ST. ALBERT'S COLLEGE ERNAKULAM (AUTONOMOUS)

Affiliated to Mahatma Gandhi University, Kottayam, Kerala

SYLLABUS FOR UNDERGRADUATE PROGRAMME

BACHELOR OF VOCATION IN SOFTWARE DEVELOPMENT

UNDER CREDIT SEMESTER SYSTEM

(WITH EFFECT FROM 2023 ADMISSION)

Approved by the Board of Studies on 21-02-23

Syllabus of B. Voc. Programme in Software Development

Proposed by the Board of Studies on 21th February 2023

Ms. Neenu Kuriakose

Chairman, Board of Studies

Approved by the Academic Council on 14th March 2023

Dr. Bijoy V. M, Principal

Chairman, Academic Council.

Adopted by the Governing Council on 22nd April 2023

Fr. Antony Thoppil

Chairman, Governing Council

Board of Studies

No.	Name	Designation
1	Ms. Neenu Kuriakose	Chairman, Head of the Department and Assistant Professor, Department of Computer Science, St. Albert's College (Autonomous), Ernakulam.
2	Dr. Bindiya M. Varghese	Dean- Computer Science, Rajagiri School of Social Sciences(Autonomous), Cochin
3	Dr. Sherly K.K	Associate Professor, Department of Information Technology, Rajagiri School of Engineering and Technology, Cochin
4	Dr. Kurian M. J	Associate Professor and HoD, Department of Computer Applications, Baselios Poulose II Catholics College, Piravom
5	Mr. Joseph Deril K. S	Associate Professor, Department of Computer Applications, MES College, Marampilly.
6	Mr. Cijin K Paul	Assistant Professor, Department of Computer Science, Union Christian College, Aluva.
7	Mr. Shiju Thomas M Y,	Assistant Professor, Rajagiri School of Computer Science, Cochin
8	Mr. Nishanth P R	Chief Executive Officer, Technovia Info Solutions Pvt Ltd

9	Fr. Christy David	Assistant Professor, Department of Computer Science, St. Albert's College
10	Fr. John Christopher Vadassery	Assistant Professor, Department of Computer Science, St. Albert's College (Autonomous)
11	Ms. Sangeetha J	Assistant Professor, Department of Computer Science, St. Albert's College (Autonomous)
12	Ms. Agnes Neenu N T	Assistant Professor, Department of Computer Science, St. Albert's College (Autonomous),
13	Mr. Shine Antony	Assistant Professor, Department of Computer Science, St. Albert's College
14	Ms. Amrutha N	Assistant Professor, Department of Computer Science, St. Albert's College
15	Ms. Haritha Rajeev	Assistant Professor, Department of Computer Science, St. Albert's College
16	Ms. Asha Thomas	Assistant Professor, Department of Computer Science, St. Albert's College
17	Ms. Angelina Dsilva	Assistant Professor, Department of Computer Science, St. Albert's College
18	Ms. Anjana C M	Assistant Professor, Department of Computer Science, St. Albert's College
19	Ms. Vidhya Vijayan	Assistant Professor, Department of Computer Science, St. Albert's College
20	Ms. Anitha M V	Assistant Professor, Department of Computer Science, St. Albert's College

Acknowledgement

There are many profound personalities whose relentless support and guidance made the syllabus of B. Voc. Software Development 2023 a success. I take this opportunity to express my sincere appreciation to all those who were part of this endeavor for structuring of the syllabus of B. Voc. Software Development.

We express profound gratitude to the Manager and Principal of St. Albert's College for their leadership and guidance for completion of this work.

We thank the all the BOS members for extending their service for the smooth completion of the syllabus restructuring. I place on record my whole hearted gratitude to all the faculty members of Department of Computer Science for their untiring efforts.

We also place on record my gratitude to all professionals, academicians and other stakeholders who gave valuable suggestions in this regard.

Board of Studies

Ernakulam

21. 02. 2023

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Preface

As envisaged in the recent regulations of Autonomous colleges in India by University Grants Commission, autonomous colleges enjoy the academic freedom to enrich the curriculum by incorporating recent trends and needs. Curriculum and syllabus of each academic program has to be revised periodically to impart major objectives like global competency, skill component, values and regional relevance. Academicians and scholars in the respective area of knowledge have to express a missionary zeal for this great purpose.

In 2016, when St. Albert's College was granted autonomy, we adopted the curriculum and syllabus followed by the Mahatma Gandhi University, Kottayam for the year 2016. In 2017, when the Mahatma Gandhi University made a comprehensive revision of their curriculum and syllabus, it was adopted by the college as it was a better curriculum that met the needs and current demands of the culture, the society, and the expectations of the population being served. However, the Syllabus revision committee of the department studied the present curriculum in detail and proposed some reasonable changes for further enrichment which may be implemented from 2023 admission onwards.

The present Bachelor of Vocational Studies in Software Development follows the Credit Semester System consisting of six semesters, an open course in the fifth semester and three elective courses in sixth semester. The students are given opportunity get one certificate course, two extra credit courses and a variety of extracurricular programs during the three years period of the programme. The present curriculum offers a wide exposure to various conventional, advanced, and applied fields in computer science and software development which will facilitate them for a graduate or for pursuing higher studies in Computer Science domain. It is intended that students will acquire due knowledge and skill which will enable them to get employed in leading academic and research institutes, and in related industries and departments. Attempts were also made to integrate the essential components to generate interest for self-employment or startups among the students.

The syllabus was proposed by teachers, academicians, and other scholars from the field; aligned with existing M.G university regulations of 2018.

Graduate Attributes

On completion of an Undergraduate Programme from St. Albert's College (Autonomous), students should be able to demonstrate the programme outcomes listed below:

PO 1: Discipline knowledge

Demonstrate comprehensive knowledge and understanding of one or more disciplines that form a part of an undergraduate programme of study.

PO 2: Critical Thinking

Apply analytic thought to a body of knowledge; analyse and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence; identify relevant assumptions or implications; formulate coherent arguments; critically evaluate practices, policies and theories by following scientific approach to knowledge development.

PO 3: Effective Communication

Capacity to connect with people, ideas, books, media, and technology to make sense of the world. This includes the ability to communicate, read, write, and listen clearly in person and through electronic media in English and in one Indian language.

PO 4: Social Responsibility

Exhibit qualities of an ideal citizen through civic and social responsibilities along with the knowledge of one's environment and the issues faced, and strive towards sustainable development.

PO 5: Digital Competency

Analyze and choose from available data and information sources to communicate, collaborate and network through a range of digital media

Programme Outcomes

After completion of this programme, the students will be able to attain the following:

PO1: Discipline Knowledge

Build solid foundation in software development concepts, principles, theories and practices through deep knowledge concepts like requirements gathering, design, implementation, testing and maintenance.

PO2: Communication Skills

Develop skills to effectively communicate ideas, and solutions to both technical and non-technical stakeholders through presentations, group discussions, project reports.

PO3: Critical Thinking

Analyze complex problems, break them down into smaller components and devise effective solutions using appropriate algorithms and data structures, learn how to debug and trouble shoot software issues efficiently.

PO 4: Social Responsibility

Understand the ethical implications of their work, including issues related to privacy, security, intellectual property and accessibility. They would be aware of professional standards, best practices and legal considerations that govern software development.

PO 5: Digital Competency

Develop software Applications through user requirements, translating them into technical specifications, creating architectural designs, implementing code modules, conducting thorough testing and deploying the final product.

PO 6: Continuous Learning and Adaptability

Develop the ability to keep up with the latest trends in the industry, learn new programming languages or frame works as needed, and adapt to changing project requirements

PO7: Project Management

Plan, Organize and execute software development projects including setting realistic goals, managing resources, tracking progress, and meeting deadlines

Regulations

1. TITLE

These regulations shall be called "ST. ALBERT'S COLLEGE (AUTONOMOUS), ERNAKULAM - REGULATIONS FOR B. Voc PROGRAMMES UNDER CREDIT SEMESTER SYSTEM 2023". (SACA B.Voc. CSS 2023)

2. SCOPE

This applies to all regular B. Voc. Programme conducted by the College with effect from 2023 admissions. The medium of instruction is English except in the case of language courses otherthan English unless otherwise stated therein.

3. DEFINITIONS

'Academic Week' is a unit of five working days in which the distribution of work is organized from day one to day five, with five contact hours of one-hour duration on each day / is a unit of six working days in which the distribution of work is organized from day one to day five with 4 hours and day six with 5 contact hours of one-hour duration on each day as decided by the Governing body of the College.

3.1 NSQF means National Skills Qualifications Framework'.

3.2 'General components' means a course that provides a general awareness about the discipline.

3.3 'Skill components' means a course in the subject of specialization within a vocational degree programme.

3.4 'Course' means a portion of a subject to be taught and evaluated in a semester (similar to a paper under the annual scheme).

3.5 'OJT' means On-the-job-training for a period of 2 weeks.

3.6 'Internship' means a professional learning experience of 2 to 4 weeks that offers meaningful practical work related to student's field of study.

3.7 'Credit' is the numerical value assigned to a paper according to the relative importance of the syllabus of the programme.

3.8 'Department' means any teaching department in a college.

3.9 'Examination Coordinator' is a teacher nominated by a Department Council to coordinate the continuous evaluation undertaken in that department.

3.10 'Department Council' means the body of all teachers of a department in a college.

3.11 'Class Tutor' means a teacher from the department nominated by the Department Council, who will advise the student on academic matters.

3.12 Grace Marks shall be awarded to candidates as per the Orders issued from the college from time to time at par with the affiliating University.

3.13 'Grade' means a letter symbol (A, B, C, etc.), which indicates the broad level of performance of a student in a Paper/Course/ Semester/Programme.

3.14 'Credit Point' (CP) is the numerical indicator of the percentage of marks awarded toa student in a course.

3.15 'Institutional Average (IA)' means average mark secured (Internal + external) for a course at the college level.

3.16 'Parent Department' means the department which offers the skill course/courses within an undergraduate Programme.

3.17 'Programme' means a three-year programme of study and examinations spread over six semesters, the successful completion of which would lead to the award of a degree.

3.18 Semester' means a term consisting of 90 working days, inclusive of tutorials, examination days, and other academic activities within a period of five months.

3.19 'Vocational Course' (Skill Enhancement Course) means a course that enables the students to enhance their practical skills and ability to pursue a vocation in their subject of specialization.

3.20 Words and expressions used and not defined in this regulation shall have the same meaning assigned to them in the Acts and Regulations of UGC, Department of Higher Education, the affiliating University and regulations of the College.

4. ELIGIBILITY FOR ADMISSION AND RESERVATION OF SEATS

4.1 A pass in Plus Two or equivalent examination or an examination recognized as equivalent thereto by UGC and affiliating University unless for certain programmesin which eligibility for admissions are approved by the Governing body and mentioned in the Prospectus.

4.2 Eligibility for admissions and reservation of seats for various Undergraduate Programmes shall be according to the rules framed by the Governing Body of the College in this regard, from time to time at par with the UGC norms and regulations of the Government of Kerala.

5. FACULTY UNDER WHICH DEGREE IS AWARDED

The Faculty of Technology and Applied Sciences

6. CURRICULUM

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

7. DURATION

7.1 The duration of the U.G. programme shall be 6 semesters.

7.2 There shall be two semesters in an academic year, the "ODD" semester commences in June, and on completion, the "EVEN" Semester commences.

7.3 There shall be a two-month vacation during April/May and internships may be conducted during this months as decided by the departments.

7.4 The certification levels will lead to Diploma/ Advanced Diploma/B.Voc Degree and will be offered under the aegis of the College in association with the respective sec- tor skill council of the programme in accordance with the NSQF as outlined in the table given below.

Award	Duration
Diploma	2 Semesters
Advanced Diploma	4 Semesters
B.Voc. Degree	6 Semesters

8. ELIGIBILITY FOR HIGHER STUDIES

Those who pass B.Voc. Degree programmes are eligible for admission to higher studies.

9. CREDIT CALCULATION

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

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

For internship/fieldwork/OJT/HOT, the credit weightage for equivalent hours shall be 50% ofthat for lectures/workshops.

10. REGISTRATION

The strength of students for each programme shall be as per the existing orders issued by theCollege following the UGC guidelines.

11. SCHEME AND SYLLABUS

11.1 The U.G. programmes shall include (a) General components, (b) Skill components.

11.2 Credit Transfer and Accumulation system can be adopted in the programme with theconcurrence of the Governing Body of the College. Transfer of Credit consists of acknowledging, recognizing and accepting credits by an institution for programmes or courses completed at another institution. The Credit Transfer Scheme shall allow students pursuing a programme in one College/University to continue their education in another College/University without break.

11.3 The B.Voc programme should follow credit and semester system of St. Albert's College(Autonomous).

11.4 A separate minimum of 30% marks each for internal and external (for both theory and practical) and an aggregate minimum of 40% are required for a pass for a course. For the programmes with practical examinations, the practical examinations will be conducted every semester or at the end of even semesters as applicable.

11.5 For a pass in a programme, a separate minimum of Grade P is

required for all the individual courses. If a candidate secures an F Grade for any one of the courses offered in a Semester/Programme only F Grade will be awarded for that Semester/Programme until he/she improves this to P Grade or above within the permitted period. The candidate who secures P Grade and above will be eligible for higher studies.

12. PROGRAMME STRUCTURE

The B.Voc. programme shall include the following elements:

- General Education Components
- Skill Components
- Project
- Internships
- OJT
- Soft skills and Personality Development Programmes
- Field Visit / Industrial Visits / Study Tour

	PARTICULARS	B.VocProgrammes
A	Programme Duration	6 Semesters
B	Total Credits required for successful completion of the Programme	180
C	Credits required from Skill Component	108
D	Credits required from General Component	72
G	Minimum attendance required	75%

COURSE STRUCTURE

NSQF Level	Credits		Normal Duration	Exit Points / Awards
	Skill Component	General Component		

Level 5 /Year 1	36	24	Two Semesters	Diploma
Level6/Year 2	72	48	Four Semesters	Advanced Diploma
Level 7/Year 3	108	72	Six Semesters	B. Voc. Degree

As per the UGC guidelines, there are multiple exit points for a candidate admitted to this course. If he/she is completing all six semesters successfully, he/she will get a B. Voc. Degree. If he/she is completing the first four semesters successfully, he/she will get an Advanced Diploma.If he/she is completing the first two semesters successfully, he/she will get a Diploma. A B.Voc. Degree holder is expected to acquire the skills needed for a Manager/Entrepreneur/skilled employee.

13. ATTENDANCE

The minimum number of hours of lectures, tutorials, seminars or practicals which a student shall be required to attend for eligibility to appear at the end semester examination shall not beless than 75% of the total number of lectures, tutorials, seminars, or practical sessions and shall have 75% separate attendance during their internship and OJT period also. Internships, OJT and soft skill and personality development programmes are part of the course and students must meet the attendance requirements for these activities to complete a semester.

14. ASSESSMENT AND CERTIFICATION BY SECTOR SKILL COUNCIL (SSC)

The department should make necessary arrangements for the simultaneous assessment and certification of Skill Development Component by aligned SSC having the approval of National Skill Development Corporation of India (NSDC).

15. EXAMINATION

The evaluation of each paper shall contain two parts:

Internal or In-Semester Assessment (ISA) External or End-Semester Assessment (ESA)

The internal to external assessment ratio shall be 1:4.

Both internal and external marks are to be rounded to the next integer.

All papers (theory & practical), grades are given **on a 7-point scale** based on the total percentage of marks, *(ISA+ESA)* as given below:-

Percentage of Marks	Grade	Grade Point
95 and above	O - Outstanding	10
90 to below 95	A+ – Excellent	9
80 to below 90	A - Very Good	8
70 to below 80	B+ – Good	7
60 to below 70	B – Above Average	6
50 to below 60	C – Average	5
40 to below 50	P – Pass	4
Below 40	F – Fail	0
	Ab – Absent	0

16. CREDIT POINT AND CREDIT POINT AVERAGE

The Credit Point (CP) of a paper is calculated using the formula:

CP = C ×GP, where C is the Credit and GP is the Grade point.

SemesterCredit Point Average (SCPA) of a Semester is calculated using the formula:

SCPA / CPA= TCP/TC, where TCP is the Total Credit Point of that semester.**Cumulative Credit Point Average (CCPA)** is calculated using the formula: **CCPA = TCP/TC**, where TCP is the Total Credit Point of that programme.

Credit Point Average (CPA) of different categories, of course, is calculated using the formula:

CPA = TCP/TC, where TCP is the Total Credit Point of a category of course.

TC is the total credit of that category of course.

Grades for the different courses, semesters and overall programme are given based on thecorresponding CPA as shown below:

CPA	Grade	
9.5 and above	O	Outstanding
9 to below 9.5	A+	Excellent
8 to below 9	A	Very Good
7 to below 8	B+	Good
6 to below 7	B	Above Average
5 to below 6	C	Average
4 to below 5	P	Pass
Below 4	F	Failure

17. MARK DISTRIBUTION FOR EXTERNAL AND INTERNAL EVALUATIONS

The external theory examination of all semesters shall be conducted by the college at the end of each semester. Internal evaluation is to be done by continuous assessment. For all courses, the total marks for external examination is 80 and the total marks for internal evaluation is 20.

For the courses having both theory and practical components, the external examination marks would include 60 for theory and 20 for practical. The internal evaluation would remain the same as above.

Mark distribution for external and internal assessments and the components for internal evaluation with their marks are shown below:

18. For all theory courses

Marks of external Examination : 80

Marks of internal evaluation : 20

Components of Internal Evaluation of theory	Marks
Attendance	5
Assignment/ Seminar/Viva	5
Test Paper 1	5
Test paper 2	5

Total	20

18.1 For practical examinations,

The total marks for external evaluation : 80

The total mark for internal evaluation : 20

Components for internal evaluation of Practical	Marks
Attendance	5
Record	5
Skill Test	5
Lab Performance/Punctuality	5
Total	20

*Marks awarded for Record should be related to the number of experiments recorded and dulysigned by the teacher concerned in charge.

All four components of internal assessments are mandatory unless for the courses otherwisementioned in the BoS.

19.1 For courses having both theory and practical components

a) Marks of theory- external examination : 20

b) Marks of practical- external examination : 60

c) Marks of internal evaluation : 20

19.2 For Internship with project

Marks of external evaluation : 80

Marks of internal evaluation : 20

Components of External Evaluation of Project	Marks
Dissertation (External)	50
Viva-Voce (External)	30
Total	80

*Marks for dissertation may include industrial visit report if proposed in the syllabus.

Components of internal Evaluation of Project	Marks
Punctuality	5
Experimentation/Data Collection	5
Skill Acquired	5
Report	5
Total	20

*All four components of internal assessments are mandatory unless for the courses otherwisementioned in the BoS

19.3 For Internships

There will only External evaluation for Internships.

Components of Internal Evaluation- Internships

Components of External Evaluation of Internship	Marks
Dissertation (External)	50
Viva-Voce (External)	30
Marks awarded by the organization/company/institution/agency (External)	20
Total	100

*Marks for dissertation may include the report of field visit done as part of internship if proposed in the syllabus.

19.4 OJT

There will be only internal evaluation for OJT.

Components of Internal Evaluation of OJT	Marks
Punctuality	10
Subject Knowledge/Viva	20
Report	50
Marks awarded by the organization/company/institution/agency (External)	20

Total	100

20 Attendance Evaluation for all papers

% of attendance	Marks
90 and above	5
85 – 89	4
80-84	3
76-79	2
75	1

(Decimals are to be rounded to the next higher whole number)

21 ASSIGNMENTS

Assignments are to be done from Ist to VIth Semesters. At least one assignments should be doneper course per semester for evaluation.

22 SEMINAR

A student shall present a seminar every semester for each course.

23 INTERNAL ASSESSMENT / TEST PAPERS

23.1 At least two internal test papers are to be attended in each semester for each course. The evaluations of all components are to be published and are to be acknowledged by the candidates. All documents of internal assessments are to be kept in the department for five years and shall be made available for verification by the College. The responsibility of evaluating the internal assessment is vested on the teacher(s), who teaches the course.

23.2 In case of any grievances regarding internal assessment, students can follow the procedures mentioned below under Grievance Redressal Mechanism - clause number 24 in regulation.

23.3 The COE shall make arrangements for giving awareness of the internal evaluation components to students immediately after the commencement of the Ist semester.

23.4 The internal evaluation marks/grades in the prescribed format should reach the office of the Controller of Examinations, St. Albert's College before the commencement of study leave in

each semester.

24 GRIEVANCE REDRESSAL MECHANISM WITH RESPECT TO INTERNAL EVALUATION

The internal assessment shall not be used as a tool for personal or other types of vengeance. A student has all rights to know how the teacher arrived at the marks. There is a provision for grievance redressal regarding internal evaluation which operates at four levels. Complaints regarding the internal evaluation shall be brought to the notice of the teacher concerned in thefirst instance. If the student is not satisfied with the decision of the teacher concerned, he/she may appeal to the Departmental Grievance Redressal Committee which shall have the Head of the department, the class Tutor, and the teacher against whom the complaint is made, as members. The student will also have the freedom to make further appeals to the College Level Grievance Redressal Committee which shall have the Principal, the COE, and the concerned Head of the department, as members. If the student is not satisfied, he may appeal to the Governing Body.

Level 1: Class level: The cell is chaired by the class tutor and the course teacher or a teachernominated by the Head of the Department.

Level 2: Department level: The department cell chaired by the Head of the Department,Examination Coordinator and teacher-in-charge as members.

Level 3: College level: A committee with the Principal as Chairman, Examination Coordinator, HOD of concerned Department and a senior teacher nominated by the college council as members.

1. EXTERNAL EXAMINATION (END SEMESTER EXAMINATION)
    a. The external examination of all semesters shall be conducted by the College at the end of each semester.
    b. Students having a minimum of 75% average attendance for all the courses only can register for the examination. Condonation of shortage of attendance to a maximum of 10 days in a semester subject to a maximum of 2 times during the whole period of the programme may be granted by the college on valid grounds. This condonation shall not be counted for internal assessment. The benefit of attendance may be granted to students attending University/College union/Co-curricular activities by treating

them as present for the days of absence, upon producing participation/attendance certificates, within one week, from competent authorities through the class tutor, HoD and Dean of Student Affairs and endorsed by the Principal. This is limited to a maximum of 10 days per semester and this benefit shall be consideredfor internal assessment also. Those students who are not eligible even with the con- donation of shortage of attendance will not be readmitted.

c. The women students can avail maternity leave as per the M.G.U order No. 490/AC A 1/2023/MGU dated 16/01/2023.

d. There shall be special supplementary exams only for the fifth semester. For reappearance/ improvement for other semesters, the students can appear along withthe next batch.

e. There shall be no provision for supplementary examination for the internal assessment.

f. A pass in the internal assessment is mandatory for registering for the End semester examination.

g. A student who registers his/her name for the external exam for a semester will be eligible for promotion to the next semester provided he/she meet the academic requirements.

h. All courses shall have a unique alphanumeric code.

i. There is no provision for betterment of internal evaluation marks as well as marks for Practical/OJT/Internship/Project/Viva.

25. PATTERN OF EVALUATION FOR EXTERNAL EXAMINATION – PRACTICAL / INTERNSHIPWITH PROJECT

The components of End Semester Examination of Practical/Internship with Project have to beset by the Chairman of the Boards of Studies concerned.

All students are required to complete Hands-on training / On-job training (OJT, Internship and a project, as directed in the respective syllabus. The project can be done individually or as a group, as decided by the Department. The Hands-on training and OJT has to be done during the period as prescribed in the particular semester of the programme. The project, if it isa requisite of the syllabi, has to be done in the final year of the programme. The reports of Hands-on training and OJT (in duplicate) have

to be submitted to the department during the particular semester prescribed in the programme and the report of the project (in duplicate) is to be submitted tothe department in the sixth semester. The project report should be produced before the examiners appointed by the College.

For reappearance/ improvement, the students can appear along with the next batch. A studentwho registers his/her name for the external exam for a semester will be eligible for promotion to the next semester.

26.PATTERN OF QUESTIONS

Questions shall be set to assess knowledge acquired, standard and application of knowledge, application of knowledge in new situations, critical evaluation of knowledge, and the ability to synthesize knowledge. The question setter shall ensure that questions covering all skills are set. She/he shall also upload a detailed scheme of answer type, short essay type/problem-solving type, and long essay type questions to be generated from the question bank. A question paper shall be a judicious mix of short answer type, short essay type /problem-solving type, and long essay type questions and to be generated from the question bank.

a. Pattern of questions for external examination for theory paper without practical.

Pattern	Total no. of questions	Number of questions to be answered	Marks of each question	Total marks
Very Short Answer type	12	10	2	20
Short Answer (Not to exceed 60 words)	9	6	5	30
Long essay	4	2	15	30
TOTAL	25	18		80

b. Pattern of questions for external examination for courses having both theory andpractical components.

Theory assessment – Short Answer Type					
Pattern	Total no. of questions	Number of questions to be answered	Marks of each question		Total marks
Short essay/ problem	8	5	4		20
Skill Assessment – Practical					
Record	Theory / Procedure / Design	Activity/ Design/ Performance	Result	Viva	Total
10	10	20	10	10	60
		Total		80	

c. Mark division for LAB examination

Record	Theory/ Procedure / Design	Activity/ Design/ Performance	Result	Viva	Total
10	20	25	15	10	80

27.MARK CUM GRADE CARD

The College under its seal shall issue to the students a MARK CUM GRADE CARD on completionof each programme, which shall contain the following information:

a. Name of the College
b. Title & Model of the B.Voc. Programme
c. Name of the Semester
d. Name and Register Number of the student
e. Date of publication of result

f. Code, Title, Credits, and Maximum Marks (Internal, External & Total) of each course opted in the semester.

g. Internal, External and Total Marks awarded, Grade, Grade point, and Credit point in each course opted in the semester.

h. The total credits and total credit points in the semester.

i. Semester Credit Point Average (SCPA) and corresponding Grade.

j. Cumulative Credit Point Average (CCPA), CPA corresponding to General and skill Courses.

k. The final Mark cum Grade Card issued at the end of the final semester shall contain the details of all courses taken during the final semester examination and shall include the final Grade (SCPA) scored by the candidate from 1st to 5th semesters, and the overall Grade for the total programme.

28. RANK/POSITION CERTIFICATE

The college publishes a position list of the top 5 candidates for each programme after the publication of 6th-semester results. Position certificate shall be issued to candidates who secure positions from 1st to 3rd in the rank list. Candidates shall be ranked in the order of meritbased on the CCPA scored by them. Grace marks awarded to the students should not be counted in fixing the rank/position. Rank certificate and position certificate shall be signed by the Controller of Examinations.

29.There shall be 3 level monitoring committees for the successful conduct of theprogramme. They are -

29.1 Department Level Monitoring Committee (DLMC), comprising the HOD and two senior-most teachers as members.

29.2 College Level Monitoring Committee (CLMC), comprising the Principal, Controller ofExaminations, and A.O/Superintendent as members.

29.3 Governing body.

30 TRANSITORY PROVISION

Not with standing anything contained in these regulations, the Governing body shall, for one year from the date of coming into force of these regulations, have the power to provide by an order that these regulations

shall be applied to any programme with such modifications as may be necessary.

30.1 The Governing body is authorized to make necessary criteria for eligibility for higher education in the grading scheme, if necessary. The Governing body is also authorized to issue orders for the perfect realization of the Regulations

Annexure I: Model Mark Cum Grade Card

St. Albert's College (Autonomous)
Ernakulam-682 018, Kerala, India.
Accredited by National Assessment and Accreditation Council (NAAC)
at A Grade ISO 9001: 2315 Certified
Affiliated to Mahatma Gandhi University, Kottayam, Kerala

GRADE CARD

NAME OF THE CANDIDATE		Student Photo
PERMANENT REGISTER NUMBER(PRN):		
DEGREE		
PROGRAMME		
STREAM		
NAME OF THE EXAMINATION		
DATE OF ISSUE		

COURSE CODE	COURSE TITLE	MARKS							GP	GRADE	CGP	RESULT
			INTERNAL		EXTERNAL		TOTAL					
		CREDITS	AWARDED	MAXIMUM	AWARDED	MAXIMUM	AWARDED	MAXIMUM				
General Component												
Skill Component												
	TOTAL											
	SEMESTER RESULT	SCPA:							SG:			

Controller of Examinations Principal

Annexure II: Consolidated Model Mark cum Grade Card

St. Albert's College (Autonomous)

Ernakulam-682 018, Kerala, India.

Accredited by National Assessment and Accreditation Council(NAAC) at A Grade ISO 9001: 2315 Certified

Affiliated to Mahatma Gandhi University, Kottayam, Kerala

CONSOLIDATED MARK CUM GRADE CARD

NAME OF THE CANDIDATE		Student Photo
PERMANENT REGISTER NUMBER (PRN)		
DEGREE		
PROGRAMME		
STREAM		

		SEMESTER RESULTS					
SEMESTER	MARKS AWARDED	MAXIMUM MARKS	CREDITS	SCPA	GRADE	MONTH AND YEAR OF PASSING	RESULT
SEMESTER 1							
SEMESTER 2							
SEMESTER 3							
SEMESTER 4							
SEMESTER 5							
SEMESTER 6							
TOTAL							

	PROGRAMME PART RESULTS					
PROGRAMME PART	MARKS AWARDED	MAXIMUM MARKS	CREDIT POINTS	CREDITS	CCPA	GRADE

GENERAL COMPONENTS						
SKILL COMPONENTS						
TOTAL						

FINAL RESULT			
CREDITS	CCPA	GRADE	RESULT

COURSE CODE	COURSE TITLE	MARKS											RESULT
		CREDITS	AWARDED	INTERNAL MAXIMUM	AWARDED	EXTERNAL MAXIMUM	AWARDED	TOTAL MAXIMUM					
SEMESTER 1													
General Components													
Skill Components													
SEMESTER RESULT				SCPA:							SG:		
SEMESTER 2													
General Components													
Skill Components													
SEMESTER RESULT				SCPA:							SG:		
SEMESTER 3													
General Components													

Skill Components				
SEMESTER RESULT	SCPA:		SG:	
SEMESTER 4				
General Components				
Skill Components				
SEMESTER RESULT	SCPA:			SG:
SEMESTER 5				
General Components				
Skill Components				
SEMESTER RESULT	SCPA:			SG:
SEMESTER 6				
General Components				
Skill Components				
SEMESTER RESULT	SCPA:			SG:

Controller of Examination Principal

Annexure III: Reverse side of the mark cum Grade Card (Common to all Semesters)DESCRIPTION OF EVALUATION PROCESS

Grade and Grade Point

The evaluation of each course comprises Internal and External components with the ratio 1:4 for all courses. Grade and grade points are given on a 7-point scale based on the percentage ofmarks (internal + external) as given in table I. Decimals are corrected to next higher whole number.

Table I

% of Marks	Grade	Grade Point
95 and above	O – Outstanding	10
90 to below 95	A+ – Excellent	9
80 to below 90	A - Very Good	8
70 to below 80	B+ - Good	7
60 to below 70	B – Above Average	6
50 to below 60	C – Average	5
40 to below 50	P – Pass	4
Below 40	F – Fail	0
	Ab (Absent)	0

Credit Point and Credit Point Average

Credit point (CP) of a course is calculated using the formula CP = C x GP Where C = Credit, GP =Grade Point

Credit Point average of a semester (SCPA) or Cumulative Credit Point Average (CCPA) for aprogramme is calculated using Total Credit point, TC = Total Credit

CCPA	Grade
9.5 and above	O– Outstanding
9 to below 9.5	A+ – Excellent
8 to below 9	A - Very Good
7 to below 8	B+ – Good
6 to below 7	B – Above Average
5 to below 6	C – Average
4 to below 5	P – Pass
Below 4	F – Failure

Note: A separate minimum of 30 % marks each for internal and external (for both Theory and practical) and an aggregate minimum of 40 % is required for a pass in a course. To pass in a programme, a separate minimum of Grade P for all the individual courses and an overall grade P or above is mandatory. If a candidate secures Grade F for any of the courses offered in a semester or a programme only grade F will be awarded to that semester/Programme until the candidate improves this to Grade P or above within the permitted period.

Read By	
Verified By	

QR Code

Programme Design

Semester I

No	Course Code	Course Title	Course Category	Hours per week	Credit
1	ENG1CCT0323	Basic English Skills for Business	GC	4	4
2	VCS1CMT0123	Principles of Management	GC	4	4
3	VCS1CMT0223	Foundations of Mathematics	GC	4	4
4	VCS1CRT0123	Computer Skills For Business	SC	4	5
5	VCS1CRP0323	Programming Principles & C, C Lab	SC	4	5
6	VCS1CRP0223	Word Processing, Image Editing and Lab	SC	4	5
7	VCS1OJT0123	OJT 1	SC		3

Semester II

No	Course Code	Course Title	Course Category	Hours per week	Credit
1	ENG2CCT0323	Advanced English Skills for Business	GC	5	4
2	VCS2CMT0123	Soft skills and Personality Development	GC	4	4
3	VCS2CMT0223	Optimization Techniques	GC	4	4
4	VCS2CRP0123	Computer Animation and Lab	SC	6	6
5	VCS2CRP0223	Data Structures, Algorithms and Lab	SC	6	6
6	VCS2CPR0123	Internship 1	SC		6

Semester III

No	Course Code	Course Title	Course Category	Hours per week	Credit
1	VCS3CMT0123	Software Engineering	GC	4	4
2	VCS3CMT0223	Environment Science and Human Rights	GC	4	4
3	VCS3CMT0323	Computer Networks	GC	4	4
4	VCS3CRT0123	Operating Systems	SC	4	5
5	VCS3CRP0123	Database Management System and Lab	SC	5	5
6	VCS3CRP0223	OOPs and LAB	SC	4	5
7	VCS3OJT0123	OJT 2	SC		3

SEMESTER IV

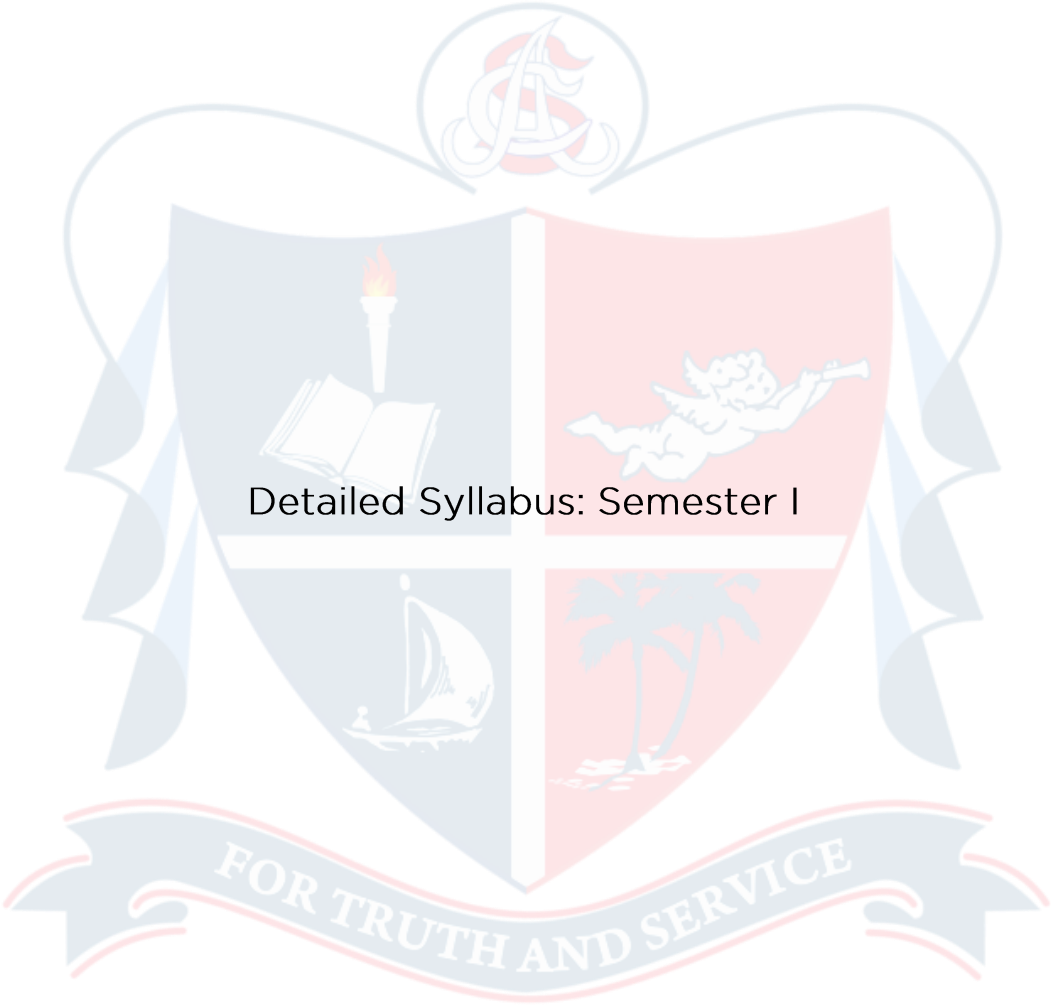
No	Course Code	Course Title	Course Category	Hours per week	Credit
1	VCS4CMT0123	Business Entrepreneurship	GC	5	4
2	VCS4CMT0223	Corporate Readiness Program	GC	4	4
3	VCS4CMT0323	Management Information Systems	GC	4	4
4	VCS4CRP0123	Web Application Development and Lab	SC	6	6
5	VCS4CRP0223	Computer Hardware Maintenance and Lab	SC	6	6
6	VCS4CPR0123	Internship 2	SC		6

Semester V

No	Course Code	Course Title	Course Category	Hours per week	Credit
1	VCS5CMT0123	Aptitude & Logical Reasoning	GC	4	4
2	VCS5CMT0223	Research Methodology	GC	4	4
3	VCS5CMT0323	Artificial Intelligence	GC	4	4
4	VCS5CRT0123	Data Analytics	SC	5	5
5	VCS5CRT0223	Software Testing	SC	4	5
6	VCS5CRP0123	Programming in Java and Lab	SC	4	5
7	VCS5OJT0123	OJT 3	SC		3

Semester VI

No	Course Code	Course Title	Course Category	Hours per week	Credit
1	VCS6CMT0123	Information Security	GC	5	4
2	VCS6CMT0223	Informatics	GC	4	4
3	VCS6CMT0323	Digital Marketing	GC	4	4
4	VCS6CRT0223	Free and Open-Source Software	SC	6	6
5	VCS6CRP0123	Mobile Application Development and Android Lab	SC	6	6
6	VCS6CPR0123	Internship with Project	SC		6



Detailed Syllabus: Semester I

General Component: Basic English Skills for Business (ENG1CCT0323)

60 Hours 4 Credits

Course Outcomes

- Recognize the speech sounds and suprasegmental features.
- Familiarize different dialects and the accents
- Demonstrate the features of listening, reading and speaking skills
- Develops skills in face to face and telephonic communication as well as in group discussions
- Builds the ability to use English for performing some of the most common communicative functions in academic, social and professional situation.

Module I: SPEECH SOUNDS (12 Hours)

Phonemic symbols – Vowels – Consonants – Syllables – Word stress – Stress in polysyllabic words – Stress in words used as different parts of speech – Sentence stress – Weak forms and strong forms – Intonation

Module II: ACCENTS (12 Hours)

Awareness of different accents: American, British and Indian – Influence of the mother tongue.

Module III: LISTENING (12 Hours)

Active listening – Barriers to listening – Listening and note taking – Listening to announcements – Listening to news on the radio and television.

Module IV: SPEAKING (12 Hours)

Word stress and rhythm – Pauses and sense groups – Falling and rising tone – Fluency and pace of delivery – Art of small talk – Participating in conversations – Making a short formal speech – Describing people, place, events and things – Group discussion skills and telephone skills.

Module V: READING (12 Hours)

Theory and Practice – Scanning – Surveying a textbook using an index – reading with a purpose – Making predictions – Understanding text structure – Locating main points – Making inferences – Reading graphics – Reading

critically – Reading for research.

References

- V.Sasikumar, P KiranmaiDutt and GeethaRajeevan. Communication Skills in English. Cambridge University Press and Mahatma Gandhi University.
- A Course in Listening and Speaking I & II, Sasikumar, V.,KiranmaiDutt and GeethaRajeevan, New Delhi: CUP, 2007
- Study Listening: A Course in Listening to Lectures and Note-taking Tony Lynch New Delhi: CUP, 4. Study Speaking: A Course in Spoken English for Academic Purposes. Anderson, Kenneth, Joan New Delhi: OUP, 2008

General Component: –Principles of Management (VCS1CMT0123)

75 Hours 5 Credits

COURSE OUTCOMES

- Describe the concept of Management and Organizations
- Recognize the planning and decision-making strategies
- Familiarize the concepts of organizational behavior and HR management
- Demonstrate the leadership qualities
- Describe the functions of a management

Module I: DEFINITION OF MANAGEMENT (15 Hours)

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

Module II: PRODUCTION & MARKETING MANAGEMENT (20 Hours)

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.

Module III: QUALITY MANAGEMENT (25 Hours)

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

Module IV: HUMAN RESOURCE MANAGEMENT (15 Hours)

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

References

Core

- P. C. Tripathi and P. N. Reddy, Principles of Management, 2/e, Tata McGraw Hill
- Poornima M. Charantimath, Total Quality Management, Pearson Education
- E.H. McGrath, Basic Managerial Skills for All, Prentice Hall of India

INTERNET RESOURCES

- www.prenhall.com/robbins

General Component: Foundations of Mathematics (VCS1CMT0223)

60 Hours 4 Credits

COURSE OUTCOMES

- Experiment various operations on discrete structures.
- Verify the validity of an argument using propositional and predicate logic.
- Construct simple mathematical proofs and possess the ability to verify them
- Demonstrate the knowledge of fundamental concepts in graph theory
- Exemplify graphs for real life problems.

Module I: SET THEORY (20 Hours)

Set Theory -Definition of Sets, Venn Diagrams, complements, cartesian products, power sets, counting principle, cardinality and countability (Countable and Uncountable sets), proofs of some generalid entitites on sets, pigeonhole principle.

Relation: Definition, types of relation, composition of relations, domain and range of a relation, pictorial representation of relation, properties of relation, partial ordering relation. Function: Definition and types of function, composition of functions, recursively defined functions.

Module II: PROPOSITIONAL LOGIC (20 Hours)

Proposition logic- basic logic, logical connectives, truth tables, tautologies, contradiction, normal forms(conjunctive and disjunctive), modus ponens and modus tollens, validity, predicate logic, universal and existential quantification. Notion of proof: proof by implication, converse, inverse, contrapositive, negation, and contradiction, direct proof, proof by using truth table, proof by counter example.

Module III: GRAPH THEORY (10 hours)

Graph Theory- What is graph- Applications of Graph- Incidence and Degree- Different Vertex – Paths and circuits- Isomorphism, Sub graphs, walks, paths and circuits- Euler graph, Hamiltonian paths and circuits, Travelling Salesman Problem, Graph coloring, Chromatic number.

Module IV: TREE (10 Hours)

Tree- Definition, types of tree(rooted, binary),properties of trees, binary search tree, tree traversing (preorder, inorder, postorder)

References

- Kenneth H. Rosen, "Discrete Mathematics and its Applications", Mc.Graw Hill, 2002.
- J.P.Tremblay& R. Manohar, "Discrete Mathematical Structure with Applications toComputer Science" Mc.Graw Hill, 1975.
- NarasinghDeo, Graph Theory, PHI
- Douglas B West, Introduction to Graph Theory, Prentice Hall India Ltd.
- Robin J Wilson, Introduction to Graph Theory, Longman Group Ltd.

Skill Component: Computer Skills For Business (VCS1CRT0123)

60 Hours 4 Credits

COURSE OUTCOMES

- Recall the basic computer terminologies.
- Recall functional knowledge about PC hardware, operations and concepts
- Demonstrate the functional knowledge of a standard office package and its related utilities
- Categorize various computer networks
- Illustrate the functionalities of digital circuits

Module I: COMPUTER CHARACTERISTICS (10 Hours)

Computer characteristics: Speed, storage, accuracy, diligence; Digital signals, Classification of computers: Microcomputer, Minicomputer, mainframes, Supercomputers;

Personal computers: Desktop, Laptops, Palmtop, Tablet PC; Hardware & Software; Von Neumann model - Different Number System: Weighted and Non-weighted, ASCII, EBCDIC

Module II: HARDWARE (10 Hours)

CPU, Memory, Input devices, output devices. Memory system: Memory Hierarchy – Primary Memory - Memory interleaving – basic concepts of virtual memory – associative memory. Secondary memory -Magnetic Disk, RAID, Optical Memory Input devices - keyboard, mouse, scanner - Output devices: Display device, size and resolution; CRT, LCD; Printers: Dot-matrix, Inkjet, Laser.

Module III: LOGIC GATES (20 Hours)

Logic gates with truth tables (AND, OR, NOT, NAND, NOR, EX-OR, EXNOR), NAND & NOR implementations- Postulate & laws of boolean algebra, De Morgan's Theorem, Simplification of Expressions (SOP, POS, Minterm, Maxterm), Gate level minimization using K-maps (upto 3-4 variables)

Module IV: LOGIC CIRCUITS AND FUNCTIONALITY (10 Hours)

Logic Circuits and Functionality- Combinational and Sequential Logic Circuits - Use of 1's & 2's complement in adders/subtractors- Flip Flops- RS, JK, D, T flip-flops - Counters- Mod 3 counter – Mod 5 counter- Mod-n counter - Registers

Module V: SOFTWARE (10 Hours)

Software: System software, Application software; concepts of files and folders, Introduction to Operating systems, Booting- Application software: Generic Features of Word processors, Spread sheets and Presentation software; Utilities and their use; Computer Viruses & Protection, Free software, open source- Introduction

Computer Networks: Types of Networks- LAN, WAN, MAN- Internet: World Wide Web, Websites, URL, browsers, search engines- only Introduction; Internet connections: ISP, email- Web pages, introduction to HTML.

References

- E. Balaguruswamy, Fundamentals of Computers, McGraw hill, 2014
- Dennis P. Curtain, Information Technology: The Breaking wave, McGrawHill, 2014
- Peter Norton, Introduction to Computers, McGrawHill, Seventh edition

Skill Component: Programming Principles & C, C Lab (VCS1CRP0323)

75 Hours 5 Credits

COURSE OUTCOMES

The students will be able to

- Classify the types of programming languages.
- Identify basic data types and control structures in C.
- Apply structured programming concepts
- Utilize standard library functions in C language
- Relate and Solve real life examples using C language.

Module I (15 Hours)

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.

Module II (15 Hours)

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, Arithmetic Operator and Arithmetic expression, Relational Operator and Relational exp.,Logical Operator and how it is used in condition, Expression Evaluation (Precedence of Operators).

Module III (20 Hours)

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, Pointers: The & and * Operators, pointer declaration, assignment and arithmetic, visualizing pointers, call by value, call by reference, dynamic

memory allocation.

Module IV (25 Hours)

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.

References

- Ashok N. Kamthene, Programming in C, Pearson Education
- E.Balaguruswamy, Programming in ANSI C, McGrawhill
- P. K. Sinha&PritiSinha, Computer Fundamentals,BPB Publications

LAB SYLLABUS

The lab work will consist of 15-20 Experiments.

Part A

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

Testing out and interpreting a variety of simple programs to demonstrate ID arrays, 2D arrays, structures, functions, Array of Structures and Structure of Arrays, Pointers to Arrays, Pointers to Structures, files and Library functions

Skill Component: Word Processing, Image Editing And Lab (VCS1CRP0223)

75 Hours 5 Credits

COURSE OUTCOMES

The students will be able to

- Prepare documents in latex
- Perform basic functions in excel
- Demonstrate the knowledge of functions of flash application.
- Edit images using Photoshop
- Build innovative presentations using presentation software

Module I: EXCEL (20 Hours)

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.

Module II: LATEX (25 Hours)

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

Module III: FLASH (15 Hours)

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.

Module IV: PHOTOSHOP (15 Hours)

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

References

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

Internet Resources:

- https://support.office.com/en-us/article/Excel-training
- https://www.sharelatex.com/learn.html
- https://helpx.adobe.com/photoshop/tutorials.html

LAB SYLLABUS

The Word Processing and Image editing laboratory work will consist of 15-20 Experiments:

PART A - MICROSOFT WORD

This includes activities to learn basic formatting in a word document and activities to create an article/advertisement in word.

PART B – MICROSOFT EXCEL

This includes activities to generate Charts, Pivot Tables, conditionals and lookup tables

PART C– LATEX

Simple activities to generate articles, reports and presentations in Latex

PART D – POWERPOINT

Creating slide with Text & and using themes/ Background, Inserting Image and applying Word Art and Smart Art

PART D – PHOTOSHOP

Adding or removing objects, designing a brochure, logo, certificate, visiting card, attractive website etc.

On The Job Training (OJT I) (VCS1OJT0123)

3 Credits

The student will attach with an IT company approved by the Department for the period of 2 weeks for industry Training. The student should actively participate in the operations of the organization and should work like any other employee of that organization. At the end of the OJT the student should prepare a comprehensive report and present the report with the aid of PPT to the corresponding teachers. Student should also produce a certificate of internship from organization. All the above details should be submitted to the Department for evaluation.

Detailed Syllabus: Semester II

General Component: Advanced English Skills For Business (ENG2CCT0323)

60 Hours 4 Credits

COURSE OUTCOMES

- Develop judgement skills.
- Develops evaluation and problem-solving skills
- Learns basic grammar to use English language accurately.
- Create an awareness about different types of official writings to enhance official communication skills
- Build the ability to do presentations in a better way.

Module I (10 Hours)

Critical Thinking: Introduction to critical thinking – Benefits - Barriers – Reasoning - Arguments - Deductive and inductive arguments – Fallacies - Inferential comprehension Critical thinking in academic writing - Clarity - Accuracy – Precision – Relevance.

Module II (10 Hours)

Research for Academic Writing and the Writing Process: Data collection - Use of print, electronic sources and digital sources - Selecting key points - Note making, paraphrasing, summary – Documentation - Plagiarism – Title – Body paragraphs - Introduction and conclusion – Revising - Proof-reading.

Module III (10 Hours)

Accuracy in Academic Writing: Articles - Nouns and prepositions - Subject-verb agreement - Phrasal verbs - Modals - Tenses - Conditionals – Prefixes and suffixes – Prepositions - Adverbs – Relative pronouns - Passives - Conjunctions - Embedded questions - Punctuation – Abbreviations.

Module IV (10 Hours)

Writing Models: Letters - Letters to the editor - Resume and covering letters - e-mail - Seminar papers - Project reports - Notices - Filling application forms - Minutes, agenda – Essays.

Module V (20 Hours)

Presentation Skills: Soft skills for academic presentations - Effective communication skills – Structuring the presentation - Choosing appropriate medium – Flip charts – OHP – Power Point presentation – Clarity and brevity - Inter-action and persuasion - Interview skills – Group Discussions.

Reference

- Marilyn Anderson, Pramod K Nayar and Madhucchandra Sen. Critical Thinking, Academic Writing and Presentation Skills. Pearson Education and Mahatma Gandhi University

General Component: Soft skills and personality Development (VCS2CMT0123)

60 Hours 4 Credits

COURSE OUTCOMES

- Demonstrate the knowledge about the sectors like Time Management, communication, work ethics, leadership, personal responsibility, and listening.
- Apply techniques to fit in a workplace.
- Familiarize with knowledge of how to improvise the personality, attitude, flexibility, motivation, and manners.
- Develop effective communication skills
- Develop effective presentation skills

MODULE I 10 hours

Personal Skills: Knowing oneself- confidence building- defining strengths-thinking creatively personal values-time and stress management.

MODULE II 15 hours

Social Skills: Appropriate and contextual use of language- non-verbal communication interpersonal skills- problem solving.

MODULE III 10 hours

Personality Development: Personal grooming and business etiquettes, corporate etiquette, social etiquette and telephone etiquette, role play and body language.

MODULE IV 15 hours

Presentation skills: Group discussion- mock Group Discussion using video recording – public speaking.

MODULE V 10 hours

Professional skills: Organisational skills- team work- business and technical correspondence-job oriented skills-professional etiquettes.

References

1. Matila Treece: Successful communication: Allyun and Bacon Pubharkat.
2. Jon Lisa Interatid skills in Tourist Travel Industry Longman Group Ltd.
3. Robert T. Reilly – Effective communication in tourist travel Industry Dilnas Publication.

4. Boves. Thill Business Communication Today Mcycans Hills Publication.
5. Dark Studying International Communication Sage Publication.
6. Murphy Hidderandt Thomas Effective Business Communication Mc Graw Hill.

General Component: Optimization Techniques (VCS2CMT0223)

60 Hours 4 Credits

COURSE OUTCOMES

- Demonstrate the role and relevance of operation research in decision making
- Demonstrate various operation research techniques for effective problem solving
- Cast engineering minima/maxima problems into optimization framework.
- Recall efficient computational procedures to solve optimization problems.
- Formulate and solve real life problems as networks and graphs

Module I (15 Hours)

Mathematical preliminaries - Linear algebra and matrices - Vector space, eigen analysis

Elements of probability theory - Elementary multivariable calculus - Linear programming – problem formulation- Graphical method - Simplex method - Duality in linear programming - Non-linear problems : Introduction

Module II (15 Hours)

Unconstrained optimization - One-dimensional search methods - Gradient-based methods - Constrained Optimization - Lagrange theorem - FONC, SONC, and SOSC conditions

Module III (15 Hours)

Transportation problem – formulation – balanced & unbalanced transportation problems- MODI method 1 Assignment problem – formulation – optimal solution, Hungarian algorithm- Traveling salesman problem

Module IV (15 Hours)

Sequencing problem– terminology and notations – assumptions – problems with n jobs through two machines - Problems with n jobs through three machines - Problems with n jobs through m machines. Network analysis –

basic terms – network construction – time analysis- Critical path method (CPM) - Programme evaluation and review technique (PERT) - Cost considerations in network analysis – crashing

References

- An introduction to Optimization by Edwin P K Chong, Stainslaw Zak
- Nonlinear Programming by DimitriBertsekas
- Miller, D. M. and Schmidt, J. W., Industrial Engineering and Operations Research, John Wiley & Sons, Signapore, 1990.
- Paneerselvam, R., Operations Research, Prentice Hall of India, New Delhi, 2008.
- Pannerselvam, R., Design and Analysis of Algorithms, Prentice Hall of India, New
- Srinivasan, G. "Operations Research-Principles and Applications", Latest edition, PHI Pvt. Ltd., 2010.
- Taha, H. A., Operations Research, Pearson, 2004

Skill Component: Computer Animation And Lab (VCS2CRP0123)

90 hours 6 Credits

COURSE OUTCOMES

- Identify 3D software and hardware
- Demonstrate the planning and implementation of animation projects
- Equip with the basic knowledge of Autodesk Maya
- Develop the skill of overall 3D workflow
- Apply performance theory to the creation of animation

MODULE 1 15 HOURS

MAYA: Introduction to MAYA - The Maya interface ñ software and hardware - Tool bar - Menu bar- layers, Shortcut Keys, Knowing the Primitive objects in Maya, Understanding About View Ports, Channel Box, Hot Box, Channel Attributes, Outline Editor.

MODULE II 20 HOURS

ANIMATION: Animation in MAYA - Principles of animation (squash and stretch, timing)... Doing Object animation & Understanding the Behavior of Shapes of Objects, Making play blasts-Working with Animation Curves - Graph Editor ñ time line- Shortcuts, Camera Animation, Setting Resolution Gates.

RIGGING: Knowing Deformers and there functionality (Lattice, Cluster, Wire, Jiggle... & Non Linear Deformers), Knowing Constraints (Point, Orient, Scale, Parent, Pole Vector, Aim...),Introduction to Joints - Understanding difference between Local Axis and World Axis for Joints

MODULE III 15 HOURS

MODELLING: Introduction to modelling - Primitive objects - NURBS and polygon modelling tools to Organic and Industrial designs ñ Editing Nurbs & Polygons, Learning Menus in Surfaces and Polygons Tabs, Shortcut. TEXTURING: Introduction to Materials: Understanding the Materials &

Behavior of material, Understanding UV Texture Editor, Applying Single Color to object, Hyper shade-Understanding different types of Maps Understanding UV mapping - UV manipulation - editing texture in Photoshop UV snap shot - Applying materials and textures to models and props ñ Shortcuts.

MODULE IV 20 HOURS

LIGHTING: Understanding Color Theory, Introduction to lighting ñ importance of lighting animation - Basic Lighting Concepts ñ types of lights ñ Change the color of the light - lightattributes - rendering – Shortcuts

RENDERING: Introduction to rendering, Knowing Renderers - software Rendering, Hardware Rendering, Vector Rendering, Mental Ray Rendering, Selecting a Render Type, Interactive Photorealistic Rendering (IPR), Batch Rendering, Working with the Options in Render setting.

MODULE V 20 HOURS

DYNAMICS: Introduction to Particles, Crating Emitter, Knowing Different types of Particle, particle object, knowing about Hardware rendering Particles & Software Rendering Particles, Goals, Particle collisions, Emit from Object, Goals, Understanding the Physics of Dynamics, Knowing Fields, Understanding Dynamics Constrains, Knowing Soft Body and Rigged Bodies, Emitting From Object, Understanding Fields, Setting Particle Life Span, Setting Color for Particles, Understanding Basic Particle Attributes.

References

- Maya 2008 Character Modeling and Animation. Author: Tereza Flaxman
- The Animator's Survival Kit (Author: Richard Williams)

Suggested Co-Curricular Activities:

*Book Reading

*Student Seminars, Debatess

*Quiz Programmes

*Assignments

*Co-operative learning

*Individual / Group Field Studies

*Group Discussions on problems relating to topics covered by syllabus

*Creating multiple tasks with own creativity Topics covered in syllabus

LAB SYLLABUS

- Camera animation
- Camera setting for layout Squash and Stretch
- Path animation
- Animating flying text
- Throwing an axe
- Working with Trax Editor
- Understanding Dope Sheet
- Bouncing Ball
- Basic relationships: Set - Driven key
- Basic relationships: Constraints
- Working with full body IK animation rig
- Layer wise Rendering
- Batch rendering

Skill Component: Data Structures, Algorithms and Lab (VCS2CRP0223)

90 hours 6 Credits

COURSE OUTCOMES

- Describe how data structures are represented in memory.
- Compare and contrast the benefits of dynamic and static data structures implementations
- Practice appropriate methodologies for implementing hashing techniques.
- Compare alternative implementations of data structures with respect to performance
- Discuss the computational efficiency of the principal algorithms for sorting, searching, and hashing.

Module I (20 Hours)

Introduction to programming methodologies – structured approach, stepwise refinement techniques, programming style, and 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

Module II (20 Hours)

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

Module III (25 Hours)

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

Module IV (25 Hours)

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

References

Core

- Tremblay and Sorenson, Introduction to data structures with applications, TMH. Additional References
- Wirth N., Algorithms + Data Structures = Programs, Prentice Hall
- Achuthsakar S. N. and Mahalakshmi T., Data Structures Using C, Prentice Hall India
- Hugges J. K., & J. I. Michtm, A Structured Approach to Programming, Prentice Hall.
- Thomas H. Corman, Charles E. Leiserson and Ronald L. Rivest.,
- Introduction to Algorithms, Prentice Hall India.

LAB SYLLABUS

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

- Representation of sparse matrix, Use of multidimensional arrays and structures, Linked list,
- String manipulation applications, Implementation of stacks using arrays and linked lists, Application problems using stacks, Implementation of Queues using linked list and array, Creation and traversals of binary trees – counting nodes, finding height etc. Creation of binary search tree, Implementation of sorting and searching algorithms

Internship I (VCS2CPR0123)

3 Credits

The student will attach himself with any organization approved by the Department for a period of 4 weeks for studying the software related project in the firm/enterprise. The objectives of study are to help students to shape social relation and create institutional tie-ups. The student should actively participate in the operations of the organization and should work like any other employee of that organization. At the end of the, the student should prepare a comprehensive report (not less than 40 pages, A4 size). The report and the specimens of the work done by the student should be attested by the organization. All the above details should be submitted to the Department for the evaluation.

Detailed Syllabus: Semester III

General Component: Software Engineering (VCS3CMT0123)

60 Hours 4 Credits

COURSE OUTCOMES

- Explain the importance of having a process for software development.
- Demonstrate the knowledge of various activities undertaken for a software development project.
- Apply the function oriented & object oriented design in software development.
- Describe the SSAD and OOAD concepts in software engineering
- Analyze the ways and methods of preparing the requirements specification into real life problems

Module I (15 Hours)

Introduction to software engineering- scope of software engineering – historical aspects, economic aspects, maintenance aspects, specification and design aspects, team programming aspects. Software engineering a layered technology – processes, methods and tools. Capability maturity model (CMM), ISO 9000. Software Development Life Cycle Model: Waterfall Model, Prototyping, iterative development, Spiral Model, time- boxing model, Agile model; Comparison of different Life Cycle Models.

Module II (15 Hours)

Software Requirements, Overview of SA/SD Methodology, Requirements Specification: Need for SRS, Characteristics of an SRS, Components of an SRS, Specification Languages, Structure of a Requirements document. Planning phase – project planning objective, software scope, empirical estimation models- COCOMO, single variable model, staffing and personal planning.

Module III (15 Hours)

Design phase-Function oriented Design – design process, principles, concepts, effective modular design, top down, bottom up strategies,

coupling, cohesion, design notations structure charts, structured design, Data Flow Diagrams, Developing the DFD Model of a system, Entity Relationship Diagram, Developing ERD of a system, Decision Trees, Decision Tables, Structured English. Object Oriented Design- Object Oriented Design using UML, Class Diagram, Use Case Diagram, Sequence Diagram, Collaboration Diagram.

Module IV (15 Hours)

Coding and Testing – programming practice, verification, size measures, complexity analysis, Common coding errors, structured programming, coding standards, incremental coding process. Testing – fundamentals. Maintenance- Overview of maintenance process, types of maintenance, Reverse Engineering.

References

- Roger S. Pressman, Software Engineering, McGraw Hill
- Rajib Mall, Fundamentals of Software Engineering, Second Edition
- Ian Sommervile, University of Lancastor, Software Engineering, Pearson Education
- K. K. Aggarwal and Yogesh Singh, Software Engineering, New age International Publishers.
- PankajJalote, An Integrated Approach to Software Engineering, Narosa Publishing House 6. Waman S. Jawadekar, Software Engineering, McGraw hill, 2013

General Component: Environmental Science and Human Rights (VCS3CMT0223)

60 Hours 4 Credits

Course outcomes

- Demonstrate the awareness and concern about current environmental issues.
- Develop a healthy respect and sensitivity to environment.
- Distinguish between various ecosystems
- Differentiate the functions of United Nations and other Global bodies
- Develop pride in social and environmental activism

Module I (10 Hours)

The Multi-disciplinary Nature of Environmental Studies: 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, Introduction, types, characteristics features and function of – forest ecosystem, grassland ecosystem, desert ecosystem, aquatic ecosystem(ponds, streams, lakes, rivers, oceans, estuaries).

Module II (10 Hours)

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, endangered and endemic species of India, conservation of bio diversity in In-situ and EX-situ.

Module III (10 Hours)

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, cleaner technologies, reuse and recycling, solid waste management, role of individuals to prevent pollution, pollution case studies, disaster management – floods, earthquake, cyclone and landslides.

Module IV (10 Hours)

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, legislation to protect the environment, environmental protection act,air(prevention and control of pollution) act, water(prevention and control of pollution) act, wild life protection act, forest conservation act, environmental management systems(EMS), environmental information systems(EIS),

P.I.L public hearing and role of NGOS, ISO 9000 and 14000, issues involved in enforcement of environment legislation, public awareness, environmental economics- environment and standard of living.

Module V (20 Hours)

Human Rights – An Introduction to Human Rights, Meaning, concept and development, Three Generations of Human Rights (Civil and Political Rights; Economic, Social and Cultural Rights).

Human Rights and United Nations– contributions, main human rights related organs - UNESCO,UNICEF, WHO, ILO, Declarations for women and children, Universal Declaration of Human Rights.

Human Rights in India– Fundamental rights and Indian Constitution, Rights for children and women, Scheduled Castes, Scheduled Tribes, Other Backward Castes and Minorities

References

Core

- ErachBharucha, Textbook for Environmental Studies (for undergraduate courses of all branches of higher education), for University Grants Commission.
- P. VenugopalaRao, Principles of Environmental Science & Engineering, PHI
- Benny Joseph, Environmental Studies, Tata McGraw Hill

Additional References

- Lester R. Brown, Plan B: rescuing a Planet under stress and a civilization in trouble, W. W. Norton and Company
- Kurien Joseph & R. Nagendran, Essentials of Environmental Studies, Pearson

General Component: Computer Networks (VCS3CMT0323)

60 hours 4 Credits

Course outcomes

- Develop an understanding of computer networking basics.
- Identify the different types of network topologies
- Explain the functionalities of different OSI layers
- Differentiate between the functionalities of different protocols
- Discuss the need to detect and correct errors in data transmission

Module I (15 Hours)

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.

Module II (15 Hours)

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.

Module III (15 Hours)

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

Module IV (15 Hours)

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.

References

Core

- Behrouz A. Forouzan, Data Communications and Networking, McGraw-Hill Education (India) Pvt. Ltd.
- Additional References
- Andrew S. Tanenbaum, Computer Networks, Pearson Education India Journals

Skill Component: Operating Systems (VCS3CRT0123)

75 Hours 5 Credits

Course outcome

- Discuss the different functions handled by operating system
- Explain the file system concepts and relate the same with other OS
- Demonstrate the knowledge of installation of windows
- Discuss the different back-up procedures used in Windows operating system
- Compare popular OS

Module I (20 Hours)

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

Module II (25 Hours)

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.

Module III (15 Hours)

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.

Module IV (15 Hours)

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

References

Core

- Kotler, Philip & Keller, Kevin Lane, Koshy, Abraham, & Mithileshwar Jha, Marketing Management, A South Asian Perspective, Pearson Education.
- Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, Operating System Concepts, John Wiley & Sons Inc.
- Satish Jain, VineetaPillai, Ambrish Kumar Rai, System software, diagnostic & Debugging tools, BPB Publications.

Additional References

- H. M. Deitel, Operating System Principles, Addison-Wesley Publishing Company
- LubomirBic, A. C. Shaw, The Logical Design of Operating Systems, Prentice Hall International

Skill Component: Database Management System And Lab (VCS3CRP0123)

75 Hours 5 Credits

Course outcome

- Recall the basic concepts of databases and database management system
- Build the relational database design requirements
- Use data modeling tools like Entity-Relationship diagrams
- Demonstrate the knowledge of structured query language and applying proper queries in data retrieval
- Apply the knowledge of Advanced Database properties.

Module I: CONCEPTS OF RELATIONAL DATABASE (20 Hours)

Introduction to Databases, Database Environment, evolution of data base systems, Advantages of database management systems, Data models, Instances and Schemas, Data Independence, Database languages, Database architecture, Database users , Database administrator, Role of DBA . Relational Database Design Relational Data Model: Relations, Domains and Attributes, Tuples, Keys.Integrity Rules..

Module II: RELATIONAL DATABASE DESIGN (25 Hours)

Concept of ER-Diagram, Converting ER-Diagram into Relational Database, Normalization, need for normalization, functional dependency, Normal forms First, Second, Third, BCNF, Multi valued functional dependency, Fourth and Fifth Normal forms. Decomposition and Transactions ACID properties, States, Concurrent executions.

Module III: STRUCTURED QUERY LANGUAGE (15 Hours)

Data Definition in SQL Data types, Creation, Insertion, Viewing, Updation, Deletion of tables, modifying the structure of the tables, Renaming, Dropping of tables. Data Constraints – I/O constraints, Primary key, foreign key, unique key constraints, ALTER TABLE command. Database Manipulation in SQL Computations done on table data, Select command, Logical operators, Range searching, Pattern matching, Grouping data from tables in SQL, GROUP BY, HAVING clauses, Joins – Joining multiple tables, Joining a table to itself

Module IV: PROGRAMMING WITH SQL (15 Hours)

Views Creation, Renaming the column of a view, destroys view, Granting and revoking permissions: Granting privileges, Object privileges, Revoking privileges Writing procedure and functions, if, if /else, while, goto, global variables, Security. Locks, types of locks, levels of locks. Cursors Working with cursors, Error Handling, Developing stored procedures, using stored procedures within queries, building user defined functions, implementing triggers, creating triggers , database triggers.

References

Core

- Elmasri&Navathe, Fundamentals of Database Systems, Pearson Education.

Additional References

- Ramon A. Mata-toledo and Pauline K. Cushman, Fundamentals of Relational Databases, Schaum Outlines, Tata McGraw Hill
- Abraham Silberschatz, Henry F. Korth, Database System Concepts,McGraw Hill

LAB SYLLABUS

The laboratory work will consist of 15-20 Experiments. The experiments will include

- Creating, listing, dropping, checking, updating tables using SQL
- Experiments that clarify the importance of keys
- Finding values within a certain range using BETWEEN keyword
- A Join between two tables (foreign key)
- Nested queries
- Statements related with VIEWs

Skill Component: Oops and Lab (VCS3CRP0223)

75 Hours 5 Credits

COURSE COUTCOME

- Recall the concepts of classes and objects Build the relational database design requirements
- Recall the concepts of classes and objects
- Apply the properties of inheritance.
- Build OOAD methodologies while developing projects
- Discuss and apply the concept of polymorphism and encapsulation

Module I: CONCEPT OF OBJECT ORIENTATION (20 Hours)

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

Module II: CLASSES AND OBJECTS IN C++ (25 Hours)

Access modifiers, static members, friend functions, Constructors and Destructors, polymorphism, Operator Overloading and type conversion, anonymous objects

Module III: INHERITANCE (15 Hours)

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.

Module IV:BINDING & POLYMORPHISM (15 Hours)

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

References

Core

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

Additional References

- H. M. Deitel and P. J. Deitel, C++: how to program, Pearson Education
- Robert Lafore, Object Oriented Programming in Turbo C++, Galgotia Publications

LAB SYLLABUS

The laboratory work will consist of 15-20 experiments.

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
- Class definitions and usage involving variety of constructors and destructors
- Programs involving various kinds of inheritances
- Programs involving operator overloading and type conversions
- Programs involving virtual base classes, friend functions
- Program to allocate memory dynamically
- Program involving class and function templates
- Programs to demonstrate(i) string processing (ii) file streams (iii) a variety of selected library functions
- Exception handli

On The Job Training (OJT 2) (VCS3OJT0123)

3 Credits

The student will attach with an IT company approved by the Department for the period of 2 weeks for industry Training. The student should actively participate in the operations of the organization and should work like any other employee of that organization. At the end of the OJT the student should prepare a comprehensive report and present the report with the aid of PPT to the corresponding teachers. Student should also produce a certificate of internship from organization. All the above details should be submitted to the Department for evaluation.

Detailed Syllabus: Semester IV

General Component: Business Entrepreneurship (VCS4CMT0123)

60 Hours 4 Credits

COURSE OUTCOMES

- Equip with the basic knowledge of entrepreneurship.
- Discuss various programs in promoting small and medium industries
- Build a plan to start new ventures
- Differentiate between micro, small and medium enterprises
- Discuss ethical environmental and sustainable principles in starting a new venture

Module I (15 Hours)

Concepts of entrepreneur: Entrepreneur- Definitions-Characteristics of entrepreneur-Classification of entrepreneur-Entrepreneurial traits-Entrepreneurial functions role of entrepreneurs in the economic development- Factor effecting entrepreneurial growth- Entrepreneurship - Meaning- definition- Entrepreneur Vs Intrapreneur- Women Entrepreneurs-Recent development-Problems-Entrepreneurial Development Programmes-Objectives of EDP-Methods of training- Phases of EDP.

Module II (15 hours)

Institutional support and incentives to entrepreneurs- Functions of Department of Industries and Commerce (DIC) - Activities of Small Industrial Development Corporation (SIDCO)-Functions of National Small Industries Corporation(NSIC)-Functions of Small Industries Development Bank of India (SIDBI)- Khadi Village Industry Commission (KVIC)Small Industries Service Institute (SISI)- Functions and services of Kerala Industrial Technical Consultancy Organisation (KITCO)-Activities of Science and Technology Entrepreneurship Development Project (STEDP)-Strategies of National entrepreneurship Development Board(NEDB)- Objectives of National Institute for entrepreneurship and small business development (NIESBUD)-Techno park-Functions of techno park Incentives- Importance- Classification of incentives- Subsidy- Types of Subsidy.

Module III (15 Hours)

Micro Small and Medium Enterprises- Features- Objectives- Importance- Role of SME in the economic development- MSME Act 2006- Salient features- Credit Guarantee Fund Trust Scheme for MSMEs - Industrial estates- Classification-Benefits- Green channel- Bridge capital- Seed capital assistance-Margin money schemes –Single Window System- Sickness- Causes –Remedies- Registration of SSI

Module IV (15 Hours)

Setting up of Industrial unit-(Only Basic study) Environment for Entrepreneurship –Criteria for selecting particular project- Generating project ideas- Market and demand analysis-Feasibility study- Scope of technical feasibility- Financial feasibility- Social cost benefit analysis-Government regulations for project clearances - Import of capital goods- approval of foreign collaboration-Pollution control clearances- Setting up of micro small and medium enterprises-Location decision- Significance. Project Report – Meaning – Definition-Purpose of project reports-Requirements of good report-Methods of reporting- General principles of a good reporting system - Performa of a project report

References

- Shukla M. B., Entrepreneurship and Small Business Management, KitabMahal Allahabad.
- SangramKeshariMohanty, Fundamentals of Entrepreneurship, PHI Learning Pvt. Ltd., New Delhi.
- H. Nandan, Fundamentals of Entrepreneurship, PHI Learning Pvt. Ltd., New Delhi.
- Dr. Vasant Desai, Small-Scale Industries and Entrepreneurship, Himalaya Publishing, Delhi.
- C. N. Sontakki, Project Management, Kalyani Publishers, Ludhiana.
- Peter F. Drucker, Innovation and Entrepreneurship, Routledge Taylor & Francis Group
- Dr. Vasant Desai, Small Business Entrepreneurship, Himalaya Publications.
- MSME Act 2006.

General Component: Corporate Readiness Programme (VCS4CMT0223)

60 hours 4 Credits

COURSE OUTCOMES

- Equip the students with an essential knowledge base on behavioural dynamics
- Discuss the concepts of employee attributes and various approaches leading to actions
- Manage employees as individual and team
- Develop a team and inculcate leadership skills
- Control the human behaviour within an organization through human relationships

Module I (15 Hours)

Understanding Organizational Behaviour - Fundamental Concepts, Organizational processes, Organizational structure, Organizational Change and Innovation processes - Effectiveness in organizations - Models of Organizational Behaviour, Systems theory and time dimension of effectiveness, Developing competencies, Limitations of Organizational Behaviour, Continuing challenges

Module II (15 Hours)

Individual differences and work behaviour - Individual differences influencing Work Behaviour. Personality - Sources of personality differences, Personality structure, Personality and Behaviour, Measuring Personality Attitudes - The nature of Employee Attitudes, Effects of Employee Attitudes, Studying Job satisfaction, Changing Employee Attitudes. Perceptions, Attributions and Emotions - The perceptual process, Perceptual grouping, Impression management, Emotions, Emotional Intelligence Motivation - Concept of Motivation, Content approaches, Process approaches, Motivation and psychological contract

Module III (15 Hours)

Managing Individuals at Work: Measuring personality attitudes; managing 10 employee attitudes Managing Teams at Work: Definition of Group - group

development- group structure - teams -Formal Organization and Informal Groups and their interaction

Module IV (15 Hours)

Developing high performance teams - turning individuals into team players 10 developing interpersonal awareness - leadership - theories – developing leadership skills

References

- Robbins, Judge &Sanghi, Organizational Behaviour, 12th Ed. Prentice Hall India
- McShane, Glinow, Organizational Behaviour, Tata McGraw Hill
- Don Hellriegel; John W. Slocum; Richard W. Woodman, Organizational Behavior, 8th Ed., Thomson South-Western

General Component: Management Information Systems (VCS4CMT0323)

60 Hours 4 Credits

COURSE OUTCOMES

- Discuss the role and relevance of MISTo inculcate entrepreneurial traits among students.
- Classify the types of MIS and its usages
- Demonstrate the knowledge of advanced MIS
- Explain the MIS framework and implementation aspects
- Discuss various optimization techniques in MIS

Module I (15 Hours)

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.

Module II (15 Hours)

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

Module III (15 Hours)

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

Module IV (10 Hours)

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

References

Core

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

Additional References

- Uma G. Gupta, Management Information Systems, Galgotia Publications

Skill Component: Web Application Development and Lab(VCS4CRP0123)

90 Hours 6 Credits

COURSE OUTCOMES

- Demonstrate the knowledge of basic skills in HTML, DHTML, CSS, JavaScript.
- Identify and apply appropriate web tools/languages in building quality websites.
- Demonstrate the knowledge of recent trends and styles in web design.
- Discuss the fundamental concepts of PHP
- Apply PHP to model real life problems

Module I (20 Hours)

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 (25 Hours)

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 (25 Hours)

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. Working with strings.

Module IV (20 Hours)

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, Session function overview: starting a session, working with session variables, passing session IDs in the query string, destroying sessions &unsetting variables. Interacting with MySQL using PHP: connecting to MYSQL, Executing queries, inserting data with PHP, retrieving data with PHP.

References

Core

- Ivan Bayross, Web Enabled Commercial application Development Using... HTML,
- JavaScript, DHTML and PHP, BPB Publications

LAB SYLLABUS

- The laboratory work will consist of 10-20 Experiments
- Practicing basic HTML tags, text tags test styles, paragraph styles, headings, lists
- Tables in HTML, Frames in HTML, nested frames, Link and Anchor Tags
- Including graphics, video and sound in web pages
- Cascading Style sheets
- DHTML
- HTML forms and Fields
- Exercises covering basic introduction to JavaScript
- Exercises covering basic introduction to PHP
- Connecting HTML forms to PHP Scripts
- Interacting with MySQL using PHP

Skill Component: Computer Hardware Maintenance And Lab (VCS4CRP0223)

90 hours 6 Credits

COURSE OUTCOMES

- Demonstrate the knowledge of basic skills in HTML, DHTML, CSS, JavaScript.
- Explain basic components of the computer
- Differentiate between various I/O devices
- Distinguish storage devices
- Use appropriate diagnostic test in evaluating the function of a system.
- Apply the basic knowledge of components in assembling a computer.

Module I (25 Hours)

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.

Module II (20 Hours)

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, CMOS Batteries. Microprocessor P5, P6,P7 Processor Specifications, Cache Memory

Module III (20 Hours)

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, IEEE-488 (GPIB), IrdA port. Networking components – wired and wireless devices.

Module IV (25 Hours)

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.

References

Core

- Scott Mueller, Upgrading and Repairing PCs, QUE.
- ManaharLotia, All About Printers/Keyboards/Mouse, BPB Publications

LAB SYLLABUS

- Familiarization of Hardware Components and troubleshooting
- Assembling (AT machine, ATX Machine)
- Hard Disk Preparation and troubleshooting
- Installation of Operating Systems and troubleshooting
- Preparations for installing networks
- Printer sharing, Internet sharing and troubleshooting

Internship 2- (VCS4CPR0123)

3 Credits

The student will attach himself with any organization approved by the Department for a period of 4 weeks for studying the software related project in the firm/enterprise. The objectives of study are to help students to shape social relation and create institutional tie-ups. The student should actively participate in the operations of the organization and should work like any other employee of that organization. At the end of the, the student should prepare a comprehensive report (not less than 40 pages, A4 size). The report and the specimens of the work done by the student should be attested by the organization. All the above details should be submitted to the Department for the evaluation.

Detailed Syllabus: Semester V

General Component: Aptitude & Logical Reasoning (VCS5CMT0123)

60 hours 4 Credits

COURSE OUTCOMESS

- Classify different types of data.
- Establish relationship between numbers
- Solve different logical problems
- Demonstrate the knowledge of use of verbal reasoning
- Utilize different methods for solving problems of reasoning

Module I (15 Hours)

Data sufficiency, Measurement, Time and distance, Arithmetic, Relationship between numbers

Module II (15 Hours)

Basic mathematical relations and formula, Computation, Data interpretation

Module III (15 Hours)

Differences, Discrimination, Decision-making, Judgment, Problem-solving, Analogies,

Module IV (15 Hours)

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

References

- Arun Sharma, How to Prepare for Logical Reasoning for the CAT, McGraw Hill Education
- K. Gupta, Logical and Analytical Reasoning, Ramesh Publishing House

General Component: Research Methodology (VCS5CMT0223)

60 hours 4 Credits

COURSE OUTCOMES

- Develop a thorough understanding about the basic concepts of research
- Able to formulate research problem and research design
- Able to draw sampling design
- Familiarize the technique of research reporting
- Read, comprehend and explain research articles in their academic discipline.

Module I: Research Methodology (10 Hours)

Objectives and Motivation of Research, Types of Research, Research Approaches, Significance of Research, Research Methods verses Methodology, Research and Scientific Method- Defining the Research Problem: Definition of Research Problem, Problem Formulation, Necessity of Defining the Problem, Technique involved in Defining a Problem.

Module II: Literature Survey (10 Hours)

Importance of Literature Survey, Sources of Information, Assessment of Quality of Journals and Articles, Information through Internet. Literature Review: Need of Review, Guidelines for Review, Record of Research Review.

Module III: Research Design (10 Hours)

Meaning of Research Design, Need of Research Design, Feature of a Good Design Important Concepts Related to Research Design, Different Research Designs, Basic Principles of Experimental Design, Developing a Research Plan

Module IV: Data Collection (15 Hours)

Collection of primary data- Secondary data, Sample Design, Need for sampling, some important sampling definitions, Estimation of population, Role of Statistics for Data Analysis, Parametric V/s Non Parametric methods,

Descriptive Statistics, Measures of central tendency and Dispersion, Hypothesis testing, Use of Statistical software. Data Analysis: Deterministic and random data, Uncertainty analysis, Tests for significance: Chisquare, student's t-test, Regression modeling, ANOVA, F-test

Module V: Research Report Writing (15 Hours)

Format of the Research report, Synopsis, Dissertation, Thesis its Differentiation, References/Bibliography, Technical paper writing/Journal report writing, making presentation-Research Proposal Preparation: Writing a Research Proposal and Research

References:

- C.R Kothari, Research Methodology, Methods & Technique; New Age International Publishers, 2004
- R. Ganesan, Research Methodology for Engineers, MJP Publishers, 2011
- RatanKhananabis and SuvasisSaha, Research Methodology, Universities Press, Hyderabad, 2015.
- Y. P. Agarwal, Statistical Methods: Concepts, Application and Computation, Sterling Publs., Pvt., Ltd., New Delhi, 2004
- Vijay Upagade and AravindShende, Research Methodology, S. Chand & Company Ltd., New Delhi, 2009
- G. NageswaraRao, Research Methodology and Quantitative methods, BS Publications, Hyderabad, 2012.
- Naval Bajjai "Business Research Methods" Pearson 2011.
- Prahalad Mishra " Business Research Methods " Oxford 2016

General Component: Artificial Intelligence (VCS5CMT0323)

60 hours 4 Credits

COURSE OUTCOMES

- Identify problems where artificial intelligence techniques are applicable
- Understand the informed and uninformed problem types and apply search strategies to solve them.
- Apply difficult real life problems in a state space representation so as to solve them using AI techniques like searching and game playing.
- Design and evaluate intelligent expert models for perception and prediction from intelligent environment.
- Formulate valid solutions for problems involving uncertain inputs or outcomes by using decision making techniques.

MODULE I 10 hours

Introduction- Artificial Intelligence: Concept and Definition, History of AI, Related concepts about AI, Physical symbol system hypothesis, Practical systems based on AI, Components of AI.

MODULE II 15 hours

Problem Solving through AI- Representation of AI problems, Production system, algorithm of problem solving, examples of AI problems, nature of AI problems.

MODULE III 15 hours

Basic concept of Heuristic search, Types of knowledge, Knowledge representation, knowledge storage, Introduction to Programming languages.

MODULE IV 10 hours

Machine learning, Planning, Understanding- Learning: an introduction, Types of learning, Planning, Understanding.

MODULE V 10 hours

Applications of AI- Neural networks, pattern recognition, computer vision.

Reference:

Ela Kumar, Artificial Intelligence, I K International Publishing House Pvt. Ltd

Skill Component: Data Analytics (VCS5CRT0123)

75 hours 5 Credits

COURSE OUTCOMES

- Demonstrate functional knowledge about Content Management System.
- Demonstrate the basic concepts of Machine Learning.
- Recognize the learning and generalization issue in neural computation.
- Demonstrate the basic learning algorithms for multilayer perceptions
- Apply algorithms to build machine intelligence
- Use data mining techniques to solve real world problems

Module I (15 Hours)

Machine Learning: Introduction and Concepts- Differentiating algorithmic and model based frameworks- Regression: Ordinary Least Squares, Ridge Regression, Lasso Regression, K Nearest Neighbours Regression & Classification

Module II (15 Hours)

Supervised Learning with Regression and Classification techniques -1 Bias-Variance Dichotomy Model Validation Approaches- Logistic Regression- Linear Discriminant Analysis- Quadratic Discriminant Analysis- Regression and Classification Trees- Support Vector Machines

Module III (25 Hours)

Ensemble Methods: Random Forest - Neural Networks – Introduction, Fundamental concepts: neuron models and basic learning rules, Learning of a single neuron and single layer neural networks - Learning of a single neuron- Single layer neural networks- Multilayer neural networks and back-propagation- Deep learning – Introduction- What is Tensor Flow

Module IV (20 Hours)

Unsupervised Learning– Clustering - Associative Rule Mining - Challenges for big data analytics

References

- Machine Learning For Absolute Beginners: Second Edition, Oliver Theobald Understanding Machine Learning: From Theory to Algorithms, ShaiShalev-Shwartz, Shai Ben-David

Skill Component: Software Testing (VCS5CRT0223)

75 Hours 5 Credits

COURSE OUTCOMES

- The students will acquire essential knowledge regarding different methods and techniques of costing applicable in various industries
- Describe the basic concept of testing.
- Demonstrate the knowledge of methods of test generation from requirements
- Describe the tools used for testing. Explain different types of testing.
- Apply various test processes and continuous quality improvement.

Module I (15 Hours)

Fundamentals of testing: What is testing, Why is testing necessary, Testing principles, Fundamental Test process, the psychology of testing. Testing throughout the software life cycle- Test Levels, Types of bugs, Test types: the targets of testing, Maintenance Testing.

Module II (15 Hours)

Test design techniques: Black box test design Techniques- Equivalence partitioning; boundary value analysis; decision tables; state transition testing

Module III (25 Hours)

White box test design techniques - Path Testing- Statement Coverage, Code Coverage, Branch Coverage, Data flow testing. Test management- Test organization Independent and integrated testing, Test Plans, Estimates and Strategies, Test Progress Monitoring and Control- defect density, failure rate, test control, test coverage, test monitoring and test report.

Module IV (20 Hours)

Tool support for testing: Automated Testing, Types of Test tool- Test management tools, Requirements management tools, Incident management tools, Configuration management tools, Dynamic analysis tools, Monitoring tools. Manual testing- Familiarization of a test tool Selenium IDE

References

- Dorothy Graham, Erik Van Veenendaal, Isabel Evans, Rex Black, Foundations of Software Testing, Gaynor Redvers-Mutton, Third Edition.
- Boris Beizer, Software Testing Techniques, Dreamtech press, second edition.
- Edward Kit, Software Testing in the Real World, Pearson Education.

Skill Component: Programming in Java & Lab (VCS5CRP0123)

75 Hours 5 Credits

COURSE OUTCOMES

- Install and work with JDK
- Recall basic data types, operators and control structures in Java Demonstrate the basic concepts of Machine Learning.
- Build Java application programs using OOP principles and proper program structuring.
- Distinguish between Java application and Java applet Recognize the learning and generalization issue in neural computation.
- Develop projects using packages, inheritance and interface and AWT

Module I (15 Hours)

Brief History of Java, Special Features of Java, Data Type & Operators in Java, Arrays, Objects, the Assignment Statement, Arithmetic Operators, Relational and Logical Operators in Java, control Structures, The Java Class, Constructor, Simple Java Application, simple Java Applet, Finalizers, Classes inside classes: composition.

Module II (15 Hours)

Inheritance & Interface, Deriving Classes, Method Over-riding, Method Overloading, Access Modifiers, Abstract Class and Method, Interfaces, Packages, Imports and Class Path.

Module III (25 Hours)

Exception Handling, The Try-Catch Statement, Catching more than one Exception, The Finally Clause, Generating Exceptions, Threads: Introduction, Creating Threads in Applications, Method in Thread Class, Threads in Applets.

Module IV (20 Hours)

Java APIs – overview of APIs, IO Packages, Java Input Stream Classes, Java Output Stream Classes, File Class, Graphic & Sound: AWT and Swing, Graphic methods, Fonts, Loading and Viewing Images, Loading and Playing Sound, AWT & Event Handling, Layouts, JDBC.

References

- E. Balagurusamy, Programming with Java, McGraw Hill Education 2. Deitel & Deitel, Java: How To Program, Pearson Education.

LAB SYLLABUS

The laboratory work will consist of 15-20 Experiments

- 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
- Class definitions and usage involving variety of constructors and finalizers
- Programs involving various kinds of inheritances, Method Over-riding, Method Overloading
- Program involving Interface, creation and handling of packages, their imports and Class Path
- Programs involving a variety of Exception Handling situations, creating and handling threads in applications and applets.
- Programs to demonstrate methods of string class
- Program to demonstrate AWT graphic method and event handling

On The Job Training (OJT 3) (VCS5OJT0123)

3 Credits

The student will attach with an IT company approved by the Department for the period of 2 weeks for industry Training. The student should actively participate in the operations of the organization and should work like any other employee of that organization. At the end of the OJT the student should prepare a comprehensive report and present the report with the aid of PPT to the corresponding teachers. Student should also produce a certificate of internship from organization. All the above details should be submitted to the Department for evaluation.

Detailed Syllabus: Semester VI

General Component: Information Security (VCS6CMT0123)

60 Hours 4 Credits

COURSE OUTCOMES

- Explain the principles and protocols of internetworks.
- Recall the basic issues in information security
- Discuss the concept of ciphers and cryptography
- Describe various cipher methods
- Recognize the fundamentals of digital signatures, e-mail security policies and ethical software

Module I: INFORMATION SECURITY (15 hours)

Network security, Confidentiality, integrity, authentication, security policy, basic network security terminology, cryptography, symmetric encryption, substitution ciphers, transposition ciphers, steganography, Block ciphers, modes of operation, Data Encryption Standard, Public key cryptography, applications, strength and weakness, RSA algorithm, key distribution (concepts only).

Module II: AUTHENTICATION (15 Hours)

Authentication methods, message digest, digital signatures, digital signature algorithm, DSS, E-mail security: Pretty Good Privacy, working of PGP, S/MIME, MIME, IP Security,
Architecture, IPSec: strengths and benefits, IPv4, IPv6, ESP protocol, Web Security: Secure Socket layer, SSL session and connection

Module – III: MALICIOUS SOFTWARE (15 hours)

Viruses, working of anti-virus software, worms, Trojans, spyware, firewall, characteristics of firewall, packet filters, application level gateways, firewall architecture, trusted systems.

Module IV (15 Hours)

Regulations in India. Information Technology Act 2000/2008.Cyber Crime and the IT Act 2000/2008.Indian Contract Act 1872, Indian Penal Code, Indian

Copyright Act, Consumer Protection Act. Future Trends – The Law of Convergence

References

- Pachghar V. K., Cryptography and Information Security, PHI.
- Brijendra Singh, Cryptography & Network Security, PHI.
- William Stallings, Cryptography and Network Security: Principles and Practice,Pearson Education India

General Component: Informatics (VCS6CMT0223)

60 Hours 4 Credits

COURSE OUTCOMES

- Familiarize cognitive informatics
- Develop a strong base on bioinformatics, geo-informatics
- Attain information about cyber laws
- Create awareness about social issues of informatics
- Recall the basic principles of social informatics.

Module I (15 Hours)

Introduction to informatics, theory and practices in informatics, information systems, Cognitive informatics: fundamentals, formal cognitive models, cognitive resonance models, cognitive information systems, Introduction to business information system.

Module II (15 Hours)

Bio-informatics: introduction to bioinformatics, tools for bio informatics applications Examples of related tools (FASTA, BLAST, BLAT, RASMOL), databases (GENBANK, Pubmed, PDB) and software (RASMOL, Ligand Explorer). Drug designing, computational modelling.

Module III (15 Hours)

Geo-Informatics: Basin concepts about spatial information, Definition, Historical evolution and need for spatially based resource information system, objectives of GIS - manual vs. automated GIS. Geographic Information System, Applications, Global Positioning System, Conceptualization of GIS, Remote Sensing.

Module IV (15 Hours)

Social Informatics: IT and society, e-governess, cyber ethics, cyber security, cyber laws. Health Issues: Proper usage of digital world, e-waste management and green computing, Plagiarism, Academic services: INFLIBNET, NICNET, BRNET.

References

Core

- Lidia Ogiela, Marek R. Ogiela, Advances in Cognitive Information Systems, Springer
- Alan Evans and et.al., Informatics: Technology in Action, Pearson Education India
- Jean-Michel Claverie, Cedric Notredame, Bioinformatics for Dummies, Wiley Publishers
- Michael Kennedy, The Global Positioning System and ArcGIS, CRC Press

Additional References

- Dan E. Krane, Fundamental Concepts of Bioinformatics, Pearson Education India
- B. Bergeron, Bioinformatics Computing, Pearson Education.
- Andrzej Polanski, Marek Kimmel, Bioinformatics, Springer
- Vijayakumaran Nair K., Vinod Chandra S.S., Informatics, PHI Learning

Internet Resources

- www.informindia.co.in
- www.informatics.nic.in

General Component: Digital Marketing (VCS6CMT0323)

60 Hours 4 Credits

COURSE OUTCOMES

- Demonstrate the basics of digital marketing
- Develop a comprehensive digital marketing strategy
- Appreciate the use new media in promoting digital marketing
- Evaluate digital marketing efforts using various measurement techniques.
- Demonstrate advanced practical skills in digital marketing.

Module I (15 Hours)

Introduction to Digital Marketing: Overview of Digital Marketing Concepts, Personalized, Customized , Targeted and Contextual Ads , Differentiation with Traditional Marketing , Understanding various Social channels , Search Engine Optimization (SEO), Search Engine Marketing (SEM),PSA , PPM/ CPM, PPC/ CPC, Google Ad words ,Link Building, Google Algorithms , - Panda & Penguin , Directory Submissions

Module II (15 Hours)

Online Marketing: Email Marketing – Building Users Lists, Deliver Emails in Inbox & Generate Relevant Clicks. Social Media Marketing - Build Brand preferences, Generate Leads , Aggregate Audience , Mobile Marketing - App-based marketing, QR codes, Location-based marketing, SMS Marketing, Content and Blog Marketing – Info graphics, White paper, Brochure, Case studies, Word press

Module III (15 Hours)

Web Analysis: Measure, Monitor and Evaluate the Website Traffic and Campaign Statistics, Introduction to Google Webmaster Tools, Integration of Google Webmaster Tools, Viewing and Understanding Reports, Drilling to Individual Keywords, Keywords Research and Analysis

Module IV (15 Hours)

Website Monetization: Ways to generate revenues online - Blog writing, selling products, Affiliate programs, Conditional Advertising, Ad sales and Contextual Ads, Google AdSense.

References

- Paul Russell Smith, Dave Chaffey, E-Marketing Excellence: The Heart of E-Business, Elsevier Butterworth-Heinemann, 2005, US.
- Judy Strauss, Raymond Frost, E-Marketing, Prentice Hall, India.

Internet Resources

- http://www.guru99.com/free-digital-marketing-tutorial.html
- http://www.omtac.com/h/n/omtac/digitalmarketingresi//292//

Skill Component: Free And Open Source Software (VCS6CRT0123)

90 Hours 6 Credits

COURSE OUTCOMES

- Explain the features of free & open source software
- Familiarize with Linux
- Write, Test and Debug Python Programs
- Implement Conditionals and Loops for Python Programs
- Use functions and represent Compound data using Lists, Tuples and Dictionaries

Module I (20 Hours)

Open source software: Features, advantages over proprietary software, examples, Free software: concepts, features, Free software Vs Open Source software, Free software movements. Policies, GPL, Free OS, History and Features of Linux, Various flavours of Linux, Linux Kernel and Shell, Graphical Desktops- GNOME, KDE, Linux File System and Directories.

Module II (25 Hours)

Basic bash Shell Commands: The Shell Prompt, The bash Manual, Filesystem Navigation, File and Directory Listing, File Handling, Directory Handling, Viewing File Contents, Monitoring Programs, Monitoring Disk Space, Working with Data Files, Using Linux Environment Variables, Understanding Linux File Permissions, Working with Editors: The vim editor.

Module III (25 Hours)

Introduction to Python, Why Python?, Script or Program? Python identifiers and reserved words, Lines and indentation, multi-line statements, comments, print and raw_input()/input, standard data types - basic, none, boolean (true & False), numbers, Python strings, data type conversion, Python basic operators, Python identity operators, Operator precedence, Control Statements, Python loops, Iterating by subsequence index, loop control statements, Mathematical functions and constants (import math), Random number functions

Module IV (20 Hours)

Python strings concept, Slicing, escape characters, String special operations, String formatting operator, Triple quotes, Raw String, Unicode strings, Built-in String methods. Python Lists - concept, creating and accessing elements, updating & deleting lists, basic list operations, reverse, Indexing, slicing and Matrices, built-in List functions, List comprehensions Python tuples and sets, Concept (immutable), built-in tuple functions. Sets: Concept, operations. Python Dictionary -Concept (mutable), creating and accessing values in a dictionary, updating dictionary, delete dictionary elements, properties of dictionary keys, built-in dictionary functions and methods.

References

- Richard Blum, Linux® Command Line and Shell Scripting, Wiley Publishing, Inc.
- Mark Summerfield, Programming in Python 3: A Complete Introduction to the Python Language, Second Edition, Addison-Wesley Professional, 2009
- Dusty Phillips, Python 3 Object-oriented Programming, Second Edition, Packet- Publishing, 2015

Skill Component: Mobile Application Development and Android Lab (VCS6CRP0123)

90 Hours 6 Credits

COURSE OUTCOMES

- Build your own Android applications
- Explain the differences between Android, Windows and other mobile development environments
- Use various layouts and widgets of Android applications
- Write simple GUI applications
- Develop database applications using SQLLite

Module I (20 Hours)

Mobile Computing: Mobile Connectivity-Cells, Framework, wireless Delivery Technology and switching methods, Mobile Information Access Devices, Mobile Data Internetworking Standards, Cellular data communication Protocols, Mobile Computing Applications. Mobile Data Bases- Protocols, Scope, Tools and Technology, M- Business.

Module II (25 Hours)

Android Development Tools: Introduction to Android Studio, Android software development kit (SDK), Application development tools (ADT) plugin, Emulators and Devices: Android virtual devices (AVDs), Connecting Androids to the development platform, Android. Platform Architecture, Android application Component's, Android Development Lifecycle: "Hello World!", Running on the emulator, Running on a device.

Module III (25 Hours)

Android User Interface, XML Fundamentals: Trees, Elements, Attributes, Examples, Simple Interactive programs, building a Dynamic UI with Fragments, Android Intents and Filters, Activity Lifecycles: Callbacks and activity pyramids, Launcher activity, Instantiation, destroying activities, Pausing, resuming, starting and stopping activities, saving and restoring activities.

Module IV (20 Hours)

Android Notifications, Android SQLite Database, Interaction with Other Apps, Location-Aware Apps, Layout Hierarchies, Adding Audio, Photos and Videos to Apps – Flutter Tool

References

Core

- Neil Smyth, Android Studio Development Essentials, eBookFrency
- Ronan Schwarz, Phil Dutson, James Steele, Nelson To, The Android
- Developer's Cookbook, Building Applications with the Android SDK (Developer's Library), Pearson Education.

LAB SYLLABUS

- Familiarization with the Android Development Platform
- Writing Android Programs
- Expanding the App Capabilities with Lifecycles and more UI options
- Demonstrating Inter-App Interaction
- Building a program that demonstrates layout hierarchies
- Incorporating audio and/or video into app projects

Internship with Project- (VCS6CPR0123)

3 Credits

The student will attach himself with any organization approved by the Department for a period of 4 weeks for studying the software related project in the firm/enterprise. The objectives of study are to help students to shape social relation and create institutional tie-ups. The student should actively participate in the operations of the organization and should work like any other employee of that organization. At the end of the, the student should prepare a comprehensive report (not less than 40 pages, A4 size). The report and the specimens of the work done by the student should be attested by the organization. All the above details should be submitted to the Department for the evaluation.

GIST OF CHANGES

Semester	Existing	Proposed
3	Social Awareness(VCS3CMT0220) Module 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, Other youth program/schemes of GOI. Module 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.	Soft skills and Personality Development(VCS3CMT0223) Module I Critical Thinking: Introduction to critical thinking – Benefits - Barriers – Reasoning - Arguments - Deductive and inductive arguments – Fallacies - Inferential comprehension Critical thinking in academic writing - Clarity - Accuracy – Precision – Relevance. Module II Research for Academic Writing and the Writing Process: Data collection - Use of print, electronic sources and digital sources - Selecting key points - Note making, paraphrasing, summary – Documentation - Plagiarism – Title – Body paragraphs - Introduction and conclusion – Revising - Proof-reading.

	Module 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 Module IV: VIGILANCE AWARENESS Introduction, Organization and Structure, Functions, Powers and Jurisdiction, Duties and Responsibilities, Administrative Powers, Financial Powers, Anti –Corruption Functions, Methodology of Enquiry / Investigation, Penal Process	Module III Accuracy in Academic Writing: Articles - Nouns and prepositions - Subject-verb agreement - Phrasal verbs - Modals - Tenses - Condition-als – Prefixes and suffixes – Prepositions - Adverbs – Relative pronouns - Passives - Conjunctions - Em-bedded questions - Punctuation – Abbreviations. Module IV Writing Models: Letters - Letters to the editor - Resume and covering letters - e-mail - Seminar papers - Project reports - Notices - Filling application forms - Minutes, agenda – Essays. Module V Presentation Skills: Soft skills for academic presentations - Effective communication skills – Structuring the presentation - Choosing appropriate medium – Flip charts – OHP – Power Point presentation – Clarity and brevity - Inter-action and

		persuasion - Interview skills – Group Discussions.

Semester	Existing	Proposed
2	Module 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. Module 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. Auto grid, Splines, Extended splines, modifying splines – Pivot point, Lathe modifier, modifying the shapes.	MODULE 1 MAYA: Introduction to MAYA - The Maya interface ñ software and hardware - Tool bar - Menu bar- layers, Shortcut Keys, Knowing the Primitive objects in Maya, Understanding About View Ports, Channel Box, Hot Box, Channel Attributes, Outline Editor. MODULE II ANIMATION: Animation in MAYA - Principles of animation (squash and stretch, timing)... Doing Object animation & Understanding the Behavior of Shapes of Objects, Making play blasts-Working with Animation Curves - Graph Editor ñ time line- Shortcuts, Camera Animation, Setting Resolution Gates. RIGGING: Knowing Deformers and there functionality (Lattice, Cluster, Wire, Jiggle... & Non Linear Deformers), Knowing Constraints (Point, Orient, Scale, Parent, Pole Vector, Aim...),Introduction to Joints - Understanding

	Module 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, and Noise. Lights and Cameras: Standard lights, Photometric lights, Place Highlight tool, Cameras – Creating a Target camera, creating a Free Camera, Creating a Physical camera, Align camera too. Module 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	difference between Local Axis and World Axis for Joints MODULE III MODELLING: Introduction to modelling - Primitive objects - NURBS and polygon modelling tools to Organic and Industrial designs ñ Editing Nurbs & Polygons, Learning Menus in Surfaces and Polygons Tabs, Shortcut. TEXTURING: Introduction to Materials: Understanding the Materials & Behavior of material, Understanding UV Texture Editor, Applying Single Color to object, Hyper shade- Understanding different types of Maps Understanding UV mapping - UV manipulation - editing texture in Photoshop UV snap shot - Applying materials and textures to models and props ñ Shortcuts. MODULE IV LIGHTING: Understanding Color Theory, Introduction to lighting ñ importance of lighting animation - Basic Lighting Concepts ñ types of lights ñ Change the color of the light - lightattributes - rendering – Shortcuts RENDERING: Introduction to rendering, Knowing Renderers - software Rendering,

		Hardware Rendering, Vector Rendering, Mental Ray Rendering, Selecting a Render Type, Interactive Photorealistic Rendering (IPR), Batch Rendering, Working with the Options in Render setting. MODULE V DYNAMICS: Introduction to Particles, Crating Emitter, Knowing Different types of Particle, particle object, knowing about Hardware rendering Particles & Software Rendering Particles, Goals, Particle collisions, Emit from Object, Goals, Understanding the Physics of Dynamics, Knowing Fields, Understanding Dynamics Constrains, Knowing Soft Body and Rigged Bodies, Emitting From Object, Understanding Fields, Setting Particle Life Span, Setting Color for Particles, Understanding Basic Particle Attributes.

Semester	Existing	Proposed
5	Content Management Tools(VCS5CMT0320) Module I Introduction to Content Management System, Advantages and Disadvantages of CMS (Client and Developer point-of-view), Main Kinds of CMS, Proprietary CMS, Open Source CMS, Data Proliferation, Storage Virtualization. Module II Web Content Management System, Enterprise Content Management System, Mobile Content Management System, Component Content Management System, Information Lifecycle Management. Module III Install Joomla - Step by Step: Unzip Files, Browse to Localhost, Review of Installation Options, Frontend Features, Backend - Control Panel, Creating Content: Create Categories, Create Articles and Apply Options, Linking to Content: Menu Manager and Setting Up a Link, Link to External Site, Additional Link Options,	Artificial Intelligence(VCS5CMT0323) MODULE I Introduction- Artificial Intelligence: Concept and Definition, History of AI, Related concepts about AI, Physical symbol system hypothesis, Practical systems based on AI, Components of AI. MODULE II Problem Solving through AI- Representation of AI problems, Production system, algorithm of problem solving, examples of AI problems, nature of AI problems. MODULE III Basic concept of Heuristic search, Types of knowledge, Knowledge representation, knowledge storage, Introduction to Programming languages. MODULE IV Machine learning, Planning, Understanding- Learning: an introduction, Types of learning, Planning, Understanding. MODULE V

	Modules: Add a Module, Add Module Only on Select Pages. Module IV Joomla Templates: What are Templates? Template Positions, Commercial vsMake Your Own, Installing Templates, Quick Start Packages	Applications of AI- Neural networks, pattern recognition, computer vision.

The General Component "Computer Fundamentals for Software Development " of Semester 1 is changed to Skill Component and Skill component " Principles of Management" is changed to General Component without affecting the credit ratio(12:18) of general and skill components in a semester.

Computer Fundamentals for Software Development -VCS1CRT0123

Principles of Management-VCS1CMT0123

The changed subject 'Soft skills and Personality Development' in Semester 3 swapped to semester 2 with the subject "Environmental Science and Human Rights" .

Soft skills and Personality Development- VCS2CMT0123

Environmental Science and Human Rights-VCS3CMT0223

The changed subject 'Corporate Readiness Program' in Semester 6 swapped to semester 4 with the subject "Digital Marketing" .

Corporate Readiness Program -VCS4CMT0223

Digital Marketing – VCS6CMT0223

The subject " Research Methodology " in Semester 6 is swapped with "Information Security" in Semester 5. The no: of hours for "Research Methodology" changed to 4 per week and No : of hours for "Information Security" changed to 5 per week.

Research Methodology-VCS5CMT0223

Information Security-VCS6CMT0123

The following course codes have been changed to make it to practical subjects.

Sl.No	Subject Name	Semester	Existing Code	New Code
1	Programming Principles & C, C Lab	1	VCS1CRT0220	VCS1CRP0323
2	Word Processing, Image Editing and Lab	1	VCS1CRT0320	VCS1CRP0223
3	Computer Animation and Lab	2	VCS2CRT0120	VCS2CRP0123
4	Data Structures, Algorithms and Lab	2	VCS2CRT0220	VCS2CRP0223
5	Database Management System and Lab	3	VCS3CRT0220	VCS3CRP0123
6	OOPs and LAB	3	VCS3CRT0320	VCS3CRP0223
7	Web Application Development and Lab	4	VCS4CRT0120	VCS4CRP0123
8	Computer Hardware Maintenance and Lab	4	VCS4CRT0220	VCS4CRP0223
9	Programming in Java and Lab	5	VCS5CRT0220	VCS5CRP0123
10	Mobile Application Development and Android Lab	6	VCS6CRT0120	VCS6CRP0123