॥ सा विद्या या विमुक्तये ॥

स्वामी रामानंद तीर्थ मराठवाडा विद्यापीठ, नांदेड

'ज्ञानतीर्थ', विष्णुपुरी, नांदेड – ४३१ ६०६ (महाराष्ट्र राज्य) भारत

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED

'Dnyanteerth', Vishnupuri, Nanded - 431 606 (Maharashtra State) INDIA

Established on 17th September, 1994, Recognized By the UGC U/s 2(f) and 12(B), NAAC Re-accredited with'B++' grade

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विज्ञान व तंत्रज्ञान विद्याशाखेतील पदवी स्तरावरील खालील विषयाचे CBCS Pattern नुसारचे सुधारित अभ्यासक्रम शैक्षणिक वर्ष २०२३—२०२४ पासून लागू करण्याबाबत.

प रि प त्र क

या परिपत्रकान्वये सर्व संबधितांना कळविण्यात येते की, प्रस्तुत विद्यापीठाच्या संलग्नित महाविद्यालयांतील विज्ञान व तंत्रज्ञान विद्याशाखेतील पदवी स्तरावरील C.B.C.S. (Choice Based Credit System) Pattern नुसारचे खालील सुधारित अभ्यासक्रम शैक्षणिक वर्ष २०२३—२४ पासून लागू करण्याच्या दृष्टीने मा. कुलगुरू महोदयानी मा. विद्या परिषदेच्या मान्यतेच्या अधीन राहून मान्यता दिलेली आहे.

1. B.Sc. Computer Management (I,II & III Year)
2. B. Sc. Information Technology (I,II & III Year)
3. BCA (Bachelor of Computer application) (II Year)

सदरील परिपत्रक व अभ्यासक्रम प्रस्तुत विद्यापीठाच्या www.srtmun.ac.in या संकेतस्थळावर उपलब्ध आहे. तरी सदरील बाब ही सर्व संबंधितांच्या निदर्शनास आणून द्यावी, ही विनंती.

विष्णुपुरी, नांदेड – ४३१ ६०६.

जा.क्र.:शैक्षणिक– /०१/परिपत्रक/UG/

पदवी–सीबीसीएस अभ्यासक्रम/२०२३–२४/346

दिनांक : २५.१०.२०२३

आपली विश्वासू

डॉ. सरिता लोसरवार

सहाय्यक कुलसचिव

प्रत माहिती व पुढील कार्यवाहीस्तव :

१) मा. अधिष्ठाता, विज्ञान व तंत्रज्ञान विद्याशाखा, प्रस्तुत विद्यापीठ.

२) मा. संचालक, परीक्षा व मूल्यमापन मंडळ यांचे कार्यालय, प्रस्तुत विद्यापीठ.

४) प्राचार्य, सर्व संबंधित संलग्नित महाविद्यालये, प्रस्तुत विद्यापीठ.

७) सिस्टम एक्सपर्ट, शैक्षणिक विभाग, प्रस्तुत विद्यापीठ. यांना देवून कळवण्यात येते की, सदरील परिपत्रक विद्यापीठाच्या संकेतस्थळावर प्रसिध्द करण्यात यावे.

Swami RamanandTeerthMarathwadaUniversity,Nanded
(NAACRe-accreditedwith‘B++’Grade)

Syllabusof

RevisedCBCSpatternB.Sc. Information Technology (I,II and IIIrdYear)

Introducedfrom AcademicYear2023-2024

B.Sc.Information Technology

B.Sc. Information Technology(3years) program / degree is a specialized program in computersciences.It builds the student on studies in Computer Science and to become competent inthe current race and development of new computational sciences. The duration of the study isofsixsemesters, whichis normallycompleted inthreeyears.

CBCS ITpattern

The B.Sc. Information Technologyprogram as per CBCS IT (Choice based credit system) pattern, inwhich choices are given to the students under open electives and subject electives. Thestudentscan chooseopenelectives from the widerangeofoptions to them.

EligibilityandFees

The eligibility of a candidate to take admission to **B.Sc. Information Technology**program is as perthe eligibility criteria is as follows.

12th Arts, Commerce, Science and MCVC passed students are eligible to take admission to **B.Sc. Information Technology**

More details on admission procedure and feestructure can be seen from the prospectus of the college / institution as well as on website oftheUniversity.

CreditPattern

Every course has corresponding grades marked in the syllabus structure. There are 24 creditsper semester.A total of 144 credits are essential to complete this program successfully. TheGradingpattern toevaluatetheperformanceofastudentis aspertheUniversityrules.

Every semester has a combination of Theory (core or elective) courses and Lab courses. Eachtheory course has 04 credits which are split as 03 external credits and 01 internal credit. Theuniversity shall conduct the end semester examination for 03 external credits. For theoryinternal credit, student has to appear for 01 class test (15 marks) and 01 assignments (10marks).Every lab course has 02 credits which are split as 01 external credit and 01 internalcredit. For lab internal credit, the student has to submit Laboratory Book (05 marks) andremaining 20 marks are for the Lab activities carried out by the student throughout thesemester. For lab external credit, 20 marks are reserved for the examinational experiment and05marks arefortheoral/ vivaexaminations.

The open elective has 04 credits which are purely internal.If students are opting for MOOCsas open elective, then, there must be a Faculty designed as MOOCs course coordinator whoshall supervise learning through MOOCS. This is intentionally needed as the MOOCs coursecoordinator shall verify the MOOC details including its duration, staring date, ending date,syllabus contents, modeof conduction, infrastructure feasibility,and financialfeasibilityduring start of each semester. This is precautionary as the offering of the MOOCs throughonline platforms are time specific and there must be proper synchronization of semesterduration with the MOOCs duration. Students must opt for either institutional / college levelopenelectiveoracourse fromUniversityrecognizedMOOCsplatformsasopenelectives.

The number of hours needed for completion of theory and practical courses as well as thepassingrules,gradingpatterns,questionpaperpattern,numberofstudentsinpracticalbatches, etc shall be as per the recommendations, norms, guidelines and policies of the UGC,State Government and the SRTM University currently operational. The course structure issupplemented with split up in units and minimum numbers of hours needed for completion ofthecourse, whereverpossible.

Under the CBSC IT pattern, students would graduate **B.Sc. Information Technology**with a minimumnumberofrequiredcreditswhichincludescompulsorycreditsfromcorecourses,openelectives and program specific elective course.All students have to undergo lab / practicalactivities leading to specific credits and project development activity as a part of professionalUGprogram.

1. **B.Sc. Information Technology**Degree / program would be of 144 Credits. Total creditspersemester=24
2. Each semester shallconsistof three core courses, one elective course, one openelective course and two practical courses. Four theory courses (core+elective)= 16Credits
3. Two practical /Lab courses= 4 Credits in total (02 credits each),OneOpenelective=4credit
4. OneCredit=25marks,TwoCredits=50Marks,FourCredits=100Marks

PEO,POandCOMappings

1. **ProgramName:**B.Sc. (ComputerScience)

2. **ProgramEducationalObjectives**:Aftercompletionofthisprogram,thegraduates/studentswould

PEOI:TechnicalExpertise	Implementfundamentaldomainknowledgeofcorecourses for developing effective computing solutionsbyincorporatingcreativityandlogicalreasoning.
PEOII:SuccessfulCareer	Deliver professional services with updated technologiesin**Information Technology**basedcareer.
PEOIII:HandsonTechnologyandProfessionalexperience	Developleadershipskillsandincorporateethics,teamworkwitheffectivecommunication&time managementintheprofession.
PEOIV: InterdisciplinaryandLife LongLearning	Undergohigherstudies,certificationsandresearch programsaspermarketneeds.

3. **ProgramOutcome(s):**Students/graduateswillbeableto

PO1: Applyknowledgeofmathematics,scienceandalgorithminsolvingComputerproblems.
PO2: Generate solutions by conducting experiments and applying techniques to analyze and interpretdata
PO3: Design component, or processes to meet the needs within realistic constraints.**PO4:** Identify, formulate, and solve problems using computational temperaments.**PO5:** Comprehend professional and ethical responsibility in computing profession.**PO6:** Expresseffectivecommunicationskills.
PO7: Recognizetheneedforinterdisciplinary,andanabilitytoengageinlife-longlearning.
PO8: Actualhandsontechnologytounderstandit'sworking.
PO9: Knowledgeofcontemporaryissuesandemergingdevelopmentsincomputingprofession.
PO10: Utilizethetechniques,skillsand moderntools,foractualdevelopmentprocess
PO11: Function effectively as an individual and as a member or leader in diverse teams and inmultidisciplinarysettingsinactual developmentwork

PO12: Researchinsightsandconductresearchincomputingenvironment.

4. **Course Outcome(s):** Every individual course under this program has course objectives and courseoutcomes(CO).Thecourseobjectivesrationallymatchwithprogrameducationalobjectives.The mappingofPEO,PO and CO isasillustratedbelow

5. MappingofPEO&POandCO

ProgramEducational Objectives	ThrustArea	**Program Outcome**	CourseOutcome
PEOI	TechnicalExpertise	PO1,PO2,PO3,PO6	Allcorecourses
PEOII	SuccessfulCareer	PO4,PO5,PO11,	All discipline specific electives courses
PEOIII	HandsonTechnologyandProfessional experience	PO8,PO10	AllLabcourses
PEOIV	InterdisciplinaryandLifeLongLearning	PO7,PO9,PO12	Allopenelectives and discipline specificelectives

SWAMIRAMANANDTEERTHMARATHWADAUNIVERSITY,NANDEDC
HOICEBASED CREDITSYSTEM(CBCS IT)
SEMESTERPATTERN
Faculty of Science &
TechnologyUnderGraduate(UG)Pr
ogrammes

Program:B.Sc.Information Technologyw.e.f.AY2023-2024

Year	Semester	Coursec ategory	Course Code	CourseTitle	Credits** *(split upwill begiven separately)
First	**First**	CoreC ourse	B.SC IT-101	Fundamental of IT	04
		CoreC ourse	B.SC IT-102	Web Page Design	04
		CoreC ourse	B.SC IT-103	Programming in C	04
		Choseanyonefromthebelow Electivecourses			
		Elective Subject	B.SC IT-104A	Numerical Ability	04
			B.SC IT-104B	Digital Marketing	
		Choseanyone OpenElectivecourses			
		OpenEl ective	B.SC IT-105A	University recognized MOOC(NPTEL / SWAYAM / others)ORIntra/Inter Departmental coursesOR	04
			B.SC IT-105B	CommunicationSkills	
		Lab/Pra ctical	B.SC IT-106	Web Page Design	02
			B.SC IT-107	Programming in C	02
Total					**24**
First	**Second**	Core Course	B.SC IT-201	RDBMS through ORACLE	04
		Core Course	B.SC IT-202	OOP's with JAVA	04
		Core Course	B.SC IT-203	Computer Network	04
		Choseanyonefromthebelow Electivecourses			
		Elective Subject	B.SC IT-204A	Logical Reasoning	04
			B.SC IT-204B	8085Microprocessor	
		Choseanyone OpenElectivecourses			
		OpenEl ective	B.SC IT-205A	University recognized MOOC(NPTEL / SWAYAM / others)ORIntra/Inter Departmental coursesOR	04
			B.SC IT-205B	Functional English	
		Lab/ Practical	B.SC IT-206	RDBMS	02
			B.SC IT-206	OOP's with JAVA	02
Total					**24**
Forskill enhancement,ifany,inall semesters,onlinecoursewithinternal creditsis mandatory					

Year	Semester	Coursecategory	Course Code	CourseTitle	Credits** (split upwill begiven separately)
Second	**Third**	CoreCourse	B.SC IT-301	Analyzing data with SQL	04
		CoreCourse	B.SC IT-302	Advanced Java	04
		CoreCourse	B.SC IT-303	Data Structure	04
		Choseanyonefromthebelow Electivecourses			
		Elective Subject	B.SC IT-304A	Software Engineering	04
			B.SC IT-304B	Operating System	
		Choseanyone OpenElectivecourses			
		OpenElective	B.SC IT-305A	University recognized MOOC(NPTEL / SWAYAM / others)ORIntra/Inter Departmental coursesOR	04
			B.SC IT-305B	JavaScript	
		Lab/Practical	B.SC IT-306	Analyzing data with SQL	02
			B.SC IT-307	Advanced Java	02
Total					**24**
Second	**Fourth**	Core Course	B.SC IT-401	Web development with PHP and MySQL	04
		Core Course	B.SC IT-402	Hibernate and Spring Framework	04
		Core Course	B.SC IT-403	Software Testing	04
		Choseanyonefromthebelow Electivecourses			
		Elective Subject	B.SC IT-404A	Cloud Computing	04
			B.SC IT-404B	Linux Fundamental	
		Choseanyone OpenElectivecourses			
		OpenElective	B.SC IT-405A	University recognized MOOC(NPTEL / SWAYAM / others)ORIntra/Inter Departmental coursesOR	04
			B.SC IT-405B	Content Management System	
		Lab/ Practical	B.SC IT-406	PHP and MySQL	02
			B.SC IT-406	Hibernate and Spring Framework	02
Total					**24**
Forskill enhancement,ifany,inall semesters,onlinecoursewithinternal creditsis mandatory					

Year	Semester	Coursecategory	Course Code	CourseTitle	Credits** (split upwill begiven separately)
Third	**Fifth**	CoreCourse	B.SC IT-501	Python Programming	04
		CoreCourse	B.SC IT-502	Data Analysis with PowerBI	04
		CoreCourse	B.SC IT-503	Programming in C#	04
		Choseanyonefromthebelow Electivecourses			
		Elective Subject	B.SC IT-504A	Introduction to AI and ML	04
			B.SC IT-504B	ReactJS	
		Choseanyone OpenElectivecourses			
		OpenElective	B.SC IT-505A	University recognized MOOC(NPTEL / SWAYAM / others)ORIntra/Inter Departmental coursesOR	04
			B.SC IT-505B	Cyber Security	
		Lab/Practical	B.SC IT-506	Python Programming	02
			B.SC IT-507	Data Analysis with PowerBI	02
Total					**24**
Third	**Sixth**	Core Course	B.SC IT-601	Python for Data Science	04
		Core Course	B.SC IT-602	ASP.Net Core	04
		Core Course	B.SC IT-603	Project	04
		Choseanyonefromthebelow Electivecourses			
		Elective Subject	B.SC IT-604A	Computer Vision	04
			B.SC IT-604B	Introduction to IOT	
		Choseanyone OpenElectivecourses			
		OpenElective	B.SC IT-605A	University recognized MOOC(NPTEL / SWAYAM / others)ORIntra/Inter Departmental coursesOR	04
			B.SC IT-605B	MongoDB	
		Lab/ Practical	B.SC IT-606	Python for Data Science	02
			B.SC IT-607	ASP.Net Core	02
Total					**24**
Forskill enhancement,ifany,inall semesters,onlinecoursewithinternal creditsis mandatory					

Nameof Course	**Bachelorof Science(Information Technology)**
Semester	**I**
Nameof Subject	**Fundamentals of IT**
SubjectCode	**B.Sc IT-101**
Lectures	**50Lectures**

Objectives

ThroughthispaperStudentshouldlearnbasicprinciplesofcomputer.Thepaperisdesignedtoaim at importingbasiclevel ofComputer.

Outcome

TolearnBasicFunctionofDeviceslikeI/O,HDDetc.ToUnderstandtheFundamentalofSoftwareandHardware.UnderstandtheConceptofOperatingSystemandNetwork.

UnitI

1. IntroductiontoComputerand History **15Lectures**

1.1 DefinitionofComputer
1.2 BasicComputerOrganization
1.3 CharacteristicsofComputer
1.4 GenerationsofComputer
1.5 Types of Computer: - Personal Computer, Microcomputer, Minicomputer, Mainframe Computer,Workstations, Client andServer

UnitII

2. ComputerPeripherals&Memory **10Lectures**

2.1 InputDevices:-Keyboard,Mouse,Trackball,Joystick,Lightpen, Speech Recognition Devices
2.2 OutputDevices:-Monitor,Printer,Projector, BiometricDevices
2.3 ComputerMemory:- RAM, ROM,CacheMemory

UnitIII

3. StorageDevicesand OperatingSystem **15Lectures**

3.1 CompactDisk,DigitalVersatileDisk
3.2 HardDiskDrive
3.3 USBFlash Drive
3.4 MemoryCard
3.5 DefinitionofoperatingSystem
3.6 TypesofOperatingSystem
3.7 DiskOperatingSystem
3.8 WindowsOperatingSystem
3.9 LinuxOperatingSystem
3.10 Android Operating System

UnitIV	

4. IntroductiontoComputerNetwork &Internet 10Lectures

4.1 DefinitionofNetwork
4.2 TypesofNetwork:-LAN,MAN,WAN
4.3 DataTransmissionModes
4.4 OSIModel
4.5 E-Mail
4.6 FileTransferProtocol
4.7 WebBrowser
4.8 TypesofWebBrowser
4.9 Internet and Intranet

References:-

1 FundamentalofComputer–5th&6thEdition,P.K.Sinha,BPBPublication
2 FundamentalofComputer-V.RajaRaman, PHIPublication

Nameof Course	**Bachelorof Science(Information Technology)**
Semester	**I**
Nameof Subject	**WebPage Design**
SubjectCode	**B.Sc IT- 102**
Lectures	**50Lectures**

Objectives:

Toimprovetheskill tocreatethestaticwebpage.

Todeveloptheabilitytocreatethedynamicwebpages.

ToenhancetheabilityofInsertagraphicwithinawebpage.

ToimprovetheskillstoCreate,validate andpublishawebpage.

Outcome:

Attheendofthecourse,studentsshouldbeableto:Designandimplementdynamic websites with goodaestheticsenseofdesigning

UNIT–I

1. IntroductionofHTMLDocuments 15Lectures

1.1 OverviewofHTML and WWW
1.2 Concept of Webpage andWebsite,
1.3 StructureofHTMLdocuments
1.4 FormattingTags:HeadingsTags, ParagraphTags, Break, Bold & strong, small, Italic, Underline, subscript,Superscript, strikethrough, center tags.
1.5 Types of Listtags,HRTag,FONTTag,
1.6 DIVtag,SPANtag,ADDRESStag,
1.7 MARQUEEtag.
1.8 Meta Tag.

UNIT–II

2. TechnologiesforWebApplication 10Lectures

2.1 Webbrowser,Webserver
2.2 Webprotocols:HTTP,FTP.
2.3 Hyperlink(Anchor)Tag&it'sallattributes,
2.4 Images In HTML.
2.5 TablesinHTML.

UNIT–III

3. BasicInteractivity andDHTML 15 Lectures

3.1 FramesinHTML:- Rows, Cols,
3.2 Iframe:- Embed PDF Document and Google Map in webpage.
3.3 Formcontrols:TextControls,PasswordField, Number, Date and Time Control, TextareaInput,
   1. Email, URL, CheckBox,RadioButtons,Select control,
   2. ResetButton,Submitbutton and Button control.

UNIT–IV

4. CSS andJavaScript 10Lectures

4.1 IntroductiontoCascadingStyleSheets
4.2 EmbeddedStyles:- Inline, Internal, ExternalStyles.
4.3 IntroductionofJAVAScript
4.4 Addingscripttodocumentswithexample.Variables.
4.5 InputandOutputstatementsofJAVAScript
4.6 Roll Over Button.

ReferenceBooks:

1. HTMLThecompleteReference(2nd EditionThomasAPowelTataMcGrawHillpublication)
2. ThecompleteReference (HTML&XHTML)-5thEditionThomasAPowelTataMcGrawHill publication

Nameof Course	**Bachelorof Science(Information Technology)**
Semester	**I**
Nameof Subject	**Programming in C**
SubjectCode	**B.Sc IT- 103**
Lectures	**50Lectures**

Objectives of C-Programming:

1. Introduce students to the fundamentals of programming using the C language.
2. Teach students about variables, data types, and operators in C.
3. Familiarize students with control structures such as loops and conditionals in C.
4. Emphasize best practices for writing efficient and maintainable C code.
5. Develop students' problem-solving skills through programming exercises and projects.

C -programming Outcomes:

1. Gaining solid knowledge of the C programming language, including its syntax, data types
2. Studying programming language structures.
3. Studying various keywords to use in programming.
4. Using operators and control statements, create programmes.
5. To describe a structure, an array, a string, and a function.

Unit I: Fundamentals and Basics of C Programming

- Computer Languages (Low Level, High Level, Language Translators.)
- Algorithm, Flowchart.
- Features and History and Application areas of C Language.
- Tokens, Character set.
- Structure of a 'C' program.
- Variables, Constants, Data Types.
- Operators and Its types, (Operator precedence and Order of evaluation.)
- Formatted input and output (Character, String)

Unit II: Control Structures & Functions

- Control Structures
  - Decision making structures: - if, if-else, else-if ladder, switch -case
  - Loop control structures: - while, do while, for.
  - Use of break and continue.
  - Unconditional branching (goto statement).
  - Functions
  - Functions and its advantages
  - declaration, definition, function call, parameter passing (by value), passing by references,
  - return statement.

- Types of Function.
- Recursive functions.
- Scope of variables

Unit III Arrays & String

- Arrays
- Concept of array.
- Types of Arrays – One, Two and Multidimensional array.
- Array Operations - declaration, initialization, accessing array elements.
- String
- Declaration and initialization of String.
- Standard library functions.
- Array of strings.

Unit IVStructure & Pointer

- Creating structures.
- Accessing structure members (dot Operator)
- Array of structures.
- Pointers and structures.
- What is Pointer?
- Pointer declaration,
- initialization Pointer to pointer
- Arrays and pointers
- Functions and pointers

References:

1. Structured Programming approach using C – Forouzan and Gilberg, Thomson learning publications
2. The C Programming language – Kernighan and Ritchie
3. Complete C Reference – Herbert Schildt
4. Pointer in C – YeshwantKanetkar

Nameof Course	**Bachelorof Science(Information Technology)**
Semester	**I**
Nameof Subject	**Numerical Ability**
SubjectCode	**B.Sc. IT- 104A**
Lectures	**50Lectures**

Course Objective: -

To enhance the problem solving skills, to improve the basic mathematical skills and to help students who are preparing for any type of campus placements and competitive examinations.

Course Outcomes: -

1. Solve mathematical problems using analytical methods;
2. Solve mathematical problems using computational methods;
3.Students can develop design and analyze numerical techniques to approximate solutions to problems.

Unit I :Introduction of Number system	Hours
1. **Numbers:** Types of numbers, Divisibility tests of numbers, Formulas for sum of natural numbers, arithmetic progression, Examples for practice. 2. **HCF and LCM**: Methods of calculating highest common factor and greatest common divisor, factorization method, Division method, Finding HCF and LCM more than two numbers, LCM factorization method, Division method, Finding HCF and LCM more than two numbers, LCM and HCF of fractions and decimal numbers, Applications of LCM and HCF.	10
Unit II :Average & Problem on ages	10
1. **Average:** Definition of average, Formulae and theoretical problem on average. **2. Problem on ages:** simultaneous equations and their applications, Theoretical problems on ages, Theoretical problems on numbers.	
Unit III:Percentage, Profit & Loss	10
1. **Percentage:** Concept of percentage, Application of percentage, Results on populations, Result on depreciations, Theoretical problem on percentage. 2. **Profit and Loss**: Definition of cost price, selling price and profit, Formulae of profit and loss, Theoretical problems on profit and loss.	
Unit IV: Time-Speed-Distance, Problems on Trains	10
1. **Time and Distance**: Concept of time and distance, Formulae of time and distance, Theoretical problems on time and distance. 2. **Problems on Train:** Formulae of problems on train, Theoretical problems on train.	

References: -

1)Quantitative Aptitude by Dr.R. S. Aggrawal, S. Chand and Company Publications
2)Quantitative Aptitude by AbijitGuha, Tata McGraw Hill Publications

Nameof Course	**Bachelorof Science(Information Technology)**
Semester	**I**
Nameof Subject	**Digital Marketing**
SubjectCode	**B.Sc. IT- 104B**
Lectures	**50Lectures**

Objectives:

1. Give a brief introduction to digital marketing and explain why it is important in the current digital environment.
2. Introduce several digital marketing channels, including display advertising, email marketing, social media marketing, email marketing, and content marketing.
3. Teach methods for finding target audiences and segmenting them according to their demographics, interests, behaviors, and other pertinent characteristics.

Outcomes:

1. To study the Digital Marketing Concepts.
2. Understanding of Digital Channels.
3. Visibility in Search Engines.
4. Studying the Competence in social media marketing.
5. To study the email marketing.
6. Capabilities in content creation and distribution.

Unit.No.	Particulars
1	IntroductiontoDigitalMarketing • DigitalMarketing:Introduction andmeaning, • Advantagesofdigitalmarketing, • Differencebetweendigitalmarketingand traditionalmarketing • Discussion on E-Commerce • ROI Between Digital and traditional Marketing
2	E-Marketing • EMarketing:ConceptofE-marketing • HistoryofE-marketing, • ObjectivesofE-marketing, • LimitationsofE-marketing • What is Website? • Understanding Website • Difference Between Blog, Portal and Website • Difference Between Website either Static or Dynamic

3	SocialMediaMarketing • Social Media Marketing: Concept of social media • Facebook, Twitter,WhatsApp,Instagram, LinkedIn Marketing • Advantagesofsocial mediaandusestobusiness. • Additional Module: E-Mail Marketing, Affiliate Marketing
4	MethodsandTechniquesofE-Marketing • Methods and Techniques of E-Marketing: Introduction and Objectives • Sponsorship Techniques • Direct Marketing Techniques • Merchandising Techniques • Online Seminar Techniques • Word-of-Mouth MarketingTechniques.

ReferenceBooks:

1. Digital Marketing- Kamat and Kamat –Himalaya
2. Digital Marketing – S.Gupta McGrew-Hill
3. Marketing Strategies for engaging the Digital Generation, D.Ryan
4 Digital Marketing- V.Ahuja, Oxford University Press

Nameof Course	**Bachelorof Science(Information Technology)**
Semester	**I**
Nameof Subject	**Communication Skills**
SubjectCode	**B.SC IT-105 B**

Course Objectives:

1. To develop communicative skills of the learners in listening, speaking, writing and reading.
2. To develop fluency in conversation and efficiency in interactional skills
3. To learn to use grammar communicatively so that they become effective and efficient
4. communicators in English.

Course Outcomes:

By the end of this course students should be able to:

1. Understand and demonstrate Basic English usages for their different purposes.
2. Clear entrance examination and aptitude tests.
3. Write various letters, reports required for professional life.

Unit-I- Morphology		**10 Lectures**
1.1	Morphology: Free & Bound Morpheme	
1.2	Word Formation Processes	
1.3	Morphological Analysis of words	
Unit- II- A. Grammar in day-to-day use:		**15 Lectures**
2.1	Word Classes: Open and Closed Word Classes	
2.2	Phrase: Types and functions of the phrases	
2.3	Basic sentence structures	
Unit-III- Communication		**10 Lectures**
3.1	Concept	
3.2	Methods (verbal & non-verbal)	
3.3	Barriers to communication	
Unit-IV- Career Skills		**10 Lecture**
4.1	Group Discussion	
4.2	Resume Building	
4.3	Personal Interview	

Reference Books:

1. Developing of Communication Skills -Krishna Mohan & MeeraBanerji
2. A Practical English Grammar A.J. Thomson -Oxford
3. Mastering English Grammar – S.H.Burton
4. Technical Communication- Raman Sharma- Oxford
5. Written Communication in English – Sarah Freeman Orient Longman Pvt. Ltd.
6. A Course in Phonetics & Spoken English -J.Sethi& P.V.Dhamija

Nameof Course	**Bachelorof Science(Information Technology)**
Semester	**I**
Nameof Subject	**Web Page Design (Lab/Practical)**
SubjectCode	**B.Sc IT- 106**

Note - Any 15 practical from the syllabus

Nameof Course	**Bachelorof Science(Information Technology)**
Semester	**I**
Nameof Subject	**Programming in C (Lab/Practical)**
SubjectCode	**B.Sc IT- 107**

Note - Any 15 practical from the syllabus

Nameof Course	**Bachelorof Science(Information Technology)**
Semester	**II**
Nameof Subject	**RDBMS through Oracle**
SubjectCode	**B.Sc. IT- 201**
Lectures	**50Lectures**

Course Objectives:
1. To understand the features of Relational database.
2. To describe data models and schemas in DBMS.
3. To use SQL- the standard language of relational databases for database operations.
4. To understand the functional dependencies and design of the databases.

Course Outcome:
1. To study the basic concepts of relational databases
2. Learn and practice data modeling using the entity-relationship and developing database designs.
3. Understand the use of Structured Query Language (SQL) and learn SQL syntax for writing queries.
4. Apply normalization techniques to normalize the databases.

Unit – IIntroduction and Basic Concepts (Lectures – 7)
1.1 Structure of DBMS
1.2 Advantages and Disadvantages of DBMS
1.3 Users of DBMS
1.4 Relational Database: Entities, Attributes and Domains
1.5 Tuples, Relations and their schemes.

Unit – IISQL Statements & Working with Tables (Lectures – 10)
2.1 What is SQL?
2.2 Types of SQL Commands (DDL, DML, DQL, DCL, TCL
2.3 Data types in SQL
2.4 Creating Tables
2.5 WHERE Clause tables, DISTINCT Clause
2.6 Column aliasing
2.7 Manipulation Table data
2.8 Altering Table structure
2.9 Data Constraints

Unit – III.Operators & SQL Functions & Views (Lectures – 7)
3.1 Arithmetic Operators, Relational Operators
3.2 Comparison Operators
3.3 LOGICAL Operators
3.4 SQL Functions: Single Row Functions, Multiple Row Functions
3.5 Views

Unit – IV.Sorting & Grouping Data and Joining Tables & Sub queries in ORACLE (Lectures – 7)

4.1 What is sorting?
4.2 ORDER BY & GROUP BY & GROUP BY HAVING Clauses
4.3 What is Join? Join Styles: Theta, ANSI, Using clause
4.4 Types of Joins: Equi-Joins, Non Equi-Join, Outer Join: Left, Right, Full, Self-Join, Cross Join
4.5 Joining three tables
Sub queries
4.6 PL/SQL Overview
4.7 Declarations Section
4.8 Executable Commands Section
4.9 Exception Handling Section

References-

1. "Oracle Database 10g PL/SQL Programming" by Scott Urman , Ron Hardman, MichaleMc Laughlin, Oracle Press, TMH, ISBN-0-07-059779-0.
2. "Oracle Database 10g The Complete Reference" By Kevin Loney, Bob Bryla Oracle
3. SQL, PL/SQL the programming language of ORACLE 4th Edition by Ivan Bayross

Nameof Course	**Bachelorof Science(Information Technology)**
Semester	**II**
Nameof Subject	**OOPs with JAVA**
SubjectCode	**B.Sc IT- 202**
Lectures	**50Lectures**

Learning Objectives:

- To understand the basic concepts and fundamentals of platform independent object oriented language.
- To demonstrate skills in writing programs using exception handling techniques and java 8 features.
- To understand streams and efficient user interface design techniques.

Course Outcomes:

After successful completion of this course, students should be able to:

- Use the syntax and semantics of java programming language and basic concepts of OOP.
- Develop reusable programs using the concepts of inheritance, polymorphism, interfaces and packages
- Apply the concepts of Exception handling to develop efficient and error free codes.

i. Use java standard API library to write complex programs

Unit I: Java Fundamentals	Hours
Java History, Java Architecture, Java Vs. C++, Java Program Structure, Command Line Arguments, Data Types, Variables, Operators, Flow Control Statements, Arrays	10
Unit II OOPS	12
Classes and Objects, static members, Constructors, Encapsulation, Inheritance, this and super keyword, Polymorphism, Garbage Collection	
Unit III: Abstraction and Packages	10
Abstract class and Abstract Methods, Interfaces, Final Keyword, System Packages, User defined Packages, static impor	
Unit IV Exception Handling and Strings	10
Introduction to Exception Handling, Exception Types, Try and catch block, finally clause, throws and throw clause, user defined exceptions, String and StringBuffer class	

ArrayList, Generics, Iterator, Comparable, TreeSet, HashSet, HashMap, TreeMap, Introduction to IO streams, Byte Stream Classes, Character Stream Classes, IO operations, Object Serialization	

References:

1. Java The Complete Reference 9th Edition, Herbert Schildt, McGraw Hill Education (India) Private Limited, New Delhi.
2. Java How to Program, Sixth Edition, H.M.Dietel and P.J.Dietel, Pearson Education/PHI
3. Introduction to Java programming, By Y.DanielLiang,Pearson Publication
4. An introduction to Java programming and object oriented application development, R. A. Johnson-Thomson
5. Understanding OOP with Java, up dated edition, T.Budd, Pearson education.

Nameof Course	**Bachelorof Science(Information Technology)**
Semester	**II**
Nameof Subject	**Computer Network**
SubjectCode	**B. Sc IT-203**
Lectures	**50Lectures**

Course objective:-• Introduction fundamental concepts of computer networking.

- Introduce students with various concepts used in network.
- Introduce various technologies and standards.
- Allow the student to gain expertise in areas of networking.

Course outcome: - After completing this course the student get the knowledge and ability to:

- Understand basic computer network technology.
- Students can identify the different types of network topologies and protocols.
- Students can Identify the different types of network standards.

UnitI

IntroductiontoComputerNetworks **12Lectures**

Definition & Applications of Computer Network
Network topologies- star, bus, mesh, ring
Data Transmission Media
Network Types LAN, MAN, WAN
Connection Oriented & Connectionless services

UnitII

Network Models and Devices **14Lectures**

NetworkModels–OSI/ISOReferenceModel&TCP/IPModel
Network Devices - NIC Cards, Hub, Switch, Bridges, Gateways, Repeaters Router.
Service Primitives - listen, connect, receive, send, disconnect

UnitIII

Multiplexing, Switching and Protocols **12 Lectures**

Multiplexing–TimedivisionandFrequencydivision
Switching-CircuitSwitching, PacketSwitching, MessageSwitching
TransmissionModes-ParallelTransmission,SerialTransmission–
AsynchronousandSynchronous
NetworkProtocols-IPprotocol,SMTP,FTP,HTTP

UnitIV

Internet and NetworkStandards **12Lectures**

InternetversesIntranet
InternetServiceProviders
E-mail–Architecture
IP-addresses
NetworkStandards–Ethernet10Base2,10Base5,10BaseT

ReferenceBooks:

1) AndrewS.Tannenbaum," ComputerNetworks",(ThirdEdition),Prentice-HallofIndiaPvt.Ltd, New Delhi.

2) DataCommunicationandNetworkingbyBehrouzForouzan,TATAMcGrawHill.

3) GerdE.Keiser",LocalAreaNetworks",TataMcGrawHillEdition,NewDelhi.

Nameof Course	**Bachelorof Science(Information Technology)**
Semester	**II**
Nameof Subject	**Logical Reasoning**
SubjectCode	**B. Sc IT-204A**
Lectures	**50Lectures**

Course Objective:

1. Understand and explain the importance of critical thinking
2. Identify the core skills associated with critical thinking
3. Construct a logically sound and well-reasoned argument
4. Demonstrate the difference between deductive and inductive reasoning

Course Outcome: -

1. Identify logical relations among statements.
2. Analyze logically complex statements into their truth functional or quantificational
3. components
4. This enable student to develop their ability to reason by introducing them to elements of
5. formal reasoning

Unit I : Series and Analogy	Hours
A. Series: Types of series, Alphabet series, Number Series, Alpha numeric series, Examples on continues pattern series. B. Analogy: Completing the Analogous Pair, Direct/Simple Analogy, Choosing the Analogous Pair, Double Analogy, Number analogy, Alphabet analogy, Correlation between letters/numbers.	10
Unit II : Coding-Decoding	
A. Coding-Decoding: Letter coding, Direct Letter Coding, Number/Symbol Coding. B. Substitution: Concept of substitution, Problem solving by using substitution. C. Deciphering: Deciphering messages word codes, Deciphering numbers/symbol codes for messages	10
Unit III: Direction Sense Test	6
A. Introduction B. Problems based on angular changes in direction C. Problems on Shadows D. General Problems based on Pythagoras Theorem	
Unit IV: Seating or Placing Arrangement	6
A. Problems based on linear and circular based arrangement.	

References :-

1. A Modern Approach to Verbal & Non-Verbal Reasoning Dr.R.SAggarwal S. Chand and Company Publications
2.Test of Reasoning Edgar Thorpe McGraw Hill Education

Nameof Course	**Bachelorof Science(Information Technology)**
Semester	**II**
Nameof Subject	**8085 Microprocessor**
SubjectCode	**B. Sc IT-204B**
Lectures	**50Lectures**

UNIT I

Microprocessor Architecture **10**

1.1 Introduction to 8085 Microprocessor
1.1.1 Features of 8085 Microprocessor
1.2 Block diagram of 8085 Microprocessor
1.2.1 ALU
1.2.2 Address/Data Bus
1.2.3 Timing and control unit
1.2.4 Registers
1.3 Pin configuration of 8085 Microprocessor
1.4 Opcode and Operand
1.5 Instruction Formats

UNIT II

Addressing Modes and Instruction Cycle **10**

2.1 Addressing modes:
2.1.1 Register Addressing
2.1.2 Direct Addressing
2.1.3 Indirect Addressing
2.1.4 Immediate Addressing
2.1.5 Implicit Addressing
2.2 Instruction Cycle
2.2.1 Fetch cycle
2.2.2 Execute cycle
2.2.3 Machine cycle

UNIT III

Instruction Set of 8085 Microprocessor **15**

3.1Introduction to instruction set of 8085
3.2 Data Transfer Group of instruction
3.3 Arithmetic Group of instruction
3.4 Logical group of instruction
3.5 Branch Control Group of instruction
3.6 Machine and I/O Control Group of instruction

UNIT IV

Programming of 8085 Microprocessor **15**

4.1 Introduction
4.2 Assembly Language Programming

References:

1. Fundamentals of MICROPROCESSOR and Microcomputer -by B. Ram publication 5th

Edition

Nameof Course	**Bachelorof Science(Computer Management)**
Semester	**II**
Nameof Subject	**Functional English**
SubjectCode	**B.Sc IT- 205 B**

Course Objectives:

1. To develop communicative skills of the learners in listening, speaking, writing and
2. reading.
3. To develop fluency in conversation and efficiency in interactional skills
4. To learn to use grammar communicatively so that they become effective and efficient
5. communicators in English.

Course Outcomes:

By the end of this course students should be able to:

1. Understand and demonstrate Basic English usages for their different purposes.
2. Clear entrance examination and aptitude tests.
3. Write various letters, reports required for professional life.

Unit-I- Day-to-Day-English		**10 Lectures**
1.1	Giving Self-Introduction	
1.2	Narrating Pictures/events	
1.3	Giving Opinions- Agreeing and Disagreeing	
Unit-II- Presentation Skills		**15 Lectures**
2.1	Concept	
2.2	Elements of Presentation	
2.3	Effective Presentation	
Unit-III- Writing Skills		**15 Lectures**
3.1	Curriculum Vitae	
3.2	Email Writing	
3.4	Essay Writing	
Unit-IV- Phonetics		**10 Lectures**
4.1	Phonemes-	
4.2	EnglishVowels and Consonants	
4.3	Phonetic Transcription of the words	

Reference Books:

1) BetterEnglishPronunciation-J.D.O’connor(CambridgePublication)
2) BusinessCommunication-UrmilaRaiAndS.M.Rai(Himalaya Pub House)
3) BusinessCommunication-Dr.V.K.Jain(SChandPublication)
4) EnglishForPracticalPurposes-Z.N.Patil(MacmillanIndiaLtd.)

Nameof Course	**Bachelorof Science(Information Technology)**
Semester	**II**
Nameof Subject	**RDBMS (Lab/Practical)**
SubjectCode	**B.Sc IT- 206**

Note - Any 15 practical from the syllabus

Nameof Course	**Bachelorof Science(Information Technology)**
Semester	**II**
Nameof Subject	**OOPs with JAVA (Lab/Practical)**
SubjectCode	**B.Sc IT- 207**

Note - Any 15 practical from the syllabus

Name of Course	Bachelor of Information Technology
Semester	Third
Name of Subject	**Analysing data with SQL**
Subject Code	BSc IT- 301
Marks Credit Points	75 Marks
Credit Points	4 Points
Lectures	50 Lectures

Course Objectives:
To understand Analysing DATA with SQL
To understand SELECT Statement
To understand Database concepts.
Course Outcomes:
Ability to learn various Analysing DATA with SQL
Ability to learn various commands of RDBMS.
Ability to learn Database concepts & PL/SQL Language.
Ability to understand the Database and functions in SQL.

UNIT I :Retrieving Data Using the SQL SELECT Statement

1.1 Basic SELECT Statement
1.2 Selecting All Columns,Selecting Specific Columns
1.3 Arithmetic Expressions,Using Arithmetic Operators
1.4 Operator Precedence
1.5 Defining a Null Value,Null Values in Arithmetic Expressions
1.6 Displaying the Table Structure
1.7 Using the DESCRIBE Command

Unit II:Restricting and Sorting Data

2.1 Limiting Rows Using a Selection,Using the WHERE Clause
2.2 Comparison Operators: - BETWEEN Operator,IN Operator,LIKE Operator, Using the NULL Conditions.
2.3 Defining Conditions Using the Logical Operators: AND, OR, NOT.
2.4 What is sorting
2.5 Using the ORDER BY Clause,Sorting
2.6 Substitution Variables
2.7 Using the DEFINE Command,Using the VERIFY Command.

UNIT III:Using Single-Row Functions to Customize Output

3.1 Single Row Function**,** Character Functions
3.2 Case-Conversion Functions,Character-Manipulation Functions
3.3 Using the Character-Manipulation Functions,Number Functions
3.4 Using the ROUND Function,Using the TRUNC Function
3.5 Using the MOD Function
3.6 Working with Dates:- RR Date Format,Using the SYSDATE Function
3.7 Date-Manipulation Functions,Using Date Functions

3.8 Using ROUND and TRUNC Functions with Dates

Unit IV:Using Conversion Functions and Conditional Expressions

4.1 Conversion Functions,Implicit Data Type Conversion,Explicit Data Type Conversion
4.2 Using the TO_CHAR Function with Dates
4.3 Elements of the Date Format Model,
4.4 Using the TO_CHAR Function with Numbers,Using the TO_NUMBER and TO_DATE Functions
4.5 General Functions: - NVL Function,Using the NULLIF Function,Using the COALESCE Function
4.6 Conditional Expressions,CASE Expression,DECODE Function.

UNIT V:Reporting Aggregated Data Using the Group Functions

5.1 What Are Group Functions?
5.2 Using the AVG and SUM Functions
5.3 Using the MIN and MAX Functions,
5.4 Using the COUNT Function
5.5 Using the DISTINCT Keyword
5.6 Creating Groups of Data: GROUP BY Clause Syntax,Using the GROUP BY Clause on Multiple Columns
5.7 Illegal Queries Using Group Functions
5.8 Restricting Group Results with the HAVING Clause.

UNIT VI: Retrieving Data by Using Subqueries

6.1 Writing a multiple-column subquery
6.2 Multiple-column comparisons involving subqueries can be: Nonpairwise comparisons, Pairwise comparisons
6.3 Solving problems with correlated subqueries
6.4 Using the EXISTS and NOT EXISTS operators
6.5 Using the WITH clause

Reference Book.

1. “Oracle Database 10g PL/SQL Programming” by Scott Urman , Ron Hardman,
MichaleMc Laughlin, Oracle Press, TMH, ISBN-0-07-059779-0.
2. “Oracle Database 10g The Complete Reference” By Kevin Loney, Bob Bryla Oracle
Press (TATA McGraw Hill Edition) ISBN-13:978-0-07-059425-8, ISBN-10: 0-07-
059425-2
3. SQL, PL/SQL the programming language of ORACLE 4th Edition by Ivan Bayross
ISBN-81- 7656964-X

Name of Course	Bachelor of Information Technology
Semester	Third
Name of Subject	**Advanced Java**
Subject Code	BSc IT- 302
Marks Credit Points	75 Marks
Credit Points	4 Points
Lectures	50 Lectures

Learning Objectives:

i To Design and build robust and maintainable web applications.

ii To create dynamic HTML content with Servlets and Java Server Pages, using the JSP Standard Tag Library (JSTL).

iii To Make Servlets and JSP work together cleanly.

Course Outcomes:

After successful completion of this course, students should be able to:

i. Create dynamic and interactive web sites and interaction with client and server.

ii. Do server side programming with java Servlets and JSP.

iii. Implement different data structure using collection framework.

Unit I: Multithreading	Hours
Introduction to multithreading, Creating Threads, Thread Life Cycle, Thread Priorities, Thread Synchronization	10
Unit II: Collection Framework	12
Collection interface, ArrayList, Vector, Generics, Iterator, Comparable, TreeSet, HashSet, HashMap, HashTable, TreeMap	
Unit III Java Database Connectivity	8
JDBC Introduction, JDBC Architecture, JDBC Drivers, Establishing Connection, Executing Query and Processing Results, Metadata, Prepared Statement, Callable Statement	
Unit IV Introduction to Servlets	Hours
Introduction to Servlets, Deploying Simple Servlet, Servlet Life Cycle, Get and Post Requests, Request Object	8
Unit V: Handling Form Data	Hours
Accessing Data from HTML Form, Using JDBC in Servlet, Servlet Chaining, Cookies and Sessions	10
Unit VI JSP	Hours
Introduction to JSP, Scripting Elements- Expressions, Scriptlets, Declarations, Directives, Sessions in JSP, Using JDBC in JSP, JavaBeans	12

in JSP	

References:

1 Java The Complete Reference 9th Edition, Herbert Schildt, McGraw Hill Education
2 (India) Private Limited, New Delhi.
3 Java Servlet & JSP Cookbook, Bruce W. Perry, O'Reilly Publication.

Name of Course	Bachelor of Information Technology
Semester	Third
Name of Subject	**Data Structure**
Subject Code	BSc IT- 303
Marks Credit Points	75 Marks
Credit Points	4 Points
Lectures	50 Lectures

DataStructureObjectives

- Toteachthebasicconceptsofdatastructuresandalgorithms
- Tounderstandconceptsaboutsearchingandsortingtechniques
- Tounderstandbasicconceptsaboutstacks,queues,lists,treesandgraphs
- Tounderstandingaboutwritingalgorithmsandstepbystepapproachinsolvingproblemswith thehelp offundamentaldatastructures

DataStructureOutcome

- Abilitytoanalyzealgorithmsandalgorithmcorrectness.
- Abilitytosummarizesearchingandsortingtechniques
- Ability todescribestack,queueandlinkedlistoperation.
- Abilitytohaveknowledgeoftreeandgraphsconcepts.

UnitI

1. **IntroductionsandOverview:**
   - 1.1 Introduction
   - 1.2 Basicterminology:elementarydataorganization
   - 1.3 Datastructure and its types
   - 1.4 Datastructureoperations
   - 1.5 NotationandConceptofalgorithm
   - 1.6 Complexity,timespacetradeoff

UnitII

2. **Array, Searching and Sorting:**
   - 2.1 Linear array
   - 2.2 Representation of lineararrayin memory
   - 2.3 Traversing linear array
   - 2.4 Insertingand Deleting
   - 2.5 Searchingmethods(Binaryandlinearsearch)
   - 2.6 Sorting Methods ((Bubble Sort, Selection Sort, and Insertion sort)

UnitIII

3. **Linked list :**
   - 3.1 Introductionto Linkedlist
   - 3.2 Representation of Linked listin memory
   - 3.3 Traversing a linked list ,
   - 3.4 Searchingalinkedlist
   - 3.5 Memoryallocation,Garbagecollection
   - 3.6 Insertionanddeletioninlinked list
   - 3.7 Two way linked list

UnitIV

4. **Stacks,Recursion:**
   Lectures
   - 4.1 Introduction
   - 4.2 Stacks
   - 4.3 Arrayrepresentationofstacks
   - 4.4 Operations on Stack
   - 4.5 Arithmeticexpression: Polish Notation
   - 4.6 Infix, Prefix and Postfix
   - 4.7 Evaluation of postfix expression
   - 4.8 Recursion: Factorial, Fibonacci

UnitV

5. **Queue**
   - 5.1 Introduction
   - 5.2 Queues
   - 5.3 Linked Representation of Queue
   - 5.4 Insertion & Deletion on Queue
   - 5.5 Dqueue
   - 5.6 Priority Queue.

UnitVI

6. **Tree and Graph:**
   - 6.1 Introduction
   - 6.2 TerminologyofBinarytree
   - 6.3 Types of Binarytree
   - 6.4 Traversing of binarytree
   - 6.5 HeaderNodes,Threads
   - **6.6** General Tree Introduction
   - **6.7** Graph Theory Terminology

6.8 Sequential representation of graph

References:-

1.Data Structure, By Seymour Lipschutz (Schaum'sOuline Series Incomputers) – McgrawHill.

2.An Introduction To Data Structurewith Application By Jeanpaul, Tremblay Paul, G.Sorenson(Tatamcgraw Hill)

Name of Course	Bachelor of Information Technology
Semester	Third

Name of Subject	**Software Engineering (Open Elective)**
Subject Code	BSc IT- 304 A
Marks Credit Points	75 Marks
Credit Points	4 Points
Lectures	50 Lectures

Prerequisites:

- Adequate knowledge of programming languages.
- Must know the mathematical functions for developing and maintaining the mathematical algorithms.

Course Objectives:

- To develop software engineering skills and testing plans.
- To understand system concepts and its application in Software development.
- To enhance skills of designing and testing software.
- To learn technical skills to assure production of quality software.

Course Outcomes:

- Ability to learn various methods of software development.
- Ability to apply various software testing techniques.

Salient Features:

- Improve your skills & build Confidence.
- Ability to understand the problem and find solutions.
- Lifelong learning and readily adapt to new software engineering environments.

Unit	NOS	Hours
Unit-I Introduction to Software Engineering • The Evolving Role of Software • Software • Software Characteristics • Software Applications • Software Evolution • Software Crisis & Horizon • Software Myths		**10**
Unit-II Process of Software • Software Engineering • Software Process • The Waterfall Model • Incremental Process Models • Evolutionary Process Models • Spiral Model		**9**
Unit-III A Generic View of Process • Software Engineering – A Layered Technology • Process Framework • Personal and Team Process Models • Personal Software Process (PSP) • Team Software Process (TSP)		**8**

• Process Technology • Product and process		
Unit-IV AGILE DEVELOPMENT • What Is Agility? • What Is an Agile Process? • The Politics of Agile Development • Agile Process Models • Feature Driven Development (FDD)		**9**
Unit-V Software Engineering Practice • Software Engineering Practice • The Essence of Practice • Core Principles • Communication Practices • Planning Practices • Modeling Practices • Analysis Modeling Principles • Design Modeling Principles		**10**
Unit-VISystem Engineering • Computer-Based Systems • The System Engineering Hierarchy • System Modeling • System Simulation		**6**

References:

1. Software Engineering -A Practitioner's approach, Sixth Edition, Roger S. Pressman, McGraw-Hill Higher Education; (1 August 2007), ISBN-10: 0077227808

2. Software Engineering -A Practitioner's approach, Fifth Edition, Roger S. Pressman, McGraw-Hill Higher Education; (1 August 2005)

1. Software Engineering 7th / 8th Edition, IAN Sommerville, Pearson Edition

Name of Course	Bachelor of Information Technology
Semester	Third

Name of Subject	**Operating System (Elective)**
Subject Code	BSc IT- 304B
Marks Credit Points	75 Marks
Credit Points	4 Points
Lectures	50 Lectures

Operating System Objectives

Through this paper Student should learn fundamentals of OS design, including memory, processor, device, and data management with lots of discussion on the pros and cons of design choices and problem/question sets to make the reader think through design alternatives

Operating System Outcome

To understand the different Concept of Operating System.

Unit I Introduction **14 Lectures**

1.1 What operating system do?

1.1.1 User view, System view, defining OS.

1.2 An Operating System Resource manager

1.3 An Operating system- Process view point

1.4 Operating system– Hierarchical and Extended machine view

1.5 Multiprocessor Systems

1.6 Operating-System Services

Unit II: Memory Management **12 Lectures**

2.1 Single Contiguous Allocation
2.2 Introduction to Multiprogramming
2.3 Partitioned Allocation
2.4 Relocatable Partitioned Memory Management
2.5 Paged Memory Management
2.6 Demand- Paged Memory Management
2.7 Segmented Memory management

Unit III: Process Management **12 Lectures**

3.1 The Process Concept,
3.2 State Model
3.3 Job Scheduling
3.4 Process Scheduling technique-
3.4.1 FCFS,
3.4.2 SJF,
3.4.3 Priority scheduling,
3.4.4 Round Robin scheduling
3.5 Multiprocessor System, Context switch

Unit IV: Process Deadlocks **6 Lectures**

4.1 Introduction, Deadlock Characterization, Preemptable and Non-preemptable Resources
4.2 Resource – Allocation Graph, Conditions for Deadlock

4.3 Handling Deadlocks: Ostrich Algorithm, Deadlock prevention, Deadlock Avoidance, Deadlock Detection (For Single and Multiple Resource Instances), Recovery From Deadlock (Through Pre-emption and Rollback)

Unit V: Device Management **6 Lectures**

5.1 Techniques for Device Management
5.2 Device characteristics- Hardware Consideration
5.3 Channels and Control Units
5.4 Device Allocation Consideration
5.5 I/O Traffic controller, I/O Scheduler, I/O Device Handlers
5.6 A Simple File System
5.7 General Model of a File System

Unit VI: File Management **6 Lectures**

6.1. File Overview: File Naming, File Structure, File Types, File Access, File Attributes, File Operations, Single Level, two Level and Hierarchical Directory Systems, File System Layout.
6.2. Implementing Files: Contiguous allocation, Linked List Allocation, Linked List Allocation using Table in Memory, Inodes.
6.3. Directory Operations, Path Names, Directory Implementation, Shared Files
6.4. Free Space Management: Bitmaps, Linked List

References:

1. Operating Systems By William Stallings Publication
2. Operating Systems ByGodbole
3. Operating Systems By John J. Donovan

Name of Course	Bachelor of Information Technology
Semester	Third
Name of Subject	**JavaScript (Elective)**

Subject Code	BSc IT- 305 A
Marks Credit Points	75 Marks
Credit Points	4 Points
Lectures	50 Lectures

Learning Objectives:

I. Understand the JavaScript language & the Document Object Model.
II. Alter, show, hide and move objects on a web page.
III. Check information inputted into a form.
IV. Javascript allows programming to be performed without server interaction.
V. Javascript can respond to events, such as button clicks.
VI. Javascript can validate data before sending out a request.
VII. Javascript can adjust an HTML document for special effects.
VIII. Javascript can create cookies! Cookies can be used to store and retrieve information from the user's computer

Course Outcomes:

After successful completion of this course, students should be able to:

I. Students will be a Front-End website developer.
II. JavaScript ensures student to have a responsive, mobile-first website.
III. It paces up the development process by offering resources such as templates and themes, which can be customized according to the project needs.

Unit I: Overview to Javascript	Hours
What is JavaScript? The development workflow Selecting the right tools for the job Just enough HTML and CSS Understanding objects Understanding variables Making comparisons Understanding events	10
Unit II Introduction to JavaScript	12
Writing your first script Internal vs. external scripts Using comments in scripts Using the NoScript Creating alert dialogs	

Understanding conditional statements Getting confirmations from users Creating prompts for users Understanding functions Making links smarter Using switch/case statements Handling errors	
Unit III: JavaScript Language Essentials	10
Getting started Creating loops Passing values to functions Detecting objects Reading arrays Returning values from functions Writing arrays Building do and while loops Re-using functions	
Unit IV: Creating Rollovers and More	Hours
Creating a basic image rollover How to write a better rollover Creating a three-state rollover Making rollovers accessible and 508 compliant Making disjointed rollovers Creating slideshows Displaying random images	10
Unit V: Building Smarter Forms	Hours
Getting started Creating jump menus Creating dynamic menus Requiring fields Cross-checking fields Displaying more informative errors Verifying radio button selections Setting one field with another field Verifying email addresses	10
Unit VI: Handling Events and Cookies	Hours
Responding to window events Responding to mouse movements Responding to mouse clicks Responding to onBlur form events Responding to onFocus form events Responding to keyboard events The DOM, Nodes, and Objects Working with Dates and Times	8

References:

1 JavaScript: The Definitive Guide,David Flanagan, O'Reilly Media; 7th edition (14 May 2020),ASIN : .BB6Q9P088B

2 Eloquent JavaScript,MarijinHaverbake, 3rd Edition,ISBN-13: 978-1593279509

3 JavaScript: The Good Parts,DouglasCrockford,Shroff; First edition,ISBN-10 : 8184045220

Name of Course	Bachelor of Information Technology
Semester	Third

Name of Subject	Lab 1: Analysing data with SQL
Subject Code	BSc IT- 306
Marks Credit Points	75 Marks
Credit Points	2 Points

Note:- Any 15 practical's should be provide on given syllabus

Name of Course	Bachelor of Information Technology
Semester	Third

Name of Subject	Lab 2: Advanced Java
Subject Code	BSc IT- 307
Marks Credit Points	75 Marks
Credit Points	2 Points

Learning Objectives:

i. To Design and build robust and maintainable web applications

ii. To Create dynamic HTML content with Servlets and JavaServer Pages, using the JSP Standard Tag Library (JSTL)

iii. To Make Servlets and JSP work together cleanly

Course Outcomes:

After successful completion of this course, students should be able to:

i. Create dynamic and interactive web sites and interaction with client and server.

ii. Do server side programming with java Servlets and JSP

iii. Implement different data structure using collection framework

Lab Work/ Practical List

Programs for the demonstration of all the concepts in Advanced Java.

1. Write a program to create multiple threads.
2. Write a program to demonstrate thread synchronization.
3. Write a java program to represent ArrayList class.
4. Write a program to demonstrate TreeSet.
5. Write a program to store user id and password using HashMap.
6. Write a java program that connects to a database using JDBC and does add, deletes, modify and retrieve operations using Statement.
7. Write a java program that connects to a database using JDBC and does add, deletes, modify and retrieve operations using PreparedStatement.
8. Write a java program that connects to a database using JDBC and does add, deletes, modify and retrieve operations using CallableStatement.
9. Write a JDBC application which will interact with Database and perform the following task. 1) Create a store procedure which will insert one record into employee table. 2) Create a store procedure which will retrieve salary for given employee id. 3) Write a java application which will call the above procedure and display appropriate information on screen.
10. Write a java program that prints the meta-data of a given table.
11. Write down the program for testing the forward action for servlet collaboration.
12. Develop Real Time Login Application using Servlet and JDBC.
13. Create Servlet file which contains following functions: 1. Connect 2. Create Database 3. Create Table 4. Insert Records into respective table 5. Update records of particular table of database 6. Delete Records from table.
14. Write down the program in which input the two numbers in an html file and then display the addition in JSP file.

15. Write down the Program for testing the include action tag in jsp.
16. Develop Student Registration Application using Servlet, JSP and JDBC.

Semester	IV
NameofSubject	Web Development with PHP and MySQL
SubjectCode	B.Sc. IT -401
Marks	75
Lectures	50

Objectives:

- Learn Core-PHP, Server Side Scripting Language.
- Learn to design dynamic and interactive Web pages.
- Learn PHP-Database handling.

Outcomes:

- Able to design dynamic and interactive web pages, websites.
- Able to run PHP scripts on server and retrieve results.
- Able to handle databases like MySQL using PHP in web sites.

1. Introduction to PHP **10**

a) Basic Syntax, Lexical Structure of PHP
b) Sending Data to the Web Browser
c) Understanding PHP, HTML, and White Space
d) Writing Comments, What Are Variables?
e) About Constants
f) Data types

2. Programming with PHP **08**

a) Creating an HTML Form
b) Handling an HTML Form
c) Managing Magic Quotes
d) Conditionals and Operators
e) Validating Form Data
f) Looping statements
g) What Are Arrays?

3 String Manipulation and Regular Expression **08**

a) Creating and accessing String, Searching & Replacing String
b) Formatting, joining and splitting String, String Related Library functions
c) Use and advantage of regular expression over Inbuilt function

4. Creating Dynamic Web Sites **08**

a) Including Multiple Files
b) Handling HTML Forms with PHP Redux
c) Making Sticky Forms
d) Creating and Calling Your Own Functions
e) Variable Scope

f) Date and Time Functions

5. Using PHP with MySQL **08**

a) Connecting to MySQL and Selecting the Database
b) Executing Simple Queries
c) Retrieving Query Results
d) Ensuring Secure SQL
e) Counting Returned Records
f) Updating Records with PHP

6. Cookies and Sessions **08**

a) Using Sessions
b) Sessions and Cookies
c) Improving Session Security

References:

1. PHP and MySQL for Dynamic Web Sites: Visual Quickpro Guide Larry Ullman
2. Programming PHP RasmusLerdorf, Kevin Tatroe, Peter MacIntyre

Semester	Four
Name of Subject	Hibernate and Spring Framework
Subject Code	BSc IT- 402
Marks Credit Points	75 Marks
Credit Points	4 Points
Lectures	50 Lectures

Learning Objectives:

i. To Access databases with JDBC and Hibernate.
ii. To Acquire knowledge on creation of software components using Spring Framework.
iii. To Learn safe and maintainable techniques for programming with AOP.
iv. To Understand REST, and use Spring MVC to build RESTful services.
v. To learn the creation of pure Dynamic Web Application using Spring MVC.
vi. To understand how to build complex UIs using Spring Boot.
vii. To be familiar with using Spring Boot starters and start.spring.io to easily create new applications.

Course Outcomes:

After successful completion of this course, students should be able to:

i. Implement the web based applications using JDBC and Hibernate.
ii. Implement web based applications using features of Spring Framework.
iii. Apply the concepts of server side technologies for dynamic web applications using Spring MVC.
iv. Use the core principles of Spring, and of Dependency Injection (DI) / Inversion of Control.
v. Integrate Spring MVC with technologies such as Hibernate.
vi. Learn how to build a simple MVC application using Spring Boot
vii. Configure database connectivity via Spring Boot

Unit I: ORM and Hibernate	Hours
Introduction to ORM Framework, ORM advantages, Hibernate Introduction, Hibernate Architecture, Hibernate Session, Hibernate SessionFactory, Hibernate Configuration, Mapping, Mapping with Annotations, Hibernate Aggregation, Hibernate Named Queries, Hibernate Native SQL, HQL- Hibernate Query Language	10
Unit II: Working with Hibernate Objects	12
Hibernate Object States, Insert Object, Retrive Object, CURD Operations, Hibernate with annotations, Hibernate Query Language, Criteria Query, Native SQL, Hibernate Mapping	

Unit III Introduction to Spring	8
Spring Features, Spring Architecture, Spring Core, Bean Configuration file, Inversion of Control, Dependency Injection, Auto Wiring	
Unit IV Spring MVC	Hours
MVC Overview, Introduction to Spring MVC, Work flow in Spring MVC, Components of Spring MVC, Spring Annotations, First Spring MVC Application	8
Unit V: Spring MVC and Hibernate	Hours
Spring MVC Form Handling, Spring MVC Application with Form Handling, Spring-Hibernate Application	6
Unit VI Introduction to Spring Boot	Hours
Overview of Spring Boot, Spring Boot Layers, Spring Boot Flow Architecture, Hello World example, Spring Boot Dependency Injection, Singleton Scope, Prototype Scope, Autowiring, Spring Boot Web App, Spring Boot MVC and JPA H2	12

References:

6. Beginning Hibernate: For Hibernate 5, Fourth Edition, Joseph B. Ottinger Jeff Linwood Dave Minter, APress Publication
7. Spring Framework Cookbook, Java Code Geeks.
8. Introducing Spring Framework, Felipe Gutierrez, APress Publication
9. Spring MVC: A Tutorial, Second Edition, Paul Deck, Brainy Software.
10. Spring MVC Beginner's Guide, Second Edition, AmuthanGaneshan, Packt Publishing Ltd

Name of Course	Bachelor of Information Technology
Semester	Fourth
Name of Subject	Software Testing

Subject Code	BSc IT- 403
Marks Credit Points	75 Marks
Credit Points	4 Points
Lectures	50 Lectures

1. **Course Objectives:**
   - To learn detection of bugs and performance issues in software.
   - Understanding to develop and run test plans.
   - Learn testing tools to detecting quickly bugs and error to smarter testing.
   - To work with various software testing methods.
2. **Course Outcomes:**
   - Determines the correctness, completeness and quality of software being developed.
   - Technical documentation is well organized using testing.

Unit	NOS	Hours
Unit-I Quality concepts • Quality • Software Quality • McCall‟s Quality Factors • ISO 9126 Quality Factors • Targeted Quality Factors • The Cost of Quality • Quality and Security • Quality Control • Quality Assurance		**8**
Unit-II Software Quality Assurance • Software Quality Assurance • Software Reviews • Formal Technical Reviews • Software Reliability • The SQA Plan		**8**
Unit-III Software Testing Strategies • A Strategic Approach to Software Testing • Unit Testing • Integration Testing • Validation Testing • System Testing • The Art Of Debugging		**8**
Unit-IV TESTING APPLICATION • Software Testing Fundamentals • Internal and External Views of Testing • White-Box Testing • Basic Path Testing • Control Structural Testing • Black Box Testing		**12**

Unit-V Webapps For Testing • Testing Concepts for WebApps • The Testing Process-An Overview • Content Testing • User interface Testing • Navigation Testing • Security Testing		**10**
Unit-VIProduct Metrics • A frame work for product metrics • Metrics for the requirements model • Metrics for design model • Metrics for source code • Metrics for testing		**5**

References:

1. Software Engineering -A Practitioner's approach, Sixth Edition, Roger S. Pressman, McGraw-Hill Higher Education; (1 August 2007),ISBN-10: 0077227808

2. Software Engineering -A Practitioner's approach, Fifth Edition, Roger S. Pressman, McGraw-Hill Higher Education; (1 August 2005)

3. Software Testing Concepts and Tools NageswaraRooDreamtech Publication

Nameof Course	**Bachelorof Science(Information Technology)**
Semester	**IV**
Nameof Subject	**Cloud Computing**
SubjectCode	**B. Sc IT-404A (Elective)**
Lectures	**50Lectures**

CourseObjectives:

- ToprovidestudentswiththefundamentalsandessentialsofCloudComputing.
- To provide students a sound foundation of the Cloud Computing so that they are able to start usingandadoptingCloud Computingservices and toolsin their reallife scenarios.
- Toenablestudentsexploringsomeimportantcloudcomputingdrivencommercialsystem sandapplications.
- To expose the students to frontier areas of Cloud Computing and information systems, whileprovidingsufficient foundations to enable furtherstudyand research.

CourseOutcomes:

- Aftersuccessfulcompletionofthiscourse,studentwillbeableto
- Explainthecore conceptsof thecloud computingparadigm: howand whythis paradigmshiftcame,the characteristics, advantages and challenges brought about by the various models and services incloud computing.
- Applythefundamental conceptsindatacenters
- Identifyresourcemanagementfundamentalsandoutlinetheirroleinmanaging infrastructureincloud computing.
- Analyzevarious cloudprogramming modelsand applythemto solveproblems onthe cloud.

UnitI		
5.	**Enterprisecomputing:aretrospective** 5.1 Introduction 5.2 Mainframearchitecture 5.3 Client-serverarchitecture 5.4 3-tierarchitectureswithTPmonitors	**07Lectures**

UnitII		
6.	**InternetasaplatformandSoftwareasaservice** 6.1 Internettechnologyandweb-enabledapplications 6.2 Webapplicationservers 6.3 Internetofservices 6.4 Emergenceofsoftwareasaservice 6.5 SuccessfulSaaSarchitectures 6.6 Dev2.0platforms 6.7 Cloudcomputing 6.8 Dev2.0intheCloudforEnterprises	**10Lectures**

UnitIII		
7.	**Cloudcomputingplatforms** 7.1 Infrastructureasaservice:AmazonEC2 7.2 Platformasaservice:GoogleAppEngine 7.3 MicrosoftAzure	**08Lectures**

UnitIV		
8.	**Webservices,AJAXand mashups** 8.1 Webservices:SOAPandREST 8.2 SOAPversusREST 8.3 AJAX:asynchronous‘rich’interfaces 8.4 Mashups:userinterfaceservices	**07Lectures**

UnitV		
9.	**Webservices,AJAXand mashups** 9.1 Relationaldatabases 9.2 Cloudfilesystems:GFSandHDFS 9.3 BigTable,HBaseandDynamo 9.4 Clouddatastores:DatastoreandSimpleDB	**08Lectures**

UnitVI		
10.	**Dev2.0Platforms** 10.1 Salesforce.com’sForce.ComPlatform 10.2 TCSInstantAppsonAmzonCloud 10.3 MoreDev2.0platforms&relatedefforts 10.4 Advantages, applicabilityandlimitsofDev2.0	**10Lectures**

ReferenceBooks:

1. Enterprise Cloud Computing: Technology, Architecture, Application By GautamShroff at Cambridge University

Name of Course	Bachelor of Information Technology
Semester	Fourth
Name of Subject	Linux Fundamental **(Elective)**
Subject Code	BSc IT- **404B**
Marks Credit Points	75 Marks

Credit Points	4 Points
Lectures	50 Lectures

Course Objectives:

- This course shall build a platform for students to start their own enterprise
- For Making Student Job Ready
- To become familiar with open source software and user interface.
- To securely handle OS without any viruses and malwares.
- For easily use free software available on internet.
- To understand the basic operating system command.
- To understand the basic concept of Linux operating system

Course Outcomes:

- Awareness of existing demanding trends in IT industry in order to get placement & Research in open source market.
- Understand the Linux OS architecture.
- Install and use different types of distributions available in market.
- Understand the different Linux basic commands

Unit I – Introduction

What is Linux, Advantages of Linux, Disadvantages of Linux, Distributions of Linux Functions of Operating system , History and development of Linux, Features of Linux, Installation steps of Linux, Difference between Linux and Windows, Difference between Linux and Unix

Unit II – Linux Environment

Linux standard directories, Hardware requirement for Linux, Basic Commands, Commands for files and directories, File processing commands, Mathematical Commands, Login & Logout, Virtual consoles, Viewing and changing user information.

Unit III - Managing Editors and Shell

Working with Text Editors, Vi editor, features of vi, Working with emacs, Managing user accounts, Managing groups, Using the Shell, Working with permissions.

Unit IV- Linux boot process and System Services

Linux boot process, Boot Loaders (LILO and GRUB), System Initialization, inittab, System services, controlling services with – Text-Based Tool and GUI-Based Tool, top command, ps and kill commands.

Unit-V – Backup and Recovery

Background – Why data loss occurs, Choosing a backup strategy, backup hardware and media, backup and recovery software – tar, cpio, dd, alternative backup software.

Unit-VI – Printing with Linux

Overview of Linux printing, Managing print services, Creating and configuring local printers, Creating and configuring network printers, Using basic printing commands, Introduction to Common Unix Printing System(CUPS).

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Reference Books:-

1) LINUX complete reference by Richard Peterson
2) Red Hat Linux 718 by Bill Ball, David Pitts
3) Unix concept and applications by Sumitabha Das
4) Fedora 7 Unleashed by Andrew Hudson and Paul Hudson (SAMS publication)

Name of Course	Bachelor of Information Technology
Semester	Fourth
Name of Subject	Content Management System
Subject Code	BSc IT- **405 B (Open Elecive)**
Marks Credit Points	75 Marks

Credit Points	4 Points
Lectures	50 Lectures

Learning Objectives:

i. Provide the skills to effectively create and operate WordPress sites.

Course Outcomes:

After successful completion of this course, students should be able to:

i. Plan website by choosing colour schemes, fonts, layouts, and more.

ii. Select, install, and activate a theme in word press.

iii. Design e-commerce site using woo commerce plugin.

Unit I: Website Development using WordPress	NOS	Hours
Installing WordPress, Installing Themes, Creating a Child Theme, Modifying a Theme, Setting Up a WordPress Site, Starting the MRP Theme, The WordPress Loop, Continuing with the Loop,	SSC/ N0503	8
Unit II Customizing Page and Form	NOS	Hours
Splitting the Page into Templates, Creating a Page for Single Posts, Creating Pages, Customizing the Navigation Menu, Customizing the Sidebar, Creating a Custom Page Template, Adding a Contact Form, Uploading a WordPress Site	SSC/ N0503	12
Unit III: Installing plugins	NOS	Hours
What are plugins? Finding plugins, Installing plugins, Activating and deactivating plugins, Editing plugin settings, Deleting plugins,	SSC/ N0501	10
Unit IV: Adding, editing, and deleting users	NOS	Hours
Adding, editing, and deleting users, User roles and permissions, Importing content from another site, Exporting your WordPress data, WordPress General settings.	SSC/ N0501	10
Unit V: Advanced WordPress Concepts	NOS	Hours
Changing the site title and tagline, Changing your URL, Using a different homepage, Updating the admin email address, Changing time zones Date/Time formats	SSC/ N0501	10

Unit VI: Woo Commerce Plugin	NOS	Hours
Introduction to Woo Commerce, Woo Commerce installation, Convert HTML to Woo commerce using [short-code], Recent Products, Featured Products, Variable Products, Woo commerce Settings, Payment Gateway Integration, Moving woo commerce site from Local Server to Live Server	SSC/ N0501	10

References:

Reference Books:

1. Professional WordPress: Design and Development by Brad Williams, David Damstra, Hal Stern
2. WordPressTo Go bySarah McHarry.
3. WooCommerce Explained by Stephen Burge

Name of Course	Bachelor of Information Technology
Semester	Fourth
Name of Subject	**Lab 1: PHP and MySQL**

Subject Code	BSc IT- **406**
Marks Credit Points	75 Marks
Credit Points	2 Points

1. Creating HTML FORM (Registration)
2. Write PHP Code to demonstrate variable in php
3. Write php code to Handling an HTML Form
4. Write php code to study of Operators used in PHP.
5. Write php code to Validating Form Data.
6. Write php code to demonstrate Array php
7. Write php code to demonstrate String Manipulation
8. Write php code to include() and required() function
9. Write php code to demonstrate concept of Forms with PHP Redux
10. Write php code to demonstrate creating Sticky Forms
11. Write php code to demo state Creating and Calling Your Own Functions
12. Write php code to demonstrate Connecting to MySQL and Selecting the Database
13. Write php code to demonstrate Retrieving Query Results
14. Write php code to demonstrate Updating Records with PHP
15. Write php code to demonstrate Cookies
16. Write php code to demonstrate Session

Name of Course	Bachelor of Information Technology
Semester	Fourth
Name of Subject	**Lab 2:** Hibernate and Spring Framework

Subject Code	BSc IT- **407**
Marks Credit Points	75 Marks
Credit Points	2 Points

Learning Objectives:

i. To Access databases with JDBC and Hibernate.
ii. To Acquire knowledge on creation of software components using Spring Framework.
iii. To Learn safe and maintainable techniques for programming with AOP.
iv. To Understand REST, and use Spring MVC to build RESTful services.
v. To learn the creation of pure Dynamic Web Application using Spring MVC.
vi. To understand how to build complex UIs using Spring Boot.
vii. To be familiar with using Spring Boot starters and start.spring.io to easily create new applications.

Course Outcomes:

After successful completion of this course, students should be able to:

i. Implement the web based applications using JDBC and Hibernate.
ii. Implement web based applications using features of Spring Framework.
iii. Apply the concepts of server side technologies for dynamic web applications using Spring MVC.
iv. Use the core principles of Spring, and of Dependency Injection (DI) / Inversion of Control.
v. Integrate Spring MVC with technologies such as Hibernate.
vi. Learn how to build a simple MVC application using Spring Boot
vii. Configure database connectivity via Spring Boot

Lab Work/ Practical List

Programs for the demonstration of all the concepts in Hibernate and Spring Framework.

1. Write a program to implement inversion of control.
2. Write a program to demonstrate dependency injection.
3. Write a program for the demonstration of auto wiring.
4. Write a program to demonstrate Spring Tag Libraries.
5. Write a program to demonstrate View Resolver.
6. Develop Custom CRUD Application using Spring MVC and JDBC.
7. Develop Login Application using Spring MVC and Hibernate.
8. Write a program for CURD operations using Spring MVC and Hibernate.

9. Develop Spring MVC Application for following operations.
   -Customer Login
   -Add Customer
   -Edit Customer Information
   -Delete Customer
   -View Customer List
10. Write a program that demonstrate simple spring boot application.
11. Write a program for demonstration of auto configuration in spring boot.
12. Write a program for developing web application using spring boot.
13. Write a program for demonstration of Spring Data JPA.

References:

1. Beginning Hibernate: For Hibernate 5, Fourth Edition, Joseph B. Ottinger Jeff Linwood Dave Minter, APress Publication
2. Spring Framework Cookbook, Java Code Geeks.
3. Introducing Spring Framework, Felipe Gutierrez, APress Publication
4. Spring MVC: A Tutorial, Second Edition, Paul Deck, Brainy Software.
5. Spring MVC Beginner's Guide, Second Edition, AmuthanGaneshan, Packt Publishing Ltd

Nameof Course	**B.Sc IT Third Year**
Semester	**VSemester**

NameofSubject	Python Programming
SubjectCode	B.SC IT-501
Marks	75
Lectures	50

Couse Objectives:

- To develop background knowledge as well as core expertise in Python
- To understand the console based application and provide the knowledge creating web based applications.
- To learn the object oriented concepts.

Course Outcomes:

- To impart the knowledge on basics concepts of object oriented programming.
- To outline the various characteristics of Python.
- To provide the familiarity in the concept of developing web based & game application.
- To converse an idea of creating application using Database Handling.
- To convey the idea of Python Machine learning concept.

UNIT-I
Introduction

1.1 Introduction to Python
1.2 Features of python
1.3 Python Interpreter
1.4 Python installation

UNIT-II
Data types and control structures

2.1 Operators (unary, arithmetic, etc.)
2.2 Data types, variables, expressions, and statements
2.3 Assignment statements
2.4 Strings and string operations
2.5 Control Structures: loops and decision

UNIT-III:
Modularization and Classes

3.1 Standard modules
3.2 Packages 1
3.3 Defining Classes
3.4 Defining functions
3.5 Functions and arguments (signature)

UNIT-IV:
Exceptions and data structures

4.1 Data Structures (array, List, Dictionary)
4.2 Exception Raising
4.3 Exception Handling
4.4 Error processing

UNIT-V:
ObjectOrientedDesign

5.1 Programming types
5.2 Object Oriented Programming
5.3 Inheritance
5.4 Polymorphism

UNIT-VI:
Database Connectivity and Networking

6.1 Getting MySQL for python
6.2 Connecting with database
6.3 Passing Query to MySQL
6.4 Networking

References:

Sr. No Name of Book Writer Publication
1. Starting Out with Python plus, MyProgramming Lab, Tony Gaddis Pearson eText --Acces s Card Package
3rd edition
2. Learning Python, Mark Lutz, O‟Reilly 5th edition
3. MySQL for Python, Albert Lukaszcwskc, Packet publication 1st Edition

Nameof Course	**B.Sc IT Third Year**
Semester	**VSemester**
NameofSubject	**Data Analysis with Power BI**

SubjectCode	B.SC IT-502
Marks	75
Lectures	50

Course Objectives:

- To learn the concept of Data Analysis with Power BI.
- To understand the concepts of BI Desktop, Data from Analysis Services and Data Model
- To understand the applications of Power BI.

Course Outcomes:

- Learn the distinction between data managing Vs Data Analysis.
- Learn different Data Analysis techniques.

UNIT I:

Introducing Power BI

Why Use Power BI?, The xVelocity In-Memory Analytics Engine, Setting Up the Power BI Environment, Exploring the Power BI Desktop Interface, Importing Data into Power BI Desktop, Importing Data from Relational Databases, Importing Data from Text Files, Importing Data from a Data Feed, Importing Data from Analysis Services

UNIT II:

Data Munging with Power Query

Discovering and Importing Data, Transforming, Cleansing, and Filtering Data, Merging Data Appending Data, Splitting Data, Unpivoting Data, Inserting Calculated Columns,

UNIT III:

Data Model

Creating the Data Model, What Is a Data Model?, Creating Table Relations, Creating a Star Schema, Understanding When to Denormalize the Data, Making a User-Friendly Model

UNIT IV:

Creating Calculations with DAX

What Is DAX?, Implementing DAX Operators, Working with Text Functions , Using DAX Date and Time Functions, Using Informational and Logical Functions, Getting Data from Related Tables, Using Math, Trig, and Statistical Functions, Tips for Creating Calculations in Power BI, Creating Measures with DAX, Measures vs. Attributes, Creating Common Aggregates, Mastering Data Context, Altering the Query Context, Using Filter Functions, Using Variables in DAX

UNIT V:

Incorporating Time Intelligence

Date-Based Analysis, Creating a Date Table Time Period–Based Evaluations, Shifting the Date Context, Using Single Date Functions, Creating Semi-additive Measures

UNIT VI:

Creating Reports with Power BI Desktop

Creating Tables and Matrices, Constructing Bar, Column, and Pie Charts, Building Line and Scatter

Charts, Creating Map-Based Visualizations, Linking Visualizations in Power BI, Drilling Through Visualizations, Publishing Reports and Creating Dashboards in the Power, BI Portal, Publishing Power BI Desktop Files to the Power BI Service, Adding Tiles to a Dashboard, Sharing Dashboards, Refreshing Data in Published Reports

Reference:

1. Mastering Microsoft Power BI: Expert techniques for effective data analytics and business intelligence byBrett Powell, Packt Publishing Ltd

Nameof Course	**B.Sc IT Third Year**
Semester	**VSemester**
NameofSubject	**Programming in C#**

SubjectCode	B.SC IT-503
Marks	75
Lectures	50

Course Objectives:

- To learn the concept of .NET architecture.
- To understand the concepts of The Common Language Runtime(CLR) & Visual Studio
- To understand the applications of C#.

Course Outcomes:

- Learn the distinction between programming language Vs .NET.
- Learn different programming representation techniques.

UNIT I:
Introducing C#

What is c#, Why C# & Evolution of C#, Character tics of C#, How C# differs from C++ & Java, Introduction to .Net Technology & Framework, Exploring Some Key Benefits of the .NET Platform, Understanding the .NET Support Lifecycle, The Common Language Runtime(CLR), Overview of .NET Assemblies, Installing .NET 6, Visual Studio .Net & .Net languages, Integrated Development environment, Building .NET Core Applications with Visual Studio

UNIT II:
Languages Basics

Breaking Down a Simple C# Program,Using the System.Console Class, Working with System, Data Types and Corresponding C# Keywords, Data Types, Operators, Control Statements, Looping Statements, Arrays, Jagged Arrays, Array List class, String class, and String Manupulations, Understanding Method Parameters, Understanding the enum Type, Understanding Value Types and Reference Types, Boxing & Unboxing variable, Understanding C# Nullable Types, Understanding the Structure

UNIT II:
Custom Classes and OOPS

Creating Custom Classes and Objects, Understanding Constructors, Understanding the static Keyword, Understanding C# Access Modifiers, Understanding Partial Classes, Polymorphism, Abstraction class, Interfaces- Creating & using interface, Inheritances, Properties, Indexers, Delegates & Multicast Delegates, Events

UNIT III:
Lambda Expressions, Namespace, Exception handling

Understanding Lambda Expressions, Processing Arguments Within Multiple Statements, Lambda Expressions with Multiple (or Zero) Parameters, Using static with Lambda Expressions, Discards with Lambda Expressions, Creating & using Namespace (DLL library), Exception

UNIT IV:
Multithreading

Understanding System. Threading Namespace, Creating & starting Thread, Threading synchronization &

Pooling

UNIT V:
Windows Application

Event Driven Programming Model, Important classes used in windows application, TextBox& Label Control, Button, CheckBox, RadioButton&GroupBox Control, ListBox&ComboBox control, Month Calendar Control, Docking Control, Tree View Control, Menu & Toolbar control, Dialog Boxes

UNIT VI:
Database Connectivity, XML & Entity Framework Core

Advantages of ADO.NET, Managed Data providers, developing a Simple ADO.NET Based Application, Retrieving & Updating Data From Tables, XML, Introducing Entity Framework Core, Object-Relational Mappers, Understanding the Role of the Entity Framework Core, The Building Blocks of the Entity Framework, The DbContext Class, The DbSet<T> Class, The ChangeTracker, Entities, Owned Entity Types, Query Types, Query Execution, Mixed Client-Server Evaluation, Tracking vs. NoTracking Queries, Code First vs. Database First, The EF Core Global Tool CLI Commands, The Migrations Commands, The Database Commands, The DbContext Commands, Creating Records, Querying Data

References:

1. Programming in C#, E Balagurusamy, McGraw Hill
2. Visual C#.Net, C Muthu, McGraw Hill

Nameof Course	**B.Sc IT Third Year**
Semester	**VSemester**
NameofSubject	**Introduction to AI and ML**
SubjectCode	**B.Sc IT – 504 A**
Marks	**75**
Lectures	**50**

Learning Objectives:

- To learn the distinction between optimal reasoning Vs. human like reasoning.
- To understand the concepts of state space representation, exhaustive search, heuristic
- To understand the applications of AI, namely game playing, theorem proving, and machine learning.

Course Outcomes:

- Learn the distinction between optimal reasoning Vs human like reasoning and formulate an efficient problem space for a problem expressed in natural language. Also select a search algorithm for a problem and estimate its time and space complexities.
- Apply AI techniques to solve problems of game playing, theorem proving, and machine learning.
- Learn different knowledge representation techniques.

UNIT – I
Introduction to AI

Definitions – Foundation and History of AI, Evolution of AI - Applications of AI, Classification of AI systems with respect to environment. Artificial Intelligence vs Machine learning, Relationship between attributes: Covariance, Correlation Coefficient, Chi Square. Intelligent Agent: Concept of Rationality, nature of environment, structure of agents.

UNIT - II
Problem Solving

Heuristic Search Techniques: Generate-and-Test; Hill Climbing; Properties of A* algorithm, Bestfirst Search; Problem Reduction. Constraint Satisfaction problem: Interference in CSPs; Back tracking search for CSPs; Local Search for CSPs; structure of CSP Problem. Beyond Classical
Search: Local search algorithms and optimization problem, local search in continuous spaces,
searching with nondeterministic action and partial observation, online search agent and unknown environments.

UNIT - III
Knowledge and Reasoning

Knowledge and Reasoning: Building a Knowledge Base: Propositional logic, first order Logic, situation calculus. Theorem Proving in First Order Logic, Planning, partial order planning. Uncertain Knowledge and Reasoning, Probabilities, Bayesian Networks. Probabilistic reasoning over time: time and uncertainty, hidden Markova models, Kalman filter, dynamic bayesian network, keeping track of many objects.

UNIT - IV
Introduction to Machine Learning

Introduction to Machine Learning, Examples of Machine Learning Applications, Learning Types Supervised Learning -Learning a Class from Examples, Vapnik-Chervonenkis (VC) Dimension, Probably Approximately Correct (PAC) Learning, Noise, Learning Multiple Classes, Regression, Model Selection and Generalization, Dimensions of a Supervised Machine Learning Algorithm Dimensionality Reduction- Introduction,Subset Selection, Principal Components Analysis, Factor Analysis, Multidimensional Scaling, Linear Discriminant Analysis, Isomap, Locally Linear Embedding

UNIT – V

Linear Methods for Regression

Introduction, Linear Regression Models and Least Squares, Subset Selection, Shrinkage Methods-Ridge Regression, Lasso Regression, Least Angle Regression, Methods Using Derived Input Directions-Principal Components Regression, Partial Least Squares, A Comparison of the Selection and Shrinkage Methods , Multiple Outcome Shrinkage and Selection, More on the Lasso and Related Path Algorithms, Logistic Regression-Fitting Logistic Regression Models, Quadratic Approximations and Inference, L1 Regularized Logistic Regression

UNIT – VI

Support Vector Machines and Tree-Based Models

SVM-Introduction to SVM, The Support Vector Classifier, Support Vector Machines and Kernels- Computing the SVM for Classification, The SVM as a Penalization Method, Function Estimation and Reproducing Kernels, SVMs and the Curse of Dimensionality, A Path Algorithm for the SVM Classifier, Support Vector Machines for Regression, Regression and Kernels. Tree Based Methods-Regression Trees, Classification Trees, Random Forests- Definition of Random Forests, Details of Random Forests- Out of Bag Samples, Variable Importance, Proximity Plots, Random Forests and Overfitting, Analysis of Random Forests-Variance and the De-Correlation Effect, Bias, Adaptive Nearest Neighbors.

References:

1) Russell, S. and Norvig, P. 2015. Artificial Intelligence - A Modern Approach, 3rd edition, Prentice Hall
2) J. Gabriel, Artificial Intelligence: Artificial Intelligence for Humans (Artificial Intelligence, Machine Learning), Create Space Independent Publishing Platform, First edition , 2016
3) Introduction to Machine Learning Edition 2, by EthemAlpaydin
4) The Elements of Statistical Learning. Trevor Hastie, Robert Tibshirani and Jerome Friedman. Second Edition. 2009.
5) Machine Learning. Tom Mitchell. First Edition, McGraw- Hill, 1997.

.Nameof Course	**B.Sc IT Third Year**
Semester	**VSemester**
NameofSubject	**ReactJS**
SubjectCode	**B.Sc IT – 504 B**
Marks	**75**
Lectures	**50**

Learning Objectives:

1. React JS course would enable the students in understanding Basics of front end
2. Design & write the simple web development using React JS programming.
3. Learn how to design forms, web applications.
4. Learn fundamental concepts of React JS such as. State, Props, Operators, conditional and looping statements, Arrays, Arrow functions etc.

Course Outcomes:

After successful completion of this course, students should be able to:

1. To design front end applications.
2. To write web application to solve the given problem
3. To design program using java script.

Unit I:
Introduction to JavaScript Hours

Variables, Arrow functions, Rest and spread, Object and array, destructuring, Template, literals, Classes, Callbacks, Promises, Async/Await ES Modules

Unit II:
Basics of React Concepts Hours

what is react?, benefits of using react, first react code, creating component classes, working with properties, what is JSX, benefits, understanding JSX, React and JSX gotchas, React component states, working with states, states and properties, stateless components, Hooks

Unit III:
Styling and Hooks

CSS in React, Inline Styling, SAAS, What is HOOK?,useState, useEffect, useContext, useRef, useReducer, useCallback, useMemo, Custom Hooks

Unit IV:
Working with forms and Menus Hours

Defining a form and its events, form elements, form validations, Bulding menu with JSX, Bulding menu without JSX.

Unit V:
React Architecture Hours

Adding webpack to project, React router, router features, React Memo 10

Unit VI:
Redux Hours

flux data architecture, redux data library, GraphQL 10

References:

1. React Quickly- AZAT MARDAN, ISBN 9781617293344, ©2017 by Manning Publications, Edition First.
2. Learning ReactFunctional Web Development with React and Redux, Alex Banks and Eve Porcello First Edition, O'Reilly.

Nameof Course	B. Sc IT Third Year
Semester	VSemester
NameofSubject	CyberSecurity
SubjectCode	B. Sc IT – 505 B
Marks	75
Lectures	50

Objectives:

1. Exhibitknowledgetosecurecorruptedsystems,protectpersonaldata,andsecurecomputernetworksin an Organization.
2. Practicewith an expertise inacademicsto designand implement securitysolutions.
3. UnderstandkeytermsandconceptsinCryptography,GovernanceandCompliance.
4. Developcybersecuritystrategiesandpolicies
5. Understandprinciplesofwebsecurityandtoguaranteeasecurenetworkbymonitoringandanalyzingthe natureofattacks throughcyber/computerforensics software/tools.

Outcomes:

1. Analyze andevaluatethe cyber securityneedsofanorganization.
2. Determineandanalyzesoftwarevulnerabilitiesandsecuritysolutionstoreducetheriskofexploitation.
3. Measuretheperformance and troubleshootcybersecuritysystems.
4. Implementcybersecuritysolutionsanduseofcybersecurity,informationassurance,andcyber/compute rforensicssoftware/tools.

Unit-I

ITActandEncryption

1.1 Objectof theAct
1.2 Scopeof theAct
1.3 SymmetricCryptography
1.4 AsymmetricCryptography
1.5 RSAAlgorithm
1.6 PublicKeyEncryption

Unit-II

AuthenticationofElectronicrecords&E-Governance

2.1 AuthenticationofElectronicrecords
2.2 DigitalSignature
2.3 RSADigitalSignature
2.4 HashFunction
2.5 WorkingofDigitalSignature
2.6 ElectronicGovernance

Unit-III

CertifyingAuthorities

3.1 NeedofCertifyingAuthorities
3.2 FunctioningofCertifyingAuthorities
3.3 TypesofCertificates
3.4 Identification,Authorizing,Transactional certificate
3.5 AppointmentofController

3.6 FunctionsofController

Unit-IV

DomainnameDisputes

4.1 BackgroundofDomainNames

4.2 Wherelies thedispute?

4.3 Insertionof InternetDomainNamesandthetrademark Law

4.4 ClassificationofCyberCrime,Targetofcomputercrime

Unit-V

CyberCrimes and Computer Virus

5.1 DamagetocomputerSystem:UnauthorizedAccess,PacketSniffing. Tempestattack,PasswordCracking,Butteroverflow

5.2 Computer virus: Viruses, Logic Bomb, Worms, Trojan Horse Programme, Denial of Service, Tampering with Computer Source Documents.

Unit-VI

Digital Devices Security , Tools and Technologies for Cyber Security

6.1 End Point device and Mobile phone security, Password policy, Security patch management, Data backup,

6.2 Downloading and management of third party software, Device security policy, Cyber Security best practices,

6.3 Significance of host firewall and Ant-virus, Management of host firewall and Anti-virus, Wi-Fi security,

6.4 Configuration of basic security policy and permissions.

References:

Cyber LawinIndiabyFarooqAhmad–PioneerBooks

Handbook ofCyber &E-commerceLawsbyP.M. Bakshi&R.K.Suri– Bharat LawhouseNewDelhi

TheIndianCyber LawbySureshT Vishwanathan–Bharat LawhouseNew Delhi.

Guideto CyberLaws byRodneyD.Ryder–Wadhwaand CompanyNagpur

B.SC IT-506 Python Programming
15- Practical's Based on Syllabus

B.SC IT-507 Data Analysis with Power BI
15- Practical's Based on Syllabus

Nameof Course	B. Sc IT Third Year
Semester	VISemester
NameofSubject	Python for Data Science
SubjectCode	B.SC IT – 601
Marks	75
Lectures	50

Course Objectives:

1. To learn data collection and preprocessing techniques for data science
2. To Understand and practice analytical methods for solving real life problems.
3. To study data exploration techniques
4. To learn different types of data and its visualization
5. To study different data visualization techniques and tool

Course Outcomes:

1. Apply data preprocessing methods on open access data and generate quality data for analysis Apply and analyze classification and regression data analytical methods for real life problems. Implement analytical methods using Python
2. Apply different data visualization techniques to understand the data.
3. Analyze the data using suitable method; visualize using the open source tool.
4. Model multidimensional data and visualize it using appropriate tool

UNIT I:
Introduction to Data Science

Defining data science, Data Science Jobs, Recognizing the different types of data, Gaining insight into the data science process, Data Science Process: Overview, Different steps. Data Preparation, Model Planning, Model Building, Communicating Results, Operationalization
Basic terminologies of Data Science
a. Data science b. Data scientist c. Data set d. Data mining e. Data visualization f. Data modeling g. Data wrangling h. Big data i. Machine learning j. Algorithms k. Deep learning

UNIT II:
Basics of Data Visualization

Introduction to data visualization, challenges of data visualization, Definition of Dashboard, Their type, Evolution of dashboard, dashboard design and principles, display media for dashboard. Types of Data visualization: Basic charts scatter plots, Histogram, advanced visualization Techniques like streamline and statistical measures, Plots, Graphs, Networks, Hierarchies, Reports. Data Science with MS-Excel, Data Science with Google Data Studio.

UNIT III:
Modules and Exception Handling in Python

Importing a Module
Importing an Entire Module
Importing a Module Under an Alias
Importing Specific Module Entities

Reloading a Module
Module Search Path
Module Loading and Compilation
Tricks for Importing Modules
Using import in a Script
Trapping import Statements
Identifying a Module or a Script
Packages
Creating a Module
Standard Modules, Packages, Exception raising, Exception Handling, Error Processing.

UNIT IV:
Working with Files

File Processing
Reading
Writing to a File
Changing Position
Controlling File I / O
File Locking
Getting File Lists
Basic File / Directory Management
Access and Ownership
Checking Access
Getting File Information
Setting File Permissions
Manipulating File Paths

UNIT V:
Pandas Data Analysis library [Data Processing]

Why Pandas? Features of Pandas, Data structures in Pandas a. Series b. DataFrame c. Panel d. Panel4D Series creation a. Using ndarray b. Using dict c. Using scalar values d. Using list, Accessing elements of Series a. Using indexing b. Using slicing c. Using ranging d. Using iloc method e. Using loc method Vectorising operations a. Vector operations using same index values b. Vector operations using different index values, DataFrame creation a. Using list b. Using dict c. Using ndarray d. Using series e. Using DataFrameϖ Viewing DataFrame elements a. Using describe function b. Using column name c. Using iloc method d. Using iat method e. Using head() f. Using tail() g. Using index method

UNIT VI:
Numpy, Matplotlib

Handling missing values, Statistical functions in data operations, SQL operations in pandas,
Numpy – Mathematical Computation Why numpy? Powerful properties of numpyϖ Types of arrays, Attributes of ndarray , Basic operations, Creating functions for array, Copy and view, Shape manipulation, Matplotlib library, Chart properties, Styling the char, Types of presentation styles, Why and How Data to be distributed?, Types of distribution, Advanced Data Visualization using SEABORN

Reference Books: -

1. Learning Python-Mark Lutz-O‟Reilly 5th edition
2. DataMining: Concepts and Techniques Jiawei Han, MichelineKamber, Jian Pei Data Science from Scratch Joel Grus O'Reilly Media Inc
3. MySQL for Python-Albert Lukaszcwskc-Packet publication 1st edition
4. Django 2 by Example (Build powerful and reliable Python web applications from scratch)-Antonio Mele

Nameof Course	B. Sc IT Third Year
Semester	VISemester
NameofSubject	ASP .Net Core
SubjectCode	B.SC IT – 602
Marks	75
Lectures	50

CourseObjectives:

1. UnderstandthebenefitsofMVCdesignovertraditionalASP.NETWebForms.
2. AcquiringsufficientknowledgeonroleofModel,ViewandControllerinintegratingthemtodevelopcompleteweb application
3. UnderstandhowRoutingAPImapsrequeststoactionmethodsincontroller.
4. LearnhowtoreusecoderenderingHTMLusingcustomHTMLHelpermethodsandTag Helpers.
5. BuildingCustomModelBindersfortypicalconditionsinwhichbuilt-indefaultbindersarenotusable.

Course Outcomes:

1. Understandingandapplyingvalidationframeworkforbothclientandservervalidations.
2. AccessdatabasesandperformingCRUDoperationsusingLINQandEntityFramework
3. Implementsecurityin ASP.NetCoreapplications.
4. DevelopServiceOrientedRESTfulservicesusingWebAPIfeatureofASP.NETCore.
5. BuildanddeployASP.NETCoreapplicationtotheproductionserver.

UNIT I:
IntroductiontoASP.NETCore

Introduction
WhatisASP.NETCore?
ASP.NETCoreFeatures
AdvantagesofASP.NETCore
MVCPattern
UnderstandingASP.NETCoreMVC
ASP.NETCorevs.ASP.NETMVCvs.ASP.NETWebForms
ASP.NETCoreEnvironmentSetup
ASP.NETCoreFirst Application
ProjectLayout
UnderstandingLifeCycleofASP.NetCoreRequest

UNIT II:

ControllersAction Methods and View

ControllersOverview
ActionMethodsandIActionResultobject
PassingdatafromControllertoView
UnderstandingActionSelectors
ActionFilters
BuildingCustomActionFilters
Middleware
AsynchronousActionMethods
IntroducingRazorView
AdvantagesofRazorView
RazorSyntax
TypesofViews
PartialViews
LayoutPages
SpecialViews
ViewCategorizationbasedonModel

UNIT III:

Helpers and ModelBinding

HtmlHelpers
Built-InHtmlHelpers
URLhelpers
TagHelpers
CustomTagHelpers
HtmlFormbehavior
ModelBinderOverview
DefaultModelBinder
BindingtoComplexClasses
IFormCollectionModelBinding
IFormFileModelBinder
BindAttribute
TryUpdateModelAsync

UNIT IV:

Validations&DataAnnotations, StatemanagementTechniques

DataAnnotationsandValidationsOverview
ValidationswithDataAnnotation
ServerSideandClientSideValidation
CustomServersidevalidation
ModellevelvalidationusingIValidatableObject
CustomunobstriveClient sideValidation
RemoteValidation
Cookies
Sessions

UNITV:

Security, MVCandEntityFrameworkCore, WebCaching

AuthenticationandAuthorization
ImplementingSecurityusingASP.NETCoreIdentity
BasicCRUDOperationsusingEntityFramework
SeparationofworkusingBOClasses
WritingGenericClass/ Repository
CachinginRepository
CacheTagHelpers
MemoryCachingIntroduction
In-MemoryCaching
ResponseCache
DistributedCache

UNT VI:

Routing, ModuleDevelopment, WebAPIandJQueryAjax

UrlRoutingOverview
CustomRoutes
AttributeRouting
RoutingConstraints
UnderstandingAreas
AddingAreas
DefiningAreaRoutes
LinkingbetweenAreas
IntroductiontoWebAPI
AJAXimplementationusingJQuery
CallingtheWebAPIwithJQueryAjax
CreatingaWebAPIthatSupportsCRUDOperationsusingEF

References

1. PROGRAMMING ASP.NET CORE Paperback – 1 January 2019 by Dino Esposito (Author)
2. ASP.NET Core in Action, Second Edition , Andrew Lock, March 2021

.Nameof Course	**B.Sc IT Third Year**
Semester	**VISemester**
NameofSubject	**Computer Vision**
SubjectCode	**B.SC IT – 604 A**
Marks	**75**
Lectures	**50**

Course Objectives:

1. The purpose of this course is to gain a basic understanding of computer vision and image analysis for 2D computer vision. The course will focus on problem solving based on this technology and industrial applications.

Course Outcomes:

Students who successfully complete this course will be able to:

1. Processing and analysis of gray level images to understand the scene
2. Perform binary image processing for simple problem solving.
3. Getting to know color and color images and using them to solve visual problems

Unit I:

Introduction

Computer Vision Definition and Image Processing and Their Differences - History and Applications of Computer Vision

Unit II:

Basic Principles of Digital Imaging

Elements of Visual Understanding - Light and Electromagnetic Spectrum - Image Sense and Imaging - Sampling and Multiplication - Relationships between Image Points - Linear and Nonlinear Operations - Principles and Color Models - Quasi-colored images

Unit III:

Image Editing

Gray Level Conversions - Histogram Correction - Location Filter - Smoothing and Sharpening

Unit IV:

Morphological operations

Binary mathematical morphology - operators of corrosion, expansion, opening, and closing - Basic morphological algorithms

Unit V:

Image Segmentation

Segmentation Based on Edge Detection, Thresholding, and Area Growth – Determination

Unit VI:

Object Identification

Decision-Making Methods such as Statistical Classification, Neural Networking

Reference Books :

[1] A. Kaehler and G. Bradski, “Learning OpenCV 3”.

[2] J. Minichino and J. Howse “Learning OpenCV 3 with Python”.

[3] R. Szeliski, “Computer vision: algorithms and applications”.

[4] R. C. Gonzalez and R. E. Woods, “Digital Image Processing (4th Edition)”.

NameofSubject	Introduction to IoT
SubjectCode	B.SC IT – 604 B
Marks	75
Lectures	50

Course Objectives:

To study the fundamentals about IoT

1. To study about IoT Access technologies
2. To study the design methodology and different IoT hardware platforms.
3. To study the basics of IoT supporting services.
4. To study about various IoT case studies and industrial applications.

Course Outcomes:

After successful completion of this course, students should be able to:

1. Understand the basics of IoT.
2. Implement the state of the Architecture of an IoT.
3. Understand design methodology and hardware platforms involved in IoT.
4. Understand how to analyse and organize the data.
5. Compare IOT Applications in Industrial & real-world.

Unit I:
Basics of IoT Networking

Overview of Internet of Things
Wireless Sensor Networks
Machine-to-Machine Communications
Cyber Physical Systems

Unit II:
Introduction to Internet of Things

Evolution of IoT
Enabling IoT and the Complex Interdependence of Technologies
IoT Networking Components
Addressing Strategies in IoT

Unit III:
IoT Sensors, Actuators and Microcontroller devices

Sensors
Sensor Characteristics
Sensing Types.
Actuators
Actuator Characteristics
Actuator Types.
Arduino
Raspberry Pi

Unit IV:
Processing in IoT

Data Format
Importance of Processing in IoT
Processing Topologies
IoT Device Design and Selection Considerations

Unit V:
IoT Connectivity Technologies

IEEE 802.15.4, Zigbee, RFID, DASH7, NFC, Z-Wave
Cloud Computing
Virtualization
Cloud Models
Sensor-Cloud: Sensors-as-a-Service
Fog Computing and Its Applications

Unit VI:
Application Areas and Futures of IoT

Agricultural IoT
Components of an agricultural IoT
Advantages of IoT in agriculture
Smart irrigation management system
Vehicular IoT
Components of vehicular IoT
Advantages of vehicular IoT
Healthcare IoT
Components of healthcare IoT
Advantages and risk of healthcare IoT
Evolution of New IoT Paradigms
Challenges Associated with IoT
Emerging Pillars of IoT

References:

1. Introduction to IoT by SudipMisra, Anandarup Mukherjee, Arijit Roy | Publication Cambridge University Press | ISBN 9781108842952, ISBN 9781108959742.
2. The Internet of things_ do-it-yourself projects with Arduino, Raspberry Pi, and BeagleBone Black | ISBN: 978-0-07-183521-3
3. he Internet of Things – Key applications and Protocols, Olivier Hersent, David Boswarthick, Omar Elloumi and Wiley, 2012.| ISBN 978-1-11999435-0

NameofSubject	MongoDB
SubjectCode	B.SC IT – 605 B
Marks	75
Lectures	50

Learning Objectives:

1. MongoDBcoursewouldenablethestudentsinunderstandingBasicsofNoSQL Databases to design the queries.
2. Learnhowtodesign Queries.
3. LearnfundamentalconceptsofMongoDBsuchassecondaryindexes,rangequeries, sorting, aggregations, and geospatial indexes etc.

CourseOutcomes:

Aftersuccessfulcompletionofthiscourse,studentsshouldbeableto:

1. To covers aspects on Big Data, NOSQL and details on architecture and development on MongoDB.
2. TowriteDatabaseapplicationtosolvethegivenproblem
3. Tousesorting,aggregations,geospatialindexesandserver-siderendering.
4. Todesign program using MongoDB.

UNITI:
IntroductiontoMongoDB

EaseofUse,EasyScaling,Tons of Features

UNITII:
GettingStarted

Documents Collections
DynamicSchemas
NamingDatabases
Getting and Starting MongoDB
IntroductiontotheMongoDBShell Running
the Shell
AMongoDBClient
BasicOperationswiththeShell Data Types
BasicDataTypes Dates
Arrays
Embedded Documents
_id and ObjectIds

UNIT III:
Creating,Updating,andDeletingDocuments

InsertingandSavingDocuments Batch Insert
Insert Validation Removing
Documents Remove Speed Updating
Documents DocumentReplacement
Using Modifiers Upserts
UpdatingMultipleDocuments
ReturningUpdatedDocuments

UNIT IV:
Querying

Introductiontofind
SpecifyingWhichKeystoReturn Limitations
Query Criteria QueryConditionals
OR Queries
$not
ConditionalSemantics Type-
SpecificQueries null
RegularExpressions Querying
Arrays
QueryingonEmbedded Documents
$where Queries Server-
SideScripting Cursors
Limits,Skips,andSorts Avoiding Large Skips
AdvancedQueryOptions

UNIT V:
Indexing

Introduction to Indexing
IntroductiontoCompoundIndexes Using Compound
Indexes
How$-OperatorsUseIndexes Indexing Objects
and Arrays Index Cardinality
Usingexplain()andhint() The Query
Optimizer When Not to Index
TypesofIndexes
UniqueIndexes
SparseIndexes
IndexAdministration
IdentifyingIndexes Changing Indexes

UNIT VI:

Aggregation

TheAggregationFramework Pipeline Operations

$match

$project

$group

$unwind

$sort

$limit

$skip

UsingPipelines MapReduce

Example1:FindingAllKeysinaCollection Example 2: Categorizing Web Pages MongoDB and MapReduce

AggregationCommands count

distinct

group

References:

1. MongoDB:TheDefinitiveGuide,SecondEdition byKristinaChodorow,PublishedbyO'ReillyMedia, Inc.,isbn=9781449344689.

2. Practical MongoDB: Architecting, Developing, and Administering MongoDBShakuntalaGuptaEdwardNavinSabharwal,ISBN-13(pbk):978-1-4842-0648-5,Published by APRESS, First Edition.

B.SC IT-606 Python for Data Science
15- Practical's Based on Syllabus

B.SC IT-607 ASP .Net Core
15- Practical's Based on Syllabus