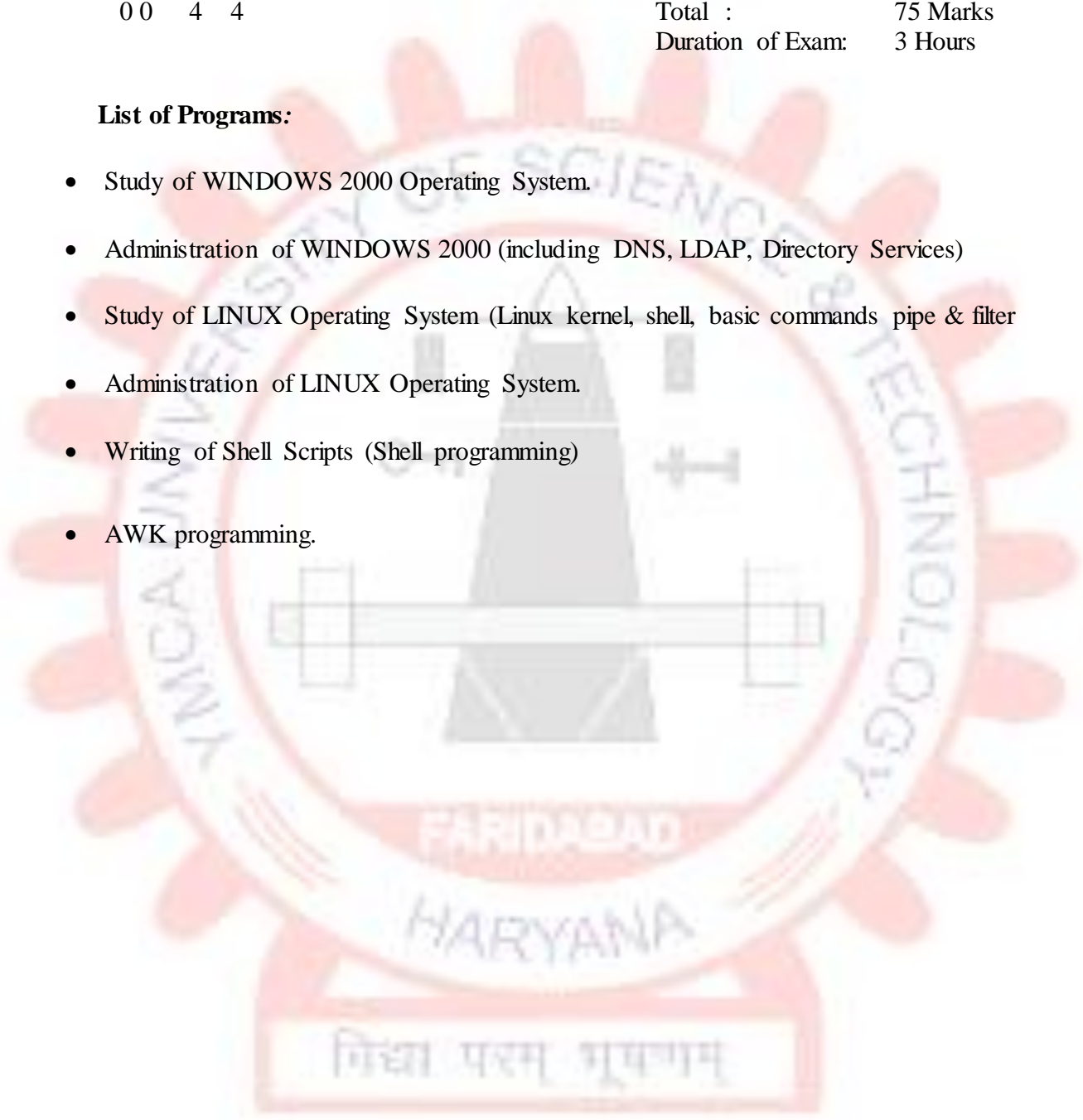
BCA-DS-206: OPERATING SYSTEMS LAB
BCA III Semester

No. of Credits: 2
L T P Total
0 0 4 4

Sessional: 25 Marks
Practical : 50 Marks
Total : 75 Marks
Duration of Exam: 3 Hours

List of Programs:

- Study of WINDOWS 2000 Operating System.
- Administration of WINDOWS 2000 (including DNS, LDAP, Directory Services)
- Study of LINUX Operating System (Linux kernel, shell, basic commands pipe & filter)
- Administration of LINUX Operating System.
- Writing of Shell Scripts (Shell programming)
- AWK programming.



YMCA University of Science and Technology, Faridabad
BCA Scheme of Studies / Examination
Semester – IV

| Course No. | Course Title | Schedule | | | | Sessional Marks/ Internal | Marks for End Term Examination | | Total Marks | Credits |
|-------------------|--|----------|---|---|-----------|------------------------------|--------------------------------|------------|----------------------------------|-----------|
| | | I | T | P | Total | | Theory | Practical | | |
| BCA-DS-211 | Artificial Intelligence | 3 | - | - | 3 | 25 | 75 | - | 100 | 3 |
| BCA-DS-212 | Programming in Java | 3 | - | - | 3 | 25 | 75 | - | 100 | 3 |
| BCA-DS-213 | Scientific R Programming | 3 | - | - | 3 | 25 | 75 | - | 100 | 3 |
| BCA-DS-214 | Computer Networks | 3 | - | - | 3 | 25 | 75 | - | 100 | 3 |
| As per list above | General Elective - II | 3 | - | - | 3 | 25 | 75 | - | 100 | 3 |
| As per list above | Audit Course (No credit just qualifying) | 2 | | | 2 | | 50 | | Marks will not be added in total | No Credit |
| BCA-DS-215 | Java Programming Lab | - | | 4 | 4 | 25 | - | 50 | 75 | 2 |
| BCA-DS-216 | R Programming Lab | - | | 4 | 4 | 25 | - | 50 | 75 | 2 |
| BCA-DS-217 | Presentation | - | | 2 | 2 | 25 | - | | 25 | 1 |
| BCA-DS-218 | Group Discussion | - | | 2 | 2 | 25 | - | | 25 | 1 |
| | Total | | | | 29 | 225 | 375 | 100 | 700 | 21 |

Note: Exam duration will be as under

(a) Theory exams will be of 3 hours duration

(b) Practical exams will be of 3 hours duration

BCA-DS-211 ARTIFICIAL INTELLIGENCE
BCA IV Semester

No. of Credits: 3
L T P Total
3 0 0 3

Sessional: 25 Marks
Theory : 75 Marks
Total : 100 Marks
Duration of Exam: 3 Hours

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

COURSE OBJECTIVES:

The aim of the course is to introduce to the field of Artificial Intelligence (AI) with emphasis on its use to solve real world problems for which solutions are difficult to express using the traditional algorithmic approach. It explores the essential theory behind methodologies for developing systems that demonstrate intelligent behavior including dealing with uncertainty, learning from experience and following problem solving strategies found in nature.

SYLLABUS

UNIT - I

Overview of A.I: Introduction to AI, Importance of AI, AI and its related field, AI techniques, Criteria for success.

Problems, problem space and search: Defining the problem as a state space search, Production system and its characteristics, Issues in the design of the search problem.

Heuristic search techniques : Generate and test, hill climbing, best first search technique, problem reduction, constraint satisfaction

UNIT - II

Knowledge Representation: Definition and importance of knowledge, Knowledge representation, and various approaches used in knowledge representation, Issues in knowledge representation, Knowledge representation using rules, rules based deduction system, resolution.

Using Predicate Logic: Representing Simple Facts in logic, representing instances and is-a relationship, Computable function and predicate.

UNIT - III

Planning: Planning in Situational Calculus, representation for planning, partial order planning algorithm

Learning: Introduction learning, Rote learning, learning by taking advice, learning in problem solving, learning from example-induction, Explanation based learning.

UNIT – IV

Expert System: Introduction, representing using domain specific knowledge, Agents and its types.

Natural language processing: Introduction syntactic processing, Semantic processing, Discourse and pragmatic processing.

COURSE OUTCOMES:

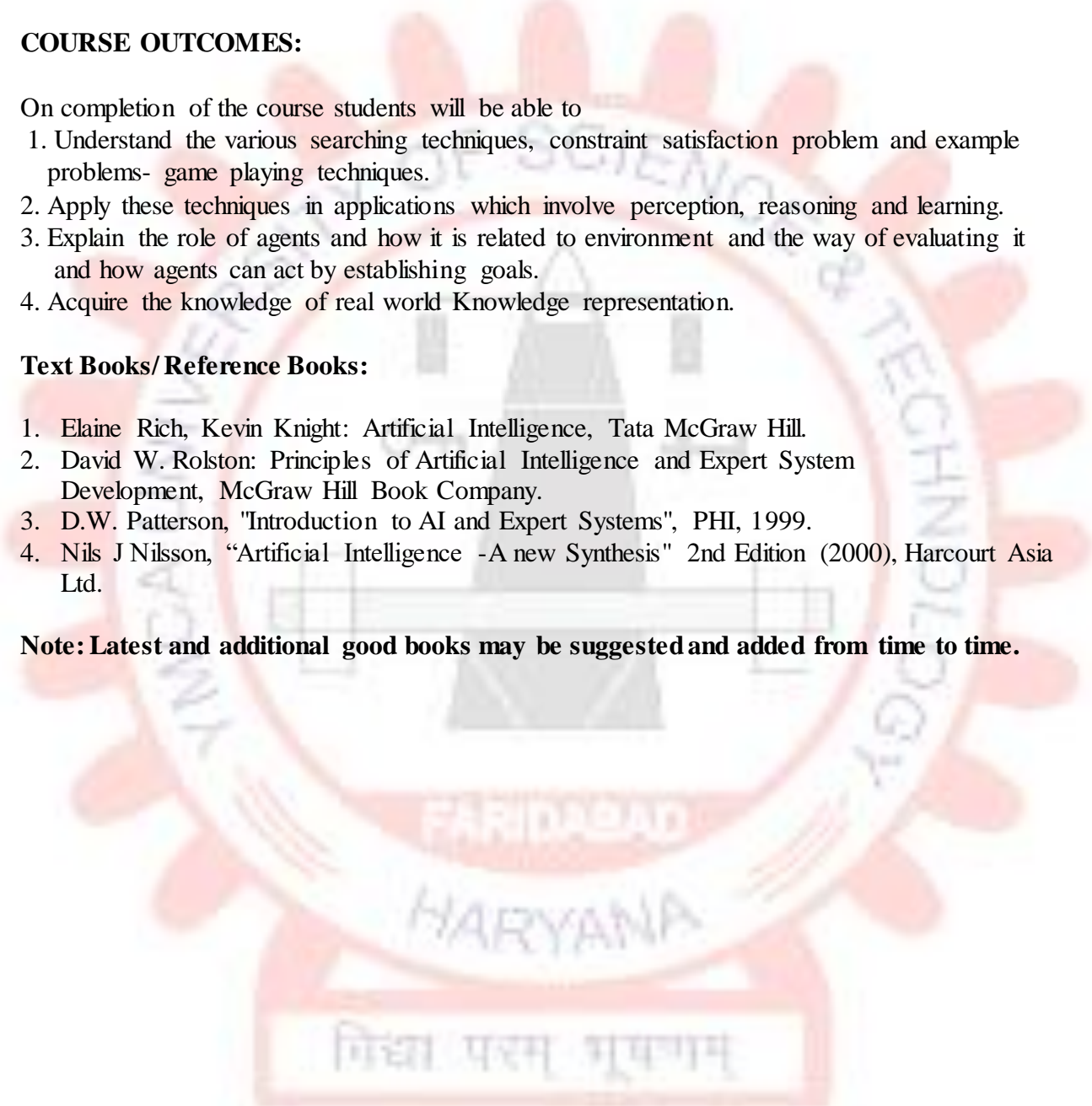
On completion of the course students will be able to

1. Understand the various searching techniques, constraint satisfaction problem and example problems- game playing techniques.
2. Apply these techniques in applications which involve perception, reasoning and learning.
3. Explain the role of agents and how it is related to environment and the way of evaluating it and how agents can act by establishing goals.
4. Acquire the knowledge of real world Knowledge representation.

Text Books/ Reference Books:

1. Elaine Rich, Kevin Knight: Artificial Intelligence, Tata McGraw Hill.
2. David W. Rolston: Principles of Artificial Intelligence and Expert System Development, McGraw Hill Book Company.
3. D.W. Patterson, "Introduction to AI and Expert Systems", PHI, 1999.
4. Nils J Nilsson, "Artificial Intelligence -A new Synthesis" 2nd Edition (2000), Harcourt Asia Ltd.

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



BCA-DS-212: PROGRAMMING IN JAVA
BCA IV Semester

| | | |
|-------------------|---|-------|
| No. of Credits: 3 | | |
| L T | P | Total |
| 3 0 | 0 | 3 |

| | |
|-------------------|-----------|
| Sessional: | 25 Marks |
| Theory : | 75 Marks |
| Total : | 100 Marks |
| Duration of Exam: | 3 Hours |

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

COURSE OBJECTIVES:

The course will introduce standard tools and techniques for software development, using object oriented approach, use of a version control system, an automated build process, an appropriate framework for automated unit and integration tests.

SYLLABUS

UNIT - I

Object Oriented Methodology-1: Paradigms of Programming Languages, Evolution of OO Methodology, Basic Concepts of OO Approach, Comparison of Object Oriented and Procedure, Oriented Approaches, Benefits of OOPs, Introduction to Common OO Language, Applications of OOPs,

Object Oriented Methodology-2: Classes and Objects, Abstraction and Encapsulation, Inheritance, Method Overriding and Polymorphism.

UNIT – II

Java Language Basics: Introduction to Java, Basic Features, Java Virtual Machine Concepts, Primitive Data Type and Variables, Java Operators, Expressions, Statements and Arrays.

Object Oriented Concepts: Class and Objects--Class Fundamentals, Creating objects, Assigning object reference variables; Introducing Methods, Static methods, Constructors, Overloading constructors; This Keyword; Using Objects as Parameters, Argument passing, Returning objects, Method overloading, Garbage Collection, The Finalize () Method.

Inheritance and Polymorphism: Inheritance Basics, Access Control, Multilevel Inheritance, Method Overriding, Abstract Classes, Polymorphism, Final Keyword

UNIT - III

Packages: Defining Package, CLASSPATH, Package naming, Accessibility of Packages, using Package Members.

Interfaces: Implementing Interfaces, Interface and Abstract Classes, Extends and Implements together. Exceptions Handling: Exception, Handling of Exception, using try-catch, Catching Multiple Exceptions, using finally clause, Types of Exceptions, Throwing Exceptions, and Writing Exception Subclasses.

UNIT - IV

Multithreading: Introduction, The Main Thread, Java Thread Model, Thread Priorities, Synchronization in Java, Interthread Communication.

I/O in Java: I/O Basics, Streams and Stream Classes, The Predefined Streams, reading from, and Writing to, Console, Reading and Writing Files, The Transient and Volatile Modifiers, Using Instance of Native Methods.

Strings and characters: Fundamentals of Characters and Strings, the String Class, String Operations, Data Conversion using Value Of () Methods, String Buffer Class and Methods.

COURSE OUTCOMES:

After taking the course, students will be able to:

1. Specify simple abstract data types and design implementations, using abstraction functions to document them.
2. Recognize features of object-oriented design such as encapsulation, polymorphism, inheritance, and composition of systems based on object identity.
3. Name and apply some common object-oriented design patterns and give examples of their use.
4. Design applications with an event-driven graphical user interface.

Text Books/ Reference Books:

1. E Balagurusamy: Programming in Java.
2. Herbert Schildt: The Complete Reference JAVA, TMH Publication.
3. Beginning JAVA, Ivor Horton, WROX Public.
4. Stephen Potts: JAVA 2 UNLEASHED, Tech Media Publications.
5. Patrick Naughton and Herbertz Schildt, "Java-2 The Complete Reference", 1999, TMH.

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

BCA-DS-213 SCIENTIFIC R PROGRAMMING
BCA IV SEMESTER

No. of Credits: 3
L T P Total
3 0 0 3

Sessional: 25 Marks
Theory : 75 Marks
Total : 100 Marks
Duration of Exam: 3 Hours

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

COURSE OBJECTIVES:

1. an introduction to resources for continuing to develop their R skill set.
2. the ability to perform basic data transformation, analysis and visualisation with R.
3. a framework for applying R to their own domain-specific problems
4. Familiarize participants with R syntax
5. Understand the concepts of objects and assignment
6. Understand the concepts of vector and data type

SYLLABUS

UNIT -1: Introduction to R

What is R, History of R, Installing R, Package installation, choosing IDE, first program, help in R, Some information about R commands, special values, Objects, Functions, Simple Manipulations: Vectors and numbers, Matrices and arrays, Factors, List, data Frames.

UNIT-2: Programming using R

Function Creation, scripts, Logical operators, Conditional Statements, Loops in R, switch Statement. List and Data Frames: Creating a list, Common List operations, Recursive list, creating a datagram, common data frame operations, using lapply () and sapply () functions.

Object oriented programming with R, S3 Classes, S4 Classes, Reference Classes

UNIT-3: Data handling in R

Saving and loading R data, import and export to CSV files, import and export via ODBC, Debugging Techniques in R, Statistical Graphics: Base Graphics, ggplot2

UNIT-4: Mathematical and statistical Concept using R

Maximum, Minimum, Frequency distribution, Measures of central tendency, Hypothesis testing, Correlation, Different statistical distribution.

COURSE OUTCOMES:

At the end of this course, each student will be able to:

1. Understand basic concepts such as data type and index and use them in their work.
2. Demonstrate use of basic functions.
3. Conceptualize and create loops to solve different types of problems.
4. Create their own customized functions.
5. Construct tables and figures for descriptive statistics.
6. Learn to understand new data sets and functions by themselves.

Text Books/Reference Books:

1. Sandeep Rakshit, R for Beginners, McGraw-Hill Education
2. Hadley Wickham, Garrett Grolmund, Hands-On Programming with R: Write Your Own Functions and Simulations.
3. Tilman M. Davies, The Book of R: A first course in Programming and Statistics.
4. Jared P. Lander, R for Everyone: Advanced Analytics and Graphics, Pearson
5. Christian Heumann, Michael Schomaker and Shalabh, Introduction to Statistics and Data Analysis - With Exercises, Solutions and Applications in R, Springer, 2016
6. By Alain F. Zuur, Elena N. Ieno, Erik H.W.G. Meesters, A Beginner's Guide to R (Use R) Springer 2009

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



BCA-DS-214: COMPUTER NETWORKS
BCA IV Semester

| | | | |
|-------------------|---|---|-------|
| No. of Credits: 3 | | | |
| L | T | P | Total |
| 3 | 0 | 0 | 3 |

| | |
|-------------------|-----------|
| Sessional: | 25 Marks |
| Theory : | 75 Marks |
| Total : | 100 Marks |
| Duration of Exam: | 3 Hours |

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

COURSE OBJECTIVES:

1. To develop an understanding of modern network architectures from a design and performance perspective.
2. To introduce the student to the major concepts involved in wide-area networks (WANs), local area networks (LANs) and Wireless LANs (WLANs).
3. To provide an opportunity to do network programming
4. To provide a WLAN measurement ideas.

SYLLABUS

UNIT: I

OSI Reference Model and Network Architecture: Introduction to Computer Networks, Example networks ARPANET, Internet, Private Networks, Network Topologies: Bus-, Star-, Ring-, Hybrid -, Tree -, Complete -, Irregular –Topology; Types of Networks: Local Area Networks, Metropolitan Area Networks, Wide Area Networks; Layering architecture of networks, OSI model, Functions of each layer, Services and Protocols of each layer

UNIT-II

TCP/IP: Introduction, History of TCP/IP, Layers of TCP/IP, Protocols, Internet Protocol, Transmission Control Protocol, User Datagram Protocol, IP Addressing, IP address classes, Subnet Addressing, Internet Control Protocols, ARP, RARP, ICMP, Application Layer, Domain Name System, Email – SMTP, POP, IMAP; FTP, NNTP, HTTP, Overview of IP version 6.

UNIT-III

Local Area Networks: Introduction to LANs, Features of LANs, Components of LANs, Usage of LANs, LAN Standards, IEEE 802 standards, Channel Access Methods, Aloha, CSMA, CSMA/CD, Token Passing, Ethernet, Layer 2 & 3 switching, Fast Ethernet and Gigabit Ethernet, Token Ring, LAN interconnecting devices: Hubs, Switches, Bridges, Routers, Gateways.

Wide Area Networks: Introduction of WANs, Routing, Congestion Control, WAN Technologies, Distributed Queue Dual Bus (DQDB), Synchronous Digital Hierarchy (SDH)/ Synchronous Optical Network (SONET), Asynchronous Transfer Mode (ATM), Frame Relay, Wireless Links.

UNIT-IV

Introduction to Network Management: Remote Monitoring Techniques: Polling, Traps, Performance Management, Class of Service, Quality of Service, Security management, Firewalls, VLANs, Proxy Servers, Introduction to Network Operating Systems: Client-Server infrastructure, Windows NT/2000.

COURSE OUTCOMES

After taking the course, students will be able to:

1. Explain the functions of the different layer of the OSI Protocol.
2. Draw the functional block diagram of wide-area networks (WANs), local area networks (LANs) and Wireless LANs (WLANs) describe the function of each block.
3. For a given requirement (small scale) of wide-area networks (WANs), local area networks (LANs) and Wireless LANs (WLANs) design it based on the market available component
4. For a given problem related TCP/IP protocol developed the network programming.
5. Configure DNS DDNS, TELNET, EMAIL, File Transfer Protocol (FTP), WWW, HTTP, SNMP, Bluetooth, Firewalls using open source available software and tools.

Text Books/ Reference books:

1. Computer Networks (3rd edition), Tanenbaum Andrew S., International edition, 1996.
2. Data Communications, Computer Networks and Open Systems (4th edition), Halsall Fred, 2000, Addison Wesley, Low Price Edition.
3. Business Data Communications, Fitzgerald Jerry.
4. Computer Networks – A System Approach, Larry L. Peterson & Bruce S. Davie, 2nd Edition
5. Computer Networking – ED Tittel , 2002, T.M.H

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

BCA-DS-215: JAVA Programming LAB
BCA IV Semester

| | | | |
|-------------------|---|---|-------|
| No. of Credits: 2 | | | |
| L | T | P | Total |
| 0 | 0 | 4 | 4 |

| | |
|-------------------|----------|
| Sessional: | 25 Marks |
| Practical: | 50 Marks |
| Total : | 75 Marks |
| Duration of Exam: | 3 Hours |

List of Programs:

1. Basics of Java: Classes and objects (Data types, Operators, Array, String)

- Write a Java program that prints all real solutions to the quadratic equation $ax^2 + bx + c = 0$. Read in a, b, c and use the quadratic formula. If the discriminant $b^2 - 4ac$ is negative, display a message stating that there are no real solutions.
- Write a Java program that prompts the user for an integer and then prints out all prime numbers up to that integer.
- Write a Java program to multiply two given matrices.
- Write a Java Program that reads a line of integers, and then displays each integer, and the sum of all the integers (Use StringTokenizer class of java.util)
- Write a Java program that checks whether a given string is a palindrome or not. Ex: MADAM is a palindrome.
- Write a Java program for sorting a given list of names in ascending order.
- Write a Java program to make frequency count of words in a given text.

2. Object Oriented Concepts:

Programs on Inheritance, Method Overloading and Overriding, Abstract class and methods, Packages and interface (at least 7 programs)

3. Advanced Concepts:

Programs on Exception and Exception handling, Multithreading, (at least 4 programs).

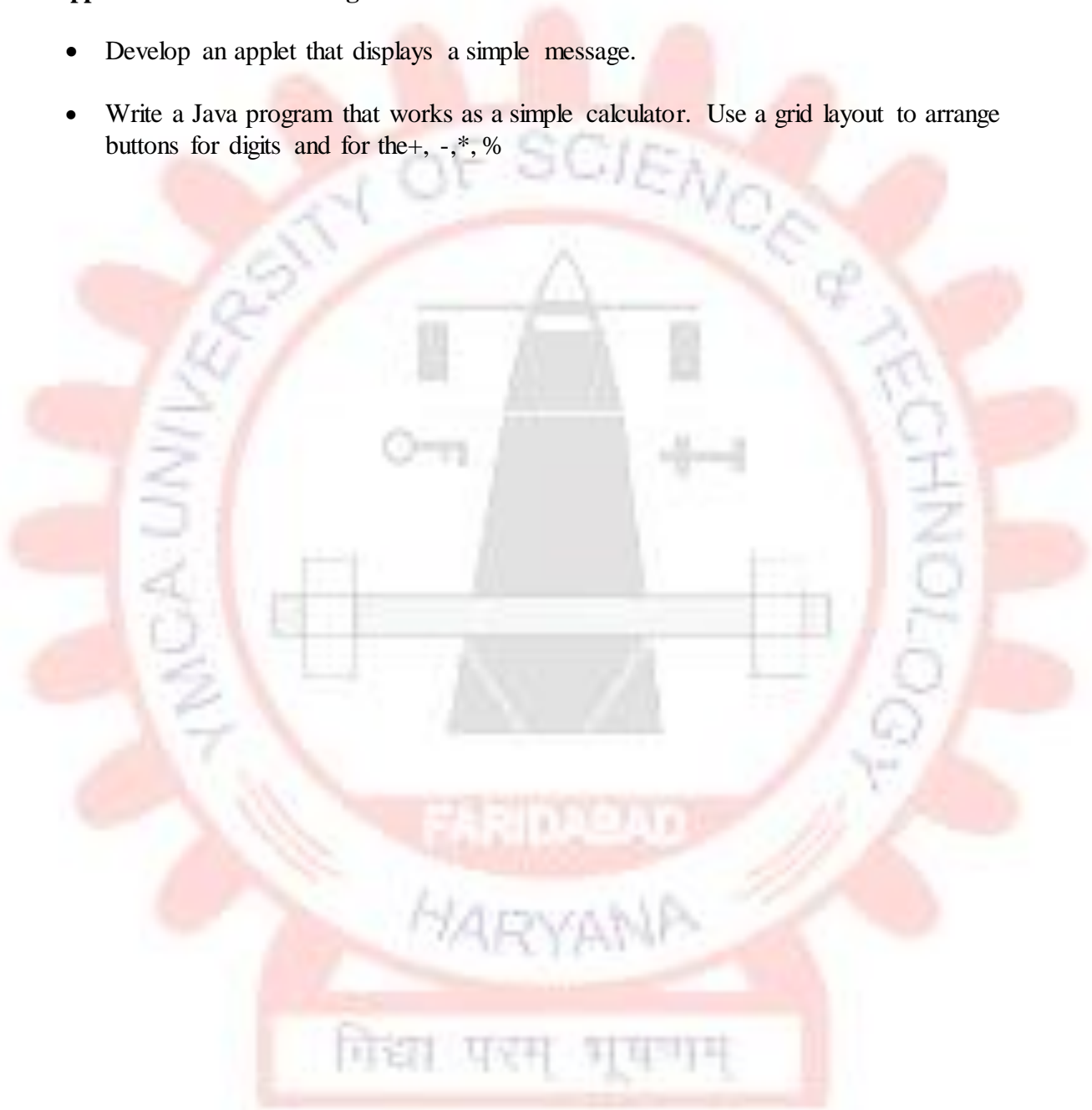
4. File Handling:

- Write a Java program that reads a file name from the user, then displays information about whether the file exists, whether the file is readable, whether the file is writable, the type of file and the length of the file in bytes.

- Write a Java program that reads a file and displays the file on the screen, with a line number before each line.
- Write a Java program that displays the number of characters, lines and words in a text file.

5. Applet and Event Handling:

- Develop an applet that displays a simple message.
- Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for digits and for the +, -, *, %



BCA-DS-216: R Programming LAB
BCA IV Semester

| | | |
|-------------------|---|-------|
| No. of Credits: 2 | | |
| L T | P | Total |
| 0 0 | 4 | 4 |

| | |
|-------------------|----------|
| Sessional: | 25 Marks |
| Practical: | 50 Marks |
| Total : | 75 Marks |
| Duration of Exam: | 3 Hours |

List of Programs:

1. Programs related to the basics:

- 1.1. Write a program in R to take input from the user (name and age) and display the values. Also print the version of R installation.
- 1.2. Write a program in R to create a sequence of numbers from 20 to 50 and find the mean of numbers from 20 to 60 and sum of numbers from 51 to 91.
- 1.3. Write an R program to create a vector which contains 10 random integer values between -50 and +50.
- 1.4. Write a program in R to find the factors of a given number.
- 1.5. Write a program in R to find the maximum and the minimum value of a given vector.

2. Programs related to the array:

- 2.1. Write a program in R to convert a given matrix to a 1 dimensional array.
- 2.2. Write a program in R to create an array of two 3x3 matrices each with 3 rows and 3 columns from two given two vectors.
- 2.3. Write a program in R to create an 3 dimensional array of 24 elements using the dim() function.

3. Programs related to the Data Frame:

- 3.1. Write a program in R to create an empty data frame.
- 3.2. Write a program in R to create a data frame from four given vectors.
- 3.3. Write a program in R to get the structure of a given data frame.
- 3.4. Write a program in R to get the statistical summary and nature of the data of a given data frame.
- 3.5. Write a program in R to extract first two rows from a given data frame.
- 3.6. Write a program in R to add new row(s) and column(s) to an existing data frame.

4. Programs related to the matrix:

- 4.1. Write a program in R to create a matrix taking a given vector of numbers as input. Display the matrix.
- 4.2. Write a program in R to access the element at 3rd column and 2nd row, only the 3rd row and only the 4th column of a given matrix.
- 4.3. Write a program in R to create two 2x3 matrix and add, subtract, multiply and divide the matrixes.

5. Programs related to the vectors:

- 5.1. Write a program in R to create a vector of a specified type and length. Create vector of numeric, complex, logical and character types of length 6.
- 5.2. Write a program in R to add, multiply, divide two vectors of integers type and length 3.

6. Programs related to the List:

- 6.1. Write a program in R to create a list containing strings, numbers, vectors and a logical value.
- 6.2. Write a program in R to create a list containing a vector, a matrix and a list and give names to the elements in the list. Access the first and second element of the list.
- 6.3. Write a program in R to select second element of a given nested list.

7. Write a program to Import and export file through ODBC.



YMCA University of Science and Technology, Faridabad
BCA Scheme of Studies / Examination
Semester – V

| Course No. | Course Title | Schedule | | | | Sessional Marks/ Internal | Marks for End Term Examination | | Total Marks | Credits |
|-------------------|----------------------------------|----------|---|---|-----------|---------------------------|--------------------------------|------------|-------------|-----------|
| | | L | T | P | Total | | Theory | Practical | | |
| BCA-DS-301 | Big Data - 1 | 3 | | - | 3 | 25 | 75 | - | 100 | 3 |
| BCA-DS-302 | Machine Learning - 1 | 3 | | - | 3 | 25 | 75 | - | 100 | 3 |
| BCA-DS-303 | Organizational Behavior | 3 | | - | 3 | 25 | 75 | - | 100 | 3 |
| BCA-DS-304 | Intellectual Property and Rights | 3 | | - | 3 | 25 | 75 | - | 100 | 3 |
| As per list above | General Elective - III | 3 | | - | 3 | 25 | 75 | - | 100 | 3 |
| BCA-DS-305 | Big Data – I Lab | - | | 4 | 4 | 25 | - | 50 | 75 | 2 |
| BCA-DS-306 | Machine Learning – I Lab | - | | 4 | 4 | 25 | - | 50 | 75 | 2 |
| BCA-DS-307 | Presentation | - | | 2 | 2 | 25 | - | | 25 | 1 |
| BCA-DS-308 | Group Discussion | - | | 2 | 2 | 25 | - | | 25 | 1 |
| BCA-DT-301 | Industrial Training - II | | | | | 50 | | 50 | 100 | 3 |
| | Total | | | | 27 | 275 | 375 | 150 | 800 | 24 |

Note: Exam duration will be as under

- (a) Theory exams will be of 3 hours duration
(b) Practical exams will be of 3 hours duration

BCA-DS-301: BIG DATA -1
BCA V Semester

| | | |
|-------------------|---|-------|
| No. of Credits: 3 | | |
| L T | P | Total |
| 3 0 | 0 | 3 |

| | |
|-------------------|-----------|
| Sessional: | 25 Marks |
| Theory : | 75 Marks |
| Total : | 100 Marks |
| Duration of Exam: | 3 Hours |

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

COURSE OBJECTIVES:

1. To Understand and Target Customers
2. To Take Strategic Decision
3. Cost Optimization
4. To Improve Customer Experiences

SYLLABUS

UNIT-I

Big Data - Beyond the Hype: Introduction, Why Big Data, History of Big Data, Characteristics of Big Data - The Four V's, advantages and disadvantages, Big Data Management approach, Technology challenges for Big Data, Big Data Architecture, Applications of Big Data

UNIT - II

Data Structures in Java: Linked List, Stacks, Queues, Sets, Maps, Generics: Generic classes and Type parameters, Implementing Generic Types, Generic methods, Wrapper classes, Concept of serialization.

UNIT – III

Working with Big Data: Hadoop framework, Hadoop Distributed File System (HDFS), Comparison between HDFS and Google File system, Building Blocks of Hadoop (Namenode, Datanode, Secondary Namenode, Job Tracker, Task Tracker), Introducing and configuring Hadoop cluster (Local, Pseudo-distributed mode, Fully distributed node), YARN architecture.

UNIT – IV

MapReduce: Overview, MapReduce programming: Driver code, Mapper Code, Reducer code, Combiner, Partitioner, Sorting, Shuffling, MapReduce Jobs Execution, Hadoop Streaming, Introduction to Hive and Pig.

COURSE OUTCOMES:

After completion of this course, students will be able to

1. Optimize business decisions and create competitive advantage with Big Data analytics

2. Understand Java concepts required for developing map reduce programs
3. Derive business benefit from unstructured data
4. Learn the architectural concepts of Hadoop and introducing map reduce paradigm

TextBooks/Reference Books

1. Hadoop: The Definitive Guide by Tom White, 3rd Edition, O'reilly
2. Hadoop in Practice by Alex Holmes, MANNING Publ.
3. Seema Acharya (Author), SubhashiniChellappan, Big Data and Analytics (2015). Wiley Publication.
4. Big Data, Black Book: Covers Hadoop 2, MapReduce, Hive, YARN, Pig, R and Data Visualization (2016), DT Editorial Services

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



BCA-DS-302: MACHINE LEARNING-1
BCA V Semester

| | | |
|-------------------|---|-------|
| No. of Credits: 3 | | |
| L T | P | Total |
| 3 0 | 0 | 3 |

| | |
|-------------------|-----------|
| Sessional: | 25 Marks |
| Theory : | 75 Marks |
| Total : | 100 Marks |
| Duration of Exam: | 3 Hours |

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

COURSE OBJECTIVES:

The purpose of machine learning is to discover patterns in your data and then make predictions based on those often, complex patterns to answer business questions, and help solve problems.

SYLLABUS

UNIT I

INTRODUCTION TO MACHINE LEARNING: Machine Learning basic concepts, Perspectives and Issues in Machine Learning, Types of Machine Learning, supervised – unsupervised – reinforcement, Data Representations: Data representation, Numerical representation, Graph representation, Applications of Machine Learning.

UNIT II

SUPERVISED LEARNING: Nearest-Neighbours, Decision Trees, Naïve Bayes, Linear classification, univariate linear regression, multivariate linear regression, regularized regression, Logistic regression, Support Vector Machines, Nonlinearity and Kernel Methods.

UNIT III

UNSUPERVISED LEARNING: Clustering: K-means, Kernel K-means, Cluster analysis, Vector Quantization, Self-Organizing Feature Map, Association Rule Mining: Apriority algorithms

UNIT IV

TECHNIQUES AND APPLICATIONS: Scalable Machine Learning, Introduction to Bayesian Learning and Inference, Recent trends in various learning techniques of machine learning and classification methods.

COURSE OUTCOMES:

After completion of course, students would be able to:

1. Extract features that can be used for a particular machine learning approach in various IOT applications.
2. To compare and contrast pros and cons of various machine learning techniques and to get an insight of when to apply a particular machine learning approach.

2. To mathematically analyze various machine learning approaches and paradigms.

Text Books/Reference Books

1. Kevin Murphy, "Machine Learning: A Probabilistic Perspective", MIT Press, 2012
2. Trevor Hastie, Robert Tibshirani, Jerome Friedman, "The Elements of Statistical Learning", Springer 2009 (freely available online)
3. Ethem Alpaydin, "Introduction to Machine Learning 3e (Adaptive Computation and Machine Learning Series)", Third Edition, MIT Press, 2014
4. Tom M Mitchell, "Machine Learning", First Edition, McGraw Hill Education.

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



BCA-DS-303 ORGANIZATIONAL BEHAVIOUR
B.C.A V SEMESTER

| | | | | | |
|-------------------|---|---|------------|-------------------|-----------|
| No. of Credits: 3 | | | Sessional: | 25 Marks | |
| L | T | P | Total | Theory : | 75 Marks |
| 3 | 0 | 0 | 3 | Total : | 100 Marks |
| | | | | Duration of Exam: | 3 Hours |

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

COURSE OBJECTIVES:

The objective of this course is to expose the students to basic concepts of management and provide insights necessary to understand behavioral processes at individual, team and organizational level.

UNIT-1

Introduction to management: concept, nature; evolution of management thoughts –traditional, behavioral, system, contingency and quality viewpoints; Managerial levels, skills and roles in an organization; Functions of Management: Planning, Organizing, Directing, Controlling, Problem solving and Decision making; Management control; managerial ethics and social responsibility; Management Information System (MIS).

UNIT-2

Fundamentals of Organizational Behavior: Concept, evolution, importance and relationship with other Fields; Contemporary challenges of OB; Individual Processes and Behavior – differences, Personality concept, determinant, theories and applications; Values, Attitudes and Emotions, Perception- concept, process and applications, Learning and Reinforcement; Motivation: concept, theories and applications; Stress management.

UNIT-3

Interpersonal Processes- Work teams and groups- Definition of Group, Stages of group development, Group cohesiveness, Types of groups, Group processes and Decision Making; Team Building; Conflict- concept, sources, types, management of conflict; Power and Political Behavior; Leadership: concept, function and styles.

UNIT-4

Organizational Processes and structure: organizational design: various organizational structures and their effect on human behavior; Organizational climate; Organizational culture;

Organizational change: Concept, Nature, Resistance to Change, Change Management, Implementing Change and Organizational Development.

COURSE OUTCOMES:

1. The students learn how to influence the human behavior.
2. Students will be able to understand behavioral dynamics in organizations.
3. Students will be able to apply managerial concepts in practical life.
4. Students will be able to understand organizational culture and change.

Text Books/Reference Books:

1. Robbins, S.P. and Decenzo, D.A. Fundamentals of Management, Pearson Education Asia, New Delhi.
2. Stoner, J et. al, Management, New Delhi, PHI, New Delhi
3. Satya Raju, Management – Text & Cases, PHI, New Delhi
4. Kavita Singh, Organisational Behaviour: Text and cases. New Delhi: Pearson Education.
5. Pareek, Udai, Understanding Organisational Behaviour, Oxford University Press, New Delhi
6. Robbins, S.P. & Judge, T.A., Organisational Behaviour, Prentice Hall of India, New Delhi

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



BCA-DS-304: INTELLECTUAL PROPERTY AND RIGHTS
B.C.A V SEMESTER

| | | | | |
|-------------------|---|---|-------------------|-----------|
| No. of Credits: 3 | | | Sessional: | 25 Marks |
| L | T | P | Theory : | 75 Marks |
| 3 | 0 | 3 | Total : | 100 Marks |
| | | | Duration of Exam: | 3 Hours |

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

COURSE OBJECTIVES:

This course is designed for students to have knowledge of all rights resulting from intellectual activity in the industrial, scientific, literary, or artistic fields, industrial designs, scientific discoveries, protection against unfair competition, literary, artistic, and scientific works, Inventions in all fields of human endeavor, trademarks, service marks, commercial names, and designations.

SYLLABUS

UNIT - I

Introduction to Intellectual Property: Concept of Intellectual Property, Kinds of Intellectual Property, Economic Importance of Intellectual Property.

Indian Theory on Private Property: Constitutional Aspects of Property, Constitutional Protection of Property and Intellectual Property, Economic Development and Intellectual Property Rights Protection.

UNIT - II

Introduction to Patents: Overview, Historical Development, Concepts: Novelty, Utility.

Patentable Subject-matter: Patent Act, 1970- Amendments of 1999, 2000, 2002 and 2005, Pharmaceutical Products and Process and Patent, Protection, Software Patents, Business Method, Protection of Plant Varieties and Farmers' Rights Act, 2001, Patenting of Micro-organism.

UNIT - III

Procedure of Obtaining of Patents: Concepts of a Patent Application, Specification: Provisional, Complete, Disclosure Aspects, Claims: Principal, Dependant, Omnibus, Examination of Application, Opposition of Application, Sealing of Patents.

Working of Patents: Compulsory License: Commercialization of Inventions: License Terms of License Agreement, Assignments of Patents, Revocation of Patents.

UNIT – IV

Infringement: What is Infringement? How is Infringement determined? Who is an Infringer? Direct, Contributory and Induced, Defences of Infringement: 5.2.1 Research Exemption, Invalidity, Misuse, Failure to mark, Laches and Estoppel and first sale doctrine.

COURSE OUTCOMES:

After the completion of course, students will be able to

1. Understand the concept of intellectual property rights.
2. Develop procedural knowledge to Legal System and solving the problem of intellectual property rights.
3. Understand the professional program in Company Secretaryship, Law, Business (M.B.A.), International Affairs, Public Administration and other fields.
4. Understand the concept of establishment of Legal Consultancy and Service provider.

Text Books/ Reference Books:

1. W.R. Cornish, Intellectual Property, Sweet & Maxwell, London (2000)
2. P. Narayana, Patent Law, Wadhwa Publication
3. Merges, Patent Law and Policy: Cases and Materials, 1996
4. Brian C. Reid, A Practical Guide to Patent Law, 2nd Edition, 1993
5. Brinkhof (Edited), Patent Cases, Wolters Kluwer.
6. Prof. Willem Hoyng & Frank Eijssvogels, Global Patent Litigation, Strategy and Practice, Wolters Kluwer.
7. Gregory Stobbs, Software Patents Worldwide, Wolters Kluwer.
8. Feroz Ali Khader, The Law of Patents- With a special focus on Pharmaceuticals in India, Lexis Nexis Butterworths Wadhwa, Nagpur.
9. Sookman, Computer Law, 1996
10. N.S. Gopalakrishnan & T.G. Agitha, Principles of Intellectual Property (2009). Eastern Book Company, Lucknow.

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

BCA-DS-305: BIG DATA -I LAB
BCA V Semester

No. of Credits: 2
L T P Total
0 0 4 4

Sessional: 25 Marks
Practical: 50 Marks
Total : 75 Marks
Duration of Exam: 3 Hours

List of Programs:

1. Installation of Hadoop.
2. To perform HDFS Shell basic operations.
3. Write a program to cut, copy and paste the file or directory from HDFS to the local file system.
4. Write a program to get status of a file in the HDFS.
5. Write a program that using Hadoop APIs to do the “ls” operation for listing all files in HDFS.
6. Implementation of MapReducer as follows (Running the WordCount program): -

Modify the given example: WordCount

- Main function – add an argument to allow user to assign the number of Reducers.
- Mapper – Change WordCount to CharacterCount (except “ ”)
- Reducer – Output those characters that occur ≥ 20 times

After finishing part I, SORT the output of part I according to the number of times using the mapreduce programming model.

6. Java Programming examples on Stack, Queue and Linked List
7. Implementation of wrapper classes in java
8. Implementation of Java objects using the concept of serialization.

BCA-DS-306: MACHINE LEARNING- I LAB
BCA V Semester

| | | | |
|-------------------|---|---|-------|
| No. of Credits: 2 | | | |
| L | T | P | Total |
| 0 | 0 | 4 | 4 |

| | |
|-------------------|----------|
| Sessional: | 25 Marks |
| Practical: | 50 Marks |
| Total : | 75 Marks |
| Duration of Exam: | 3 Hours |

List of Programs: -

1. Write a program to implement k-Nearest Neighbour algorithm to classify the iris data set.
2. Print both correct and wrong predictions.
3. Write a program to implement feature scaling & feature standardization of pre-processing & compare its result with KNN algorithm.
4. Write a program to demonstrate the working of the decision tree based ID3 algorithm.
5. Use an appropriate data set for building the decision tree and apply this knowledge to classify a new sample.
6. Estimate the accuracy of decision classifier on cancer dataset using 5-fold cross-validation.
7. Write a program to implement Support vector machine algorithm on sample dataset.
8. Write a program to implement Simple Linear Regression on a sample dataset.
9. Write a program to implement Multi-Variate Linear Regression on a sample dataset.
10. Write a program to implement the naïve Bayesian classifier for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier, considering few test data sets
11. Write a program to construct a Bayesian network considering medical data like heart patient or diabetes dataset.
12. Using a dataset with known class labels compare the labeling error of the K-means algorithm. Measure the error by assigning a class label to each example. Assume that the number of clusters is known. Write a program to implement k-Nearest Neighbour algorithm to classify the iris data set.
13. Print both correct and wrong predictions.
14. Write a program to implement feature scaling & feature standardization of pre-processing & compare its result with KNN algorithm.

15. Write a program to demonstrate the working of the decision tree based ID3 algorithm.
16. Use an appropriate data set for building the decision tree and apply this knowledge to classify a new sample.
17. Estimate the accuracy of decision classifier on cancer dataset using 5-fold cross-validation.
18. Write a program to implement Support vector machine algorithm on sample dataset.
19. Write a program to implement Simple Linear Regression on a sample dataset.
20. Write a program to implement Multi-Variate Linear Regression on a sample dataset.
21. Write a program to implement the naïve Bayesian classifier for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier, considering few test data sets
22. Write a program to construct a Bayesian network considering medical data like heart patient or diabetes dataset.
23. Using a dataset with known class labels compare the labeling error of the K-means algorithm. Measure the error by assigning a class label to each example. Assume that the number of clusters is known.



YMCA University of Science and Technology, Faridabad
BCA Scheme of Studies / Examination
Semester – VI

| Course No. | Course Title | Schedule | | | | Sessional Marks/ Internal | Marks for End Term Examination | | Total Marks | Credits |
|-------------------|---------------------------|----------|---|---|-----------|---------------------------|--------------------------------|------------|-------------|-----------|
| | | I | T | P | Total | | Theory | Practical | | |
| BCA-DS-301 | Big Data – II | 3 | - | - | 3 | 25 | 75 | - | 100 | 3 |
| BCA-DS-302 | Machine Learning – II | 3 | - | - | 3 | 25 | 75 | - | 100 | 3 |
| BCA-DS-303 | Employability Skills | 3 | - | - | 3 | 25 | 75 | - | 100 | 3 |
| BCA-DS-304 | Bio Informatics | 3 | - | - | 3 | 25 | 75 | - | 100 | 3 |
| As per list above | General Elective - IV | 3 | - | - | 3 | 25 | 75 | - | 100 | 3 |
| BCA-DS-305 | Big Data – II Lab | - | - | 4 | 4 | 25 | - | 50 | 75 | 2 |
| BCA-DS-306 | Machine Learning – II Lab | - | - | 4 | 4 | 25 | - | 50 | 75 | 2 |
| BCA-DS-307 | Presentation | - | - | 2 | 2 | 25 | - | - | 25 | 1 |
| BCA-DS-308 | Group Discussion | - | - | 2 | 2 | 25 | - | - | 25 | 1 |
| | Total | | | | 27 | 225 | 375 | 100 | 700 | 21 |

Note: Exam duration will be as under

- (a) Theory exams will be of 3 hours duration
- (b) Practical exams will be of 3 hours duration

BCA-DS-311: BIG DATA II
B.C.A VI SEMESTER

No. of Credits: 3
L T P Total
3 0 3

Sessional: 25 Marks
Theory : 75 Marks
100
Total : Marks
Duration of Exam: 3 Hours

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

COURSE OBJECTIVES:

This course is to help students learn, understand, and practice big data analytics and machine learning approaches, which include the study of modern computing big data technologies and scaling up machine learning techniques focusing on industry applications. Mainly the course objectives are: conceptualization and summarization of big data and machine learning, trivial data versus big data, big data computing technologies, machine learning techniques, and scaling up machine learning approaches.

SYLLABUS

UNIT – I

Hadoop I/O The Writable Interface, Writable Comparable and comparators, Writable Classes: Writable wrappers for Java primitives, Text, Bytes Writable, Null Writable, Object Writable and Generic Writable, Writable collections, implementing a Custom Writable: Implementing a Raw Comparator for speed, Custom comparators

UNIT – II

Pig: Introduction, Pig Architecture, Pig Latin Data model, Pig Latin operators, Pig Diagnostic operators, Pig Data manipulation, built-in functions, user defined functions, Scripting with Pig Latin

UNIT – III

Hive: Getting Started with Apache Hive, Hive architecture, working with Hive Data Types, Creating and Managing Databases and Tables, views and indexes, Hive Data Manipulation Language, Querying and Analyzing Data.

UNIT – IV

Spark: Introduction, Spark Architecture, Advantages over traditional data approaches, Spark Ecosystem, Spark for Big Data processing and its applications

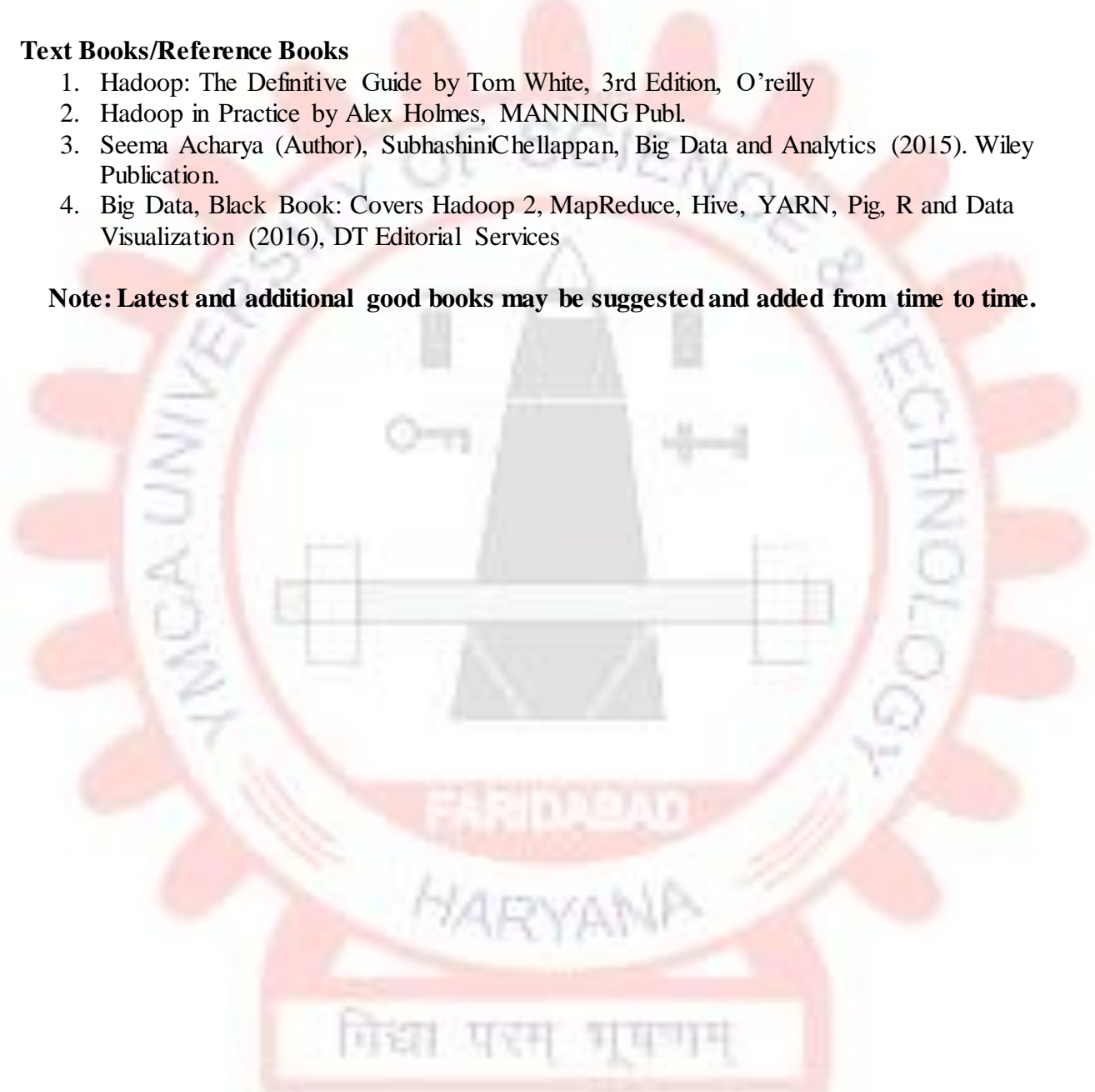
COURSE OUTCOMES:

1. To introduce programming tools PIG & HIVE in Hadoop ecosystem.
2. Preparing for data summarization, query, and analysis.
3. Applying data modeling techniques to large data sets.
4. Creating applications for Big Data analytics.
5. Building a complete business data analytic solution.

Text Books/Reference Books

1. Hadoop: The Definitive Guide by Tom White, 3rd Edition, O'reilly
2. Hadoop in Practice by Alex Holmes, MANNING Publ.
3. Seema Acharya (Author), SubhashiniChellappan, Big Data and Analytics (2015). Wiley Publication.
4. Big Data, Black Book: Covers Hadoop 2, MapReduce, Hive, YARN, Pig, R and Data Visualization (2016), DT Editorial Services

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



BCA-DS-312: MACHINE LEARNING - II
B.C.A VI SEMESTER

No. of Credits: 3
L T P Total
3 0 3

Sessional: 25 Marks
Theory : 75 Marks
100
Total : Marks
Duration of Exam: 3 Hours

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

COURSE OBJECTIVES:

This course is designed to help students learn to design and implement machine learning solutions to classification, regression, and clustering problems; and be able to evaluate and interpret the results of the algorithms.

SYLLABUS

UNIT-1

COMBINING DIFFERENT MODELS: Evaluating Machine Learning algorithms and Model Selection, Introduction to Statistical Learning Theory, Ensemble Methods: Boosting, Bagging, Random Forests.

UNIT- II

DIMENSIONALITY REDUCTION: Dimensionality Reduction, Linear Discriminant Analysis – Principal Component Analysis, Kernel PCA– Factor Analysis – Independent Component Analysis

UNIT –III

LEARNING WITH NEURAL NETWORKS: Perceptron, multilayer neural networks, learning neural networks structures – Deep Learning and Feature Representation Learning

UNIT IV

REINFORCEMENT LEARNING: Reinforcement Learning overview, Elements of Reinforcement Learning, Generalization in reinforcement learning, policy search, adaptive dynamic programming.

COURSE OUTCOMES:

After completing this course, student will be able

1. To have a good understanding of numerical approaches to learning (optimization and integration).

2. Develop an idea of how to choose a probabilistic model to describe a particular type of data.
3. To know how to evaluate a learned model in practice.
4. To understand the role of machine learning in massive scale automation.
5. Understand the mathematics necessary for constructing novel machine learning solutions.

Text Books/Reference Books

1. K. P. Murphy, —Machine Learning: A probabilistic perspective, MIT Press, 2012.
2. M. Mohri, A. Rostamizadeh, and A. Talwalkar, —Foundations of Machine Learning, MIT Press, 2012.
3. D. Barber, —Bayesian Reasoning and Machine Learning, Cambridge University Press, 2012.
4. P. Flach, —Machine Learning: The art and science of algorithms that make sense of data, Cambridge University Press, 2012.

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



BCA-DS-313: EMPLOYABILITY SKILLS
B.C.A VI SEMESTER

| | | | | |
|-------------------|---|-------|-------------------|----------|
| No. of Credits: 3 | | | Sessional: | 25 Marks |
| L T | P | Total | Theory : | 75 Marks |
| 3 0 | 0 | 3 | | 100 |
| | | | Total : | Marks |
| | | | Duration of Exam: | 3 Hours |

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

COURSE OBJECTIVES:

1. Review and evaluate your personal attributes and employability skills which are necessary for successful employment and career development.
2. Investigate employment opportunities, complete a job application including a CV for for a specific job opportunity.
3. Understanding of employability skills and personal attributes in relation to job selection methods
4. Understanding of the skills and attributes required to maintain and successfully develop in employment.

SYLLABUS

UNIT –I

VERBAL ABILITY and BASIC QUANTITATIVE APTITUDE: Synonyms, Antonyms and One word substitutes, Speed, Time and Distance, Time and Work, Linear Equations, Progressions (Sequences & Series), Permutation and Combination, Probability, Functions, Set Theory, Number Systems, LCM and HCF, Percentages, Collection and Scrutiny of data: Primary data, questionnaire and schedule; secondary data, their major sources including some government publications

UNIT II

LOGICAL REASONING – I: Number and Letter Series, Calendars, Clocks, Cubes, Venn Diagrams, Binary Logic, Seating Arrangement, Logical Sequence, Logical Matching, Logical Connectives, Syllogism. Blood Relations; concept of a statistical population and sample from a population; qualitative and quantitative data.

UNIT-III

MEASURES OF CENTRAL TENDENCY: Objective of averaging, characteristics of good average, types of average, arithmetic mean of grouped and ungrouped data, correcting incorrect values, weighted arithmetic mean, median - median of grouped and ungrouped data merit and

limitation of median, computation of quartile, decile and percentile Mode - calculation of mode of grouped and ungrouped data, merits and limitation of mode, relationship between mean, median and mode. Geometric mean and Harmonic mean.

UNIT-IV

PRESENTATION OF DATA: Construction of tables with one or more factors of classification; Diagrammatic and Graphical representation of non-frequency data; Frequency distribution, cumulative frequency distribution and their graphical representation - histogram, Column Graphs, Bar Graphs, Line Charts, Pie Chart, Data Interpretation – Introduction and approach

COURSE OUTCOMES:

After completing this course student will be able:

1. To help students explore their values and career choices through individual skill assessments
2. To make realistic employment choices and to identify the steps necessary to achieve a goal
3. To develop and practice self-management skills for the work site
4. To explore and practice basic communication skills
5. To learn skills for discussing and resolving problems on the work site
6. To assess and improve personal grooming
7. To promote safety awareness including rules and procedures on the work site

Text Books/Reference Books:

1. Bajpai, N. Business Statistics, Pearson, 2010
2. Sharma J.K., Business Statistics, Pearson Education India, 2010.
3. Richard I Levin, David S. Rubin: Statistics for Management, Pearson Prentice Hall Education Inc. Ltd, NewDelhi, 5th Ed.
4. Anderson; David R, Dennis J. Sweeney and Thomas A. Williams, Quantitative Methods for Business, Prentice-Hall, WestPublishing Company, 1996.
5. CAT Complete course, UPKAR publications

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

विद्यया परमं भूषणम्

BCA-DS-314: BIO INFORMATICS
B.C.A VI SEMESTER

No. of Credits: 3
L T P Total
3 0 0 3

Sessional: 25 Marks
Theory : 75 Marks
Total : 100Marks
Duration of Exam: 3 Hours

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

COURSE OBJECTIVES:

The basic objective is to give students an introduction to the basic practical techniques of bioinformatics. Emphasis will be given to the application of bioinformatics and biological databases to problem solving in real research problems. The students will become familiar with the use of a wide variety of internet applications, biological database and will be able to apply these methods to research problems.

SYLLABUS

UNIT-I

HISTORY, SCOPE AND IMPORTANCE: Important contributions - sequencing development - aims and tasks of Bioinformatics - applications of Bioinformatics – challenges and opportunities - Computers and programs – internet - world wide web – browsers – EMB net – NCBI.

UNIT-II

DATABASES - TOOLS AND THEIR USES: Importance of databases - nucleic acid sequence databases - protein sequence data bases - structure databases - bibliographic databases and virtual library - specialized analysis packages.

UNIT-III

INTRODUCTION TO BIOINFORMATICS ALGORITHMS: Algorithms and Complexity Biological algorithms versus computer algorithms – The change problem –Correct versus Incorrect Algorithms – Recursive Algorithms – Iterative versus Recursive Algorithms – Big-O Notations – Algorithm Design Techniques.

UNIT-IV

UNIX COMMANDS: Advanced Unix Commands-Introduction-ls-cat-more-, Advanced Unix commands-mv-rm-rmdir-uniq-sort-, Advanced Unix commands-grep. PERL: Introduction to Perl-scalars, Arrays-Using standard Perl Modules-Perl regular expressions I.

BIOPERL: Installation and usage of bioperl modules

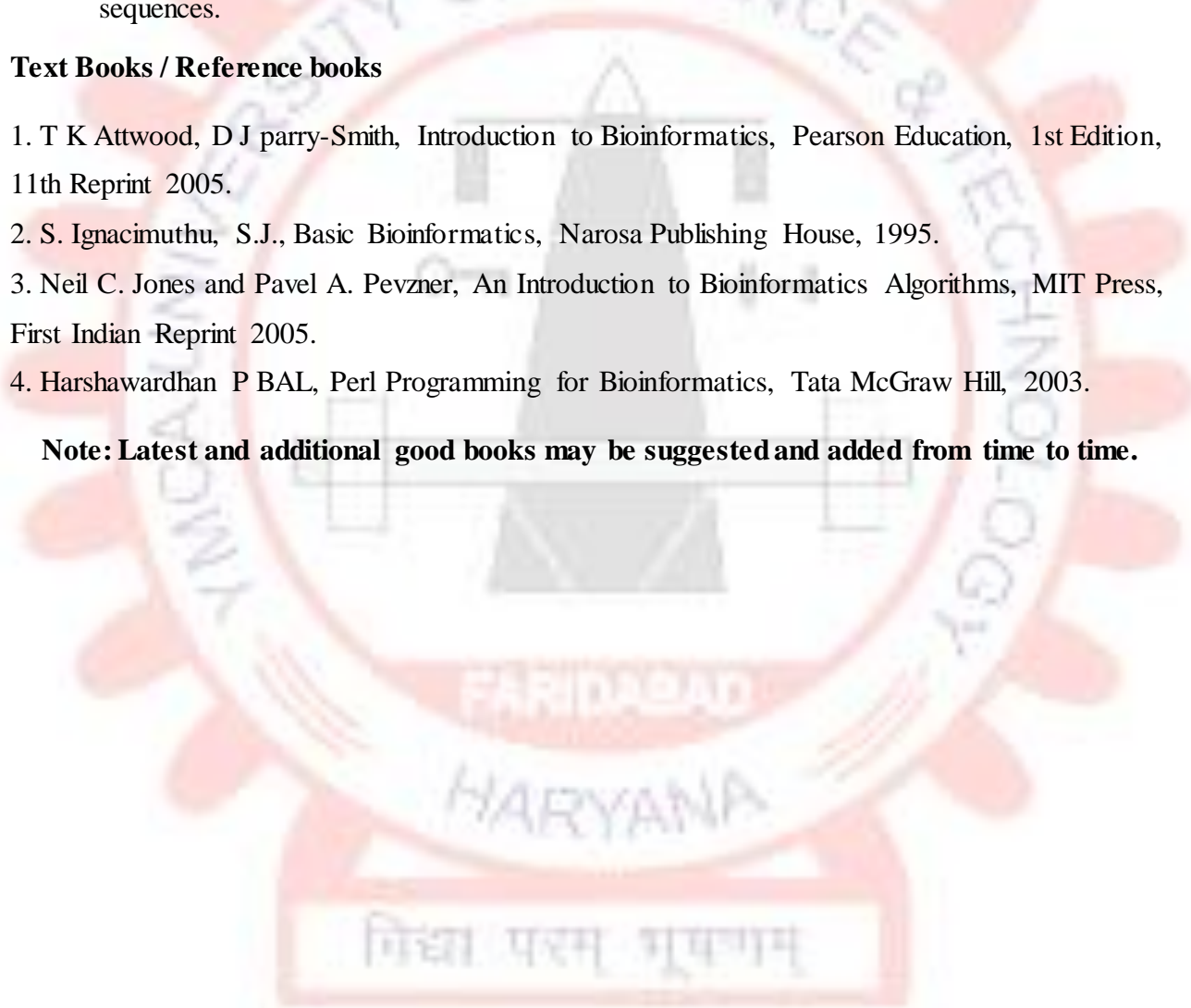
COURSE OUTCOMES:

1. The basic objective is to give students an introduction to the basic practical techniques of bioinformatics. Emphasis will be given to the application of bioinformatics and biological databases to problem solving in real research problems.
2. The students will become familiar with the use of a wide variety of internet applications, biological database and will be able to apply these methods to research problems
3. The student will be aware about the bioinformatics methods including accessing the major public sequence databases, use of the different computational tools to find sequences, analysis of protein and nucleic acid sequences by various software packages.
4. The students will be able to predict the secondary and tertiary structures of protein sequences.

Text Books / Reference books

1. T K Attwood, D J parry-Smith, Introduction to Bioinformatics, Pearson Education, 1st Edition, 11th Reprint 2005.
2. S. Ignacimuthu, S.J., Basic Bioinformatics, Narosa Publishing House, 1995.
3. Neil C. Jones and Pavel A. Pevzner, An Introduction to Bioinformatics Algorithms, MIT Press, First Indian Reprint 2005.
4. Harshawardhan P BAL, Perl Programming for Bioinformatics, Tata McGraw Hill, 2003.

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



BCA-DS-315: BIG DATA –II LAB
BCA VI Semester

No. of Credits: 2
L T P Total
0 0 4 4

Sessional: 25 Marks
Practical: 50 Marks
Total : 75 Marks
Duration of Exam: 3 Hours

List of Programs:

I) Working with Pig using various built-in and user-defined functions.

1. Installation of Cloud era to work with Pig.
2. Execute various commands and queries.
3. Loading data
4. Produce histogram.
5. Sum the word counts for each word length using the SUM function with the FOREACH GENERATE command.
6. Copy the data file into HDFS.
7. Importing CSV files, creating tables in pig.
8. Facebook analysis by installing plug-into see the details like: liked pages of friends etc. and many other activities.

II) Working with Hive

1. Installation of Hive
2. Introduction to Hive shell
3. Making a script file in Hive.
4. Loading dataset, loading tables.
5. Creating tables, creating databases, editing tables.
6. Apply various queries like:
7. Different ways of querying through Interactive shell window or using Hive script.

III) Introduction to Spark framework and Spark installation

1. Understand the purpose of SparkContext.
2. Initialize Spark with the various Programming Languages.
3. Passing functions to Spark and run some Spark Examples.



BCA-DS-316: MACHINE LEARNING –II LAB
BCA VI Semester

No. of Credits: 2
L T P Total
0 0 4 4

Sessional: 25 Marks
Practical: 50 Marks
Total : 75 Marks
Duration of Exam: 3 Hours

List of Programs:

1. Compute the accuracy of different classifiers (KNN, Naïve Bayes and SVM), considering a test data set.
2. Develop a machine learning method to classify your incoming mail.
3. Develop a machine learning method to Predict stock prices based on past price variation.
4. Estimate the precision, recall, accuracy, and F-measure of the decision tree classifier on the text classification task.
5. Write a program to implement Random Forest Approach using sample dataset.
6. Write a program to implement dimensionality reduction using Principal component Analysis.
7. Build an Artificial Neural Network by implementing the Backpropagation algorithm and test the same using appropriate data sets.
8. Develop a machine learning method to implement recommendation system to rate movies, books, etc.



GEC-DS-1 DISCRETE STRUCTURES

| | | | | |
|-------------------|---|-------|-------------------|-----------|
| No. of Credits: 3 | | | Sessional: | 25 Marks |
| L T | P | Total | Theory : | 75 Marks |
| 3 0 | 0 | 3 | Total : | 100 Marks |
| | | | Duration of Exam: | 3 Hours |

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

COURSE OBJECTIVES:

Throughout the course, students will be expected to demonstrate their understanding of Discrete Mathematics by being able to do each of the following:

1. Use mathematically correct terminology and notation.
2. Construct correct direct and indirect proofs.
3. Use division into cases in a proof.
4. Use counterexamples.
5. Apply logical reasoning to solve a variety of problems.

SYLLABUS

UNIT I

Set Theory and Propositional Calculus: Introduction to set theory, Set operations, Algebra of sets, Duality, Finite and Infinite sets, Classes of sets, Power Sets, Multi sets, Cartesian Product, Representation of relations, Types of relation, Equivalence relations and partitions, Partial ordering relations and lattices.

UNIT II

Function and its types: Composition of function and relations, Cardinality and inverse relations
Introduction to propositional Calculus: Basic operations: AND (\wedge), OR (\vee), NOT (\sim), Truth value of a compound statement, propositions, tautologies, contradictions.

UNIT III:

Techniques of Counting and Recursion and recurrence Relation: Permutations with and without repetition, Combination. Polynomials and their evaluation, Sequences, Introduction to AP, GP and AG series, partial fractions, linear recurrence relation with constant coefficients, Homogeneous solutions, Particular solutions, Total solution of a recurrence relation using generating functions.

UNIT IV

Algebraic Structures: Definition and examples of a monoid, Semigroup, Groups and rings, Homomorphism, Isomorphism and Automorphism, Subgroups and Normal subgroups, Cyclic groups, Integral domain and fields, Cosets, Lagrange's theorem.

COURSE OUTCOMES:

1. For a given logic sentence express it in terms of predicates, quantifiers, and logical connectives
2. For a given a problem, derive the solution using deductive logic and prove the solution based on logical inference
3. For a given a mathematical problem, classify its algebraic structure
4. Evaluate Boolean functions and simplify expressions using the properties of Boolean algebra
5. Develop the given problem as graph networks and solve with techniques of graph theory

Text Books/Reference Books:

1. Discrete Mathematics by Johnson Bough R., 5th Edition, PEA, 2001.
2. Concrete Mathematics: A Foundation for Computer Science, Ronald Graham, Donald Knuth and Oren Patashik, 1989, Addison-Wesley
3. Mathematical Structures for Computer Science, Judith L. Gersting, 1993, Computer Science Press.
4. Applied Discrete Structures for Computer Science, Doerr and Levasseur, (Chicago: 1985,SRA)
5. Discrete Mathematics by A. Chtewynd and P. Diggle (Modular Mathematics series), 1995, Edward Arnold, London
6. Schaums Outline series: Theory and problems of Probability by S. Lipshutz, 1982, McGraw-Hill Singapore
7. Discrete Mathematical Structures, B. Kolman and R.C. Busby, 1996, PHI
8. Discrete Mathematical Structures with Applications to Computers by Tembley & Manohar, 1995, Mc Graw Hill.
9. Elements of Discrete Mathematics, C.L Liu, 1985, McGraw Hill

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

GEC-DS-2
PRINCIPLES OF SOFTWARE ENGINEERING

No. of Credits: 3
L T P Total
3 0 0 3

Sessional: 25 Marks
Theory : 75 Marks
Total : 100Marks
Duration of Exam: 3 Hours

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

COURSE OBJECTIVES:

1. To enable the students to apply a systematic application of scientific knowledge in creating and building cost effective software solutions to business and other types of problems.
2. To make the students understand project management concepts & their metrics.
3. To make the students understand requirement engineering and its models (Information, functional, behavioral).
4. To make the students understand to develop quality software, its maintenance & introduce about software reliability.

SYLLABUS

UNIT I

Introduction: Software Crisis, Software Processes & Characteristics, Software life cycle models, Waterfall, Prototype, Evolutionary and Spiral Models.

Software Requirements Analysis & Specifications:

Requirement engineering, requirement elicitation techniques like FAST, QFD, requirements analysis using DFD, Data dictionaries ER Diagrams, Requirements documentation, Nature of SRS, Characteristics & organization of SRS .

UNIT – II

Software Project Management Concepts: The Management spectrum, The People, The Problem, The Process, The Project.

Software Project Planning: Size Estimation like lines of Code & Function Count, Cost Estimation Models, COCOMO, Risk Management.

UNIT – III

Software Design: Cohesion & Coupling, Classification of Cohesiveness & Coupling, Function Oriented Design, Object Oriented Design, Software Metrics: Software measurements: What & Why, Token Count, Halstead Software Science Measures, Design Metrics, Data Structure Metrics

Software Implementation: Relationship between design and implementation, Implementation issues and programming support environment, Coding the procedural design, Good coding style

UNIT – IV

Software Testing: Testing Process, Design of Test Cases, Types of Testing, Functional Testing, Structural Testing, Test Activities, Unit Testing, Integration Testing and System Testing, Debugging Activities.

Software Maintenance: Management of Maintenance, Maintenance Process, Reverse Engineering, Software Re-engineering, Configuration Management, Documentation.

COURSE OUTCOMES:

The student will be able to

1. Understand Software life cycle models and have a knowledge of different phases of Software life cycle.
2. Identify, formulate, review, estimate and schedule complex software projects using principles of mathematics.
3. Create a bug free software with good design and quality by using appropriate techniques and modern engineering and IT tools.
4. Analyze verification, validation activities, static, dynamic testing, debugging tools and techniques and importance of working in teams.

Text Books/ Reference Books:

1. Pressman : Software Engineering, TMH.
2. K.K Aggarwal & Yogesh Singh: Software Engineering, New Age International Publishers.
3. Jalote, Pankaj : An Integrated Approach to Software Engineering, Narosa Publications.
4. Ghezzi, Carlo : Fundamentals of Software Engineering, PHI.
5. Fairly, R.E. : Software Engineering Concepts, McGraw-Hill.
6. Lewis, T.G.: Software Engineering, McGraw-Hill.
7. Shere : Software Engineering & Management, Prentice Hall.

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

GEC-DS-3
COMPUTER ORGANIZATION-1

No. of Credits: 3
L T P Total
3 0 0 3

Sessional: 25 Marks
Theory : 75 Marks
Total : 100Marks
Duration of Exam: 3 Hours

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

COURSE OBJECTIVES:

The basic objective of this course is to give students an introduction of:

1. How Computer Systems work and the basic principles.
2. Concept of computer architecture and Micro programming.

SYLLABUS

UNIT – I

Information Representation: Number Systems, Binary Arithmetic, Fixed-point and Floating-point representation of numbers, BCD Codes, Error detecting and correcting codes, Character Representation – ASCII, EBCDIC, Unicode

UNIT – II

Binary Logic: Boolean Algebra, Boolean Theorems, Boolean Functions and Truth Tables, Canonical and Standard forms of Boolean functions, Simplification of Boolean Functions – Venn Diagram, Karnaugh Maps.

UNIT – III

Digital Logic: Introduction to digital signals, Basic Gates–AND, OR, NOT, Universal Gates and their implementation – NAND, NOR, Other Gates – XOR, XNOR etc. NAND, NOR, AND-OR-INVERT and OR-AND-INVERT implementations of digital circuits, Combinational Logic – Characteristics, Design Procedures, analysis procedures, Multiple NAND and NOR circuits.

UNIT – IV

Combinational Circuits: Half-Adder, Full-Adder, Half Subtractor, Full-Subtractor, Parallel binary adder/ subtractor, YMCA University of Science & Technology Faridabad Page 8 Encoders, Decoders, Multiplexers, Demultiplexers, Comparators, Code Converters, BCD to Seven-Segment Decoder.

COURSE OUTCOMES:

After completion of this course, student will be able to

1. Understand the working of logic families and logic gates
2. Design & implement combinational logic circuits
3. Understand the various code converters

Text Books/ Reference Books:

1. Gill, Nasib Singh and Dixit J.B.: Digital Design and Computer Organisation, University Science Press (Laxmi Publications), New Delhi.
2. M. Morris Mano, Digital Logic and Computer Design, Prentice Hall of India Pvt. Ltd.
3. V. Rajaraman, T. Radhakrishnan, An Introduction to Digital Computer Design, Prentice Hall of India Pvt. Ltd.
4. Andrew S. Tanenbaum, Structured Computer Organization, Prentice Hall of India Pvt. Ltd.
5. Nicholas Carter, Schaum's Outlines Computer Architecture, Tata McGraw-Hill
6. Note: Latest and additional good books may be suggested and added from time to time.

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



GEC-DS-4 OPERATION RESEARCH

| | | |
|-------------------|-------------------|----------|
| No. of Credits: 3 | Sessional: | 25 Marks |
| L T P Total | Theory : | 75 Marks |
| | | 100 |
| 3 0 3 | Total : | Marks |
| | Duration of Exam: | 3 Hours |

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

COURSE OBJECTIVES:

This course aims at familiarizing the students with quantitative tools and techniques, which are frequently applied to business decision-making & to provide a formal quantitative approach to problem solving and an intuition about situations where such an approach is appropriate.

SYLLABUS

UNIT I

DEVELOPMENT–DEFINITION–CHARACTERISTICS AND PHASES: Types of models– operation Research models – applications. **ALLOCATION :** Linear Programming Problem Formulation – Graphical solution – Simplex method – Artificial variables techniques -Two–phase method, Big-M method – Duality Principle.

UNIT II

TRANSPORTATION PROBLEM: Formulation–Optimal solution, unbalanced transportation problem – Degeneracy. Assignment problem – Formulation – Optimal solution - Variants of Assignment Problem Traveling Salesman problem.

REPLACEMENT : Introduction, Replacement of items that deteriorate with time – when money value is not counted and counted – Replacement of items that fail completely, group replacement. staffing problem, equipment renewal problem.

UNIT III

SYSTEM RELIABILITY: Introduction-Definition-Failure Rates-Bath-tub shaped failure rate(Hazard Rate)-Reliability of systems-series arrangement and parallel arrangement-methods of assuring reliability. Software Reliability - Comparison of Software and Hardware Reliability-Development of Software Reliability Models- Parameter Estimation of Models and Prediction of Reliability Levels- criteria to Compare Software Reliability models.

UNIT IV

INFORMATION THEORY-Introduction, measure of Information, binary unit of information entropy, properties of average measure of entropy, important relations for various entropies, set of

axioms for an entropy function, uniqueness theorem, communication system, noiseless channel, Channel capacity, efficiency and redundancy, executed mutual information, encoding.

WAITING LINES : Introduction – Single Channel – Poisson arrivals – exponential service times – with infinite population and finite population models– Multichannel – Poisson arrivals, exponential service times with infinite population single channel Poisson arrivals.

COURSE OUTCOMES:

After completing this course student will be able:

1. Identify and develop operational research models from the verbal description of the real system.
2. Understand the mathematical tools that are needed to solve optimisation problems.
3. Use mathematical software to solve the proposed models.
4. Develop a report that describes the model and the solving technique, analyse the results and
5. propose recommendations in language understandable to the decision-making processes in Management Engineering.

Text books / Reference Books:

1. Operations Research / S.D.Sharma-Kedarnath
2. Introduction to O.R/Taha/Pearson
3. Operation Research/A.P.VERMA/SK KATARIA AND SONS
4. Operations Research/P.K.GUPTA & D.S.HIRA
5. Software Reliability / John D.musa ,Anthony Iannino and KajuzuhiraOkumoto/ Mc-Grawhill

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

GEC-DS-5 SOFTWARE TESTING

No. of Credits: 3
L T P Total
3 0 0 3

Sessional: 25 Marks
Theory : 75 Marks
100
Total : Marks
Duration of Exam: 3 Hours

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

COURSE OBJECTIVES:

1. To study fundamental concepts in software testing, including software testing objectives, process, criteria, strategies, and methods.
2. To discuss various software testing issues and solutions in software unit test; integration, regression, and system testing.
3. To learn how to planning a test project, design test cases and data, conduct testing operations, manage software problems and defects, generate a testing report.
4. To expose the advanced software testing topics, such as object-oriented software testing methods, and component-based software testing issues, challenges, and solutions.
5. To gain software testing experience by applying software testing knowledge and methods to practice-oriented software testing projects.
6. To understand software test automation problems and solutions.
7. To learn how to write software testing documents, and communicate with engineers in various forms.

SYLLABUS

UNIT I:

Software testing principles: Types of Debugging and testing, fundamentals of test process, Need for testing, Psychology of testing, Testing economics, Software Verification & Validation, types of testing.

UNIT – II

Testing strategies: White box testing techniques: Control Flow based testing -Statement coverage, Branch Coverage, Path Coverage; Data flow based testing, Mutation testing, Automated code coverage analysis, Black box testing techniques: Boundary value analysis, Robustness testing, Equivalence partitioning, Cause-effect graphing, Syntax testing - Finite state testing; Levels of testing - Unit, Integration and System Testing; Acceptance testing: α , β , and γ testing.

UNIT – III

Testing object oriented software: Challenges, Differences from testing non-Object Oriented Software, Class testing strategies, Class Modality, State-based Testing, Message Sequence Specification. Testability and related issues: Design for Testability - Observability & Controllability - Built-in Test – Design by Contract - Precondition, Post condition and Invariant - Impact on inheritance - Applying in the real world Regression Testing – Challenges.

UNIT – IV

Miscellaneous topics: Automated Tools for Testing - Static code analyzers, Test case generators, GUI Capture/Playback, Stress Testing, Testing Client-server applications, Testing compilers and language processors, Testing web-enabled applications, Ad hoc testing: Buddy testing, pair testing, Exploratory testing, Agile and extreme testing.

COURSE OUTCOMES:

After completion of this course, Student will be able to understand

1. the concept of software.
2. how software works.
3. how to find errors, bugs in the software.
4. different testing strategies with advantages and disadvantages.

Text Books/Reference Books:

1. Glenford J. Myers, “The Art of Software Testing”, 2/e, John Wiley & Sons
2. Mathur P Aditya, Foundations of Software Testing, Pearson Education, 2008
3. D. Srinivasan & R. Gopalaswamy, Software Testing – Principles & Practices, Pearson Education
4. Robert V. Binder, “Testing Object-Oriented Systems: Models Patterns and Tools”, Addison Wesley.
5. Patton Ron, Software Testing, 2/e, Pearson education.
6. Limaye G. M., Software Testing – Principles, Techniques, and Tools, Tata McGraw Hill.

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

GEC-DS-6 COMPUTER ORGANIZATION-II

No. of Credits: 3
L T P Total
3 0 0 3

Sessional: 25 Marks
Theory : 75 Marks
Total : 100 Marks
Duration of Exam: 3 Hours

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

COURSE OBJECTIVES:

The basic objective of this course is to give students an introduction of:

1. The basic principles for accessing I/O devices and memory unit.
2. Concepts of advanced processors, parallel and pipelining techniques.

SYLLABUS

UNIT – I

Sequential Logic: Characteristics, Flip-Flops, Clocked RS, D type, JK, T type and Master-Slave flip-flops. State table, state diagram and state equations. Flip-flop excitation tables

UNIT – II

Sequential Circuits: Designing registers–Serial Input Serial Output (SISO), Serial Input Parallel Output (SIPO), Parallel Input Serial Output (PISO), Parallel Input Parallel Output (PIPO) and shift registers. Designing counters – Asynchronous and Synchronous Binary Counters, Modulo-N Counters and Up-Down Counters

UNIT – III

Memory & I/O Devices: Memory Parameters, Semiconductor RAM, ROM, Magnetic and Optical Storage devices, Flash memory, I/O Devices and their controllers.

UNIT – IV

Instruction Design & I/O Organization: Machine instruction, Instruction set selection, Instruction cycle, Instruction Format and Addressing Modes. I/O Interface, Interrupt structure, Program controlled, Interrupt-controlled & DMA transfer, I/O Channels, IOP.

COURSE OUTCOMES:

1. Design & analyse sequential logic circuits
2. Acquire basic knowledge of digital logic families & semiconductor memories
3. Acquire basic knowledge of computer architecture.

Text Books/ Reference Books:

1. Gill, Nasib Singh and Dixit J.B.: Digital Design and Computer Organisation, University Science Press (Laxmi Publications), New Delhi.
2. M. Morris Mano, Digital Logic and Computer Design, Prentice Hall of India Pvt. Ltd.
3. V. Rajaraman, T. Radhakrishnan, An Introduction to Digital Computer Design, Prentice Hall of India Pvt. Ltd.
4. Andrew S. Tanenbaum, Structured Computer Organization, Prentice Hall of India Pvt. Ltd.
5. Nicholas Carter, Schaum's Outlines Computer Architecture, Tata McGraw-Hill.

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



GEC-DS-7
MULTIMEDIA TECHNOLOGIES

| | | |
|-------------------|-------------------|----------|
| No. of Credits: 3 | Sessional: | 25 Marks |
| L T P Total | Theory : | 75 Marks |
| | | 100 |
| 3 0 0 3 | Total : | Marks |
| | Duration of Exam: | 3 Hours |

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

COURSE OBJECTIVES:

The course is designed for students:

1. Those who want to broaden their knowledge by including multimedia studies.
2. Looking for a foundation from which to pursue advanced topics in multimedia studies.
3. Professional developers who want a technical foundation for developing applications with distributed multimedia components.
4. Networks professionals who needs to manage multimedia delivery service.

SYLLABUS

UNIT I

Basics of Multimedia Technology: Computers, communication and entertainment; multimedia an introduction; framework for multimedia systems; multimedia devices; CD- Audio, CD-ROM, CD-I, presentation devices and the user interface; multimedia presentation and authoring; professional development tools; LANs and multimedia; internet, World Wide Web & multimedia distribution network ATM& ADSL; multimedia servers & databases; vector graphics; 3D graphics programs; animation techniques; shading; anti-aliasing; morphing; video on demand.

UNIT II

Image Compression & Standards: Making still images; editing and capturing images; scanning images; computer color models; color palettes; vector drawing; 3D drawing and rendering; PEG-objectives and architecture; JPEG-DCT encoding and quantization, JPEG statistical coding, JPEG predictive lossless coding; JPEG performance; overview of other image file formats as GIF, TIFF, BMP, PNG etc.

UNIT III

Audio & Video: Digital representation of sound; time domain sampled representation; method of encoding the analog signals; sub band coding; fourier method; transmission of digital sound; digital audio signal processing; stereophonic & quadraphonic signal processing; editing sampled sound; MPEG Audio; audio compression & decompression; brief survey of speech recognition and generation; audio synthesis; musical instrument digital interface; digital video and image compression; MPEG motion video compression standard; DVI technology; time base media representation and delivery.

UNIT IV

Virtual Reality: Applications of multimedia, intelligent multimedia system, desktop virtual reality, VR operating system, virtual environment displays and orientation making; visually coupled system requirements; intelligent VR software systems. Applications of environment in various fields.

COURSE OUTCOMES:

1. Course focuses on multimedia information representation and relevant signal processing aspects, multimedia networking and communications, and multimedia standards especially on the audio, image and video compression.
2. The students are expected to achieve a basic understanding of multimedia systems. With such background equipment, students would be able to evaluate more advanced or future multimedia systems.
3. To learn various multimedia authoring systems and various networking aspects used for multimedia applications.
4. Develop various Multimedia Systems applicable in real time
5. Understand about Design interactive multimedia software and apply various networking protocols for multimedia applications.

Text Books/Reference Books

1. Multimedia: Sound & Video, Lozano, 1997, PHI, (Que)
2. Multimedia: Production, planning and delivery, Villamil & Molina, Que, 1997
3. Multimedia on the PC, Sinclair, BPB
4. Multimedia: Making it work, Tay Vaughan, fifth edition, 1994, TMH.
5. Multimedia in Practice by Jeff coate Judith, 1995, PHI.
6. Multimedia Systems by Koegel, AWL x Multimedia Making it Work by Vaughan.
7. Multimedia Systems by John .F. Koegel, 2001, Buford.
8. Multimedia Communications by Halsall & Fred, 2001, AW.

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

GEC-DS-8 PRINCIPLES OF ACCOUNTING

No. of Credits: 3
L T P Total
3 0 0 3

Sessional: 25 Marks
Theory : 75 Marks
Total : 100Marks
Duration of Exam: 3 Hours

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

COURSE OBJECTIVES:

This course introduces students to the world of accounting and assumes no prior knowledge of the subject area. It will be demonstrated how a practical understanding and interpretation of accounting reports and other accounting tools can improve decision-making and add value for company stakeholders.

SYLLABUS

UNIT I

Meaning and nature of accounting, Scope of financial accounting, Interrelationship of Accounting with other disciplines, Branches of Accounting, Accounting concepts and convention, Accounting standards in India.

UNIT – II

Journal, Rules of Debit and Credit, Sub Division of Journal: Cash Journal, Petty Cash Book, Purchase Journal, Purchase Return, Sales Journal, Sales Return Journal, Ledger, Trial Balance

UNIT-III

Preparation of Final Accounts, Profit & Loss Account, Balance Sheet without adjustments and with adjustments.

UNIT – IV

Meaning of Inventory, Objectives of Inventory Valuation, Inventory Systems, Methods of Valuation of Inventories-FIFO, LIFO and Weighted Average Method, Concept of Depreciation, Causes of Depreciation, Meaning of Depreciation Accounting, Method of Recording Depreciation, Methods of Providing Depreciation

COURSE OUTCOMES:

1. This course will impart knowledge to the students regarding preparation of financial statements their analysis.
2. The students will be able to understand applications of cost accounting and cost control

techniques like standard costing etc.

3. The course will help them to take better managerial decisions.

4. Students will be able to know about budget control technique

Text Books/Reference books

1. Maheshwari, S.N. and Maheshwari, S. K., (2009) An Introduction to Accountancy, Eighth Edition, Vikas Publishing House.
2. Gupta R. L., & Gupta V.K., "Principles & Practice of Accounting", Sultan Chand & Sons, 1999.
3. Tulsian, P.C., (2009) Financial Accountancy, 2nd edition, Pearson Education.
4. Monga J R, "Introduction to Financial Accounting", Mayur Paperbacks, 2010. [R3] Raja Sekaran/Lalitha, "Financial Accounting", Pearsons

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



GEC-DS-9 MANAGEMENT INFORMATION SYSTEM

| | | | | | |
|-------------------|---|---|------------|-------------------|--------------|
| No. of Credits: 3 | | | Sessional: | 25 Marks | |
| L | T | P | Total | Theory : | 75 Marks |
| 3 | 0 | 0 | 3 | Total : | 100 Marks |
| | | | | Duration of Exam: | 3 Hours |

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

COURSE OBJECTIVES:

The course provides a foundation in the theory and practical application of information systems within an organization. Managing, analyzing, designing, and implementing an MIS will be the focus of the course. Strategic value, methodologies, quality, decision making, modeling, re-engineering, software, hardware, and ethics will all be included. This course is an introduction to Management Information Systems solutions through business-driven information systems.

SYLLABUS

UNIT – I

The meaning and role of MIS: What is MIS?. Decision support systems, systems approach, the systems view of business, MIS Organization within the company. Management Organizational theory and the systems approach: Development of organization theory, management and organizational behavior, management, information, and the systems approach.

UNIT – II

Information Systems for decision making: Evolution of an information system, Basic Information Systems, decision making and MIS, MIS as a technique for making programmed decisions, decision assisting information systems. Strategic and project planning for MIS: General business planning, appropriate MIS response, MIS planning – general, MIS planning – details.

UNIT – III

Conceptual system design: Define the problems, set system objectives, establish system constraints, determine information needs, determine information sources, develop alternative conceptual designs and select one, document the system concept, prepare the conceptual design report.

UNIT IV

Implementation, evaluation and maintenance of the MIS: Plan the implementation, acquire floor space and plan space layouts, organize for implementation, develop procedures for implementation, train and operating personnel, computer related acquisitions, develop forms for data collection and information, dissemination, develop the files, test the system, cut over, document the system, evaluate the MIS, control and maintain the system. Pitfalls in MIS development: Fundamental weaknesses, soft spots in planning, design problems, implementation: The TAR PIT.

COURSE OUTCOMES:

1. Relate the basic concepts and technologies used in the field of management information systems.
2. Compare the processes of developing and implementing information system.
3. Translate the role of information systems in organizations, the strategic management processes, with the implications for the management.
4. Apply the understanding of how various information systems like DBMS work together to accomplish the information objectives of an organization.

Text books/Reference Books:

1. R. G. Murdick, J. E. Ross and J. R. Clagget, “Information Systems for Modern Management”, 3rd Edition by, PHI – 1994.
2. Parker, Charles Case, Thomas, “Management Information System: Strategy & Action”, 2nd Edition, TMH, 1993

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

GEC-DS-10 MATLAB

| | | |
|-------------------|-------------------|-----------|
| No. of Credits: 3 | Sessional: | 25 Marks |
| L T P Total | Theory : | 75 Marks |
| 3 0 3 | Total : | 100 Marks |
| | Duration of Exam: | 3 Hours |

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

COURSE OBJECTIVES:

The course is intended to assist undergraduates in learning the basics of programming in general and programming MATLAB in particular. Basics of programming in MATLAB will be covered, with the goal of having students become comfortable enough to continue learning MATLAB and other programming languages on their own.

SYLLABUS

UNIT 1

Introduction to Programming

Components of a computer, working with numbers, Machine code, Software hierarchy.

Programming Environment

MATLAB Windows, A First Program, Expressions, Constants, Variables and assignment statement, Arrays.

UNIT 2

Graph Plots

Basic plotting, Built in functions, Generating waveforms, Sound replay, load and save.

UNIT 3

Procedures and Functions

Arguments and return values, M-files, Formatted console input-output, String handling.

Control Statements

If, Else, Else-if, Repetition statements: While, for loop.

UNIT 4

Manipulating Text

Writing to a text file, Reading from a text file, Randomizing and sorting a list, searching a list.

GUI Interface

Attaching buttons to actions, Getting Input, Setting Output.

COURSE OUTCOMES:

After completion of this course, student will be able to

1. Learn basics of Programming environment of MATLAB.
2. Understand how to use control statements in MATLAB
3. Understand how to manipulate text using MATLAB.

Text Books/ Reference Books:

1. MATLAB: An Introduction with Applications, by Amos Gilat, 2nd edition, Wiley, 2004.
2. C.B. Moler, Numerical Computing with MATLAB, SIAM, 2004.

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



GEC-DS-11 BUSINESS ECONOMICS

No. of Credits: 3
L T P Total
3 0 0 3

Sessional: 25 Marks
Theory : 75 Marks
Total : 100 Marks
Duration of Exam: 3 Hours

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

COURSE OBJECTIVES:

To integrate the basic concepts of economics with the tools of mathematics and statistics in order to analyze and make optimal business decisions.

SYLLABUS

UNIT I

Introduction to Business Economics and Fundamental concepts: Nature, Scope, Definitions of Business Economics, Difference Between Business Economic and Economics, Contribution and Application of Business Economics to Business. Micro Vs. Macro Economics. Opportunity Costs, Time Value of Money, Marginalism, Incrementalism, Market Equilibrium and Forces, Risk, Return and Profits.

UNIT II

Demand Analysis & Elasticity of Demand: Objectives, Meaning, Law of Demand, Movement Vs. Shift in Demand Curve, Measurement of Elasticity of Demand, Factors Affecting Elasticity of Demand, Income Elasticity of Demand, Cross Elasticity of Demand, Advertising Elasticity of Demand and Expectation Elasticity of Demand. Demand Forecasting: Need, Objectives and Methods (Brief)

UNIT III

Consumer Behavior: Cardinal Utility Approach: Diminishing Marginal Utility, Law of Equi-Marginal Utility. Ordinal Utility Approach: Indifference Curves, Marginal Rate of Substitution, Budget Line and Consumer Equilibrium.

Theory of Production: Meaning and Concept of Production, Factors of Production, production function, ISO Quants. Fixed and Variable Factors. Law of Variable Proportion (Short Run Production Analysis), Law of Returns to a Scale (Long Run Production Analysis).

UNIT IV

Cost Analysis & Price Output Decisions: Concept of Cost, Cost Function, Short Run Cost, Long Run Cost, Economics and Diseconomies of Scale. Explicit Cost and Implicit Cost, Private and Social Cost. Pricing Under Perfect Competition, Pricing Under Monopoly, Control of Monopoly, Price Discrimination, Pricing Under Monopolistic Competition, Pricing Under Oligopoly.

COURSE OUTCOMES:

After completion of this course, student will be able to

1. Demonstrate the applicability of the concept of organizational behavior to understand the behavior of people in the organization.
2. Demonstrate the applicability of analyzing the complexities associated with management of individual behavior in the organization.
3. Analyze the complexities associated with management of the group behavior in the organization.
4. Demonstrate how the organizational behavior can integrate in understanding the motivation (why) behind behavior of people in the organization.

Text Books/ Reference Books:

1. Chaturvedi, D.D. and S. L. Gupta; *Managerial Economics*, Brijwasi Publishers, 2003.
2. Diwedi, D.N.; *Managerial Economics*, Vikas Publishers, 2003.
3. Mehta, P. L.; *Managerial Economics*, Sultan Chand & Sons., 2003.
4. Koutsoyiannis, A.; *Modern Micro Economics*, Macmillan Press Ltd., 2003.
5. Dwivedi, D.N.; *Microeconomics: Theory and Applications*, Pearson Education, 2003.
6. Peterson, Lewis; *Managerial Economics*, 4th Pearson Education, 2002.

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

GEC-DS-12 E-BUSINESS

No. of Credits: 3
L T P Total
3 0 0 3

Sessional: 25 Marks
Theory : 75 Marks
Total 100 Marks
Duration of Exam: 3 Hours

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

COURSE OBJECTIVES:

This course introduces the concepts, vocabulary, and procedures associated with E-Commerce and the Internet. The student gains an overview of all aspects of E-Commerce. Topics include development of the Internet and E-Commerce, options available for doing business on the Internet, features of Web sites and the tools used to build an E-Commerce web site, marketing issues, payment options, security issues, and customer service.

SYLLABUS

UNIT - I

Electronic Commerce: Overview of Electronic Commerce, Scope of Electronic Commerce, Traditional Commerce vs. Electronic Commerce, Impact of E-Commerce, Electronic Markets, Internet Commerce, e-commerce in perspective, Application of E Commerce in Direct Marketing and Selling, Obstacles in adopting E-Commerce Applications; Future of E-Commerce.

UNIT - II

Value Chains in electronic Commerce: Supply chain, Porter's value chain Model, Inter Organizational value chains, Strategic Business unit chains, Industry value chains. Security Threats to E-commerce: Security Overview, Computer Security Classification, Copyright and Intellectual Property, security Policy and Integrated Security, Intellectual Property Threats, electronic Commerce Threats, Clients Threats, Communication Channel Threats, server Threats.

UNIT - III

Implementing security for E-Commerce: Protecting E-Commerce Assets, Protecting Intellectual Property, Protecting Client Computers, Protecting E-commerce Channels, Insuring Transaction Integrity, Protecting the Commerce Server. Electronic Payment System: Electronic Cash, Electronic Wallets, Smart Card, Credit and Change Card.

UNIT - IV

Business to Business E-Commerce: Inter-organizational Transitions, Credit Transaction Trade Cycle, a variety of transactions. Electronic Data Interchange (EDI): Introduction to EDI, Benefits

of EDI, EDI Technology, EDI standards, EDI Communication, EDI Implementation, EDI agreement, EDI security.

COURSE OUTCOMES:

After completion of course, students would be able to:

1. Understand the basic concepts of electronic transactions.
2. Study of various types of business models and customer relationship management.
3. Students will be able to understand about various business strategies and marketing strategies.
4. Study of various legal and ethical issues related to electronic transactions.
5. Study of intellectual property rights and its importance.
6. Study of Entrepreneurship management
7. Study of analyzing the external environment, the competition and designing the framework for establishing a venture capital.
8. Study of business intelligence and knowledge management tools.

Text Books/ Reference Books:

1. R.Kalakota and A.B.Whinston, Readings in Electronic Commerce, Addison Wesley.
2. David Kosiur, Understanding E- Commerce, Microsoft Press, 1997.
3. Soka, From EDI to Electronic Commerce, McGraw Hill, 1995.
4. David whitely, E-commerce Strategy, Technology and application, Tata McGraw Hill.
5. Gary P. Schneider and Jame Perry, Electronic Commerce Thomson Publication.
6. Doing Business on the Internet E-COMMERCE S. Jaiswal; Galgotia Publications.
7. E-Commerce An Indian Perspective; P.T.Joseph; S.J.; PHI.
8. E-Commerce; Efrain Turbon; Jae Lee; David King; H.Michael Chang.

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

