।। सा विद्या या विमुक्तये ।।

स्वामी रामानंद तीर्थ मराठवाडा विद्यापीठ, नांदेड

"ज्ञानतीर्थ" परिसर, विष्णुपुरी, नांदेड - ४३१६०६ (महाराष्ट्र)

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY NANDED

"Dnyanteerth", Vishnupuri, Nanded - 431606 Maharashtra State (INDIA)
Established on 17th September 1994 – Recognized by the UGC U/s 2(f) and 12(B), NAAC Re-accredited with 'A' Grade

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परिपत्रक

सर्व संबधितांना या परिपत्रकान्वये कळविण्यात येते की, प्रस्तुत विद्यापीठांतर्गत आझाद महाविद्यालय, औसा, ता. औसा, येथे विद्यापीठ अनुदान आयोगाचे दिनांक १३ ऑगस्ट २०१८ रोजीच्या पत्रान्वये कम्युनीटी कॉलेज अंतर्गत सर्टीफीकेट कोर्सेस व डीप्लोमा कोर्सेस अंतर्गत Software Development and Data Recovery (Certificate/Diploma Courses) या अभ्यासक्रमास शैक्षणिक वर्ष २०१८–१९ पासुन लागु करण्यासाठी मा. कुलगुरू यांनी विद्यापरीषदेच्या वतिने मान्यता प्रदान केली आहे.

तरी उपरोक्त प्रमाणे ही बाब सर्व संबंधितांच्या निदर्शनास आणून द्यावी.

''ज्ञानतीर्थ'' परिसर	)(	
विष्णुपुरी, नांदेड.	)(	स्वा/—
जा.क्र.शै.०१/Syllabus/२०१८–१९/३०२०	)(	कुलसचिव
दिनांक : २५/०२/२०१९	)(	
	)(	

प्रत माहिती व पुढील कार्यवाहीस्तव :

१) प्राचार्य, आझाद महाविद्यालय, औसा, ता. औसा, जि. लातुर.
२) संचालक, परीक्षा व मुल्यमापन मंडळ, प्रस्तुत विद्यापीठ.
३) कुलसचिव, (निवडणूक व सभा कक्ष) यांचे कार्यालय, प्रस्तुत विद्यापीठ.
४) उपकुलसचिव, पदव्युत्तर विभाग, प्रस्तुत विद्यापीठ.
५) उपकुलसचिव, पात्रता विभाग, प्रस्तुत विद्यापीठ.
६) सिस्टीम एक्सपर्ट, प्रस्तुत विद्यापीठ.(सदरील परिपत्रक व अभ्यासक्रम विद्यापीठाच्या संकेतस्थळावर प्रसारित करावे.)

AZAD MAHAVDYLAYA, AUSA

Tq. AUSA, Dist. LATUR (MS)

[COMMUNITY COLLEGE]

REGULATION, SCHEME & SYLLABUS

OF

SOFTWARE DEVELOPMENT

(2018 ADMISSION ONWRDS)

....

- **COURSE STRUCTURE**

NSQF Level	Skill Component Credits	General Education Credits	Normal Calendar Duration	Exit Points/ Awards
6 Months	18	12	One semester	Certificate
Year 1	36	24	Two Semesters	Diploma
Year 2	72	48	Four Semesters	Advanced Diploma

As per the UGC guidelines, there are multiple exit points for a candidate admitted in this course.

- If he/she is completing One semester he/she will get a Certificate in Software Development.

- If he/she is completing the first two semesters he/she will get a diploma in Software Development.

- If he/she is completing the all four semesters successfully, he/she will get an advanced diploma in Software Development.

Certificate and Diploma holder is expected to become Data Interpreter. Advanced diploma holder is expected to become a multi-skilled Software Associate with data recovery skill.

➢ PROGRAMME STRUCTURE

Software Development course shall include:

☐ Language courses (English)

☐ General Education Components

☐ Skill Components

☐ Project

☐ Industrial Training

☐ Soft Skills and Personality Development Programmes

Semester I:

General Education					Skill Component				
No.	Course Code	Title	Credit	Hrs/ Week	No.	Course Code	Title	Credit	Hrs/ Week
1	GE101	Communication English-I	4	4	1	SC101	Fundamentals of Computer Organizations	4	4
2	GE102	Basics of Mathematics-I	4	4	2	SC102	Programming Principles and C	4	4
3	GE103	Introduction to IT	4	4	3	SC103	Word Processing and Image Editing	3	3
					4	SC104	**Lab Work** C Programming	4	4
					5	SC105	**Lab Work** Word Processing and Image Editing	3	3
		Total	**12**	**12**			**Total**	**18**	**18**

Semester II:

	General Education					Skill Component			
No.	Course Code	Title	Credit	Hrs/ Week	No.	Course Code	Title	Credit	Hrs/ Week
1	GE201	Communication English-II	4	4	1	SC201	Computer Animations	4	4
2	GE202	Basics of Mathematics-II	4	4	2	SC202	Data Structure and Algorithms	4	4
3	GE203	Environmental Studies	4	4	3	SC203	Computer Networks	3	3
					4	SC204	**Lab Work** Data Structure	4	4
					5	SC205	**Lab Work** Animations	3	3
		Total	**12**	**12**			**Total**	**18**	**18**

Semester III:

	General Education					Skill Component			
No.	Course Code	Title	Credit	Hrs/ Week	No.	Course Code	Title	Credit	Hrs/ Week
1	GE301	Fundamentals of Statistics	4	4	1	SC301	Operating Systems	4	4
2	GE302	Social Awareness	4	4	2	SC302	Object Oriented Programming	4	4
3	GE303	Business Informatics	4	4	3	SC303	Data Recovery Management-I	3	3
					4	SC304	**Lab Work** Object Oriented Programming	4	4
					5	SC305	**Lab Work** Data Recovery	3	3
		Total	**12**	**12**			**Total**	**18**	**18**

Semester IV:

	General Education					**Skill Component**			
No.	**Course Code**	**Title**	**Credit**	**Hrs/ Week**	**No.**	**Course Code**	**Title**	**Credit**	**Hrs/ Week**
1	GE401	General Aptitude and Logical Reasoning	4	4	1	SC401	Computer Hardware Maintenance	4	4
2	GE402	Principles of Management	4	4	2	SC402	Web Application & development	4	4
3	GE403	Management Information Systems	4	4	3	SC403	Data Recovery Management-II	3	3
					4	SC404	**Lab Work** Computer Hardware Maintenance	4	4
					5	SC405	**Lab Work** Project	3	3
		Total	**12**	**12**			**Total**	**18**	**18**

➢ REGULATION

• INTRODUCTION

The University Grants Commission (UGC) has launched a scheme on skills development based higher education as part of college/university education, leading to Community College with multiple exits such as Diploma/Advanced Diploma/Degree under the NSQF. The Community College programme is focused on universities and colleges providing undergraduate studies which would also incorporate specific job roles along with broad based general education. This would enable the graduates completing Community College to make a meaningful participation in accelerating India's economy by gaining appropriate employment, becoming entrepreneurs and creating appropriate knowledge.

The proposed programme in Software Development will be a judicious mix of skills, professional education related to Software Development and also appropriate content of general education. It is designed with the objective of equipping the students to cope with the emerging trends and challenges in the Software Development environment.

• ELIGIBILITY FOR ADMISSION

Eligibility for admissions to Community College Software Development shall be according to the rules framed by the University from time to time.

✓ No student shall be eligible for admission to Community College, Software Development unless he/she has successful*y* completed the examination conducted by a Board/ University at the +2 level of schooling or its equivalent from any recognized board or university.

✓ Equal weightage should be given to vocational subjects at +2 levels while considering the students for admission into the course for recognition of skill credits.

✓ There shall be no age bar for admission in the skill based certificate/ diploma / degree programme under NSQF.

✓ While deciding criteria for admission into any particular trade, the institutions will consider students having background in relevant stream at 10+2 level.

- **CURRICULUM**

　　The curriculum in each of the years of the programme would be a suitable mix of general education and skill development components.

- **DURATION**

　　The duration of the course of Software Development shall be One year (2 SEM) for diploma, Two years (4 SEM) for Advanced diploma and Three years (6 SEM) for degree. The duration of each semester shall be five months inclusive of the days of examinations. There shall be at least 90 working days in a semester and a minimum 540 hours of instruction in a semester.

- **CREDIT CALCULATION**

The following formula is used for conversion of time into credit hours.

 One Credit would mean equivalent of 15 periods of 60 minutes each, for theory, workshops/labs and tutorials.

 For self-learning, based one-content or otherwise, the credit weightage for equivalent hours of study should be 50% or less of that for lectures/workshops.

  DISTRIBUTION OF MARKS

Course Code	Subject	General/Skill	Credit	Contact Hrs	Marks ESE	Marks CA	Total Marks
SEMESTER I							
GE101	Communication English-I	General	4	72	80	20	100
GE102	Basics of Mathematics-I	General	4	72	80	20	100
GE103	Introduction to IT	General	4	72	80	20	100
SC101	Fundamentals of Computer Organizations	Skill	4	72	80	20	100
SC102	Programming Principles and C	Skill	4	72	80	20	100
SC103	Word Processing and Image Editing	Skill	3	54	80	20	100
SC104	**Lab Work** C Programming	Skill	4	72	80	20	100
SC105	**Lab Work** Word Processing and Image Editing	Skill	3	54	80	20	100

SEMESTER II							
GE201	Communication English-II	General	4	72	80	20	100
GE202	Basics of Mathematics-II	General	4	72	80	20	100
GE203	Environmental Studies	General	4	72	80	20	100
SC201	Computer Animations	Skill	4	72	80	20	100
SC202	Data Structure and Algorithms	Skill	4	72	80	20	100
SC203	Computer Networks	Skill	3	54	80	20	100
SC204	**Lab Work** Data Structure	Skill	4	72	80	20	100
SC205	**Lab Work** Animations	Skill	3	54	80	20	100

Course Code	Subject	General/Skill	Credit	Contact Hrs	Marks ESE	Marks CA	Total Marks
SEMESTER III							
GE301	Fundamentals of Statistics	General	4	72	80	20	100
GE302	Social Awareness	General	4	72	80	20	100
GE303	Business Informatics	General	4	72	80	20	100
SC301	Operating Systems	Skill	4	72	80	20	100
SC302	Object Oriented Programming	Skill	4	72	80	20	100
SC303	Data Recovery Management-I	Skill	3	54	80	20	100
SC304	**Lab Work** Object Oriented Programming	Skill	4	72	80	20	100
SC305	**Lab Work** Data Recovery	Skill	3	54	80	20	100

		SEMESTER IV						
GE401	General Aptitude and Logical Reasoning	General	4	72	80	20	100
GE402	Principles of Management	General	4	72	80	20	100
GE403	Management Information Systems	General	4	72	80	20	100
SC401	Computer Hardware Maintenance	Skill	4	72	80	20	100
SC402	Web Application & development	Skill	4	72	80	20	100
SC403	Data Recovery Management-II	Skill	3	54	80	20	100
SC404	**Lab Work** Computer Hardware Maintenance	Skill	4	72	80	20	100
SC405	**Lab Work** Project	Skill	3	54	80	20	100

□ **ATTENDANCE**

The minimum number of hours of lectures, tutorials, seminars, or practical which a student shall be required to attend for eligibility to appear at the end semester examination shall not be less than 75 per cent of the total number of lectures, tutorials, seminars or practical sessions. Soft skill and personality development programmes are part of the course and students must attend in these activities to complete a semester.

□ **EVALUATION**

There shall be Continuous Assessment (CA) and End Semester Evaluation (ESE) for Software Development course. CA is based on specific components viz., attendance, tests, assignments and seminars. The CA shall carry a weightage of 20 per cent and ESE shall carry a weightage of 80 per cent. The weightage of each component of CE shall be: Attendance – 1, assignment / seminar – 1 and test papers -2. The teacher shall define the expected quality of an

assignment in terms of structure, content, presentation etc. Seminar shall be graded in terms of structure, content, presentation, interaction etc.

The allotment of mark for attendance shall be as follows:

Attendance (in %)	Mark (out of 5)
> 90	5
>85 & ≤90	4
>80 & ≤85	3
>75 & ≤80	2
75	1
< 75	0

□ **ASSIGNMENTS/ SEMINARS**

Every student shall be required to do one assignment or one seminar for each course. The seminars shall be organized by the teachers in charge of CA and the same shall be assessed by a group of teachers including the teacher / teachers in charge of that course.

□ **TESTS**

For each course there shall be at least two class tests during a semester. Grades for the test component in CA shall be awarded on the basis of the grades secured for the better of the two class tests. Valued answer scripts shall be made available to the students for perusal within 20 days from the date of the test.

□ **END SEMESTER EVALUATION (ESE)**

End Semester Examination of all the courses in all semesters shall be conducted. The duration of examination of all courses shall be 3 hours.

GRADING

Both CA and ESE will be carried out using direct grading system on a 7 point scale and the grades are given below:

Criteria for Grading:

Grade Range	Grade	Performance
9 and above	A+	Outstanding
8 to <9	A	Excellent
7 to <8	B	Very Good
6 to <7	C	Good
5 to <6	D	Satisfactory
4 to <5	E	Adequate
<4	F	Failure

SYLLABUS

GE101: Communication English-I

1. AIM

☐ To familiarize students with English sounds and phonemic symbols.

☐ To enhance their ability in listening and speaking.

2. OBJECTIVES

On completion of the course, the students should be able to

☐ listen to lectures, public announcements and news on TV and radio

☐ communicate effectively and accurately in English

3. SYLLABUS

UNIT I: **Listening Skills:** Difference between listening and hearing –active listening –barriers to listening - academic listening - listening for details - listening and note-taking - listening for sound contents of videos - listening to talks and

UNITII: Pronunciation: Phonemic symbols – consonants – vowels –syllables - word stress - strong and weak forms- intonation.

UNIT III: **Speaking Skills:** Interactive nature of communication -importance of context - formal and informal - set expressions in different situations –greeting – introducing – making requests - asking for / giving permission - giving instructions and directions – agreeing / disagreeing, inviting and apologizing telephonic skills - conversational manners.

UNIT IV: **Dialogue Practice:** (Students should be given ample practice in dialogue, using core and supplementary materials)

REFERENCES

- ▪ *English for Effective Communication*, Oxford University Press, 2013.
- • *Dramatic Moments: A Book of One Act Plays,* Orient Black Swan, 2013.
- • *English Pronunciation in Use*, Marks, Jonathan, New Delhi: CUP, 2007.
- • *Study Listening*, Lynch, Tony, New Delhi: CUP, 2008.
- • *Study Speaking*, Kenneth, Anderson, Tony Lynch, Joan MacLean, New Delhi: CUP, 2008.
- • *English Pronouncing Dictionary,* Jones, Daniel, 17th Edition, New Delhi: CUP, 2009.

GE102 Basics of Mathematics-I

1. AIM

☐ To provide grounding in Mathematics most relevant to the discipline.

2. OBJECTIVES

☐ To introduce the basic concepts in mathematics

☐ To introduce number theory and its application in the field of computer science.

☐ To work with the basics of matrices and analyze its application in computer science.

3. SYLLABUS

UNIT I: **Theory of numbers:** Prime numbers, Unique factorization theorem, G.C.D, Euclidean Algorithm (without proof)- application problems, Congruence, Fermat's theorem(without proof) - application problems,

UNITII: **Differentiation**: Review of basic differentiation, Derivatives of hyperbolic functions, Logarithmic differentiation, Implicit differentiation, Leibnitz theorem (without proof) - application problems, Rolle's Theorem (without proof) - application problems, Maxima and minima.

UNIT III: Matrices: Definition, types and operations of matrices, symmetric, skew symmetric, Hermitian, Skew Hermitian and Orthogonal matrices, Elementary row operations, Inverse of a matrix using elementary row operations.

UNIT IV: **Fourier Series:** Fourier Series – periodic functions, Euler' s formula for Fourier coefficients, Fourier series of Functions of period $2l$, Fourier series of even and odd functions. **Laplace transforms** of standard and periodic functions.

4. REFERENCES

☐ *Differential Calculus*, Shanthi Narayan,S. Chand & Company

☐ *Advanced Engineering Mathematics*, H. K. Dass, S. Chand & Company PVT. LTD.

☐ *Elementary Number Theory*, Thomas Koshy, 2nd edition.

☐ *Higher Engineering Mathematics*, B. S. Grewal, Khanna Publishers

☐ *Higher Engineering Mathematics*, B. V. Ramana, Tata McGraw Hill, 2006

☐ *Engineering Mathematics I*, Sureshan J. Nazarudeen and Royson,Zenith Publication.

GE103 Introduction to IT

1. AIM

☐ To create overall awareness about scope of the field of IT

☐ To create background knowledge for the various courses in the programme.

2. OBJECTIVES

☐ To introduce the basic terminology in the field of IT

☐ To impart functional knowledge about PC hardware, operations and concepts

☐ To impart knowledge in word processor, spread sheet and presentation software.

☐ To impart functional knowledge about networks and internet.

☐ To give an overview of computer application in various fields.

3. SYLLABUS

UNIT I: Computer characteristics: Speed, storage, accuracy, diligence; Digital signals, Binary System, ASCII; Historic Evolution of Computers; Classification of computers: Microcomputer, Minicomputer, mainframes, Supercomputers; Personal computers: Desktop, Laptops, Palmtop, Tablet PC; Hardware & Software; Von Neumann model.

UNIT II: Hardware: CPU, Memory, Input devices, output devices. Memory units: RAM (SDRAM, DDR RAM, RDRAM etc. feature wise comparison only); ROM-different types: Flash memory; Auxiliary storage: Magnetic devices, Optical Devices; Floppy, Hard disk, Memory stick, CD, DVD, CD-Writer; Input devices - keyboard, mouse, scanner, speech input devices, digital camera, Touch screen, Joystick, Optical readers, bar code reader; Output devices: Display device, size and resolution; CRT, LCD; Printers: Dot-matrix, Inkjet, Laser; Plotters, Sound cards & speaker.

UNIT III: Software: System software, Application software; concepts of files and folders, Introduction to Operating systems, Different types of operating systems: single user, multitasking, time-sharing multi-user; Booting, POST; Basic features of two GUI operating systems: Windows & Linux (Basic desk top management); Programming Languages, Compiler, Interpreter, Databases; Application software: Generic Features of Word processors, Spread sheets and Presentation software; Utilities and their use; Computer Viruses & Protection, Free software, open source.

UNIT IV: Computer Networks: Connecting computers, Requirements for a network: Server, Workstation, switch, router, network operating systems; Internet: brief history, World Wide Web, Websites, URL, browsers, search engines, search tips; Internet connections: ISP, Dial-up, cable modem, WLL, DSL, leased line; email, email software features (send receive, filter, attach, forward, copy, blind copy); characteristics of web-based systems, Web pages, introduction to HTML.

4. REFERENCES

☐ *Fundamentals of Computers*, E. Balaguruswamy, McGraw hill, 2014

☐ *Information Technology: The Breaking wave*, Dennis P. Curtain, McGrawHill, 2014

☐ *Introduction to Computers*, Peter Norton, McGrawHill, Seventh edition.

SC101 Fundamentals of Computer Organizations

1. AIM

☐ To provide an understanding about the organization of a computer system

2. OBJECTIVES

☐ To learn the functional units of a computer such as the memory system, processing unit, input-output organization

3. SYLLABUS

UNIT I: Basic Structure of computers – functional units – basic operational concepts – bus structures – Memory locations and addresses – memory operations – instructions and instruction sequencing– execution of a complete instruction – multiple-bus organization – sequencing of control signals.

UNIT II: Memory system: basic concepts – semiconductor RAMs – memory system considerations – semiconductor ROMs – flash memory – cache memory – interleaving – basic concepts of virtual memory – associative memory. Secondary memory -Magnetic Disk, RAID, Optical Memory

UNIT III: Processing unit: Fundamental concepts, register transfers, performing an arithmetic or logic operations, fetching a word in memory, execution of a complete instruction, branch instruction, hardwired control, a complete processor, microprogrammed control.

UNIT IV: Input/Output organization: accessing I/O devices, Interrupts, enabling and disabling interrupts, handling multiple devices, Direct memory access, bus arbitration-interface circuits – standard I/O interfaces (PCI, SCSI, USB).

4. REFERENCES

☐ *Computer Organisation*, Hamacher Vranesic Zaky,Mc Graw Hill(Fifth edition)

☐ *Sructured Computer Organisation*, Andrew S. Tannenbaum, Prentice Hall India Learning Private Limited

☐ *Computer Organisation and Architecture,* William Stallings , PHI

SC102 Programming Principles and C

1. AIM

☐ To expose students to algorithmic thinking and problem solving and impart moderate skills in programming in an industry-standard programming language.

2. OBJECTIVES

☐ To introduce students to basic data types and control structures in C.

☐ To introduce students to structured programming concepts

☐ To introduce students to standard library functions in C language.

3. SYLLABUS

UNIT I: Software and Types of Software, Programming Languages- Machine Language, Assembly Language, High Level Language, Object Oriented Language and its features.Algorithms and Their Representations, Flow charts, Pseudo code, Types of Programming Languages, Structured Programming, Different approaches of Programming: Top-down and Bottom-up.

UNIT II: Introduction to programming: Character set, Variables and Constants, Rules for naming the Variables/Identifiers; Basic data types of C, int, char, float, double; storage capacity – range of all the data types; Storage classes;Operators and Expressions: Assignment Operator,

UNIT III: Control structures, if, if else, switch-case, for, while, do-while, break, continue. Arrays, Defining simple arrays, Multi-dimensional arrays, declaration, initialization and processing;Functions & Pointers: concept of modular programming, Library, User defined functions, declaration, definition & scope, recursion,

UNIT IV: Advanced features: Array & pointer relationship, pointer to arrays, array of pointers. Strings: String handling functions; Structures and unions; File handling: text and binary files, file operations, Library functions for file handling, Modes of files.

4. REFERENCES

☐ *Programming in C*, Ashok N. Kamthene, Pearson Education

☐ *Programming in ANSI C*, E.Balaguruswamy, McGrawhill

☐ **Computer Fundamentals**, P. K. Sinha & Priti Sinha, BPB Publications

SC103 Word Processing and Image Editing

1. AIM

☐ To create knowledge of Latex, MS Excel, Adobe flash and Photoshop

2. OBJECTIVES

At the end of the course the students will be able to

☐ prepare documents in Latex
☐ perform basic functions in Excel
☐ create animation in Flash
☐ edit images using Photoshop

3. SYLLABUS

UNIT I: Excel: Introduction to Spread sheet , Creating Worksheets & feeding data , Using functions, Editing Cells and Using commands and functions , Moving and Copying, Inserting and Deleting Rows and Columns , Sorting, Filtering, What If Analysis Tool- goal seek, scenario, Formatting a Worksheet , Working with Charts , Working with Macros , Pivot tables, creation of Forms in Excel.

UNIT II: Latex: Creating a Document in Latex, Latex Commands- Paragraph's and newlines, bold, italics and underlining, Lists, Errors. Mathematical expressions, Figures &Tables, Drawing diagram directly in Latex, bibliography management, International Language Support, Document structure-section and chapters, Nomenclature, Indices, table of Contents, Hyperlinks, Fonts & Formatting and presentations.

UNIT III: Flash: Introduction, Drawing, Working with Colour, Using Imported Artwork, Adding Sound, Working with Objects, Using Layers, Using Type, Using Symbols and Instances, Creating Animation, Creating interactive movies, Creating Printable movies, Publishing and Exporting.

UNIT IV: Photoshop: Getting image into Photoshop, Selecting, Transforming and Retouching, Drawing, Painting, Applying Filters for special effects, Designing Web pages, Creating Rollovers and Animations, Preparing Graphics for the Web, Saving and exporting images.

4. REFERENCES

☐ **Adobe Flash CS3 Professional Hands-On Training**, Todd Perkins, Peachpit Press

Internet Resources

☐ https://support.office.com/en-us/article/Excel-training

☐ https://www.sharelatex.com/learn

☐ https://helpx.adobe.com/photoshop/tutorials.html

SC104 Lab Work
C Programming

1. AIM

☐ To provide an opportunity for hands-on practice of algorithmic thinking and problem solving in an industry standard programming language.

2. OBJECTIVES

This course will provide hands-on practice in the following topics, under a variety of programming situations with a focus on writing, debugging and analyzing structured programs:

☐ basic data types in C

☐ basic control structures in C

☐ arrays, structures and files

☐ standard library functions in C language

☐ solving moderately complex problems involving the above and requiring selection of appropriate data structures and efficient algorithms

3. SYLLABUS

The C laboratory work will consist of 12-16 Experiments:

Part A

1. Testing out and interpreting a variety of simple programs to demonstrate the syntax and use of the following features of the language: basic data types, operators and control structures.

Part B

2. 1-D Arrays: A variety of programs to declare, initialize, read, print and process 1-D arrays of various basic data types. Processing to include, selection, sum, counting, selective sum, selective counting, reversing etc.

3. Pointers: A large number of trivial programs involving all possible data types to familiarize the syntax of pointers in a variety of situations and to draw memory diagrams based on the observations.

4. Structures: A variety of programs to declare, initialise, read, print and process structures made up of a variety of data types and structures.

5. 2-D Arrays: A variety of programs to declare, initialise, read, print and process 2-D arrays of various basic data types. Processing to include, selection, sum, counting, selective sum, selective counting, reversing etc.

6. Array of Structures and Structure of Arrays: Programs to demonstrate declaration and processing of structure of arrays and array of structures.

7. Pointers to Arrays: A number of programs to demonstrate handling of 1-D and 2-D arrays using pointers and to draw memory diagrams based on the observations.

8. Pointers to Structures: A number of programs to demonstrate use of pointers to structures and to draw memory diagrams based on the observations.

9. Functions –I: Simple Examples of declaring and using functions of the following categories (i) no argument, no return, (ii) argument, no return, (iii) no argument, return, (iv) argument, return, all pass by value

10. Functions –II: Declaring and using functions with pass by reference, Passing and Returning structures, Recursive functions.

11. Files: Simple Example involving use of multiple files: declaring, opening, closing, reading from and writing to text files.

12. Files: Example involving use of multiple files: declaring, opening, closing, reading from and writing to binary files.

13. Library functions: A variety of Examples demonstrating (i) string processing functions (ii) a variety of selected library functions

14. Debugging programs involving syntactic and/or logical errors

15-16: Developing programming solutions to problems including program design,
algorithm development and data structure selection.

4. REFERENCES

□ ***The C Puzzle Book***, Alan R. Feuer, Pearson Education

□ ***Test Your C Skills***, Yashvant Kanetkar, BPB Publications, 3rd Edition

SC105 Lab Work
Word Processing and Image Editing

1. AIM

To make students undergo a hands-on experience in the most widely used text editing and image editing software which will be of great practical use in their daily life in future.

2. OBJECTIVES

By the end of the course, the students should be able to

☐ perform basic formatting and text editing in word

☐ create attractive presentations in PowerPoint and Latex

☐ generate worksheets in Excel and perform all basic computations

☐ perform professional image editing in Photoshop

3. SYLLABUS

The Word Processing and Image editing laboratory work will consist of 12-16 Experiments:

Part A – Microsoft Word

1. Activities to learn basic formatting in a word document

2. Activities to create an article/advertisement in word.

Part B – Microsoft Excel

3. Charts and Pivot Tables: Activities to generate charts and pivot tables will help to visualize the information at hand. It will convey the appropriate message from the data.(*2Experiments*)

4. Conditionals and Lookup Tables: Experiments that includes conditional checking, COUNTIF, AVERAGEIF etc.(*2 Experiments*)

Part C– Latex

5. Simple activities to generate articles, reports and presentations in Latex (*3 Experiments*).

Part D - PowerPoint

6. Creating slide with Text & and using themes/ Background to make it more attractive and applying custom animation on slides.

7. Inserting Image and applying Word Art and Smart Art to add caption and Titles

8. Inserting Audio and Video to slides.

Part E - Photoshop

9. Add an object to an image.

10. Remove an object from an image.

11. Change the color of an object in an image.

12. Create a pencil drawing of an image.

13. Change the hair color of an object in an image.

14. Design a brochure for an exhibition.

15. Design a logo for your institution.

16. Design a certificate of participation for a seminar.

17. Design a visiting card with relevant details.

18. Create a rollover button.

19. Design an attractive website.

4. REFERENCES

☐ **Adobe Flash CS3 Professional Hands-On Training**, Todd Perkins, Peachpit Press

Internet Resources

☐ https://support.office.com/en-us/article/Excel-training

☐ https://www.sharelatex.com/learn

☐ https://helpx.adobe.com/photoshop/tutorials.html

❖ <u>SEMESTER II</u>

<u>GE201 Communication English-II</u>

1. AIM

☐ To familiarize students with different writing techniques.

☐ To introduce them to the basics of academic presentation.

☐ To sharpen their accuracy in writing.

2. OBJECTIVES

On completion of the course, the students should be able to

☐ understand the mechanism of general and academic writing

☐ recognize the different modes of writing

☐ improve their reference skills, take notes, refer and document data and materials

3. SYLLABUS

UNIT I: Writing as a skill – its importance - mechanism of writing – words and sentences - paragraph as a unit of structuring a whole text - combining different sources – functional use of writing –personal, academic and business writing – creative use of writing.

UNIT II: Writing process - planning a text - finding materials - drafting – revising – editing - finalizing the draft - computer as an aid - key board skills - word processing - desk top publishing.

UNIT III: Writing models – essay - précis - expansion of ideas – dialogue - letter writing - personal letters - formal letters - CV – surveys – questionnaire - e-mail – fax - job application - report writing.

UNIT IV: Presentation as a skill - elements of presentation strategies – audience – objectives – medium- key ideas - structuring the material - organizing content - audio-visual aids - handouts - use of power point - clarity of presentation - non-verbal communication - seminar paper presentation and discussion.

4. REFERENCES

☐ ***English for Effective Communication,*** Oxford University Press, 2013.

☐ ***Students Must Write***, Robert, Barraas, London: Routledge, 2006.

☐ ***Academic Writing,*** Bailey, Stephen,Routledge, 2006.

☐ ***Academic Writing***, Ilona, Leki, CUP, 1998.

☐ ***Effective Presentation***, Jay, New Delhi: Pearson, 2009.

GE202 Basics of Mathematics-II

1. AIM

☐ To provide the precision of mathematical notation and techniques needed for the students to formulate what a computer system is supposed to do.

2. OBJECTIVES

☐ To acquire the knowledge on some fundamental mathematical concepts and terminology

☐ To introduce the graph theory and basic algorithms in graph theory

3. SYLLABUS

UNIT I: Set Theory, Relations and functions: Review of set theory concepts, Set Operations, Characteristic functions, Fuzzy set theory : Basic notions of fuzzy set, the algebra of fuzzy subsets, Relations: Operations on relations, Equivalence relation and partitions, **UNIT II: Algebraic structures:** Algebra, Group, Ring, Polish Expressions, Communication Model and Error Corrections, Hamming Codes.

UNIT III: Graph theory: Introduction, Graph Notation, Topological sort, Graph Propagation algorithm, Depth First, Breadth-first searches, Shortest Path algorithm-Dijkstra's Algorithm, Directed acyclic graphs.

UNITIV: Languages and Grammars – Introduction, Phase Structure Grammar, Types of Phase Structure Grammar Finite state Machines with outputs, Finite state Machines with no outputs.

4. REFERENCES

☐ *Discrete Mathematics*, Rajendra Akerkar, Rupali Akerkar, Pearson Education

☐ *Discrete Mathematics and its applications*, Kenneth Rosen, 7th edition, McGraw Hill.

☐ *Discrete Mathematical structures,* R.M. Somasundaram, PHI Learning.

☐ *Graph Theory with Applications to Engineering and Computer Science*, Narsingh Deo, Prentice-Hall, Inc.

☐ *Getting Started with MATLAB*, Rudra Pratap, Oxford University Press

GE203 Environmental Studies

1. AIM

☐ To understand about the deteriorating condition of our environment among students

2. OBJECTIVES

On completion this course, student should:

☐ have better awareness and concern about current environmental issues

☐ develop a healthy respect and sensitivity to environment

☐ develop pride in social and environmental activism

3. SYLLABUS

UNIT I: Definition, scope and importance, Need for Public Awareness, Ecology and Ecosystems: Definition of Ecology, Structure and function of an ecosystem, Producers, Consumers and Decomposers, Energy flow in the ecosystem, Ecological succession, Food chains, food webs and ecological pyramids.

UNIT II: Biodiversity and its conservation: Introduction, genetic, species and ecosystem diversity definition, value of biodiversity, biodiversity at global, national and local levels, India as a mega diversity nation, hot spots of biodiversity, threats to biodiversity – habitat lose, poaching of wild life, man wild life conflicts.

UNIT III: Natural Resources: Air resources-features, composition, structure, air quality management, forest resources-, water resources, mineral resources, food resources, energy resources, land resources, Environmental pollution: definition, air pollution, water pollution, marine pollution, thermal pollution, soil pollution, noise pollution, nuclear hazards, waste management.

UNIT IV: Social issues and the environment: From unsustainable to sustainable development, urban problems related to energy, water conservation, rain water harvesting, water shed management, resettlement and rehabilitation of people- it's problems and concerns, case studies, environmental ethics- environmental value relationships, environmental ethics and species preservation, climate change, global warming, acid rain, Ozone layer depletion, nuclear accidents and holocaust, case studies, waste land reclamation, consumerism and waste products.

4. REFERENCES

☐ ***Principles of Environmental Science & Engineering***, P. Venugopala Rao, PHI

☐ ***Environmental Studies***, Benny Joseph, Tata McGraw Hill

☐ ***Essentials of Environmental Studies***, Kurien Joseph & R. Nagendran, Pearson

SC201 Computer Animations

1. AIM

☐ To create skills in animation

2. OBJECTIVES

At the end of the course the students will be able to

☐ Create objects using 3D Max

☐ Perform animation

☐ Add special effects

3. SYLLABUS

UNIT I: Animation: Definition, Short history of animation, Techniques of animation, Different types of animation, Workflows of different types of animation - Preproduction, Production And Post-production stages. **Introduction to 3DS Max:** Exploring the Max interface, Snap settings, Units setup, Viewport navigation controls, Selection techniques.

UNIT II: Working with objects: Standard primitives, Rendering a still image, Extended primitives, Bend modifier, Taper modifier, Mirror tool, Align tool, Architectural objects - AEC extended primitives, Doors, Windows, Stairs. Autogrid, Splines, Extended splines, Modifying splines – Pivot point, Lathe modifier, Modifying the shapes.

UNIT III: Materials and Maps: Material editor, Materials, Maps. Modifying 3D mesh objects, Compound objects, Modifiers and modifier stack, Types of modifiers – Extrude, Face Extrude, Lattice, Twist, Noise.

UNIT IV: Animation: Introduction, Time slider and Animation playback controls, Understanding animation and time controls, Morph compound object, Rendering an animation. **Systems, Hierarchy, and Kinematics:** Creating a Ring array system, Animating a ring array system, Creating a Sunlight system, Creating a Daylight system, Forward and Inverse kinematics, Creating a Hierarchy.

4. REFERENCES

☐ *Autodesk 3ds Max 2017: A Comprehensive Guide*, Prof. Sham Tickoo, BPB Publications

☐ *3ds Max 2014 Bible*, Kelly L. Murdock, John Wiley & Sons

SC202 Data Structure and Algorithms

1. **AIM**

   ☐ Having successfully completed this course, the student will be able to:

☐ apply advance C programming techniques such as pointers, dynamic memory allocation, structures to developing solutions for particular problems;

☐ design and implement abstract data types such as linked list, stack, queue and tree by using C as the programming language using static or dynamic implementations;

☐ analyse, evaluate and choose appropriate abstract data types and algorithms to solve particular problems

2. OBJECTIVES

This course introduces fundamental concepts in data structures and reviews important concepts in programming. It also attempts to develop good programming skills and habits, including for example, good software testing skills.

3. SYLLABUS

UNIT I: Introduction to programming methodologies – structured approach, stepwise refinement techniques, programming style, documentation – analysis of algorithms: frequency count. Data abstraction. Complexity of algorithms: Time and space complexity of algorithms using "big oh" notation. Recursion: Recursive algorithms, Analysis of recursive algorithms. Logic characteristics of strings, physical representation for strings

UNIT II: Study of basic data structures – vectors, arrays, records, stacks, queues and dqueues. – linked lists – trees, binary tree traversals – graphs – applications. Storage management – free storage lists, reference counters, garbage collection, storage compaction, boundary tag method.

UNIT III: Internal and external sorting techniques – selection, bubble, insertion, merge sorting, partition exchange sorting, heap sort. Searching – linear and binary – hashing. File organizations- External sorting – sorting with disks, sorting with tapes.

UNIT IV: Algorithms and Complexity – Concepts in algorithm analysis – the efficiency of algorithms, average and worst – case analysis, asymptotic notation, time and space Recurrences – substitution method, iteration method and master method, Analysis of sorting algorithms.

4. REFERENCES

☐ *Introduction to data structures with applications*, Tremblay and Sorenson, TMH.

☐ *Algorithms + Data Structures = Programs*, Wirth N., Prentice Hall

☐ *Data Structures Using C*, Achuthsakar S. N. and Mahalakshmi T., Prentice Hall India

☐ *A Structured Approach to Programming*Hugges J. K., & J. I. Michtm,, Prentice Hall.

☐ *Introduction to Algorithms*, Thomas H. Corman, Charles E. Leiserson and Ronald L. Rivest., Prentice Hall India.

SC203 Computer Networks

1. AIM

☐ To create an awareness of networking and different tools used

2. OBJECTIVES

At the end of the course the students will be able to

☐ Explain different components in each network layer

☐ Discuss different applications of it

3. SYLLABUS

UNIT I: Introduction to Networks, Network criteria, Physical structures, Categories of Network, Interconnection of Networks, and Network models - OSI model-layers, TCP/IP protocol suite. Multiplexing- FDM, TDM, WDM, Transmission Media-Guided and Unguided, Switching-circuit switched Network, packet- switched network, message switched network.

UNIT II: Data Link Layer-Error Detection and correction-types of Errors, Block coding, Hamming distance, Cyclic Codes, Checksum, Multiple Access Protocols - ALOHA, CSMA, CSMA/CD, FDMA, TDMA, CDMA, Ethernet-categories of Ethernet, Fast Ethernet.

UNIT III: Network Layer-Logical Addressing, IPV4 , IPV6, Network Layer- Forwarding, Unicast Routing Protocols- Distance vector routing, path vector routing, Multicast Routing Protocols(brief explanation only).

UNIT IV: Transport layer- Process to Process delivery- UDP, TCP, congestion control and Quality of Service- techniques to improve Quality of service. Application Layer- Domain Name System, FTP, TELNET, Electronic Mail, WWW, HTTP.

4. REFERENCES

☐ *Data Communications and Networking*, Behrouz A. Forouzan, McGraw-Hill Education (India) Pvt. Ltd.

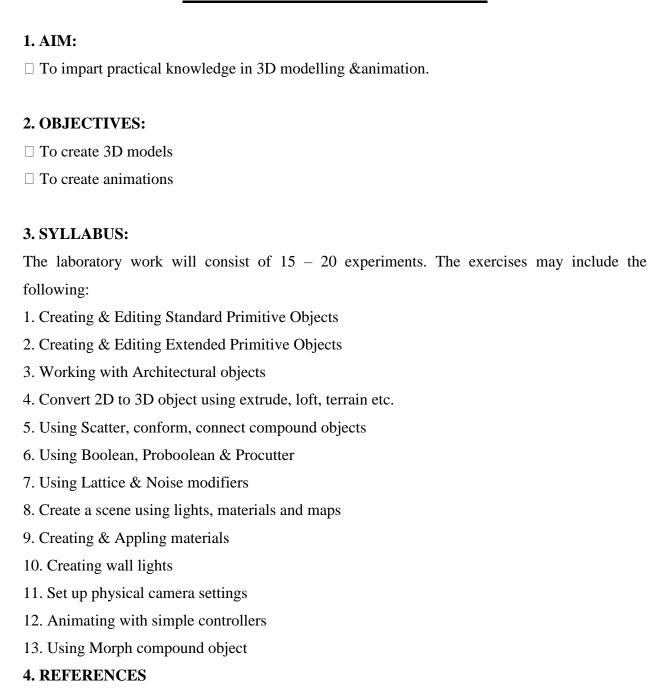☐ *Computer Networks*, Andrew S. Tanenbaum, Pearson Education India

SC204 Lab Work Data Structure

AIM

☐ To develop skills in design and implementation of data structures and their applications.

2. OBJECTIVES

☐ To write and execute programs in C to solve problems using data structures such as arrays, linked lists, stacks, queues, trees, and search trees.

☐ To write and execute programs in C to implement various sorting and searching methods.

3. SYLLABUS

The laboratory work will consist of 15 – 20 experiments. The exercises may include the following:

1. Representation of sparse matrix

☐ addition

☐ multiplication

☐ transpose of sparse matrices

2. Use of multidimensional arrays and structures

3. Linked list

☐ singly linked list

☐ circular linked list

☐ doubly linked list

4. String manipulation applications.

5. Implementation of stacks using arrays and linked lists.

6. Application problems using stacks

☐ Conversion between infix

☐ postfix and prefix

☐ Expression evaluation etc.

7. Implementation of Queues using linked list and array –

☐ Multiple Queue

☐ Dequeue

☐ Priority queue

8. Creation and traversals of binary trees – counting nodes, finding height etc.

9. Creation of binary search tree

☐ searching an item

☐ insertion of a node

☐ deletion of nodes

10. Implementation of sorting and searching algorithms

4. REFERENCES

☐ *Data Structures*, Seymour Lipschutz, McGraw Hill Education

SC205 Lab Work Animations

1. AIM:

☐ To impart practical knowledge in 3D modelling &animation.

2. OBJECTIVES:

☐ To create 3D models

☐ To create animations

3. SYLLABUS:

The laboratory work will consist of 15 – 20 experiments. The exercises may include the following:

1. Creating & Editing Standard Primitive Objects

2. Creating & Editing Extended Primitive Objects

3. Working with Architectural objects

4. Convert 2D to 3D object using extrude, loft, terrain etc.

5. Using Scatter, conform, connect compound objects

6. Using Boolean, Proboolean & Procutter

7. Using Lattice & Noise modifiers

8. Create a scene using lights, materials and maps

9. Creating & Appling materials

10. Creating wall lights

11. Set up physical camera settings

12. Animating with simple controllers

13. Using Morph compound object

4. REFERENCES

☐ *Autodesk 3ds Max 2017: A Comprehensive Guide,* Prof. Sham Tickoo, BPB Publications

❖ SEMESTER III

GE301 Fundamentals of Statistics

1. AIM

☐ To develop the skill for applying appropriate statistical tools and techniques in different situations.

2. OBJECTIVES

☐ To enable the students to gain understanding of statistical techniques

3. SYLLABUS

UNIT I: Introduction: Meaning, definition, Primary and Secondary data -Classification, tabulation and diagrammatic representation of data - Bar charts, Pie diagram, Histograms, Frequency polygon, Ogives. **Measures of central tendency** - Arithmetic Mean, Median, Mode, **Measures of dispersion**–Quartile Deviation, Mean deviation and standard deviation. **UNIT II: Correlation:** Meaning and definition, Types of correlation, Methods of measuring correlation for ungrouped data, Karl Pearson's co-efficient of correlation and its interpretation, Spearman's rank correlation;

UNIT III: Permutations & Combinations Meaning, Permutation of different things, Permutation of things not all different, restricted combination of things not all different.

UNIT IV: Probability: Concept of probability - Addition and Multiplication theorem on probability – Conditional probability and independence of events – Baye's theorem – Concept of random variable – Mathematical expectation – Mean, Standard deviation, **4. REFERENCES**

☐ *Statistical Methods,* Gupta S. P., Himalaya Publishing House, Mumbai.

☐ *Advanced Engineering Mathematics,* H. K. Dass, S. Chand & Company Pvt. Ltd.

☐ *Statistics - Theory and Practice,* Gupta B. N., SahityaBhawan Publications, Agra.

☐ *Statistics - Theory, Methods and Application,* Sanchetti D. C. and Kapoor V. K., Sultan Chand & Sons

☐ *Statistics - Concept and Application,* Nabendu Pal and Haded Sarkar S. A., PHI, NewDelhi.

☐ *Business Mathematics and Statistics,* Agarwal B. M., Ane Books Pvt. Ltd., New Delhi.

GE302 Social Awareness

1. AIM

☐ To indulge social awareness and responsibility in students so that they come out as better human beings

2. OBJECTIVES

☐ To learn the basic concepts and functions of NSS

☐ To learn proper safety and precautionary measures in case of a fire outbreak

☐ To make aware the students about the organ donation legalities and amendments

☐ To educate the students about the judiciary and how to handle corruption

3. SYLLABUS

UNIT I: Introduction and Basic concepts of NSS: History, Philosophy, aims & objectives of NSS, Emblem, flag, motto, song, badge etc., Organizational structure, roles and responsibilities of various NSS functionaries; **NSS Programs and Activities:** Concept of regular activities, special camping, day camps, Basis of adoption of village/slums, methodology of conducting survey, Financial pattern of the scheme.

UNIT II: Fire Safety: Introduction, Classification of fire, Portable fire extinguishers, Pumps and primers, Foam and foam making equipments. Fire protective clothing, Ladders, Ropes and lines, bends & hitches, Fire prevention

UNIT III: Human organ transplantation: Organ Transplant in India: The Present situation, What is the solution?, Human organ transplantation acts and organ allocation guidelines, Amendments of organ and tissue transplantation act and rules, Organ allocation guidelines, Medical legal aspects of deceased donor transplant

UNIT IV: Vigilance Awareness: Introduction, Organisation and Structure, Functions, Powers and Jurisdiction, Duties and Responsibilities, Administrative Powers, Financial Powers, Anti – Corruption Functions, Methodology of Enquiry / Investigation, Penal Process

4. REFERENCES

☐ *National Service Scheme Manual(Revised) 2006*, Government of India, Ministry of Youth Affairs and Sports, New Delhi.

☐ *Principles of Fire Safety Engineering: Understanding Fire and Fire Protection*, Das A. K., Prentice Hall India Learning Pvt. Ltd.

GE303 Business Informatics

1. AIM

☐ To create an awareness about role of IT in business and to introduce basic accounting principles.

2. OBJECTIVES

By the end of this course, the student should be able to

☐ have awareness about the role of IT in business

☐ have knowledge of basic Accounting Principles

☐ understand how to manage journal and ledgers

☐ have knowledge of how to prepare Final Accounts

☐ have basic knowledge of an Accounting Package

3. SYLLABUS

UNIT I: Business Informatics: History of e-commerce, definition, classification- B2B, B2C, C2C, G2C, B2G. Electronic payment systems – relevance of currencies, credit cards, debit cards, smart cards, e-credit accounts, e-money, security concerns in e commerce, authenticity, privacy, integrity, non-repudiation, encryption, secret key cryptography, public key cryptography, digital signatures, firewalls, mobile commerce, intellectual property law, common law and EC legal issues.

UNIT II: Accounting Concepts: Basic Accounting Principles and Conventions, Accounting Standards, Accounting v/s Book Keeping Terms used in accounting, users of accounting information

UNIT III: Recording of transactions: Journals, Subsidiary Books, Ledger, Cash Book, Bank Reconciliation Statement, Trial Balance. Depreciation: Meaning, need & importance of depreciation, methods of charging depreciation.

UNIT IV: Preparation of final accounts: Preparation of Trading and Profit & Loss Account and Balance Sheet of sole proprietary business with adjustments. Computerized Accounting: Journalizing and preparing final accounts using TALLY

4. REFERENCES

☐ *Electronic Commerce–A Managerial Perspective*, Erfan Turban et.al., Pearson Education.

☐ *Fundamentals of Accounting & Financial Analysis*, Anil Chowdhry, Pearson Education

☐ *Accounting Made Easy,* Rajesh Agarwal & R. Srinivasan , Tata McGraw –Hill

☐ *Financial Accounting for Management*Dr. S. N. Maheshwari ,, Vikas

SC301 Operating Systems

1. AIM

☐ To discuss the internal working of operating system

2. OBJECTIVES

At the end of the course the students will be able to

☐ discuss the different functions handled by operating system

☐ explain the file system concepts

☐ describe the installation of windows

☐ discuss the different back-up procedures used in Windows operating system

3. SYLLABUS

UNIT I: Introduction: What operating systems do, Operating System Organization, Operating System Structure, Operating-System Operations. Functions of Operating System, Types of OS - batch processing - multiprogramming - time sharing - real time system - Multiprocessor system - distributed system. Operating System Services. **Information management:** File concepts, access methods, directory and disk structure

UNIT II: Process management: Process concept, Process scheduling, operations on processes, scheduling concepts, scheduling criteria, scheduling algorithms. **Memory management: Memory Management Strategies** – Preliminaries, Swapping Contiguous memory allocation, paging, segmentation **Virtual memory management**–Basic concept, demand paging, copy-on write, page replacement, thrashing, overlay. **Device management:** Overview of Mass Storage Structure, Disk Structure, Disk Scheduling.

UNIT III: Process Co-ordination: Synchronization: The Critical-Section Problem, Semaphores, classical synchronization problem-bounded buffer and reader/writer problem, Monitors. **Deadlocks:** Dead lock problem, characteristics, prevention, avoidance – Banker's algorithm, detection, Recovery from deadlock.

UNIT IV: Windows XP: System Components, File and Folder Management, Study of control panel and its settings, Installation and Administration of Windows XP: hardware requirements for the installation - the steps involved in installation, Booting Process. Back-up & Restore procedures, types of back-up, media for back-up

4. REFERENCES

☐ *Operating System Concepts*, Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, John Wiley & Sons Inc.

☐ *System software, diagnostic & Debugging tools*, Satish Jain, Vineeta Pillai, Ambrish Kumar Rai, BPB Publications.

☐ *Operating System Principles*, H. M. Deitel, Addison-Wesley Publishing Company

☐ *The Logical Design of Operating Systems*, Lubomir Bic, A. C. Shaw, Prentice Hall International

SC302 Object Oriented Programming

1. AIM

☐ To introduce the student to the basic concepts of object orientation and impart skills in an industry standard object oriented language

2. OBJECTIVES

On the completion of this course, the student will be able to

☐ understand the concepts of classes and object

☐ define classes for a given situation and instantiate objects for specific problem solving

☐ reuse available classes after modifications if possible

☐ possess skill in object oriented thought process

3. SYLLABUS

UNIT I: Concept of Object orientation – why related data and methods should be kept as a single unit – comparison with procedural and structured programming – Classes and objects – data abstraction, encapsulation, inheritance, polymorphism, dynamic binding, message passing. Advantages of object orientation – reusability, maintenance, security, comfort in programming. Input and output streams in C++, Basic data types and declarations

UNIT II: Classes and objects in C++, access modifiers, static members, friend functions, Constructors and Destructors, polymorphism, Operator Overloading and type conversion, anonymous objects

UNIT III: Inheritance- parent and child classes, private, public and protected inheritance, multiple inheritance and multi-level inheritance, Virtual base classes. C++ and memory models – new and delete operators, Heap, dynamic objects.

UNIT IV: Binding & Polymorphism: Early binding, Late Binding, Pointers to derived class objects, virtual functions, Pure virtual functions, abstract classes, object slicing, exception handling in C++: try, throw and catch

4. REFERENCES

☐ ***Object oriented Programming with ANSI & Turbo C++,*** Ashok N. Kamthane, Pearson

☐ ***C++: how to program***, H. M. Deitel and P. J. Deitel, Pearson Education

☐ ***Object Oriented Programming in Turbo C++***, Robert Lafore, Galgotia Publications

SC303 Data Recovery Basics

1. AIM

☐ To introduce the student to the basic concepts of data recovery

2. OBJECTIVES

On the completion of this course, the student will be able to

☐ understand the concepts of data recovery

☐ possess skill in data recovery process

3. SYLLABUS

UNIT I: Hard disk data organization- Introduction to HDD, Components of HDD, Form factor, Hard disk destruction servicesPrimary formatting of hard disk, Advanced formatting of hard disk, Data storage region of hard disk**,**

UNITII:Data Storage, Backup, and Security-Introduction, Storage, Network Storage, External Storage Devices, Physical Storage, Backup, Examples of data loss:Disasters (floods, fires),Theft, Hardware or software malfunctions, Unauthorized access, Data Migration, Security

UNITIII:Elementary knowledge of data recovery-The essence of data recovery, The scope of data recovery, The principle of data recovery, Data loss:(Software reason,Hardware reason), Data Protecting Technologies: (SMART Technology,SPS, DFT), Floppy disk array technology, SAN, NAS,

UNITIV:Hardware and Software Recovery- Partition, File-system, File Storage, Partition Recovery, File-system Recovery, Deleted Files, File and Folder Structure Recovery, File carving for Lost Files

References

1. Data Recovery With & Without Programming, Tarun Tyagi, BPB Publications, New Delhi, India

2 File Data Recovery- Mathew Blank, Createspace Independent Pub; Large Print edition (10 December 2014)

SC304 Lab Work
Object Oriented Programming

1. AIM

□ To provide an opportunity for hands-on practice of object oriented programming and problem solving in an industry-standard programming language.

2. OBJECTIVES

This course will provide hands-on practice in a the following topics, under a variety of programming situations with a focus on writing, debugging and analyzing object oriented programs:

□ basic data types and control structures in C++

□ managing classes and objects in a variety of situations

□ solving moderately complex problems involving the above and requiring selection of appropriate structures and algorithms

3. SYLLABUS

The laboratory work will consist of 15-20 experiments, only by using class concept:

Part A

1. Testing out and interpreting a variety of simple programs to demonstrate the syntax and use of the following features of the language: basic data types, operators and control structures.

2. Solving a problem using (i) structures and (ii) classes and comparison between the two (the problem logic and details should be kept minimal and simple to enable focus on the contrast between the two methods, for example declaring result of a set of students defining the name and total marks in the program itself).

3. Class definitions and usage involving variety of constructors and destructors

Part B

4. Programs involving various kinds of inheritances

5. Programs involving operator overloading and type conversions

6. Programs involving virtual base classes, friend functions

7. Program to demonstrate early and late binding

8. Program to allocate memory dynamically

9. Program involving class and function templates

10. Programs to demonstrate (i) string processing (ii) file streams (iii) a variety of selected library functions

11. Exception handling

12. Handling of 2-D arrays using pointers

13. Debugging programs involving syntactic and/or logical errors

4. REFERENCES

☐ *C++: How to Program*, Deitel & Deitel, Pearson Education

SC305 Lab Work
Data Recovery& DBMS

1. AIM

This course will provide hands-on practice in the following topics, under a variety of computing situations with a focus on writing and analyzing SQL statements.

☐ Installing and configuring a proper SQL tool

☐ Database design and implementation

☐ recovering the data

☐ Create user interface and study the working of a data base.

2. OBJECTIVES

The student should be made to

☐ learn to create and use a database

☐ be familiarized with a query language

☐ have hands on experience on Commands

☐ familiarize data recovery management

☐ be exposed to different applications

3. SYLLABUS

The laboratory work will consist of 15-20 Experiments. Some sample topics are given below:

Part A

1. SQL statement for creating, listing, dropping, checking, updating tables

2. Record manipulation using – insert, delete, update

3. Experiments that clarify the importance of keys

4. Queries with an Expression and a column alias

5. A simple query that aggregates (groups) over a whole table

6. A query with a literal string in the SELECT list

7. Queries with sub string comparison and ordering

8. Query using the "IS NULL" syntax to list (compare '=NULL' instead of IS NULL")

9. Finding values within a certain range

10. Using the --"BETWEEN" keyword

Part B

11. A Join between two tables (foreign key)

12. Nested queries

13. The EXISTS and UNIQUE function in SQL

14. Renaming attributes and joined tables

15. Statements related with VIEWs

16. Recover lost data

4. REFERENCES

☐ *Fundamentals of Database Systems*, Elmasri & Navathe , Pearson Education.

☐ *Fundamentals of Relational Data Bases*, Ramon A. Mata-toledo and Pauline K. Cushman, Schaum Outlines, Tata McGraw Hill

☐ *Database System Concepts*, Abraham Silberschatz, Henry F. Korth, McGraw Hill

❖ SEMESTER IV

GE401 General Aptitude and Logical Reasoning

1. AIM

☐ To impart students with logical skills to solve problems easily

2. **OBJECTIVES**

At the end of the course the students will be able to

☐ interpret different data

☐ establish relationship between numbers

☐ solve different logical problems

3. SYLLABUS

UNIT I: Data sufficiency, Measurement, Time and distance, Arithmetic, Relationship between numbers

UNIT II: Basic mathematical relations and formula, Computation, Data interpretation

UNIT III: Differences, Discrimination, Decision-making, Judgment, Problem-solving, Analogies, Analysis

UNIT IV: Arithmetic reasoning, Relationship concept, Arithmetic number series, Similarities, Verbal and figure classification, Space visualization, Observation.

4. REFERENCES

☐, *How to Prepare for Logical Reasoning for the CAT*, Arun Sharma McGraw Hill Education

☐ *Logical and Analytical Reasoning*, A. K. Gupta, Ramesh Publishing House

GE402 Principles of Management

1. AIM

☐ To introduce the students to basic principles of management to provide an overview of its practice in the global industries.

2. OBJECTIVES

To introduce students to

☐ concept of Management and Organisations

☐ planning and decision making strategies

☐ concepts of organizational behaviour and HR management

☐ leadership qualities

3. SYLLABUS

UNIT I: Definition of Management – evolution of management principles - styles of Management – levels in management-structured and unstructured decision making – functions of management. Organizational behaviour – motivational theories

UNIT II: Production & Marketing Management: Time management–workflow design – scheduling CP/M – critical path – PERT, Problems, Types of Markets – Marketing Mix – Product life cycle – pricing strategies – advertisement-sales promotion

UNIT III: Quality Management. Concept of quality, total quality management, 7 sigma principles, ISO certifications, Component maturity models, CMM Levels.

UNIT IV: Human Resource Management: Meaning of HRM, Recruitment- selection and training – difference between training and development – on the job and off the job training.

4. REFERENCES

☐ *Principles of Management*, P. C. Tripathi and P. N. Reddy, 2/e, Tata McGraw Hill

☐ *Total Quality Management*, Poornima M. Charantimath, Pearson Education

☐ *Basic Managerial Skills for All*, E.H. McGrath, Prentice Hall of India

GE403 Management Information Systems

1. AIM

☐ The students should be able to analyze a specific case study and take decisions on them.

☐ Students should be able to manage time and resources

2. OBJECTIVES

☐ To know MIS framework and methodologies, socio-economic environment and MIS impact, critical success factors and implementation aspects of MIS.

3. SYLLABUS

UNIT I: An introduction to information systems, Data and Information, Management and Decision Making, Classification of Information Systems, Impact of Business on Information Systems, Information for Functional Areas of Management, Computers and Information Systems, Importance of MIS, Evolution of MIS.

UNIT II: Transaction processing system; hardware and software requirements, tools used, case studies, merits and demerits of transaction processing system.

UNIT III: Managerial control, Information and tools required, difference between transactional system and managerial system. Frequency of taking outputs, Need for interconnected system, common database, Redundancy control, case studies. Decision support system, concept and tools, case studies, virtual organizations, strategic decisions-unstructured approach, cost and values of unstructured information

UNIT IV: Optimization techniques, difference between optimization tools and DSS tools, expert system, difference between expert system and management information system. Role of chief Information officer

4. REFERENCES

☐ *Management Information Systems*, S. Sadagopan, Prentice-Hall of India

☐ *Management Information Systems*, Uma G. Gupta, Galgotia Publications

SC401 Computer Hardware Maintenance

1. AIM

☐ To create knowledge of computer hardware and ways of maintaining

2. OBJECTIVES

At the end of the course the students will be able to

☐ Explain the working of computers

☐ Identify different components of computers and explain their uses

3. SYLLABUS

UNIT I: Motherboard- Types of mother board Form Factor- Components, Chipsets-Evolution, Architecture, North Bridge/South Bridge Architecture, Hub Architecture, Super I/O chips, System Bus-Types (PCI and AGP), functions and features, Memory Bus, I/O Buses.

UNIT II: System Components: Keyboards-switches, working, interface, connectors, Pointing and positioning devices – Types, construction & working, Wireless input devices, Printers: Dot matrix, Inkjet, Laser Printer Technology, Installing Printer Support, Preventive Maintenance, Common Printing Problems, Monitor-Display specifications, SMPS: types- voltages, UPS,

UNIT III: Mother board settings. IDE interface- ATA IDE, Serial ATA- SCSI Interface- Hard Disk Drive- Construction and operation, features – Partitioning and Formatting. Hard Disk Drive Troubleshooting and Repair. Ports – Serial, COM ports, USB, IEEE-1394, Parallel – LPT1,

UNIT IV: Diagnostics, Testing, and Maintenance, Diagnostics Software, PC Maintenance Tools, Preventive Maintenance, Operating Systems Software and Troubleshooting, File Systems and Data Recovery, FAT Disk Structures, FAT File System Utilities, NTFS.

4. REFERENCES

☐ *Upgrading and Repairing PCs*, Scott Mueller, QUE.

☐ *All About Printers/Keyboards/Mouse*, Manahar Lotia, BPB Publications

☐ *The Indispensable PC Hardware Book*, Hans-Peter Messmer, 3rd Edition, Addison-Wesley Professional

☐ *PC Hardware: A Beginner's Guide*, Ron Gilster, McGraw-Hill

SC402 Web Application & development

1. AIM

☐ To expose students to technology of web sites and to introduce various tools and languages required for technical and creative design of state-of-the-art web sites

2. OBJECTIVES

To impart basic skills in moderately complex use of the following tools/scripts/languages:

☐ HTML, DHTML, CSS, JavaScript and PHP.

☐ To impart necessary ability to choose the appropriate web tools/languages for creating state-of-the art web sites

☐ To expose students to current trends and styles in web design and applications

3. SYLLABUS

Module I: HTML: General Introduction to Internet and WWW; HTML – The structure of HTML program, HTML tags – Text formatting, Text styles, List, Adding graphics to HTML documents, Tables, Linking document, Frame; simple introduction to XML.

Module II: JavaScript: Introduction to JavaScript, JavaScript in web pages, Writing JavaScript into HTML, Data types, Variables, Array, Operators, Control structures, Functions; **JavaScript Document Object Model**: Introduction, Understanding objects in HTML, Browse objects, Web page HTML object hierarchy, handling events using JavaScript. Forms, DHTML, CSS

Module III: The building blocks of PHP: variables, globals& super globals. **Data types**: type casting, **Operators & Expressions**, **Flow control functions in PHP**, **Functions**: Defining a function variable scope, calling a function, returning values ,setting default values for arguments, passing variable reference **Arrays**: creating arrays(associative &multidimensional), accessing values from arrays. Array related functions.

Module IV: Forms in PHP: Creating a simple input form, combining HTML & PHP code on a single page, form validation, redirecting the user, creating a send mail form, creating a file upload form. **Cookies**: Introduction, setting a cookie with PHP, deleting a cookie.**4. REFERENCES**

☐ Ivan Bayross, *Web Enabled Commercial application Development Using… HTML, JavaScript, DHTML and PHP*, BPB Publications

☐ H. M. Deitel, P. J. Deitel & A. B. Goldberg, *Internet and Worldwide web programming: How to Program*, Pearson Education

SC403 Data Recovery Management-II

1. AIM

☐ To introduce the student to the basic concepts of data recovery

2. OBJECTIVES

On the completion of this course, the student will be able to

☐ understand the concepts of data recovery

☐ possess skill in data recovery process

3. **SYLLABUS**

UNIT I: Hard Disk Data Organization- Primary formatting of hard disk. Low level format, Main functions of low level format, Advanced formatting of hard disk, High-level format, Format partition, Format hard disk partition by Partition Magic, Data storage region of hard disk-MBR, File Allocation Table (FAT),

UNIT II: Common Cases of Partition Recovery - MBR Recovery, Recovery of Partition, Partition Table Doctor, Auto mode, Interactive, DBR recovery, Recover DBR by Format, Boot partition, The FAT table recovery.

UNIT III: Raw Recovery-Data recovery in dynamic volume, Data recovery on inaccessible partition, File recovery on RAW partition, Data recovery when all the partitions are lost, Data recovery when GHOST Image restore failed.

UNIT IV: The Data Protection-Introduction of data security software, tips to protect data, IT security measures, Data Protection Tips for Mobile Devices, ways to secure your stored data, encrypting the information.

REFERENCES

1. Principles of data managements- BCS publications
2. Production and Application Data Recovery Second Edition , Gerardus Blokdyk

SC404 Lab Work
Computer Hardware Maintenance

1. AIM

The aim of this course is to provide an introduction to computer parts and computer software basics.

2. OBJECTIVES

At the end of the course students should

☐ have a good understanding of Hardware Parts of Computer

☐ have a good understanding of the fundamental concepts of Computer Organization

☐ know how to install an operating system

☐ know how to install a network

☐ know how to perform printer sharing and internet sharing

3. SYLLABUS

1. Familiarization of Hardware Components and troubleshooting

☐ Mother board

☐ Display

☐ Printers

☐ Primary memory and storage devices

☐ Key Board

2. Assembling

☐ AT machine

☐ ATX Machine

3. Hard Disk Preparation and troubleshooting

☐ FDISK

☐ Disk Manager

☐ Partition Magic

4. Installation of Operating Systems and troubleshooting

5. Preparations for installing networks

☐ Crimping - Cross and Straight connections

☐ Installation of Network Cards

6. Printer sharing, Internet sharing and troubleshooting

SC405 Lab Work
Project Work

1. AIM

☐ To expose students to industry-standard project practices, through a real-life project work under time and deliverable constraints, applying the knowledge acquired through various courses.

2. OBJECTIVES

☐ To provide an opportunity to apply the knowledge gained through various courses in solving a real life problem

☐ To provide an opportunity to practice different phases of software/system development life cycle

☐ To introduce the student to a professional environment and/or style typical of a global IT industry

☐ To provide an opportunity for structured team work and project management

☐ To provide an opportunity for effective, real-life, technical documentation

☐ To provide an opportunity to practice time, resource and person management.

3. PROJECT GUIDELINES

☐ Group Size – maximum 3 members

☐ No. of records – No. of group members + 1 (Department copy)

☐ Certificate should include the names of all members

The minimal phases for the project are:

☐ Project search

☐ finalization and allocation

☐ Investigation of system requirements

☐ Data and Process Modelling

☐ System Design

☐ Program design

☐ Program coding and unit testing

☐ System integration

☐ System implementation and acceptance testing