Sunrise University

Approved by Govt. of Rajasthan vide Sunrise University Act, 2011
Recognized by UGC Act, 1956 u/s 2 (f)

SYLLABUS OF BACHELOR OF TECHNOLOGY
In the

DEPARTMENT OF INFORMATION TECHNOLOGY

Semester-I

Code	Subject	Cr	Hrs./Week			Exam Hrs.	MaximumMarks				
			L	T	P		MS1	MS2	END TERM	IA	Total
Theory											
101	EngineeringMathematics-I	3	3	1	0	3	10	10	60	20	100
102	EngineeringPhysics	3	3	1	0	3	10	10	60	20	100
103	CommunicationSkills	3	3	1	0	3	10	10	60	20	100
104	ProgrammingForProblem Solving	3	4	1	0	3	10	10	60	20	100
105	Basic ElectricalEngineering	3	3	1	0	3	10	10	60	20	100

Practicals&Sessionals

Code	Subject	Cr	Hrs./Week			Exam Hrs.	IA(60%)		EA(40%)	Total
			L	T	P		MP1 30%	MP2 30%		
106	EngineeringPhysicsLab	2	0	0	2	2	30	30	40	100
106	Language Lab	2	0	0	2	2	30	30	40	100
108	ComputerProgrammingLab	2	0	0	2	2	30	30	40	100
109	BasicElectricalLab	2	0	0	2	2	30	30	40	100
110	ComputerAidedEngg.Graphics	2	0	0	3	3	30	30	40	100
	GrandTotal	**26**	**18**	**6**	**11**					**1000**

Semester-II											
Code	**Subject**	**Cr**	**Hrs./Week**			**Exam Hrs.**	**MaximumMarks**				
			L	**T**	**P**		**MS1**	**MS2**	**END TERM**	**IA**	**Total**
Theory											
201	EngineeringMathematics-II	3	3	1	0	3	10	10	60	20	100
202	EngineeringChemistry	3	3	1	0	3	10	10	60	20	100
203	HumanValues	3	4	1	0	3	10	10	60	20	100
204	BasicMechanical Engineering	3	3	1	0	3	10	10	60	20	100
205	BasicCivilEngineering	2	2	1	0	3	10	10	60	20	100
Practicals&Sessionals											
Code	Subject	Cr	Hrs./Week			Exam Hrs.	IA(60%)		EA(40%)		Total
			L	T	P		MP1 30%	MP2 30%			
206	Engineering ChemistryLab	2	0	0	2	2	30	30	40		100
206	HumanValuesActivities	2	0	0	2	2	30	30	40		100
208	ManufacturingPractice Workshop	2	0	0	2	2	30	30	40		100
209	BasicCivilEngineering Lab	2	0	0	3	3	30	30	40		100
210	ComputerAidedMachine Drawing	2	0	0	2	2	30	30	40		100
	GrandTotal	**26**	**18**	**06**	**11**						**1000**

Semester-III

Code	Subject	Credit	Hrs./Week			Exam Hrs.	MaximumMarks				
			L	T	P		MT1	MT2	EndTerm	TA	Total
Theory subjects											
3BTIT01	Digital Electronics & Logic Design	3	3	0	0	3	10	10	60	20	100
3BTIT02	Object Oriented Programming	3	3	1	0	3	10	10	60	20	100
3BTIT03	Computer Architecture	3	3	1	0	3	10	10	60	20	100
3BTIT04	Data Structures	3	3	1	0	3	10	10	60	20	100
3BTIT05	Software engineering	3	3	1	0	3	10	10	60	20	100
3BTIT06	Mathematics III	3	3	1	0	3	10	10	60	20	100
Practicallaboratorycourses											
Code	**Subject**	**Credit**	**Hrs./Week**			**Exam Hrs.**	**MaximumMarks**				
			L	**T**	**P**		**MP1**	**MP2**	**EndTerm**	**Viva**	**Total**
3BTIT07	Object Oriented Programming Lab	2	0	0	2	3	30	30	30	10	100
3BTIT08	Data Structures Lab	2	0	0	2	3	30	30	30	10	100
3BTIT09	Digital Electronics & Logic Design Lab	2	0	0	2	3	30	30	30	10	100
	Grand Total	**26**	**18**	**4**	**8**						**1000**

Semester-IV

Code	Subject	Credit	Hrs./Week			Exam Hrs.	MaximumMarks				
			L	T	P		MT1	MT2	EndTerm	TA	Total
Theorysubjects											
4BTIT01	Discrete Mathematics	3	3	0	0	3	10	10	60	20	100
4BTIT02	Computer Networks	3	3	1	0	3	10	10	60	20	100
4BTIT03	Operating System	3	3	0	0	3	10	10	60	20	100
4BTIT04	Algorithm Analysis and Design	3	3	1	0	3	10	10	60	20	100
4BTIT05	Database Management Systems	3	3	1	0	3	10	10	60	20	100
4BTIT06	Management InformationSystem and Knowledge Management	3	3	1	0	3	10	10	60	20	100
Practicallaboratorycourses											

Code	Subject	Credit	Hrs./Week			Exam Hrs.	MaximumMarks				
			L	T	P		MP1	MP2	EndTerm	Viva	Total
4BTIT06	Network Lab	2	0	0	2	3	30	30	30	10	100
4BTIT08	Algorithm Analysis andDesign Lab	2	0	0	2	3	30	30	30	10	100
4BTIT09	Operating System Lab	2	0	0	2	3	30	30	30	10	100
4BTIT10	Database Management Systems Lab	2	0	0	2	3	30	30	30	10	100
	Grand Total	**26**	**18**	**4**	**8**						**1000**

Semester-V

Code	Subject	Credit	Hrs./Week			Exam Hrs.	MaximumMarks				
			L	T	P		MT1	MT2	EndTerm	TA	Total
Theory subjects											
5BTIT01	Web Technology	3	3	1	0	3	10	10	60	20	100
5BTIT02	Theory of Automata	3	3	1	0	3	10	10	60	20	100
5BTIT03	Distributed Computing	3	3	1	0	3	10	10	60	20	100
5BTIT04	Compiler Design	3	3	0	0	3	10	10	60	20	100
5BTIT05	Elective I	3	3	1	0	3	10	10	60	20	100
5BTIT06	Numerical Methods	3	3	1	0	3	10	10	60	20	100
Practicallaboratorycourses											
Code	**Subject**	**Credit**	**Hrs./Week**			**Exam Hrs.**	**MaximumMarks**				
			L	**T**	**P**		**MP1**	**MP2**	**EndTerm**	**Viva**	**Total**
5BTIT06	Web Technology Lab	2	0	0	2	3	30	30	30	10	100
5BTIT08	Compiler Design Lab	2	0	0	2	3	30	30	30	10	100
5BTIT09	Communication Skills Lab	2	0	0	2	3	30	30	30	10	100
	Grand Total	**26**	**18**	**4**	**8**						**1000**

Semester-VI

Code	Subject	Credit	Hrs./Week			Exam Hrs.	MaximumMarks				
			L	T	P		MT1	MT2	EndTerm	TA	Total
Theory subjects											
6BTIT01	Industrial Economics & Principles of Management	3	3	1	0	3	10	10	60	20	100
6BTIT02	Computer Graphics and Virtual Reality	3	3	1	0	3	10	10	60	20	100
6BTIT03	Unix Internals	3	3	1	0	3	10	10	60	20	100
6BTIT04	Software Quality Assurance	3	3	0	0	3	10	10	60	20	100
6BTIT05	Multimedia Technologies	3	3	1	0	3	10	10	60	20	100
6BTIT06	Elective II	3	3	1	0	3	10	10	60	20	100
Practicallaboratorycourses											
Code	**Subject**	**Credit**	**Hrs./Week**			**Exam Hrs.**	**MaximumMarks**				
			L	**T**	**P**		**MP1**	**MP2**	**EndTerm**	**Viva**	**Total**
6BTIT06	Unix Lab	2	0	0	2	3	30	30	30	10	100
6BTIT08	Multimedia Technologies Lab	2	0	0	2	3	30	30	30	10	100
6BTIT09	Computer Graphics Lab	2	0	0	2	3	30	30	30	10	100
	Grand Total	**26**	**18**	**4**	**8**						**1000**

Semester–VII

Code	Subject	Credit	Hrs./Week			Exam Hrs.	MaximumMarks				
			L	T	P		MT1	MT2	EndTerm	TA	Total
7BTIT01	Mobile Communications	3	3	1	0	3	10	10	60	20	100
7BTIT02	Cryptography and Information Security	3	3	1	0	3	10	10	60	20	100
7BTIT03	Software Testing	3	3	1	0	3	10	10	60	20	100
7BTIT04	Elective III	3	3	0	0	3	10	10	60	20	100
7BTIT05	Elective IV	3	3	0	0	3	10	10	60	20	100
Code	**Subject**	**Credit**	**Hrs./Week**			**Exam Hrs.**	**MaximumMarks**				
			L	**T**	**P**		**MP1**	**MP2**	**EndTerm**	**Viva**	**Total**
7BTIT05	Cryptography & Information Security Lab	2	0	0	2	3	30	30	30	10	100
7BTIT06	Colloquium*	2	0	0	2	3	30	30	30	10	100
7BTIT06	Project #	2	0	0	2	3	60	60	60	20	100
	Grand Total	**26**	**18**	**4**	**8**						**1000**

Semester-VIII

Code	Subject	Credit	Hrs./Week			Exam Hrs.	MaximumMarks				
			L	T	P		MT1	MT2	EndTerm	TA	Total
Theory subjects											
8BTIT01	Soft Computing	3	3	1	0	3	10	10	60	20	100
8BTIT02	Elective V	3	3	1	0	3	10	10	60	20	100
8BTIT03	Elective VI	3	3	1	0	3	10	10	60	20	100
Practicallaboratorycourses											
Code	**Subject**	**Credit**	**Hrs./Week**			**Exam Hrs.**	**MaximumMarks**				
			L	**T**	**P**		**MP1**	**MP2**	**EndTerm**	**Viva**	**Total**
8BTIT05	Software Testing Lab	3	0	0	2	3	30	30	30	10	100
8BTIT06	Neural Network Lab using Matlab	3	0	0	2	3	30	30	30	10	100
8BTIT07	Project**	4	0	0	2	3	60	60	60	20	100
	Grand Total	**26**	**18**	**4**	**8**						**1000**

LIST OF ELECTIVE COURSES

Subject code	Course Name	Credits	Lectures	Tutorials	Practical
THEORY					
ITEL1	Distributed Database	3	3	-	-
ITEL2	Mobile Computing	3	3	-	-
ITEL3	Embedded Systems	3	3	-	-
ITEL4	Advanced Computer Architecture	3	3	-	-
ITEL5	Cloud Computing and Services	3	3	-	-
ITEL6	Statistical Modeling and Tools	3	3	-	-
ITEL7	Big Data Analytics	3	3	-	-
ITEL8	Mobile Application Development	3	3	-	-
ITEL9	Network Protocols	3	3	-	-
ITEL10	XML and Web Services	3	3	-	-
ITEL11	Service Oriented Architecture	3	3	-	-
ITEL12	System Analysis and Design	3	3	-	-
ITEL13	Decision Support System	3	3	-	-
ITEL14	Advanced Java Technology	3	3	-	-
ITEL15	.Net Technology	3	3	-	-
ITEL16	Artificial Intelligence	3	3	-	-
ITEL17	E-commerce & ERP	3	3	-	-
EC8T02	Digital Image Processing	4	3	1	-

101EngineeringMathematics-

SN	CONTENTS
1	**Calculus:** Improperintegrals(BetaandGammafunctions)andtheirproperties;Applicationsofdefiniteintegralstoevaluatesurfa
2	**SequencesandSeries:** Convergenceofsequenceandseries,testsforconvergence; Power series, Taylor's series, series for exponential, trigonometric andlogarithmfunctions.
3	**FourierSeries:** Periodic functions, Fourier series, Euler's formula, Change ofintervals,Halfrangesineandcosineseries,Parseval'sth
4	**MultivariableCalculus(Differentiation):** Limit,continuityandpartialderivatives,directionalderivatives,totalderivative;Tangentplaneandnormalline;MaximLagrangemultipliers;Gradient,curland divergence.
5	**MultivariableCalculus(Integration):** Multiple Integration:Double integrals(Cartesian),change oforderof integration in doubleintegrals, Changeof variabland volumes,Centre ofmass and Gravity (constantand variabledensities); Triple integrals(Cartesian),Simple applicationsparallelepipeds;Scalarlineintegrals,vectorlineintegrals,scalarsurfaceintegrals, vectorsurfaceintegrals,TheoremsofGreen,GaussandStokes.

102:EngineeringPhysics

SN	CONTENTS	Hours
1	**WaveOptics:** Newton'sRings,Michelson's Interferometer,FraunhoferDiffraction fromaSingleSlit.Diffractiongrating:Construction,theoryandspectrum, Resolving power and Rayleigh criterionfor limit of resolution,Resolvingpowerofdiffractiongrating,X-RaydiffractionandBragg'sLaw.	9
2	**QuantumMechanics:** Introduction to quantum Mechanics, Wave-particle duality,Matterwaves,Wavefunctionandbasicpostulates,Timedependentandtime independentSchrodinger'sWaveEquation,Physicalinterpretationof wavefunctionanditsproperties,ApplicationsoftheSchrodinger's Equation:Particleinonedimensionalandthreedimensionalboxes.	6
3	**CoherenceandOpticalFibers:** Spatialandtemporalcoherence:Coherencelength;Coherencetimeand'Q'factorforlight,Visibilityasameasureof Coherenceandspectral purity, Optical fiber as optical waveguide, Numerical aperture;Maximumangleofacceptanceandapplicationsofoptical fiber.	4
4	**Laser:** Einstein'sTheoryoflaseraction;Einstein'scoefficients;PropertiesofLaser beam, Amplification of light by populationinversion,Components of laser, Construction and working ofHe-Ne andsemiconductorlasers,ApplicationsofLasersinScience,engineering andmedicine.	6
5	**MaterialScience&SemiconductorPhysics:** Bondinginsolids:covalentandmetallicbonding,Energybandsinsolids: Classification of solids as Insulators, SemiconductorsandConductors, Intrinsicand extrinsicsemiconductors,Fermidiracdistribution function and Fermi energy, Conductivity in semiconductors,HallEffect:Theory, HallCoefficientandapplications.	6
6	**IntroductiontoElectromagnetism:** Divergenceandcurlofelectrostaticfield,Laplace'sandPoisson'sequationsforelectrostaticpotential,Bio-Savartlaw,Divergenceand curlofstaticmagneticfield,Faraday'slaw,Displacementcurrentand magneticfieldarisingfromtimedependentelectricfield,Maxwell's equations,FlowofenergyandPoyntingvector.	8
	TOTAL	**40**

03:CommunicationSkills

SN	CONTENTS	Hours
1	**Communication:** Meaning,ImportanceandCycleofCommunication.MediaandTypes ofCommunication. Verbal and Non-Verbal Communication.Barriers tocommunication. Formal and Informal Channels of Communication(Corporate Communication). DivisionsofHumanCommunication andMethods to improve Interpersonal Communication.Qualities of goodcommunication.	6
2	**Grammar:** PassiveVoice. ReportedSpeech. ConditionalSentences. ModalVerbs.LinkingWords(Conjunctions)	6
3	**Composition:** Job Application and Curriculum-Vitae Writing. Business Letter Writing.ParagraphWriting.ReportWriting.	6
4	**ShortStories:** "Luncheon" bySomersetMaugham."HowMuchLandDoesaManNeed?"byCountLeoTolstoy."The NightTrainatDeoli"byRuskinBond.	6
5	**Poems:** "NoMenareForeign"byJamesKirkup."If"byRudyardKipling."WheretheMindis withoutFear"byRabindranathTagore.	65
	TOTAL	35

104:ProgrammingforProblemSolving

SN	CONTENTS	Hours
1	**FundamentalsofComputer:** Storedprogramarchitectureofcomputers,Storagedevice-Primary memory,andSecondarystorage,Random,Direct,Sequentialaccess methods,Concepts ofHigh-level,AssemblyandLow-levellanguages,Representingalgorithmsthroughflowchartandpseudocode.	**12**
2	**Numbersystem:** Data representations,Conceptsofradixand representation ofnumbersinradixrwithspecialcasesofr=2,8,10and16with conversionfromradixr1tor2,r'sand(r-1)'scomplement,Binaryaddition,Binarysubtraction,Representationofalphabets.	**12**
3	**CProgramming:** Problemspecification, flowchart, datatypes, assignmentstatements,input outputstatements, developing simpleC programs, Ifstatement,forloops,whileloops,do-whileloops,switchstatement, breakstatement,continuestatement,developmentofCprograms using above statements, Arrays, functions,parameter passing, recursion,ProgramminginCusingthesestatements,Structures,files,pointersandmultifile handling.	**12**
	TOTAL	**36**

105:BasicElectricalEngineering

SN	CONTENTS	Hours
1	**DCCircuits:** Electricalcircuit elements(R,LandC),voltageandcurrent sources,Kirchhoffcurrentandvoltagelaws,Series-Parallelcircuits,Nodevoltagemethod,Meshcurrentmethod,Superposition,Th evenin's,Norton'sandMaximumpowertransfertheorems.	8
2	**ACCircuits:** Representationof sinusoidal waveforms, peak and r.m.s values,phasorrepresentation,realpower,reactivepower,apparentpower,powerfa ctor.Analysisofsingle-phaseACcircuitsconsistingofR,L, C,RL,RCandRLCcombinations(seriesandparallel),resonance. Threephasebalancedcircuits,voltageandcurrentrelationsinstar and deltaconnections.	8
3	**Transformers:** Idealandpracticaltransformer,EMFequation,equivalentcircuit,lossesintransforme rs,regulationandefficiency.	6
4	**ElectricalMachines:** Generationofrotatingmagneticfields,Constructionandworkingof athree-phase induction motor, Significance of torque-slipcharacteristic. Starting and speed control of inductionmotor,single-phaseinduction motor. Construction, working, torque-speed characteristicandspeedcontrolofseparatelyexcitedDCmotor. Construction andworkingof synchronousgenerators.	6
5	**PowerConverters:** Semiconductor PN junction diode and transistor (BJT).CharacteristicsofSCR,powertransistorandIGBT.B asiccircuitsofsinglephaserectifierwithRload,SinglephaseInverter,DC-DCconverter.	6
6	**ElectricalInstallations:** LayoutofLTswitchgear:Switchfuseunit (SFU),MCB,ELCB,MCCB,Typeofearthing.Powermeasurement,elementarycalc ulationsfor energyconsumption.	6
	TOTAL	**40**

106:EngineeringPhysicsLab

1Todeterminethewavelengthofmonochromaticlightwiththehelpof Michelson'sinterferometer.
2.Todeterminethewavelengthofsodiumlight byNewton's Ring.
3. Todeterminethewavelengthofprominentlinesofmercurybyplanediffractiongrating withthehelpof spectrometer.
4. DeterminationofbandgapusingaP-Njunctiondiode.
5. Todeterminetheheightofgivenobjectwiththehelp ofsextant.
6.Todeterminethedispersive powerofmaterialofaprismwiththehelpofspectrometer.
6.Tostudythechargeanddischargeofacondenserandhencedeterminethesameconstant(bothcurrentandvoltagegraphsaretobeplotted.
8. Todeterminethecoherencelengthandcoherencetimeoflaserusing He–Nelaser.
9. Tomeasurethenumericalapertureofanopticalfibre.
10. TostudytheHallEffectanddeterminetheHallVoltageandHallcoefficients.

106:LanguageLab

1. PhoneticSymbols andTranscriptions.
2. Extempore.
3. GroupDiscussion.
4. DialogueWriting.
5. Listeningcomprehension.

108:ComputerProgrammingLab

1. To learn about the C Library, Preprocessor directive, Input-outputstatement.
2. Programstolearndatatype,variables,If-elsestatement
3 Programs tounderstandnestedif-elsestatementandswitchstatement
4. Programstolearniterativestatements likewhileanddo-whileloops
5. Programstounderstandforloopsforiterativestatements
6. Programstolearnabout arrayandstringoperations
6.Programstounderstandsortingandsearchingusingarray
8. Programstolearnfunctions andrecursivefunctions
9. ProgramstounderstandStructureand Union operation
10Programs tolearnPointeroperations
11.ProgramstounderstandFilehandlingoperations
12Programstoinput datathroughCommandlineargument

109:BasicElectricalEngineeringLab

1. Basicsafetyprecautions. Introductionanduseofmeasuringinstruments –voltmeter,ammeter,multi-meter,oscilloscope.Real-liferesistors,capacitorsandinductors.
2. Transformers: Observation of the no-load current waveform on anoscilloscope.Loadingofatransformer:measurementofprimaryandsecondaryvoltagesandcurrents,andpower.
3. Three-phase transformers: Star and Delta connections. Voltage and Current relationships(line-linevoltage,phase-to-neutralvoltage,lineandphase currents).Phase-shifts between the primary andsecondaryside.
4. Demonstrationofcut-outsectionsofmachines:dcmachine(commutator-brusharrangement),inductionmachine(squirrelcagerotor),synchronous machine(fieldwinging-slipringarrangement)andsingle-phaseinductionmachine.
5. TorqueSpeedCharacteristicofseparatelyexciteddcmotor.
6. Demonstrationof(a)dc-dcconverters(b)dc-acconverters–PWMwaveform (c)theuseofdc-acconverterforspeedcontrolofaninduction motorand(d)Components ofLTswitchgear.

110:ComputerAidedEngineeringGraphicsLab

Introduction: Principlesofdrawing,lines,typeoflines,usageof Drawing instruments,lettering,Conic sectionsincluding parabola, hyperbola, Rectangular Hyperbola (General method only); Scales-Plain,DiagonalandVernierScales.
ProjectionsofPoint&Lines: PositionofPoint,NotationSystem,SystematicApproachforprojectionsofpoints,front view&Topviewofpoint,Positionof straight lines, line parallel to Both the RPs, Lineperpendicular to either of the RPs, LineinclinedtooneRPandparalleltotheother,LineinclinedtoBoththeRPs,Tracesof aline(Onedrawingsheet,oneassignmentinsketchbook).
ProjectionofPlanes: Positionsofplanes,Termsusedinprojectionsofplanes, planeparalleltoRP,planeinclinedtooneRPandperpendicultartotheotherRP,planeperpendiculartoBoththeRPs,planeInclinedtoBoththeRPs,Trueshapeoftheplane,Distanceof apointfromplane,Anglebetweentwoplanes.**ProjectionsofRegularSolids:**frustumandtruncatedsolids,thoseinclinedto both the Planes-AuxiliaryViews.
SectionofSolids: Theoryofsectioning,sectionofprismsandcubes,sectionof pyramidsandTetrahedronsectionofCylinders,sectionofcones,sectionofspheres (Onedrawingsheet,oneassignmentinsketchbook)
OverviewofComputerGraphics: CoveringtheoryofCADsoftware[suchas:Themenu System, Toolbars(standard, Object Properties, Draw, Modify andDimension),DrawingArea(Background,Crosshairs,CoordinateSystem),Dialogboxesandwindows,Shortcutmenus(ButtonBars), CommandLine(whereapplicable),TheStatusBar,Differentmethods ofzoomas usedinCAD,Selectanderaseobjects.:IsometricViewsoflines,Planes,SimpleandcompoundSolids.

201:EngineeringMathematics-II

SN	CONTENTS	Hours
1	**Matrices:** Rankofamatrix,rank-nullitytheorem;Systemoflinearequations; Symmetric,skew-symmetricandorthogonalmatrices; Eigenvaluesand eigenvectors; Diagonalizationof matrices; Cayley-HamiltonTheorem,andOrthogonaltransformation.	**10**
2	**Firstorderordinarydifferentialequations:** Linearand Bernoulli'sequations,Exact equations,Equationsnotof firstdegree:equationssolvablefor*p*,equationssolvablefor*y*, equations solvable for *x* andClairaut'stype.	**6**
3	**Ordinarydifferentialequationsofhigherorders:** Linear Differential Equations of Higher order with constant coefficients,SimultaneousLinear DifferentialEquations,Secondorderlineardifferentialequationswithvariablecoefficients:Homogenous andExactforms,onepartofCFisknown,Changeofdependentand independentvariables,methodofvariationofparameters,Cauchy-Eulerequation; PowerseriessolutionsincludingLegendredifferentialequationandBesseldifferentialequations.	**12**
4	**PartialDifferentialEquations–Firstorder:** OrderandDegree,Formation;LinearPartialdifferentialequationsof First order,Lagrange'sForm,NonLinearPartialDifferentialequationsoffirstorder,Charpit'smethod, Standardforms.	**6**
5	**PartialDifferentialEquations–Higherorder:** Classification of Second order partial differential equations,Separationofvariablesmethodtosimpleproblemsin Cartesian coordinates including twodimensionalLaplace,onedimensionalHeatandonedimensionalWaveequations.	**6**
	TOTAL	**40**

202:EngineeringChemistry

SN	CONTENTS	Hours
1	**Water:** Common impurities, hardness, determination of hardness bycomplexometric (EDTAmethod), Degree of hardness, Units of hardness Municipalwatersupply:Requisiteofdrinkingwater,Purificationof water; sedimentation, filtration, disinfection, breakpoint chlorination.Boiler troubles:ScaleandSludgeformation, Internaltreatmentmethods, Priming andFoaming, Boiler corrosion and CausticembrittlementWater softening;Lime-Sodaprocess, Zeolite (Permutit)process, Demineralization process.Numerical problems based onHardness,EDTA,Lime-SodaandZeolite process.	**10**
2	**OrganicFuels:** Solidfuels:Coal,ClassificationofCoal,ProximateandUltimate analysesofcoalanditssignificance,GrossandNetCalorificvalue, Determination of Calorific value of coal byBomb Calorimeter.Metallurgical coke, Carbonization processes; Otto-Hoffmann by-productovenmethod. Liquidfuels:Advantagesofliquidfuels,Mining, Refining and Composition ofpetroleum,Cracking,Syntheticpetrol,Reforming,Knocking, Octanenumber, Anti-knocking agents, Cetanenumber Gaseousfuels;Advantages,manufacturing,compositionandCalorificvalueofcoalgasandoilgas,Determinationofcalorific value of gaseous fuels by Junker'scalorimeter Numericalproblems basedondeterminationofcalorificvalue(bomb calorimeter/Junkerscalorimeter/Dulongs formula, proximate analysis& ultimateandcombustionoffuel.	**10**
3	**Corrosionanditscontrol:** Definitionandsignificanceofcorrosion,Mechanismofchemical(dry)andelectrochemical(wet)corrosion,galvaniccorrosion,concentrationcorrosionandpittingcorrosion. Protection from corrosion; protective coatings-galvanization andtinning,cathodicprotection,sacrificialanodeandmodificationsin design.	**3**
4	**EngineeringMaterials:** PortlandCement; Definition,ManufacturingbyRotarykiln.Chemistryofsettingandhardeningofcement.Role of Gypsum. Glass:Definition,Manufacturingbytankfurnace,significanceofannealing,Types andpropertiesofsoftglass,hardglass,borosilicateglass,glasswool,safetyglass Lubricants: Classification, Mechanism, Properties; Viscosity andviscosity index, flash and fire point, cloud and pour point.	**10**
5	**Organicreactionmechanismandintroductionofdrugs:** Organicreactionmechanism:Substitution; SN1,SN2,Elecrophilicaromatic substitution inbenzene, free radical halogenations of alkanes,Elimination;eliminationinalkylhalides,dehydrationofalcohols,Addition:electrophilicandfreeradicaladditioninalkenes,nucleophilicaddition in aldehyde and ketones, Rearrangement; Carbocation and free radicalrearrangements Drugs:Introduction,Synthesis,propertiesandusesofAspirin,Paracetamol	**6**
	TOTAL	**40**

203: HumanValues

SN	CONTENTS	Hours
1	**CourseIntroduction-Need,BasicGuidelines,ContentandProcessforValueEducation** Understandingtheneed,basicguidelines,SelfExploration-its content and process; 'Natural Acceptance' andExperiential Validation, ContinuousHappinessandProsperity-HumanAspirations,Right understanding,Relationship and Physical Facilities,Understanding HappinessandProsperitycorrectly-Acriticalappraisalofthecurrentscenario. Methodtofulfilltheabovehumanaspirations:understandingandlivinginharmonyatvariouslevels	5
2	**UnderstandingHarmonyintheHumanBeing-HarmonyinMyself**Understandinghumanbeingasaco-existenceofthesentient'I'andthe material'Body' Understanding the needs of Self ('I') and 'Body' - Sukh and Suvidha UnderstandingtheBodyasaninstrumentof'I',Understandingthe characteristicsandactivitiesof'I'andharmonyin'I'Understanding theharmonyofIwiththeBody:SanyamandSwasthya;correctappraisalof Physicalneeds,meaningofProsperityindetail,ProgramstoensureSanyamandSwasthya.	5
3	**UnderstandingHarmonyintheFamilyandSociety-HarmonyinHuman-HumanRelationship** Understanding harmony in the Family, Understanding values in human-humanrelationship;meaningofNyayaandprogramforitsfulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect (Samman),meaningofVishwas;Differencebetweenintentionandcompetence,meaningofSamman,Differencebetweenrespectanddifferentiation; theothersalientvaluesinrelationship, harmonyinthesociety,Samadhan,Samridhi,Abhay,Sah-astitvaascomprehensiveHuman Goals,Visualizingauniversalharmonious orderinsociety- Undivided Society(AkhandSamaj),UniversalOrder(SarvabhaumVyawastha)- fromfamilytoworldfamily.	5
4	**UnderstandingHarmonyintheNatureandExistence-WholeexistenceasCoexistence** UnderstandingtheharmonyintheNature.Interconnectednessand mutualfulfillmentamongthefourordersofnature-recyclabilityandself-regulationinnature.UnderstandingExistenceasCo-existence	5
5	**ImplicationsoftheaboveHolisticUnderstandingofHarmonyonProfessionalEthics.Naturalacceptanceofhumanvalues** DefinitivenessofEthicalHumanConduct.BasisforHumanistic Education, Humanistic Constitution andHumanistic Universal Order. Competence in Professional Ethics: a) Ability to utilize the professional competence foraugmentinguniversalhumanorder, b)Abilitytoidentifythescopeandcharacteristicsofpeople-friendly andeco-friendlyproductionsystems,technologiesandmanagementmodels.StrategyfortransitionfromthepresentstatetoUniversalHumanOrder:Atthelevelof individual:associallyandecologicallyresponsibleengineers,technologistsandmanagers. Casestudies relatedtovalues inprofessionallifeandindividuallife.	5
	TOTAL	**25**

204:BasicMechanicalEngineering

SN	CONTENTS	Hours
1	**Fundamentals:** Introductiontomechanicalengineering,conceptsofthermalengineering,mechanicalmachine design,industrial engineering andmanufacturingtechnology. Steam Boilersclassificationandtypesofsteam boilersandsteamturbines.IntroductionandClassificationofpowerplants.	6
2	**PumpsandICEngines:** Applicationsand working ofReciprocating and Centrifugalpumps.Introduction, Classification ofICEngines,Main ComponentsofICEngines,WorkingofICEnginesanditscomponents.	6
3	**RefrigerationandAirConditioning:** Introduction,classificationandtypesofrefrigerationsystemsand air-conditioning.Applications ofrefrigerationandAir-conditioning.	6
4	**TransmissionofPower:** IntroductionandtypesofBelt andRopeDrives,Gears.	6
5	**PrimaryManufacturingProcesses:** MetalCastingProcess:IntroductiontoCastingProcess,Patterns,Molding, Furnaces. Metal Forming Processes: Introduction toForging,Rolling, Extrusion, Drawing. Metal Joining Processes:Introductiontovarioustypesof Welding,GasCutting,Brazing,andSoldering.	6
6	**EngineeringMaterialsandHeatTreatmentofSteel:** Introductiontovariousengineeringmaterialsandtheir properties.	5
TOTAL		**40**

205:BasicCivilEngineering

SN	CONTENTS	Hours
1	**Introductiontoobjective,scopeandoutcomethesubject**	
2	**Introduction:** ScopeandSpecializationofCivilEngineering,RoleofcivilEngineerinSociety,Impactofinfra structuraldevelopmentoneconomyofcountry.	**8**
3	**Surveying:** Object,Principles&TypesofSurveying;SitePlans,Plans&Maps;Scales& UnitofdifferentMeasurements. LinearMeasurements:Instrumentsused.LinearMeasurementbyTape,RangingoutSurvey Lines and overcoming Obstructions; Measurements on sloping ground;Tape corrections,conventionalsymbols. AngularMeasurements:Instrumentsused;IntroductiontoCompass Surveying,BearingsandLongitude&Latitudeof aLine,Introductiontototalstation. Levelling:Instrumentused, Objectoflevelling,Methodsoflevellinginbrief, Contourmaps.	**8**
4	**Buildings:** SelectionofsiteforBuildings,LayoutofBuildingPlan,Typesofbuildings,Plintharea, carpet area, floor spaceindex, Introduction to buildingbyelaws,conceptofsunlightandventilation.Components ofBuildings&theirfunctions,BasicconceptofR.C.C.,Introductiontotypesof foundation.	**8**
5	**Transportation:** IntroductiontoTransportationEngineering;TrafficandRoadSafety: TypesandCharacteristicsofVariousModesofTransportation;VariousRoadTrafficSigns,Ca usesofAccidentsandRoadSafetyMeasures.	**8**
6	**EnvironmentalEngineering:** Environmental Pollution, Environmental Acts and Regulations,FunctionalConceptsofEcology,BasicsofSpecies,Biodiversity, Ecosystem,HydrologicalCycle;ChemicalCycles:Carbon,Nitrogen& Phosphorus; Energy Flow in Eco-systemsWaterPollution:Water Qualitystandards,IntroductiontoTreatment&DisposalofWasteWater.ReuseandSavingofWat er,Rain Water Harvesting.SolidWasteManagement:ClassificationofSolidWaste,Collection, TransportationandDisposalofSolid.RecyclingofSolidWaste: Energy Recovery,Sanitary Land fill, On-SiteSanitation. Air&NoisePollution:PrimaryandSecondaryairpollutants,HarmfuleffectsofAirPollution, ControlofAirPollution..NoisePollution, HarmfulEffectsofnoisepollution,controlofnoisepollution,Global warming& Climate Change,Ozonedepletion,GreenHouse effect	**8**
	TOTAL	**40**

206:EngineeringChemistryLab

1. DeterminationthehardnessofwaterbyEDTA method
2. Determinationofresidualchlorineinwater
3. Determinationofdissolvedoxygeninwater
4. Determination ofthestrengthofFerrousAmmoniumsulphatesolution with the help ofK2Cr2O6solutionbyusingdiphenylamineindicator
5. Determinationofthe strengthofCuSO4solutioniodometricallybyusing hyposolution
6. Determination ofthestrengthofNaOHandNa2CO3inagivenalkalimixture
6. ProximateanalysisofCoal
8. Determination oftheflash&firepoint and cloud &pourpointoflubricatingoil
9. Determination ofthekinematicviscosityoflubricatingoilbyRedwood viscometer no. 1atdifferenttemperature
10. SynthesisofAspirin/ Paracetamol

206: Human ValuesActivitiesLab

PS1:
Introduceyourselfindetail.Whatarethegoalsinyourlife?Howdoyousetyour goalsinyourlife?Howdoyoudifferentiatebetweenrightandwrong?Whathave beenyoursalientachievementsandshortcomingsinyourlife?Observeandanalyze them.

PS2:
Now-a-days,thereisalotoftalkaboutmanytechnogenicmaladiessuchasenergy andmaterialresourcedepletion,environmentalpollution,globalwarming,ozone depletion,deforestation,soildegradation,etc.- all these seem to be manmade problems,threateningthesurvivaloflifeEarth-Whatistherootcauseofthese maladies & what is the way out inopinion?
On the otherhand, thereisrapidly growingdangerbecauseof nuclearproliferation, armsrace,terrorism,breakdownofrelationships,generationgap,depression & suicidal attemptsetc.- whatdoyouthink,istherootcauseofthesethreats to human happiness and peace - what couldbe thewayoutinyouropinion?

PS3:
1. Observethateachof ushas thefacultyof 'Natural Acceptance',basedon whichonecanverify whatisrightornot rightforhim.(Assuch weare not properly trained to listen to our'Natural Acceptance' andmay a timeit is also clouded by our strong per-conditioning and sensoryattractions). Explorethefollowing:
(i) WhatisNaturallyAcceptable'toyouinrelationshipthefeelingofrespectordisrespectforyourself andforothers?
(ii) Whatis'naturallyAcceptable'toyou-tonurtureortoexploitothers?Is yourlivinginaccordance withyournaturalacceptance ordifferentfromit?
2. Outofthethreebasicrequirementsforfulfillmentofyouraspirations-rightunderstanding,relationship and physical facilities - observe how the problems inyourfamilyarerelatedtoeach.Alsoobservehowmuchtime&effortyoudevote foreach inyourdailyroutine.

PS4:

listdownallyourimportantdesires.Observewhetherthedesireisrelatedto Self (I) or theBody. Ifitappearstoberelatedtoboth,visualizewhichpartofitisrelatedtoSelf(I) andwhichpartisrelatedtoBody.

PS5:

1. a.Observethatanyphysicalfacilityyouuse,followsthegivensequencewithtime: Necessaryandtasteful-unnecessarybutstilltasteful-unnecessaryand tasteless-intolerable
b.Incontrast,observethatanyfeelinginyouiseithernaturallyacceptableornot acceptableatall.If notacceptable,youwantitcontinuously andif notacceptable, you do not want it anymoment!
2. Listdownallyour importantactivities.Observewhether theactivityisof'I'orof

PS6:

1.Chalkoutsomeprogramstowardsensuringyourharmonywiththebody-interms ofnurturing,protectionandrightutilizationof thebody.

2.Findouttheplantsandshrubsgrowinginandaroundyourcampus,whichcanbeusefulincuringcommondiseases.

PS6:

Formsmallgroups intheclassandmakethemcarryoutadialoguefocusing onthefollowing eightquestionsrelatedto'TRUST';

1a.DoIwanttomakemyselfhappy?2a.DoIwanttomaketheotherhappy?

3a.Doestheotherwant tomakehimself/herselfhappy?4a.Doestheotherwant tomakemehappy?

What istheanswer?

Intention(NaturalAcceptance)

1b.AmIabletoalwaysmakemyselfhappy?2b.AmIabletoalwaysmaketheotherhappy?

3b. Istheotherabletoalwaysmakehimself/herselfhappy?What istheanswer?

Leteachstudentanswerthequestions forhimselfandeveryoneelse.Discuss thedifferencebetweenintentionandcompetence.Observewhetheryouevaluateyourselfand othersonthebasis of intention/competence.

PS8:

1.Observe, on how many occasions, you are able to respect your related ones (by doingtherightevaluation)andonhowmanyoccasionsyouaredisrespecting by way of under-evaluation, over-evaluationorotherwise evaluation.

2.Also,observewhetheryourfeelingofrespectisbasedontreatingtheotherasyouwouldtreatyourselforondifferentiations basedonbody,physicalfacilitiesorbelieds.

PS9:

1.Writeanarrationintheformofastory,poem,skitoressaytoclarifyasalient Human Valuetothechildren.

2.Recollectandnarrateanincidentinyourlifewhereyouwereabletoexhibitwillfuladherencetobaluesinadifficultsituation.

PS10:

Listdownsomecommonunits(things)of Naturewhichyoucomeacrossinyourdailylifeandclassify theminthefourordersofNature.Analysisandexplaintheaspect ofmutualfulfillmentofeachunitwithotherorders.

PS11:

Makeacharttoshowthewholeexistenceasco-existence.Withthehelpofthischarttrytoidentifythe role and the scope of some of the courses of your study. Also indicatetheareaswhicharebeingeitherover-emphasizedorignoredinthepresentcontext.

PS12:

Identifyanytwoimportantproblemsbeingfacedbythesocietytodayandanalyze therootcauseoftheseproblems.Canthesebesolvedonthebasicofnaturalacceptance ofhumanvalues.Ifso, howshouldoneproceedinthisdirectionfrom

PS13:

1. Suggest ways in which you can use your knowledge ofScience/Technology/Managementetc.formovingtowardsauniversalhumanorder.
2. Proposeabroadoutlinefor humanisticConstitutionatthelevelofNation.

PS14:

Thecourseisgoingtobeover now.Itistimetoevaluatewhatdifferenceinyourthinkingithasmade.Summarizethecoremassageofthiscours egraspedbyyou. How has this affectedyouinterms of;

a. Thought
b. Behavior
c. Workand
d. Relization

Whatpracticalstepsareyouabletovisualizeforthetransitionofthesocietyfromitspresentstate.Project: Everystudentrequiredtotake-upasocialprojecte.g.educatingchildrenin needy/weakersection,services inhospitals, NGO's andothersuchworki.e. socialworkatvillagesadoptedbyrespectiveinstitute/college.

208:ManufacturingPracticesWorkshop

CarpentryShop

1. T–Lapjoint
2. Bridle

jointFoundrySho p

3. Mouldofanypattern
4. Casting ofanysimple

patternWeldingShop

5. Lapjointbygaswelding
6. Buttjoint byarcwelding
6. Lapjointbyarcwelding
8. Demonstrationofbrazing,

soldering&gascuttingMachine ShopPractice

9. JobonlathewithonestepturningandchamferingoperationsFittin gandSheetMetalShop
10. Finishingoftwosidesofasquarepieceby filing
11. Making mechanicaljointandsolderingofjointon sheetmetal
12. Tocutasquarenotchusinghacksawandtodrillaholeandtapping

209:BasicCivilEngineering Lab

1. LinearMeasurementbyTape:

a) RangingandFixingofSurveyStationalongstraightlineand acrossobstacles.

b) Layingperpendicularoffsetalongthesurveyline

2. CompassSurvey:MeasurementofbearingoflinesusingSurveyor'sandPrismatic compass

3. Levelling:UsingTilting/Dumpy/AutomaticLevel

a) Todeterminethereducedlevelsinclosedcircuit.

b) Tocarryoutprofilelevellingandplotlongitudinalandcrosssectionsfor roadbyHeightofInstrumentandRise&FallMethod.

4. Tostudyandtakemeasurementsusingvariouselectronicsurveyinginstrumentslike EDM,TotalStationetc.

5. To determinepH,hardnessand turbidityofthegivensampleofwater.

6. TostudyvariouswatersupplyFittings.

6. To determinethepHand totalsolidsofthegivensampleofsewage.

8. TostudyvariousSanitaryFittings.

210:ComputerAided MachineDrawingLab

Introduction:Principlesofdrawing,conventionalrepresentationofmachinecomponentsa ndmaterials,lines,typesoflines,dimensioningtypes,rulesofdimensioning.

Conversionofpictorialviewsintoorthographicviews:(1drawingsheet)Introductiontoorth ographicprojection,concept of first angle and third angle projection,drawingofsimplemachineelementsinfirstangleprojection,missingviewprobl emscoveringPrinciplesofOrthographic Projections.

Sectionalviewsofmechanicalcomponents: (1 drawing sheet) Introduction, cutting planeline,typeofsectionalviews-
fullsection,halfsection,partialorbrokensection,revolvedsection,removedsection,offsets ection,sectioningconventions-
spokes,webrib,shaft,pipes,differenttypesofholes,conventionsofsectionlinesfordifferent metalsandmaterials.

Fastenersandother mechanicalcomponents:(Freehandsketch)Temporaryand permanentfasteners, thread nomenclature and forms, thread series, designation,representationofthreads,boltedjoints,lockingarrangementofnuts,screws,was hers,
foundationboltsetc.,keys,typesofkeys,cotterandknucklejoints.Rivetedjoints,rivetsandriv eting,typeofrivets,typesofrivetedjointsetc.Bearing:Ball,roller,needle,footstepbearing.Co upling:Protectedtype,
flange, andpintypeflexiblecoupling.Othercomponents:Weldedjoints,beltsandpulleys, pipesandpipejoints,valves etc.

OverviewofComputerGraphics:(2drawingsheets)CoveringtheoryofCADsoftwaresuchas :ThemenuSystem,Toolbars(Standard,ObjectProperties,Draw,Modify and Dimension),Dra CAD,Selectanderaseobjects.:IsometricViewsof
Lines,Planes,SimpleandcompoundSolids

BACK

Subject Code	*Course name*	*Credits*	*Lectures*	*Tutorials*	*Practical*
EC3T03	Digital Electronics & Logic Design	4	3	1	-

Unit I: Introduction To Digital System Design
Number systems, binary arithmetic and codes: positional number system; binary, octal and hexadecimal number systems; representation of signed numbers; binary arithmetic –addition, subtraction, multiplications and division; fixed and floating point numbers ; binary coded decimal codes; Gray codes; error detection and correction codes-parity check codes and Hamming code.

Unit II: Boolean Algebra And Switching Functions
Boolean algebra; basic postulates and fundamental theorems of Boolean algebra; truth tables; basic logic operations and gate symbols ; algebraic forms of switching functions- SOP and POS forms, minterms and maxterms; derivation of canonical forms; minterms and maxterms; simplification of switching functions- K-map and quine- Mc Cluskey tabular minimization methods; synthesis of combinational logic circuits-NAND and NOR networks.

Unit III: Logic Families
Introduction to different logic families; operational characteristics of BJT in saturation and cut-off regions; operational characteristics of MOSFET as switch; TTL inverter- circuit description and operation; CMOS inverter-circuit description and operation; other TTL and CMOS gates; electrical behavior of logic circuits- noise margins, fanout, transmission time, propagation delay, power dissipation.

Unit IV: Combinational Logic Modules
Decoders, encoders, multiplexers, de-multiplexers and their applications; three state devices and buses; code converter; binary adders: half adder and full adder, ripple carry adder, carry-look-ahead adder; subtractors ; multipliers; ALU; comparators; parity circuits; circuit timing-timing diagrams and specifications ; combinational circuit design examples.

Unit V: Sequential Logic Devices And Circuits
Latches; flip- flops; registers, shift-registers; counters ripple counters , synchronous counters , up-down counters, BCD counters, ring counters, timing diagrams and specifications; state machine models-synchronous state machines; state machine design examples design examples; design using ASM charts ; timing hazards and races ; design and analysis of asynchronous sequential circuits: pulse mode and fundamental mode.

Unit VI: Programmable Logic Devices (PLDs)
PROMs, PLAs, PAL, Semiconductor memory: organization, Operation, and classification.

Textbooks:

1. J.F. Wakerly, Digital Design-principles and practices , 3rd Ed, Pearson Education; 2001.
2. V.P.Nelson, H.T.Nagle, B.D. Carroll and J.D. Irwin, Digital Logic Circuit Analysis and Design, Prentice-Hall,1995.
3. R.F.Tinder, Engineering Digital Design, 2nd Ed. Harcourt India,2001.

References:

1. F.J. Hill and G.R. Peterson, Computer –aided Logical Design, 4th Ed. John Wiley, 1993.
2. M.D. Ercegovac, T. Lang and J.H. Moreno, Introduction to Digital Systems, John Wiley, 2000.
3. M. Mano, Digital Design, 2nd Ed. PHI, 1997.
4. Z. Kohavi, Switching and Finite Automata Theory; TMH, 2000.
5. P.K. Lala; Practical Design Logic design and Testing, Prentice-Hall, 1996.

6. D.D. Gajski; Principles of Digital Design, Prentice Hall, 1996.

BACK

Subject Code	*Course name*	*Credits*	*Lectures*	*Tutorials*	*Practical*
IT3T1	Object Oriented Programming	3	3	-	-

UNIT I

Introduction: Introducing Object-Oriented Approach related to other paradigms (functional, data decomposition), Characteristics of Object –Oriented Languages.

Basic terms and ideas: Abstraction, Encapsulation, Information hiding, Inheritance, Polymorphism, Review of C, Difference between C and C++, cin, cout, new, delete operators.

UNIT II

Classes and objects : Abstract data types, Objects & classes, attributes, methods, C++ class declaration, State identity and behavior of an object,Constructors and destructors, instantiation of objects, Default parameter value,Copy Constructor, Static Class Data, Constant and Classes, C++ garbage collection, dynamic memory allocation.

UNIT III

Inheritance and Polymorphism : Inheritance, Types of Inheritance, Class hierarchy,derivation-public, private & protected, Aggregation, composition vs Classification hierarchies, polymorphism, Type of polymorphism- Compile time and runtime, Method polymorphism, polymorphism by parameter, Operator overloading, Parametric Polymorphism, Generic function – template function,f unction name overloading, Overriding inheritance methods.

UNIT IV

File and Exception Handling : Persistent objects, Streams and files, Namespaces, Exception handling, Generic Classes.

UNIT V

Standard Template Library: Standard Template Library, Overview of Standard Template Library, Containers, Algorithms, Iterators, Other STL Elements, The Container Classes, General Theory of Operation, vectors.

Text Books:

1. Grady Booch, Robert A. Maksimchuk, Michael W. Engle ‖Object-Oriented Analysis and Design with Applications (3rd Edition)‖
2. Bruce, Foundations of Object Oriented Languages, PHI
3. Jana, C++ & Object Oriented Programming, PHI
4. Rambaugh, James Michael, Blaha - –Object Oriented Modelling and Design‖ - Prentice Hall India/ Pearson Education**.**

Reference Books:

1. **Rajaram: Object Oriented Programming and C++, New Age International**
2. Olshevsky : Revolutionary guide to Object Oriented Programming using C++, Shroff / Wrox

   Mahapatra: Introduction to System Dynamic Modelling, Universities Press.

BACK

Subject Code	*Course name*	*Credits*	*Lectures*	*Tutorials*	*Practical*
IT3T2	Computer Architecture	3	3	-	-

UNIT-I

Functional units – Basic operational concepts – Bus structures – Software Performance – Memory Locations and Addresses – Memory Operations – Instruction and Instruction Sequencing – Addressing Modes – Flynn's Classification of Computers (SISD, MISD, MIMD) – RISC – CISC – ALU Design – Fixed and Floating Point Operations

UNIT-II

Addition and Subtraction – Fast Adders – Binary Multiplication – Binary Division – Floating Point Numbers – Representation – Arithmetic Operators

UNIT-III

Fundamental Concepts – Multiple Bus Organization – Execution of Complete Instruction – Hardwired Control – Micro Programmed Control – Instruction Level Parallelism

UNIT-IV

Basic Concepts – Data Hazards – Instruction Hazards – Influence on Instruction Sets – Data Path and Control Considerations – Performance Considerations –Exception Handling – Advanced Concepts in Pipelining – Exploitation of more ILP – Hardware and Software Approaches – Dynamic Scheduling – Speculation –Compiler Approaches – Multiple Issue Processors

UNIT-V

Basic Concepts – Semiconductor RAM – ROM – Speed – Size and Cost – Cache Memories – Improving Cache Performance – Virtual Memory – Memory Management requirements – Associative Memories – Secondary Storage Devices – Accessing I/O Device – Interrupts – DMA – Buses – Interface Circuits – Standard I/O Interfaces (PCI, SCSI, USB) – I/O Devices and Processors

Text Book:

1. Carl Hamacher, Zvonko Vranesic and Safwat Zaky, ―Computer Organization‖, Fifth Edition, Tata McGraw Hill, 2002.
2. David A. Patterson and John L. Hennessy, ―Computer Organization and Design: The Hardware/Software Interface‖, Third Edition, Elsevier, 2005.

Reference Books:

1. William Stallings, ―Computer Organization and Architecture: Designing for Performance‖, Sixth Edition, Pearson Education, 2003.
2. John P. Hayes, ―Computer Architecture and Organization‖, Third Edition, Tata McGraw Hill, 1998.
3. V.P. Heuring, H.F. Jordan, ―Computer Systems Design and Architecture‖, Second

Edition, Pearson Education, 2004.
4. Behrooz Parhami, —Computer Architecture‖, Oxford University Press, 2007.

BACK

Subject Code	*Course name*	*Credits*	*Lectures*	*Tutorials*	*Practical*
IT3T3	Data Structures	3	3	-	-

UNIT I

Basic concept of data structures, mathematical preliminaries-big oh notation, notion of space and time complexity, simple algorithms and illustration of their complexity, recursion.

UNIT II

Abstract Data Types – Algorithm Notations - Basic data structures – Arrays – Lists – Singly linked lists – Doubly linked lists – Circular lists - Stacks and Queues – Applications of Stack and Queues

UNIT III

Trees – Binary Trees – Binary tree representation and traversals – Threaded binary trees, Counting Binary Tree, AVL Trees – Binary tree representation of general trees – Application of trees: Set representation – Graph and its representations – Graph Traversals

UNIT IV

Insertion sort – Merge sort – Quick sort – Heap sort, Radix sort – Sorting with disks – K-way Merging – Sorting with Tapes – Polyphase Merge

UNIT V

Linear Search – Binary Search - Hash Tables – Overflow Handling – Cylinder Surface Indexing – Hash Index – B-Tree Indexing.

Text books:

1. E. Horowitz and S. Sahani, ― Fundamentals of Data Structures‖, Galgotia Book source Pvt. Ltd. 1999.
2. R.L.Kruse, B.P. Leung, C.L. Tondo, ― Data Structure and program design in C‖,PHI,2000.
3. Sartaj Sahni, ―Data Structures, Algorithms, and Applications in C++‖, Second Edition, McGraw Hill NY, Silicon Press, 2005.

Reference books:

1. Schaum‘s outline series, ― Data Structure‖, TMH, 2002.
2. Y.Langsamet. Al., ― Data Structures using C and C++‖, PHI,1999.
3. Yashwantkanethkar, ― Data Structure through C‖, BPB, 2005.
4. AV Aho, J hopcroft, JD Ullman, ―Data Structures and Algorithms‖, Addison-Wesley.
5. Goodrich, Michael T., Roberto Tamassia, David Mount. ―Data Structures and Algorithms in C++‖, Seventh Edition, Wiley Publishers, 2004.
6. Mark Allen Weiss, Data Structures and Algorithm Analysis in C++, 3rd edition, Pearson Education India, 2007.
7. Jean-Paul Tremblay and Paul G. Sorenson, An Introduction to Data Structures with

Applications, Second Edition, Tata McGraw-Hill, New Delhi, 1991.
8. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, "Introduction to Algorithms", Third Edition, Prentice Hall of India, , 2010.

BACK

Subject Code	*Course name*	*Credits*	*Lectures*	*Tutorials*	*Practical*
IT3T4	Software engineering	3	3	-	-

UNIT-1
Software and software engineering-Evolution and impact of software engineering, Software life cycle Models, Waterfall model, , Incremental and Evolutionary Process Models, Feasibility study, Functional and nonfunctional requirements, Requirement gathering, Requirement analysis and specification.

UNIT-2
Issues in software design-Basic issues in software design, Modularity, Cohesion, Coupling and layering , Function oriented software design, Data flow diagram and structure chart.

UNIT-3
Software project management-Project management, Project planning and control, Cost estimation, Project scheduling using PERT and GANTT charts.

UNIT-3
Object modeling-Object modelling using UML, Object oriented software development ,User interface design,Object oriented software development, Coding standards and code review techniques.

UNIT-4
Testing-Fundamentals of testing, White box and black box testing, Test coverage analysis and test case design techniques, Mutation testing, Static and dynamic analysis..
UNIT-5
Software reliability-Hardware reliability vs software reliability, failure and faults, reliability models, basic model, logarithmic poissonmodel,software quality models, CMM & ISO 9001.

UNIT-6
Quality management-Rayleigh nordenresults, Quality management, ISO and SEI CMMI, PSP and six sigma, Computer aided software engineering,Software maintenance, Software reuse, Component based software development.

Text Book:

1.Rajib Mall, *Fundamentals of Software Engineering*, 3rd ed., PHI (Pretice Hall India), (2009).

Reference Books:

1. Roger S.Pressman, *Software Engineering:A Practitioner Approach*, 7th ed., Mcgraw Hill, (2010).

2. Ian Sommerville, *Software Engineering*, 9th ed., Pearson Education.

BACK

Subject Code	*Course name*	*Credits*	*Lectures*	*Tutorials*	*Practical*
MAT3T1	MATHEMATICS-III	4	3	1	-

Unit I
Fourier Series and Fourier Transforms : Euler's formulae, conditions for a Fourier expansion, change of interval, Fourier expansion of odd and even functions, Fourier expansion of square wave, rectangular wave, saw-toothed wave, half and full rectified wave, half range sine and consine series, complex form of Fourier series

Unit II
Fourier integral theorem – Fourier transform pair-Sine and Cosine transforms – Properties – Transform of elementary functions – Convolution theorem – Parseval's identity.

Unit III
Partial differential Equations
Formation, solutions of first order equation, singular solutions, Lagrange's Linear equation, Integral surfaces passing through a given curve, solutions of linear equations of second order ant their classifiactions-parabolic, elliptic and hyperbolic

Unit IV
Applications of Partial Differential Equations
Method of separation of Variables, Solutions of one dimensional wave equation and one dimensional heat equation, Steady state solution of two-dimensional heat equation

UNIT V
Z-transform – Elementary properties – Inverse Z-transform – Convolution theorem – Initial and Final value theorems – Formation of difference equation – Solution of difference equation using Z-transform

Textbooks:

1) Higher Engineering Mathematics: B. S. Grewal
2) Advanced Engineering Mathematics: E. Kreyszig

Reference books:

1) Advanced Engineering Mathematics: Jain and Iyenger
2)Advanced Engg. Mathematics: Michael D. Greenberg
3) Advanced Engineering Mathematics (7th Edition): Bali N., Goyal M.

BACK

Subject Code	*Course name*	*Credits*	*Lectures*	*Tutorials*	*Practical*
MAT4T1	Discrete Mathematics	4	3	1	-

Unit I
Introduction to Set theory, algebra of sets, venn diagrams, countable and uncountable sets, ordered pairs and cartesian products, relations, types of relations, properties of relations, equivalence classes, functions, types of functions, composition of functions, Partially ordered sets, lattices.

Unit II
Combinatorics-permutation and combination, recurrence relation, generating function, Boolean algebra, logical operations, logic gates, SOP and POS, simplification of boolean expression by algebraic method, boolen expression from logic and switching network

Unit III
Probability-sample space, conditional probability, independent variables and independent experiments, Baye‘s theorem, Random variables(continuous and discrete), Probability distributions-Discrete,Binomial, Poisson, Markov chains

Unit IV
Algebraic structures-semi-groups, groups, cyclic groups, permutaion groups, homomorphisms, rings, integral domains, fields.

Unit V
Graph Theory-Types of graphs, sub-graphs and isomorphic graphs, paths,cycles and connectivity, Eulerian and Hamiltonian graphs, graph colouring, Trees-Spanning trees, binary trees, tree traversals, binary search trees

Unit VI
Number theory-division algorithm, Eucld‘s algorithm, fundamental theorem of arithmetic, congruences, Chinese remainder Theorem, Fermat‘s little theorem, special numbers like Catalan, Fibonacci, Stirling and Harmonic numbers.

Textbooks:

1) Discrete Mathematics and its Applications: K H Rosen, Tata McGraw Hill
2) Discrete Mathematical Structures with Applications to Computer Science: J P Trembly and R Manohar, Tata McGraw Hill
3) A textbook of Discrete Mathematics: S K Sarkar, S.Chand

Reference books:

1) Elements of Discrete Mathematics: C L Liu, Tata McGraw Hill

Schaum‘s Outline of Theory and Problems of Discrete Mathematics: S Lipchutz and M

L Lipson, Tata McGraw Hill

BACK

Subject Code	*Course name*	*Credits*	*Lectures*	*Tutorials*	*Practical*
IT4T1	Computer Networks	3	3	-	-

UNIT I

Overview of data communication and Networking: Introduction; Data communications: components, data representation(ASCII,ISO etc.),direction of data flow(simplex,half duplex, full duplex); Networks: distributed processing, network criteria, physical structure (type of connection,topology), categories of network (LAN, MAN,WAN);Internet: brief history, internet today; Protocols and standards.

UNIT II

Reference models: OSI reference model, TCP/IP reference model, their comparative study.

Physical level: Overview of data(analog & digital), signal(analog & digital), transmission (analog & digital)& transmission media (guided & non-guided); TDM, FDM, WDM; Circuit switching: time division & space division switch, TDM bus;Telephone network;

Data link layer: Types of errors, framing(character and bit stuffing), error detection & correction methods; Flow control; Protocols:Stop & wait ARQ, Go-Back- N ARQ, Selective repeat ARQ, HDLC;

Medium access sub layer: Point to point protocol, LCP, NCP, FDDI, token bus, token ring; Reservation, polling, concentration; Multiple accessprotocols: Pure ALOHA, Slotted ALOHA, CSMA, CSMA/CD, FDMA, TDMA, CDMA; Traditional Ethernet, fast Ethernet;

Network layer: Internetworking & devices: Repeaters, Hubs, Bridges, Switches, Router, Gateway; Addressing : Internet address classful address, subnetting; Routing : techniques, static vs. dynamic routing , routing table for classful address;Routing algorithms: shortest path algorithm, flooding, distance vector routing, link state routing; Protocols: ARP,RARP, IP, ICMP, IPV6; Unicast and multicast routing protocols.

Transport layer: Process to process delivery; UDP; TCP; Congestion control algorithm: Leaky bucket algorithm, Token bucket algorithm, choke packets; Quality of service: techniques to improve Qos.

Application layer: DNS; SMTP, SNMP, FTP, HTTP & WWW; Security: Cryptography, user authentication, security protocols in internet,Firewalls.

UNIT III

Modern topics: ISDN services & ATM ; DSL technology, Cable modem, Sonet.Wireless LAN: IEEE 802.11; Introduction to blue-tooth, VLAN‘s, Cellular telephony & Satellite network.

Text books

1. B. A. Forouzan – ‒Data Communications and Networking (3rd Ed.) ‒ – TMH
2. A. S. Tanenbaum – ‒Computer Networks (4th Ed.)‖ – Pearson Education/PHI
3. W. Stallings – ‒Data and Computer Communications (5th Ed.)‖ – PHI/ Pearson Education
4. Zheng & Akhtar, Network for Computer Scientists & Engineers, OUP
5. Black, Data & Computer Communication, PHI
6. Miller, data Communication & Network, Vikas
7. Miller, Digital & Data Communication, Jaico

8. Shay, Understanding Data Communication & Network, Vikas

Reference Books::

1. Kurose and Rose – ― Computer Networking -A top down approach featuring the internet‖ – Pearson Education.
2. Leon, Garica, Widjaja – ―Communication Networks‖ – TMH.
3. Walrand – ―Communication Networks‖ – TMH.
4. Comer – ―Internetworking with TCP/IP, vol. 1, 2, 3(4th Ed.)‖ – Pearson Educatio

BACK

Subject Code	*Course name*	*Credits*	*Lectures*	*Tutorials*	*Practical*
IT4T2	Operating System	3	3	-	-

UNIT I

Introduction : Introduction to OS. Operating system functions, evaluation of O.S., Different types of O.S.: batch, multi-programmed,time-sharing, real-time, distributed, parallel. **System Structure:**Computer system operation, I/O structure, storage structure, storage hierarchy, different types of protections, operatingsystem structure (simple, layered, virtual machine), O/S services, system calls.

UNIT II

Process Management : Concept of processes, process scheduling, operations on processes, co-operating processes, interprocesscommunication. **Threads**: overview, benefits of threads, user and kernel threads.

UNIT III

CPU scheduling : scheduling criteria, preemptive & non-preemptive scheduling, scheduling algorithms (FCFS, SJF, RR, priority), algorithm evaluation, multi-processor scheduling.

UNIT IV

Process Synchronization : background, critical section problem, critical region, synchronization hardware,classical problems of synchronization, semaphores.

UNIT V

Deadlocks: system model, deadlock characterization, methods for handling deadlocks, deadlock prevention,deadlock avoidance, deadlock detection, recovery from deadlock.

UNIT VI

Memory Management : background, logical vs. physical address space, swapping, contiguous memory allocation, paging, segmentation, segmentation with paging.

UNIT VII

Virtual Memory : background, demand paging, performance, page replacement, page replacement algorithms(FCFS, LRU), allocation of frames, thrashing.

UNIT VIII

File Systems : file concept, access methods, directory structure, file system structure, allocation methods(contiguous, linked, indexed), free-space management (bit vector, linked list, grouping), directory implementation(linear list, hash table), efficiency & performance.

UNIT IX

I/O Management : I/O hardware, polling, interrupts, DMA, application I/O interface (block and characterdevices, network devices, clocks and timers, blocking and nonblocking I/O), kernel I/O subsystem (scheduling,buffering, caching, spooling and device reservation, error handling), performance.

UNIT X

Disk Management : disk structure, disk scheduling (FCFS, SSTF, SCAN,C-SCAN) , disk reliability, disk formatting, boot block, bad blocks.

UNIT XI

Protection & Security : Goals of protection, domain of protection, security problem, authentication, one time password, program threats,system threats, threat monitoring, encryption.

Text Books :

1. Milenkovie M., ―Operating System : Concept & Design‖, McGraw Hill.
2. Tanenbaum A.S., ―Operating System Design & Implementation‖, Practice Hall NJ.
3. Silbersehatz A. and Peterson J. L., ―Operating System Concepts‖, Wiley.

4. Dhamdhere: Operating System TMH.
5. Stalling, William, —Operating Systems‖, Maxwell McMillan International Editions, 1992.
6. Dietel H. N., —An Introduction to Operating Systems‖, Addison Wesley.

Reference Books:

1. Tannenbaum, _ Operating Systems‖, PHI, 4th Edition,2009.
2. E.Madnick,J. Donovan,‖Operating Systems‖, Tata McGraw Hill,2001.

BACK

Subject Code	*Course name*	*Credits*	*Lectures*	*Tutorials*	*Practical*
IT4T3	Algorithm Analysis and Design	4	3	1	-

UNIT I
Introduction to algorithms, growth function, complexity analysis of algorithm, Master theorem, recurrences.

UNIT II
Divide and Conquer: Introduction; merge, quick sort, medians and order statistics, Strassen‘s algorithm for matrix multiplications

UNIT III
Greedy algorithm: Introduction to Greedy Algorithm Design; an activity selection problem; Huffman codes; Knapsack problem

UNIT IV
Dynamic programming: Introduction; matrix-chain multiplication, longest common subsequence, optimal binary search tree problem

UNIT V
String matching: The naïve string matching algorithm, the Rabin-Karp algorithm, the Knuth-Morris Pratt algorithm

UNIT VI
Graph algorithm: Representation of graphs; Breadth first search, Depth First Search, minimum spanning trees.Kruskal and Prim‘s algorithm. Single-source shortest paths: The Bellman-Ford algorithm, single-source shortest paths in directed acyclic graphs, Dijkstra‘salgorithm. All-pairs shortest paths: The Floyd-Warshall algorithm

UNIT VII
NP-Completeness: Polynomial-Time verification, NP-Completeness andreducibility, NP-Completeness proof, NP-complete problems.

Text Books:

1. T . H. Cormen, C. E. Leiserson, R.L. Rivest, Clifford Stein, ― Introduction toAlgorithm‖, 3nd Ed., PHI,2004.
2. Sara Baase and Allen Van Gelder.‖Computer Algorithms: Introduction to Design and Analysis‖, Pearson Education(Singapore) Pvt. Ltd, New Delhi.

REFERENCES BOOKS:

1. A.V. Aho,J.E. Hopcroft, J.D. Ullman, ‒The Design and Analysis of ComputerAlgorithms‖, Addition Wesley, 1998.
2. Ellis Horowitz and SartazSahani, ― Computer Algorithms‖, Galgotiapublications,1999.
3. D. E. Knuth, ― The Art of Computer Programming‖, 2nd Ed., Addison Welsey, 1998.

BACK

Subject Code	*Course name*	*Credits*	*Lectures*	*Tutorials*	*Practical*
IT4T4	Database Management Systems	3	3	-	-

UNIT I
Introduction to database system, components of DBMS, DBMS architecture, three-schema architecture of a database, Data model, overview of hierarchical network and relational DBMS
UNIT II
ER-model, EER-model: specialization, generalization, aggregation
UNIT III
Relational data model: concepts of relations, schema-instance distinction, keys, referential integrity and foreign keys. Relational algebra operators: selection, projection, cross product, various types of joins, division, example queries. Tuple relation calculus, domain relational calculus, converting the databasespecification in
UNIT IV
Dependencies and Normal forms: Importance of a good schema design, problems encounter with bad schema design, motivation for normal forms, functional dependencies, Armstrong‘s axioms for FD‘s, closure of a set of FD‘s, minimal covers, definitions of 1NF, 2NF, 3NF, and BCNF, decompositions and desirable properties of them, algorithm for 3NF and BCNF normalization, multi-valued dependencies and 4NF, join dependencies and definition 5NF.
UNIT V
Data Storage and Indexes- file organizations, primary, secondary index structures, various index structures-hash based, dynamic hashing techniques, multi-level indexes, B+ trees
UNIT VI
Transaction and Error recovery- concepts of transaction processing, ACID properties, concurrency control, locking based protocols for concurrency control, error recovery and logging, undo, redo, undo-redo logging and recovery methods.

TEXT BOOKS:

1. Korth, Silberschatz, ― Database system concepts ―, 4th Ed., TMH, 2003.
2. Steve Bobrowski, ― Oracle 8 architecture‖, TMH,2000.
3. Raghu Ramakrishnan,‖ Database Management System,‖ WCB/McGraw Hill

REFERENCES BOOKS:

1. C.J.Date, ― An introduction to database systems‖, 7th Ed., Narosa publishing,2004.
2. Elmasri and Navathe, ‒ Fundamentals of database systems ‒, 4th Ed., A.Wesley, 2004.
3. J.D. Ullman, ― Principles of database systems‖, 2nd Ed., Galgotia publications,1999.

BACK

Subject Code	*Course name*	*Credits*	*Lectures*	*Tutorials*	*Practical*
IT4T5	Management Information System and Knowledge Management	3	3	-	-

UNIT I
Concept of information: Definition, features, types, process of generation and communication; Quality of information; Information. Information system: Definition, fundamental concept, the challenge of information system.

UNIT II
MIS definition, characteristics, evolution of MIS, MIS concept : framework for understanding and designing MIS in an organization; Structure of MIS based on management and function, multiple approaches to the structure of MIS; operational elements(physical components, process, output for users), activity subsystem and decision support.

UNIT III
System Analysis Design function, CASE Tools, project Feasibility, InformationRequirement & Decision Analysis, preparing System proposal, Input/Output design,procedures & control design, system development, Testing & Quality assurance.

UNIT IV
MIS implementation, operation, evaluation and maintenance.

UNIT V
Classification information system: Transaction Processing System, Decision Support System, Office Automation System, Information reporting system, Executive Support System, Expert System.

UNIT VI
Advanced Concepts in Information Systems: Enterprise resource planning, SupplyChain Management, C.R.M., procurement Management.

Text Books/ References Books:

1. Brain,‖ Management Information System‖, TMH.
2. Ashok Kumar Sharma, ― Analysis Design & Implementation of InformationSystems: A transaction to objects‖.
3. O'Brien, James A,‖ Management Information System‖, Tata McGraw Hill, New Delhi.

4. George M. Scott,‖ Management of Information System‖, McGraw Hill Book Company, New Delhi.
5. Schultheis, Robert and Summer, Mary,‖ Management Information System‖, Tata McGraw Hill, New Delhi.
6. Arora& Bhatia, ― Information System for Managers‖.

BACK

Subject Code	*Course name*	*Credits*	*Lectures*	*Tutorials*	*Practical*
IT5T1	Web Technology	3	3	-	-

UNIT-I
The Internet, Client-Server communication, TCP/IP, UDP, DNS, WWW. Hypertext Transfer Protocol – HTTP Request and Response Message, Browser and server functions, Uniform Resource Locator, Server Cache control.

UNIT-II
Markup languages – HTML and XHTML, HTML tags, Document Structure, headings, images, lists, tables, frames, forms, links, element attributes, event handlers.

UNIT-III
Cascading Style Sheets – syntax, importing CSS to HTML documents, CSS box model, Responsive layouts. JavaScript Fundamentals – Variables and Data Types, statements, operators, functions, objects, built-in objects, events and event handlers, strings, Arrays.

UNIT-IV
Extensible Markup Language – Namespace, Document Type Definition, XML Schema, Document Object Model, creating XML documents, Javascript and XML:AJAX, DOM- based XML processing, Event oriented parsing:SAX, introduction to XSL, XPath, XSLT.

UNIT-V
Server side programming with PHP – Adding PHP to HTML, Syntax and Variables, Passing information between pages, Strings, Arrays, Functions, Numbers, Basic PHP errors / problems. PHP/MySQL Functions, Displaying queries in tables, Building Forms from queries, String and Regular Expressions, Sessions, Cookies and HTTP, Type and Type Conversions.

TEXT BOOKS
1. Jeffrey C.Jackson, "Web Technologies--A Computer Science Perspective", Pearson Education.
2. PHP : The Complete Reference By Steven Holzner, Tata McGrawHill.

REFERENCES:
1. Web Design The complete Reference, Thomas Powell, Tata McGrawHill.
2. HTML and XHTML The complete Reference, Thomas Powell, Tata

McGrawHill.
1. 3. www.w3schools.com for online reference

BACK

Subject Code	*Course name*	*Credits*	*Lectures*	*Tutorials*	*Practical*
IT5T2	Theory of Automata	3	3	-	-

UNIT I

Finite State Machines : Definition, concept of sequential circuits, state table & state assignments, concept of synchronous, asynchronous and liner sequential machines.

UNIT II

Finite State Models : Basic definition, mathematical representation, Moore versus Mealy m/c, capability & limitations of FSM, state equivalence & minimization, machine equivalence, incompletely specified machines, merger graph & compatibility graph, merger table, Finite memory, definite, information loss less & inverse machines : testing table &
testing graph.

UNIT III

Structure of Sequential Machines : Concept of partitions, closed partitions, lattice of closed partitions, decomposition serial & parallel.

UNIT IV

Finite Automation : Preliminaries (strings, alphabets & languages, graphs & trees, set & relations), definition, recognition of a language by an automata - idea of grammar, DFA, NFA, equivalence of DFA and NFA, NFA with emoves,regular sets & regular expressions : equivalence with finite automata, NFA from regular expressions, regular expressions from DFA, two way finite automata equivalence with one way, equivalence of Moore & Mealy machines, applications of finite automata.

UNIT V

Closure Properties of Regular Sets : Pumping lemma & its application, closure properties minimization of finite automata : minimization by distinguishable pair, Myhill-Nerode theorem.

Context Free Grammars : Introduction, definition, derivation trees, simplification, CNF & GNF.

UNIT VI

Pushdown Automata : Definition, moves, Instantaneous Descriptions, language recognised by PDA, deterministic PDA, acceptance by final state & empty stack, equivalence of PDA and CFL.

UNIT VII

Closure Properties of CFLs : Pumping lemma & its applications, ogden‘s lemma, closure properties, decision algorithms.Introduction to Z. Regular language properties and their grammars. Context sensitive languages.

UNIT VIII

Introduction to Turing Machines: Problems that computers cannot solve,Turing machine,programming technique for Turing Machines,Extensions to basic Turing Machine,Restricted Turing Machines,Turing Machines and Computers

UNIT IX

Undecidability: Not recursively enumerable language,undecidable problem,POST‘s correspondence problem,undecidability of ambiguity for CFF‘S.

UNIT X

Intractable Problems: The classes P and NP,An NP – Complete problem, Restricted satiesfiability problem.

Text Books :
1. Hopcroft JE. and Ullman JD., ―Introduction to Automata Theory, Languages & Computation‖, Narosa.
2. K.L.P Mishra & N. Chandrasekharan – -Theory of Computer Science‖, PHI.
3. Ash & Ash – ―Discrete Mathematics‖,TMH.
4. Lewis H. R. and Papadimitrou C. H., ―Elements of the theory of Computation‖, P.H.I.
5.. Kain, -Theory of Automata & Formal Language‖, McGraw Hill.

Reference Books:
1. Kohavi ZVI, ―Switching & Finite Automata‖, 2nd Edn., Tata McGraw Hill.
2. Linz Peter, ―An Introduction to Formal Languages and Automata‖, Narosa
3. ―Introduction to Formal Languages‖, Tata McGraw Hill, 1983.

BACK

Subject Code	*Course name*	*Credits*	*Lectures*	*Tutorials*	*Practical*
IT5T3	Distributed Computing	3	3	-	-

UNIT-I

Introduction to Distributed Systems, trends and challenges in Distributed Systems, Resource sharing. Case Study – World Wide Web.

UNIT-II

System Architectures, middleware, absence of global clock, Lamport's & vector logical clocks, Causal ordering of messages, global state, termination detection.

Distributed Mutual Exclusion: Classification of distributed mutual exclusion, requirement of mutual exclusion theorem, Token based and non token based algorithms, performance metric for distributed mutual exclusion algorithms.

UNIT-III

Distributed Deadlock Detection: system model, resource Vs communication deadlocks, deadlock prevention, avoidance, detection & resolution, centralized dead lock detection, distributed dead lock detection, path pushing algorithms, edge chasing algorithms.

Agreement Protocols: Introduction, System models, classification of Agreement Problem- Interactive consistency Problem, Applications of Agreement algorithms.

UNIT-IV

Distributed Objects and Remote Invocation: Communication between distributed objects, Remote procedure call, Events and notifications, Java RMI case study.

Transactions and Concurrency Control: Transactions, Nested transactions, Locks, Optimistic Concurrency control, Timestamp ordering, Comparison of methods for concurrency control.

UNIT-V

Distributed Transactions: Introduction, Flat and nested distributed transactions, Atomic commit protocols, concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery. Distributed shared memory – Design and Implementation issues, consistency models, CORBA Case Study: CORBA RMI, CORBA services.

UNIT-VI

File service components, design issues, interfaces, implementation techniques, Sun Network File System – architecture and implementation, other distributed file systems – AFS, CODA. Name services – SNS name service model.

TEXTBOOKS

1. Distributed Systems – Concepts and Design, George Coulouris, Jean Dollimore, Tim Kindberg and Gordon Blair.
2. "Advanced Concepts in Operating Systems", by Mukesh Singhal & Niranjan G Shivaratri,Tata McGraw Hill.

Reference Books:

1. Tanenbaum S , –Distributed Operating Systems‖, Pearson Education .
2. P K Sinha, –"Distributed System: Concepts and Design‖, PHI.

Distributed Systems – Principles and Paradigms. Andrew S. Tanenbaum and Maarten Van Steen.

BACK

Subject Code	***Course name***	***Credits***	***Lectures***	***Tutorials***	***Practical***
IT5T4	Compiler Design	3	3	-	-

UNIT I

Introduction to Compiling: Compilers, Analysis of the source program, The phases of the compiler, Cousins of the compiler.

UNIT II

Lexical Analysis : The role of the lexical analyzer, Tokens, Patterns, Lexemes, Input buffering, Specifications of a token, Recognition of atokens, Finite automata, From a regular expression to an NFA, From a regular expression to NFA, From a regular expression to DFA, Design of a lexical analyzer generator (Lex).

UNIT III

Syntax Analysis :The role of a parser, Context free grammars, Writing a grammar, Top down Parsing, Non-recursive Predictive parsing(LL), Bottom up parsing, Handles, Viable prefixes, Operator precedence parsing, LR parsers (SLR, LALR), Parser generators (YACC). Error Recovery strategies for different parsing techniques.

UNIT IV

Syntax directed translation : Syntax director definitions, Construction of syntax trees, Bottom-up evaluation of S attributed definitions, L attributeddefinitions, Bottom-up evaluation of inherited attributes.

UNIT V

Type checking : Type systems, Specification of a simple type checker, Equivalence of type expressions, Type conversions.

Run time environments : Source language issues (Activation trees, Control stack, scope of declaration, Binding of names), Storage organization(Subdivision of run-time memory, Activation records), Storage allocation strategies, Parameter passing (call by value,call by reference, copy restore, call by name), Symbol tables, dynamic storage allocation techniques.

UNIT VI

Intermediate code generation : Intermediate languages, Graphical representation, Three-address code, Implementation of three address statements (Quadruples, Triples, Indirect triples).

UNIT VI

Code optimization : Introduction, Basic blocks & flow graphs, Transformation of basic blocks, Dag representation of basic blocks, Theprinciple sources of optimization, Loops in flow graph, Peephole optimization.

UNIT VII

Code generations : Issues in the design of code generator, a simple code generator, Register

allocation & assignment.

Text Books:

1. Aho, Sethi, Ullman - ―Compiler Principles, Techniques and Tools‖ - Pearson Education.
2. Holub - ―Compiler Design in C‖ - PHI.
3. Tremblay, et al., ―The Theory and practice of compiler Writing‖, McGraw Hill, New York,1985.

Reference Books::

1. Andrew L. Appel, ―Modern Compiler Implementation in C‖, Delhi,Foundation ooks,2000.
2. Dick Grune et. Al., ―Modern Compiler Design ―, Wiley Dreamtech, 2000.

BACK

Subject Code	*Course name*	*Credits*	*Lectures*	*Tutorials*	*Practical*
MAT5T1	Numerical Methods	4	3	1	-

Unit I

Numerical solution of algebraic and transcendental equations by bisection method, Regula-Falsi method,Newton-Raphson‘s method, Solution of linear simultaneous equations- Gauss elimination, Gauss-Jordan method and Gauss-Seidel iterative method

Unit II

Finite differences-Forward, backward and central differences, Newton‘s forward and backward interpolation formulae, Gauss‘s interpolation formula, Stirling‘s formula, Lagrange interpolation, Newton‘s divided difference formula

Unit III

Numerical differentiation at the tabulated points with forward, backward and central differences, maximum and minimum of a tabulated function, Numerical Integration with Trapezoidal rule, Simpson‘s 1/3 rule, Simpson‘s 3/8 rule.

Unit IV

Numerical Solution of Ordinary Differential Equation
Picard‘s method, Taylor series method, Euler‘s method, Modified Euler‘s method, Runge-Kutta method, Predictor-Corrector method

Unit V

Method of least squares, fitting of other curves, fitting a parabola, measures of dispersion, skewness, kurtosis, correlation and regression.

Textbooks:

1) Higher Engineering Mathematics: B S Grewal
2) Numerical methods for scientists and engineers : K Sankara Rao

Reference Books:

1) Applied Numerical Methods: C F Gerald and P O Wheatley

BACK

Subject Code	*Course name*	*Credits*	*Lectures*	*Tutorials*	*Practical*
IT6T1	Industrial Economics & Principles of Management	3	3	-	-

UNIT I
Introduction: Nature and Scope of economics, micro and micro economics; Problems in industrial economics; A framework of industrial economics.
UNIT II
Demand and supply, elasticity concept, indifference curve analysis, consumer‘s equilibrium, marginal utility concept, pricing techniques, price effect, income effect, substitution effect.
UNIT III
Money and Banking: Value and function of money, inflation, quantity theory of money, functions of banking system: commercial banking system and central banking system, business fluctuation.
UNIT IV
Management: Definition, nature and significance of management, evaluation of management thought, contribution of Max Weber and Taylor and Fayol. Different functions of management:-planning, organizing, staffing, directing and controlling.
UNIT V
Human Behavior: Factors of human behavior, perception, learning and personality development, inter-personal relationship and group behavior.

TEXT BOOKS:

1. Dewett, KK,‖Modern economic theory‖, s chand and co‖.
2·Luthers Fred,‖ Organisational Behaviour‖.
3. Prashad L M ,‖Principles of management‖ .
4. AW Stonier and DC Horgne,‖A textbook of economic theory‖, Oxfordpublishing house pvt.Ltd.

BACK

Subject Code	*Course name*	*Credits*	*Lectures*	*Tutorials*	*Practical*
IT6T2	Computer Graphics and Virtual Reality	3	3	-	-

UNIT-I

Introduction to Computer Graphics, Display devices, Bitmap and Vector based Graphics, Overview of coordinate system, scan conversion of: point, line using differential analyzer and Breshenham's algoritm, circle using midpoint approach. Curve Generation: Bezier and B-Spline curves. Introduction to fractals: generation procedure, classification, dimension and Koch Curve.

UNIT-II

Area Filling:Inside/Outside test, scanline polygon fill algorithm, Boundary fill and floor fill algorithm. Basic 2D transformations: Translation, Rotation, Scaling, Reflection, Shear – Homogeneous Matrix representation and composite transformation.

UNIT-III

Introduction to 2D viewing, viewing pipeline, view coordinate reference frame, window to viewport transformation, point clipping. Line clipping: Cohen Sutherland Algorithm, Liang Barsky algorithms. Polygon clipping: Sutherland Hodgeman polygon clipping and Weiler Atherton. Text Clipping.

UNIT-IV

Three Dimensional Transformations: Translation, Scaling, Rotation and Composite. 3D object representation: Polygon surfaces, Tables, Meshes. 3D viewing pipeline, viewing transformation, Projections: Parallel (oblique and orthographic), Perspective (one point); visibility – Z-Buffer.

UNIT-V

Introduction to Animation, key frame animation, animation sequence, Motion control methods, morphing, mesh warping.

UNIT-VI

Virtual Reality : Basic Concepts , Classical Components of VR System , Types of VR Systems, Three Dimensional Position Trackers, Navigation and Manipulation Interfaces, Gesture. Interfaces, Graphical Display, Sound displays, and Haptic Feedback . Input Devices ,Graphical Rendering Pipeline , Haptic Rendering Pipeline, Open GL rendering pipeline.Applications of Virtual Reality.

UNIT-VII

Geometric Modeling: Virtual Object Shape, Object Visual Appearance. Kinematics Modeling: Object Position, Transformation Invariants, Object Hierarchies, Physical Modeling: Collision Detection, Surface Deformation, Force Computation. Behavior Modeling.

UNIT-VIII

Programming through VRML : Defining and Using Nodes and Shapes , VRML Browsers , Java 3D :Visual Object Definition by Shape 3D instances , Defining personal visual object class, ColorCube Class, Geometric – Utility Classes, Geometry Classes , Attributes.

TEXTBOOKS

1. Donald Hearn and M. Pauline Baker, ―Computer Graphics‖, Pearson Education.
2. R. K Maurya, ―Computer Graphics with Virtual Reality‖, Wiley India.

Reference Books:

1. Grigore Burdea, Philippe Coiffet, ―Virtual Reality Technology‖, Wiley.
2. Steven Harrington, ―Computer Graphics‖, McGraw Hill.
3. Vince, ―Virtual Reality Systems‖, Pearson Education.
4. F.S. Hill , Stephen M. Kelley , ―Computer Graphics using Open GL‖ Prentice Hall

BACK

Subject Code	*Course name*	*Credits*	*Lectures*	*Tutorials*	*Practical*
IT6T3	Unix Internals	3	3	-	-

UNIT I GENERAL OVERVIEW OF THE SYSTEM

History − System structure − User perspective − Operating system services − Assumptions about hardware − Introduction to the kernel − Architecture of the UNIX operating system − Introduction to system concepts − Kernel data structures − System administration − Summary and preview.

UNIT II

BUFFER CACHE

Buffer headers − Structure of the buffer pool − Advantages and disadvantages of the buffer cache − Internal representation of files − Inodes − Structure of a regular file − Directories − Conversion of a path name to an inode − Super block − Other file types.

UNIT III

SYSTEM CALLS FOR FILE SYSTEM

Open − Read − Write − File and record locking − Adjusting the position of file I/O − LSEEK − Close − File creation − Creation of special files − Pipes − Dup − Mounting andunmounting file systems.

UNIT IV

THE STRUCTURE OF PROCESSES

Process states and transitions − Layout of system memory − The context of a process − Saving the context of a process − Process control − Process creation − Signals − Process termination − Awaiting process termination − Invoking other programs − The shell − System boot and the INIT process.

UNIT V

PROCESS SCHEDULING AND MEMORY MANAGEMENT POLICIES

Process scheduling − Memory management policies − Swapping − A hybrid system with swapping and demand paging − The I/O subsystem − Driver interfaces − Disk Drivers − Terminal drivers.

TEXT BOOK

Maurice J. Bach, ―The Design of the Unix Operating System‖, PHI, 2004.

REFERENCE

1. Vahalia, ―Unix Internals: The New Frontiers‖, Pearson Education Inc, 2003.
2. John Lion, "Lion's Commentary on UNIX", 6th edition, Peer-to-Peer Communications, 2004.
3. Daniel P. Bovet & Marco Cesati, ―Understanding the Linux Kernel‖, O'REILLY, Shroff Publishers &Distributors Pvt. Ltd, 2000.
4. M. Beck et al, ―Linux Kernel Programming‖, Pearson Education Asia, 2002.

BACK

Subject Code	*Course name*	*Credits*	*Lectures*	*Tutorials*	*Practical*
IT6T4	Software Quality Assurance	3	3	-	-

UNIT I

Introduction-Uniqueness of software quality assurance, Environment for which SQA methods are developed, Classification of the causes of software errors, SQA and software engineering, Product operation, revision, Transition software quality Factors.

UNIT II

Quality components-SQA system and architecture, Contract review process and stages, Implementation of contract review, Development plan and quality plan objectives, Elements of quality and development plan,Pre-maintenance software quality components, Maintenance software quality assurance tools.

UNIT III

Software Quality infrastructure components-Objectives of training and certifications and its process. Corrective and preventive actions and their process, Development of solutions and implementation, Software configuration, Its items and its management tasks and organization, Software change control.

UNIT IV

Management components of software quality-Components of project progress control, Classification of software

quality metric, Product and process metrics, Limitations of software metrics, Objectives of cost quality metrics, Classic and extended model of cost quality metrics.

UNIT V

Standards, certification and assessment-ISO 90001 and ISO 9000-3, CMM and CMMI, Bootstrap

Methodology, IEEE/EIA std 12207, IEEE Std 1012,Project management responsibilities for quality assurance

Text Book:

1. Daniel galin, *Software Quality Assurance*, 1st ed., Pearson Education.

Reference Books:

1. Milind Limaye, *Software Quality Assurance,* Tata McGraw-Hill.
2. G. Gordon Schulmeyer,Handbook of Software Quality Assurance,4rd ed.

BACK

Subject Code	***Course name***	***Credits***	***Lectures***	***Tutorials***	***Practical***
IT6T5	Multimedia Technologies	3	3	-	-

UNIT-I

Introduction to Multimedia: Media and Data Streams; Sound/Audio, Images and Graphics, Video and Animation. Multimedia and Hypermedia, Applications of Multimedia.

UNIT-II

Graphics and Image data representations, image data types, color lookup tables, image file formats : GIF, JPEG, PNG, TIFF, BMP. Multimedia authoring tools.

UNIT-III

Video signals: Component video, composite video, S-video. Analog videos, digital videos. Digitization of sound, MIDI: hardware aspects, MIDI messages, coding of audio.

UNIT-IV

Data Compression, Lossless data compression:variable length coding:Huffman,LZW coding, dictionary based coding, arithmetic, differential coding of images, lossless JPEG. Lossy Compression algorithm, image compression standards. Video compression based on motion compensation, H.261, H.263, basic audio compression.

UNIT-V

Multimedia Communication Systems; Quality of multimedia data transmission, multimedia over IP and ATM networks, Media on demand, content based retrieval in digital libraries, multimedia databases.

TEXTBOOKS

1. Fundamentals of Multimedia, Ze-Nian Li and Mark S. Drew.
2. –Multimedia Computing Communications & Applications ‖ by Ralf Steinmetz, Klara Nahrstedt , , Pearson Education (2004)

Reference Books:

Multimedia Systems, By John E Koegal, Buford, IIBK. (1994)

BACK

Subject Code	*Course name*	*Credits*	*Lectures*	*Tutorials*	*Practical*
IT7T1	Mobile Communications	3	3	-	-

INTRODUCTION TO MOBILE COMMUNICATION SYSTEM

Evolution of Mobile Radio Communications, Examples of Wireless Communication Systems, Second Generation (2G)Cellular Networks, Third Generation(3G) Wireless Networks. The Cellular Concept: Frequency reuse, Channel Assignment Strategies, Interference and system capacity, Trunking and Grade of Service, Improving Coverage and capacity in Cellular systems (Cell Splitting, Sectoring, A Microcell Zone Concept)

MOBILE RADIO PROPAGATION

Introduction to Radio Wave Propagation, Free space propagation model, Three Basic Propagation Mechanisms(reflection, diffraction, scattering), Outdoor Propagation models, Indoor propagation models, Small-Scale Multipath propagation, Impulse Response Model of a Multipath Channel, Small-Scale Multipath Measurements, Parameters of Mobile multipath channels, Types of small scale fading, Flat Fading, Frequency Selective Fading, Fast Fading , Slow Fading.

MODULATION TECHNIQUES FOR MOBILE RADIO

Linear Modulation Techniques(BPSK, DPSK, QPSK, Offset QPSK), Constant Envelope Modulation (BFSK, MSK, GMSK), Combined Linear and Constant Envelope Modulation Techniques (Minimum Shift Keying, Gaussian MSK, M-ary QAM, M-ary FSK, Orthogonal Frequency Division Multiplexing), Spread Spectrum Modulation Techniques, Pseudo-Noise(PN) Sequence, Direct Sequence Spread Spectrum,(DS-SS), Frequency Hopped Spread Spetrum(FH-SS),Performance of DS-SS and Performance of FH-SS.

MULTIPLE ACCESS TECHNIQUES

Multiple Access Techniques: Frequency Division Multiple Access(FDMA), Time Division Multiple Access(TDMA), Spread Spectrum Multiple Access, Frequency Hopped Multiple Access(FHMA) and Code Division Multiple Access(CDMA), Space Division Multiple Access(SDMA),Packet Radio Protocols, Pure ALOHA, Slotted ALOHA, Capacity of Cellular Code Division Multiple Access and Space Division Multiple Access.

WIRELESS SYSTEMS AND STANDARDS

Global System for Mobile(GSM), GSM Services and Features, GSM System Architecture, GSM

Radio Subsystem, GSM channels, GSM Traffic Channels and GSM Control Channels, Frame structure for GSM, Signal Processing in GSM , CDMA Digital Cellular Standard, Frequency and Channel Specifications, Forward CDMA Channel, Reverse CDMA Channel

TEXT BOOKS:

1. T S Rappaport, Wireless Communications, Pearson Education, India
2.Upen Dalal, Wireless Communication, Oxford University Press,2010

REFERENCE BOOKS:

1. W C Y Lee, Mobile Communication Engineering – Theory and Applications; TMH
2. Jochen Schiller, ‑Mobile Communications‖, Second Edition, Pearson Education, 2003.

3. William Stallings, ‑Wireless Communications and Networks‖, Pearson Education, 2002.
4. T L Singhal, Wireless Communications, Tata McGraw Hill 2010.
5. V K Garg, Wireless Communication and Networking; Morgan Kaufman Publishers India; 2008

BACK

Subject Code	***Course name***	***Credits***	***Lectures***	***Tutorials***	***Practical***
IT7T2	Cryptography and information security	3	3	-	-

UNIT-I

Symmetric Ciphers: Substitution Techniques, Transposition Techniques, Rotor Machines, Steganography. Block Cipher Principles, Data Encryption Standard (DES): The Strength of DES, Differential and Linear Cryptanalysis. Triple DES, Advanced Encryption Standard (AES): AES Structure, AES Transformation Functions, AES Key Expansion.

UNIT-II

Asymmetric Ciphers: Introduction to Number Theory: Prime numbers, Fermat‘s and Euler‘s Theorems, Testing for Primality. Principles Of Public-Key Cryptosystems: Public-Key Cryptosystems, Applications for Public-Key Cryptosystems, Requirements for Public-Key Cryptography, Public-Key Cryptanalysis. The RSA Algorithm: Description of the Algorithm, Computational Aspects, The Security of RSA. Key Management, Diffie Hellman Key Exchange.

UNIT-III

Authentication Methods and Protocols: Password based authentication, Token Based authentication, Biometric Authentication, Digital Certificates, X. 509 Directory Services, PKI, Needham Schroeder - Authentication Protocol, Single sign on, Kerberos Authentication Protocol, Message Authentication : Authentication Requirements, Authentication Functions, Message Authentication Codes, MD5 Message Digest Algorithms, Digital Signatures, Digital Signature Standards.

UNIT-IV

Network Security - Electronic Mail Security : Pretty Good Privacy. IP Security : Overview, IP Security Architecture, Authentication Header, Encapsulation Security Payload.

Web Security : User Authentication and session management, Cookies, Secure HTTP, SQL Injection Techniques, Cross Site Scripting, Cross-Site Request Forgery, Session Hijacking and Management, Phishing and Pharming Techniques, Web Services Security.

UNIT-V

System Security- Intruders, Malicious Software, Viruses and Related Threats, Counter Measures, Firewalls and its Design Principles.

TEXTBOOKS

1. William Stallings, Cryptography and Network Security, Pearson Education/PHI.
2. Cryptography and Network Security by Behrouz A. Forouzan, TATA McGraw hill.

Reference Books:

1. Charlie Kaufman, Radia Perlman, Mike Speciner, Network Security: Private Communication in Public World, Pearson Education.
2. Atul Kahate, Cryptography and Network Security, TMH.

BACK

Subject Code	***Course name***	***Credits***	***Lectures***	***Tutorials***	***Practical***
IT7T3	Software Testing	3	3	-	-

UNIT I

Software Testing Fundamentals-Black box,White box(statement,branch,conditional,and path coverage,Mc Cabe,s complexity), Static and dynamic testing,Verification and Validation, Performing high level and low level review of specification test techniques, Static and dynamic black box testing, Test to pass and test to fail, Equivalence partition, Data and state testing, Other black box testing techniques.

UNIT II

Software Testing Strategies-Static and dynamic white box testing,Generic code review checklist, Dynamic white box testing, Unit and integration testing, Data coverage, Code coverage.

UNIT III

Applying testing skills-Configuration testing overview, Compatibility testing, Platform and application versions, Backward and forward compatibility, Data sharing compatibility, Usability testing, User interface testing,Traits of good UI,Testing for disabled: accessibility testing, Website testing: Gray box testing, Usability testing.

UNIT IV

Automated Tools for Testing-benefits of automation and tools , test Tools, Software Test Automation, Random Testing: monkeys and gorillas, Test sharing and beta testing.

UNIT V

Working with Test Documentation-Goal of test planning, Test planning topics: high level expectations, people, Places and things, Test phases and test strategies, Test schedule and cases. Bug reporting, Test case planning overview, Isolating and reducing bugs, Bug life cycle, Bug tracking systems.

Text Book:

1.Ron Patton,*Software Testing*, 2nd ed., Pearson, (2005).

Reference Books:

1. Paul C. Jorgensen.,*Software Testing Software Testing: A Craftsman's Approach*, CRC PRESS, (2010).

2.Rajib Mall,Software Engineering,2nd ed.,Prentice(2007).

BACK

Subject Code	***Course name***	***Credits***	***Lectures***	***Tutorials***	***Practical***
IT8T1	Soft Computing	3	3	-	-

UNIT I

Introduction - What is soft computing ? Differences between soft computing and hard computing, Soft Computing constittuents, Methods in soft computing, Applications of Soft Computing.

UNIT II

Introduction to Genetic Algorithms- Introduction to Genetic Algorithms (GA), Representation, Operators in GA, Fitness function, population, building block hypothesis and schema theorem; Genetic algorithms operators- methods of selection, crossover and mutation, simple GA(SGA), other types of GA, generation gap, steady state GA, Applications of GA

UNIT III

Neural Networks- Concept, biological neural syste,. Evolution of neural network, McCulloch-Pitts neuron model, activation functions, feedforward networks, feedback networks, learning rules – Hebbian, Delta, Percepron learning and Windrow-Hoff, winner-take-all.

UNIT IV

Supervised learning- Perceptron learning, single l layer/multilayer perceptron, linear separability, hidden layers, back popagation algorithm, Radial Basis Function network; Unsupervised learning - Kohonen, SOM, Counter-propagation, ART, Reinforcement learning, adaptive resonance architecture, applications of neural networks to pattern recognition systems such as character recognition, face recognition, application of neural networks in image processing.

UNIT V

Fuzzy systems - Basic definition and terminology, set-theoretic operations, Fuzzy Sets, Operations on Fuzzy Sets, Fuzzy Relations, Membership Functions, Fuzzy Rules & Fuzzy Reasoning, Fuzzy Inference Systems, Fuzzy Expert Systems, Fuzzy Decision Making; Neuro-fuzzy modeling- Adaptive Neuro-Fuzzy Inference Systems, Coactive Neuro-Fuzzy Modeling, Classification and Regression Trees, Data Clustering Algorithms, Rulebase Structure

Identification and Neuro-Fuzzy Control, Applications of neuro-fuzzy modeling.

UNIT VI

Swarm Intelligence- What is swarm intelligence? Various animal behavior which have been used as examples, ant colony optimization, swarm intelligence in bees, flocks of birds, shoals of fish, ant-based routing, particle swarm optimization

Text Book:

1. S.N. Shivanandam, *Principle of soft computing*, Wiley. ISBN13: 9788126527410 (2011)
2. Jyh-Shing Roger Jang, Chuen-Tsai Sun, Eiji Mizutani, –Neuro-Fuzzy and Soft Computing‖, Prentice-Hall of India, 2003.
3. George J. Klir and Bo Yuan, –Fuzzy Sets and Fuzzy Logic-Theory and Applications‖, Prentice Hall, 1995.
4. James A. Freeman and David M. Skapura, –Neural Networks Algorithms, Applications, and Programming Techniques‖, Pearson Edn., 2003.

Reference Books:

1. Mitchell Melanie, –An Introduction to Genetic Algorithm‖, Prentice Hall, 1998.
2. David E. Goldberg, Genetic Algorithms in Search, Optimization & Machine Learning, Addison Wesley, 1997.

BACK

Subject Code	*Course name*	*Credits*	*Lectures*	*Tutorials*	*Practical*
ITEL1	Distributed Database	3	3	-	-

UNIT I

Distributed Database Overview-Distributed Database management system DDBMS, Features of Distributed Vs Centralized databases, Why Distributed databases?.

UNIT II

Principals and Concepts related to Distributed Databases-Review of Databases, Review of Computer Networks, Principals of Distributed Databases.

UNIT III

Distributed Database Architecture-Reference Architecture for Distributed databases, Architectural model for DDBMS, Distributed DBMS architecture.

UNIT IV

Designing Strategies of Distributed Databases from the replication and Fragmentation Point of View-Types of Data Fragmentation, Distributed database alternative design strategies, Advantages and Disadvantages of Fragmentation and Replication.

UNIT V

Distributed Query Design and Execution-Difference between centralized and Distributed query execution, Transforming global queries and fragment queries, Distributed grouping and aggregation functions used in Distributed query processing.

UNIT VI

Query Optimization in Distributed Database Environment-Framework for Query Optimization, General queries, Decomposition and Data Localization, Need for Query optimization.

UNIT VII

Distributed Query Design and Execution Strategies-Difference between centralized and Distributed query execution,Transforming global queries and fragment queries, Distributed grouping and aggregation functions used

in Distributed query processing. Distributed Transaction Management-Introduction to Transaction Management, Atomicity and Concurrency control.

UNIT VIII
Transaction Concurrency Control Techniques-Different techniques for concurrency control, Role of concurrency in the Integrity of the DDBMS.

UNIT IX
Distributed Database Administration-Catalog Management in distributed database, Authorization:Need and techniques,Catalog meaning and Need and Its role in DDBMS, Protection :Why and How in DDBMS Environment.

UNIT X
DDBMS Object Management and Disaster Prevention, Recovery and Backup--Fundamental Object concepts and Object management, Architectural issues, Object management and Distributed Object storage, Object Query Processing.Database Recovery Models,BackupTypes, Backup Options,Backup Strategies, Restoring Databases, Database Snapshots.

Text Book:
1. Stefano Ceri, Giuseppe Pelagatti, *Distributed Database Principles & Systems*., 5th ed.McGraw-Hill (2008).

Reference Books:
1. M. Tamer ozsu, Patrick valduriez, S. Sridhar, pearson, principles of distributed Database systems, 1th ed., Pearson, (2006).
2. Chris leiter, Dan Wood, Michael Cierkowski, Albert Boettger, Beginning microsoftsql Server 2008 administration, 1st ed., wiley (2009).

BACK

Subject Code	*Course name*	*Credits*	*Lectures*	*Tutorials*	*Practical*
ITEL2	Mobile Computing	3	3	-	-

Unit I
Mobility:Issues, challenges, and benefits; Review of mobile and cellular communication technology; Reviewof distributed/network operating systems, ubiquitous computing.

Unit II
Global System for Mobile Communication (GSM) System Overview:GSM Architecture, Mobility Management, Network Signaling, GPRS

Unit III
Mobile IP Networks:Physical mobility, challenges, limits and connectivity, mobile IP and cellular IP in mobile computing.

Unit IV
Mobile Transport Layer:Transportlayer issues in wireless, Indirect TCP, Snoop TCP, Mobile TCP.

Unit V
Wireless LANs:Introduction to IEEE 802.11, Bluetooth technologies and standards.

Unit VI
Mobile AdhocNetworks:Hidden and exposed terminal problems; Routing protocols: DSDV, DSR, AODV.

Unit VII
Mobile Devices and OS:Various types of Devices, Operating System: PalmOS, WindowsCE, Windows Mobile.

Unit VIII

Application Development:WWW programming model, Development Environment for Mobile Devices.

Text Book:

1. Jochen Schiller Mobile Communication, Pearson Education.
2. U. Hansman and L. Merck. Principles of Mobile Computing‖, 2nd Ed., Springer

Reference Books:

1. S. Tanenbaum. : Computer Networks, 4th Ed., Pearson Education.
2. D. Milojicic, F. Douglis. : Mobility Processes, Computers and Agents‖,Addison Wesley
3. Raj Kamal : Mobile Computing, Oxford University Press

BACK

Subject Code	***Course name***	***Credits***	***Lectures***	***Tutorials***	***Practical***
ITEL3	Embedded Systems	3	3	-	-

Unit I:

Introduction to embedded systems design: Embedded system, Processor in the System, Microcontroller, Memory Devices, Embedded System Project Management, ESD and Co-design issues in System development Process, Design cycle in the development phase for an embedded system, Use of target system or its emulator and In-circuit emulator, Use of software tools for development of an ES.

Unit II:

Inter-process Communication and Synchronization of Processes, Tasks and Threads, Problem of Sharing Data by Multiple Tasks, Real Time Operating Systems: OS Services, I/O Subsystems, Interrupt Routines in RTOS Environment, RTOS Task Scheduling model, Interrupt Latency and Response times of the tasks.

Unit III

Resourse Management/Scheduling Paradigms: static priorities, static schedules, dynamic scheduling, best effort current best practice in scheduling (e.g. Rate Monotonic vs. static schedules), Real-world issues: blocking, unpredictability, interrupts, caching, Examples of OSs for embedded systems - RT Linux, VRTX.

Unit IV

Programming languages for embedded systems e.g., Handel-C and Esterel, system support for embedded systems, selected embedded system-based applications: process-

control, robotics, etc.

Unit V

Software Development Methodology: Model based development, Statecharts, General languagecharacteristics, MISRA C, Hardware/Software Co- design, Hardware/software partitioning, Testing embedded systems, Design for testability and Self-test.Case studies, Controlling an Injection molding process, Flight simulator, digital call center handler, codec.

Text Book:

1. Raj Kamal, Embedded Systems, TMH, 2004.
2. Jack Ganssle, "The Art of Designing Embedded Systems", Newnes, 1999.

Reference Books:

1. David E. Simon, *An Embedded Software Primer*, Pearson Education, 1999.
2. C.M. Krishna and Kang G, *RTS: Real-Time Systems*,Shin, McGraw-Hill, 1997.

BACK

Subject Code	***Course name***	***Credits***	***Lectures***	***Tutorials***	***Practical***
ITEL4	Advanced Computer Architecture	3	3	-	-

UNIT-I

Introduction - What is computer architecture? CPU Performance metrics. Performance measurement. Benchmark programs, Quantitative Principles of Computer Design.

UNIT-II

Instruction Set Principles, Classifying Instruction Set Architectures, Memory Addressing, Type and Size of Operands, Operations in the Instruction Set, Instructions for Control Flow, Encoding an Instruction Set

UNIT-III

Pipelining - Speedup. Pipeline hazards , Instruction-Level Parallelism: Concepts and Challenges, Basic Compiler Techniques for Exposing ILP, Forwarding, Branch prediction, Dynamic Scheduling, advanced techniques for Instruction Delivery and Speculation, Limitations of ILP.

UNIT-IV

Memory Hierarchy Design, Eleven Advanced Optimizations of Cache Performance, Memory Technology and Optimizations. Cache memory- Locality of reference. Cache organization and access. Multilevel caches. Measuring and Improving Cache Performance. Cache coherence. Virtual memory- Hardware support for address translation, page fault handling. Translation look aside buffer.

UNIT-V

Input/Output- Hard disk. Flash memory. I/O Performance, Reliability Measures, and Benchmarks, I/O interfacing. Memory mapped I/O. Interrupt driven I/O. Direct memory access. Redundant arrays of inexpensive disks; Introduction to advanced topics- Multi-cores. Multi-processors. Clusters.

Text Books:

1. David A. Patterson and John L. Hennessy, Computer Organization and Design: The Hardware and Software Interface, Morgan Kaufmann Publishers, Fourth Edition.(2009)

Reference Books:

1. John L. Hennessy and David A. Patterson, Computer Architecture: A Quantitative Approach, Morgan

Kaufmann Publishers (2007)

BACK

Subject Code	***Course name***	***Credits***	***Lectures***	***Tutorials***	***Practical***
ITEL5	Cloud Computing and Services	3	3	-	-

UNIT I - INTRODUCTION

Cloud definition, benefits, usage scenarios - History of Cloud Computing - Cloud Architecture - Types of Clouds - Business Models around Clouds – Major Players in Cloud Computing - Issues in Clouds - Eucalyptus - Nimbus - Open Nebula - Cloud Sim

UNIT II - CLOUD SERVICES

Types of Cloud services: Software as a Service - Platform as a Service – Infrastructure as a Service - Database as a Service - Monitoring as a Service – Communication as a Service - Service providers - Google, Amazon, Microsoft Azure, IBM, Sales Force

UNIT III - COLLABORATION USING CLOUD SERVICES

Email Communication over the Cloud - CRM Management - Project Management - Event Management - Task Management – Calendar - Schedules - Word Processing – Presentation – Spreadsheet - Databases – Desktop - Social Networks and Groupware

UNIT IV - VIRTUALIZATION FOR CLOUD

Need for Virtualization – Pros and cons of Virtualization – Types of Virtualization – System Vm, Process VM, Virtual Machine monitor – Virtual Machine properties - Interpretation and binary translation, HLL VM - Hypervisors – Xen, KVM, VMWare, Virtual Box - Hyper-V

UNIT V - SECURITY, STANDARDS AND APPLICATIONS

Security in Clouds: Cloud security challenges – Software as a Service Security, Common Standards: The Open Cloud Consortium – The Distributed management Task Force – Standards for application Developers – Standards for Messaging – Standards for Security, End user access to cloud computing, Mobile Internet devices and the Cloud

Text Book:

1. John Rittinghouse & James Ransome, "Cloud Computing, Implementation, Management and Strategy", CRC Press, 2010.
2. Michael Miller, "Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate". Que Publishing, August 2008.
3. James E Smith, Ravi Nair, "Virtual Machines", Morgan Kaufmann Publishers, 2006.

Reference Books:

1. David E.Y. Sarna, "Implementing and Developing Cloud Application", CRC press 2011.
2. Lee Badger, Tim Grance, Robert Patt-Corner, Jeff Voas, " Draft cloud computing synopsis and recommendations", NIST, May 2011.
3. Anthony T Velte, Toby J Velte, Robert Elsenpeter, "Cloud Computing : A Practical Approach", Tata McGraw-Hill 2010.
4. Haley Beard, "Best Practices for Managing and Measuring Processes for Ondemand Computing, Applications and Data Centers in the Cloud with SLAs", Emereo Pty Limited, July 2008.
5. G.J.Popek, R.P. Goldberg, "Formal Requirements for Virtualizable Third Generation Architectures", Communications of the ACM, No.7 Vol.17, July 1974.

BACK

Subject Code	*Course name*	*Credits*	*Lectures*	*Tutorials*	*Practical*
ITEL6	Statistical Modeling and Tools	3	3	-	-

UNIT 1-Review of Probability and Distributions: Rules for probability, random variables and their distributions, moments, special discrete and continuous distributions, laws of large numbers and central limit theorem, sampling distributions.

UNIT 2-Parametric Methods: Point estimation – unbiasedness, consistency, UMVUE, sufficiency and completeness, method of moments, maximum likelihood estimation and method of scoring. Bayes, minimax and admissible estimators. Interval estimation - confidence intervals for means, variances and proportions. Testing of Hypotheses - tests for parameters of normal populations and for proportions, goodness of fit test and its applications.

UNIT 3-Multivariate Analysis: Multivariate normal, Wishart and Hotelling's T^2 distributions and their applications in testing of hypotheses problems. Classification of observations, principal component analysis, canonical correlations and canonical variables.

UNIT 4-Nonparametric Methods: Empirical distribution function, asymptotic distributions of order statistics, single sample problems, problems of location, prediction intervals, Kolmogorov Smirnov one sample statistics, sign test, Wilcoxon signed rank statistics, two sample problems, Mann-Whitney-Wilcoxon tests, scale problems, Kolmogorov Smirnov two sample criterion, Hoeffding's U-statistics.

UNIT 5-Statistical Tools: IBM-SPSS, R, MATLAB.

REFERENCE

1. An Introduction to Probability and Statistics by V.K. Rohatgi & A.K. Md.E.Saleh.
2. Modern Mathematical Statistics by E.J. Dudewicz & S.N. Mishra
3. Introduction to Probability and Statistics for Engineers and Scientists by S.M. Ross
4. An Introduction to Multivariate Analysis by T. W. Anderson
5. Nonparametric Statistical Inference by J.D. Gibbons & S. Chakraborti

Subject Code	*Course name*	*Credits*	*Lectures*	*Tutorials*	*Practical*
ITEL7	Big Data Analytics	3	3	-	-

UNIT 1 - Descriptive Statistics
Introduction to the course, Descriptive Statistics, Probability Distributions

UNIT 2 - Inferential Statistics
Inferential Statistics through hypothesis tests, Permutation & Randomization Test

UNIT 3 - Regression & ANOVA
Regression, ANOVA(Analysis of Variance)

UNIT 4 - Machine Learning: Introduction and Concepts
Differentiating algorithmic and model based frameworks, Regression : Ordinary Least Squares, Ridge Regression, Lasso Regression, K Nearest Neighbours Regression & Classification

UNIT 5 - Supervised Learning with Regression and Classification techniques -1
Bias-Variance Dichotomy, Model Validation Approaches, Logistic Regression, Linear Discriminant Analysis, Quadratic Discriminant Analysis, Regression and Classification Trees, Support Vector Machines

UNIT 6 - Supervised Learning with Regression and Classification techniques -2
Ensemble Methods: Random Forest, Neural Networks, Deep learning

UNIT 7 - Unsupervised Learning and Challenges for Big Data Analytics
Clustering, Associative Rule Mining, Challenges for big data analytics

UNIT 8 - Prescriptive analytics
Creating data for analytics through designed experiments, Creating data for analytics through Active learning, Creating data for analytics through Reinforcement learning

REFERENCE

[1] Hastie, Trevor, et al. The elements of statistical learning. Vol. 2. No. 1. New York: springer, 2009.
[2] Montgomery, Douglas C., and George C. Runger. Applied statistics and probability for engineers. John Wiley & Sons, 2010.
[3] Mitchell, Tom M., Machine Learning, McGraw Hill, 2013.
[4] Pang-Ning Tan, Michael Steinbach, and *Vipin Kumar,* Introduction to *Data Mining*, Pearson, 2014.
[5] Alpaydin, Ethem. Introduction to *machine learning* — 2nd ed, PHI, 2010.

BACK

Subject Code	*Course name*	*Credits*	*Lectures*	*Tutorials*	*Practical*
ITEL8	Mobile Application Development	3	3	-	-

Unit 1.

The Android Platform: Introduction to the Android platform and the Android Studio IDE, Android components, Activities and their lifecycle.

Unit 2.

User Interface Design: Intents, Activity lifecycle, UI Design: Widgets and Layouts, UI Events, Event Listeners, XML & LOGS, Advanced Database & introduction to iOS

Unit 3.

Graphics Support in Android: Drawables, Basics of Material Design, 2D graphics: Canvas/Drawing using a view, Modern deployment & development practice.

Unit 4.

Multimedia in Android: Audio playback and MediaPlayer, SoundPool

Unit 5.

Networking support: Basics of networking in Android, AsyncTask, HttpURLConnection

Text Book

1. Rajiv Ramnath, Roger Crawfis, and Paolo Sivilotti, Android SDK 3 for Dummies, Wiley
2. Valentino Lee, Heather Schneider, and Robbie Schell, Mobile Applications: Architecture, Design and Development, Prentice Hall, 2004.
3. Suzanne Ginsburg, Designing the iPhone User Experience: A User-Centered Approach to Sketching and Prototyping iPhone Apps, Addison-Wesley Professional, 2010.
4. Brian Fling, Mobile Design and Development, O'Reilly Media, Inc., 2009.

BACK

Subject Code	*Course name*	*Credits*	*Lectures*	*Tutorials*	*Practical*
ITEL9	Network Protocols	3	3	-	-

Unit I

Introduction:Network Communication Architecture and Protocols.

Unit II

IP Addressing,CIDR, Subnetting and Supernetting.

Unit III

Data gram,ARP,RARP, Message Protocol, Group Management Protocols.

Unit IV

Process to process communication-User datagram –Checksum- UDP operation- uses of UDP – UDP design,TCP Services –Segment -Options- Checksum-Flow control- Error Control-TCP Timers-Connection-State Transition Diagram-Congestion Control-TCP operation- TCP Design.

Unit V

Client-server Model-Concurrency-Processes, BOOTP and DHCP, Name Space-Domain name Space-Distribution of Name space-DNSin the Internet-Resolution- DNS Messages- Types of Records-Compression-DDNS Encapsulation.

Unit VI

Connections- Communication-Command Processing-FileTransfer-User Interface-Anonymous FTP, Sockets-Byte ordering- Address Transformation-Bytemanipulation Function-Information about Remote Host- Socket System Calls- Connectionless Iterative server- UDP Client/Server Programs-Connection oriented Concurrent Server – TCPClient/Server Programs.

Text Book

1. TCP/IP Protocol Suite. Behrouz A. Forouzan (TMH edition)

Reference Book:

1. Internetworking with TCP/IP. D. E. Comer (PHI publications).

BACK

Subject Code	*Course name*	*Credits*	*Lectures*	*Tutorials*	*Practical*
ITEL10	XML and Web Services	3	3	-	-

UNIT I - XML Fundamentals

Basics – XML Tree – Syntax – XML Elements – Attributes – Validation – XML Viewing – CSS – XSLT – XML Namespace – CDATA - XML Parser – DOM – XML to HTML – Applications

UNIT II - XML Technology

XML Essentials – Schema – XML Design Techniques – Security – Transformation – Query – XML Components – XML Processing – XML Publishing

UNIT III - Web Services Fundamentals

RPC concepts – RMI Implementation – Concepts and Use of Web Services - Web Service Architecture - JAX-RPC – XML-RPC - Web Services Platform: SOAP – UDDI – WSDL – Simple Web Service Creation – Deployment

UNIT IV - Web Services Development and Deployment

XML Web Services Standards – AXIS2 Framework - SOAP Messages – Life Cycle of a Message – Message Exchange Patterns – Handling of SOAP Messages - AXIS2 Clients and Services – SOAP Messages with Attachments – Applications

UNIT V - DEPLOYMENT PLATFORM ARCHITECTURAL MODELS

AXIS2 Requirements – Architecture – Information Model – XML Processing Model – SOAP Message Processing Model – Deployment Model – Client Communication with Web Services – Transports – Code Generation – Data Binding – Modules – Handlers – SOAP Faults

Textbooks:

1. Gustavo Alonso, Fabio Casati, Harumi Kuno, Vijay Machiraju, –Web Services - Concepts, Architectures and Applications‖, Springer Verlag, 2010.
2. Ron Schmelzer, –XML and Web Services Unleashed‖, Sams, 2002.

References:

1. Frank. P. Coyle, XML, Web Services And The Data Revolution, Pearson Education, 2002.
2. Eric Newcomer, –Understanding Web Services: XML, WSDL, SOAP and UDDI‖, Addison Wesley Professional, 2002.
3. David A. Chappell and Tyler Jewell, –Java Web services‖, O'Reilly Media, Inc., 2002.
4. Anne Thomas Mannes, ―Web Services: A Manger‘s Guide‖, Addison Wesley Professional, 2003.
5. http://www.w3schools.com
6. http://www.w3.org
7. http://axis.apache.org/axis2/java/core/docs/toc.html

BACK

Subject Code	*Course name*	*Credits*	*Lectures*	*Tutorials*	*Practical*
ITEL11	Service Oriented Architecture	3	3	-	-

UNIT I - SOA FUNDAMENTALS

Defining SOA, Roots of SOA, Characteristics of SOA, Concept of a service in SOA, Basic SOA architecture - Comparing SOA to client-server and distributed internet architectures – Anatomy of SOA- How components in an SOA interrelate - Principles of service orientation.

UNIT II - WEB SERVICES AND SOA

Web services – Service descriptions – Messaging with SOAP –Message exchange Patterns – Coordination – Atomic Transactions – Business activities – Orchestration – Choreography – Service layer abstraction – Application Service Layer – Business Service Layer – Orchestration Service Layer.

UNIT III - SOA ANALYSIS AND DESIGN

Service oriented analysis – Business-centric SOA – Deriving business services- service modeling - Service Oriented Design – WSDL basics – SOAP basics – SOA composition guidelines – Entity-centric business service design – Application service design – Task centric business service design

UNIT IV - ENTERPRISE PLATFORMS AND SOA

SOA platform basics – SOA support in J2EE – Java API for XML-based web services (JAX-WS) - Java architecture for XML binding (JAXB) – Java API for XML Registries (JAXR) - Java API for XML based RPC (JAX-RPC)- Web Services Interoperability Technologies (WSIT) - SOA support in .NET – Common Language Runtime - ASP.NET web forms – ASP.NET web services – Web Services Enhancements (WSE)

UNIT V - SOA SECURITY

WS-BPEL basics – WS-Coordination overview - WS-Choreography, WS-Policy, WSSecurity

Textbooks:

1. Thomas Erl, –Service-Oriented Architecture: Concepts, Technology, and Design‖, Pearson Education, 2005.

References:

1. Thomas Erl, –SOA Principles of Service Design –(The Prentice Hall Service-Oriented Computing Series from Thomas Erl), 2005.
2. Newcomer, Lomow, –Understanding SOA with Web Services‖, Pearson Education, 2005.
3. Sandeep Chatterjee, James Webber, –Developing Enterprise Web Services, An Architect‘s Guide‖, Pearson Education, 2005.
4. Dan Woods and Thomas Mattern, –Enterprise SOA Designing IT for Business

Innovation‖ O'REILLY, First Edition, 2006.

BACK

Subject Code	*Course name*	*Credits*	*Lectures*	*Tutorials*	*Practical*
ITEL12	System Analysis and Design	3	3	-	-

Unit I

Fundamentals of System:System definition and concepts- Characteristics and types of system, Manual andautomated systems, Real-life Business sub-systems- Production, Marketing, Personal, Material, Finance,Systems models types of models- Systems environment and boundaries, Realtime and distributed systems, Basic principles of successful systems.

Unit II

Systems analyst and System Development cycle :Role and need of systems analyst ,Qualifications and responsibilities ,Systems Analyst as an agent of change,system,SDLC,Various phases of development :Analysis, Design, Development,Implementation, Maintenance.

Unit III

Systems documentation considerations and System Planning :Principles of systems documentation,Types of documentation and their importance,Enforcing documentation discipline in an organization .System Planning:Data and fact gathering techniques: Interviews, Group communication,Presentations, Site visits.Feasibility study and its importance,Types of feasibility reports,System,Selection,plan and proposal,Prototyping.

Unit IV

Systems Design and modeling :Process modeling, Logical and physical design, Design representation,Systemsflowcharts and structured charts , Data flow diagrams , Common diagrammingconventions and guidelines using DFD and ERD diagrams. Data Modeling andsystems analysis , Designing the internals:Program and Process design,Designing Distributed Systems .Classification of forms,Input/output forms design, User-interface design, Graphical interfaces.Modular and structured design-Module specifications ,Module coupling and cohesion , Top-down and bottom-updesign .

Unit V

System Implementation and Maintenance:Planning considerations, Conversion methods, producers and controls, Systemacceptance Criteria, System evaluation and performance, Testing and validation,Systems qualify Control and assurance, Maintenance activities and issues.

Unit VI

System Audit and Security :Computer system as an expensive resource-Data and Strong mediaProcedures and norms for utilization of computer equipment, Audit of computer system usage, Audit trails,Types of threats to computer system and control measures-Threat to computersystem and control measures, Disaster recovery and contingency planning

Unit VII

Object Oriented Analysis and design:Introduction to Object Oriented Analysis and design life cycle, object modeling: ClassDiagrams, Dynamic modeling: state diagram,sequence diagramming.

Unit VIII

Cost-Benefit and analysis and Case study:Tools and techniques of Cost-Benefit and analysis.Casestudy:InventoryControl**,**Railway Reservation System**,**University Management System**,**Hospital management System.

Text Book:

1. Elias M.Awad,System analysis and design

Reference Books:

1. Perry Edwards, System analysis and design, McGraw Hill international edition, 1993.
2. James A.Senn ,*Analysis and design of information systems*, McGraw-Hill, 1989

BACK

Subject Code	***Course name***	***Credits***	***Lectures***	***Tutorials***	***Practical***
ITEL13	Decision Support System	3	3	-	-

Unit I

A Framework for Decision Support, The Concept of Decision Support Systems; Group Support Systems; Enterprise Information Systems.

Unit II

Decision-Making Systems: Introduction and Definitions; Systems; Models; Phases of the Decision Making Process; The Intelligence Phase; Decision-Making: The Design Phase; The Choice Phase; The Implementation Phase; How Decisions Are Supported; Personality Types, Gender, Human Cognition, and Decision Styles; The Decision-Makers

Unit III

Decision Support Systems: DSS Configurations; What Is a DSS?; Characteristics and Capabilities of DSS; Components of DSS; The Data Management Subsystem; The Model Management Subsystem; The User Interface (Dialog) Subsystem; The Knowledge-Based Management Subsystem; The User; DSS Hardware; DSS Classifications;

Unit IV

Modeling and Analysis: MSS Modeling; Static and Dynamic Models; Certainty, Uncertainty, and Risk; Influence Diagrams; MSS Modeling with Spreadsheets; Decision Analysis of a Few Alternatives; The Structure of MSS Mathematical Models; Mathematical Programming Optimization; Multiple Goals, Sensitivity Analysis, What-If, and Goal Seeking; Problem-Solving Search Methods; Heuristic Programming; Simulation; Visual Interactive Modeling and Visual Interactive Simulation; Quantitative Software Packages; Model Base Management.

Unit V

Business Intelligence: Data Collection, Problems, and Quality; The Web/Internet and Commercial Database Services; Database Management Systems in Decision Support Systems/ Business Intelligence; Database Organization and Structures; Data Warehousing; Data Marts; Business Intelligence/Business Analytics; Online Analytical Processing (OLAP); Data Mining; Data Visualization, Multidimensionality, and Real-Time Analytics; Geographic Information Systems; Business Intelligence and the Web: Web Intelligence/Web Analytics.

Unit VI

Intelligent Decision Support Systems: Knowledge-Based Systems, Knowledge Acquisition, Representation, and Reasoning.

Text Book:

1. Decision Support Systems and Intelligent Systems, Seventh Edition, Efraim Turban, Jay E. Aronson, Richard V. McCarthy, Prentice-Hall of India, 2007

Reference Book:

1. Decision Support Systems, A Knowledge-Based Approach, Clyde W. Holsapple and Andrew B. Whinston
2. Decision Support Systems For Business Intelligence by Vicki L. Sauter

BACK

Subject Code	*Course name*	*Credits*	*Lectures*	*Tutorials*	*Practical*
ITEL14	Advanced Java Technology	3	3	-	-

UNIT I - **Collections :** Collection Interfaces, Concrete Collections, The Collections Framework

UNIT II -
Multithreading : Creating thread and running it, Multiple Thread acting on single object, Synchronization, Thread communication, Thread group, Thread priorities, Daemon Thread, Life Cycle of Thread

UNIT III - **Networking :**
Internet Addressing, InetAddress, Factory Methods, Instance Methods, TCP/IP Client Sockets, URL, URL Connection, TCP/IP Server Sockets, Datagrams

UNIT IV - **Enterprise Java Bean:** Preparing a Class to be a JavaBean, Creating a JavaBean, JavaBean Properties, Types of beans, Stateful Session bean, Stateless Session bean, Entity bean

UNIT V - **Java Database Connectivity (JDBC):**
Merging Data from Multiple Tables: Joining, Manipulating Databases with JDBC, Prepared Statements, Transaction Processing, Stored Procedures C

UNIT VI -
Servlets: Servlet Overview and Architecture, Interface Servlet and the Servlet Life Cycle, Handlin g
HTTP get Requests, Handling HTTP post Requests, Redirecting Requests to Other Resources, Ses sion Tracking, Cookies, Session Tracking with HttpSession

UNIT VII - **JavaServer Pages (JSP):** Introduction, JavaServer Pages Overview,
A First JavaServer Page Example, Implicit Objects, Scripting, Standard Actions, Directives, Custom Tag Libraries

UNIT VIII - **Remote Method Invocation:**
Defining the Remote Interface, Implementing the Remote Interface, Compiling and Executing the Server and the Client

UNIT IX - **Common Object Request Broker Architecture (CORBA):** Technical/Architectural Overview, CORBABasics, CORBA services

UNIT X -
Introduction Smart Phone Application Development: Introduction to android platform, Creating application template, adding activity, intent, services to application, using Google map API

Reference Book:

1. –Advanced Java 2 Platform HOW TO PROGRAM‖ by H. M.Deitel, P. J. Deitel, S. E. Santry – Prentice Hall

2. –Beginning Java™ EE 6 Platform with GlassFish 3 From Novice to Professional‖ by Antonio Goncalves – Apress publication

BACK

Subject Code	*Course name*	*Credits*	*Lectures*	*Tutorials*	*Practical*
ITEL15	.Net Technology	3	3	-	-

UNIT 1 - Introduction to .NET Framework: NET framework, MSIL, CLR, CLS, CTS, Namespaces, Assemblies The Common Language Implementation, Assemblies, Garbage Collection, The End to DLL Hell - Managed Execution.

UNIT 2 - C# - The Basics and Console Applications in C#: Name Spaces - Constructor and Destructors, Function Overloading & Inheritance, Operator Overloading, Modifiers - Property and Indexers , Attributes & Reflection API, When to use Console Applications - Generating Console Output, Processing Console Input.

UNIT 3 - C#.NET: Language Features and Creating .NET Projects, Namespaces Classes and Inheritance -, Namespaces Classes and Inheritance -, C, Exploring the Base Class Library -, Debugging and Error Handling -, Data Types -, Exploring Assemblies and Namespaces, String Manipulation ,Files and I/O ,Collections.

UNIT 4 - ADO.NET: Benefits of ADO.NET, ADO.NET compared to classic ADO -, Datasets, Managed Providers -, Data Binding: Introducing Data Source Controls -, Reading and Write Data Using the SqlDataSource Control.

UNIT 5 - Windows Forms and Controls in details: The Windows Forms Model, Creating Windows Forms Windows Forms Properties and Events, Windows Form Controls, Menus - Dialogs – ToolTips.

UNIT 6 - Visual Inheritance in C#.NET: Apply Inheritance techniques to Forms, Creating Base Forms, Programming Derived Forms.

UNIT 7 - Mastering Windows Forms: Printing - Handling Multiple Events, GDI+, Creating Windows Forms Controls.

UNIT 8 - ASP.NET: Introduction to ASP.NET, Working with Web and HTML Controls, Using Rich Server Controls, Login controls, Overview of ASP.NETValidation Controls, Using the Simple Validations, Using the Complex Validators Accessing Data using ADO.NET, Using the Complex Validators Accessing Data using ADO.NET, Configuration Overview.

UNIT 9 - Themes and Master Pages: Creating a Consistent Web Site, ASP.NET 2.0 Themes - Master Pages, Displaying Data with the GridView Control Introducing the GridView Control, Filter Data in the GridView Control, Allow Users to Select from a DropDownList in the Grid, Add a Hyperlink to the Grid, Deleting a Row and Handling Errors.

UNIT 10 - Managing State: Preserving State in Web Applications and Page-Level State, Using Cookies to Preserve State, ASP.NET Session State ,Storing Objects in Session State, Configuring Session State, Setting Up an Outof-Process State Server, Storing Session State in SQL Server, Using Cookieless Session IDs, Application State Using the DataList and Repeater Controls, Overview of List-Bound Controls, Creating a Repeater Control and DataList Control.

UNIT 11 - Creating and Consuming Web Services: The Motivation for XML Web Services, Creating an XML Web Service with Visual Studio, Designing XML Web Services, Creating Web Service Consumers, Discovering Web Services Using UDDI.

UNIT 12 - Advanced in .NET: Introduction to Windows Presentation Foundation (WPF), Window Communication Foundation and its Application.

REFERENCE

[1] Matthew Macdonald and Robert Standefer, ASP.NET Complete Reference. TMH.
[2] Christian Nagel, Professional C# .Net, Wrox Publication.
[3] Vijay Mukhi, C# The Basics, BPB Publications.

BACK

Subject Code	*Course name*	*Credits*	*Lectures*	*Tutorials*	*Practical*
ITEL16	Artificial Intelligence	3	3	-	-

UNIT I

Introduction : Overview of Artificial intelligence- Problems of AI, AI technique, Tic - Tac - Toe problem.

Intelligent Agents: Agents & environment, nature of environment, structure of agents, goal based agents, utility based agents, learning agents.

UNIT II

Problem Solving: Problems, Problem Space & search: Defining the problem as state space search, production system, problem characteristics, issues in the design of search programs.

Search techniques: Solving problems by Searching: problem solving agents, searching for solutions; uniform search strategies: breadth first search, depth first search, depth limited search, bidirectional search, comparing uniform search strategies.

UNIT III

Heuristic search strategies: Greedy best-first search, A* search, memory bounded heuristic search: local search algorithms & optimization problems: Hill climbing search, simulated annealing search, local beam search, genetic algorithms; constraint satisfaction problems, local search for constraint satisfaction problems.

UNIT IV

Adversarial search: Games, optimal decisions & strategies in games, the minimax search procedure, alpha-beta pruning, additional refinements, iterative deepening.

UNIT V

Knowledge & reasoning: Knowledge representation issues, representation & mapping, approaches to knowledge representation, issues in knowledge representation.

Using predicate logic: Representing simple fact in logic, representing instant & ISA relationship, computable functions & predicates, resolution, natural deduction.

Representing knowledge using rules: Procedural verses declarative knowledge, logic programming, forward verses backward reasoning, matching, control knowledge.

UNIT VI

Probabilistic reasoning: Representing knowledge in an uncertain domain, the semantics of Bayesian networks, Dempster-Shafer theory, Fuzzy sets & fuzzy logics.

Planning: Overview, components of a planning system, Goal stack planning, Hierarchical planning, other planning techniques.

Text Books :

1. Artificial Intelligence, Ritch & Knight, TMH
2. Artificial Intelligence A Modern Approach, Stuart Russel Peter Norvig Pearson
3. Introduction to Artificial Intelligence & Expert Systems, Patterson, PHI
4. Poole, Computational Intelligence, OUP
5. Logic & Prolog Programming, Saroj Kaushik, New Age International

6. Expert Systems, Giarranto, VIKAS
7. Artificial Intelligence, Russel, Pearson

Reference Books:

3. Char nick, — Introduction to Artificial Intellegence‖, Addision Welsey.
4. Expert System Programming‖, PHI.
5. Lioyed, ‖ Foundation of logic Programming‖, Springer Verlag.

BACK

Subject Code	*Course name*	*Credits*	*Lectures*	*Tutorials*	*Practical*
ITEL17	E-commerce & ERP	3	3	-	-

UNIT I

Introduction to ecommerce: aim and function of ecommerce. Application of ecommerce in business functions, tools and technologies for ecommerce, types of ecommerce and challenges in ecommerce.

UNIT II

Electronic Data Interchange(EDI): Definition, concept and evolution of EDI, traditional versus EDI enabled system for document exchange, EDI layered architecture, process of EDI, EDI implementation,, message exchange, components of EDI, UNEDIFACT standards and message structure, EDI enabled procurement process.

UNIT III

Intranet, Extranet and VPN(Virtual Private Network):-Their architecture and applications,
Electronic Payment System: E-cash: purchasing and using of e-cash; Electronic purses; E-cheque payment system; online third party verified payment system through credit card and debit card. First Virtual Internet Payment, cyber cash model.
Security system in ecommerce transaction: Security issues: confidentiality, integrity, authentication, non-repudiation; A brief introduction to cryptography, public key solution, key distribution, legal issues in cryptography. SSL and SET

UNIT IV

Application of ecommerce and case studies: Case studies and applications of ecommerce in Retailing, Banking, Manufacturing, Airlines and Railway reservation and e-governance.Cyber Crimes.

UNIT V

ERP- An Enterprise Perspective; Production Finance, Personnel disciplines and their relationship, Transiting environment, MIS Integration for disciplines, Case Study, Information/Workflow, Network Structure, Client Server Integrator System, Virtual Enterprise.

UNIT VI

ERP- Resource Management Perspective; Functional and Process of Resource. Management, Basic Models of ERP system- HRD, Personnel Management, Training and Development, Skill Inventory, Material Planning and Control, Inventory, Forecasting, Manufacturing, Production Planning, Production Scheduling, Production Control, Sales and Distribution, Finance, Resource Management in global scenario, dynamic data management in complex global scenario.

Text Books

1. –Ecommerce: Strategy, Technologies and Applicationss‖, David Whiteley, Tata McGraw Hill
2. –Ecommerce: The cutting Edge of Business‖, KK Bajaj and Debjani Nag, McGraw Hill.
3. S.Sadagopan, — Enterprise Resource Planning‖, Tata McGraw Hill,1999.
4. Alexis Leon, — Enterprise Resource Planning‖, Tata McGraw Hill,2000.

References:

1. –The complete Reference: Internet‖, Margaret Levine Young, TMH.
2. –Ecommerce: Concepts, Models, Strategies‖, CSV Murthy, Himalayas Publishing House.
3. –Frontiers of Electronic Commerce‖, Ravi Kalakota& Andrew B. Wilson, Addison-Wesley
–Network Security Essentials: Applications and Standards‖, William Stallings, Pearson Education.

BACK

Subject Code	*Course name*	*Credits*	*Lectures*	*Tutorials*	*Practical*
EC8T02	Digital Image Processing	4	3	1	-

Unit I: Introduction

Digital Image representation, fundamental steps in image processing, Elements of digital image processing systems.

Unit II :Digital Image Fundamentals

Elements of Visual perception, A simple Model, Image Sensing and Acquisition, Image Sampling and quantization, some basic relationships between pixels.

Unit III: Image Transformation and enhancement

Some basic Intensity Transformation functions, Histogram Processing, Smoothing and Sharpening Spatial Filters, Smoothing and Sharpening using Frequency Domain Filters.

Unit IV: Image Restoration

Degradation Model, Noise Models, Restoration in the presence of Noise – Spatial Filtering, Periodic Noise Reduction by Frequency Domain Filtering, Inverse Filtering, Minimum Mean square error filter.

Unit V :Image Segmentation

Point Detection, Line Detection, Edge Detection, Thresholding, Region – Based Segmentation, Color Image Processing.

Textbooks:

1. Digital Image Processing - Rafael C Gonzalez - Addison Wesley

References:

1. Digital Image Processing - Richard E Woods -'" Addison Wesley
2. Fundamentals of Digital Image Processing - A.K Jain – PHI