INSTITUTE OF SCIENCE, TECHNOLOGY & ADVANCED STUDIES (VISTAS)
(Deemed to be University Estd. u/s 3 of the UGC Act, 1956)
PALLAVARAM - CHENNAI
ACCREDITED BY NAAC WITH 'A' GRADE
Marching Beyond 25 Years Successfully

Bachelor of Computer Application

BCA

With Specialization in Block Chain Technology

Curriculum and Syllabus

Regulation 2022

Based on Choice Based Credit System (CBCS)

and

Learning Outcomes based Curriculum Framework(LOCF))

Effective from the Academic year2022-2023

Department of Computer Applications

School of Computing Sciences

DEPARTMENT OF COMPUTER APPLICTAIONS
SCHOOL OF COMPUTING SCIENCES

VISION

Our Vision is to be a center of excellence in IT education, training and research, aiming to wards carrying out advanced research and development in information and software technologies, and in leveraging IT in specific domain areas enabling students to become innovators and entrepreneurs.

MISSION

- To be a department of excellence in technical education, widely known for the development of competent and socially responsible IT professionals, entrepreneurs and researchers. To promote professionals with knowledge and understanding, by providing them with latest developments in Computer Applications so that they contribute not only to the progress ofsoftwareanditsapplicationsbutevenencompasstheentiredomainofcomputertechnology.
- To impart quality education for long lasting development and opportunity in an extensive career in the various fields of Computer science/ Information Technology.
- To increase innovative learning to the needs of Industry and Society
- To be the source of bringing out globally competent pioneering computing professionals, researchers, innovators and entrepreneurs.

PROGRAM EDUCATIONAL OBJECTIVES (PEO)

PEO1: Emerge as globally competent computer professionals in multidisciplinary domains.

PEO2: Excel as socially committed individual having an ethical values and empathy for the need of society

PEO3: Become an entrepreneur possessing a leadership skill that can provide solutions and develop software products.

PEO4: Involve in lifelong learning to adapt the latest technologies and advancements in the emerging areas of computer applications.

PEO5 : Provide technical & skill based quality training to the students in the field of Information technology

PROGRAM OUTCOME(PO)

PO1:ComputationalKnowledge:

Apply knowledge of computing fundamentals, computing specialization, mathematics, and domain knowledge appropriate for the computing specialization to the abstraction and conceptualization of computing models from defined problems and requirements.

PO2:ProblemAnalysis:

Identify, formulate, research literature, and solve complex computing problems reaching Substantiated conclusions using fundamental principles of mathematics, computing sciences, and relevant domain disciplines.

PO3: Design/Development of Solutions:

Design and evaluate solutions for complex computing problems, and design and evaluate systems, components, or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.

PO4: Conduct Investigations of Complex Computing Problems:

Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern Tool Usage:

Create, select, adapt and apply appropriate techniques, resources, and modern computing tools to complex computing activities, with an understanding of the limitations.

PO6:ProfessionalEthics:

Understandandcommittoprofessionalethicsandcyberregulations,responsibilities,and norms of professional computing practice.

PO7: Life-long Learning:

Recognize the need, and have the ability, to engage in independent learning for continual Development asa computing professional.

PO8: Project management and finance:

Demonstrate knowledge and understanding of the computing and management Principles and apply these to one's own work, as a member and leader in a team, to Manage projects and in multidisciplinary environments.

PO9: Communication Efficacy:

Communicate effectively with the computing community, and withsociety at large, about complex computing activities by being able to comprehend and write effectivereports,designdocumentation,makeeffectivepresentations,andgiveandunderstandclea rinstructions.

PO10: Societal and Environmental Concern:

Understand and assess societal, environmental, health, safety, legal, and cultural issues within local and global contexts, and the consequential responsibilities relevant to professional computing practice.

4.2Programme Specific Outcome

PSO1: BewellversedinthevarioussoftwareandlogicalskillslikeJavaProgramming, Python Programming, Database concepts etc.

PSO2:

Becompetentinthefundamentalsofsoftwareandhardwareconceptsandtheemergingtech nologiesinnetworks,recent trends incomputersciencefield.

Vels Institute of Science Technology & Advanced Studies School of Computing Sciences

Department of Computer Applications

Board of Studies Members

S.No	Name&Designation	Address	Role
1	Dr.P.MayilvahananProfessor & Director ,SCS	SchoolofComputingSciences,VISTAS,Chennai.	Chairman
2	Dr. T. VelmuruganAssociate Professor&Head	Department of Computer Science,DGVaishnavCollege, Chennai.	Industry Expert(ExternalMember)
3	Dr.P.MageshKumar ManagingDirector	CalibsoftTechnologiesPvtLtd.,Chennai.	Academic Expert(ExternalMember)
4	Mr.R. BalamuruganSoftwareEngineer	SCOPUSTechnologiesLtd.,Chennai	AlumniMember
5	Dr.S.PrasannaProfessor&Head	DepartmentofComputerApplications,School of Computing Sciences,VISTAS,Chennai	InternalMember
6	Dr. T. KamalakannanProfessor&Head	DepartmentofInformationTechnology,School of Computing Sciences,VISTAS,Chennai	InternalMember

VELS INSTITUTE OF SCIENCE, TECHNOLOGY AND ADVANCED STUDIES(VISTAS),CHENNAI

CHOICEBASEDCREDITSYSTEM(CBCS)

and

LEARNING OUTCOME BASED CURRICULUM FRAMEWORK (LOCF)UGREGULATIONS2021

BCAWITHSPECIALIZATIONINBLOCKCHAINTECHNOLOGYDEGREE

(Applicabletoallthecandidatesadmittedfromtheacademicyear2022-23onwards)

1. DURATIONOFTHEPROGRAMME

- Three years(six semesters)
- Eachacademicyearshallbedividedintotwosemesters.Theoddsemestersshallconsistoftheperiodfrom July to November of each year and the even semesters from January to May of each year.
- There shall be not less than 90 working days for each semester.

2. ELIGIBILITYFORADMISSION

Students should have passed the Higher Secondary Examinations of (10+2) stream with **Computer Science** or **Mathematics/Business Maths** as one of the subjects or any examination of any other authority accepted by the Board of Management of VISTAS.

3. MEDIUMOFINSTRUCTION

The medium of instruction for all UG programmes is English excluding Tamil, Hindi and French Language Papers

4. CREDITREQUIRMENTSANDELIGIBILITYFORAWARDOFDEGREE

A Candidate shall be eligible for the award of Degree only if he/she has undergone the prescribed course of study in VISTAS for a period of not less than three academic years and passed the examinations of all the prescribed courses of Six Semesters earning a minimum of 140 credits as perthe distribution given in for Part I, II, III and also fulfilled such other conditions as have been prescribed thereof.

5. COURSE

Each course / subject is to be designed under lectures / tutorials / laboratory or

field work / seminar /practical training / Assignments / Term paper or Report writing etc., to meet effective teaching and learningneeds.

6. COURSEOFSTUDYANDCREDITS

TheCourseComponentsandCreditDistributionshallconsistPartI,II&III:

The UG programme consists of a number of courses. The term 'course' is applied to indicate a logical part of the subject matter of the programme and is invariably equivalent to the subject matter of a 'paper' intheconventionalsense.Thefollowingarethevariouscategoriesofcoursessuggestedfor theUGprogrammes.

PartI–

LanguageCourses(LC)(anyoneofTamil,Hindi,Frenchorspecialsubjectdesignedinlieuofthea bove).

PartII–English Language courses (ELC) or special subject designed

The Language courses and English Language Courses are 4 each / 2 each in number and the LC and ELCaremeant to develop the students communicative skill at the UG level.

Part III – Core courses i.e. major courses that compulsorily required for each of the programme of study (CC), Ability Enhancement Course (AHC),Discipline Specific Elective Course (DSE) and Skill Enhancement Course(SEC).

For each course, credit is assigned based on the following:Contact hour per week CREDITS

1 Lecture hour	-	1Credit
1 Tutorial hour	-	1Credit
2 Practical hours	-	1 Credit(Laboratory/ Seminar/Project Work/etc.)

7. REQUIREMENTS FOR PROCEEDING TO SUBSEQUENT SEMESTER

6.1. **Eligibility:** Students shall be eligible to go to subsequent semester only if they earn sufficient attendance asprescribedtherefor bytheBoardof Managementfrom time totime.

6.2. **Attendance:** All Students must earn 75% and above of attendance for appearing for the UniversityExamination.(Theory/Practical)

6.3. **Condo nationofshortageofattendance:**IfaStudent fails to earn the

minimumattendance(Percentage stipulated), the HODs shall condone the shortage of attendance on medical grounds upto a maximum limit of 10% (i.e. between 65% and above and less than 75%) after paying theprescribed fee towards the condonation of shortage of attendance. The students with attendance oflessthan65andmorethan50%shallbecondonedbyVContherecommendationofHODso n

genuinegrounds,willbepermittedto

appearfortheregularexaminationonpaymentoftheprescribedcondonation fee.

6.4. **Detained students for want of attendance:** Students who have earned less than 50% of attendanceshall be permitted to proceed to the next semester and to complete the Program of study. SuchStudents shall have to repeat the semester, which they have missed by rejoining after completion offinal semester of the course, by paying the fee for the break of study as prescribed by the Universityfrom timeto time.

6.5. **TransferofStudents and Credits:**Thestrengthofthe credits systemis that it permits interInstitutionaltransfer of students. By providing mobility,itenables individualstudents to developtheir capabilities fully by permitting them to move from one Institution to another in accordance withtheiraptitudeandabilities.

6.5.1. Transfer of Students is permitted from one Institution to anotherInstitution for the sameprogram with same nomenclature, provided, there is a vacancy in the respective program ofStudyin theInstitution wherethetransferisrequested.

6.5.2. ThemarksobtainedinthecourseswillbeconvertedintoappropriategradesaspertheUniversi tynorms.

6.5.3. ThetransferstudentsarenoteligibleforRanking,PrizesandMedals.

6.5.4. Students who want to go to foreign Universities upto two semesters or Project Work with theprior approval of the Departmental / University Committee are allowed to transfer of theircredits. Marks obtain in the courses will be converted into Grades as per the University normsandthestudentsareeligibleto getCGPAand Classification.

7. EXAMINATION AND EVALUATION

7.1. Examination:

8.1.1 There shall be examinations at the end of each semester, for odd semesters in the month of October / November, for even semesters in April / May. A candidate who does not pass the examination inany course(s) shall be permitted to appear in such failed courses in the subsequent examinations to be held in October/NovemberorApril/May.

8.1.2 A candidate should get registered for the first semester examination. If registration is not possible owing to shortage of attendance beyond condonation limit /

regulations prescribed OR belated joining OR on medical grounds, the candidates are permitted to move to the next semester. Such candidates shall re-do the missed semester after completion of the programme.

8.1.3 The results of all the examinations will be published through University Website. In the case of passed out candidates, their arrear results, willb epublished through UniversityWebsite.

8.2ToRegisterForAllSubjects:

StudentsshallbepermittedtoproceedfromtheFirstSemesteruptoFinalSemester irrespectiveof

their failure in any of the Semester Examination, except for the shortage of attendance programs. For thispurpose, Students shall register for all the arrear subjects of earlier semesters along with the current(subsequent)Semester Subjects.

8.3. Marks for Continuous Internal Assessment (CIA)Examinations and End Semester Examinations (ESE)forPARTI, II,III

8.3.1 There shall be no passing minimum for Continuous Internal Assessment (CIA) Examinations.

8.3.2 For End Semester examination, passing minimum shall be 40% (Forty Percentage) of the maximum marks prescribed for the Course /Practical /Project and Viva-Voce.

8.3.3 In the aggregate (CIA and ESE)the passing minimum shall be of40%.

8.3.4.He/She shall be declared to have passed the whole examination, if he/she passes in all the courses whereverprescribedinthe curriculumbyearning140CREDITSinPartI,II,III.

8. QUESTIONPAPERPATTERNFORENDSEMESTEREXAMINATION

SECTION–A 10 questions10 X2= 20 Marks

SECTION–B 5questionseither orpatternX16=80Marks

Total 100 Marks

9. SUPPLEMENTARYEXAMINATION: SupplementaryExaminationsareconductedf orthestudents who appeared in thefinalsemester examinations. Eligible criteria for appearing in the Supplementary Examinations areas follows:

9.1. Eligibility: A Student who is having a maximum of two arrear papers is eligible to appear for the Supplementary Examination.

9.2. Non-eligibility for those completed the program: Students who have completed their Program duration but having arrears are not eligible to appear for Supplementary Examinations.

10. RETOTALLING,REVALUATIONANDPHOTOCOPYOFTHEANSWERSCRIPTS:

10.1. Re-totaling: All UG Students who appeared for their Semester Examinations are eligible forapplyingfor re-totalingof theiranswer scripts.

10.2. Revaluation: All current batch Students who have appeared for their Semester Examinations areeligible for Revaluation oftheiranswer scripts.Passed out candidates arenoteligibleforRevaluation.

10.3. Photocopy of the answer scripts: Students who have applied for revaluation can download theiranswerscriptsfromtheUniversityWebsiteafterfifteendaysfromthedateofpublication oftheresults.

11. THEEXAMINATIONANDVALUATIONFORMOOCSwillbeas per therequirements oftheregulatorybodies andwillbe specifiedatthebeginningoftheSemesterandnotifiedbytheuniversityNPTEL-SWAYAMCoordinator(SPOC).

12. CLASSIFICATIONOFSUCCESSFULSTUDENTS

12.1. Part I Tamil / Other Languages; Part Ii English And Part Iii Core Subjects, Allied, ElectivesCourses And Project: Successful Students passing the Examinations for the Part I, Part II and PartIIIcoursesand securingthemarks

a) CGPA9.00to10.00shallbedeclaredtohavepassedtheexaminationin**FirstclasswithOutstanding**.

b) CGPA7.50to8.99shallbedeclaredtohavepassedtheexaminationin**Firstclasswithdistinction**.

c) CGPA6.00to7.49shallbedeclaredtohavepassedtheexaminationin**FirstClass**.

d) CGPA5.00to5.99intheaggregateshallbedeclaredtohavepassedtheexaminationinthe **SECOND**Class.

e) CGPA4.00to4.99shallbedeclaredtohavepassedtheexaminationinthe**THIRD**Class.

13. MARKSANDGRADES: Thefollowingtableshowsthemarks,gradepoints,letter gradesandclassificationto indicatetheperformanceof the Student:

13.1. **ComputationofGradePointAverage (GPA)**inaSemester,Cumulative GradePointAverage(CGPA)and Classification

GPA for a Semester: = ∑iCiGi ÷ ∑iCi That is, GPA is the sum of the multiplication of grade points bythe creditsof thecoursesdivided bythesum

ofthecreditsofthecoursesinasemester.

Where,Ci=Credits earnedforcourseiinanysemester,Gi = Grade Points obtained for course i in any semestern=Semesterinwhich suchcourseswere credited.

CGPAfortheentireprogramme:=∑n∑iCniGni÷∑n∑iCniThatis,CGPAisthesumofthemultiplication of grade points by the credits of the entire programme divided by the sum of the creditsofthecoursesof theentireprogramme

GradeConversionTable–UG

Rangeof Marks	**Grade Points**	**Letter Grade**	**Description**
90 –100	10	O	Outstanding
82 – 89	9	A+	Excellent
75 – 81	8	A	VeryGood
67 – 74	7	B+	Good
60 – 66	6	B	AboveAverage
50 – 59	5	C	Average
40 – 49	4	D	Minimumforpass
0 –39	0	RA	Reappear
		AAA	Absent

13.1.1. Letter Grade andClassCGPA

OverallPerformance –UG		
CGPA	**GRADE**	**CLASS**
4.00 -4.99	D	ThirdClass
5.00 -5.99	C	SecondClass
6.00 -6.69	B	FirstClass
6.70 -7.49	B+	
7.50 -8.19	A	FirstClasswithDistinction*
8.20 -8.99	A+	
9.00 -10.00	O	FirstClass-Outstanding*

- TheStudentswhohavepassedinthefirstappearanceandwithintheprescribedsemesterofthe UGProgramme (Major, AlliedandElectivecoursesonly)are eligible.

13.2. RANKING

15.1 StudentswhopassalltheexaminationsprescribedfortheProgramintheFIRSTAPPEARANCEITSELFALONEare eligiblefor Ranking/Distinction.

15.2 InthecaseofStudentswhopassalltheexaminationsprescribedfortheProgramwithabreakintheFirstAppearanceareonlyeligiblefor Classification.

15.3 StudentsqualifyingduringtheextendedperiodshallnotbeeligibleforRANKING.

14. MAXIMUMPERIODFORCOMPLETIONOFTHEPROGRAMSTOQUALIFYFORADEGREE

14.1.AStudentwhoforwhateverreasonsisnotabletocompletetheprogramswithinthenormalperiod(N)ortheMinimumdurationprescribedfortheprogramme,maybeallowedtwoyears

periodbeyondthenormal period to clear thebacklogto bequalified for thedegree. (TimeSpan =N+ 2yearsfor thecompletion ofprogramme)

14.2.Inexceptionalcaseslikemajoraccidentsandchildbirthanextensionofoneyearconsideredbeyondmaximumspanoftime (TimeSpan=N+2+1yearsforthe completionofprogramme).

15. REVISIONOFREGULATIONS,CURRICULUMANDSYLLABI

The University may from time to time revise, amend or change the Regulations, Curriculum, SyllabusandSchemeof examinations throughtheAcademicCouncil with the approvalof the BoardofManagement.

Vels Institute of Science and Technology and Advanced studies(VISTAS)

BCAWITHSPECIALIZATIONIN BLOCKCHAINTECHNOLOGY DEGREE

CoursesofStudyandSchemeofAssessment

TotalNo ofCredits:140

BCAWITHSPECIALIZATION INBLOCKCHAIN TECHNOLOGY

CourseComponents

Component	**ISem**	**IISem**	**IIISem**	**IVSem**	**VSem**	**VISem**	**Total Credits**
CoreCourses &Languages	17 +6	17+6	21	18	5	-	90
AbilityEnhancementCourses (AEC)	2	-	2	-	-	-	4
Discipline SpecificElective(DSE)& GenericElective(GEC)	-	-	-	-	16	10+3	29
Skillenhancement Course(SEC)	-	2	2	3	2	5(DE)+3	17
TotalCredits	**25**	**25**	**25**	**21**	**23**	**21**	**140**

LearningOutcomes-BasedCurriculumFramework

UndergraduateEducation

B.C.AWITHSPECIALIZATIONINBLOCKCHAINTECHNOLOGY

Introduction

TheLearningOutcomes-BasedCurriculumFramework(LOCF)fortheundergraduateprogramslike B.C.A WITH SPECIALIZATION IN BLOCK CHAIN TECHNOLOGY is intended to provide a broadframeworktocreate anacademic basethatrespondstothe need ofthe studentstounderstand the basicsof

B.C.AWITHSPECIALIZATIONIN BLOCKCHAINTECHNOLOGY.

The IT industry is growing rapidly and hence the demand forBCA WITH SPECIALIZATION INBLOCK CHAIN TECHNOLOGY graduates is increasing every passing day. The Bachelor of ComputerApplications(BCAWITHSPECIALIZATIONINBLOCKCHAINTECHNOLOGY)isan

undergraduate program which is three-year program that span six semesters. It is designed to bridge thegapbetween thestudiesof computersandits applications.Thisprogramaimstoshape computerprofessionals with the right moral and ethical values and can prepare students to face the challenges andopportunitiesinITindustriesbybuildingstrongfoundations.Thesyllabusfocusesonthe corefundamentalsofcomputerscience,butgenerallyundergoesrevisionaccordingtotheind ustryrequirement with the aim of increasing employment opportunities for students. After obtaining a BCAWITH SPECIALIZATION IN BLOCK CHAIN TECHNOLOGYDegree, students can find well-paidjob opportunities in leading IT companies. The roles that one can bag after completing a BCA WITHSPECIALIZATIONINBLOCK

CHAINTECHNOLOGYDegreeprogrammeisthatofaSystemengineer, software tester, junior programmer, web developer, system administrator, software developer,etc. BCA WITH SPECIALIZATIONIN BLOCK CHAIN TECHNOLOGYgraduatesare not onlyrecruited by the private sector but also by public sector. Government organizations like Indian AirForce(IAF), Indian Army, and India Navy hire a large bunch of computer professionals for their ITdepartment.

1. LearningOutcomesBasedApproachToCurriculumPlanning

2.1NatureandextentofUGprograminB.C.AWITHSPECIALIZATIONINBLOCKCHAINTECHNOLOGY:

TheUGprogramsinB.C.AWITHSPECIALIZATIONINBLOCKCHAINTECHNOLOGYbuildson

the basic Computer Science taught at the +2 level in all the schools in the country. Ideally, the +2 seniorsecondary school education should aim and achieve a sound knowledge of computer and with sufficientprogramming knowledge. The curriculumum and syllabus should be framed in such way to ignite theyoung minds of the students to have the urge to innovate and create new approaches for succeeding in ITindustry.

2.2 *Aims of UG program in B.C.A WITH SPECIALIZATION IN BLOCK CHAIN TECHNOLOGY*

TECHNOLOGYThemissionistoemergeasaworldwide Conglomerateofpremiereducationalestablishment forB.C.AWITH SPECIALIZATION IN BLOCK CHAIN TECHNOLOGY,alltaking pride in havingnurtured datathat mayresultin fulfiltheaspirationsofIT industriesandtherefore theIndividual.

The primary objective of this program is to produce a foundation of computing principles and businesspractices for effectively managing information systems and enterprise software package. It helps studentsto analyze the necessities for system development and exposes students to business software package andinformation systems. This course provides students with choices to concentrate on application software,systemsoftwareor mobileapplications.

Commit our-self to a mission to stand out in analysis and to form an environment of effective learning,generate a spirit of questioning, enquiry, induce healthy challenges and aggressiveness, feel of completeaccomplishmentand instinctauthority.

3. Graduate attributes in B.C.A WITH SPECIALIZATION IN BLOCKCHAINTECHNOLOGY

Some of the characteristic attributes of a graduate in B.C.A WITH SPECIALIZATION IN BLOCKCHAINTECHNOLOGY

- CommunicationSkills
- Disciplinaryknowledge
- Criticalthinking
- Analyticalreasoning
- Problemsolving
- Reflectivethinking
- Leadershipqualities
- Scientificreasoning
- digitalliteracy
- Team work
- Skilledprojectmanager
- Ethicalawareness/reasoning
- Lifelonglearners

- Self-directedlearning

4. Programme learning outcomes relating

B.C.AWITHSPECIALIZATIONINBLOCKCHAIN TECHNOLOGY

4.1 ProgrammeOutcome

PO1:ComputationalKnowledge: Applyknowledgeofcomputingfundamentals,computingspecialization, mathematics, and domain knowledge appropriate for the computing specialization to theabstractionandconceptualizationofcomputingmodelsfrom definedproblemsandrequirements.

PO2:ProblemAnalysis: Identify,formulate,researchliterature,andsolvecomplexcomputingproblems reaching Substantiated conclusions using fundamental principles of mathematics, computingsciences,and relevant domain disciplines.

PO3:Design/DevelopmentofSolutions: Designandevaluatesolutionsforcomplex computingproblems, and design and evaluate systems, components, or processes that meet specified needs withappropriateconsiderationforpublichealthandsafety,cultural,societal,andenvironmentalconsiderations.

PO4: Conduct Investigations of Complex Computing Problems: Use research-based knowledge andresearch methods including design of experiments, analysis and interpretation of data, and synthesis ofthe informationto providevalidconclusions.

PO5: Modern Tool Usage: Create, select, adapt and apply appropriate techniques, resources, andmoderncomputingtoolstocomplexcomputingactivities,withanunderstandingofthe limitations.

PO6:ProfessionalEthics: Understandandcommittoprofessionalethicsandcyberregulations,responsibilities,and normsof professionalcomputingpractice.

PO7: Life-long Learning: Recognize the need, and have the ability, to engage in independent learningforcontinual Development asa computingprofessional.

PO8: Project management and finance: Demonstrate knowledge and understanding of the computingand management Principles and apply these to one's own work, as a member and leader in a team, toManage projectsandin multidisciplinaryenvironments.

PO9: Communication Efficacy: Communicate effectively with the computing

community, and withsociety at large, about complex computing activities by being able to comprehend and write effectivereports,designdocumentation,makeeffectivepresentations,andgiveandunderstandclearinstructions.

PO10: Societal and Environmental Concern: Understand and assess societal, environmental, health,safety, legal, and cultural issues within local and global contexts, and the consequential responsibilitiesrelevantto professional computingpractice.

4.2 ProgrammeSpecificOutcome

PSO1:

Bewellversedinthevarioussoftwareandlogicalskillslike JavaProgramming,PythonProgramming,Databaseconceptsetc.

PSO2:

Becompetentinthefundamentalsofsoftwareandhardwareconceptsandtheemergingtechnologiesinnetworks,recent trends incomputerscience field.

5. DegreeofBachelorOfComputerApplications

5.1 DurationOfthe Programme

- Threeyears(sixsemesters)
- Eachacademicyearshallbedividedintotwosemesters.Theoddsemestersincludestheperiodfrom Julyto Novemberand theevensemestersfromJanuaryto Mayofeachyear.
- There shall notbelessthan 90 workingdaysforeach semester.

5.2. EligibilityforAdmission

Students should have passed the Higher Secondary Examinations of (10+2) stream with**ComputerScience**/**Mathematics/Business Maths** as one of the subjects or any examination of any other authorityacceptedbytheBoard of Management ofVISTAS.

5.3. CreditRequirmentsAndEligibilityForAwardOfDegree

A Candidate shall be eligible for the award of the Degree only if he/she has undergone the prescribedcourse of study in a College affiliated to the University for a period of not less than three academic yearsand passed the examinations of all the Six

Semesters prescribed earning a minimum of 140 credits as perthe distribution given in for Part I, II, III, IV & V and also fulfilled such other conditions as have beenprescribed thereof.

5.4. CourseOfStudy,CreditsAnd SchemeOfExamination

The Course Components and Credit Distribution shall

consist Part I, II & III:(Minimumnumber of

Creditstobeobtained)

CreditAssignmentEachcourseisassignedcertainnumberofcreditsbasedonthefollowing:
Contactperiodper week CREDITS

1Lecture Period - 1Credit

1 TutorialPeriod - 1Credit

2 PracticalPeriods -

1 Credit(Laboratory/

Seminar/ProjectWork/e

tc.)

5.5. RequirementsForProceedingToSubsequentSemester

- **Eligibility:** Students shall be eligible to go to subsequent semester only if they earn sufficientattendance asprescribedbytheBoard of Managementfromtime to time.
- **Attendance:**AllStudentsmustearn75%andaboveofattendanceforappearingfortheUniversityExamination. (Theory/Practical)
- **Condonation of shortage of attendance:** If a Student fails to earn the minimum attendance(Percentage stipulated), the HODs shall condone the shortage of attendance up to a maximumlimit of 10% (i.e. between 65% and above and less than 75%) after collecting the prescribed feetowards the condonation of shortage of attendance. Such fees collected and should be remitted tothe University.
- **Non-eligibility for condonation of shortage of attendance:** Students who have secured less than65 % but more than 50 % of attendance are NOT ELIGIBLE for condonation of shortage ofattendance and such Students will not be permitted to appear for the regular examination, but willbe allowedto proceed tothenext year/next semesteroftheprogram
- **Detainedstudentsforwantofattendance:**Studentswhohaveearnedlessthan50%ofattendance shall be permitted to proceed to the next semester and to complete the Program ofstudy. Such Students shall have to repeat the semester, which they have missed by rejoining aftercompletion of final semester of the course, by paying the fee for the break of study as prescribedbytheUniversityfromtimetotime.
- **Condonation of shortage of attendance for married women students:** In respect of marriedwomenstudentsundergoingUGprograms,theminimumattendanceforcondonation(Theory/Practical) shall be relaxed and prescribed as 55% instead of 65% if they conceive duringtheir academic career. Medical certificate from the Doctor together with the attendance detailsshall be forwarded to the university to consider the condonation of attendance mentioning thecategory.
- **Zero Percent (0%) Attendance:** The Students, who have earned 0% of attendance, have to repeatthe program (by rejoining) without proceeding to succeeding semester and they have to obtainpriorpermission fromtheUniversityimmediatelyto rejoin theprogram.
- **Transfer of Students and Credits:** The strength of the credits system is that it permits interInstitutional transfer of students. By providing mobility, it enables individual students to developtheir capabilities fully by permitting them to move from one Institution to another in accordancewiththeiraptitudeandabilities.
- Transfer of Students is permitted from one Institution to another Institution for the same programwithsamenomenclature.Provided,thereisavacancyintherespectiveprogramofStudyinthe

Institutionwherethetransferis requested.ProvidedtheStudentshouldhavepassedallthecoursesin theInstitution fromwherethetransfer isrequested.

- Themarksobtainedinthecourseswillbeconvertedandgradeswillbeassignedaspertheuniversitynorms.
- Thetransferstudentsarenoteligibleforclassification.
- ThetransferstudentsarenoteligibleforRanking,PrizesandMedals.
- Students who want to go to foreign Universities up to two semesters or Project Work with theprior approval of the Departmental/College Committee are allowed to get transfer of credits andmarks which will be converted into Grades as per the University norms and are eligible to getCGPAand Classification;theyare not eligible for Ranking,PrizesandMedals.

5.6. ExaminationandEvaluation

- Register forallsubjects: Students shallbepermitted to proceed from theFirstSemester up toFinal Semester irrespective of their failure in any of the Semester Examination. For this purpose,Studentsshallregisterforall the arrear subjectsof earliersemestersalong withthe current(subsequent)Semester Subjects.
- MarksforInternalandEndSemesterExaminationsforPARTI, II, III
- ThereshallbenopassingminimumforInternal.
- For external examination, passing minimum shall be 40% [Forty Percentage] of the maximummarksprescribedfor the paper for each Paper/Practical/Projectand Viva-Voce.
- Intheaggregate[External/Internal]thepassingminimumshallbeof40%.
- He / She shall be declared to have passed the whole examination, if he/she passes in all the papersandpracticalwhereverprescribedaspertheschemeoftheexaminationsbyearning140CREDITSin PartI,II,III.

5.7. MaximumPeriodForCompletionOfTheProgramsToQualifyForADegree

- A Student who for whatever reasons isnot able to complete the programs within the normalperiod (N) or the Minimum duration prescribed for the programme, may be allowed two yearsperiod beyond the normal period to clear the backlog to be qualified for the degree. (Time Span =N+ 2yearsfor thecompletion ofprogramme)

5.8. RevisionOfRegulations,CurriculumAndSyllabi

- The University may from time to time revise, amend or change the Regulations, Curriculum,Syllabus and Scheme of examinations through the Academic Council with the approval of theBoardof Management.

VELSINSTITUTEOFSCIENCE,TECHNOLOGYAND ADVANCEDSTUDIES(VISTAS)BCAWITHSPECIALIZATIONIN BLOCKCHAIN TECHNOLOGY

DEGREE COURSE COURSES OF STUDY AND SCHEME OFASSESSMENT (MINIMUM CREDITSTOBE EARNED:140)

		Hours/Week				Maximum		
MarksCodeNo.	Course	Lecture	Tutorial	Practical	Credits	CA	SEE	Total
SEMESTER 1								
LANG	TamilI/ Hindi/French	3	0	0	3	40	60	100
ENG	EnglishI	3	0	0	3	40	60	100
CORE1	ComputerArchitecture andOrganization	4	0	0	4	40	60	100
CORE2	ProgramminginC	4	1	0	5	40	60	100
CORE3	Mathematics–1	4	0	0	4	40	60	100
CORE PRAC	Practical–IC	0	0	4	2	40	60	100
CORE PRAC	Practical – IIProductivitySoftware	0	0	4	2	40	60	100
AECC	CommunicationSkills	1	0	2	2	40	60	100
SEC	Orientation/Induction programme/Lifeskills	-	-	-	-	-	-	-
		19	1	10	25			

SEMESTER2

LANG	TamilII/ Hindi/French	3	0	0	3	40	60	100
ENG	EnglishII	3	0	0	3	40	60	100
CORE4	WebTechnology	4	0	0	4	40	60	100
CORE5	JavaProgramming	4	1	0	5	40	60	100
CORE6	MATHEMATICS–II	4	0	0	4	40	60	100
CORE PRAC	Practical–IIIJAVA	0	0	4	2	40	60	100
CORE PRAC	Practical–IVWebtechnology Lab	0	0	4	2	40	60	100
SEC	Soft Skills – I/ SectorSkillCouncilCourse	2	0	0	2	40	60	100
SEC	NSS / NCC / SwachhBharat/InplantTraining	-	-	-	-	-	-	-
		20	1	8	25			

VELSINSTITUTEOFSCIENCE,TECHNOLOGYANDADVANCEDSTUDIES

BCA WITH SPECIALIZATION IN BLOCK CHAIN TECHNOLOGYDEGREECOURSE

		Hours/Week				Maximum Marks		
Code No.	Course	Lecture	Tutorial	Practica	Credits	CA	SEE	Total
SEMESTER 3								
CORE7	Data science using Python	4	1	0	5	40	60	100
CORE8	Cryptography and Network Security	4	0	0	4	40	60	100
CORE9	Essentials of Blockchain Technology Applications	4	0	0	4	40	60	100
CORE10	Financial Accounting	4	0	0	4	40	60	100
AECC	Environmental Studies	2	0	0	2	40	60	100
CORE PRAC	Practical–Python	0	0	4	2	40	60	100
CORE PRAC	Practical – Network Security Lab	0	0	4	2	40	60	100
SEC	Soft Skills- II/ Sector Skill Council Course	2	0	0	2	40	60	100
SEC	Swayam /NPTEL /Value Added Course	-	-	-	-	-	-	-
		20	1	8	25			

VELSINSTITUTEOFSCIENCE,TECHNOLOGYANDADVANCEDSTUDIES

BCAWITHSPECIALIZATIONINBLOCKCHAINTECHNOLOGYDEGREECOURSE

CodeNo.	Course	Hours/Week			Credits	MaximumMarks		
		Lecture	Tutorial	Practical		CA	SEE	Total
SE								
CORE11	DistributedSystems	4	1	0	5	40	60	100
CORE12	Advanced DatabaseSystems	4	0	0	4	40	60	100
CORE13	Statistical&Numerical Methods	5	0	0	5	40	60	100
COREPRAC	Advanceddatabasesystemlab	0	0	4	2	40	60	100
COREPRAC	DistributedSystemLab	0	0	4	2	40	60	100
SEC	SoftSkillsIII/SectorSkill CouncilCourse	2	0	0	2	40	60	100
SEC	Internship / CapabilityEnhancementProgramme	0	0	2	1	-	-	-
		15	1	10	21			

VELS INSTITUTE OF SCIENCE, TECHNOLOGY AND ADVANCED

STUDIESBCAWITHSPECIALIZATION

INBLOCKCHAINTECHNOLOGYDEGREE
COURSE

	Hour/Week	MaximumMarks

SEMESTER5

CodeNo.	Course	Lecture	Tutorial	Practical	Credits	CA	SEE	Total
CORE14	**PrinciplesofCloudComputing**	4	1	0	5	40	60	100
DSE1	DisciplineSpecificElective-I	3	0	0	3	40	60	100
DSE2	DisciplineSpecificElective– II	3	0	0	3	40	60	100
DSE3	DisciplineSpecificElective-III	3	0	0	3	40	60	100
DSE4	DisciplineSpecificElective –IV	3	0	0	3	40	60	100
DSELAB	CloudcomputingLab	0	0	4	2	40	60	100
DSELAB	BlockchainLab	0	0	4	2	40	60	100
SEC	Internship/MiniProject/Sector SkillCouncilCourse	0	0	4	2	40	60	100
SEC	SkillEnhancementTraining/StudentClubActivities	-	-	-	-	-	-	-
		16	1	12	23			

VELS INSTITUTE OF SCIENCE, TECHNOLOGY AND ADVANCED STUDIES

BCA WITH SPECIALIZATION IN BLOCK CHAIN TECHNOLOGYDEGREECOURSE

SEMESTER 6

CodeNo.	Course	Hour/Week			Credits	MaximumMarks		
		Lecture	Tutorial	Practical		CA	SEE	Total
DSE5	DisciplineSpecificElective– V	3	0	2	4	40	60	100
DSE6	DisciplineSpecificElective–VI	3	0	0	3	40	60	100
DSE7	DisciplineSpecificElective –VII	3	0	0	3	40	60	100
DSE/GE	GenericElective-I	3	0	0	3	40	60	100
SEC	EntrepreneurshipDevelopment	2	0	0	2	40	60	100
DE	CapstonrProjectWork	0	0	10	5	40	60	100
SEC	TechnicalSeminar/InnovationCouncil/StartupInitiative	0	0	2	1	40	60	100
		14	0	14	21			

UGCRecommendedGenericElectives

1. ConsumerAffairs
2. DisasterManagement
3. Universal HumanValues

LISTOFDISCIPLINESPECIFICELECTIVECOURSES

DSE–1	• BlockchainEcosystem • PublicKeyInfrastructureandTrustManagement • BlockchainFundamentals
DSE–2	• BitcoinMining • SmartContractEssentials • BlockchainandMoney
DSE -3	• BlockchainTechnologies:BusinessInnovationandApplications • BlockchainArchitectureDesign • Blockchain,Cryptoeconomics,andtheFutureofTechnology
DSE–4	• CryptocurrencyTechnologies • BitcoinandCryptocurrencyTechnologies
DSE–5	• CyberSecurity • WebSecurity • InformationSecurity
DSE–6	• DataPrivacy • InternetTransactions
DSE–7	• BlockchainEthics:TheImpactandEthicsofCryptocurrencyandBlockchainTechnology • DistributedConsensusandBlockchains • DisasterRecoveryandBusinessContinuityManagement

LISTOFSKILLENHANCEMENTCOURSES

SEC	Softskill-I
	Softskill-II
	NSS
	Ethicsand Values
	EthicalHacking
	MatlabProgramming

LISTOFABILITYENHANCEMENTCOMPULSORYCOURSE

AECC	CommunicationSkill
	EnvironmentalStudies

CORE COURSES

I SEMESTER

I SEM LANG HINDI– I 3 00 3

COURSEOBJECTIVE:

Toenablethestudentstodevelopcommunicationskills

Totrainstudentsinofficiallanguage

Toenrich theirknowledgeinHindi literature

UnitI - ' Ek atuut kadi',letterwriting,Technical words. 9

UnitII 'Devi singh', letterwriting, Technical words. 9

UnitIII 'kabiraaki kaashi',letterwriting, Technical words. 9

UnitIV 'kabiraaki kaashi',letterwriting, Technical words. 9

UnitV ' bharathiyavigyan ki kahaani '-'hamne diyaa,hamne liyaa' ,

letterwriting 9

TotalNo ofHours :45

COURSEOUTCOME

Attheend ofthiscourse

CO1 Studentswill be familiar with official letter writingCO2 will betrained inwriting various letters.

CO3 students will be moulded with good characterunderstandhumanvalues

CO4 students willgain knowledgeabout ancientIndia

CO5 will knowthe equivalenthindiwords forscientificterms

TEXTBOOK

GadyaKhosh ,Prashasanikshabdavali,Patralekhan

I SEM 21LFR001 FRENCHI 3 00 3

COURSEOBJECTIVE:

TointroduceFrenchlanguage.

To enable the students to understand and to acquire the basic knowledge of French languagewithelementary grammar.

UNIT:IINTRODUCTION 09

Introduction-Alphabet-commentprononcer,écrireetlirelesmots-base:lesprénomspersonnel de 1er , 2eme et 3eme personnes-conjugaisons les verbes être et avoir en formeaffirmative,négative

Etinterrogative.

UNITII-LECON 1-3 09

Leçon 1 :Premiers mots en français- 2.Les hommes sont difficiles 3.Vive la liberté-Réponsesauxquestionstiresdelaleçon-Grammaire:Lesadjectivesmasculinesouféminines-Lesarticledéfinieset indéfinis-Singuliers et pluriels.

UNITIII-LECON 4-6 09

Leçons 4. L'heure c'est l'heure 5.Elle va revoir sa Normandie 6.Mettez-vous d'accord groupede nom-Réponses aux questions tires de la leçon-Grammaire :A placer et accorder l'adjectifengroupedenom-Prépositionde lieu-Aécrirelesnombresetl'heureen français

UNIT:IV-LECON 7-9 09

Leçon7.Troisvisagedel'aventure,8.AmoiAuvergne9.Recitdevoyage-Réponsesauxquestions tires de la leçon-Grammaire : Adjectif processif- Les phrases au présent del'indicatif-Lesphrases avecles verbespronominaux au présent.

UNIT:V-COMPOSITION: 09

A écrireunelettrea unamil'invitanta unecélébrationdifférente ex :mariage-A faire ledialogue-A lirele passageet répondreaux questions.

TotalNo of Hours: 45

TEXTBOOK:

Jack GIRARDER & Jean Marie GRIDLIG,<<Méthode de Français PANORAMA>>, CléInternationale, Goyal Publication ,New DelhiEdition 2014.

REFERENCEBOOKS:

DONDO Mathurin, "Modern French Course", Oxford University Press, New Delhi Edition2014.

Nithya Vijayakumar get ready French grammar-Elementary Goyal publications ,New DelhiEdition 2014.

I SEM LANG ENGLISH I– PROSE **3 0 0 3**

COURSEOBJECTIVE:

Toenablestudentstodeveloptheircommunicationskillseffectively.Tomakestudentsfamiliar withusageskillsinEnglishLanguage.

Toenrichtheirvocabulary inEnglish

Todevelopcommunicativecompetency.

CreditHours

UNIT I **09**

DangersofDrugAbuse- HardinBJones

TightCorners-E.V.Lucas

UNIT II **09**

Futurology-AldousHuxley

IfYouareWrong,Admitit-DaleBreckenridgeCarnegie

UNIT III **09**

Industry-Dr.M.NarayanaRao&Dr.B.G.Barki

TurningPoint of My Life -A.JCronin

UNIT IV **09**

Excitement-MackR.Douglas

TheKandaMan Eater-JimCorbett

UNIT V **09**

Vocabulary andExercisesundertheLessons

TotalNo ofHours:45Hours

COURSEOUTCOME

At the end of this course students will be able to,CO1 Examinethe languageofprose.

CO2 Utilizeinstructionsonfundamentalsofgrammar

CO3 Developtheirownstyleofwritingafterstudyingdiverseproseessays.CO4 Classifydifferent essayson the basisof their types.

CO5 Criticallycommentonthetextualcontentofprose.

TEXTBOOKS

EnglishforCommunication Enrichment:byJeya Santhi June2015.

Dr. M. Narayana Rao and Dr. B. G. Barki – Anu's Current English forCommunication(AnuChitra). June2012.

Dr.Ananthan ,R. EffectiveCommunication.Ed. Chennai :Anu ChithraPub.2010.

WEBSOURCES:

https://www.gradesaver.com/

https://www.enotes.com/

https://www.jstor.org/

https://www.sparknotes.com/

https://www.cliffsnotes.com/

I SEM COMPUTER ORGANIZATION AND ARCHITECTURE 4 0 0 4

COURSE OBJECTIVES:

To understand the architecture of computers and to analyze the performance using various addressing modes.

To familiarize with hierarchical memory system including cache memories and virtual memory.

To impart knowledge about different ways of communicating with I/O devices and standard I/O interfaces.

UNIT I BASIC STRUCTURE OF COMPUTERS 12

Functional units – Basic operational concepts – Bus structures – Performance and metrics – Instructions and Instruction sequencing – Hardware – Software Interface – Instruction set architecture – Addressing modes – RISC– CISC – ALU design – Fixed point and floating point operations : Floating Point Numbers and Operations.

UNIT II BASIC PROCESSING UNIT 12

Some Fundamental concepts – Execution of a complete instruction: Branch instructions – Multiple bus organization – Hardwired control: A Complete Processor – Micro programmed control: Microinstructions –Microprogram Sequencing – Wide-Branch Addressing – Microinstructions with next address field – Prefetching and emulation – Nano programming.

UNIT III PIPELINING 12

Basic concepts: Role of Cache Memory – Pipeline Performance – Data Hazards – Instruction Hazards – Influence on Instruction Sets: Addressing modes – Condition Codes – Datapath and Control Considerations – Superscalar Operation: Out-of-Order Execution – Execution Completion – Dispatch Operation – Performance Considerations –Exception Handling.

UNIT IV MEMORY SYSTEM 12

Basic concepts – Semiconductor RAM – ROM – Speed – Size and cost – Cache Memories: Mapping Functions –Replacement Algorithms – Example – Performance Considerations: Interleaving – Hit Rate and Miss Penalty–Caches on the Processor Chip – Virtual Memories – Memory Management Requirements – Associative Memories– Secondary Storage devices.

UNIT V I/O ORGANIZATION

12 Accessing I/O devices – Interrupts : Interrupt Hardware – Enabling and Disabling Interrupts – Handling Multiple Devices – Controlling Device Requests – Exceptions – Direct Memory Access: Bus Arbitration – Buses:

Synchronous Bus – Asynchronous Bus – Interface circuits: Parallel Port – Serial Port – Standard I/O Interfaces (PCI, SCSI, and USB), I/O devices and processors.

TOTAL: 60h

TEXT BOOK:

1. Carl Hamacher, Zvonko Vranesic and Safwat Zaky, “Computer Organization”, Fifth Edition, Tata McGraw

Hill, 2002.

REFERENCE BOOKS:

1. William Stallings, “Computer Organization and Architecture – Designing for Performance”, Sixth Edition,

Pearson Education, 2003.

2. David A. Patterson and John L. Hennessy, “Computer Organization and Design: The Hardware/Software

interface”, Third Edition, Elsevier, 2005.

3. John P. Hayes, “Computer Architecture and Organization”, Third Edition, Tata McGraw Hill, 1998.

4. M. Morris Mano, “Computer system Architecture”, Third edition, Prentice Hall of India, 2004.

COURSE OUTCOME

CO1: Apply the basic features of operational concepts with its functional operations.

CO2 :Determine hardware blocks and control lines are used for specific instructions that

execute at different operational level.

CO3 :Demonstrate the operation like add and multiply integers and floating-point

numbers using two’s complement and IEEE floating point representation for various

models.

CO4 :Analyze clock periods, performance, and instruction throughput of single-cycle,

multi-cycle, and pipelined implementations of a simple instruction set

CO5 :Deduct and describe the pipeline hazards and identify possible solutions to those

Hazards

I SEM PROGRAMMING IN C **4** **1** **0** **5**

COURSEOBJECTIVE

Tointroducesthebasicconceptsofprogrammingin C.

Tounderstandthelogicofaproblem andwritestructuredCprograms.

Todeal theconcept offunctionsinClanguages.

Todemonstrateanunderstandingofprimitivedatatypes,values,operatorsandexpressionsin C

UNITI INTRODUCTION **15**

Fundamentalcharacterset–Identifierandkeywords–datatypes–Constants–variables–Declarations–Expressions–Statements–Arithmetic,Unary,Relationalandlogical,AssignmentandconditionalOperators–Library Functions.

UNITII INPUT,OUTPUTFUNCTIONS ANDCONTROLSTRUCTURES **15**

Data input output functions – Simple C programs – Flow of control – if, if-else, while, do-while, forloop,Nestedcontrol structures –Switch,Breakandcontinue,go-tostatements –Commaoperator.

UINTIII FUNCTIONS ANDSTORAGECLASSES **15**

Functions–Definition–Proto-types–Passingarguments–Recursions–storageClasses–Automatic,External,Static, Register Variable–Multi-file programs.

UNITIV ARRAYS, STRINGS, STRUCTUREANDUNION **15**

Arrays–definingandProcessing–Passingarraystofunctions–Multi-DimensionalArrays–Arraysand String. Structures – User defined data types – Passing structures to functions – self-referentialstructures – Unions – Bitwise operations.

UNITV POINTERS AND FILES **15**

Pointers – Declarations–Passingpointers tofunctions–OperationinPointers –PointerandArrays

–ArraysandPointers-StructuresandPointers–Files–Creating,Processing,OpeningandClosingadata file.

Total No ofHrs:75

COURSEOUTCOMES

On completion ofthis course,Studentscanableto,

CO1:Design simple applications using File, Pointers & Structures.CO2: Create simple programs using Functions & Control StructuresCO3:Analyzethe basic structure ofCLanguage.

CO4:ApplytheConceptofInput,Output Statements,Operators&expressionsinCprogramsCO5: Understand the basictokens inClanguage

TEXTBOOK

1.E.Balaguruswamy,ProgramminginANSIC, TMHpublishingCompany LTD,2008.

REFERENCEBOOKS

H.Schildt,TheCompleteReference,4thEdition,TMH,2004.

Gottfried,B.S,ProgrammingwithC,fourthedition,TMHPub.Co.Ltd,2004.

KanetkarY,LetusC,BPBpublicationswithANSI&TurboC,Firstedition,PearsonEducation,New Delhi,2008.

WEBSITES

www.w3schools.com

www.tutorialspoint.com

www.javapoint.com

www.geeksforgeeks.org

WEBSOURCES

https://www.vssut.ac.in/lecture_notes/lecture1424354156.pdf

https://www.unf.edu/~wkloster/2220/ppts/cprogramming_tutorial.pdf

I SEM MATHEMATICS–I 4 0 0 4

COURSE OBJECTIVE:

To develop the skills of the students in the areas of Algebra, Numerical methodsTrigonometry and Calculus. The course will also serve as a prerequisite for post graduate andspecializedstudiesand research.

UNIT– I ALGEBRAAND NUMERICAL METHODS 12

Algebra:Summationofseriessimpleproblems.NumericalMethods:OperatorsE, □, □,differencetables-Newton'sforwardandbackwardinterpolationformulaeforequalintervals,Lagrange'sinterpolationformula.

UNIT-II MATRICES 12

Introduction-Basicoperations-Symmetric-skewsymmetric-Hermitian-SkewHermitian–Unitary-orthogonal-Inverseofamatrix-Solutionoflinearsystem(Cramer'srule)-FindingtheEigenrootsandEigenvectors ofamatrix-Cayley Hamiltontheorem(without proof)

UNIT-III THEORY OF EQUATIONS 12

Polynomialequationswithrealcoefficients,irrationalroots,complexroots,symmetricfunctionsofroots,transformationofequationbyincreasingordecreasingrootsbyaconstant,reciprocalequation. Newton'smethod tofind aroot approximately -simpleproblems.

UNITIV TRIGONOMETRY 12

Introduction-Expansionsofsinnθandcosnθinaseriesofpowersofsinθandcosθ-Expansions of sinnθ, cosnθ, tannθ in a series of sines, cosines and tangents of multiples of"θ"-Expansionsofsinθ,cosθandtanθinaseriesofpowersof"θ"–Hyperbolicandinversehyperbolicfunctions - Logarithms of complex numbers.

UNITV DIFFERENTIAL CALCULUS 12

Differentiation-Successive differentiation, n^{th} derivatives, Leibnitz theorem (without proof)and applications, Jacobians, Curvature and radius of curvature in Cartesian co-ordinates,maximaand minimaof functions of two variables.

TotalNo of Hours :60 Hrs

COURSEOUTCOME:

Oncompletionofthis course,thestudentswill be ableto:

CO1.Evaluatetheunderlyingassumptions ofanalysistoolsandrelations ofSetTheory

CO2.Understandanddiscusstheapplicationsofmatricesandutilizes.

CO3.Discusstheusesand limitationsofTheoryofequations

CO4. Understand the key terminology, concept tools and techniques used in trigonometryCO5.Applythemaximaandminimaindetailedwaysandtheapplicationsofpartialdifferentialequations.

TEXTBOOKS

P. Kandaswamy and K.Thilagavathy, Allied Mathematics paper I, 1st Semester,S.Chand PublishingPvt.Ltd. 1st Edition,2003.

S. Narayanan and T.K. ManickavasagamPillai – Ancillary Mathematics, S.ViswanathanPrinters, 1986, Chennai.

REFERENCEBOOKS

P.R.Vittal,AlliedMathematics,MarghamPublications,4th Edition 2009.

A.Singaravelu,AlliedMathematics,MeenakshiAgency,2007.

P.DuraipandianandS.UdayaBaskaran,AlliedMathematics, Vol.I&IIMuhilPublications,Chennai.

WEBSOURCES

https://books.google.co.in/books?id=4C4rDAAAQBAJ&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false

https://ncert.nic.in/ncerts/l/keep203.pdf

http://www.universityofcalicut.info/SDE/VI%20Sem.%20B.Sc%20Maths%20-%20Additional%20Course%20in%20lie%20of%20Project%20-Theory%20of%20equations%20&%20fuzzy%20set.pdf

https://www.math.ust.hk/~machas/numerical-methods.pdf

https://www.researchgate.net/publication/321825504_Differential_Calculus

I SEM PROGRAMMING IN C LAB **0 0 4 2**

COURSEOBJECTIVE

- ✓ Tointroducestowriteprogramsusingbasicconceptsof C programming.
- ✓ Topracticesthestudenttowritesimpleprogramsusingfunction.
- ✓ Toimprovesthelogicalthinkinginprogramming.

LISTOFEXPERIMENTS

1. Writeaprogram inC tofind whetherthegivenstring isPalindromeor not.
2. Writeaprogramin Cto countvowels, consonantsetc.
3. Writeaprogramin C tofind thefactorialof anumber.
4. Writeaprogram in C to find thegiven numberis prime ornot.
5. Writeaprogram inC to find thevalue ofNPR
6. Writeaprogram in C tofind theGCD oftwo numbers.
7. Writeaprogramin Cto findtheFibonacciSeries
8. WriteaprograminCtofindMatrix Addition/Subtraction.
9. Writeaprogramin Cto findMatrix Transpose.
10. Writeaprogram inC forswapping 2numbers.
11. Writeaprogramin Cto open,readandclose thefile,

12. Write aprograminCtoreadnameandmarksofnnumber of studentsandstorethemina file.

TotalNo of Hrs:30

COURSEOUTCOMES:

On completion ofthis course,Studentscanableto,

CO1:DesignsimpleapplicationsusingFile,Pointers& Structures.CO2:Createsimple programsusingControl Structures

CO3:Develop C Programs using Array.CO4:DevelopCProgramsusingFunctions.

CO5:Developsimpleprogramsusingoperators&Expression.

TEXTBOOK

1.E.Balaguruswamy,ProgramminginANSIC, TMHpublishingCompany LTD,2008.

REFERENCEBOOKS

H.Schildt,TheCompleteReference,4thEdition,TMH,2004.

Gottfried,B.S,ProgrammingwithC,fourthedition,TMHPub.Co.Ltd,2004.

KanetkarY,LetusC,BPBpublicationswithANSI&TurboC,Firstedition,PearsonEducation,New Delhi,2008.

WEBSITES

www.w3schools.com

2www.tutorialspoint.com

www.javapoint.com

www.geeksforgeeks.org

WESOURCES

https://www.vssut.ac.in/lecture_notes/lecture1424354156.pdf

https://www.unf.edu/~wkloster/2220/ppts/cprogramming_tutorial.pdf

http://mars.tekkom.dk/w/images/4/42/6272_cnote.pdf

https://www.slideshare.net/gauravjuneja11/c-language-ppt

https://www.slideshare.net/avikdhupar/amazing-c

I SEM PRACTICAL – II PRODUCTIVITY SOFTWARE 4 0 0 4

List of Experiments

1. Text Manipulation using MS-WORD.
2. Usage of Bullets and Numbering, Header and Footer using MS-WORD.
3. Usage of Spell check, Find & Replace using MS-WORD.
4. Table Manipulation using MS-WORD.
5. Picture Insertion and Alignment using MS-WORD.
6. Usage of Spell check, Find & Replace using MS-WORD.
7. Creation of documents using templates using MS-WORD.
8. Cell Editing using MS-EXCEL.
9. Data Sorting using MS-EXCEL.
10. Usage of Formulas & Built In Functions using MS-EXCEL.
11. Worksheet Preparation using MS-EXCEL.
12. Drawing Graphs using MS-EXCEL.
13. Inserting ClipArt's & Pictures using MS-EXCEL.
14. Slide Transitions and Animation using MS-POWER POINT.
15. Organisation Chart using MS-POWER POINT.

Total No of Hours: 60

COURSE OUTCOME

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

CO1: Understand the basic icons and tools in IDE

CO2: Develop to format a document

CO3: Develop mail merge.

CO4: Develop applications such as mark sheet preparation, EB bill in MS Excel

CO5: Develop a presentation using power point application

II SEMESTER

SEM II LANG HINDI – II 30 0 3

COURSEOBJECTIVES:

Unit	I	-	‘zaruurath’(kahani),Translation- Definition,Types	9
Unit	II		‘Panditkouun ‘(kahani),Translation-Anuvadak kegun	9
Unit	III	-	‘Panditkouun(kahani), TranslationPractice	9
Unit	IV	-	Rajani(naatak),TranslationPractice	9
Unit	V	-	Rajani(naatak),TranslationPractice	9

TotalNo OfHours:45

COURSEOUTCOME

Attheend ofthiscourse

CO1 Studentswillknowtheimportance&processoftranslationCO2 They can develop the skill of translation

CO3 willknowthedifferentwritingskillsofauthorsCO4 gain knowledgein hiindi literature

CO5 will acquireknowledgein hindi sahithya

TEXTBOOK: Gadyakhosh

II SEM 21LFR002 FRENCH II 3 0 0 3

COURSEOBJECTIVE:

Tofortify thegrammar and vocabularyskills ofthestudents.

ToenablethestudentshaveanideaoftheFrenchcultureandcivilization

UNIT:ILECON10-11 09

Leçons:10Lesaffairesmarchent,11unrepasmidiaproblèmes-Réponsesauxquestionstires de la leçon-grammaire ;présent progressif passe récent ou future proche-complémentd'Objectdirecte-complément d'objet

UNITII-LECON12-13 09

Leçons12:toutestbienquifinibien,-13auxarmescitoyens-réponsesauxquestionstiresdela leçon-grammaire :les pronoms<<en ou y>> rapporter des paroles-Les pronoms relatifsque, quiou ou.

UNITIII-LECON14-15 09

Leçons 14.Qui ne risque rien n'a rien-15.la fortune sourit aux audacieux-réponsesaux questions tires de la leçon-grammaire : comparaison-les phrases au passecompose.

UNIT:IV-LECON16-18 09

Leçons16lapublicitéetnosrêves17laFrancelamonde18campagnepublicitaireréponsesaux questions tires de la leçon-grammaire :les phrases al'imparfait-les phrases au futureUNIT:V-COMPOSITION: 09

Aécrireunelettrederegret//refusaunamiconcernantl'invitationd'unecélébrationreçue-aécrireun essaie surun sujetgénérale-alirele passageet répondre aux questions.

TotalNo of Hours: 45

TEXTBOOK:

JackGIRARDER&JeanMarieGRIDLIG,<<MéthodedeFrançaisPANORAMA>>,Clé

Internationale,GoyalPublication,NewDelhiEdition2014.

REFERENCEBOOKS:

DONDO Mathurin, “Modern French Course”, Oxford University Press, New Delhi Edition2014.Nithya Vijayakumar get ready French grammar-Elementary Goyal publications ,NewDelhi,Edition2014.

ISEMENGLISH II	**POETRY**	**3 0 0 3**

COURSEOBJECTIVE

Toenablestudentstodeveloptheircommunicationskillseffectively.

Toenrich theirvocabularyin English

Todevelopcommunicativecompetency.

CreditHours

UNITI **09**

1.GrowingOld-WinstonFarewell

2.Ecology-A.K. Ramanujan

UNITII **09**

3.Stoppingby Woods onaSnowy Evening-Robert Frost

4. OurCasuarina Tree-ToruDutt

UNITIII **09**

5.GoodbyeParty forMiss PushpaT.S. -NissimEzekiel

6. TheBull-Ralph Hodgson

UNITIV **09**

7. If-RudyardKipling

8.TheDrownedChildren-Louise Glück

UNITV **09**

Australia-A.D.Hope

AFarCryfromAfrica - DerekWalcott

TotalNo ofHours :45 Hours

COURSEOUTCOME

Atthe endofthiscourse studentswill beable to,

CO1:Learntoemploy Poeticexpressionsinthecourseofdailyspeech.CO2:Provetheirbetter communicativeability.

CO2:Provetheirskillinwritingsentenceswithpoeticimpact.CO4:Developdifferentsensibilities inapproachinglife.

CO3:Solvelife'sproblemsashighlightedintheselections.

TEXTBOOKS

SelectionsfromCaribbeanLiterature.MahaamPublishers,Chennai.

OurCasuarinaTree-Vasan PublicationBy Dr.AShanmugakani

WEBSOURCES

https://www.gradesaver.com/

https://www.enotes.com/

https://www.jstor.org/

https://www.sparknotes.com/

https://www.cliffsnotes.com/

II SEM WEB TECHNOLOGY 4 0 0 4

COURSEOBJECTIVE

To impart the knowledge of basic concepts and coding of HTML, Java script and CSS. Thiscourse elaborates internet related technologies to design a creative and dynamic website in asystematicway.

UNITI HTML 12

InternetBasic– IntroductiontoHTML–PRE-List:Orderedandunordered-CreatingTable

Linking document –How to work efficiently with images in web pages, image maps, GIFanimation,adding multimedia -Frames-Graphicsto HTMLDoc– -Forms.

UNITII STYLESHEET 12

Sheet basics – Adding style to document – Creating style sheet rules – Why we use CSS-adding CSS to your web pages- Grouping styles – Style Sheet Types :Inline Style sheet –External Style Sheet-Import Style Sheet – Style Sheet Properties: Font , Text , Background&Color , Margin , Padding , Border & Box , Display.

UNITIII XML &DHTML 12

XML&DHTML:-extensiblemarkuplanguage(XML).DynamicHTML:Documentobjectmodel(DCOM)-AccessingHTML&CSSthroughDCOMDynamiccontentstyles&positioning-Eventbubbling-data binding..

UNITIV JAVASCRIPT 12

Introduction to JavaScript –Advantage of JavaScript – JavaScript syntax – Data type –Variable–Array–OperatorandExpression–LoopingConstructor–Function–Dialogbox.-JavaScript document object model – Introduction – object in HTML – Event Handling –Window object – Document object – Browser Object – Form Object – Navigator object –Screenobject–Build in object–User defined object– Cookies

UNITV AJAX 12

Ajax: Introduction, advantages &disadvantages, Purpose of it, Ajax based web application,alternativesofAjaxJavaScript&AJAX:Introductiontoarray-operators,makingstatements-date & time-mathematics-strings-Event handling-form properties. AJAX. Introduction tojQueryand AngularJS.

TotalNoof Hrs:60

COURSEOUTCOME

Oncompletion ofthiscourse,thestudentscanableto,

CO1: CreateStaticweb sitesusing HTML& CSS.

CO2: Design dynamic and interactive web pages by embedding Java Script.CO3: Analyze the usage different technologies such as XML & AJAX.CO4: Understandtheconcept of Cookies.

CO5: Remember basic tags and Properties in HTML, CSS, Java Script, and XML&Ajax.

TEXTBOOKS

Bayross,WebEnableCommercialApplicationDevelopmentUsingHTML,DHTML,JavaScript,Perl CGI, BPB Publications.

HTMLCompleteReference.

REFERENCE BOOKS

Jaworski,MasteringJavaScript,BPBPublications,2006

DT Editorial Services (Author), "HTML 5 Black Book (Covers CSS3,JavaScript,XML,XHTML,AJAX,PHP,jQuery)",Paperback2016,2ndEdition.

WEBSITES

www.w3schools.com

www.tutorialspoint.com

www.javapoint.com

www.geeksforgeeks.org

WEBSOURCES

https://www.darshan.ac.in/Upload/DIET/Documents/CE/2160708_Web%20Technology%20Study%20Material%20GTU_23042016_032646AM.pdf

https://www.vssut.ac.in/lecture_notes/lecture1423183400.pdf

https://www.webstepbook.com/supplements/slides/ch10-ajax_xml.pdf

https://www.lamsade.dauphine.fr/~mlampis/EAPPS/lec2/js-slides.pdf

II SEM PROGRAMMING IN JAVA 4 0 0 4

COURSEOBJECTIVE

Tomakestudentsfamiliarwithoops&appletprogramming

Javaprogrammingcanbeusedtodevelopbothwebbased&consolebasedapplication&stand-alone application

Javaisoneofthetopmostlanguagesusedinmostofthe ITcompanies.Itisajobassuredcourse.

UNITIINTRODUCTIONTOJAVA 12

IntroductiontoJava–FeaturesofJava–ObjectOrientedConcepts–LexicalIssues–DataTypes–Variables –Arrays –Operators–ControlStatements.

UNITIICLASSES&OBJECTS 12

Classes–Objects–Constructors–Overloadingmethods–Staticandfixedmethods–InnerClasses–String Class– Inheritance–Overridingmethods –Usingsuper–Abstract class.

UNITIII PACKAGES 12

Packages–AccessProtection–Importingpackages–ExceptionHandling–ThrowandThrows–Thread– Synchronizing–Runnable Interface–Multithreading.

UNIT IV INPUT/OUTPUT STREAMS 12

I/Ostreams–FileStreams–Applets–AppletLifeCycle-StringBuffer–CharArray–JavaUtilityclasses–Calendar– Date–Random–Scanner–Timer–Vector.

UNITV AWT 12

AWT-WorkingwithwindowsusingAWTClasses-AWTControls-LayoutManagersandMenus.

TotalNoofHours:60

COURSEOUTCOME

At theendofthiscoursethe studentswillbeableto,

CO1: Todeterminethebasicconceptsandimplementationtechniques ofOOPs.

CO2:

Constructclassandobjectandexperimentwith OOPsconcepts,compileandtest,runJavaprogramscomprisi ngmore thanone class,toaddressthe problem.

CO3: ExplaintheimportanceofpackagesandinterfacesinjavaandimplementmembersofclassesfoundintheJava packages andinterfaces.

CO4: Concludethe I/Ostreamconceptsandestimatethepropercodedocument.

CO5: Demonstratethe abilitytoemploy varioustypesofselectionconstructsina Javaprogram.

TEXTBOOKS

CayS.Horstmann,GaryCornell-CoreJava2 Volume1– Fundamentals,5thPHI,2000.

E.Balaguruswamy,"ProgrammingwithJAVA",3rdedition ,TataMcGraw-Hill Publications,2007.

REFERENCE BOOKS

K.ArnoldandJ.Gosling-TheJavaProgrammingLanguage–SecondEdition,AddisonWesley,2002.

P.NaughtonandH.Schildt–Java2(TheCompleteReferences)-SeventhEdition,TMH2004.

II SEM MATHEMATICS-II 4 0 0 4

COURSE OBJECTIVE :

To impart the knowledge of Integral calculus, Differential Equations,Fourier Series and Laplace transform. The course will also serve as a prerequisite for postgraduate and specializedstudies and research.

UNIT-IINTEGRALCALCULUS 12

Integralcalculus:Integration–Definiteintegrals–Bernoulli'sformula-Reductionformulafor

$\int sin^n x dx, \int cos^n x dx, \int tan^n x dx, \int x^n e^{ax} dx.$

UNIT-IIDIFFERENTIAL EQUATIONS 12

Ordinary Differential Equations: First order of higher degree equations – Second order and non-homogenous linear differential equations with constant coefficient.Partial Differential Equations:Formation of partial differential equations by eliminating arbitrary constants and arbitraryfunction-Solutions of four standard types of first order equation-Lagrange method of solving linear partialdifferential equation Pp+Qq =R

UNIT-IIIFOURIERSERIES 12

Fourierseriesofperiodicfunctionsontheinterval[c,c+2□]–EvenandOddfunctions-Halfrangesineandcosineseries.

UNIT-IV LAPLACETRANSFORM 12

Laplacetransformation:Definition,Laplacetransformofbasictrigonometric,exponentialandalgebraic functions - Inverse Laplace transform- Solving differential equation of second order withconstantcoefficients usingLaplacetransform

UNIT– V VECTOR DIFFERENTIATION 12

Introduction-Scalar point functions-Vector point functions-Vector differential operator□,Gradient-Divergence-Curl-Solenoidal-irrotational-identities-Simple problems

TotalNo of Hours: 60 Hrs

COURSEOUTCOMES:

Oncompletion ofthiscourse,thestudentswillbeableto:

CO1.Understandthekeyterminology,concepttoolsandtechniquesusedinIntegralcalculus

CO2.Discusstheapplicationsofdifferentialequations.

CO3.Analyzetheuses,limitationsandapplicationsofFourierseries

CO4.EvaluateLaplacetransformanditsapplications

CO5.Understandthekeyterminology,concepttoolsandtechniquesusedinVectorDifferentiation.

TEXTBOOKS

P. Kandaswamy and K.Thilagavathy, Allied Mathematics paper II, 2nd Semester,S.Chand PublishingPvt.Ltd. 1st Edition, 2004

S. Narayanan and T.K. ManickavasagamPillai – Ancillary Mathematics, S.ViswanathanPrinters, 1986, Chennai.

REFERENCEBOOKS:

P.R.Vittal,AlliedMathematics,Margham Publications,4thEdition2009.

A.Singaravelu,AlliedMathematics,MeenakshiAgency,2007.

P.DuraipandianandS.UdayaBaskaran,AlliedMathematics,Vol.I&IIMuhilPublications,Chennai

WEBSOURCES

http://mdudde.net/pdf/study_material_DDE/M.Sc.MAthematics/DIFFERENTIAL%20EQUATIONS.pdf

https://ncert.nic.in/ncerts/l/lemh201.pdf

http://www.universityofcalicut.info/SDE/Vector_calculus_BSc_Maths.pdf

II SEM PROGRAMMING IN JAVA LAB 0 0 4 2

COURSEOBJECTIVE:

Tomakestudentsfamiliarwithoops&appletprogramming

Java programming can be used to develop both web based & console based application & stand-alone application

JavaisoneofthetopmostlanguagesusedinmostoftheITcompanies.

Itisajobassuredcourse.

APPLICATIONS 30

AreaofshapesusingOverloading/Overriding/Interfaceconcepts.

SubstringRemovalfromaString.

Determining theorderofnumbersgenerated randomlyusing RandomClass.

UsageofCalendarClassandits manipulation.

StringManipulationusingbuilt-infunctions.

UsageofVector Classes.

ImplementationofThreadbasedapplication.

ImplementationofExceptionHandling.

APPLET 30

WorkingwithFramesandvariouscontrolstoprepareaBio-dataform.

WorkingwithDialogsandMenus.

WorkingwithPanelsandLayouts.

WorkingwithvariousshapesusingGraphicsclass.

WorkingwithColorsandFonts.

TotalNoofHours:60

COURSEOUTCOME

At the end of this course the students will be able to,CO1: AssessJava programwithbasic OOP concept.

CO2: Examinethestringconceptswithstringbufferclass.CO3: ExplainthedatabasecreationinJavaprograms.

CO4: Apply the exception handling and thread concepts.CO5: Assessjavaprogram&utilizetheAppletconcepts.

II SEM WEB TECHNOLOGY LAB 0 0 4 2

COURSEOBJECTIVE

To impart the knowledge of basic concepts and coding of HTML, Java script and CSS. Thiscourse elaborates internet related technologies to design a creative and dynamic website in asystematicway

LISTOFPROGRAMS

HTML

TableHandling

DesigningTimeTable

Designinganindexofa bookusingorderedandunordered List

Designinganindex ofabookusing NestingofList

Toscrollanimageovera screen

Createa web pageto link twoormorepages.

Createaweb pagetoadvertise aproductusing FramesandLinks

CreateaBio-data usingForm tag.

CASCADINGSTYLESHEET

CreateanExternalStyle SheetusingFont,TextandColorProperties

Create an Internal Style Sheet using Font, Text and Color Properties and BorderProperties

CreateanInlineStyleSheetusingFont,Text,ColorandBackgroundProperties

JAVASCRIPT

SimpleCalculator

StringObject

ArrayObject

MathObject

ScreenObject

NavigatorObject

Closingawindowafter aminute

WorkingwithOnMouseOverEvent.

TotalNoof Hrs:30

COURSEOUTCOME

On completion of this course, the students can able to,CO1: DesignStatic web sitesusing HTML & CSS.

CO2: Design dynamic and interactive web pages by embedding Java Script.CO3: Experimentthe differenttechnologies suchas XML& AJAX.

CO4: Implementthe conceptofCookies.

CO5: Describe the basic tags and Properties in HTML, CSS, Java Script, and XML&Ajax.

TEXTBOOKS

Bayross,WebEnableCommercialApplicationDevelopmentUsingHTML,DHTML,JavaScript,Perl CGI, BPB Publications.

HTMLCompleteReference.

REFERENCEBOOKS

Jaworski,MasteringJavaScript,BPBPublications,2006

DT Editorial Services (Author), "HTML 5 Black Book (Covers CSS3,JavaScript,XML,XHTML,AJAX,PHP,jQuery)",Paperback2016,2ndEdition.

WEBSITES

1.www.w3schools.com2.www.tutorialspoint.com3.www.javapoint.com

4.www.geeksforgeeks.org

WEBSOURCES

https://www.darshan.ac.in/Upload/DIET/Documents/CE/2160708_Web%20Technology%20Study%20Material%20GTU_23042016_032646AM.pdf

https://www.vssut.ac.in/lecture_notes/lecture1423183400.pdf

https://www.webstepbook.com/supplements/slides/ch10-ajax_xml.pdf

https://www.lamsade.dauphine.fr/~mlampis/EAPPS/lec2/js-slides.pdf

III SEMESTER

III SEM DATA SCIENCE WITH PYTHON 4 1 0 5

COURSE OBJECTIVES:

To provide computational environments for data scientists using python.

To includes the ndarray for efficient storage and manipulation of dense data arrays in python

To features the dataframe for efficient storage and manipulation of labeled/columnar data in python

To make decisions using applied and practical machine learning techniques.

To learn the efficient and clean Python implementations of the most important and established machine learning algorithms

UNIT I I PYTHON: BEYOND NORMAL PYTHON 12

Shell Or Notebook – I python Shell – I python Magic Commands - Input And Output History - Ipython And Shell Commands– Shell Related Magic Commands - Errors And Debugging - Profiling And Timing Code.

UNIT II INTRODUCTION TO NUMPY 12

Understanding Data Types - The Basics Of Numpy Arrays - Computation On Numpy Arrays -Universal Functions –Aggregations - Min, Max,computation On Arrays: Broadcasting - Comparisons, Masks, And Boolean Logic – Fancy Indexing - Sorting Arrays - Structured Data: Numpy's Structured Arrays.

UNIT III DATA MANIPULATION WITH PANDA 12

Installing And Using Pandas - Introducing Pandas Objects - Data Indexing And Selection - Operating On Data In Pandas-Handling Missing Data -Hierarchical Indexing - Combining Datasets: Concat And Append - Combining Datasets: MergeAnd Join - Aggregation And Grouping - Pivot Tables - Vectorized String Operations - Working With Time Series - HighPerformance Pandas: Eval() And Query()

UNIT IV VISUALIZATION WITH MATPLOTLIB 12

General Matplotlib Tips - Two Interfaces For The Price Of One - Simple Line Plots - Simple Scatter Plots – Visualizing Errors - Density And Contour Plots -Histograms, Binnings, And Density - Customizing Plot Legends – Customizing Colorbars - Multiple Subplots - Text And Annotation - Customizing Ticks -Customizing Matplotlib: Configurations And Stylesheets - Three-Dimensional Plotting In Matplotlib - Geographic Data With Basemap - Visualization With Seaborn.

UNIT - V MACHINE LEARNING 12

Machine Learning - Introducing Scikit-Learn - Hyperparameters And Model Validation - Feature Engineering – Naïve Bayes Classification - Linear Regression - Support Vector Machines -Manifold Learning - K-Means Clustering – Gaussian Mixture Models.

TOTAL: 60 Hours

COURSE OUTCOMES:

CO1: Perform powerful libraries for Machine learning applications and other scientific computations

CO2: Describe about numpy and deal with feature like linear algebra, fourier transforms and advanced random number capabilities.

CO3: Implement the pandas help us with mugging and preparing data and also it is great for operating on and maintaining structured data, manipulating, transforming, and cleaning data

CO4: Apply the matplotlib will let you plot different kinds of graphs and visualizing different types of data

CO5: Describe the concepts and model of machine learning

III SEM CRYPTOGRAPHY AND NETWORK SECURITY 4 0 0 4

COURSE OBJECTIVES:

Students to have a theoretical understanding of the principles underlying cryptography and cryptanalysis.

Students to have a fundamental understanding of symmetric and asymmetric encryption, hashing, and digital signatures.

Students to learn the basic concepts in networking and wireless security, applied cryptography, as well as ethical, legal, social and economic facets of security.

Students to be able to evaluate the security of communication systems, networks and protocols based on a multitude of security metrics.

UNIT I CRYPTOGRAPHY AND ENCRYPTION TECHNIQUES 12

Overview – Principles-Concepts –Symmetric and Asymmetric Encryption–AES – Block Cipher Operations– RSA Algorithm – Diffie Hellman Key Exchange.

UNIT II DATA INTEGRITY ALGORITHMS AND MUTUAL TRUST 12

Hash Functions – SHA – Message Authentication Codes – Digital Signatures- Key Management and Distribution – X.509 Certificates – Kerberos.

UNIT III NETWORK SECURITY 12

Vulnerabilities - Security Assessment, Analysis, and Assurance-Disaster Management – Access Control and Authentication – Authorization.

UNIT IV WIRELESS NETWORK SECURITY 12

Wireless Security – Wireless LAN - Smart Phones – PDA – Bluetooth- Broadband Security

UNIT V SECURITY IN EMERGING TECHNOLOGIES 12

Next Generation Mobile Networks – Wireless Sensor Networks – Adhoc Networks – IP based Mobile Networks

Total Hours – 60

COURSE OUTCOMES:

Students who complete this course should

CO1: Analyse the vulnerabilities in any computing system and hence be able to design a security solution

CO2: Identify the security issues in the network and resolve it

CO3: Evaluate security mechanisms using rigorous approaches by key ciphers and Hash functions.

CO4: Demonstrate various network security applications, IPSec, Firewall, IDS, Web Security, Email Security and Malicious software

CO5: Ability to take up doctoral level research work in security

TEXT BOOKS

1. William Stallings, "Cryptography and Network Security – Principles and Practice" 7th Edition, Pearson Education,ISBN No. 978- 0134444284,2016.

2. Joseph MiggaKizza, " Guide to Computer Network Security" 3rd Edition, Springer Publishers, ISBN No 978-1447166535,2015.

REFERENCES:

1. Wolfgang Osterhage, " Wireless Security", CRC Press, ISBN No. 978-1578087686,2011.

2. William Stallings, "Network Security Essentials, Applications and Standards",5thEdition, Pearson Education, ISBNNo.978-0133370430,2013.

3. John R.Vacca , "Network and System Security",2nd Edition, Elsevier Publishers, ISBN No.978-0124166899,2014.

III SEM Essentials of Block chain Technology Applications 4 0 0 4

Course Objectives:

Understand the structure of a block chain and why/when it is better than a simple distributed Database

Evaluate the setting where a block chain-based structure may be applied, its potential and its limitations

Understand how block chain systems (mainly Bitcoin and Ethereum) work

Design, build, and deploy smart contracts and distributed applications,

UNIT I INTRODUCTION 12

Introduction of block chain- the basic terms about block chain-advent of block chain technology- evolution of block chain technology –block chain mechanism -the advantages introduced by the block chain technology -challenges of block chain adoption -Distinguish different types of block chains.

UNIT II BITCOIN 12

Transactions, blocks, mining, scripting, attacks on mining-Building blocks: Hash functions, signature schemes, zero-knowledge proofs, consensus algorithms- Proof of work, proof of stake, proof of burn, proof of storage-Distinguish Proof-of-Work and Proof-of-Stake concepts -- Byzantine Fault Tolerance- Sharding - Layer 2 approaches

UNIT III SMART CONTRACTS 12

Basic terms about smart contract -the advent of smart contract - the smart contract mechanism- Restate the advantages introduced by the smart contract -challenges of smart contract - different applications of smart contract -Implement hands-on the smart contract using solidity and Ethereum

UNIT IV PRIVACY ISSUES 12

Anonymity, mixing techniques, privacy with ZK-Snarks.-Permissioned block chains: Distributed consensus, sharing algorithms, privacy issues.

UNIT V SCALING ISSUES 12

Sharding - Layer 2 approaches Lightning networks, Payment networks. Platforms and

ledgers: Ethereum, Ripple, Hyper ledger, Algorand, etc –Block chain applications Government- Identity management-Auto executing contracts-Three signature escrow- Triple entry account- Elections and voting.

TOTAL : 60 HRS.

COURSE OUTCOME:

CO1: Blockchain technology landscape

CO2: Understand the block chain technology, its benefits and challenges

CO3: Applications and implementation strategies

CO4: Explain Bit coin security practices

CO5: State-of-the-art, open research challenges, and future directions

TEXTBOOKS

1. A. Narayanan, J. Bonneau, E. Felten, A. Miller, S Goldfeder, J. Clark: Bitcoin and Cryptocurrency Technologies, Princeton University Press. 2017.

2. A. M. Antonopoulos: Mastering Bitcoin: Programming the Open Blockchain, O'Reilly, 2017.

REFERENCES

1.Draft version of "S. Shukla, M. Dhawan, S. Sharma, S. Venkatesan, 'Blockchain Technology: Cryptocurrency and Applications', Oxford University Press, 2019.

2.J.A.Garay et al, the Bitcoin backbone protocol - analysis and applications eurocrypt 2015 lncs vol 9057, (volii), pp 281-310

3.R.Pass et al, Analysis of blockchain protocol in asynchronous networks , eurocrypt 2017,

III SEM FINANCIALACCOUNTING-I 4 0 0 4

COURSEOBJECTIVE

To give an insight into the basics of Accounting Concepts and Principles to Prepare toStudentsto havethe foot hold in Accounts.

UNITI INTRODUCTION TO ACCOUNTING 12

Meaning and definition of accounting- functions of accounting – limitations of accounting –accounting concepts and conventions, systems of accounting – single entry system – doubleentrysystem– subsidiarybooksincludingcashbook–trialbalance–rectificationoferrors.

UNITII PREPARATION OF FINAL ACCOUNTS 12

Final accounts with adjustments – closing stock, outstanding expenses, unexpired or prepaidexpense, accrued income, income received in advance, depreciation, additional bad debts,provisionfordoubtfuldebts,provisionfordiscountondebtors,interestoncapital,interestondrawing,discount on creditors and creationofvarious reserves.

UNITIII BANKRECONCILIATIONSTATEMENTANDACCOUNTS 12

Bank reconciliation statement – Importance of Bank Reconciliation Statement – Scope ofBank Reconciliation Statement - Insurance Claim Account – loss of property and stock –averageclause.

UNITIV CALCULATION OF DEPRECIATIONUNDER DIFFERENT 12

Depreciation accounts – definition and causes of depreciation – need for depreciation –methods of calculating the amount of depreciation – straight line method – diminishingbalancemethod.

UNITV SINGLE ENTRYSYSTEMOF ACCOUNTING 12

Single entry system – salient features – limitations of single entry system – distinctionbetween single entry system and double entry system – ascertainment of profit – net worthmethod– conversion method (simple problems only)

TotalNo of Hours: 60 Hrs

COURSEOUTCOME

Attheendofthiscoursethe studentscanable to,

CO1:Developaccountsusingadjustment.Combinational circuits

CO2:BuildJournal,ledgerandBalanceSheet.

CO3:Analyze the depreciation under different methodsCO4:Understand the basic concepts of accountingCO5:Explainsingleentry anddouble entrysystem.

TEXTBOOKS:

1.T.S.Reddy&A.Murthy,"FinancialAccounting",MarghamPublications,SixthRevisionEdition, 2011.

2.P.C.Tulsian,"FinancialAccounting",TataMCGrawHillLtd,2003.

REFERENCES:

1.AssishK.Bhattacharyya,"FinancialAccounting",Prenticeofhallof India,2002.

2.N.Vinayagam andB.Charumaki,"FinancialAccounting",S.Chand&CompanyLtd.,2002, Reprint– 2008.

WEBSITES

www.accountigcoach.com

www.topaccountingdegrees.org

WEBSOURCES

https://www.csus.edu/indiv/c/clarket/course1/chap001.pdf

https://www.slideshare.net/ashu1983/financial-accounting

III SEM **PRACTICAL- PYTHON LAB 0 0 4 2**

COURSE OBJECTIVES:

To implement Python programs with conditionals and loops. Also represent compound data using Python lists, tuples, dictionaries and Read and write data from/to files in Python.

LIST OF PROGRAMS:

1. Compute the GCD of two numbers.
2. Find the square root of a number (Newton's method)
3. Exponentiation (power of a number)
4. Find the maximum of a list of numbers
5. Linear search and Binary search
6. Selection sort, Insertion sort
7. First n prime numbers
8. Multiply matrices
9. Programs that take command line arguments (word count)
10. Find the most frequent words in a text read from a file
11. Simulate elliptical orbits in Pygame
12. Simulate bouncing ball using Pygame

TOTAL HOURS: 60Hrs

TEXTBOOKS:

1.CharlesDierbach,"IntroductiontoComputerScienceusingPython-AcomputationalProblem solvingFocus",Wiley IndiaEdition,2015.

REFERENCEBOOKS:

1.TimothyA.Budd,“ExploringPython”,TataMCGrawHillEducationPrivateLimited2011, 1st Edition.

.ChSatyanarayanaM RadhikaMani,BNJagadesh,“Pythonprogramming”,UniversitiesPress2018.

WEBSITE

www.w3schools.com

www.tutorialspoint.com

www.javapoint.com

www.geeksforgeeks.org

WEBSOURCE

http://interactivepython.org/courselib/static/pythonds

http://docs.python.org/3/tutorial/index.html

https://www.w3schools.com/python/default.asp

https://www.tutorialspoint.com/python3/python_tutorial.pdf

III SEM **NETWORK SECURITY LAB 0 0 4 2**

COURSE OBJECTIVES:

The student learns to work with various Redundancy Check Algorithms, Sliding Window Protocol, Routing Algorithm, Sub netting Procedures.

LIST OF PROGRAMS:

1. To detect Errors using Vertical Redundancy Check (VRC).
2. To detect Errors using Longitudinal Redundancy Check (LRC).
3. To detect Errors using Cyclic Redundancy Check (CRC).
4. Socket programming to implement Asynchronous Communication.
5. Socket programming to implement Isochronous Communication.
6. To implement Stop & Wait Protocol.
7. To implement Sliding Window Protocol.
8. To implement the Shortest Path Routing using Dijkstra algorithm.
9. Socket Programming to Perform file transfer from Server to the Client.
10. To implement Remote Procedure call under Client / Server Environment.
11. Code simulating PING and TRACEROUTE commands
12. Implementing of Sub netting

TOTAL HOURS: 60Hrs

IV SEMESTER

IV SEM DISTRIBUTED SYSTEMS 4 1 0 5

COURSE OBJECTIVES:

- ✓ To provide hardware and software issues in modern distributed systems.
- ✓ To get knowledge in distributed architecture, naming, synchronization, consistency and replication, fault tolerance, security, and distributed file systems.
- ✓ To analyze the current popular distributed systems such as peer-to-peer (P2P) systems will also be analyzed.

UNIT-I Characterization of Distributed Systems 15

Introduction, Examples of Distributed Systems, Resource Sharing and the Web, Challenges. System Models: Introduction, Architectural Models, Fundamental Models.

UNIT-II Time and Global States 15

Introduction, Clocks Events and Process States, Synchronizing Physical Clocks, Logical Time and Logical Clocks, Global States, Distributed Debugging. Coordination and Agreement: Introduction, Distributed Mutual Exclusion, Elections, Multicast Communication, Consensus and Related Problems.

UNIT-III Inter Process Communication 15

Introduction, The API for the Internet Protocols, External Data Representation and Marshalling, Client-Server Communication, Group Communication, Case Study: IPC in UNIX. Distributed Objects and Remote Invocation: Introduction, Communication between Distributed Objects, Remote Procedure Call, Events and Notifications, Case Study: JAVA RMI.

UNIT-IV Distributed File Systems 15

Introduction, File Service Architecture, Case Study 1: Sun Network File System, Case Study 2: The Andrew File System. Name Services: Introduction, Name Services and the Domain Name System, Directory Services, Case Study of the Global Name Services. Distributed Shared Memory: Introduction, Design and Implementation Issues, Sequential Consistency and IVY case study, Release Consistency, Munin Case Study, Other Consistency Models.

UNIT- V Transactions and Concurrency Control 15

Introduction, Transactions, Nested Transactions, Locks, Optimistic Concurrency Control, Timestamp Ordering, Comparison of Methods for Concurrency Control. Distributed Transactions: Introduction, Flat and Nested Distributed Transactions, Atomic Commit Protocols, Concurrency Control in Distributed Transactions, Distributed Deadlocks, Transaction Recovery.

TOTAL : 75 HRS.

TEXT BOOK

1. Distributed Systems, Concepts and Design, George Coulouris, J Dollimore and Tim Kindberg,

Pearson Education, Edition. 2009.

REFERENCE BOOKS

1. Distributed Systems, Principles and Paradigms, Andrew S. Tanenbaum, Maarten Van Steen, 2nd Edition, PHI.

2. Distributed Systems, An Algorithm Approach, Sukumar Ghosh, Chapman&Hall/CRC, Taylor & Fransis Group, 2007

IV SEM ADVANCED DATABASE SYSTEM 4 0 0 4

COURSE OBJECTIVES:

- To learn the modeling and design of databases.
- To acquire knowledge on parallel and distributed databases and its applications.
- To study the applications of Object-Oriented database
- To understand the principles of intelligent databases and usage of advanced data models.
- To learn emerging databases such as XML, Cloud and Big Data.

UNIT I PARALLEL AND DISTRIBUTED DATABASES 12

Database System Architectures: Centralized and Client-Server Architectures – Server System Architectures – Parallel Systems- Distributed Systems – Parallel Databases: I/O Parallelism – Inter and Intra Query Parallelism – Inter and Intra operation Parallelism – Distributed Database Concepts - Distributed Data Storage – Distributed Transactions – Commit Protocols – Concurrency Control – Distributed Query Processing – Three Tier Client Server Architecture- Case Studies.

UNIT II OBJECT AND OBJECT RELATIONAL DATABASES 12

Concepts for Object Databases: Object Identity – Object structure – Type Constructors – Encapsulation of Operations – Methods – Persistence – Type and Class Hierarchies – Inheritance – Complex Objects – Object Database Standards, Languages and Design: ODMG Model – ODL – OQL – Object Relational and Extended – Relational Systems: Object Relational features in SQL/Oracle – Case Studies.

UNIT III XML DATABASES 12

XML Databases: XML Data Model – DTD - XML Schema - XML Querying – Web Databases – JDBC – Information Retrieval – Data Warehousing – Data Mining

UNIT IV MOBILE DATABASES 12

Mobile Databases: Location and Handoff Management - Effect of Mobility on Data Management - Location Dependent Data Distribution - Mobile Transaction Models - Concurrency Control - Transaction Commit Protocols- Mobile Database Recovery Schemes

UNIT V MULTIMEDIA DATABASES 12

Multidimensional Data Structures – Image Databases – Text/Document Databases- Video Databases – Audio Databases– Multimedia Database Design.

TOTAL:60 hours

COURSE OUTCOMES:

Upon the successful completion of the course, students will be able to:

CO1: Develop skills on databases to optimize their performance in practice.

CO2: Analyze each type of databases and its necessity

CO3: Design faster algorithms in solving practical database problems

CO4: Analyze mobile databases and various transaction models.

CO5: Gain knowledge about multimedia databases and its applications.

TEXT BOOKS

1. R. Elmasri, S.B. Navathe, "Fundamentals of Database Systems", Fifth Edition, Pearson Education/Addison

Wesley, 2007.

2. Thomas Cannolly and Carolyn Begg, " Database Systems, A Practical Approach to Design, Implementation and

Management", Third Edition, Pearson Education, 2007.

3. Henry F Korth, Abraham Silberschatz, S. Sudharshan, "Database System Concepts", Fifth Edition, McGraw Hill,

2006.

4. V.S.Subramanian, "Principles of Multimedia Database Systems", Harcourt India Pvt Ltd., 2001.

REFERENCES

1. C.J.Date, A.Kannan and S.Swamynathan,"An Introduction to Database Systems", Eighth Edition, Pearson

Education, 2006.

2. Vijay Kumar, " Mobile Database Systems", John Wiley & Sons, 2006.

IV SEM STATISTICAL AND NUMERICAL METHODS 5 0 0 5

COURSEOBJECTIVE:

TodeveloptheskillsofthestudentsintheconceptsofStatisticsandNumericalMethods.Thecoursewillalsoserve asaprerequisiteforpostgraduateandspecializedstudiesandresearch.

UNIT-I INTRODUCTION TO STATISTICS 15

Introduction to statistics -Measures of Central Tendency: Mean, Median, Mode-Measures ofDispersion: Range, Quartile Deviation,Mean Deviation, Standard Deviation and CoefficientofVariation.

UNIT-IICORRELATION ANDREGRESSIONANALYSIS 15

Correlation: Types of Correlation-Methods of studying correlation- Scatter diagram method,KarlPearson'sCoefficientofcorrelation,Spearman'sRankCorrelationCoefficient.Regression:Regr essionLinesand Regression equations-simple problems.

UNIT-IIITESTING OF HYPOTHESIS 15

Introduction- Concept of Sampling and Sampling Distribution –Parameter and Statistics-Standarderror– TestsofSignificanceforsmallsamples:t-testforSinglemean-differenceof means ,F-test(variance –Ratio test) , Chi-Square tests for Goodness of Fit and test forindependenceof attributes in contingency table.

UNIT-IVALGEBRAIC ANDTRANSCENDENTAL EQUATIONS 15

Rootsofequations:GraphicalMethod-BisectionMethod-FalsepositionMethod–Newton

–Raphson's Method- Secant Method- AlgebraicEquations: Gauss Elimination Method-Gauss-Jordan Method-Matrix InverseMethod-Gauss-Seidel Method.

UNITVNUMERICALDIFFERENTIATION ANDINTEGRATION 15

NumericalDifferentiation-ErrorsinNumericalDifferentiation-CubicSplineMethod-NumericalIntegration-TrapezoidalRule-Simpson's1/3and3/8Rules-RombergIntegration-

OrdinaryDifferentialEquations-Taylor'sSeriesMethod-Euler'sMethod-RungeKutta2ndand4thOrder Methods.

TotalNo of Hours: 75

COURSEOUTCOMES:

Oncompletion ofthiscourse,thestudentswillbeableto:

CO1. Understand the key terminology, concepts tools and techniques used instatisticalanalysis

CO2. Evaluate the underlying assumptions of analysis tools of correlation and regressionCO3.Understandtheissuessurroundingtechniquesandsignificanceoftestingofhypothesis CO4.Analyzetheusesandlimitationsandapplicationsofalgebraicandtranscendentalequations

CO5Analyzetheutilizationofdifferentiationandintegration

TEXTBOOKS

1.S.P.Gupta, Statistical Methods, Sultan Chand & Sons, 35th Revised Edition,2007.(UnitI,II,III)

2.S.Arumugam,A.ThangapandiIsaacandA.Somsundaram,NumericalMethods,ScitechPublicationsIndia Pvt. Ltd.2001.(Unit IV,V)

REFERENCEBOOKS:

P.R.VitalandV.Malini,StatisticalandNumericalMethods,MarghamPublications,1stEdition,2007.

A.Singaravelu,NumericalMethods,MeenakshiAgency,2008

WEBSOURCES

https://d3bxy9euw4e147.cloudfront.net/oscms-prodcms/media/documents/IntroductoryBusinessStatistics-OP.pdf

http://www.ddegjust.ac.in/studymaterial/mcom/mc-106.pdf

IV SEM ADVANCED DATABASE MANAGEMENT SYSTEM LAB 0 0 4 2

COURSE OBJECTIVES:

Explore the features of a Database Management Systems

To interface a database with front end tools

To understand the internals of a database system

LIST OF LAB EXERCSE

1. Distributed Database for Bookstore

2. Deadlock Detection Algorithm for distributed database using wait- for graph

3. Object Oriented Database – Extended Entity Relationship(EER)

4 Parallel Database – University Counselling for Engineering

5. Parallel Database – Implementation of Parallel Join & ParallelSort

6. Active Database – Implementation of Triggers & Assertions for Bank Database

7. Deductive Database – Constructing Knowledge Database for Kinship Domain (Family Relations)

8. Study and Working of WEKA Tool

9 Query Processing – Implementation of an Efficient QueryOptimizer

10 Designing XML Schema for Company Database

11. Building Web Applications using PHP & MySQL

12. Big Data Analytics using Hadoop

TOTAL: 45 Hours

COURSE OUTCOMES:

At the end of the course, a student will be able to

CO1: Create databases for database-driven applications.

CO2: Apply transaction management for suitable case study.

CO3: Implement query processing and optimization.

CO4: Analyze the applicability of advanced databases like DDBMS, OODBMS,etc. in real life scenarios.

CO5: Work in teams to create and implement distributed databases for real-life case study

IV SEM DISTRIBUTED SYSTEM LAB 0 0 4 2

COURSE OBJECTIVES:

- ✓ Explore the features of a Distributed System Lab
- ✓ To provide hardware and software issues in modern distributed systems.
- ✓ To get knowledge in distributed architecture, naming, synchronization, consistency and replication, fault tolerance, security, and distributed file systems.
- ✓ To analyze the current popular distributed systems such as peer-to-peer (P2P) systems will also be analyzed

LIST OF LAB EXERCSE

1.To Simulate the functioning of Lamport's Logical Clock in C.

2. To Simulate the functioning of Lamport's Vector clock in C

3. Simulate the Distributed Mutual Exclusion in C.

4. Implement a Distributed Chat Server using TCP Sockets in C.

5. Implement Java RMI" mechanism for accessing methods of remote systems.

6. Simulate Balanced Sliding Window Protocol in C.

7. Implement CORBA mechanism by using C++program at one end and Java program on the

8. To Simulate the Non Token/ Token based algorithm in Distributed system.

9. To Simulate the Distributed Deadlock Detection algorithm-Edge chasing.

10. To Implement 'RPC' mechanism for accessing methods of remote systems.

V SEMESTER

V SEM **PRINCIPLES CLOUD COMPUTING 4 1 0 5**

COURSE OBJECTIVES:

This course introduces the fundamental concepts of cloud computing model for enabling ubiquitous, convenient access to shared pool of configurable computing resources and storage solutions over a network.

COURSE OUTCOMES:

CO-1: Ability to understand architecture and concepts of different cloud models.

CO-2: Capable of creating applications by utilizing cloud platforms.

CO-3: Ability to assess own organization's needs for capacity building and training in cloud related IT areas.

CO-4: Attempt to generate new ideas and innovations in cloud computing.

CO-5: Ability to choose the appropriate technologies and approaches for the related issues to cloud computing.

Unit I PRINCIPLES CLOUD COMPUTING **15**

History of Cloud Computing – Cloud Architecture – Cloud Storage – Why Cloud Computing Matters – Advantages of Cloud Computing – Disadvantages of Cloud Computing – Companies in the Cloud Today – Cloud Services

Unit II WEB-BASED APPLICATION **15**

Pros and Cons of Cloud Service Development – Types of Cloud Service Development– Software as a Service – Platform as a Service – Web Services – On Demand Computing – Discovering Cloud Services Development Services and Tools –

Amazon Ec2 – Google App Engine – IBM Clouds

Unit III CENTRALIZING EMAIL COMMUNICATIONS **15**

Collaborating on Schedules – Collaborating on To-Do Lists – Collaborating Contact Lists – Cloud Computing for the Community – Collaborating on Group Projects and Events for the Corporation

Unit IV COLLABORATING ON CALENDARS SCHEDULES AND TASKMANAGEMENT **15**

Exploring Online Scheduling Applications –Exploring Online Planning and Task Management – Collaborating on Event Management – Collaborating on Contact Management – Collaborating on Project Management – Collaborating on Word Processing - Collaborating on Databases– Storing and Sharing Files

Unit V COLLABORATING VIA WEB-BASED COMMUNICATION TOOLS **15**

Evaluating Web Mail Services – Evaluating Web Conference Tools – Collaborating via Social Networks and Groupware – Collaborating via Blogs and Wikis

TOTAL: 75 Hours

TEXT BOOKS:

1.Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online, Michael Miller , Queue Publishing,August 2008.

2. Cloud Computing Best Practices for Managing and Measuring Processes for OndemandComputing, Applications and Data Centers in the Cloud with SLAs, Haley Beard, Emereo Pty Limited, July 2008.

REFERENCE BOOKS:

1. Cloud computing a practical approach 2010, velete, Antony. T,TMH, 4th Edition,2007.

2. Cloud computing with Windows Azure platfo, Jennings,Roger, PHI,2009

V SEM **CLOUD COMPUTING LAB** **0 0 4 2**

COURSE OBJECTIVES

- ✓ Introducing cloud computing and Amazon web services.
- ✓ Understanding and using EC2 instances.
- ✓ Deploying and managing applications on AWS cloud.
- ✓ Using AWS security services.
- ✓ Implementing the networking concepts on AWS cloud.

LIST OF EXERCISE :

1. Installing openstack - mitaka in Enterprise linux (RHEL 7 based – Centos 7) and verifying the answer file

2. Identify the physical network and Configure the ovs –vctl in Enterprise linux

3. Managing users, projects, flavors, quota for users and projects using keystone service

4. Adding, importing and creating the images using glance service

5. Configure the networking services with external and internal network using neutron

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6. Creating the security groups and generate the key pair (RSA) for the instance of a project

7. Launching the instance in internal network and logging in using key pair

8. Configuring FWAAS in internal network of the private cloud

9. Configuring LBAAS in internal network of the private cloud

10. Configuring VPNAAS in internal network of the private cloud

11. Configuring object storage using swift

12. Monitoring instances using Ceilometer.

COURSE OUTCOME

CO4:Analyze and understand the functioning of different components involved in Amazon web services cloud platform.

CO5:Describe the functioning of Platform as a Service

CO6:Design & Synthesize Storage as a service using own Cloud

V SEM **BLOCKCHAIN LAB** **0 0 4 2**

LIST OF EXERCISES :

1. Create a Public Ledger vs. Private Ledger with the various attributes like Access, Network Actors,Native token, Security, Speed and examples.

2. How would a blockchain help in processing insurance claims of the insurance industry, which suffers from a number of issues like fraud, contract complexity, human error, information flows in reinsurance and claims processing? Use various aspects to summarize the solution.

3. Prepare your build system and Building Bitcoin Core.

4. Write Hello World smart contract in a higher programming language (Solidity).

5. Solidity example using arrays and functions

6. create a Maven project using Web3j.

7. Construct and deploy your contract (Use deploy method)

Implement an ICO on Ethereum.

8. Install IPFS locally on our machine, initialize your node, view the nodes in network and add files and directories install Swarm and run any test file.

TEXT BOOKS

1. Imran Bashir, “Mastering Blockchain: Distributed Ledger Technology, decentralization, and smart contracts explained”, 2nd
2. Edition, Packt Publishing Ltd, March 2018.
3. Bellaj Badr, Richard Horrocks, Xun (Brian) Wu, “Blockchain By Example: A developer's guide to creating decentralized
4. applications using Bitcoin, Ethereum, and Hyperledger”, Packt Publishing Limited, 2018.

REFERENCE BOOKS

1. Andreas M. Antonopoulos , “Mastering Bitcoin: Unlocking Digital Cryptocurrencies”, O’Reilly Media Inc, 2015
2. Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder, “Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction”, Princeton University Press, 2016.

DISCIPLINE SPECIFICELECTIVE

(DSE)

DISCIPLINE SPECIFICELECTIVE

(DSE - I)

DSE-1 BLOCKCHAIN ECO SYSTEM 3 0 0 3

COURSE OBJECTIVES:

- ✓ To understand the mechanism of Blockchain eco system.
- ✓ To understand the functionality of current implementation of blockchain technology.
- ✓ To understand the required cryptographic background.
- ✓ To explore the applications of Blockchain to cryptocurrencies and understanding limitations of current Block chain.
- ✓ An exposure towards recent research.

UNIT I Introduction to Cryptography and Cryptocurrencies 12

Cryptographic Hash Functions, Hash Pointers and Data Structures, Digital Signatures, Public Keys as Identities, A

Simple Cryptocurrency.

UNIT II Block Chain Storage Techniques 12

Decentralization-Centralization vs. Decentralization-Distributed consensus, Consensus with- out identity using a blockchain, Incentives and proof of work. Simple Local Storage, Hot and Cold Storage, Splitting and Sharing Keys, Online Wallets and Exchanges, Payment Services, Transaction Fees, Currency Exchange Markets.

UNIT III Mechanics of Bitcoin Mining and Anonymity 12

Bitcoin transactions, Bitcoin Scripts, Applications of Bitcoin scripts, Bitcoin blocks, The Bit- coin network, Limitationsand improvements. The task of Bitcoin miners, Mining Hardware, Energy consumption and ecology, Mining pools, Mining incentives and strategies. Anonymity Basics, How to De-anonymize Bitcoin, Mixing, Decentralized Mixing, Zerocoin and Zerocash

UNIT IV Community, Politics, and Regulation 12

Consensus in Bitcoin, Bitcoin Core Software, Stakeholders: Who's in Charge, Roots of Bitcoin, Governments Notice onBitcoin, Anti Money Laundering Regulation, New York's Bit License Proposal. Bitcoin as a Platform: Bitcoin as anAppend only Log, Bitcoins as Smart Property, Secure Multi Party Lotteries in Bitcoin, Bitcoin as Public Randomness,Source-Prediction Markets, and Real World Data Feeds

UNIT V Altcoins and the Cryptocurrency Ecosystem 12

Altcoins: History and Motivation, A Few Altcoins in Detail, Relationship Between Bitcoin and Altcoins, Merge MiningAtomic Crosschain Swaps-6 BitcoinBacked Altcoins, Side Chains, Ethereum and Smart Contracts , Recent Trends

TOTAL:60 hours

COURSE OUTCOMES:

At the end of this course, the Student will be able to

CO1: To Understand and apply the fundamentals of Cryptography in Cryptocurrency

CO2: To gain knowledge about various operations associated with the life cycle of Blockchain and Crypto currency

CO3: To deal with the methods for verification and validation of Bitcoin transactions

CO4: To demonstrate the general ecosystem of several Cryptocurrency

CO5: To educate the principles, practices and policies associated Bitcoin business

TEXT BOOKS

1.Narayanan, A., Bonneau, J., Felten, E., Miller, A., and Goldfeder, S. (2016). Bitcoin and cryptocurrency technologies: a

comprehensive introduction. Princeton University Press.

REFERENCES

1. Antonopoulos, A. M. (2014). Mastering Bitcoin: unlocking digital crypto currencies. OReilly Media, Inc.

2. Franco, P. (2014). Understanding Bitcoin: Cryptography, engineering and economics. John Wiley and Sons

DSE I PUBLIC KEY INFRASTRUCTRE AND

TRUST MANAGEMENT 3 0 0 3

COURSE OBJECTIVES:

- ✓ The goal of this course is to enable the student to understand the
- ✓ foundational elements and complexity of a public key infrastructure.

UNIT – I **9**

Uses of cryptography, the concept devil and Alice. Principle of Cryptography. PKCS standards IEEE P1363, Block cipher modes of operation and data transformation for asymmetrical algorithms,Data transformation for RSA algorithm, Cryptographic Protocols,Protocol properties, Attributes of cryptographic protocols.

UNIT – II **9**

Crypto Hardware and software, Smart cards, Universal Cryptointerface, Real world attacks, Evaluation and certification, Public KeyInfrastructure, PKI Works.

UNIT – III **9**

Directory service, Requesting certificate revocation information,Practical Aspects Of PKI Construction-The course of constructionof PKI, Basic questions about PKI construction,The most important PKI suppliers.

UNIT – IV **9**

The internet and the OSI modelThe OSI model, Crypto standards for OSI Layers 1 and 2-Cryptoextensions for ISDN (Layer 1), Cryptography in the GSM standard(Layer 1), Crypto extensions for PPP (Layer 2), Virtual private networks.

UNIT – V **9**

IPsec and IKE, IPsec, IKE, SKIP, Critical assessment of IPsec, Virtual private network with IPsec,SSL, TLS AND WTLS (Layer 4)-SSL working method, SSL protocol operation,Successful SSL, Technical comparison between IPsec and SSL, WTLS.

TOTAL : 45HRS

TEXT BOOKS:

1. Klaus schmeh:“Cryptography and public key infrastructure on

the internet”, 1st Edition, Allied Publishers, 2004.

REFERENCES:

1. Wenbo Mao: “Modern Cryptography : theory and practice”, 1st

Edition, Pearson Education, 2005.

COURSE OUTCOMES:

By the end of the course student can

CO1. Distinguish between public key technology and a public keyinfrastructure.

CO2. Understand the relationship of identity management to PKI

CO3. Understand the components of a public key infrastructure.

CO4. Understand the issues related to Trust management mechanisms.

CO5. Understand Secure Crypto protocols like SSL and so on.

DSE-I BLOCKCHAIN FUNDAMENTALS 3 0 0 3

COURSE OBJECTIVES :

- ✓ To understand the history, types and applications of Blockchain
- ✓ To acquire knowledge about cryptography and consensus algorithms.
- ✓ Deploy projects using Web3j and design blockchain based applications

UNIT 1: INTRODUCTION TO BLOCKCHAIN 9

Distributed DBMS – Limitations of Distributed DBMS, Introduction to Block chain – History, Definition,Distributed Ledger, Blockchain Categories – Public, Private, Consortium, Blockchain Network and Nodes,Peer-to-Peer Network, Mining Mechanism, Generic elements of Blockchain, Features of Blockchain

UNIT 2: BLOCKCHAIN ARCHITECTURE 9

Operation of Bitcoin Blockchain, Blockchain Architecture – Block, Hash, Distributer P2P, Structure of Blockchain- Consensus mechanism: Proof of Work (PoW), Proof of Stake (PoS), Byzantine Fault Tolerance (BFT), Proof of Authority (PoA) and Proof of Elapsed Time (PoET)

UNIT 3: BLOCKCHAIN-BASED FUTURES SYSTEM 9

Project presentation- Futures smart contract: Blockchain oracles- Web3j: Setting up the Web3J- Installing web3j- Wallet creation, Java client: The wrapper generator- Initializing web3j- Setting up Ethereum accounts- Deploying the contract

UNIT 4: BLOCKCHAINS IN BUSINESS AND CREATING ICO 9

Public versus private and permissioned versus permission less blockchains- Privacy and anonymity in Ethereum- Why are privacy and anonymity important? - The Ethereum Enterprise Alliance- Blockchainas-a-Service- Initial Coin Offering (ICO): Project setup for ICO implementation- Token contracts- Token sale contracts-Contract security and testing the code.

UNIT 5: DISTRIBUTED STORAGE IPFS AND SWARM 9

Ethereum Virtual Machine- Swarm and IPFS: Installing IPFS, Hosting our frontend: Serving your frontend using IFPS, Serving your frontend using Swarm, IPFS file uploader project: Project setup the web page

TOTAL: 45hours

COURSE OUTCOME:

Upon completion of this course, the students will be able to

CO 1:Contentedly discuss and describe the history, types and applications of Blockchain

CO 2:Gains familiarity with cryptography and Consensus algorithms.

CO 3:Create and deploy projects using Web3j.

CO 4:Implement an ICO on Ethereum

C05 :Design blockchain based application with Swarm and IPFS

TEXT BOOKS

1. Imran Bashir, “Mastering Blockchain: Distributed Ledger Technology, decentralization, and smart contracts explained”, 2nd
2. Edition, Packt Publishing Ltd, March 2018.
3. Bellaj Badr, Richard Horrocks, Xun (Brian) Wu, “Blockchain By Example: A developer's guide to creating decentralized
4. applications using Bitcoin, Ethereum, and Hyperledger”, Packt Publishing Limited, 2018.

REFERENCE BOOKS

1. Andreas M. Antonopoulos , “Mastering Bitcoin: Unlocking Digital Cryptocurrencies”, O’Reilly Media Inc, 2015
2. Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder, “Bitcoin and Cryptocurrency
3. Technologies: A Comprehensive Introduction”, Princeton University Press, 2016.

DISCIPLINE SPECIFICELECTIVE

(DSE - II)

DSE-2 BICOIN MINING 3 0 0 3

COURSE OBJECTIVE

- ✓ To build a bitcoin payment system and to perform auctions in Ethereum.
- ✓ To study about cryptocurrencies and their functions.
- ✓ To understand about Bitcoin and Ethereum and the role of Blockchain in various domains.

UNIT I **9**

Introduction to Crypto and Cryptocurrencies – Crypto and crypto currencies differences – how does crypto currencies work – Crypto currencies types - Cryto currencies examples- Cryptocurrencies Furture- Cryptocurrencies Fraud

UNIT II **9**

Economics of Bitcoin – Green Agents- Red agents – Analysis – Equilibrium conditions for speculations-Implication of Monetary Policy - Bitcoin Decentralization –Bitcoin Mechanics– Bitcoin storage and uses Bitcoin Mining – Bitcoin and Anonymity- Bitcoin Community – Politics – Regulations

UNIT III **9**

Bitcoin as platform – Understanding Bitcoin – Bitcoin's Blockchain technology- Bitcoin platform – Hyperledger Fabric- Ethereum – Corda - Bitcoin Exchange – Bitcoin and Blockchain difference -

UNIT IV **9**

Altcoins and the cryptocurrency Ecosystem – Innovation – Utility – Decentralization – Bitcoin Ecosystem -Drawbacks – Altcoins universe - Future

UNIT –V **9**

Enterprise applications - Scalability in Blockchain - Blockchain Interoperability - Blockchain Applications ¬ - Blockchain and its future and Adoption

TEXT BOOKS :

1.Imran Bashir, “Mastering Blockchain: Distributed Ledger Technology, decentralization, and smart contractsexplained”, 2nd Edition, Packt Publishing Ltd, March 2018.

2. Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller, Steven Goldfede, “Bitcoin and CryptocurrencyTechnologies”, Princeton University Press, 2016.

REFERENCE BOOKS :

1. Brojo Kishore Mishra , Sanjay Kumar Kuanar “Handbook of IoT and Blockchain: Methods, Solutions, and

Recent Advancements (Internet of Everything (IoE)) “, CRC Press; 1st edition , November 2020.

2. Jai Singh Arun , Jerry Cuomo , Nitin Gaur Blockchain for Business- For Understanding transformation,

growth and new models of Business -First Edition Published by Pearson Paperback–12December2019

COURSE OUTCOME :

Upon completion of this course, the students will be able to

CO1. Build a bitcoin payment system.

CO2. Building their own Cryptocurrency and perform Auctions in Ethereum.

CO3. Grasp what is Cryptocurrency and how it functions

CO4. Recall about Bitcoin and Ethereum

CO5. Apply Blockchain in various domains

DSE-2 BLOCK CHAIN AND MONEY 3 0 0 3

COURSE OBJECTIVE :

- ✓ To deploy Blockchain and smart contracts on Ethereum.
- ✓ To understand the importance of consensus
- ✓ To implement Blockchain money for various use cases.

UNIT - 1: BUILDING A BITCOIN PAYMENT SYSTEM 9

The emergence of blockchain and cryptocurrency-What is blockchain? - Interact with the blockchainTypes of blockchains: Classification of blockchains, Building A Bitcoin payment system: Getting startedwith Bitcoin, Building a payment gateway. Hands on 1. Run a bitcoin client. - 2. Synchronize the blockchain-3. Set up a Regtest environment4. Build a payment request URI

UNIT 2: CRYPTOCURRENCY AND AUCTIONS IN ETHEREUM 9

Building Your Own Cryptocurrency- Compiling Bitcoin from source- New cryptocurrency – Readercoin:Cloning Bitcoin, Readercoin rebranding- Peer-to-Peer Auctions in Ethereum: Introduction to Ethereum,Building an auction DApp: Auction description, Auction contract in Solidity- Contract code analysisEnumerations, Arrays, Mappings, Structures, Functions, Modifiers, Inheritance.

UNIT 3: CRYPTOCURRENCIES AND BITCOIN 9

Introduction to Cryptocurrencies, Tokens – Cryptosecurities, Players involved - Cryptocurrency Users,Miners, Cryptocurrency exchanges, Trading platforms, Wallet providers, Coin inventors, Coin offerors.Distributed Ledger Technology (DLT), Bitcoin (BTC) – Genesis Block, Buy Bitcoin, Transactions, UnspentTransaction Output (UTXO), Bitcoin Mining, Value of Bitcoin, Advantages and Disadvantages

UNIT 4: ETHEREUM CRYPTOCURRENCY 9

Ethereum (ETH) – Smart Contracts, UTXO, Types of Accounts - Externally controlled accounts andContract account, Merkley Tree, Ether, Components of Ethereum Transaction, DApps, Hard & Soft Fork,Bitcoin Stack versus Ethereum Stack.

UNIT 5: Blockchain Business models **9**

Introduction to Blockchain Business Models-Need for Blockchain business modelsTraditional business models-Types of Blockchain Business Models- Blockchain As A Service(BaaS)-Token Economy-Utility Token Business Model-Blockchain-Based Software ProductsP2P Blockchain Business Model-Blockchain Professional Services. Block chain for Bankingand Financial transactions.

TEXT BOOKS

1. Andreas M. Antonopoulos , "Mastering Bitcoin: Unlocking Digital Cryptocurrencies", O'ReillyMedia Inc, 2015
2. Melanie Swa "Blockchain", First Edition, O'Reilly Jan 2015

REFERENCE BOOKS

1. Hyperledger Fabric - https://www.hyperledger.org/projects/fabric
2. Zero to Blockchain - An IBM Redbooks course, by Bob Dill, David Smits -
3. https://www.redbooks.ibm.com/Redbooks.nsf/RedbookAbstracts/crse0401.html

COURSE OUTCOME :

Upon completion of this course, the students will be able to

CO1. Recall the structure and mechanism of Bitcoin, Ethereum, Hyperledger and Multichain Blockchain platforms

CO2. Infer the importance of consensus in transactions and how transactions are stored on Blockchain.

CO3. Setup your own private Blockchain and deploy smart contracts on Ethereum.

CO4. Deploy the business network using Hyperledger Composer.

CO5. Implement Blockchain for various use cases

DSE-2 SMART CONTRACT ESSENTIALS 3 0 0 3

COURSE OBJECTIVES:

- ✓ This course is designed for developers that have familiarity with other high-level programming languages.
- ✓ The main element of this course is to provide students with a solid understanding of the many opportunities for building decentralized applications using the Web3 stack and the Turing-complete Solidity language over the Ethereum Virtual Machine (EVM).

UNIT – I Introduction to Blockchain and Ethereum 9

Introduction - Blockchain - Blockchain Architectural Overview - The Web of Trust - Ethereum's main components - Ethereum's sub-protocols - The new generation of the Web - Smart Contracts and Decentralized Applications - Web apps vs. dApps

UNIT – II Introduction to Smart Contracts 9

An overview to the history of smart contracts - life-cycle of a smart contract - Ethereum's smart contract languages - Interfacing with Ethereum - The Solidity Programming Language - Development Environments - Blockchain technology Supporting Turing-Complete Languages - A comparison of Ethereum and Bitcoin - Overview of Ethereum's tech stack, architecture.

UNIT – III Virtual Machines and Beyond 9

History of Virtual Machines - State replication, consensus and the Ethereum Architecture - Introduction to the Ethereum Virtual Machine and EVM Byte Code interpretation - Incentivisation structures, rewards schemes, and gas pricing - Development Pipeline - development with Solidity - Development environments (Truffle) - Intro to Solidity - Smart contract layout - The structure of .sol source file

UNIT – IV Deep-dive into Solidity 9

Understanding the different compiler versions - Authoring smart contracts - Contract definitions - Basic data types - Local and State Variables

UNIT – V Global Variables and Functions 9

Predefined Global Variables - Structs and Enums - Mapping and Arrays - Build-in o User Functions - Expressions and Control Structures - Valid expressions of the language - Exception Handling Object Oriented Constructs- Experimenting with Front-end Libraries -Unit Testing and Debugging Contracts

TEXT BOOKS :

1. Mastering ethereum: building smart contracts and dapps Antonopoulos, Andreas M., and Gavin Wood O'Reilly Media 2018
2. Ethereum: A secure decentralised generalised transaction ledger Wood, Gavin Ethereum project yellow paper 151, no. 2014 (2014): 1-32. http://gavwood.com/paper.pdf 2014
3. The science of the blockchain Wattenhofer, Roger CreateSpace Independent Publishing Platform 2016
4. Swap, Swear, and Swindle: Incentive System for Swarm Trón, Viktor, Aron Fischer, Dániel A. Nagy, Zsolt Felföldi, and Nick Johnson 2016
5. A survey of attacks on ethereum smart contracts (sok) Atzei, Nicola, Massimo Bartoletti, and Tiziana Cimoli Springer, Berlin, Heidelberg 2017

COURSE OUTCOME:

After completion of the course students are expected to be able to:

CO1: Understand and evaluate the components of blockchain-based technologies which support Turing-complete languages
CO2: Explain in detail the architecture of Ethereum and the structure of the Ethereum VirtualMachine (including Byte Code interpretation)
CO3: Understand the inner workings of smart contracts as means for developing decentralized applications;
CO4:Understand the interaction between the enclosed smart contract network and the external world, be aware of further implications these interactions pose to the aspect of decentralization
CO5:Reuse common implementation patterns, like modifiers and contract driven development;

DISCIPLINE SPECIFICELECTIVE

(DSE - III)

DSE-3 BLOCKCHAIN TECHNOLOGIES: BUSINESS INNOVATION

AND APPLICATIONS 3 0 0 3

COURSE OBJECTIVE

- ✓ To learn the basics of Blockchain and apply cryptographic algorithms
- ✓ To identify the consensus methods for an application
- ✓ To use Blockchain for business models

UNIT 1: Introduction **9**

History of Blockchain-Terminologies in Blockchain-Types of Blockchain-Applications of BlockchainHow blockchain works-Ingredients of Blockchain.

UNIT 2: Cryptography Algorithms **9**

Introduction to cryptography-Encryption and Decryption-Ciphers-Cryptography using arithmetic modulo primes-hashing algorithms-SHA-256 algorithm-Application of SHA algorithm.

UNIT 3: Cryptography Algorithms **9**

Introduction to cryptography-Encryption and Decryption-Ciphers-Cryptography using arithmetic modulo primes-hashing algorithms-SHA-256 algorithm-Application of SHA algorithm.

UNIT 4: Blockchain Technology Stack **9**

Data structures for Blockchain-Merkle trees-Shared data- Protocols—Fat protocols-PlatformsDAPPS-Smart Contracts.

UNIT 5: Blockchain Business models **9**

Introduction to Blockchain Business Models-Need for Blockchain business modelsTraditional business models-Types of Blockchain Business Models- Blockchain As A Service (BaaS)-Token Economy-

Utility Token Business Model-Blockchain-Based Software ProductsP2P Blockchain Business Model-Blockchain Professional Services. Block chain for Banking and Financial transactions.

TOTAL : 45 Hrs

TEXT BOOKS

1. Brojo Kishore Mishra , Sanjay Kumar Kuanar "Handbook of IoT and Blockchain: Methods, Solutions, and Recent Advancements (Internet of Everything (IoE)) ", CRC Press; 1st edition , November 2020.

2. Jai Singh Arun , Jerry Cuomo , Nitin Gaur Blockchain for Business- For Understanding transformation, growth and new models of Business -First Edition Published by Pearson Paperback– 12December2019

REFERENCES

1. https://iabtechlab.com/wp-content/uploads/2018/07/Blockchain-Technology-Primer.pdf

2. https://www.blockchain-council.org/blockchain/the-best-blockchain-business-models/

COURSE OUTCOME

CO 1:Discuss the basics of Blockchain

CO 2:Apply the Cryptographic techniques in Blockchain

CO 3:Identify the appropriate Consensus methods for application

CO 4 :Describe the technology stack for Blockchain

CO 5:Apply the Blockchain for business models

DSE-3 BLOCKCHAIN ARCHITECTURE DESIGN 3 0 0 3

COURSE OBJECTIVE:

- ✓ To understand the fundamentals of network and symmetric ciphers.
- ✓ To apply asymmetric ciphers and data integrity algorithms.
- ✓ To explore the basics of cryptocurrencies and use Ethereum programming.

UNIT 1: INTRODUCTION TO BLOCKCHAIN 9

Distributed DBMS – Limitations of Distributed DBMS, Introduction to Block chain – History, Definition, Distributed Ledger, Blockchain Categories – Public, Private, Consortium, Blockchain Network and Nodes,Peer-to-Peer Network, Mining Mechanism, Generic elements of Blockchain, Features of Blockchain, and Types of Blockchain.

UNIT 2: BLOCKCHAIN ARCHITECTURE 9

Operation of Bitcoin Blockchain, Blockchain Architecture – Block, Hash, Distributer P2P, Structure of Blockchain- Consensus mechanism: Proof of Work (PoW), Proof of Stake (PoS), Byzantine Fault tolerance (BFT), Proof of Authority (PoA) and Proof of Elapsed Time (PoET)

UNIT 3: BLOCKCHAIN-BASED FUTURES SYSTEM 9

Project presentation- Futures smart contract: Blockchain oracles- Web3j: Setting up the Web3J-Installingweb3j- Wallet creation, Java client: The wrapper generator- Initializing web3j- Setting up Ethereum accounts- Deploying the contract

UNIT 4: BLOCKCHAINS IN BUSINESS AND CREATING ICO 9

Public versus private and permissioned versus permission less blockchains- Privacy and anonymity inEthereum- Why are privacy and anonymity important? - The Ethereum Enterprise Alliance- Blockchainas-a-Service- Initial Coin Offering (ICO): Project setup for ICO implementation- Token contracts- Token sale contracts-Contract security and testing the code.

UNIT 5: DISTRIBUTED STORAGE IPFS AND SWARM 9

Ethereum Virtual Machine- Swarm and IPFS: Installing IPFS, Hosting our frontend: Serving your frontend using IFPS, Serving your frontend using Swarm, IPFS file uploader project: Project setup the web page

TOTAL : 45 Hrs

TEXT BOOKS

1. Imran Bashir, “Mastering Blockchain: Distributed Ledger Technology, decentralization, and smart contracts explained”, 2nd
2. Edition, Packt Publishing Ltd, March 2018.
3. Bellaj Badr, Richard Horrocks, Xun (Brian) Wu, “Blockchain By Example: A developer's guide to creating decentralized
4. Applications using Bitcoin, Ethereum, and Hyperledger”, Packt Publishing Limited, 2018.

REFERENCE BOOKS

1. Andreas M. Antonopoulos , “Mastering Bitcoin: Unlocking Digital Cryptocurrencies”, O’Reilly Media Inc, 2015
2. Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder, “Bitcoin and Cryptocurrency
3. Technologies: A Comprehensive Introduction”, Princeton University Press, 2016.

E BOOKS

1. https://www.velmie.com/practical-blockchain-study
   MOOC
2. https://www.udemy.com/course/build-your-blockchain-az/

DSE-3 BLOCKCHAIN, CRYPTOECONOMICS

ANDTHE FUTURE TECHNLOGY 3 0 0 3

COURSE OBJECTIVE

- ✓ To understand the fundamentals of network and symmetric ciphers.
- ✓ To apply asymmetric ciphers and data integrity algorithms.
- ✓ To explore the basics of cryptocurrencies and use Ethereum programming

UNIT - I. BLOCKCHAIN TECHNOLOGY 9

DLT, public and private blockchains - How Bitcoin works: address, transaction, node, consensus, forks, script language

UNIT - II ETHEREUM 9

Ethereum - network architecture and EVM - Blockchain scalability 1st nd 2nd layer solutions: sharding, state channels, sidechains,roll-ups, DAGs, BDN - Ethereum 2.0 current development

UNIT - III CONSENSUS PROTOCOLS 9

Raft, Paxos, dBFT, pBFT, fBFT, PoS, DPoS, LPoS, PoA - Vulnerabilities in consensus: double spending, selfish mining, long range attacks,nothing at stake

UNIT – IV CONFIDENTIALITY IN BLOCKCHAIN 9

Zero knowledge proof - SNARK, zk-STARK, Bulletproof -

UNIT – V Decentralized Finance: design 9

Lending and borrowing, interest rate models -Decentralized oracles, synthetic assets, and prediction markets - Stablecoins: pegged assets, crypto backed assets, algorithmic stablecoinsDecentralized exchanges: CMFFs, IL, concentrated liquidity, stableswap - DeFi vulnerabilities and attacks, flash loans.

TEXT BOOKS :

1. Antonopoulos, Andreas M. (2014). Mastering Bitcoin: Unlocking Digital Crypto-Currencies. O'Reilly Media, Inc, ISBN:978-1-4493-7404-4
2. Nakamoto, Satoshi. (2009). Bitcoin: A Peer-to-Peer Electronic Cash System. Cryptography Antonopoulos, A. M., & Wood, G. (2018). Mastering Ethereum: building smart contracts and dapps. O'reilly Media Inc, ISBN: 978-1-4919-7194-9
3. Wood, G. (2014). Ethereum: A secure decentralised generalised transaction ledger. Ethereum project yellow paper, 151(2014), 1-32.

REFERENCE BOOKS

1. William Stallings, Network Security Essentials (Applications and Standards), Pearson Education, India,2017
2. Imran Bashir, “Mastering Blockchain: Distributed Ledger Technology, Decentralization and Smart
3. Contracts Explained”, Second Edition, Packt Publishing, 2018.

COURSE OUTCOMES:

At the conclusion of the course, students should have:

CO1 :Understanding of blockchain technology basics, application of blockchain to digital transformation of the financial industry, and relevant research directions in the field.

CO2 : Capability of self-development of new research methods, changing the scientific and production profile of activities.

CO3 :Ability to use modern information technologies and software in professional activities, to set tasks for specialists in the development of R software for solving professional problems.

CO4:Explore the basics of cryptocurrencies.

CO5:Use Ethereum programming

DISCIPLINE SPECIFICELECTIVE

(DSE - IV)

DSE-4 CRYPTOCURRENCY TECHNLOGIES 3 0 0 3

COURSE OBJECTIVE

- ✓ To understand the fundamentals of network and symmetric ciphers.
- ✓ To apply asymmetric ciphers and data integrity algorithms.
- ✓ To explore the basics of crypto currencies and use Ethereum programming.

UNIT 1: INTRODUCTION TO CYBER SECURITY 9

Introduction to Cyber Security, Need for security, Concept of Cyber Space, Cyber Crimes and Cyber-attack. Fundamental security principles – threats, attacks and vulnerability. Key Security triad – Confidentiality, Integrity and Availability. Key components of cybersecurity network architecture. Introduction to basic Security Management and Policies - Authentication, Authorization, Access control, Identification and Accounting.

UNIT 2: SYMMETRIC CIPHERS **9**

Cryptography – Private key Cryptography - Classical Encryption Techniques - Substitution Techniques - Transposition Techniques - Rotor Machines - Steganography - Data Encryption Standard - Advanced Encryption Standard - Multiple Encryption and Triple DES .

UNIT 3: ASSYMMETRIC CIPHERS AND DATA INTEGRITY ALGORITHMS **9**

Public-Key Cryptography - RSA algorithm - Diffie-Hellman Key Exchange - Elgamal Cryptographic System - Elliptic Curve Arithmetic - Elliptic Curve Cryptography. MD5 message digest algorithm - Secure hash algorithm (SHA) Digital Signatures: Digital Signatures - authentication protocols - digital signature standards (DSS) - proof of digital

signature algorithm -

UNIT 4: CRYPTOCURRENCIES **9**

History, A basic crypto currency, Creation of coins, Payments and double spending, Bitcoin – Digital Signatures as Identities – eWallets – Personal Crypto security - Bitcoin Mining – Mining Hardware – Energy Consumption – Mining Pools – Mining Incentives and Strategies.

UNIT 5: ETHEREUM **9**

The Ethereum Network – Components of Ethereum Ecosystem – Ethereum Programming Languages: Runtime Byte Code, Blocks and Blockchain, Fee Schedule – Supporting Protocols – Solidity Language.

TOTAL : 45 Hrs

TEXT BOOKS

1. William Stallings, “Crpyptography and Network security Principles and Practices”, Pearson/PHI,2017.
2. Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder, “Bitcoin and
3. Cryptocurrency Technologies: A Comprehensive Introduction”, Princeton University Press, July, 2016.

REFERENCE BOOKS

4. William Stallings, Network Security Essentials (Applications and Standards), Pearson Education, India,2017
5. Imran Bashir, “Mastering Blockchain: Distributed Ledger Technology, Decentralization and Smart
6. Contracts Explained”, Second Edition, Packt Publishing, 2018.

COURSE OUTCOMES:

Upon completion of this course, the students will be able to

CO1:Recall the network security fundamentals.

CO2:Employ various symmetric ciphers.

CO3:Apply asymmetric ciphers and data integrity algorithms.

CO4:Explore the basics of cryptocurrencies.

CO5:Use Ethereum programming

DSE-4 BITCOIN AND CRYPTO CURRENCY TECHNOLOGIES 3 0 0 3

COURSE OBJECTIVE

- ✓ To deploy Private Blockchain and smart contracts on Ethereum.
- ✓ To understand the importance of consensus
- ✓ To implement Blockchain for various use cases.
- ✓ To build a bitcoin payment system and to perform auctions in Ethereum.
- ✓ To study about cryptocurrencies and their functions.
- ✓ To understand about Bitcoin and Ethereum and the role of Blockchain in various domains

UNIT I **9**

Introduction to Crypto and Cryptocurrencies – Crypto and crypto currencies differences – how does crypto currencies work – Crypto currencies types - Cryto currencies examples- Cryptocurrencies Furture- Cryptocurrencies Frauds–

UNIT II **9**

Economics of Bitcoin – Green Agents- Red agents – Analysis – Equilibrium conditions for speculations-Implication of Monetary Policy - Bitcoin Decentralization –Bitcoin Mechanics– Bitcoin storage and uses Bitcoin Mining – Bitcoin and Anonymity- Bitcoin Community – Politics – Regulations

UNIT III **9**

Bitcoin as platform – Understanding Bitcoin – Bitcoin's Blockchain technology- Bitcoin platform – Hyperledger Fabric- Ethereum – Corda - Bitcoin Exchange – Bitcoin and Blockchain difference -

UNIT IV **9**

Altcoins and the cryptocurrency Ecosystem – Innovation – Utility – Decentralization – Bitcoin Ecosystem -Drawbacks – Altcoins universe - Future

UNIT V **9**

Role of AI in Cryptocurrency - Cryptocurrency Trading: Issues & Considerations, Benefits of AI in Crypto Trading - Making Price Predictions with AI: Issues with Price Prediction, Benefits of AI in Prediction, Time series forecasting with ARIMA, Applications of algorithmic or quant trading in Cryptocurrency

TEXT BOOKS

1. Andreas M. Antonopoulos , "Mastering Bitcoin: Unlocking Digital Cryptocurrencies", O'Reilly Media Inc, 2015
2. Melanie Swa "Blockchain", First Edition, O'Reilly Jan 2015

REFERENCE BOOKS/E-BOOKS

1. Hyperledger Fabric - https://www.hyperledger.org/projects/fabric
2. Zero to Blockchain - An IBM Redbooks course, by Bob Dill, David Smits -
3. https://www.redbooks.ibm.com/Redbooks.nsf/RedbookAbstracts/crse0401.htm

COURSE OUTCOME:

Upon completion of this course, the students will be able to

CO 1: Recall the structure and mechanism of Bitcoin, Ethereum, Hyperledger and Multichain lockchain platforms

CO2: Infer the importance of consensus in transactions and how transactions are stored on Blockchain.

CO 3:Setup your own private Blockchain and deploy smart contracts on Ethereum.

CO 4:Deploy the business network using Hyperledger Composer.

CO 5:Implement Blockchain for various use case

DISCIPLINE SPECIFICELECTIVE

(DSE - V)

DSE-5 **CYBER SECURITY** **3 0 2 4**

COURSE OBJECTIVE

- ✓ Assess the current security landscape, including the nature of the threat,
- ✓ the general status of common vulnerabilities, and the likely consequences
- ✓ of security failures;
- ✓ Assess how all domains of security interact to achieve effective systemwide security at the enterprise level.
- ✓ Appraise the interrelationships among elements that comprise a modern
- ✓ security system, including hardware, software, policies, and people;
- ✓ Compare and contrast logical and physical security

UNIT 1: INTRODUCTION TO CYBER SECURITY **9**

Introduction to Cyber Security, Need for security, Concept of Cyber Space, Cyber

Crimes and Cyber-attack. Fundamental security principles – threats, attacks and

vulnerability. Key Security triad – Confidentiality, Integrity and Availability.

UNIT 2: SECURITY ATTACKS, PRINCIPLES AND MANAGEMENT 9

Introduction to different classes of security attacks - active and passive. Impact of attacks on an organization and individuals. Principles of Cybersecurity cybersecurity architecture principles. Cybersecurity models (the CIA triad, the star model, the Parkerian hexad).

UNIT 3: SECURITY PLANS, POLICIES AND PROCEDURES 9

Defining a Cyber Security policy, General security expectations, roles and responsibilities in the organization – Stakeholders.

UNIT 4: OVERVIEW OF SECURITY COUNTERMEASURE TOOLS 9

Introduction to key security tools including firewalls, anti-virus and cryptography –Identify security tools and hardening techniques – Prevention of cyber-attacks. Security Countermeasure tools and techniques - Encryption standards.

UNIT 5: TESTING, DIGITAL FORENSICS AND NEXT GENERATION SECURITY 9

Cyber security testing – Penetration testing. System Level Solutions – Intrusion Detection System (IDS) and Intrusion Protection System (IPS). Basic Concept of Ethical Hacking. Protecting against Cyber Crime – Identity Theft, Cyber Stalking and Investment fraud

TEXT BOOKS

1. William Stallings, (2016)"Principle of Computer Security", McGraw Hill Education, FourthEdition

REFERENCE BOOKS

1. William, Stallings. (2018). Effective Cyber security: A Guide to Using Best Practices and
2. Standards, Addison - Wesley Professional Publishers, 1st Edition.

E BOOKS

https://bookauthority.org/books/best-network-security-ebooks

COURSE OUTCOME :

Upon completion of this course, the students will be able to

CO1:Outline the Cyber Issues in Real World.

CO2: Evaluate the trends and patterns that will determine the future state of cyber secuity.

CO3: Identify the attacks on WWW

CO4: Describe the Internet Security Protocols

CO5: Identify and explore the authentication mechanisms over internet

DSE-5 WEB SECURITY 3 0 2 4

COURSE OBJECTIVES:

- ✓ To study and practice fundamental techniques in developing secure web based applications
- ✓ To identify and find the vulnerabilities of web based applications and to protect those applicationsfrom attacks

UNIT : 1 INTRODUCTION 9

Introduction - Evolution of Web Applications - Web Application Security - Core Defence Mechanisms - Handling User Access - Handling User Input- Handling Attackers - Managing the Application - The OWASP Top Ten List

UNIT:2 WEB APPLICATION TECHNOLOGIES **9**

Web Functionality Encoding Schemes Mapping the Application - Enumerating the Content and Functionality Analysing the Application Bypassing Client Side Controls : Transmitting Data Via the Client Capturing User Data Handling Client Side Data Securely - Input Validation, Blacklist Validation - Whitelist Validation - The Defence-in-Depth Approach - Attack Surface Reduction Rules of Thumb

UNIT :3 WEB APPLICATION AUTHENTICATION **9**

Authentication Fundamentals- Two Factor and Three Factor Authentication - Password Based, Builtin HTTP, Single Sign-on Custom Authentication- Secured Password Based Authentication: Attacks against Password, Importance of Password Complexity - Design Flaws in Authentication Mechanisms - Implementation Flaws in Authentication Mechanisms - Securing Authentication

UNIT 4 SESSION MANAGEMENT **9**

Need for Session Management Weaknesses in Session Token Generation Weaknesses in Session Token Handling Securing Session Management; Access Control : Access Control Overview, Common Vulnerabilities Attacking Access Controls Securing Access Control.

UNIT :5 WEB SECURITY PRINCIPLES **9**

Origin Policy, Exceptions Cross Site Scripting, Cross Site Forgery Scripting; File Security Principles: Source Code Security, Forceful Browsing, Directory Traversals- Classifying and Prioritizing Threats Origin Policy.

Total : 45 hours

TEXT BOOK(S)

1. B. Sullivan, V. Liu, and M. Howard, Web Application Security, A B Guide. New York: McGraw-Hill Education, 2011. (ISBN No.: 978-0-07-177616-5).

2. D. Stuttard and M. Pinto, , 2nd ed. Indianapolis, IN: Wiley, John Sons, 2011. (ISBN No. : 978-1-118-02647-2)

REFERENCE BOOKS

1. Hanqing and L. Zhao, Web Security: A Whitehat Perspective. United Kingdom: Auerbach

Publishers, 2015.(ISBN No.: 978-1-46-659261-2).

2. M. Shema and J. B. Alcover, Hacking Web Apps: Detecting and Preventing Web Application Security Problems. Washington, DC, United States: Syngress Publishing, 2014.(ISBN No. 978-1-59-749951-4)

COURSE OUTCOME:

CO1.To understand security-related issues in Web-based systems and applications.

CO2.To understand the fundamental mechanisms of securing a Web-based system.

CO3.To be able to implement security mechanisms to secure a Web-based application.

CO4.To be able to evaluate a Web-based system with respect to its security requirements

DSE-5 INFORMATION SECURITY 3 0 2 4

COURSE OBJECTIVE

- ✓ Understand the Factors of Security.
- ✓ Learn Security Goals.
- ✓ Learn about physical security and network security

UNIT I THE CIA TRIAD 9

Confidentiality, Integrity & Availability, what is Information Security? Identification and

Authentication, Authorization and Access Control, Auditing and Accountability

UNIT II CRYPTOGRAPHY, OPERATIONS SECURITY 9

Modern Cryptography Tools, Protecting Data at rest, In motion, And In Use, Origins Of Operations Security, The Operations Security Process, Laws Of Operations Security, Operations Security in our Personal Lives

UNIT III PHYSICAL SECURITY AND NETWORK SECURITY 9

Introduction, Physical Security Controls, Protecting People, Data and Equipment. Protecting Networks, Protecting Network Traffic. Network Security Tools

UNIT IV OPERATING SYSTEM AND APPLICATION SECURITY 9

Operating System Hardening, Protecting Against Malware, Software Firewalls and Host Intrusion Detection, Operating System Security Tools, Software Development Vulnerabilities, Web Security, Database Security, Application Security Tools.

UNIT V INFORMATION SECURITY - AUDIT AND MONITORING, INTELLIGENCE, COMPLIANCE, MANAGEMENT AND GOVERNANCE 9

Change and Security Implications, System Models, Targets and Methods, Log Management, Data Aggregation and Reduction, Notifications and Reporting, Monitoring and Control Challenges, Auditing Standards, SAS 70 Audits, Sarbanes-Oxley, Addressing Multiple Regulations for Information Security Technical Frameworks for IT Audits, Intelligence and Compliance, Management and Governance.

TOTAL: 45

COURSE OUTCOME:

The student should be able to:

CO 1:Abide the 4 factors of security

CO 2: Have an overview on cryptography.

CO 3:Know the basic tools of information security

TEXT BOOK :

1. William Stallings, Lawrie Brown, Computer Security: Principles and Practice, 3rd edition, 2014.
2. Nina Godbole, Information Systems Security: Security Management, Metrics, Frameworks and BestPractices, Wiley, 20173.Nina Godbole, Sunit Belapure, Cyber Security- Understanding cyber-crimes, computer forensics and legal perspectives, Wiley Publications, 2016
3. Andrew Vladimirov Michajlowski, Konstantin, Andrew A. Vladimirov, Konstantin V. Gavrilenko,Assessing Information Security: Strategies, Tactics, Logic and Framework, IT Governance Ltd,O‟Reilly, 2010

REFERENCE BOOKS :

1. Charles P. Pfleeger, Security in Computing, 4th Edition, Pearson, 2009.
2. Christopher J. Alberts, Audrey J. Dorofee , Managing Information Security Risks, Addison-Wesley Professional, 2004
3. Peter Zor, The Art of Computer Virus Research and Defense, Pearson Education Ltd, 2005
4. Lee Allen, Kevin Cardwell, Advanced Penetration Testing for Highly-Secured Environments – Second Edition, PACKT Publishers, 2016
5. Chuck Easttom , System Forensics Investigation and Response, Second Edition, Jones & Bartlett Learning, 2014
6. David Kennedy, Jim O‟Gorman, Devon Kearns, and Mati Aharoni, Metasploit The Penetration Tester‟s Guide, No Starch Press, 2014

DISCIPLINE SPECIFICELECTIVE

(DSE - VI)

DSE-VI **DATA PRIVACY** **3 0 0 3**

COURSE OBJECTIVES:

- ✓ To recognize the need of data privacy.
- ✓ To categorize the statistical and computational techniques needed to share data, with a primary focus on the social, behavioural and health sciences.
- ✓ To formulate architectural, algorithmic and technological foundations for the maintenance of the privacy of individuals, the confidentiality of organizations, and the protection of sensitive

information, despite the requirement that information be released publicly or semi-publicly

UNIT:1 Data Privacy and its Importance **9**

Need for Sharing Data, Methods of Protecting Data, Importance of Balancing Data Privacy and Utility, Disclosure, Tabular Data, Micro data, Approaches to Statistical disclosure control, Ethics, principles, guidelines and regulations

UNIT:2 Microdata **9**

Disclosure, Disclosure risk, Estimating re-identification risk, Non-perturbative microdata masking, Perturbative microdata masking, Information loss in microdata

UNIT:3 Static Data Anonymization on Multidimensional Data **9**

Privacy Preserving Methods, Classification of Data in a Multidimensional Data Set, Group- Based Anonymization, k- Anonymity, l-Diversity, t-closeness

UNIT :4 Static Data Anonymization on Complex Data Structures **9**

Privacy Preserving Graph Data, Privacy Preserving Time Series Data, Time Series Data Pro-tectionMethods, Privacy Preservation of Longitudinal Data, Privacy Preservation of Trans- action Data.

UNIT:5 Data Anonymization Threats **9**

Threats to Anonymized Data, Threats to Data Structures, Threats by Anonymization Techniques, Randomization, k- Anonymization, l-Diversity, t-Closeness. Dynamic Data Protection:Tokenization, Understanding Tokenization, Use Cases for Dynamic Data Protection, Benefits ofTokenization Compared to Other Methods, Components for Tokenization.

TOTAL : 45 hrs

TEXT BOOKS:

1. Nataraj Venkataramanan, AshwinShriram, Data Privacy: Principles and Practice,

Taylor Fran- cis, 2016. (ISBN No.: 978-1-49-872104-2).

2. Anco Hundepool, Josep Domingo-Ferrer, Luisa Franconi, Sarah Giessing, Eric Schulte

Nordholt, Keith Spicer, Peter-Paul de Wolf, Statistical Disclosure Control, Wiley, 2012. (ISBN No.: 978- 1-11-997815-2)

REFERENCE BOOKS

1. George T. Duncan. Mark Elliot, Juan-Jose Salazar-GonZalez, Statistical Confidentiality: Principle and Practice. Springer, 2011. (ISBN No.: 978-1-44-197801-1).

2. Aggarwal, Charu C., Yu, Philip S., Privacy-Preserving Data Mining : Models and Algorithms, Springer, 2010. (ISBN No.: 978-0-38-770991-8).

COURSE OUTCOME:

CO1.Characterize basic rules and principles for protecting privacy and personal information.

CO2.Design enhanced privacy protection methods by envisioning the basic attacks to happen.

CO3.Formulate data that supports useful statistical inference while minimizing the disclosure of sensitive information

DSE-VI INTERNET TRANSACTIONS 3 0 0 3

COURSE OBJECTIVES

- ✓ To develop an understanding of concepts of Internet and Data exchange.
- ✓ To examine aspects of retailing Architecture.
- ✓ To develop and execute plans to deal with security.

UNIT – I INTRODUCTION 9

Overview of developments in Information Technology and Defining E-Commerce: The scope of E commerce,Electronic Market, Electronic Data Interchange, Internet Commerce, Benefits and limitations of E-Commerce,Produce a generic framework for E-Commerce, Architectural framework of Electronic Commerce, Web based

UNIT – IIINTERNET TRANSACTONS ARCHITECTURE 9

Consumer Oriented E CommerceE-Retailing: Traditional retailing and e retailing, Benefits of e retailing, Key success factors, Models of eretailing, Features of e retailing. E services: Categories of e-services, Web-enabled services, matchmakingservices, Information-selling on the web, e entertainment, Auctions and other specialized services. Business to

UNIT – III Business Electronic Commerce 9

Electronic Data Interchange: Benefits of EDI, EDI technology, EDI standards, EDI communications, EDIImplementation, EDI Agreements, EDI Security. Electronic Payment Systems, Need of Electronic PaymentSystem: Study and examine the use of Electronic Payment system and the protocols used, Study ElectronicFund Transfer and secure electronic transaction protocol for credit card payment. Digital economy: Identify themethods of payments on the net – Electronic Cash, cheques and credit cards on the Internet.

UNIT – IVSecurity in Internet Transactions 9

Threats in Computer Systems: Virus, Cyber Crime Network Security: Encryption, Protecting Web server with aFirewall, Firewall and the Security Policy, Network Firewalls and Application Firewalls, Proxy Server.

UNIT V Issues in Internet Transactions 9

Understanding Ethical, Social and Political issues in E-Commerce: A model for Organizing the issues, BasicEthical Concepts, Analyzing Ethical Dilemmas, Candidate Ethical principles Privacy and Information Rights:Information collected at E-Commerce Websites, The Concept of Privacy, Legal protections IntellectualProperty Rights: Types of Intellectual Property protection, Governance.

TEXT BOOKS :

1. Elias. M. Awad, " Electronic Commerce", Prentice-Hall of India Pvt Ltd.

2. RaviKalakota, Andrew B. Whinston, "Electronic Commerce-A Manager's guide", Addison-Wesley.

3. Efraim Turban, Jae Lee, David King, H.Michael Chung, “Electronic Commerce–A ManagerialPerspective",

Addison-Wesley.

REFERENCE :

1. Elias M Award, “Electronic Commerce from Vision to Fulfilment”, 3rd Edition, PHI,

Judy Strauss, Adel El-Ansary, Raymond Frost, “E-Marketing”, 3RDEdition, Pearson Education.

DISCIPLINE SPECIFICELECTIVE

(DSE - VII)

DSE VII BLOCKCHAIN ETHICS : IMPACT AND ETHICS OF CRYPTOCURRENCY AND BLOCKCHAIN TECHNOLOGY 3 0 0 3

COURSE OBJECTIVES:

- ✓ To understand the mechanism of Blockchain and Cryptocurrency.
- ✓ To understand the functionality of current implementation of blockchain technology.
- ✓ To understand the required cryptographic background.
- ✓ To explore the applications of Blockchain to cryptocurrencies andunderstanding limitations of current Blockchain.
- ✓ An exposure towards recent research.

UNIT-1 BLOCK CHAIN ETHICS 9

Block chain Ethics- Ethics and trust – Conceptual model – Code of ethics - Ethical decision Making – Reasoning

UNIT II ETHICS OF CRYPTO CURRENCIES 9

Ethics of Blockchain Technology stack – Key difference- Ethics of crypto currencies – Ethics of smart contracts

UNIT III BITCOIN TRANSACTIONS 9

Bitcoin transactions, Bitcoin Scripts, Applications of Bitcoin scripts, Bitcoin blocks, The Bit-coinnetwork,Limitations and improvements.Ethics Training – Education – Ethical Leadership

UNIT IV BITCOIN MINING 9

New Technology – Strategic view of Innovations - Ethics of block chain decentralization- Conclusion and future research Cryptographic Hash Functions, Hash Pointers and Data Structures, Digital Signatures,PublicKeys as Identities, A Simple Cryptocurrencyand Use.

UNIT V CRYPTOCURRENCY 9

Role of AI in Cryptocurrency - Cryptocurrency Trading: Issues & Considerations, Benefits of AI in Crypto Trading - Making Price Predictions with AI: Issues with Price Prediction, Benefits of AI in Prediction, Time series forecasting with ARIMA, Applications of algorithmic or quant trading in Cryptocurrency **9**

Total Lecture hours: 45 h

TEXT BOOKS :

1. Mastering Blockchain: A deep dive into distributed ledgers, consensus protocols, smart contracts, DApps, cryptocurrencies, Ethereum, and more, 3rd Edition, Imran Bashir, Packt Publishing, 2020, ISBN: 9781839213199, book website: https://www.packtpub.com/product/mastering-blockchain-third-edition/9781839213199

REFERENCES :

1. Hyperledger Tutorials - https://www.hyperledger.org/use/tutorials
2. Ethereum Development Resources - https://ethereum.org/en/developers

COURSE OUTCOME:

CO1. To Understand and apply the fundamentals of Cryptography in Cryptocurrency

CO2. To gain knowledge about various operations associated with the life cycle of Blockchain and Cryptocurrency

CO3. To deal with the methods for verification and validation of Bitcoin transactions

CO4. To demonstrate the general ecosystem of severalCryptocurrency

CO5. To educate the principles, practices and policies associated Bitcoin business

DSE VII DISTRIBUTED CONSENSUS AND BLOCKCHAIN 3 0 0 3

COURSEOBJECTIVE

- ✓ To impart the knowledge of by the end of the course
- ✓ Students will be able toUnderstandhow blockchain systems (mainly Bitcoin and Ethereum) work
- ✓ To securely interact withthem,Design, build, and deploy smart contracts and distributed applications
- ✓ Integrateideasfrom blockchain technology into their own projects.

UNITI: BASICSCONCEPTS 9

DistributedDatabase,TwoGeneralProblem,ByzantineGeneralproblemandFaultTolerance,HadoopDistributedFileSystem,DistributedHashTable,ASICresistance,TuringComplete.•Cryptography:Hashfunction,DigitalSignature-ECDSA,MemoryHardAlgorithm,Zero KnowledgeProof.

UNITII:INTRODUCTION TOBLOCKCHAIN 9

Introduction,Advantageoverconventionaldistributeddatabase,BlockchainNetwork,Mining Mechanism, Distributed Consensus, Merkle Patricia Tree, Gas Limit, Transactionsand Fee, Anonymity, Reward, Chain Policy, Life of Blockchain application, Soft & HardFork,Privateand Publicblockchain.

UNITIII: DISTRIBUTED CONSENSUS 9

Nakamoto consensus, Proof of Work, Proof of Stake, Proof of Burn, Difficulty Level, SybilAttack,Energy utilization and alternate.

UNITIV:CRYPTOCURRENCY 9

History, Distributed Ledger, Bitcoin protocols - Mining strategy and rewards, Ethereum -Construction, DAO, Smart Contract, GHOST, Vulnerability, Attacks, Sidechain, NamecoinCryptocurrencyRegulation:Stakeholders,RootsofBitcoin,LegalAspects-CryptocurrencyExchange,Black Market and Global Economy.

UNITV: BLOCKCHAIN APPLICATIONS 9

Internet of Things-Medical Record Management System-Blockchain in Government andBlockchainSecurity-BlockchainUseCases–FinanceTutorial&Practical:NaiveBlockchainconstruction, Memory Hard algorithm - Hashcash implementation, Direct Acyclic Graph,Play with Go-ethereum, Smart Contract Construction, Toy application using Blockchain,Miningpuzzles .

TotalNo ofHours: 45

TEXTBOOK:

1. Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller, and StevenGoldfeder.Bitcoinandcryptocurrencytechnologies:acomprehensiveintroduction.PrincetonUniversity Press, 2016.(Freedownloadavailable)

REFERENCEBOOKS:

Antonopoulos,MasteringBitcoin:UnlockingDigitalCryptocurrencies

SatoshiNakamoto,Bitcoin:APeer-to-PeerElectronicCashSystem

DR. Gavin Wood, "ETHEREUM: A Secure Decentralized Transaction Ledger,"Yellowpaper.2014.

NicolaAtzei,MassimoBartoletti,andTiziana Cimoli,AsurveyofattacksonEthereumsmart

WEBSITES

Www.w3schools.com

Www.tutorialspoint.com

https://en.wikipedia.org

Www.geeksforgeeks.org

www.investopedia.com

www.guru99.com

WEBSOURCES

https://www.slideshare.net/asrithak/blockchain-technology-ppt

https://www.slideshare.net/Mithileysh/blockchain-technology-181440314

https://scet.berkeley.edu/wp-content/uploads/BlockchainPaper.pdf

COURSEOUTCOMES

CO1: Design, build, and deploy a distributed application.CO2:ExplaindesignprinciplesofBitcoinandEthereum.CO3:Explain Nakamoto consensus.

CO4:ExplaintheSimplifiedPaymentVerificationprotocol.

CO5:Listanddescribedifferencesbetweenproof-of-workandproof-of-stakeconsensus.

DSE VII

DISASTER RECOVERY AND BUSINESS CONTINUITY MANAGEMENT 3 0 0 3

COURSE OBJECTIVES

- ✓ To develop an understanding of concepts of risk management
- ✓ To examine aspects of incident response and contingency planning consistingof incident response plans, disaster recovery plans, and business continuityplans.
- ✓ To develop and execute plans to deal with contingency, incident response,disaster recovery and business continuity

UNIT - I: DISASTER RECOVERY AND BUSINESS CONTINUITY INTRODUCTION 9

Disaster Different source of disaster and types of disasters. Disaster Recovery Operational cycle of disaster recovery, disaster recovery cost, incidents that requires disaster recovery plans, evaluating disaster recovery - methods, team, phases, objectives, checklist. Best practises for disaster recovery - Business continuity - Business continuity vs. disaster recovery

UNIT II: DISASTER RECOVERY PLANNING AND IMPLEMENTATION 9

Introduction - Aspects of security - Application security - Database security - Distributed system security - Firmware security - Industrial security. Profiles Operational profile, Appli- cation profiles, Inventory profile, Disaster recovery plan - Business impact analysis - Disaster recovery roles and responsibilities - Disaster recovery planning steps - Disaster preparedness - Notification and activation procedures

UNIT -III: BUSINESS CONTINUITY MANAGEMENT 9

Introduction - Elements of business continuity management. Business continuity plan - Businesscontinuity planning and strategies - BCP standards and guidelines - BCP Project Organization – Crisis communication plan - Emergency response plan - Contingency planning

UNIT- IV: MANAGING, ASSESSING AND EVALUATING RISKS 9

Introduction - Importance of risk management - Risk management methodology - Attack methods and Countermeasures - Cost benefits analysis of risk management - Risk assessment responsibilities - Responsibilities of security professional - Information system auditing and monitoring - Verification

UNIT – V : BUSINESS RECOVERY **9**

Business recovery planning process mobilizing business recovery team, Assessing extent of damage and business impact, Preparing specific recovery plans, Assess damaged property and documents, Backup recovery site, Monitoring progress, Keeping stockholders informed, Handling business operation back to regular management. Planning recovery activities Communication systems, Human resources, Corporate proprietary information and documentation, IT systems Software architecture recovery.

TEXT BOOKS :

1. John W. Rittinghouse and James F. Ransome, Business Continuity and Disaster Recovery for Info Sec Managers. Elsevier: Elsevier Digital Press, 2005. (ISBN: 978-0-52-119019-0)

2. EC Council Press. Disaster Recovery, 1st Ed. Course Technology, 2011. (ISBN: 978-1-55558-339-2)

REFERENCE BOOKS :

1. ISO 27001:2013 A specification for an information security management system

2. David Alexander, Amanda Finch, David Sutton, Andy Taylor. Information Security Management Principles, 2nd Ed. BCS Shop, 2013. (ISBN: 9781780171753)

3 ISO Guide 73:2009 Definitions of generic terms related to Risk Management

4 ISO Guide 27005:2011 Guidelines for information security risk management

5 ISO 31010:2010 Risk Management Risk Assessment Techniques

6 Mark Talabis, Jason Martin. Information Security Risk Assessment Toolkit Practical Assessments through Data Collection and Data Analysis. Syngress Imprint, 2013. (ISBN: 978-1-59-749735-0).

COURSE LEARNING OUTCOMES

CO1:Understand the concept of business continuity

CO2:Learn the importance of a BCP(business continuity planing)

CO3:See how load balancing maintains business continuity

CO4:Discover how a DCP(Disaster recover plan) is a second line of defense

CO5:Learn how to choose the right fail over solution

SKILLENHANCEMENTCOURSE

(SEC)

21SSKU11 SOFTSKILL–I 2 0 0 2

COURSEOBJECTIVE:

- ✓ Totrainthestudents to improvethe vocabularyand readingcomprehension.
- ✓ Totrain thestudentsto participateingroup discussion
- ✓ Toelevatetheircomprehensionskillsandconversation.

UNITI:EFFECTIVE COMMUNICATIONSKILLS 06

Talkingaboutyourcompany–MakingPoliterequests–Introducingyourselfandothers

Socialisingwithothers – Talkingaboutwork activities –Talking aboutyourjob

Communicationpractice–Roleplays

UNITII:WRITTENBUSINESSCOMMUNICATION 06

EssentialEmailwritingskills–FormalandInformalE-mails–Usageofformallanguage

ReportWriting–Writingproject reports–Extended writingpractice –Email Etiquette

UnderstandingBusiness E-mails

UNITIII:TELEPHONEETIQUETTE 06

The basics of Telephone Etiquette – Customer Service – Being courteous – Makingarrangements – Giving clear and concise information – Tone and Rate of speech –Pronunciations– Summarisation– MockTelephonic Conversations

UNITIV:LEADERSHIP SKILLS 06

EssentialLeadershipSkills–InterpersonalSkills–TeamBuilding–Teamwork–Do'sand Don'ts of Leadership skills – Importance of communication in Leadership–Delegatingand Handling of Projects

UNITV:LISTENINGANDANSWERINGQUESTION 06

Listening for the main ideas – Listening for details – Listening for specific information –Predicting and listening for opinions – Recognising context – Listening for sequence –UnderstandingPronunciation– Listening practice

Total:30 Hours

COURSEOUTCOME

OnCompletionofthiscourse,students canableto

CO1:Toenhanceparticipant'sBusinessCommunicationSkills

CO2:Toenhancetheparticipant'sReading,Speaking,ListeningandWritingcapabilities

CO3: To engage in a conversation with others to exchange ideasCO4: To impart leadership qualities among the participantsCO5: Toexpress opinionsto enhancetheir social skills

TEXTBOOKS

Raman,M.&SangeetaSharma.TechnicalCommunication.OUP.2008

Taylor,Grant.EnglishConversationPractice.TataMcGrawHillEducationPvt.Ltd.2005

Tiko,Champa& JayaSasikumar. Writingwith aPurpose.OUP. NewDelhi. 1979

WEBSOURCES

https://www.skillsyouneed.com/ips/communication-skills.html

https://blog.smarp.com/top-5-communication-skills-and-how-to-improve-them

https://blog.hubspot.com/service/phone-etiquette

21SSKU21 SOFTSKILL-II 2 0 0 2

COURSEOBJECTIVE:

- ✓ Totrain thestudentstoimprovetheirskills.
- ✓ Toteachthemsoftskillsandstrength theirfoundationintimeandstresmanagement
- ✓ Toelevatetheirinterviewskills

UNITI:READINGCOMPREHENSIONANDVOCABULARY 06

ReadingTechniques–TypesofReading– Skimming –Scanning–Readingfordetail

Identifying key words – Underlining unfamiliar key words – Vocabulary Building – ReadingComprehensionpractice

UNITII:PRESENTATIONSKILLS 06

PresentationMethods –PreparationandPractice–Organisingcontent–Do'sandDon'tsofaPresentation – PresentationTechniques – MockPresentation

UNITIII:GROUPDISCUSSION 06

Introduction to Group Discussion – Preparation for GD – Structure of GD's – Do's andDon'ts – Tips and Strategies – Etiquette and Practice – Body Language and Posture –SharingIdeas with respect– Understanding Opinions– Mock GDPractice

UNITIV:CONVERSATIONAL SKILLS 06

Introduction to Small talk – How to start and end a conversation – Exchanging ideas – ExpressingInterests–GivingOpinions–SocialskillsandEtiquette–InformalConversations– FormalMeetings– GroupPractice

UNITV:SELF –INTRODUCTION AND ROLEPLAY 06

Introducing oneself – Exchange of Greetings – Appropriate Greetings – Usage ofVocabulary– RapportBuilding –HandshakesandFirstImpressions–BasicEtiquette

TotalNo of Hours:30 Hours

COURSEOUTCOME:

OnCompletionofthis course,studentscaableto

CO1: To get students to understand the importance of communicating in EnglishCO2: Tounderstandeffectivecommunicationtechniques

CO3: To increase self-confidence through regular practiceCO4:Toencourageactiveparticipationintheirregularclass

CO5: Toenableparticipantstofacelargegroup ofaudiencewithconfidence

TEXTBOOKS

1. EnglishforCompetitiveExaminationsbyR.P.Bhatnagar&RajulBhargavaMacmillanIndialtd. Delhi.
2. Carnegie,Dale.TheQuickandEasyWaytoEffectiveSpeaking.New York:PocketBooks, 1977.
3. Kalish,Karen.Howto GiveaTerrificPresentation.New York: AMACOM, 1996

WEBSOURCES

https://www.skillsyouneed.com/ips/communication-skills.html

https://venngage.com/blog/presentation-skills/

https://gdpi.hitbullseye.com/Group-Discussion.php

SEC SOFTSKILL-III 2 0 0 2

COURSEOBJECTIVE:

1. ToenablestudentstodeveloptheirsoftskillsandBody Language
2. ToenhancestudentsReading, Writing,Listening andSpeaking skills
3. Todeveloptheirself-confidencetoexcelatInterviews

UNITI:SKILLENHANCEMENT 06

Time Management – Planning and Organisation – Scheduling – PrioritizationDelegation – Task Management – Stress Management – Overcoming anxietyConfidenceBuilding– Body Language

UNITII:RESUME/COVERLETTERWRITING 06

SWOT Analysis – Details and Resume Writing – Resume Examples – Building Resumeusing SWOT – Writing Resume – Writing Cover Letter – Resume Correction – ResumeFeedback

UNITIII: INTERVIEW SKILLS 06

Interview Do's and Don'ts – First Impression – Grooming – Body Language –Frequentlyasked questions– UsefulLanguage–MockInterview

UNITIV:QUANTITATIVE ABILITY 06

Permutation&Combinations–Probability–Profit&Loss–RatioProportions&Variations–Cubes –Venn Diagrams – LogicalReasoning–Critical Reasoning

UNITV:REVISIONARY MODULES 06

GroupDiscussions–HRProcess – InterviewProcess –MockGroupDiscussions

TotalNo ofHours: 30

COURSEOUTCOME

OnCompletionofthis course,studentscanable to

CO1:Todevelopparticipant'ssocial andprofessionalskills

CO2:Tohelpparticipantsmanagetime effectively

CO3: Tobuildastrongresumetosuitcorporaterequirements

CO4:Tofaceinterviewsconfidently

CO5: Toenhancetheiraptitudeabilities

TEXTBOOKS

Meena.K andV.Ayothi(2013)ABookonDevelopmentofSoftSkills(SoftSkills:ARoad Map to Success)P.R. Publishers &Distributors.

Soft Skills – Know Yourself & Know the World, S.Chand & Company LTD, RamNagar, NewDelhi

Prasad, H. M. How to Prepare for Group Discussion and Interview. NewDelhi: TataMcGraw-HillPublishingCompany Limited, 2001.

Pease,Allan.BodyLanguage.Delhi:SudhaPublications,1998.

WEBSOURCES

https://www.skillsyouneed.com/ips/communication-skills.html

https://www.businessnewsdaily.com/5836-top-interviewing-skills.html

https://gdpi.hitbullseye.com/Group-Discussion.php

SEC NATIONALSERVICESCHEME 2 0 0 2

COURSEOBJECTIVE:

- ✓ Socialawarenessprogramme
- ✓ Volunteerparticipationinsocialrelated campaign

UNITI SPECIALCAMPINGPROGRAMME 6

Natureanditsobjectives

Selectionofcampsiteandphysicalarrangement

Organizationof N.S.S.campthroughvariouscommitteesanddisciplineinthecamp.

Activitiesto beundertakenduring theN.S.S. camp.

Useof themass mediainthe N.S.S. activities

UNITII CONTRIBUTIONOFSOCIALREFORMS 6

MahatmaJotibaPhule

RajarshiShahuChhatrapati

Dr.B.R.Ambedkar

UNITIII SOCIALPROBLEMS 6

Waterscarcity

Womenharassment

UNITIV NATIONAL INTEGRATION 6

NeedforNational Integrity

VariousObstaclessuchascaste,religion,language

UNITVSPECIAL PROGRAMME **6**

LegalAwareness

HealthAwareness

First-aid

CareerGuidence

TotalNo of Hours: 30

COURSEOUTCOME

On Completion ofthiscourse, studentscanableto,

CO1:Developdocumentationandreportingof aevent.

CO2:Analyzethecost and planningandreports.

CO3:Analyzesocio–EconomicProblems

CO4:Explaintheroleofdisastermanagementinmodernlife

CO5:Listthe ofvariousenvironment issues

TEXTBOOKS

ChhatrapatiShahu–ThePillarofSocial Democracy,Ed.P.B.Salunkhe

NationalServiceSchemeManual,Govt.of India

REFERENCEBOOKS

SocialserviceopportunitiesinHospitals,KapilK.Krishan,TISS

HistoryofSocialReformsinMaharashtra,Ed.J.Y.Bhosale,S.U.Kolhapur

WEBSOURCES

http://www.igntu.ac.in/Download/aboutNSS.pdf2.https://www.slideshare.net/SiniAlby/nss-57278390

SEC ETHICSANDVALUES 2 0 0 2

COURSEOBJECTIVE:

- ✓ Toincreaseethicalsensitivity.
- ✓ Toincreaseethicalknowledge.
- ✓ Toimproveethical judgment.

UNIT-I INTRODUCTION 6

WhyValueEducation – EthicalReflections –WhatisEthics?SwamiVivekananda

UNIT:II APPROACH TOLIFE 6

Approach to Life - Happiness as Goal - Historical Perspective – Life in the Past EconomicAwareness– Economic

UNIT:III KINDS OFVALUES 6

Kinds of Values S.Ignacimuthu S.J – Living Excellence Anthony Robbins – Concern forInfluence of Science and Technology in Human'sSocial Life Social Relevance of ScienceandTechnologyFeatures– Status of Women– Mass MediaandValues.

UNITIVGOALSAND HUMANRIGHTS 6

UseGoalstohelp yougrowDavidJ.Schwartz–essentialCharacteristicsof HumanRights.

UNITVINFLUENCEOF SCIENCE ANDTECHNOLOGY 6

SocialRelevanceofScienceandTechnology–EconomicAwareness–EconomicFeatures–Statusof Women– MassMedia and Values.

TOTAL : 30 HRS

COURSEOUTCOME :

Attheend ofthecoursestudentscan,

CO1:Canableto develop the ethical valuedefined byswamiVivekananda.

CO2:Ableto analyzethe obstacles inlifeand toreach thegoal.

CO3:Ableto understand thestatus of women inthis society

CO4:Ableto understandthe influenceof science&technology inHuman Life.

CO5:Ableto understandtheeconomicdrive.

TEXTBOOKS

1. Touchstone:SynergyofValues –Universityof Madras.
2. Inharmony-ValueEducationatCollegeLevel-Dept.ofEthicsandReligiousStudiesLoyollaCollege, Madras.

WEBSOURCES

1.https://vit.ac.in/files/Ethics_Manual.pdf2.https://soaneemrana.org/onewebmedia/Professional%20Ethics%20and%20Human

%20Values%20by%20R.S%20NAAGARAZAN.pdf

https://eng.rizvi.edu.in/wp-content/uploads/2020/04/Handbook-Human-Values-and-Professional-Ethics.pdf

SEC ETHICALHACKING 2 0 0 2

COURSEOBJECTIVE:

- ✓ To help students understand how ethical hacking is used as a method to preventhacking.
- ✓ Tomakeitpossibleforstudentstolearntheprocessofidentifyingvulnerabilitiesandexploits of the technological ecosystem comprising of various hardware, software,network,OS and applicationsand identify suitable countermeasures.
- ✓ To facilitate students, appreciate the need for understanding non-technology aspectsofethical hackingsuch as legalframeworks, documentation andreport writing.

UNITI INTRODUCTION TO ETHICAL HACKING 6

Hacking Methodology, Process of Malicious Hacking, and Foot printing and scanning: Footprinting,scanning. Enumeration: Enumeration.

UNITII TYES OF HACKING 6

System Hacking and Trojans: System Hacking, Trojans and Black Box Vs. White BoxTechniques.

UNITIII HACKINGMETHODOLOGY 6

DenialofService,Sniffers,SessionHijackingandHackingWebServers:SessionHijacking,HackingWeb Servers.

UNITIV WEB APPLICATION 6

Web Application Vulnerabilities and WebTechniques Based Password Cracking:WebApplicationVulnerabilities, Web BasedPasswordCracking Techniques.

UNITIII WEBAND NETWORKHACKING 6

SQLInjection,HackingWirelessNetworking,Viruses,WormsandPhysicalSecurity:Viruses and Worms, Physical Security. Linux Hacking: Linux Hacking. Evading IDS andFirewalls:EvadingIDS and Firewalls.

TotalNo ofHours: 30

COURSEOUTCOME

OnCompletion ofthiscourse,studentscanableto

CO1:Justifytheneedformeticulousdocumentationinwritingreportsforconsumptionofbothtechnical and management audiences

CO2:Differentiatetheprocessesofvulnerabilityassessmentandethicalhackingfrompenetrationtesting.

CO3:Comprehendtheimportanceofappropriatecountermeasuresformanagingvulnerabilities.

CO4:Explaintheimportanceofethicalhackinginachievingthegoalsofinformationsecurity.

CO5:Articulatetherationaleforhavinganadequatelegalframeworkfordealingwithhackingand ethical hacking.

TEXTBOOKS

1. Gray Hat Hacking The Ethical Hackers Handbook, 3rd Edition Paperback – 1 Jul2017 by Allen Harper, Shon Harris, Jonathan Ness, Chris Eagle, McGraw HillEducation;3 ed (1 July 2017)
2. CEH v9: Certified Ethical Hacker Version 9 Study Guide by Sean-Philip Oriyano,Sybex;Stg edition (17 June2016)
3. HackingforBeginners:Ultimate7HourHackingCourseforBeginners.LearnWireless Hacking, Basic Security, Penetration Testing by Anthony Reynolds,CreateSpace IndependentPublishingPlatform (10April 2017)
4. AnEthicalGuideTo WI-FIHackingand SecuritybySwaroopYermalkar,BecomeShakespeare.com;First edition (15 August 2014)
5. Hands-OnEthicalHackingandNetwork Defense byMichaelT.Simpson|KentBackman |James Corley,Cengage India 1st edition (2016)

REFERENCEBOOKS

1. TheBasicsofHackingand PenetrationTesting:EthicalHackingandPenetrationTesting Made Easy by Patrick Engebretson, Syngress; 2 edition (12 September2013)
2. Hacking With Python: The Complete Guide to Ethical Hacking, Basic Security,Botnet Attack, Python hacking and Penetration Testing Kindle Edition by John C.Smalls

WEBSITES

1.www.javatpoint.com2.www.tutorialspoint.comWEBSOURCES

1.https://www.javatpoint.com/ethical-hacking-tutorial2.https://www.tutorialspoint.com/ethical_hacking/index.htm

SEC MATLABPROGRAMMING 2 0 0 2

COURSEOBJECTIVE:

TomakethestudentstobefamiliarinMatlabtoolcontainingsomanytoolboxsuchasdatamining, imageprocessing, signal processing andso on.

UNIT–I Introductionto MATLAB	BriefIntroduction
	InstallationofMATLAB
	History
	UseofMATLAB
	Keyfeatures
MATLABsoftware	Introductionto MATLABSoftware
	MATLABwindow
	Command window
	Workspace
	Command history
	Settingdirectory
	WorkingwiththeMATLABuserinterface
	Basiccommands
	Assigningvariables
	Operationswithvariables
DatafilesandDatatypes	Characterandstring
	Arraysand vectors
	Columnvectors
	Rowvectors
UNIT–II BasicMathematics	BODMASRules
	Arithmeticoperations
	Operatorsandspecial characters
	Mathematicalandlogicaloperators
	Solvingarithmeticequations

Operationsonmatrix	CratingrowsandcolumnsMatrix
	Matrixoperations
	Findingtranspose,determinantandinverse
	Solvingmatrix
UNIT– III M-Files	WritingScript file
	Executingscriptfiles
	TheMATLAB Editor
	Savingmfiles
Plots	Plottingvectorandmatrixdata
	Plotlabelling,curvelabellingandediting
GUIDesign	IntroductionOfGraphicalUserInterface
	GUIFunctionProperty
	GUIComponent Design
	GUIContainer
	WritingthecodeofGUICallback

	Dialog Box
	MenuDesigning
	Applications
UNITIV MATLABProgramming	Automatingcommandswithscripts
	Writingprogramswithlogicandflowcontrol
	Writingfunctions
	ControlstatementProgramming
	ConditionalStatementProgramming
	Examples
Loops and ConditionalStatements	ControlFlow ConditionalControl —if, else,switch
	LoopControl—for,while,continue,break
	ProgramTermination —return
UNIT–V Image Processing withMATLAB	Importingand VisualizingImages
	Importinganddisplayingimages
	Convertingbetweenimagetypes
	Exportingimages
	InteractiveExplorationofImages
	Obtainingpixelintensityvalues
	Extractingaregionofinterest
	Computingpixelstatistics
	Measuringobjectsizes
	Creatingacustominteractivetool
	PreprocessingImages
	Adjustingimagecontrast
	Reducingnoisein an image
	Usingslidingneighborhoodoperations
	Usingblockprocessingoperations

TotalNo of Hours: 30

COURSEOUTCOME:

OnCompletion ofthiscourse,Studentscanableto

CO1:Develop simple.M files in Matlab

CO2:Analyzevarious toolboxes available inMatlab.

CO3:ApplymathematicalFunctions,arrays.matricesinspecifiedapplications..

CO4: Interpret plots and export this for use in reports and presentations.CO5: Execute and manipulate images using image processing toolbox. .

TEXTBOOKS

1. IntroductiontoProgramminginMATLAB–Sam H.Davis
2. IntroductiontoMATLAB– ElaPekalska

WEBSITES

1.www.tutorialspoint.comWEBSOURCES

https://www.tutorialspoint.com/matlab/index.htm

https://www.slideshare.net/ashishmeet/introduction-to-matlab-18425069

VISEM SECV ENTREPRENEURSHIPDEVELOPMENT 2 0 0 2

COURSEOBJECTIVE:

- ✓ Todevelopandstrengthenentrepreneurial qualityandmotivationinstudents
- ✓ Toimpartbasicentrepreneurialskillsandunderstandingtorunabusinessefficientlyandeffectively.
- ✓ Tounderstandtheconceptandprocessofentrepreneurshipanditscontributioninandroleinthegrowthan d developmentofindividualandthenation.

UNITI ENTREPRENEURSHIP 6

Entrepreneur – Personality characteristics of successful entrepreneur– Types of Entrepreneurs – Knowledgeandskillsrequiredforanentrepreneur–DifferencebetweenEntrepreneurandIntrapreneur

UNITII BUSINESS 6

Definition, Classification – Characteristics, Ownership Structures – Project Formulation – Stepsinvolved in setting up a Business–Market Survey and Research–Techno Economic FeasibilityAssessment

UNITIIIBUSINESSPLANPREPARATION 6

Sourcesofproductforbusiness–Pre-feasibilitystudy–Criteriaforselectionofproduct–Ownership

Capital–Budgetingprojectprofilepreparation–Matchingentrepreneurwiththeproject– Feasibilityreportpreparation and evaluationcriteria.

UNITIVSUPPORTTOENTREPRENEURS 6

SicknessinsmallBusiness–Concept,Magnitude,CausesandConsequences,CorrectiveMeasures –Business Incubators – Government Policy for Small Scale Enterprises – Growth Strategies in smallindustry.

UNITVENTPRENEURSHIP DEVELOPMENTPROGRAMME 6

Meaning, Objectives–Phases of EDP– steps in EDP–Strategies for Entrepreneurship development– Institutions in aid of Entrepreneurship Development Programme–Use of IT enabled services inentrepreneurship -E Licensing, Efiling.

TotalNoofHours:30hrs

COURSEOUTCOMES:

At the end of the course, a student will be able toCO1:UnderstandtheconceptofEntrepreneurship

CO2:Identify,createandanalyzeentrepreneurialopportunities.

CO3:AssesstechnoeconomicfeasibilityofaBusinessPlan

CO4:CreateBusinessPlans

CO5:Statevariousstatutoryinstitutionsinvolvedintheprocessof Entrepreneurshipdevelopment

TEXTBOOKS:

HisrichRD,PetersMP,"Entrepreneurship"8thEdition,TataMcGraw-Hill,2016

KhankaS.S.,"Entrepreneurial Development"SChand& Company; edition,2016

REFERENCEBOOKS:

Sharma,"EntrepreneurshipDevelopment",PHILEARNINGPVTLTD,(2017)

AbhinavGanpule&AdityaDhobale,"EntrepreneurshipDevelopment",KindleEdition,JatayuPublication;1 edition ,2018.

SangeetaSharma,"EntrepreneurshipDevelopment",10thEdition,KindleEditionPHILearning,2018

WEBSITES

http://www.simplynotes.in/e-notes/mbabba/entrepreneurship-development/

https://openpress.usask.ca/entrepreneurshipandinnovationtoolkit/chapter/chapter-1- introduction-to-entrepreneurship/

WEBSOURCES

https://articles.bplans.com/10-great-websites-for-entrepreneurs/

https://www.entrepreneur.com/article/272185

GENERICELECTIVES(GE)

VI SEM GE INTERNET BASICS 3 0 0 3

COURSEOBJECTIVE:

- ✓ Tomakethe studentunderstands theoverallviewofinternet.
- ✓ Toinculcatethestudentsaboutthevariousfacilitiesavailableininternet.
- ✓ Togainpracticalknowledgeaboutinternet.

UNITI INTRODUCTION 9

Internet and its history, defining and describing the Internet, Brief history, discussing thefuture of the Internet, Internet Resources. Describe the important features of the Web andWebbrowser software, Evaluatee-mailsoftwareandWeb-based e-mail services

UNITII EMAIL 9

Email,Partsofemail,Emailsoftware,Webbasedemail,Emailaddress,Listservers ,Newsgroups,Newsgroupsnames,Newsgroupsreaders,Chat rooms,Conferencing.

UNITIII INTERNETRESOURCES 9

InternetResources,Games,Filetransferprotocol,Telnet,WorldWideWeb,Behavioron the Internet , Accessing the Internet , Types of access , Online services , Internet servicesproviders,Howandwheretolookfor theserviceBrowsingtheWeb,Browsing theWeb.

UNITIV FTP 9

Use FTP and other services to transfer and store data, Demonstrate the use of real-timechatandbrieflydescribethehistoryofthewirelessInternet.Usemailinglists,newsgroups, and newsfeeds, Create HTML documents and enhance them with browserextensions

UNITV APPLICATIONS 9

Applications of Internet- education, business, government, Communication , Job searches,Healthandmedicine,Travel,Entertainment,Shopping,Stockmarketupdates,Research.

TotalNo ofHours: 45

COURSEOUTCOME

Attheendof thecourse studentscanableto,

CO1: Develop & design mail to his/her friendsCO2: Analyze the search engine (ie) browsers.CO3:Usethe applications ofinternet

CO4:UnderstandthebasicconceptsandfeaturesofWeb.

CO5:Understandthesecuritythreatsandelectroniccommerce.

TEXTBOOK

1. RohitKhurana,"COMPUTERFUNDAMENTALSandINTERNETBASICS",AphPublishingCorporation,2010.

REFERENCEBOOK

2. MargaretLevineYoung,"InternetMilleniumEdition",OsbornePublications,2000.

WEBSITES

www.w3schools.com

www.tutorialspoint.com

www.javapoint.com

WEBSOURCES

https://www.oswaalbooks.com/download/freeresources/class10/175Quick%20Revision%20Notes%20_10th%20Computer%20Application.pdf

https://fcit.usf.edu/internet/chap1/chap1.htm

https://www.slideshare.net/osuchin/internet-basics-13440260

https://www.slideshare.net/argusacademy/internet-40994977

VI SEM GE WEBDESIGNING 3 0 0 3

COURSEOBJECTIVE:

- ✓ Toexplainthestudentthemajorconceptsof webdesigning.
- ✓ Thiscourseexplainsthe graphicsandanimation..
- ✓ Thiscourse IntroducebasicsconceptofCSS.

UNITI WEB DESIGNPRINCIPLES 9

Basic principles involved in developing a web site , Planning process , Five Golden rules ofweb designing , Designing navigation bar , Page design , Home Page Layout , DesignConcept.

UNITII BASICSINWEBDESIGN 9

BriefHistoryofInternet,WhatisWorldWideWeb,Whycreateawebsite,WebStandards

,Audiencerequirement.

UNITIII INTRODUCTION TOHTML 9

What is HTML ,HTML Documents , Basic structure of an HTML document ,Creating anHTMLdocument,MarkupTags,Heading-Paragraphs,LineBreaks,HTMLTags,ElementsofHTML,IntroductiontoelementsofHTML,WorkingwithText,WorkingwithLists,

Tables and Frames ,Working with Hyperlinks, Images and Multimedia.Working with Forms and controls.

UNITIV INTRODUCTIONTO CASCADINGSTYLESHEETS 9

Concept of CSS , Creating Style Sheet , CSS Properties , CSS Styling(Background, TextFormat, Controlling Fonts) , Working with block elements and objects , Working with Listsand Tables ,CSS Id and Class , Box Model(Introduction, Border properties, Padding ,Properties,Margin properties) .

UNITV INTRODUCTION TOWEBPUBLISHING ORHOSTING 9

Creating the Web Site, Saving the site, working on the web site, Creating web site structure,CreatingTitles for web pages, Themes-Publishingweb sites.

TotalNo ofHours: 45

COURSEOUTCOME :

Attheendof thecourse studentscanableto

CO1:DesignstaticWebsites usingHTML.

CO2:Createwebsitesusing CSS.

CO3:ApplyCSSproperties&abletoembed the stylesheet intoHTMLdocuments

CO4:Demonstratewebhosting.

CO5:Understandbasictagsand CSSProperties

TEXTBOOK

1. IvanBayross,"HTML5andCSS3MadeSimple",BPBpublications,Dec2012.

REFERENCEBOOK

1. ThomasAPowell,"HTMLCompleteReference",McGrawPublications,2000

WEBSITES

www.w3schools.com

www.tutorialspoint.com

www.javapoint.com

WEBSOURCES

1.https://www.tutorialspoint.com/html/html_tutorial.pdf2.https://wtf.tw/ref/duckett.pdf3.https://www.shahucollegelatur.org.in/Department/Studymaterial/bvoc/Web%20Hosting.pdf

VI SEM GE MYSQL 3 0 0 3

COURSEOBJECTIVE:

- ✓ Tomakethe studentunderstands how theSQLworks in computer.
- ✓ Topracticethestudentaboutcreation,deletion,insertion,appendingofdatabaseinSQL.
- ✓ Tomakethe studentto createa reportofthedatabasecreated.

UNITI THEORY, TERMINOLOGY ANDCONCEPTS 9

Client/Server Concepts,Database and Database Objects, Data Definition using SQL ,Databases,Data Types,Tables ,Constraints andIndexes ,Views.

UNITII BASIC DATA MANIPULATION USING SQL 9

RecurringSQLConstructs,Addingdata,Modifyingdata,Removingdata,Searchingdata

,Advanced Data Manipulation using SQL , Expressions ,Grouping and AggregateFunctions, Joining Tables.

UNITIII THEORY, TERMINOLOGY ANDCONCEPTS 9

Client/ServerConcepts,DatabaseandDatabaseObjects,Transactions,TransactionConcepts , SQL for working with Transaction ,Import/Export,Tools for Import/Export ,SQLforImport/Export.

UNITIV FILES SYSTEMS AND DATABASES 9

The Relational Database Model, Structured Query Language (SQL), Entity RelationshipModeling(ERD), Normalization ofDatabaseTables , DatabaseDesign.

UNITV SQL QUERIES 9

SQLQueries-BasicSQLQueries&ModificationCommands,SQLfunctions,SQLJOIN,TableCreation andNormalization, DDL functions, DatabaseProject

TotalNo ofHours: 45

COURSEOUTCOME

Attheendof thecourse studentscanableto

CO1:CreateSQLQueriesusingDDL,DML& DCLcommandsCO2: Understand the basic terminology & concepts of database.CO3:Understand the entity-relationship model..

CO2:UnderstandSQLjoin&normalization.

CO3:Explaintheclient/serverconcept.

TEXTBOOK

PaulDuBois,"MySQLDeveloper'sLibrary, 5th Edition,2013.

REFERENCEBOOK

1.MichaelKruckenberg,“ProMYSQL”,ApressPublications,2005.

WEBSITES

www.w3schools.com

www.tutorialspoint.com

www.javapoint.com

WEBSOURCES

https://www.tutorialspoint.com/mysql/mysql_tutorial.pdf

https://downloads.mysql.com/docs/mysql-tutorial-excerpt-5.7-en.pdf

https://www.slideshare.net/webhostingguy/mysqlppt-3672569

https://slideplayer.com/slide/13209422/

ABILITYENHANCEMENTCOMPULSORYCOURSE (AECC)

ISEM AECC COMMUNICATION SKILLS 1 0 2 2

COURSEOBJECTIVE:

This course is to subject the students to practise the components invariousunits.Tomakestudentsreadyforplacementinterviewswithincampus.

Toinfuseconfidenceto facejob situations.

CreditHours

UNIT I **06**

ResumeandCV-Writing

ComplaintLetter

SocialCorrespondence

LetterofEnquiry

UNITII **06**

ShortEssayWriting

UNITIII **06**

ExplainingProverbs

UNITIV **06**

UseofPrepositions

UNITV **06**

SynonymousWords

TotalNo ofHours: 30 Hours

COURSEOUTCOME:

OnCompletionofthisCourse,studentscanable

CO1:Toenhancelearners'confidencelevel.

CO2:Tomakelearners'feel theassimilationof skills.

CO3:Toengageina conversationwith otherstoexchangeideas.

CO4:Toimpart leadershipqualitiesamong theparticipants.

CO5:Toexpress opinionsto enhancetheir socialskills.

TEXTBOOKS

ForUnitI–V Effective Communication For You – V. SyamalaEmeraldPublishers, Chennai.

Cameron,David.MasteringModernEnglish,Hyderabad:OrientBlackswan,1978(rpt.1989, 1993, 1995,1998).

Freeman,Sarah.WrittenCommunicationinEnglish,Hyderabad:OrientBlackswan,1977(21st Impression,2007).

Singh,VandanaR.TheWrittenWord.NewDelhi:OxforduniversityPress,2003(3rdImpression, 2007)

Seely, John. Oxford Guide to Effective Writing and Speaking. New Delhi: OxfordUniversityPress, 2000 (4thImpression,2008)

WEBSOURCES:

https://www.myperfectresume.com/career-center/resumes/how-to/write

https://www.englishgrammar.org/

II SEM AECC ENVIRONMENTALSTUDIES 2 0 0 2

COURSEOBJECTIVE

Toinculcatetheimportanceofenvironmentalpollution,preservationofnatureandenvironmentalmanagement for human welfare.

UNIT-IMULTIDISCIPLINARYNATUREOFENVIRONMENTALSTUDIES,NATURALRESOURCES 06

Definition,scopeandimportance,needforpublic awareness.

Renewable and non-renewable resources - Natural resources and associated problems. a)Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction,mining,damsandtheireffectsonforestandtribalpeople.b)Waterresources:Useandover-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefitsandproblems.c)Mineralresources:Useandexploitation,environmentaleffectsofextractingand using mineral resources, case studies. d) Food resources: World food problems, changescaused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticideproblems, water logging, salinity, case studies. e) Energy resources: Growing energy needs,renewableandnonrenewableenergysources,useofalternateenergysources.Casestudies.

Landresources:Landasaresource,landdegradation,maninducedlandslides,soilerosionanddesertification-Roleofanindividualinconservationofnaturalresources-Equitableuseofresourecesforsustainable lifestyles.

UNIT-IIECOSYSTEMS,BIODIVERSITYANDITSCONSERVATION 06

Conceptofanecosystem.-Structureandfunctionofanecosystem Producers,consumersanddecomposers.-Energyflowintheecosystem.Ecologicalsuccession.-Foodchains,foodwebsandecologicalpyramids.

Introduction,types,characteristicfeatures,structureandfunctionofthefollowing ecosystem:a)Forestecosystemb)Grasslandecosystemc)Desertecosystem d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)Introduction–Definition,genetic, species and ecosystem diversity.

Biogeographicalclassificationof India,Valueofbiodiversity:consumptiveuse,productiveuse,social,ethical,aestheticandoptionvalues-Biodiversityatglobal,Nationalandlocallevels.Inidaasamega-diversitynation. Hot-sportsofbiodiversity. Threatstobiodiversity:habitatloss,

poaching of wildlife, man-wildlife conflicts.Endangered and endemic species of India.Conservationofbiodiversity: In-situand Ex-situ conservation ofbiodiversity.

UNIT-IIIENVIRONMENTALSCIENCE 06

Definition,Cause,effectsandcontrolmeasuresofa)Airpollutionb)Waterpollutionc)Soilpollution d) Marine pollution e) Noise pollution f) Thermal pollution g) Nuclear hazards.Solid waste Management. Causes,effects and control measures of urban and industrialwastes. Role of an individual in prevention of pollution. Pollution case studies. Diastermanagement- floods, earthquake, cyclone and landslides.

UNIT-IV SOCIALISSUES ANDTHEENVIRONMENT 06

From Unsustainable to Sustainable development, Urban problems related to energy - Waterconservation,rainwaterharvesting,watershedmanagement-Resettlementandrahabilitationof people; its problems and concerns. Case Studies - Environmental ethics: Issues andpossiblesolutions.Climatechange,globalwarming,acidrain,ozonelayerdepletion,nuclearaccidents and holocaust. Case Studies. Wasteland reclamation. Consumerism and wasteproducts. Environment Protection Act, Air (Prevention and Control of Pollution) Act, Water(PreventionandcontrolofPollution)Act,WildlifeProtectionAct,ForestConservationAct Issuesinvolvedinenforcementofenvironmentallegislation.Publicawareness.

UNIT-V HUMANPOPULATIONANDTHEENVIRONMENT 06

Populationgrowth,variationamongnations.Populationexplosion–FamilyWelfareProgramme. Environment and human health. Human Rights. Value Education. HIV/AIDS.Women and Child Welfare. Role of Information Technology in Environment and humanhealth.CaseStudies.Fieldwork-
Visittoalocalareatodocumentenvironmentalassetsriver/forest/grassland/hill/mountain,Visittoalocalpollutedsite-
Urban/Rural/Industrial/Agricultural,Studyofcommonplants,insects,birds,Studyofsimpleecosystems-pond,river,hill slopes, etc.

TotalNoofHours:30hrs

COURSEOUTCOME

CO1: Tounderstandthenatureandfactsaboutenvironment.

CO2:Tofindandimplementscientific,technological,economicsolutionstoenvironmentalproblems.

CO3:Toknowabouttheinterrelationshipbetweenlivingorganismsandenvironment.

CO4:Tounderstandtheintegratedthemesandbiodiversity,naturalresources,pollutioncontrolandwaste management.

CO5: Toappreciatetheimportanceofenvironment byassessingitsimpact onthehumanworld.

TEXTBOOKS

2. DeAK,EnvironmentalChemistry,WileyEasternLtd.
3. BharuchaErach,2003. TheBiodiversityofIndia, MapinPublishing Pvt.Ltd, India.
4. BrunnerRC,1989,HazardousWasteIncineration,McGrawHillInc.480pgs.
5. ClarkRS,MarinePollution,ClandersonPress,Oxofrd(TB).

REFERENCEBOOKS

1. AgarwalKC,2001.EnvironmentalBiology,Nidi PublishersLtd.Bikaner.
2. GleickHP,1993.WaterinCrisis,PacificInstituteforStudiesinDevelopment,EnvironmentandSecurity.Stockholm EnvironmentalInstitute,OxfordUniversity Press,473pgs.
3. Heywood VH, and Watson RT, 1995. global Biodiversity Assessment. Cambridge UniversityPress1140pgs.
4. Jadhav H and Bhosale VM, 1995. Environmental Protection and Laws. Himalaya PublishingHouse,Delhi284pgs.
5. Miller TG,Jr.Environmental Science,WadsworthPublishingCO.(TB)