B. Sc. Electronics andCommunicationSyst

Syllabus

AFFILIATEDCOLLEGES

ProgramCode:26B

2020–2021onwards

BHARATHIARUNIVERSITY

(A State University, Accredited with "A" Grade by NAAC,Ranked13thamongIndianUniversitiesby MHRD-NIRF,
WorldRanking:Times-801-1000,Shanghai-901-1000,URAP-982)

Coimbatore-641046 TamilNadu India

ProgramEducationalObjectives(PEOs)	
The**B.Sc.ELECTRONICSANDCOMMUNICATIONSYSTEMS**program describeaccomplishmentsthatgraduatesareexpectedtoattainwithinfive tosevenyearsaftergraduation	
PEO1	Provide graduates with a strong foundation in Electronicsdomain and toenable them to devise and deliver efficient solutions to challenging problemsinElectronics,Communications and allied disciplines.
PEO2	Impartanalyticandthinkingskillstodevelopinitiativesandinnovativeideasf orR&D,Industryand societal requirements.
PEO3	Provide sound theoretical and practical knowledge of Electronics, managerialand entrepreneurial skills to enable students to contribute to the wellbeing ofsocietywith aglobal outlook.
PEO4	Inculcate qualities of teamwork as well as social, interpersonal and leadershipskills and an ability to adapt to evolving professional environments in thedomainsof engineeringand technology.
PEO5	Motivategraduatestobecomegoodhumanbeingsandresponsiblecitizensforthe overall welfareofthe society.
PEO6	Developattitudeinlifelonglearning,applyingandadaptingnewideasand technologiesastheirfieldevolves.
PEO7	Topreparegraduateswhowillhaveknowledge,abilityandcouragetopursuehigherst udiesandresearch.

ProgramSpecificOutcomes(PSOs)	
AfterthesuccessfulcompletionofB.Sc. ELECTRONICSANDCOMMUNICATIONS YSTEMSprogram, thestudents areexpectedto	
PSO1	Demonstrateproficiencyinuse of softwareandhardware requiredtopracticeelectronicsand communication profession**.**
PSO2	Graduateswillbeabletoapplyfundamentalsofelectronicsinvariousdomainsof analogand digital systems
PSO3	Apprehend and analyses specific engineering problemsof communication,electronic circuits, computer programming, embedded systems, VLSI designand semiconductor technology by applying the knowledge of basic sciences,engineeringmathematics andengineeringfundamentals.
PSO4	Abilitytocommunicateeffectivelywithexcellentinterpersonalskillsanddemonstratethepractice ofprofessionalethics forsocietal benefit
PSO5	Graduateswillbeabletoapplyfundamentalsofelectronicsinvariousdomainsof analogand digital systems.
PSO6	Useembeddedsystemconcepts fordevelopingIoTapplications

ProgramOutcomes (POs)	
OnsuccessfulcompletionoftheB.Sc.ELECTRONICSANDCOMMUNICATION SYSTEMSprogram	
PO1	**Engineering knowledge**: Apply the knowledge of mathematics, Science,Engineering fundamentals and an engineering specialization to the solutionofcomplexengineeringproblems
PO2	**Problemanalysis:**Identify,formulate,reviewresearchliteratureandanalysescomplexengineering problemsreaching substantiatedconclusionusingprinciples of mathematics andEngineeringsciences
PO3	**Design/Developmentofsolutions:**DesignsolutionsforcomplexEngineering problems and design system components or processes that meetthe specified needs with appropriate consideration for the public health andsafety,and thecultural, societal and environmental conditions.
PO4	**Conductinvestigationofcomplexproblems**:Useresearch- b a s e d knowledge and research methods including design of experiments, analysisand interpretation of data, and synthesis of the information to provide validconclusions.
PO5	**Modern tool usage:** Create, select, and apply appropriate techniques,resources, and modern engineering and IT tools including predictionandmodellingtocomplexengineeringactivitieswithanunderstandingof thelimitations
PO6	**Theengineerandsociety**:Applyreasoninginformedbythecontextualknowledgeto assess societal,health, safety,legaland culturalissuesandtheconsequentresponsibilitiesrelevanttotheprofessionalengineeringpractice.
PO7	**EnvironmentandSustainability:**Understandtheimpactoftheprofessional engineering solution in societal and environmental contexts,anddemonstratetheknowledgeofandneedfiresustainabledevelopment
PO8	**Ethics:**Applyethicalprinciplesandcommittoprofessionalethicsandresponsibilitiesandnorms of the engineeringpractice.
PO9	**Individualandteamwork:**Functioneffectivelyasanindividual,anasamemberorleader indiverseteams, andinmultidisciplinarysettings.
PO10	**Life-Longlearning**:Recognizetheneedforandhavethepreparationandabilitytoengageinindependentandlife-longlearninginthe broadestcontextoftechnological change.

BHARATHIARUNIVERSITY:COIMBATORE641046
B.Sc. Electronics and Communication SystemsCurriculum
(Forthestudentsadmittedduringtheacademicyear 2020–21onwards)

Course Code	TitleoftheCourse	Credits	Hours		MaximumMarks		
			Theory	Practical	CIA	ESE	TOTAL
FIRSTSEMESTER							
11T	Language–I	4	6	-	25	75	100
12E	English– I	4	6	-	25	75	100
13A	**CorePaperI :** BasicElectronics	4	5	-	25	75	100
--	**CorePracticalI:** Basic ElectronicsLab	-	-	3	-	-	-
--	**CorePracticalII** : Semiconductor DevicesLab	-	-	3	-	-	-
1AA	**AlliedI** Mathematics–I	4	5	-	25	75	100
1FA	EnvironmentalStudies#	2	2	-	-	50	50
Total		18	24	6	100	350	450
SECONDSEMESTER							
21T	Language–II	4	6	-	25	75	100
22E	English– II	4	6	-	25	75	100
23A	**CorePaperII :** SemiconductorDevices	4	5	-	25	75	100
23P	**CorePracticalI:** Basic ElectronicsLab	4	-	3	40	60	100
23Q	**CorePracticalII:** Semiconductor DevicesLab	4	-	3	40	60	100
2AA	**Allied:II** Mathematics–II	4	5	-	25	75	100
2FB	Value Education – Human Rights #	2	2	-	-	50	50

	SwatchBharat-Summer internship**		-	-	-	-	-
Total		26	24	6	180	470	650
THIRDSEMESTER							
33A	**CorePaperIII**: Principles ofCommunicationSystems	4	4	-	25	75	100
33B	**CorePaperIV:** DigitalPrinciplesand Applications	4	4	-	25	75	100
33C	**CorePaperV:** ElectronicCircuits	4	4	-	25	75	100
--	**Core Practical III:Digital**Electronic lab	-	-	3	-	-	-
--	**Core Practical IV:**Electronic circuits,Radio,TVa nd Instrumentationlab	-	-	3	-	-	-
3AD	**Allied:III** Programmingin C	3	4	-	20	55	75
--	**CorePracticalV:** Computer ProgrammingLab	-	-	3	-	-	-
3ZA	**SkillbasedSubjectI:** ComputerArchitecture andorganization	3	3	-	20	55	75
3FB/ 3FC	Tamil @ / AdvancedTamil#(O R) Non-major elective - I(YogaforHuman excellence#Womens Rights#)	2	2	-	-	50	50
Total		20	21	9	115	385	500

FOURTHSEMESTER							
43A	**Core Paper VI :**IC'sandInstrumentation	4	4	-	25	75	100
43B	**CorePaperVII**: ModernTelevision Engineering	4	4	-	25	75	100
43C	**CorePaperIII** Digitaland CellularCommunication	4	4	-	25	75	100
43P	**CorePracticalIII** DigitalElectronicsLab	4	-	3	40	60	100
43Q	**Core Practical IV:**Electronic circuits,Radio,TVand Instrumentationlab	4	-	3	40	60	100
4AD	**Allied:IV** Object OrientedProgrammingusingC++	3	4	-	20	55	75
43R	**CorePractical V:** Computer ProgrammingLab	2	-	3	20	30	50
4ZB	**SkillbasedSubjectII:** VisualProgramming	3	3	-	20	55	75
4FB/ 4FE	Tamil @ /AdvancedTamil # (OR) Non-major elective - II(GeneralAwareness#)	2	2	-	-	50	50
Total		30	21	9	215	535	750

FIFTHSEMESTER							
53A	**CorePaperIX**:8085 Microprocessor and Applications	4	6	-	25	75	100
5EA/ 5EB/ 5EC/ 5ED	**Elective–I**	4	6	-	25	75	100
5EE/ 5EF/ 5EG/ 5EH	**Elective-II**	4	6	_	25	75	100
--	**CorePracticalVI:** Microprocessorand MicrocontrollerLab	-	-	3	-	-	-

--	**CorePracticalVII:** Industrial and PowerElectronics Lab	-	-	3	-	-	-
--	**Core Practical VIII**:Electronic CommunicationLab	-	-	3	-	-	-
5ZC	**Skillbasedsubject –III** Internet and JavaProgramming	3	3	-	20	55	75
Total		15	21	9	95	280	375
SIXTHSEMESTER							
63A	**CorePaperX**:8051 Microcontroller andEmbeddedSystems	4	6	-	25	75	100
63P	**CorePracticalVI**: Microprocessor andMicrocontroller Lab	**4**	-	3	40	60	100
63Q	**CorePracticalVII:** Industrial and PowerElectronics Lab	**4**	-	3	40	60	100
63R	**CorePracticalVIII:** Electronic CommunicationLab	4	-	3	40	60	100
67V	**PROJECT**	4	4	-	-	100	100*
6EI/ 6EJ/ 6EK/ 6EL	**Elective-III**	4	6	-	25	75	100
6ZP	**Skill based Subject – IV**Practical - Visual &JavaProgramming Lab	3	-	3	30	45	75
67A	ExtensionActivities@	2	-	-	50	-	50
6NM	Naan Mudhalvan Course: Salesforce	2	2	-	25	25	50**
Total		31	18	12	300	375	775

GrandTotal	**140**			1005	2395	**3500**

@ No University Examinations. Only Continuous Internal Assessment (CIA)

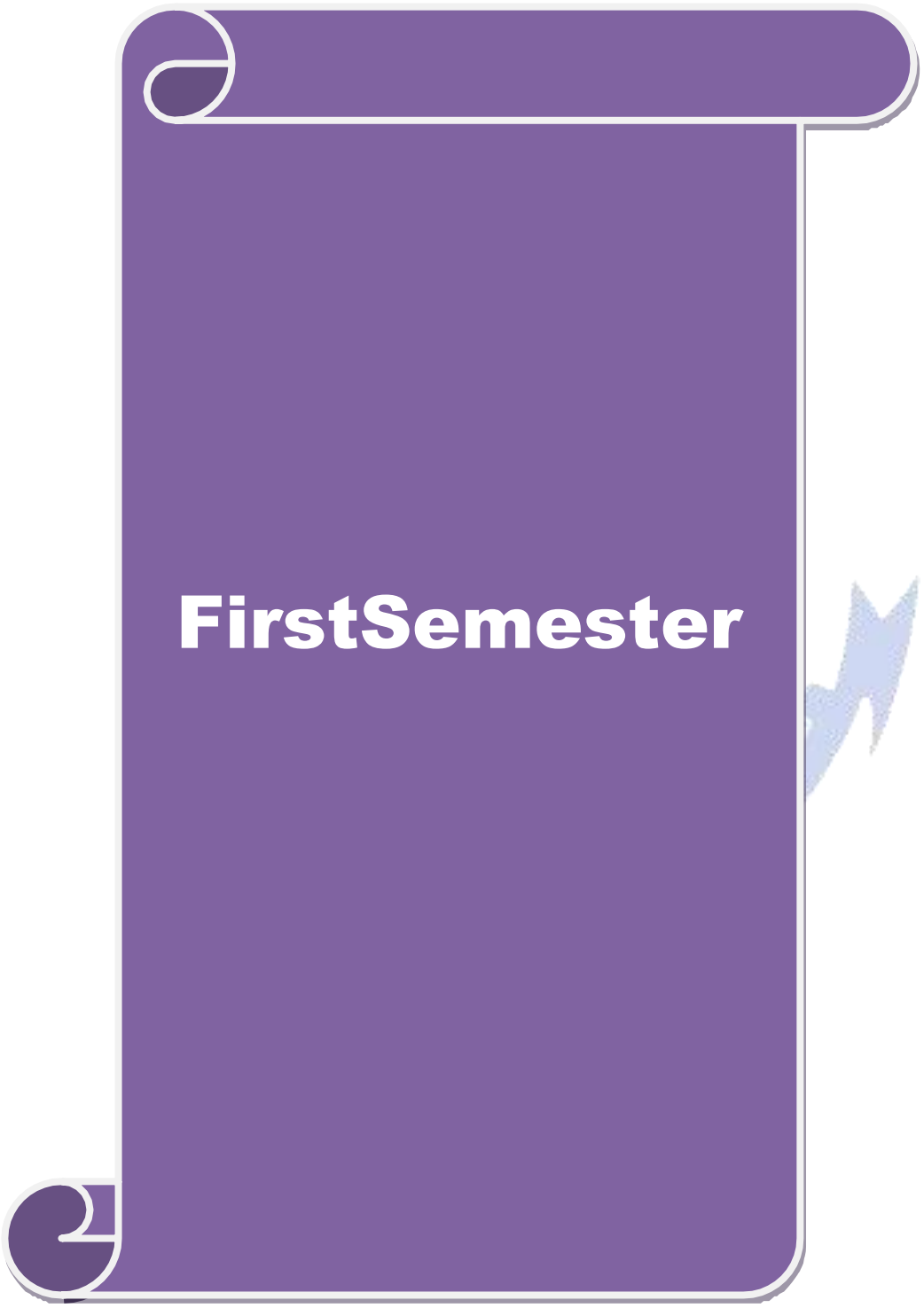
#No ContinuousInternal Assessment (CIA). OnlyUniversityExaminations.

*** SwatchBharatSummerinternship-extra2creditswouldbegiven.Itismandatory**

*For Project report 80 marks and viva-voce 20 marks.

**Naan Mudhalvan – Skill courses- external 25 marks will be assessed by Industry and internal will be offered by respective course teacher.

Naan Mudhalvan	http://kb.naanmudhalvan.in/Bharathiar_University_(BU)


FirstSemester

Coursecode	13A	BASICELECTRONICS	L	T	P	C
Core/Elective/Supportive		Core	5	0	0	4
Pre-requisite		HighersecondaryPhysics	Syllabus Version		2020-2021	

CourseObjectives:

Themain objectives ofthis courseareto:
1. Tobecomefamiliar withfundamentalsofelectroniccomponents
2. Tolearn to usecommon electroniccomponents
3. Todesign electroniccircuitstoperformrealistictasks

ExpectedCourseOutcomes:

Onthesuccessful completionofthe course,studentwill beableto:

1	Understandthebasicelectroniccomponents	K2
2	Understandthebasicelectroniccomponents	K2
3	Differentiateanddemonstratethevoltage andcurrentsource.	K3
4	Applytheelectroniccomponents innetworktheorems.	K3
5	Putintopracticeanduse theelectronic components	K4

K1-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**-Create

Unit:1	Resistors&Inductors	11hours

TypesofResistors: Fixed,Variable-BriefmentionoftheirConstructionandCharacteristics-ColorCodingof Resistors-ConnectingResistorsin Series andParallel
TypesofInductors: Fixed,Variable-SelfandMutualInductance-Faraday'sLawandLenz'sLawOfElectromagneticInduction-EnergyStoredInAnInductor-InductanceInSeriesAnd
Parallel-TestingofResistanceandInductanceusingMultimeter.

Unit:2	Capacitors	11hours

Principles of Capacitance-Parallel Plate Capacitor-Permittivity-Definition of Dielectric Constant - Dielectric Strength-Energy Stored in a Capacitor-Types of Capacitors: Air, Paper, Mica, Teflon,Ceramic, Plastic and Electrolytic: Construction and Application- Connecting Capacitors in SeriesandParallel- Factors GoverningtheValueof Capacitors-TestingofCapacitors UsingMillimeters.

Unit:3	ElectricalElementsAndCircuits	12hours

Potential Difference- Electric Current-Electromotive Force-Ohms Law- Kirchoff's Law-Kirchoff'sCurrent Law-Analysis of Resistance in Series Circuits, Parallel Circuits and Series Parallel Circuits-ConceptofVoltageSourceandCurrentSource-VoltageSourceinSeriesandCurrentSourcein
Parallel-SimpleProblemsinDCCircuits.

Unit:4	NetworkTheorems	12hours

Superposition Theorem - Thevenin Theorem-Thevenizing a Circuit with Two Voltage Sources - BridgeCircuit-Norton'sTheorem-TheveninNortonConversion-ConversionofVoltageandCurrentSources-Millman'sTheorem-StarandDeltaConversion-MaximumPowerTransfer
Theorem-Simple Problemsin DC Circuits.

Unit:5	ACCircuits	12hours

IntroductiontoSinusoidalWave-RMSValue-AverageValue-ACCircuitswithResistance-CircuitswithXLAlone–CircuitswithXCAlone-SeriesReactanceAndResistance-Parallel Reactance andResistance-SeriesParallelReactanceandResistance-RealPower-

Unit:6	**ContemporaryIssue**	**2hours**
GroupdiscussionontheoverallstudyofCapacitors,resistorsandInductors		
	TotalLecturehours	**60hours**

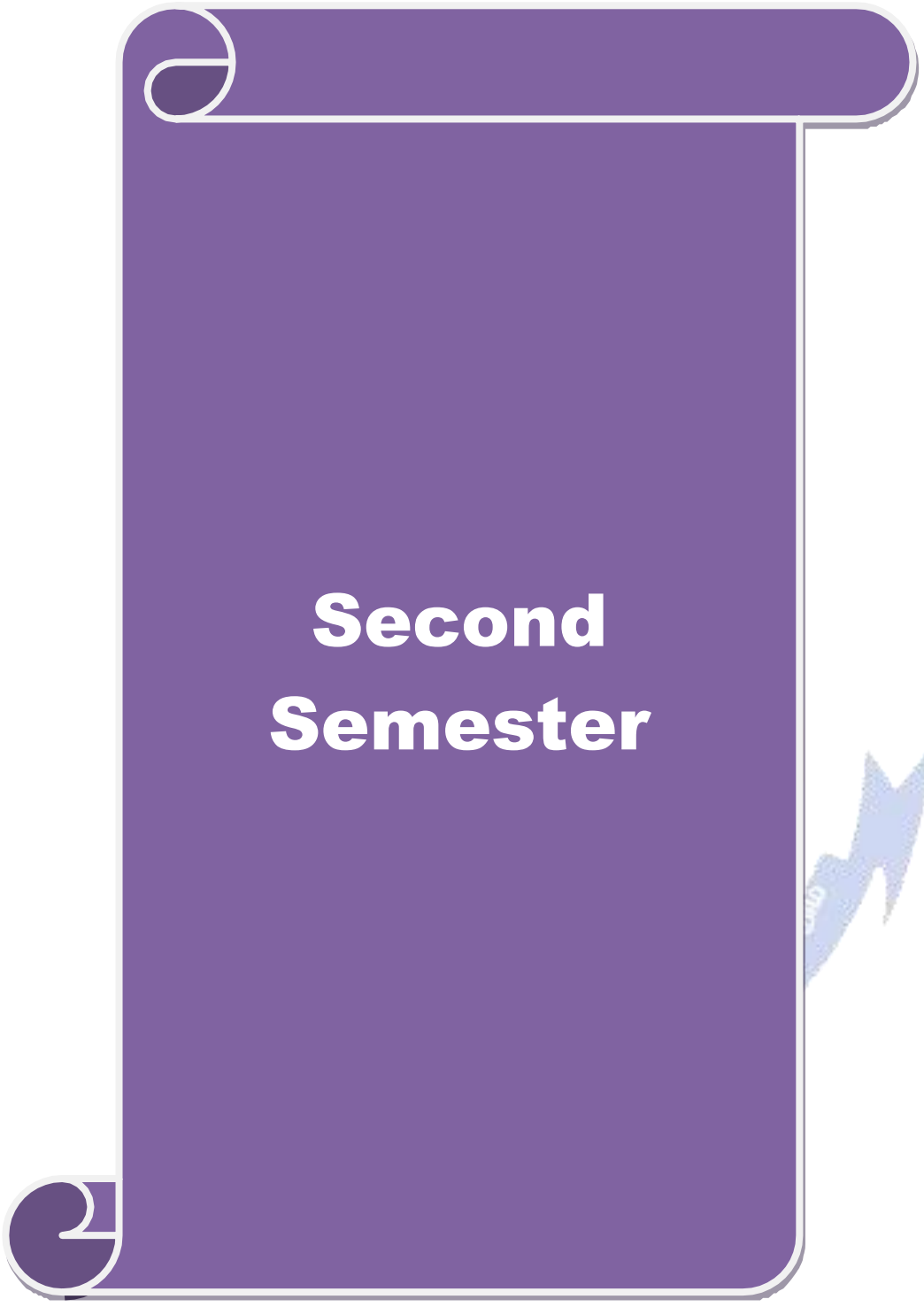
TextBook(s)	
1	S.Salivahanan, N.Suresh Kumar, A.Vallavaraj**"Electronic Devices And Circuits"**-TataMcGraw-HillPublishingCompanyLimited, NewDelhi. 1998.
2	B.V.NarayanaRao "**PrinciplesOfElectronics**", WileyEastern Limited,1992
ReferenceBooks	
1	BernardGrob**"BasicElectronics"**-TataMcGraw-HillPublishingCompanyLimited,9thEdition.
2	B.L.Theraja,**"BasicElectronics-SolidStateDevices",**S.ChandCompanyLtd.**2000**
RelatedOnlineContents[MOOC,SWAYAM, NPTEL,Websitesetc.]	
1	https://nptel.ac.in/courses/108/104/108104139/
2	https://nptel.ac.in/courses/108/101/108101091/
3	https://www.youtube.com/playlist?list=PLFF553CED56CDE25D
4	https://www.youtube.com/watch?v=w8Dq8blTmSA

CourseDesignedBy:K.Manikantan,AssistantProfessor,GovernmentArtsCollege,Ooty&
Dr.NOmMuruga,AssistantProfessor, GovernmentArtsCollege,Ooty.

MappingwithProgrammeOutcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	L	L	L	L	M	S	M
CO2	L	L	L	L	L	M	M	S	M	S
CO3	M	M	S	L	M	S	L	L	M	M
CO4	M	L	L	L	L	S	L	L	M	S
CO5	L	L	M	M	L	L	S	M	L	M

*S-Strong;M-Medium;L-Low


Second
Semester

Coursecode	23A	SEMICONDUCTORDEVICES	L	T	P	C
Core/Elective/Supportive		Core	5	0	0	4
Pre-requisite		Highersecondaryphysics	Syllabus Version		2020-2021	

CourseObjectives:

Themain objectives of this courseareto:
1. Toenablethestudentstounderstand andgainthe knowledgeonsemiconductordevices.
2. Toacquaintthestudentswithconstruction,theoryandcharacteristicsofthe electronicdevices.

ExpectedCourseOutcomes:

Onthesuccessfulcompletion ofthecourse, studentwill beable to:

1	Explainthe structureofthebasic electronicdevices	K1
2	Understandthe characteristicsandoperationsofspecialdiodes	K2
3	Understandthe characteristicsandoperationsoftransistors	K2
4	Understandthe characteristicsandoperationsofFETandUJT	K2
5	Usethespecialdiodesforvariousapplications	K3

K1-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**-Create

Unit:1	PNJunctionDiode	10hours

Energy BandStructureand Conduction inInsulator - Semiconductor,Conductor-Intrinsic andExtrinsic Semiconductor – Doping – P Type – N Type Semiconductor - Formation of PN JunctionDiode-ForwardBias-Reverse BiasCondition–Characteristics-ClippingandClamping.

Unit:2	SpecialDiodes	12hours

ZenerDiode-VICharacteristics–Breakdown-BackwardDiode–VaractorDiode-StepRecoveryDiode -PointContactDiode–ScottkeyDiode-TunnelDiode-GunnDiode–ImpattDiode-PINDiode–PNPN Diode

Unit:3	BJT	12hours

Introduction To Bipolar Junction Transistor – Construction - Transistor Biasing - Operation ofNPN and PNP Transistor - CB, CE &CC Configuration - Bias Stability - Load Line - Method ofBiasing:FixedBias-CollectortoBaseBias-VoltageDividerBias–BiasCompensation-Thermal Runaway–Heat Sink

Unit:4	FETand UJT	12hours

Introduction to FET - Construction and Operation of N-Channel JFET - Drain Characteristics-Comparison of JFET &BJT - Introduction to MOSFET - Enhancement MOSFET – DepletionMOSFET - FET as a Voltage Variable Resistor(VVR) - Introduction to UJT – Characteristics –UJTasRelaxation Oscillator - Introduction to PUT –SCR– TRIAC –DIAC

Unit:5	OptoelectronicDevices	12hours

Principles,OperationandCharacteristicsOfOptoElectronicDevices:LDR–PhotoDiode-PhotoTransistor–PhotoVoltaicCell–SolarCell–PhotoEmissiveSensors–VacuumPhotoTube–GapFilledPhotoTube–PhotoMultiplexer–LED–IREmitter–LCD–Opto–Couplers

Unit:6	ContemporaryIssues	2hours

Diodes,transistors

TotalLecturehours	60hours

TextBook(s)	
1	S.Salivahanan,N.SureshKumar,A.Vallavaraj,**"ElectronicsDevicesAndCircuits",**Tata McgrawHillPublishingCompanyLimited,New Delhi,8thEdition.
2	B. L.Theraja,**"BasicElectronics–SolidState Devices"**,S.Chand&CompanyLtd.
ReferenceBooks	
1	S. L.Kakani,K.C.BhanDai**"ATextBookOf Electronics"**.S.Chand&CompanyLtd.2000
2	BernardGrob**"BasicElectronics"**-TataMcGraw-HillPublishingCompanyLimited,9thEdition.
RelatedOnlineContents[MOOC,SWAYAM, NPTEL,Websitesetc.]	
1	https://nptel.ac.in/courses/108/108/108108122/
2	https://nptel.ac.in/courses/108/108/108108112/
3	https://nptel.ac.in/courses/115/102/115102103/
CourseDesignedBy:K.Manikantan,AssistantProfessor,GovernmentArtsCollege,Ooty& Dr.NOm Muruga, AssistantProfessor, Government ArtsCollege,Ooty	

MappingwithProgrammeOutcomes										
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	S	S	L	M	L	M	M	M	S	M
CO2	L	L	L	L	L	M	M	M	L	L
CO3	L	M	L	L	S	M	L	L	M	M
CO4	L	M	M	L	L	S	M	L	M	S
CO5	L	L	M	M	S	S	L	M	M	S

*S-Strong;M-Medium;L-Low

Coursecode	23P	BASICELECTRONICSLAB	L	T	P	C
Core/Elective/Supportive		Corepractical -I	0	0	3	4
Pre-requisite		Highersecondaryphysics	Syllabus Version		2020-2021	

CourseObjectives:

Themain objectives ofthis courseareto:

1. Tounderstand the fundamental principlesofcircuit theory
2. Tomakeuseof circuitlawsandtheoremsandmeasuringthecircuit parameters.

ExpectedCourseOutcomes:

Onthesuccessful completionofthecourse,student willbe ableto:

1	Applytheconcept ofbasic circuit and theorems	K3
2	Understandthebasicprinciplesofohmsandkirchoff'slaws	K2
3	Simplifythe circuitsusingseriesandparallel equivalentsand usingThevenin's andNorton'sequivalent circuits.	K3
4	Design resonancecircuits.	K4
5	Usethe oscilloscopefor thedisplayand measurementsof signals.	K2

K1-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**-Create

1. Studyof Multimeter– Checkingof Components
2. MeasurementofAmplitude,Frequency&Phase DifferenceusingCRO
3. VerificationofOhm's Law
4. VoltagesourcesinSeries,ParallelandSeries–Parallel
5. ResistanceinSeries,ParallelandSeries–Parallel
6. VoltageandCurrentDividers
7. VerificationofKirchoff'sLaw
8. WheatstoneBridge
9. VerificationofNorton'sTheorem
10. VerificationofThevenin'sTheorem
11. VerificationofMillman'sTheorem
12. VerificationofSuperpositionTheorem
13. LCRBridge
14. SeriesResonanceCircuit
15. ParallelResonanceCircuit

16. TransientResponseofRCCircuit
17. TransientResponseofRLCircuit
18. Capacitors& InductorsinSeries&Parallel
19. FrequencyResponse ofR,L&C
20. LowPassFilter&HighPassFilter
21. BandpassandBandRejectionFilter
22. VerificationofMaximumPowerTransferTheorem
23. Measurementofresistanceandcapacitanceinseriesandparallel

CourseDesignedBy:K.Manikantan, AssistantProfessor,Government ArtsCollege,Ooty&
Dr.NOmMuruga,Assistant Professor,Government ArtsCollege,Ooty

RelatedOnlineContents[MOOC,SWAYAM, NPTEL,Websitesetc.]	
1	https://nptel.ac.in/courses/122/106/122106025/
2	https://nptel.ac.in/courses/122/106/122106026/

MappingwithProgrammeOutcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	L	L	M	M	M	L	L	M	S	M
CO2	L	L	L	L	L	M	M	S	M	S
CO3	M	M	M	M	L	L	S	L	M	M
CO4	M	L	L	L	L	S	L	L	M	S
CO5	M	M	L	L	M	S	S	L	L	M

*S-Strong;M-Medium;L-Low

Coursecode	23Q	SEMICONDUCTORDEVICESLAB	L	T	P	C
Core/Elective/Supportive		Corepractical–II	0	0	3	4
Pre-requisite		HighersecondaryPhysics	Syllabus Version		2020-2021	

CourseObjectives:

Themain objectives ofthis courseareto:

1.Tounderstandandexperimentthebasicparametersofelectronicdevices.2To construct fewapplicationsusingsemiconductordevices.

ExpectedCourseOutcomes:

Onthesuccessful completionofthe course,studentwill beableto:

1	Experimentthefundamental operationsofthemainsemiconductorelectronic devices.	K3
2	Design andconstructelectroniccircuitsusingsemiconductordevices.	K3
3	Understandthetransistorcharacteristics	K2
4	Understandthe characteristicsof LDRandsolarcell	K2
5	Analysethecharacteristicsofdiodesandtransistors	K4

K1-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**-Create

1. BandGap EnergyofSilicon / Germanium Diode
2. V-ICharacteristicsofJunctionDiode
3. V-ICharacteristicsofZenerDiode
4. TransistorCharacteristicsofCEConfiguration
5. TransistorCharacteristicsofCBConfiguration
6. TransistorCharacteristicsofCCConfiguration
7. ClippingCircuits
8. ClampingCircuits
9. MeasurementofStabilityFactorofFixedBias
10. MeasurementofStabilityFactor ofSelf Bias
11. V-ICharacteristicsofJFET
12. V-ICharacteristicsof UJT
13. UJTasOscillator
14. FETasVoltageVariable Resistor(VVR)
15. CharacteristicsofLDR
16. CharacteristicsofSolarCell
17. StudyofIR(Tx&Rx)
18. StudyofLEDand7 Segment display
19. TemperatureCo-efficientofJunctionDiode
20. ZenerasaVoltageregulator
21. ON/ OFFcontrol of relayusingOpto–Couplers

22. CharacteristicsofSCR
23. TRIACCharacteristics

Course Designed By: K.Manikantan , Assistant Professor, Government Arts College ,Ooty&Dr.NOmMuruga,AssistantProfessor,GovernmentArtsCollege,Oo

MappingwithProgrammeOutcomes										
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	L	L	M	L	L	L	L	M	S	M
CO3	L	M	M	M	L	M	L	S	M	L
CO3	M	L	S	L	L	S	L	L	L	M
CO4	M	M	L	L	L	S	M	L	M	L
CO5	L	L	M	M	L	S	L	L	S	L

ThirdSemester

Coursecode	33A	PRINCIPLES OF COMMUNICATIONSYSTEMS	L	T	P	C
Core/Elective/Supportive		Core	4	0	0	4
Pre-requisite		Highersecondaryphysics	Syllabus Version		2020-2021	

CourseObjectives:

Themain objectives ofthis courseareto:

1. Tounderstandtheconceptofwavepropagationanditstypes.
2. ToacquireknowledgeonAmplitudeandFrequencymodulation.
3. Toinculcatetheprincipleof radioreceiversanditstypes.

ExpectedCourseOutcomes:

Onthesuccessful completionofthecourse,student willbe ableto:

1	Understandthebasicbuildingblocksof communicationsystems	K2
2	Analyzetheperformance ofamplitudeandfrequencymodulationtechniques.	K4
3	Demonstratethestagesofradioreceiver.	K3
4	ComparetheoperationofFMandSSBreceivers	K4
5	Analyzetheperformanceofreceiver.	K4

K1-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**-Create

Unit:1	WavePropagation	9hours

EMWaves–Free SpacePropagation–Surface WavePropagation–SkyWavePropagation– SpaceWavePropagation –TroposphereScatterPropagation–StructureOfAtmosphere–Virtual Height –MUF–LUF–SkipDistance– OWF–IonosphereAbnormalities-DuctPropagation

Unit:2	Antennas	9hours

Electromagnetic Radiations – Elementary Doublet – Current And Voltage Distribution – ResonantAntennas, Radiation Patterns and Length Calculations – Non Resonant Antennas – Antenna Gain andEffectiveRadiatedPower–AntennaResistance–Bandwidth,BeamWidthandPolarization– Grounded and Ungrounded Antennas – Effects Of Height – Feed Point – Couplers – ImpedanceMatching – Dipole Arrays - Yagi Uda Antenna – Parabolic Antenna – Horn and Lens Antenna –HelicalAntenna

Unit:3	ModulationTechiniques	10hours

IntroductiontoCommunicationSystems– Information–Transmitter–Channel–Noise–Receiver –-NeedforModulationBandWidthRequirement–AmplitudeModulation:AMTheory– FrequencySpectrumofAMWave–RepresentationofAM–PowerRelationsInAMWave– AMTransmitterBlockDiagram–FrequencyModulation–SystemDescription– MathematicalRepresentation–FrequencySpectrum– Generation of FM– DirectandIndirect Methods.

Unit:4	SingleSidebandModulation	9hours

Introduction–Principles–BalancedModulator– SSBGeneration:FilterMethod,PhaseShiftMethodandThird Method–SSB Reception:PilotCarrier SSB andIndependentSideBand–VestigialSideband Transmission–Introduction to PAM, PWMAnd PPM

Unit:5	Receiver	9hours

Introduction–SuperHeterodyneReceiver–ChoiceofIFandOscillatorFrequencies–ImageRejection–AdjacentChannelSelectivity–SpuriousResponse-Tracking–AGC–Double ConversionReceiver		
Unit:6	**ContemporaryIssues**	**2hours**
Seminaronreceiver,groupdiscussiononcommunicationsystems		
	TotalLecturehours	**48hours**

TextBook(s)	
1	Kennedy and Davis **"Electronic Communication Systems"** Tata McGraw Hill, 8th edition,1999
2	DennisRoddyandJohnCoolen, **"ElectronicCommunications"**PHI,4thedition,1995.
ReferenceBooks	
1	K.D.PrasadandSatyaprakahan,**"AntennaWavePropagation"**3rd edition.
RelatedOnlineContents[MOOC,SWAYAM, NPTEL,Websitesetc.]	
1	https://swayam.gov.in/nd1_noc20_ee16/preview
2	https://swayam.gov.in/nd1_noc19_ee47/preview
CourseDesignedBy:K.Manikantan,AssistantProfessor,GovernmentArtsCollege,Ooty& Dr.NOm Muruga, AssistantProfessor, Government Arts College,Ooty	

MappingwithProgrammeOutcomes										
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	L	L	M	L	L	L	L	M	S	M
CO2	L	M	M	M	L	M	L	S	M	L
CO3	M	L	S	L	L	S	L	L	L	M
CO4	M	M	L	L	L	S	M	L	M	L
CO5	L	M	S	M	M	M	L	L	M	M

*S-Strong;M-Medium;L-Low

CourseCode	33B	DIGITAL PRINCIPLES ANDAPPLICATIONS	L	T	P	C
Core/Elective/Supportive	Core		4	0	0	4
Pre-Requisite:	HighersecondaryPhysics		Syllabus Version	2020-2021		

CourseObjectives:

TheMainObjectivesof thiscoursearetо:

1. ToacquirethebasicknowledgeofNumber system,Digitallogiccircuitsanditsapplication.
2. Tooutlinetheformalproceduresfortheanalysisanddesignofcombinationalandsequen tialcircuits.
3. Tolearn theconceptsof A/D,D/Aconversionsandtheirtypes.

ExpectedCourseOutcomes:

Onthesuccessful completionofthecourse,student willbe ableto:

1	Understandthebasicsof Numbersystemand gates	K2
2	Realizetheoperation of variouslogicgatesandanalyzingtheoutputs	K1
3	Analysesanddesignthecombinationallogiccircuits	K4
4	AnalysesanddesigntheSequentiallogiccircuits	K4
5	Designvarioussynchronousandasynchronoussequentialcircuits	K6

K1-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze; **K5**-Evaluate;**K6**-Create

Unit:1	NumberSystemAndCodes	10hours

Decimal,Binary,OctalandHexaDecimalNumbers–Conversion–FloatingPointRepresentation – Binary Addition, Subtraction and Multiplication – 1's and 2's Compliments - Binary Coded Decimal(BCD) – Weighted Codes and Non-weighted Codes – Excess Three – Grey Code – Error DetectionCodes–HammingCodes – ASCIICodes–EBCDIC Codes – HollerithCode –ParityAdvantages.

Unit:2	BooleanAlgebraAndLogicGates	12hours

Booleanlogicoperations–Booleanfunctions –TruthTables–Basic Laws –DeMorgansTheorem –SumofProductsandProductsofSums–Karnaughmap–LogicGates–OR,AND,NOT,NAND,NOR,EX-OR and EX-NOR Gates– CodeConversion– VHDLCodingforLogic Gates.

Unit:3	CombinationalLogicCircuits	12hours

Half Adder – Full Adder – Half Subtractor – Full Subtractor – Parallel Binary Adder – 4 bit BinaryAdder / Subtractor – BCD adder – Multiplexer – Demultiplexer – Decoders – Encoders – ParityGenerators/ Checkers–MagnitudeComparators– VHDLCoding forCombinationalCircuits

Unit:4	SequentialLogicCircuits	12hours

FlipFlops–RS,ClockedRS,JK,JKMasterSlave,DandTFlipFlops–ShiftRegistersanditsTypes–Ring Counters– RippleCounters–SynchronousCounter–UpDowncounter–Mod-3,Mod- 5 Counters–DecadeCounter–Applications.

Unit:5	D/Aand A/DConverters	12hours

Digital to Analog Converters: Resistive Divider Type - Ladder Type – Accuracy and Resolution - Analogto DigitalConverters: Counter– RampType –simultaneous Conversion– DualSlope Type – Successive ApproximationType–AccuracyandResolution.

Unit:6	ContemporaryIssues	2hours

Analysisof analoganddigitalcircuits	
	TotalLecturehours **60hours**
TextBook(s)	
1	Malvino & Leech, **"Digital Principles And Applications",** Tata McGraw Hill Edition V,2002.
2	M.MorrisMano,**"DigitalLogicAndComputerDesign"**,PHI2005.
ReferenceBooks	
1	Floyd andJain,DigitalFundamentals,PrenticeHall2010
2	M. Morris Mano Charles Kime, Digital Logic and Computer Design Fundamentals, PearsonEducationLimited, 2014
RelatedOnlineContents[MOOC,SWAYAM, NPEL,Websiteetc.]	
1	https://soaneemrana.org/onewebmedia/DIGITAL%20PRINCIPLES%20AND%20APPLICATION%20BY%20LEACH%20&%20MALVINO.pdfE book,Malvino&Leech,–**DigitalPrinciplesAnd Applications**,Tata McGraw Hill Edition X!,2011
2	https://nptel.ac.in/courses/117/106/117106086/Introductiontodigitalcircuits
3	https://www.youtube.com/watch?v=CL3ups78jrs/IntroductiontodigitalDesign
CourseDesignedBy:R.Archana,Assistantprofessor,NehruArtsandScienceCollege & Dr.NOmMuruga, AssistantProfessor,GovernmentArts College,Ooty.	

MappingwithProgrammeOutcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10
CO1	S	S	M	M	M	M	S	M	M	S
CO2	S	M	M	M	M	M	S	L	L	L
CO3	S	S	S	M	M	L	L	L	M	M
CO4	M	M	M	S	S	S	L	L	M	M
CO5	M	M	S	S	M	L	M	M	S	M

*S-Strong;M-Medium;L-Low

CourseCode	33C	ELECTRONICCIRCUITS	L	T	P	C
Core/Elective/Supportive		Core	4	0	0	4
Pre-Requisite:		BasicElectronics	Syllabus Version		2020-2021	

CourseObjectives:

TheMain Objectivesof thiscourseareto:

1. Toenablethestudentstounderstandandgaintheknowledgeonpowersupplies,amplifiersandoscillators.
2. ToAcquaintthestudentswithconstruction,theoryandcharacteristicsoftheelectronicamplifiercircuits andtypes of multivibrators.

ExpectedCourseOutcomes:

Onthesuccessful completionofthecourse,student willbe ableto:

1	derstandtheconcepts ofRectifiersand regulators	K2
2	StudyaboutSmallsignalamplifiers	K1
3	alyzethefunctionsofPoweramplifiers	K4
4	alyzetheperformanceofnegativeas wellaspositivefeedbackcircuits	K4
5	signoscillatorsandMultivibrators	K6

K1-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**-Create

Unit:1	RectifiersAndRegulators	10hours

Halfwave,FullwavesandbridgeRectifiers–CalculationofRMSValue–AverageValue –RippleFactor–Efficiency–TransformerUtilityFactor–PeakInverseVoltage–Inductor Filter – Capacitor Filter – LC Filter – Pi Filter - Voltage Doubler – VoltageRegulator– ZenerDiodeShuntRegulator–TransistorShuntandSeriesRegulator–OverloadProtection– Construction ofDC PowerSupply.

Unit:2	SmallSignalAmplifiers	12hours

CE, CB, CC amplifiers – Calculation of I/P Resistance, O/P Resistance – Current Gain - VoltageGain–PowerGain–SingleStageTransistorAmplifier–DCandACloadline–RC CoupledAmplifier – Gain Frequency Response – Bandwidth – Transformer Coupled Amplifier –ImpedanceMatching–FET Amplifier.

Unit:3	PowerAmplifiers	12hours

OperationandGraphicalRepresentationofClassA,ClassB,ClassCandClassABAmplifiers – Maximum Collector Efficiency of Class A Power Amplifier – Collector Dissipation Curve – Harmonic Distortion – Class B Push Pull Amplifier – Crossover Distortion – ComplementarySymmetryPush Pull Amplifier

Unit:4	FeedbackAmplifiers	12hours

Basicconceptsoffeedback–PositiveFeedback–NegativeFeedback– EffectsofNegativeFeedbackonGain,BandwidthandDistortion–Noise– VoltageSeriesFeedback-VoltageShuntFeedback – Current SeriesFeedback– Current ShuntFeedback.

Unit:5	OscillatorsAndMultivibrators	12hours

BarkhausenCriterion–HartleyOscillator–ColpittsOscillator–PhaseShiftOscillator–WeinBridgeOscillators–PeizoElectricCrystalanditsEffects –CrystalOscillator-Astable Multivibrator–Monostablemultivibrator –BistableMultivibrator–SchmittTrigger		
Unit:6	**ContemporaryIssues**	**2hours**
	Webinarprogramonelectroniccircuits	
https://nptel.ac.in/courses/108/102/108102097/#IntroductiontoElectroniccircuitsNPTEL.		
https://nptel.ac.in/courses/108/102/108102095/AnalogElectroniccircuitsNPTEL.		
	TotalLecturehours	**60hours**
TextBook(s)		
1	S.K.Sahdev,—ElectronicPrinciples,DhanpatRai&Co(P) Ltd,2ndEdition,1998	
2	B.L.Theraja,-**BASICELECTRONICS**, ChandCompanyLtd,2000	
ReferenceBooks		
1	V.K.Metha,RohitMetha, **PrinciplesOf Electronics,**SChand,2006.	
2	B.Sasikala,C.Poornachandra,**ElectronicDevices And Circuits**,Scitech2003.	
RelatedOnlineContents[MOOC,SWAYAM, NPEL,Websiteetc.]		
1	http://www.ee.iitm.ac.in/~ani/2012/ec5135/lectures.htmlLectureNotes	
2	https://nptel.ac.in/courses/108/102/108102097/#IntroductiontoElectronic circuitsNPTEL.	
3	https://nptel.ac.in/courses/108/102/108102095/AnalogElectroniccircuitsNPTEL.	
CourseDesignedBy:R.Archana,Assistantprofessor,NehruArtsandScienceCollege & Dr.NOmMuruga,Assistant Professor,GovernmentArtsCollege,Ooty.		

MappingwithProgrammeOutcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10
CO1	S	S	M	M	M	M	S	M	M	S
CO2	S	M	M	M	M	M	S	L	L	L
CO3	S	S	S	M	M	L	L	L	M	M
CO4	M	M	M	S	S	S	L	L	M	M
CO5	M	M	S	S	M	L	M	M	S	M

*S-Strong;M-Medium;L-Low

CourseCode	3ZA	COMPUTERARCHITECTURE ANDORGANIZATION	L	T	P	C
Core/Elective/Supportive	SkillBasedSubject -I		3	0	0	3
Pre-Requisite:	HigherSecondaryComputerScience		Syllabus Version		2020-2021	

CourseObjectives:

TheMain Objectivesof thiscourseareto:

1. Toenable thestudents tolearn thenewestcomputer technologyand trends.
2. TolearnsubjectpresentstheModerncomputerorganization,Processorandmemorydesign,Peripherals andrecent system architecture.

ExpectedCourseOutcomes:

OntheSuccessfulcompletionofthe course,studentwill beableto:

1	Demonstratecomputerarchitectureconceptsrelatedtodesignofmodernprocessors,memories andI/Os.	K3
2	Analyzetheperformance ofcommerciallyavailablecomputers.	K6
3	Distinguishtheorganizationofvariouspartsofasystem memory hierarchy	K6
4	Understandthedesignofthevariousfunctionalunitsandcomponentsofcomputers.	K1
5	Identifytheelementsofmoderninstructionssets andtheirimpactonprocessordesign.	K5

K1-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**-Create

Unit:1	ModernComputerOrganization	9hours

Introduction–LayersinModernComputer -ComputerOrganization –MainMemory –CPUOperation–ComputerTypes–SystemPerformanceandMeasurement– HighPerformanceTechniques–BootingSequence–ComputerDesignProcess–ComputerStructure– Computer Function – ArchitectureAnd Organization– CISCVsRISC

Unit:2	ProcessorDesignAndDataPath	9hours

Introduction–ProcessorRole–ProcessorDesignGoals–ProcessorDesignProcess– Data Path Organization–MainMemoryInterface–LocalStorageRegisterFile–DataPathSimpleInstructions

Unit:3	MemoryDesignAndManagement	9hours

Introduction – MemoryParameters –Classification of Memory–MemoryTechnology – Main Memory Allocation – Static RAM IC – Dynamic RAM – ROM Logic – MultipleMemoryDecoding–MemoryHierarchy–MainMemoryDrawbacks–CacheMemory– Principleof Cache – Virtual MemoryConcept – Advantageof VirtualMemory.

Unit:4	ComputerPeripherals	8hours

Introduction–Keyboard–CRTDisplayMonitor–Printer–MagneticStorageDevices– FloppyDiskDrive–HardDiskDrive–SpecialTypesofDiskDrives–MouseandTrackBall–Modem– CD-ROMDrive–Scanner–DigitalCamera–DVD–SpecialPeripherals.

Unit:5	AdvancedSystemArchitecture	8hours

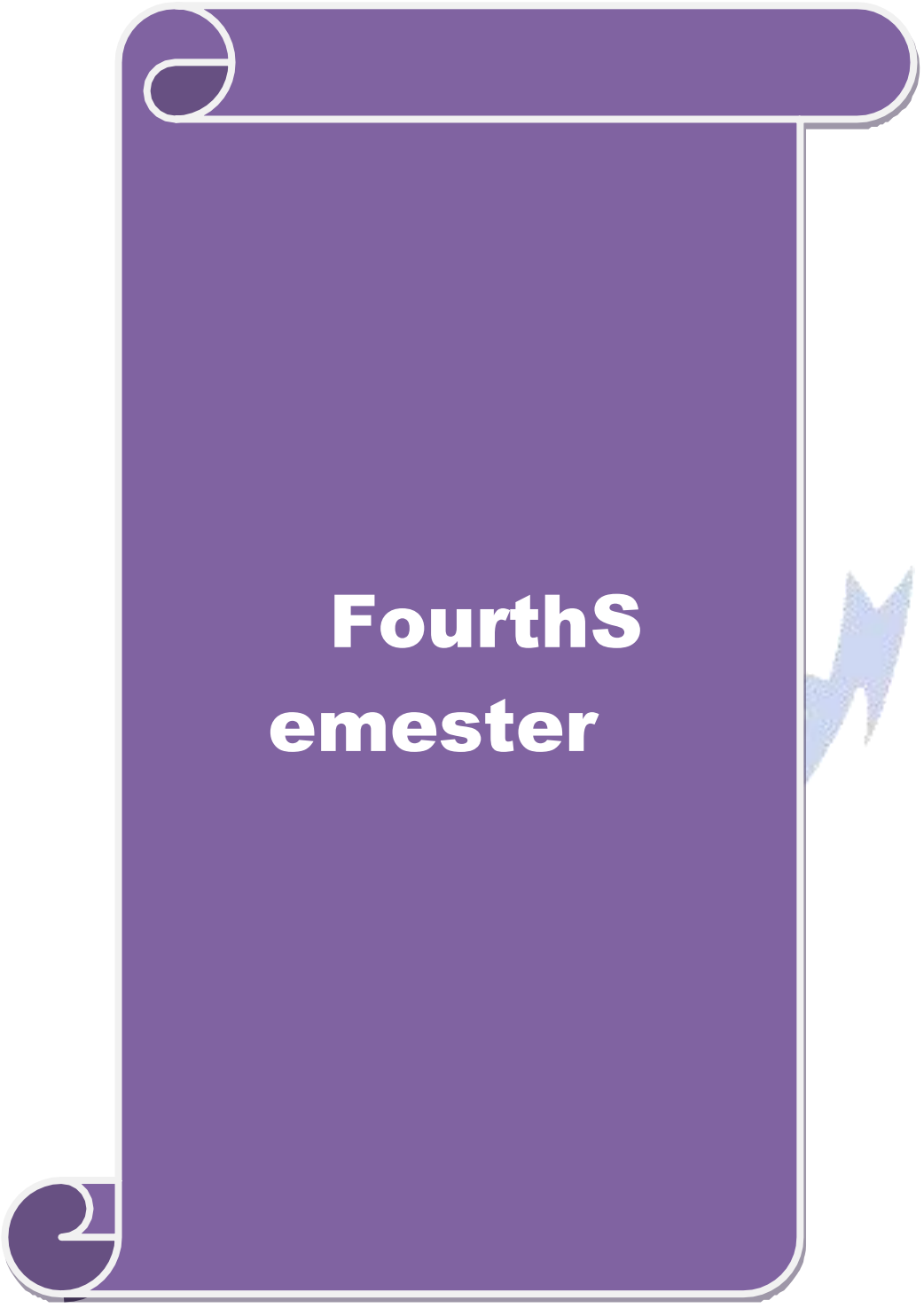
Introduction–HighPerformanceComputerArchitecture–RISCSystems–SuperscalarArchitecture –VLIW Architecture–EPICArchitecture–MultiprocessorSystems.		
Unit:6	**CONTEMPORARYISSUES**	**2hours**
Interactionprogrammeoncomputerarchitecture		
	TotalLecturehours	**45hours**
TextBook(s)		
1	Govindarajalu.B, **"Computer Architecture And Organization Design PrinciplesAnd Applications"**Tata McGraw-Hill, 2006.	
2	M.MorisMano,"**ComputerSystemArchitecture"**,3rdedition,Pearson/PHI,India, 2006.	
ReferenceBooks		
1	WilliamStallings,"**ComputerOrganizationAndArchitecture**",PrenticeHallof India,SixthEdition.	
2	Patterson&Hennessy,"**ComputerOrganizationAnd Design**",Morgan Kaufmann,2007.	
RelatedOnlineContents[MOOC,SWAYAM, NPEL,Websiteetc.]		
1	https://nptel.ac.in/courses/106/102/106102062/Introductiontocomputerarchitecture,Nptel	
2	https://nptel.ac.in/courses/106/103/106103068/ComputerArchitectureandOrganization	
CourseDesignedBy:R.Archana,Assistantprofessor,NehruArtsandScienceCollege& Dr.NOmMuruga,Assistant Professor,GovernmentArtsCollege,Ooty.		

MappingwithProgrammeOutcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10
CO1	S	S	M	M	M	M	S	M	M	S
CO2	S	M	M	M	M	M	S	L	L	L
CO3	S	S	S	M	M	L	L	L	M	M
CO4	M	M	M	S	S	S	L	L	M	M
CO5	M	M	S	S	M	L	M	M	S	M

*S-Strong;M-Medium;L-Low


EDUCATE TO ELEVATE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emester

CourseCode	43A	IC'SANDINSTRUMENTATION	L	T	P	C
Core/Elective/Supportive		Core	4	0	0	4
Pre-Requisite:		BasicElectronics	Syllabus Version		2020-2021	

CourseObjectives:

TheMain Objectivesof thiscourseareto:

1. ToimparttheknowledgeonICfabrication, Timer, PLL, and electronicinstruments
2. Toenable thestudents toacquiretheknowledgeofOp-amp., transducersand its
3. applicationsinelectroniccircuitsandknowthetechniqueofmeasurementsusingelectronicinstruments

ExpectedCourseOutcomes:

OntheSuccessfulcompletion ofthe course,studentwill beableto:

1	Recognizethestandardsin ICFabricationTechnology.	K1
2	Understandthe workingofTimer and PLL	K2
3	DesignsimplecircuitsusingOpAmp.	K6
4	Understandtheprincipleofvarious typesof transducers	K2
5	Studytheconstruction and workingof frequentlyusedequipment's like CRO,DigitalVoltmeteretc.	K4

K1-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**-Create

Unit:1	ICFabricationTechnology	10hours

FundamentalsofMonolithic ICTechnology–BasicPlanarProcess –WaferPreparation –EpitaxialGrowth–Oxidation–Photolithography–DiffusionofImpurities–IsolationTechniques –Metallization–MonolithicTransistors–IntegratedResistors–IntegratedCapacitors-IntegratedInductors -Thin andThick film Technology.

Unit:2	TimerAnd PLL	12hours

FunctionalBlockDiagramof555timer–MonostableOperation–Applications:–LinearRampGenerator – Pulse Width Modulator – Astable Operation – Applications: Schmitt Trigger–FSKGenerator-PhaseLockedLoop:FunctionalBlockDiagram–Phase Detector / Comparator –Voltage Controlled Oscillator – Low Pass Filter – Applications: Frequency Multiplier /Division– AM Detection

Unit:3	OperationalAmplifier	12hours

IdealCharacteristics-InvertingandNon-invertingAmplifier–Op-ampParameters–Summing Amplifier – Difference Amplifier – Integrator – Differentiator – InstrumentationAmplifier – Voltage to Current Converter – Current to Voltage Converter – Precision halfWaveRectifiers – Precision Full Wave Rectifiers

Unit:4	Transducers	12hours

Introduction–ElectricalTransducer–BasicrequirementsofTransducer–ClassificationofTransducers–SelectionofTransducers–ResistiveTransducers–Potentiometers–Thermistors – Thermocouple – LVDT – RVDT – Piezoelectric Transducers – Hall EffectTransducers– PhotoelectricTransducers – DigitalDisplacementTransducers		
Unit:5	**ElectronicInstruments**	**12hours**
QMeters-CRO:BlockDiagram–CathodeRayTube–MeasurementofFrequency–MeasurementofVoltageandCurrent–DigitalOscilloscope–Digitalvoltmeter:RampTypeDVM–DualSlopeIntegratingTypeDVM–DigitalMultimeter–HumidityandHumidityMeasurement–Measurement ofPH.		
Unit:6	**ContemporaryIssues**	**2hours**
Seminarontransducersandoperationalamplifier		
	TotalLecturehours	**60hours**

TextBook(s)	
1	D.RoyChoudhuryandShahil BJain,–**LinearIntegratedCircuits**,SecondEdition NewAgeInternational Publishers, 2004
2	K.R.Botkar,–**IntegratedCircuits**,10th Edition Khanna Publishers, 2006
ReferenceBooks	
1	J.B.GUPTA–**ACourseInElectronicandElectrical MeasurementsAnd Instrumentation**,12th Edition, S.K Kataria &Sons
2	A.K. Sawhney, **Electrical & Electronic Measurements And Instrumentation**,DhanpathRai &Co (P)Ltd, 2004.
RelatedOnlineContents[MOOC,SWAYAM, NPEL,Websiteetc.]	
1	https://nptel.ac.in/courses/108/108/108108111/Integrated circuits,op–amps andtheirapplications
2	https://nptel.ac.in/courses/117/106/117106030/AnalogICDesign
CourseDesignedBy:R.Archana,Assistantprofessor,NehruArtsandScienceCollege& Dr.NOm Muruga, AssistantProfessor, GovernmentArts College,Ooty. .	

MappingwithProgrammeOutcomes										
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P10**
CO1	S	S	M	M	M	M	S	M	M	S
CO2	S	M	M	M	M	M	S	L	L	L
CO3	S	S	S	M	M	L	L	L	M	M

CO4	M	M	M	S	S	S	L	L	M	M
CO5	M	M	S	S	M	L	M	M	S	M

*S-Strong;M-Medium;L-Low

CourseCode	43B	MODERN TELEVISIONENGINEERING	L	T	P	C
Core/Elective/Supportive	Core		4	0	0	4
Pre-requiste:	BasicElectronics		Syllabus Version		2020-2021	

CourseObjectives:

TheMain Objectivesof thiscourseareto:

1. Todesignofthesubjectistoimpartthe knowledgeonTelevisionstandards,receiversection,and syncseparatorcolortelevision with advanced techniques.
2. Toacquiretheknowledgeabout colortelevision and itsrecent developments

ExpectedCourseOutcomes:

OntheSuccessfulcompletion ofthe course, studentwill beable to:

1	Acquireknowledgeon televisionstandards	K1
2	StudyonTransmitterandreceiverstandards	K2
3	Understandthe Picturetubeofcolor TV	K2
4	Knowledgeonperformanceof ColorTV and othermoderndevices	K3
5	FamiliarizeAdvancedTVSystems	K4

K1-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**-Create

Unit:1	FundamentalsOfTelevision	12hours

Aspect ratio-Image continuity-Number of scanning lines-Interlaced scanning-Pictureresolution-Cameratubes-ImageOrthicon-Videocon-Plumbicon-Monochromepicturetubes-Composite video signal- video signal dimension-horizontal sync. Composition-verticalsync.Detailsfunctionsofverticalpulsetrain-Scanningsequencedetails-VSBtransmission-Soundsignal transmission-Standard channel bandwidth.

Unit:2	MonochromeTelevisionTransmitterAndReceiver	12hours

TVtransmitter-TVsignal Propagation-Interference-TVTransmissionAntennas-MonochromeTV receiver- RF tuner- UHF, VHF tuner-Digital tuning techniques-AFT- IF subsystems-AGCNoise cancellation-Video and Sound inter-carrier detection-Vision IF subsystem- DC re-insertion-Videoamplifiercircuits-Syncoperation- - Linedeflectioncircuits-EHTgeneration-Receiverantennas

Unit:3	EssentialsOf ColourTelevision	10hours

Three colour theory-Luminance, Hue and saturation- colour television cameras-Values ofluminance and colour difference signals-Colour television display tubes-Delta-gun Precision-in-lineandTrinitroncolourpicturetubes-Purityandconvergence-PurityandstaticandDynamicconvergence adjustments-Pincushion-correctiontechniques-Automaticdegaussingcircuit.

Unit:4	ColourTelevisionSystems	12hours

NTSCcolourTVsystems-SECAMsystem-PALcolourTVsystems-Cancellationofphaseerrors--Chromosignalamplifier-separationofUandVsignals-colourburstseparation-Burst phaseDiscriminator-ACCamplifier-ReferenceOscillator-Identandcolourkillercircuits-UandVdemodulators-Sound in TV.

Unit:5	AdvancedTelevisionSystems	12hours

Satellite TV technology - Geo Stationary Satellites - Domestic Broadcast System - Cable TV-CableSignalSources-CableSignalProcessing,Distribution&Scrambling-VideoRecording -VideoHomeFormats-DVDPlayers-Digitaltelevision-Transmissionandreception– Projectiontelevision-FlatpaneldisplayTVreceivers-LCDandPlasmascreenreceivers-3DTV-EDTV.		
Unit:6	**ContemporaryIssues**	**2hours**
Preparinganalysisreport ontelevisionanditsfuturedevelopments		
	TotalLecturehours	**60hours**

TextBook(s)	
1	R.R.Gulati,"**MonochromeTelevisionPractice, Principles,TechnologyAndServicing**."ThirdEdition2006,NewAgeInternation al(P)Publishers.
2	R.R.Gulati, **Monochrome & Color Television**, New Age International Publisher,2003.
ReferenceBooks	
1	A.MDhake,"**TelevisionAndVideoEngineering**",2nded.,TMH,2003.
2	2.R.P.Bali,**ColorTelevision,TheoryAndPractice**,TataMcGraw-Hill,1994
RelatedOnlineContents[MOOC,SWAYAM, NPEL,Websiteetc.]	
1	https://nptel.ac.in/courses/117/102/117102059/Introductiontocommunication
2	https://www.youtube.com/watch?reload=9&v=EAybxdgS2T4TVTransmission
CourseDesignedBy:R.Archana,Assistantprofessor,NehruArtsandScienceCollege.& Dr.NOmMuruga,Assistant Professor,GovernmentArtsCollege,Ooty.	

MappingwithProgrammeOutcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10
CO1	S	S	M	M	M	M	S	M	M	S
CO2	S	M	M	M	M	M	S	L	L	L
CO3	S	S	S	M	M	L	L	L	M	M
CO4	M	M	M	S	S	S	L	L	M	M
CO5	M	M	S	S	M	L	M	M	S	M

*S-Strong;M-Medium;L-Low

CourseCode	43C	DIGITAL AND CELLULARCOMMUNICATIONS	L	T	P	C
Core/Elective/Supportive	Core		4	0	0	4
Pre-Requisite:	BasicElectronics		Syllabus Version	2020-2021		

CourseObjectives:

TheMain Objectivesof thiscourseareto:

1. Toenhancetheknowledgeincommunication withdigitalandcellularsystems
2. Tolearn thedigital andcellulartechnology

ExpectedCourseOutcomes:

OntheSuccessfulcompletionofthe course,studentwill beableto:

1	owtheconceptsofdatatransmissionsystems	K1
2	AnalyzetheModelofCommunicationsystem	K6
3	FamiliarizeDigital carrierModulationSchemes	K4
4	Understandpulsemodulationandquantizationtechniques	K2
5	alyzethecellularsystemdesign andtechnical challenges.	K4

K1-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**-Create

Unit:1	DataTransmission	10hours

Introduction – Representation of Data Signal – Parallel and Serial Data Transmission – 20milli Amps Loop andLine Drivers– Transient Noise – Data Signal– Signal ShapingandSignallingSpeed– Noiseand Error Analysis–Repeaters.

Unit:2	CommunicationSystem	12hours

Model of Communication System – Elements of Digital Communication System: InformationSource, Source Encoder/Decoder, Communication Channel, Modulator, Demodulator, ChannelEncoder/Decoder, Other Functional Blocks – Analysis of Communication System – Design ofCommunicationSystem.

Unit:3	DigitalCarrierModulationSchemes	12hours

BinaryPhaseShiftKeying–DifferentialPhaseShiftKeying–DifferentiallyEncodedPSK–QuadraturePhaseShiftKeying–Base Band SignalReceiver –PhaseShiftKeying –FrequencyShiftKeying–Non-Coherent Detectionof FSK.

Unit:4	PulseModulationAndQuantization	12hours

PulseAmplitudeModulation-PulseWidthModulation-PulsePositionModulation-Quantization of Signals–Quantization Error–Pulse Code Modulation–Electrical Representationof BinaryDigits–PCMSystem–Companding–MultiplexingPCMSignals–DifferentialPCM–DeltaModulation–AdaptiveDeltaModulation

Unit:5	DigitalCellularSystems	12hours

GSMArchitecture–LayerModeling–Transmission –DataService–MultipleAccessScheme –ChannelCodingInterLeaving–RadioResourceManagement–MobilityManagement–Communication Management – Network Management – TDMA Architecture–

TransmissionandModulation–CDMA–TermsofCDMASystems–CallProcessing–HandOverProcedures		
Unit:6	**ContemporaryIssues**	**2hours**
Seminaron cellulartechnology		
	TotalLecturehours	**60hours**
TextBook(s)		
1	Sam K.Shanmugam, **"Digital And Analog Communication Systems"**, John WileyPublications,2005	
2	JohnG.Proakis,**"DigitalCommunications"**,TataMcGrawHill International,2001.	
ReferenceBooks		
1	W.C.Y.Lee, **"Mobile Cellular Telecommunication"**, McGraw Hill Publications,1995	
2	Ke-LinDu,M.N.S.Swamy,"**WirelessCommunicationSystems"**,Cambridge UniversityPress, 2010.	
RelatedOnlineContents[MOOC,SWAYAM, NPEL,Websiteetc.]		
1	https://nptel.ac.in/courses/106/106/106106167/WirelessandCellularCommunication	
2	https://nptel.ac.in/courses/117/105/117105077/DigitalCommunication	
CourseDesignedBy:R.Archana,Assistantprofessor,NehruArtsandScienceCollege.& Dr.NOmMuruga,Assistant Professor,GovernmentArtsCollege,Ooty.		

MappingwithProgrammeOutcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10
CO1	S	S	M	M	M	M	S	M	M	S
CO2	S	M	M	M	M	M	S	L	L	L
CO3	S	S	S	M	M	L	L	L	M	M
CO4	M	M	M	S	S	S	L	L	M	M
CO5	M	M	S	S	M	L	M	M	S	M

*S-Strong;M-Medium;L-Low

CourseCode	43P	TITLEOFTHECOURSE	L	T	P	C
Core/Elective/Supportive		DigitalElectronicsLab	0	0	3	4
Pre-Requisite:		DigitalElectronics	Syllabus Version		2020-2021	

CourseObjectives:

TheMain Objectivesofthiscourseareto:

1. Tounderstandthelogicaloperationofvariousgatesandtheorems
2. Todevelopvariousdigitalcircuits

ExpectedCourseOutcomes:

OntheSuccessfulcompletionofthe course,studentwill beableto:

1	Understandthelogicaloperationofvariousgates &theorems	K2
2	Analyzethe circuitusingBooleanlaws	K4
3	DesigntheAdder andsubtractorcircuitusinglogicgates	K6
4	Design andanalyzeCombinationalandSequentialcircuits	K6
5	Acquire knowledge about VHDL code for design and simulate of digital logiccircuits	K2

K1-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**-Create

	DigitalElectronicsLab	90hours

(ANY16EXPERIMENTS)

1. VerificationofBasicGatesandUniversalGates
2. VerificationofDemorgan'sTheorem
3. 2-bitComparatorusingGates
4. HalfAdderandFullAdder
5. HalfSubtractorandFull Subtractor
6. 4-bit BinaryAdder
7. MultiplexerandDemultiplexers
8. EncoderandDecoder
9. BCDto7-SegmentDisplay
10. Studyof Flip flops
11. BinarytoGreyandGreyto BinaryConversion
12. ShiftRegistersandRingCounter
13. AnalogtoDigitalConverter
14. DigitaltoAnalogConverter
15. Op-Amp:AdderandSubtractor
16. Op-Amp:IntegratorandDifferentiator
17. CurrenttoVoltageandVoltagetoCurrentConverter
18. RealizeBasicgatesfromuniversalgates

19. SynchronousandAsynchronousCounter
20. MagnitudeComparator.
21. Design andSimulationofBasicLogicGatesusingVHDLCoding.
22. DesignandSimulation ofadder usingVHDLCoding.
23. .DesignandSimulationofSubtractorCircuitusingVHDLCoding

TotalLecturehours	**90Hours**

CourseDesignedBy:R.Archana,Assistantprofessor,NehruArtsandScienceCollege.&
Dr.NOmMuruga,Assistant Professor,GovernmentArtsCollege,Ooty.

MappingwithProgrammeOutcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10
CO1	S	S	M	M	M	M	S	M	M	S
CO2	S	M	M	M	M	M	S	L	L	L
CO3	S	S	S	M	M	L	L	L	M	M
CO4	M	M	M	S	S	S	L	L	M	M
CO5	M	M	S	S	M	L	M	M	S	M

*S-Strong;M-Medium;L-Low

CourseCode	43Q	ELECTRONICCIRCUITS, RADIO,TV ANDINSTRUMENTATION LAB	L	T	P	C
Core/Elective/Supportive:	CorePracticalIV		0	0	3	4
Pre-Requisite:	BasicElectronicsLab		Syllabus Version		2020-21	

CourseObjectives:

TheMain Objectivesof thiscourseareto:

1. Tounderstandtheconceptofworkingofregulatedpowersupplies,rectifiers,amplifiersandoscillators.
2. Toexperimentthemodulationanddetectiontechniques.

ExpectedCourseOutcomes:

OntheSuccessfulcompletionofthe course,studentwill beableto:

1	Designpowersupplyandrectifier circuits	K6
2	DesignAmplifiercircuits	K6
3	DesigndifferentOscillatorcircuits	K6
4	DesigndifferentModulationcircuits	K6
5	DesigncircuitswithTransducers	K6

K1-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**-Create

PartI	ElectronicCircuits	45hours

1. DCRegulatedPower SupplyusingZenerDiode
2. VoltageDoubler
3. FeedbackAmplifier
4. EmitterFollower
5. TransformerCoupledAmplifier
6. HartleyOscillator
7. ColpittsOscillator
8. PhaseshiftOscillator
9. WeinBridgeOscillator
10. RCCoupledAmplifier
11. HalfWaveand FullWaveRectifier
12. FilterCircuits

PartII	Radio,TVAndInstrumentation	45hours

13. FirstIFAmplifier
14. AMModulation andDetection
15. FMModulationandDetection
16. SecondIFamplifier
17. AudioamplifierusingTBA 810
18. AlignmentofcolourTVusingvideo pattern generator.

19. Syncseparator
20. VerticalselectionandhorizontslselectionfaultofTVreceiver
21. Videoamplifierfault.
22. EHTgeneration
23. Temperaturemeasurementusingthermistor.
24. DisplacementmeasurementusingLVDT.
25. Weighingmachine usingloadcell
26. Instrumentationamplifier.
27. Characteristicsofphotovoltaiccell(solarcell)

(Any16 Experiments)

TotalLecturehours	**90hours**

CourseDesignedBy:C.N.OmprakashAnand,Assistantprofessor,GovernmentArtsCollege,Ooty,Coimbatore&
Dr.NOmMuruga, AssistantProfessor,GovernmentArts College,Ooty.

MappingwithProgrammeOutcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10
CO1	S	S	M	M	M	M	S	M	M	S
CO2	S	M	M	M	M	M	S	L	L	L
CO3	S	S	S	M	M	L	L	L	M	M
CO4	M	M	M	S	S	S	L	L	M	M
CO5	M	M	S	S	M	L	M	M	S	M

*S-Strong;M-Medium;L-Low

Coursecode	4ZB	VISUALPROGRAMMING	L	T	P	C
Core/Elective/Supportive		SkillBasedSubject -II	3	0	0	3
Pre-requisite		Basic computer skills and familiarity withMicrosoftWindows.	Syllabus Version		2020-2021	

CourseObjectives:

Themain objectivesof thiscourseareto:

1. Toprovide fundamentalskills inutilizingthetools ofavisualenvironment.
2. ToimplementSDIandMDIapplicationswhileusingforms,dialogs,andothertypesofGUIcomponents
3. ToApplyvisualprogrammingconceptinsoftwaredevelopmentbydesigningprojectswithmenusand submenus
4. Tousevisualprogrammingenvironmenttocreatesimplevisualapplications.

ExpectedCourseOutcomes:

Onthesuccessful completionofthecourse,student willbe ableto:

1	GaintheKnowledgeofdifferentelementsofavisualprogramminglanguageasbuildingblocks to develop correct, coherent programs.	K2
2	Abilitytoimplementtheeventdrivenprogrammingusing VisualBasic6.0formsand Controls	K3
3	Abilitytocreate menutomakethe applicationmoreinteractive	K6
4	GaintheKnowledgeabouthowtouseexistingCommonDialogControlslikeFile Dialogbox, ColorDialogbox,etc. toenhancethefunctionality	K4
5	Testingand debugVisual Basicprograms	K5

K1-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**–Create

Unit:1	VisualBasicOverview	6hours

Visual Basic: Getting Started – Visual Basic Environment: Tool Bars – The Tool Box and CustomControls and Components – Using File Menu, Edit Menu, View Menu, Project Menu, Format Menu,DebugMenu, AddingMenu andWindow Menu–CustomizingaFormandWritingSimplePrograms

Unit:2	VisualBasicObjects	7hours

The Tool Box – Creating Controls – Properties Setting – First Steps in Programming- Code Window – VisualBasic'sEditingTools–Statements inVB–DataTypes –WorkingwithVariables –Input BoxesandMessage Boxes –DisplayingInformation

Unit:3	BuildingTheUserInterface	7hours

ControllingProgramFlow–Built-InFunctions–UserDefinedFunctionsandProcedures–ControlArrays – Listand Combo Boxes – The Flex Grid Control- Finishing the Interface: Frames – Option Buttons – CheckBoxes–ScrollBars–Timers–CommonDialogBoxes–TheMicrosoftWindowsCommonControls 6.0 – Menus – MDIForms

Unit:4	DatabaseWithVisualBasic	7hours

CommunicatingwithOtherWindowApplications– DatabaseDevelopmentwithVisualBasic(DAO,RDO)–BuildingActiveControls– OLE

Unit:5	DebuggingAndApplications	7hours

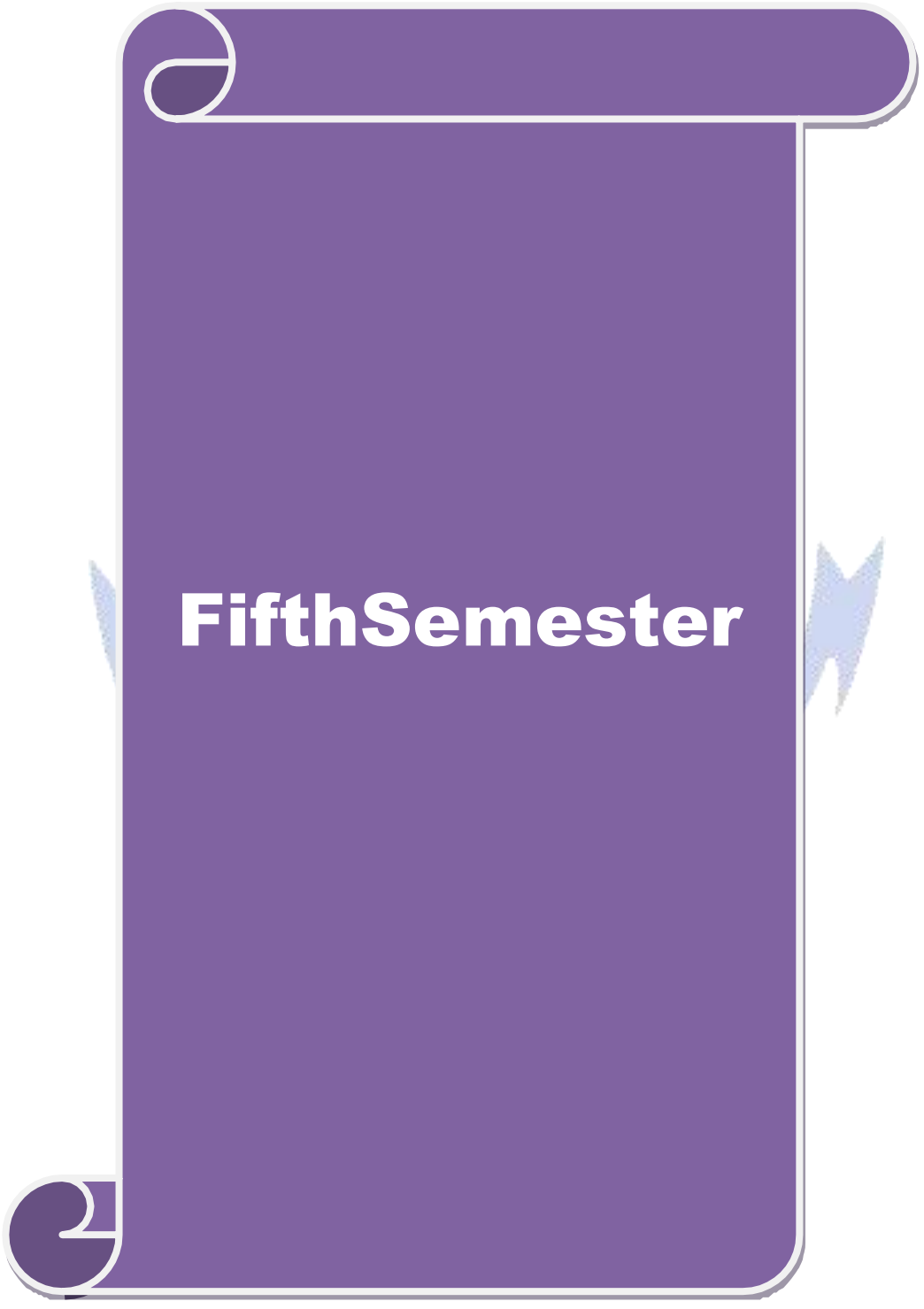
VC++Fundamentals –UsingVisualStudio's IDE–Menus–Writing,CompilingandDebugging SimplePrograms –Buildinga Basic Application –Types– OverviewofMFC

Unit:6	ContemporaryIssues	2hours
Webinaron visualprogramming		
	TotalLecturehours	**36hours**
TextBook(s)		
1	GaryCornell,**"VisualBasic6.0FromTheGroundUp"**,TataMcGrawHillCompany,1999.	
2	ChrisH.Pappas&WilliamH.Murray, **"TheCompleteReferenceVisualC++6"**,TataMcGraw Hill,Delhi.	
ReferenceBooks		
1	JohnPaulMuller,**"VisualC++FromTheGroundUp"**,TataMcGrawHill,Delhi.	
2	RichardC.LeineckerandTomArcher,**"VisualC++6ProgrammingBible",** WileyIndiaPvtLtd.	
RelatedOnlineContents[MOOC,SWAYAM, NPTEL,Websitesetc.]		
1	https://www.youtube.com/watch?v=5nahqfJTQXs	
2	https://www.youtube.com/watch?v=1oGpl6qNKoQ	
3	https://www.youtube.com/watch?v=gcFHyVYdeFU	
CourseDesignedBy:M.Baskaran,AssistantProfessor,KSGCollegeofArtsandScience& Dr.NOm Muruga, AssistantProfessor, GovernmentArts College,Ooty.		

MappingwithProgrammeOutcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10
CO1	S	S	S	M	M	M	S	L	L	S
CO2	S	S	S	M	M	M	S	L	L	L
CO3	S	S	S	M	M	L	L	S	S	M
CO4	M	M	M	S	S	S	L	L	M	M
CO5	M	M	S	S	S	L	M	M	S	S

*S-Strong;M-Medium;L-Low


FifthSemester

Coursecode	53A	8085 MICROPROCESSOR ANDAPPLICATIONS	L	T	P	C
Core/Elective/Supportive		Core	6	0	0	4
Pre-requisite		Requires the basic of Digital circuits andProgramminglanguages	Syllabus Version		2020-2021	

CourseObjectives:

Themain objectives ofthis courseareto:

1. Toenablethestudentsto learntheMicroprocessorArchitecture.
2. Tolearntheinstructionsetof 8085andtodevelopprogrammingskills.
3. Toknowvarious peripheraldevicesand to interfacethem with8085.

ExpectedCourseOutcomes:

Onthesuccessfulcompletion of thecourse, student willbe able to:

1	Explainthe8085microprocessor architectureand itsinstructionset.	K1
2	Understandandrealizethe Interfacingofmemory&variousI/Odevices with8085 Microprocessor	K2
3	Interfacethe8085microprocessorwithvariousperipheraldevices.	K3
4	UnderstandtheoperationofProgrammableInterfaceDevicesand realizethe programming&interfacingofitwith8085 microprocessor.	K4
5	Explaintheneedfordifferentinterfacing devices	K5

K1-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**–Create

Unit:1	IntroductionTo8085	14hours

PinDiagram–Architecture–DemultiplexingtheBus–GenerationofControlSignals–Fetching,Decoding andExecutionof Instruction–InstructionTimingandOperation Status.

Unit:2	InstructionSetAndAddressingModes	15hours

Instruction Set – Addressing Modes – Instruction Format – Simple Program – Memory ReadMachineCycle– MemoryWrite MachineCycle

Unit:3	InterfacingConcepts	14hours

PeripheralI/OInstructions–DeviceSelectionandDataTransfer–InputInterfacing–Practical InputInterfacingUsingDecoders–InterfacingO/PDevices:LEDand7SegmentDisplay– InterfacingMemory– MemoryTime and Unit States

Unit:4	ParallelAndSerialInterface	14hours

Introduction to Programmable Peripheral Interface 8255 – Pin Diagram – Architecture – ModesofOperation:I/OandBSR– Architectureand Operation of8251 (USART)

InterruptAndTimerLogic

8085Interrupts-ArchitectureofProgrammableInterruptController8259— Architectureof8254Programmable Interval Timer / Counter – Modes of Operation of 8254 – Generating Square WaveUsing8254

Unit:5	Applications	15hours

Time Delay Program – Traffic Light Control System – Water Level Controller – Stepper MotorControl –InterfacingDAC–Interfacing ADC–TemperatureMeasurement

Unit:6	ContemporaryIssues	2hours
Seminaronmicroprocessoranditsapplications		
	TotalLecturehours	72hours

TextBook(s)	
1	R.S.Gaonkar,**"MicroprocessorArchitecture,ProgramAndItsApplicationWith8085"**, NewAge International(P)Ltd,
2	S.Malarvizhi,**"MicroprocessorandItsApplication"**,-Anuradhe AgenciesPublications –I edition,March1999.
ReferenceBooks	
1	DoughlasV.Hall,"**MicroprocessorsandInterfacing,ProgrammingandHardware**", TMH,2012
2	M.RafiQuazzaman,"**MicroprocessorsTheory andApplications:Inteland Motorola**",: PrenticeHallof India,Pvt. Ltd.,NewDelhi,2003.
RelatedOnlineContents[MOOC,SWAYAM,NPTEL,Websitesetc.]	
1	https://nptel.ac.in/courses/108/103/108103157/
2	https://www.youtube.com/watch?v=t0Z8P_hpbFk&vl=en
3	https://www.youtube.com/watch?v=fS7FFOaC_iQ

CourseDesignedBy:M.Baskaran,AssistantProfessor,KSGCollegeofArtsandScience&
Dr.NOm Muruga, AssistantProfessor, GovernmentArts College,Ooty.

MappingwithProgrammeOutcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10
CO1	S	S	S	M	M	M	S	L	L	S
CO2	S	S	S	M	M	M	S	L	L	L
CO3	S	S	S	M	M	L	L	S	S	M
CO4	M	M	M	S	S	S	L	L	M	M
CO5	M	M	S	S	S	L	M	M	S	S

*S-Strong;M-Medium;L-Low

Coursecode	5ZC	INTERNETANDJAVAPROGRAMMING	L	T	P	C
Core/Elective/Supportive		SkillBasedSubject-III	3	0	0	3
Pre-requisite		This course requires that the students arefamiliarwithprogramminglanguagesucha sC/C++and data structures,algorithms	Syllabus Version		2020-2021	

CourseObjectives:

Themain objectivesof thiscourseareto:

1. Todesignof thesubjectis toprovideknowledgeaboutinternet,Javadatatypes,classes and files.
2. Tolearntheinternetconcept andJavaprogrammingsystems.

ExpectedCourseOutcomes:

Onthesuccessful completionofthecourse,student willbe ableto:

1	Gainknowledge abouttheconceptsofInternetandabletoprogramthe applicationsusingJava.	K1
2	Design,create,build,and debugJavaapplicationsand applets	K2
3	ImplementobjectorientedprogrammingconceptsinJava.	K3
4	DemonstrateuseofMultithreadinginJavaapplication.	K4
5	Enhancelogicalreasoningandprogrammingskills.	K5

K1-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**–Create

Unit:1	IntroductionToInternet	7hours

Internet – Introduction- Understanding Internet- Internet Addressing - Hardware Requirements toConnectto theInternet.

Unit:2	BasicsOfJAVA	7hours

DataTypes,Arrays, Operators,FlowControl– Branching, Looping

Unit:3	InheritanceAndInterfaces	7hours

Classes–NewOperator, DotOperator,MethodDeclarationandCalling,Constructors,Thisin Constructors, Inheritance,Super,MethodOverridingFinal,Finalize,Static,Packageand ImportStatement,InterfaceandImplements

Unit:4	ExceptionHandlingAndMultithreading	7hours

ExceptionHandling– ExceptionTypes,UncaughtandCalling,NestedTryStatements,JavaThreadModel,and Thread, Runnable, ThreadPriorities, Synchronization, Deadlock

Unit:5	ManagingI/OOperation And Applet	6hours

File–InputStream,OutputStream,andFileStream.Applets-Tag,Order ofAppletInitialization, Repainting,SizingGraphics-IntroductiontoAWTProgramming

Unit:6	ContemporaryIssues	2hours

Webinaron programmingusingjava,seminar on internet andits uses

	TotalLecturehours	36hours

TextBook(s)	
1	HarleyHahn,**"TheInternetComplete Reference"**,TataMcGrawpublicity,2ndEdition,1997
2	PatrickNaughton., **" PatrickNaughton"**,ThenJavahandbook,TataMcGraw,1997
ReferenceBooks	
1	HerbertSchildt,"TheCompleteReference,Java", McGraw-Hill.
2	E.Balaguruswamy,"ProgrammingwithJavaAPrimer",McGraw-Hill.
RelatedOnlineContents[MOOC,SWAYAM, NPTEL,Websitesetc.]	
1	https://www.youtube.com/watch?v=pWusFlk747Y
2	https://www.youtube.com/watch?v=M9G_VeQgy7I
3	https://www.youtube.com/watch?v=3u1fu6f8Hto
Course Designed By: M.Baskaran, Assistant Professor , KSG College of Arts and Science&Dr.NOm Muruga, Assistant Professor,Government ArtsCollege,Ooty.	

MappingwithProgrammeOutcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10
CO1	S	S	S	M	M	M	S	L	L	S
CO2	S	S	S	M	M	M	S	L	L	L
CO3	S	S	S	M	M	L	L	S	S	M
CO4	M	M	M	S	S	S	L	L	M	M
CO5	M	M	S	S	S	L	M	M	S	S

*S-Strong;M-Medium;L-Low


SixthSemester

Coursecode	63A	8051 MICROCONTROLLER AND EMBEDDEDSYSTEMS	L	T	P	C
Core/Elective/Supportive		Core	5	0	0	4
Pre-requisite		DigitalElectronics8085Microprocessor	Syllabus Version		2020-2021	

CourseObjectives:

Themain objectivesof thiscourseareto:

1. Studythearchitecture and addressingmodesof8051.
2. Impartknowledge aboutassemblylanguageprogramsof8051.
3. Helpstounderstandtheimportanceofdifferentperipheraldevices&theirinterfacingto8051.
4. ImpartknowledgeofdifferenttypesofexternalinterfacesincludingLEDS,LCD,
5. KeypadMatrix,Switches&Sevensegmentdisplay.

ExpectedCourseOutcomes:

Onthesuccessfulcompletion of thecourse, student willbe able to:

1	DescribearchitectureandoperationofMicrocontroller8051.	K1
2	Fosterabilitytounderstandthedesignconceptof Microcontroller.	K2
3	Designvariousapplicationsusingitsperipherals.	K3
4	Analyzethedatatransfer throughserialandparallelports.	K4
5	Learnbasichardwareofvariousmicrocontrollers.	K2

K1-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**–Create

Unit:1	OverviewAndInstructionSet	14hours

Microcontrollers and Embedded Processors – Microcontrollers for Embedded Systems – Overviewof 8051 Family–8051Instruction Set andRegisters.

Unit:2	AssemblyProgrammingAndAddressingModes	14hours

Introductionto8051AssemblyProgramming–TheProgramCounterandROM–DataTypesand Directives–FlagBitsandPSWRegister–RegisterBankandStack–LoopandJumpInstructions – I/OPortProgramming–AddressingModes.

Unit:3	ArithmeticAnd LogicalOperationsInAIPAnd C	14hours

ArithmeticInstructionsandPrograms– UnsignedAdditionandSubtractionandUnsignedMultiplication and Division – Logic Instructions and Programs – Single Bit Instructions andProgramming.ProgrammingwithC:DataTypes–TimeDelayProgramming–I/OProgramming –LogicOperationsArithmeticOperations

Unit:4	8051InterruptsAndPeripherals	14hours

BasicRegistersofTimer–Programming8051Timer–CounterProgramming–BasicsofSerialCommunication–8051ConnectiontoRS232–8051SerialCommunicationProgramming–8051Interrupts – ProgrammingExternal Hardware Interrupts

Unit:5	RealWorldApplications	14hours

InterfacingLCDtothe8051–InterfacingADC–InterfacingSensorsto8051–InterfacingStepperMotor –8051Interfacingtothe Keyboard –InterfacingDACtothe8051

Unit:6	ContemporaryIssues	2hours
Anoveralldiscussiononembeddedsystemsandmicrocontrollers		
	TotalLecturehours	72hours

	TextBook(s)
1	Muhammad Ali Mazidi, Janice GillispieMazidi and Rolin D. McKinlay, "**The 8051MicrocontrollerAndEmbeddedSystemsUsingAssemblyAndC**",PHI,2ndedition2006.
2	AyalaJ.K.,**The8051Microcontroller:Architecture,programmingandapplications**,Penram International(2005)3rd ed.

	ReferenceBooks
1	Mazidi,E.andMazidi,F., **The8051MicrocontrollerAndEmbeddedSystems**,Prentice-Hallof India(2004)2nded.
2	PeatmanJ.,**EmbeddedSystemDesign UsingPic18fxxx**,PrenticeHall,2003.

	RelatedOnlineContents[MOOC,SWAYAM, NPTEL,Websitesetc.]
1	https://www.youtube.com/watch?v=84YUQu8tE4w
2	https://www.youtube.com/watch?v=GPz_mR7Flas
3	https://www.youtube.com/watch?v=uFhDGagZzjs

CourseDesigned By:M.Baskaran,AssistantProfessor,KSGCollegeofArtsandScience&
Dr.NOmMuruga, AssistantProfessor,GovernmentArts College,Ooty.

MappingwithProgrammeOutcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10
CO1	S	S	S	M	M	M	S	L	L	S
CO2	S	S	S	M	M	M	S	L	L	L
CO3	S	S	S	M	M	L	L	S	S	M
CO4	M	M	M	S	S	S	L	L	M	M
CO5	M	M	S	S	S	L	M	M	S	S

*S-Strong;M-Medium;L-Low

Coursecode	63P	MicroprocessorandMicrocontrollerLab	L	T	P	C
Core/Elective/Supportive		Core–Practical-VI	0	0	3	4
Pre-requisite		Requires the basic of Digital circuits andProgramminglanguages	Syllabus Version		2020-2021	

CourseObjectives:

Themain objectivesof thiscourseareto:

1.Tointroducestheassemblylanguageprogramming ofMicroprocessorandMicrocontroller.

1.2.Itdevelopsthestudent'sAssemblylanguageprogrammingskillsandgivespracticaltrainingofinterfacingtheperipheraldeviceswith theMicroprocessorand Microcontroller.

ExpectedCourseOutcomes:

Onthesuccessful completionofthecourse,student willbe ableto:

1	Learnassemblylanguage programmingofMicroprocessor andMicrocontrollerwith interfacingtheperipheral devices.	K3
2	Learn assemblylanguage programmeofmicrocontroller	K1
3	Understandthebasicconceptsofinterfacingandperipheraldevices	K2
4	Applytheknowledgegainedinto apractical exposure	K3
5	Analyzetheconceptsof microprocessorandmicrocontroller	K4

K1-Remember;**K2**-Understand;**K3**-Apply;

(ANY16EXPERIMENTS)

8085MICROPROCESSORLAB

1. Addition/ Subtraction of8 / 16 bit Data
2. Multiplication/Division8bitData
3. BlockDataTransfer
4. Smallest/largestofN Numbers
5. Toarrangein ascending/ DescendingOrder
6. Sumof N 8 bit Numbers
7. 1'sand2's Compliment ofan Array(8bit)
8. UP/DOWNCounter using7 Segment Displays
9. Traffic Light Control

Interface10.Data Transfer using 8255 (PPI)11.Squarewavegeneratorusing8 25512.ADCInterface 13.DACInterface14.Stepp erMotorinterface

8051MICROCONTROLLER LAB

15. Arithmeticand LogicalPrograms
16. Key

Interface17.LED Interface

18. SolidStateRelayInterface
19. SquareWaveGeneration

20. ADCInterface
21. DACInterface
22. StepperMotorInterface
23. LCDInterface

CourseDesigned By:M.Baskaran, Assistant Professor, KSGCollegeofArts and Science&
Dr.NOmMuruga,AssistantProfessor,Government ArtsCollege,Ooty.

MappingwithProgrammeOutcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10
CO1	M	M	S	S	S	M	S	M	M	S
CO2	S	S	S	M	M	M	S	M	L	L
CO3	S	S	M	M	M	L	L	L	S	M
CO4	S	S	M	S	S	S	L	L	S	M
CO5	M	M	S	S	S	L	L	L	S	M

*S-Strong;M-Medium;L-Low

Coursecode	63Q	INDUSTRIALANDPOWERELECTRONICS	L	T	P	C
Core/Elective/Supportive		Core–Practical-VII	0	0	3	4
Pre-requisite		BasicknowledgeofElectronicCircuitsorpermissionofinstructor	Syllabus Version		2020-2021	

CourseObjectives:

Themain objectivesof thiscourseareto:

2. Tomakethestudentsto designtriggeringcircuitsofSCR.
3. Tounderstandthecharacteristicsofpowerelectronicdevices.

ExpectedCourseOutcomes:

Onthesuccessful completionofthecourse,student willbe ableto:

1	Designtriggeringcircuits ofSCR	K2
2	Understandthecharacteristicsofpowerelectronicdevices.	K3
3	Design andstudyofDIAC andTRIACcircuits	K3
4	Understandthe basic knowledgeofPCB	K2
5	Analysetheparametersofvaiouscomponentsofelectroniccircuits	K4

K1-Remember;**K2**-Understand;**K3**-Apply;

(ANY16EXPERIMENTS)

1. Triggeringof SCRbyR,CandDiac.
2. Designofsnubbercircuit.
3. FanregulatorusingTriac.
4. Thyristorchopper.
5. TRIAC Flasher.
6. CommutationTechniques.
7. SpeedcontrolofDCmotorusingSCR.
8. Automaticstreetlightcontroller
9. Burglar

Alarm10.Sequencer Circuit.11.Power Inverter12.SwitchingRegulators
13.Automatic Battery Charger Fire alarm14.ON / OFF relay control using opto – coupler15.Servostabilizer
16.Layout andArtWorkpreparation for PCB17.etching Drilling and Component mounting of PCB18.Temperaturecontroller using AD590/LM35.
19.Construction of Emergency Lamp.20.PhaseControlCircuit
21. Cycloconverter
22. Thyristorprotectioncircuit

Course Designed By: M.Baskaran, Assistant Professor , KSG College of Arts and Science&Dr.NOmMuruga,AssistantProfessor, GovernmentArtsCollege,Ooty.

MappingwithProgrammeOutcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10
CO1	M	M	S	S	S	M	S	M	M	S
CO2	S	S	S	M	M	M	S	M	L	L
CO3	S	S	M	M	M	L	L	L	S	M
CO4	S	S	M	S	S	S	L	L	S	M
CO5	M	M	S	S	S	L	L	L	S	M

*S-Strong;M-Medium;L-Low

Coursecode	63R	ElectronicCommunicationLab	L	T	P	C
Core/Elective/Supportive		Core–Practical-VIII	0	0	3	4
Pre-requisite		BasicknowledgeofElectronicCommunication	Syllabus Version		2020-2021	

CourseObjectives:

Themain objectives ofthis courseareto:

1. ToUnderstandthe conceptofDigitalCommunication
2. ToexperimenttheModulationandDetectiontechniques
3. Tostudyaboutwireless communicationtechnologies.

ExpectedCourseOutcomes:

Onthesuccessful completionofthecourse,student willbe ableto:

1	Understandthe conceptofDigitalCommunicationandwireless communication technologies.	K2
2	ObtainexperimentknowledgeabouttheModulation andDetection techniques	K3
3	UnderstandthepracticalcomponentsinvolvedinPAM	K2
4	Applytheprinciplesintopracticalexperience	K3
5	Analysethe practical exposreover thePAM and PWM, PCM	K4

K1-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**–Create

(ANY16EXPERIMENTS)

1. PulseAmplitudeModulation(PAM)andDetection
2. PulseWidthModulation(PWM)and PulsePositionModulation(PPM)
3. GenerationandDetectionofPCM
4. GenerationofdeltaandAdaptivedeltamodulation
5. AmplitudeShiftKeying
6. FrequencyShift Keying
7. PhaseShiftKeying
8. QPSK
9. DPSK
10. StudyofTDM/FDM
11. Fullduplexcommunicationmodel1
2.Alignment of satellite receiver13.Studyof GPS Handset
14. Studyof GSMModule
15. PINDiodeCharacteristics
16. LaserDiodeCharacteristics
17. FiberOpticsTXand Rx
18. SignalSamplingand Reconstruction

19. GUNNdiode Oscillator
20. Reflex Klystron Characteristics using microwave bench 21.Radiation patternHORNantenna.
22. RadiationpatternofDipole&YagiUdaantennas
23. RadiationpatternLoop&arrayantennas

CourseDesignedBy:M.Baskaran,AssistantProfessor,KSGCollegeofArtsandScience&
Dr.NOmMuruga, AssistantProfessor, GovernmentArts College,Ooty.

MappingwithProgrammeOutcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10
CO1	M	M	S	S	S	M	S	M	M	S
CO2	S	S	S	M	M	M	S	M	L	L
CO3	S	S	M	M	M	L	L	L	S	M
CO4	S	S	M	S	S	S	L	L	S	M
CO5	M	M	S	S	S	L	L	L	S	M

*S-Strong;M-Medium;L-Low

Coursecode	6ZD	VISUALANDJAVA PROGRAMMINGLAB	L	T	P	C
Core/Elective/Supportive		SkillBasedSubject -V–Practical.	0	0	3	3
Pre-requisite		Basic computer skills and familiarity withMicrosoft Windows. students are familiar withprogramminglanguagesuchasC/C++anddata structures,algorithms	Syllabus Version		2020-2021	

CourseObjectives:

Themain objectivesof thiscourseareto:

1. Todesignanddevelop Windows-basedbusinessapplicationsusingVisualBasic
2. Emphasisonthefundamentalsofstructureddesign,development,implementation,anddocumentation.
3. GainknowledgeaboutbasicJavalanguagesyntax andsemanticstowriteJavaprograms

ExpectedCourseOutcomes:

Onthesuccessfulcompletion ofthe course, studentwill beable to:

1	DevelopWindows-based businessapplicationsusingVisual Basic	K6
2	Understandthe fundamentalsofstructureddesign,development,implementation,anddocumentation.	K2
3	Gainknowledge about basicJavalanguagesyntaxandsemantics towriteJava Programs	K2
4	Createownprogrammeonvisualprogramming	K6
5	Createownprogrammingonjavaprogramming	K6

K1-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**–Create

VisualProgramming(any8experiments)

1. BuildingSimple ApplicationsusingBasic Tools.
2. WorkingwithIntrinsicControl andActiveXcontrols.
3. CreateanApplicationwithmultipleformsanddialogs.
4. WriteaVBprogramto designane-mail registrationform.
5. CreateanApplicationwithMenu editor.
6. CreateanApplication withDAOcontrols
7. Createan ApplicationusingCommondialogs.
8. Writeaprogramfor DragandDropEvents.
9. CreateaDatabaseforlibrarymanagement usingADDcontrols.
10. CreatinganapplicationusingActiveXcontrol.
11. CreateaScientificcalculatorinVB.
12. DevelopaVBapplication toeitherlinkorembed MSWorddocument toanOLE control.
13. DisplayStudent information usingGrid control.
14. CreateanApplicationusingRDO controls.
15. Developan applicationtoperformthefollowingoperationintheEmployeetableusingDAO.

i) AddanewRecord.
ii) DeleteaRecord.
ii) ModifyaRecord.

JAVAProgramming(Any8Experiments)

1.Program toprint thefollowingtriangleofnumbers 112 1231234

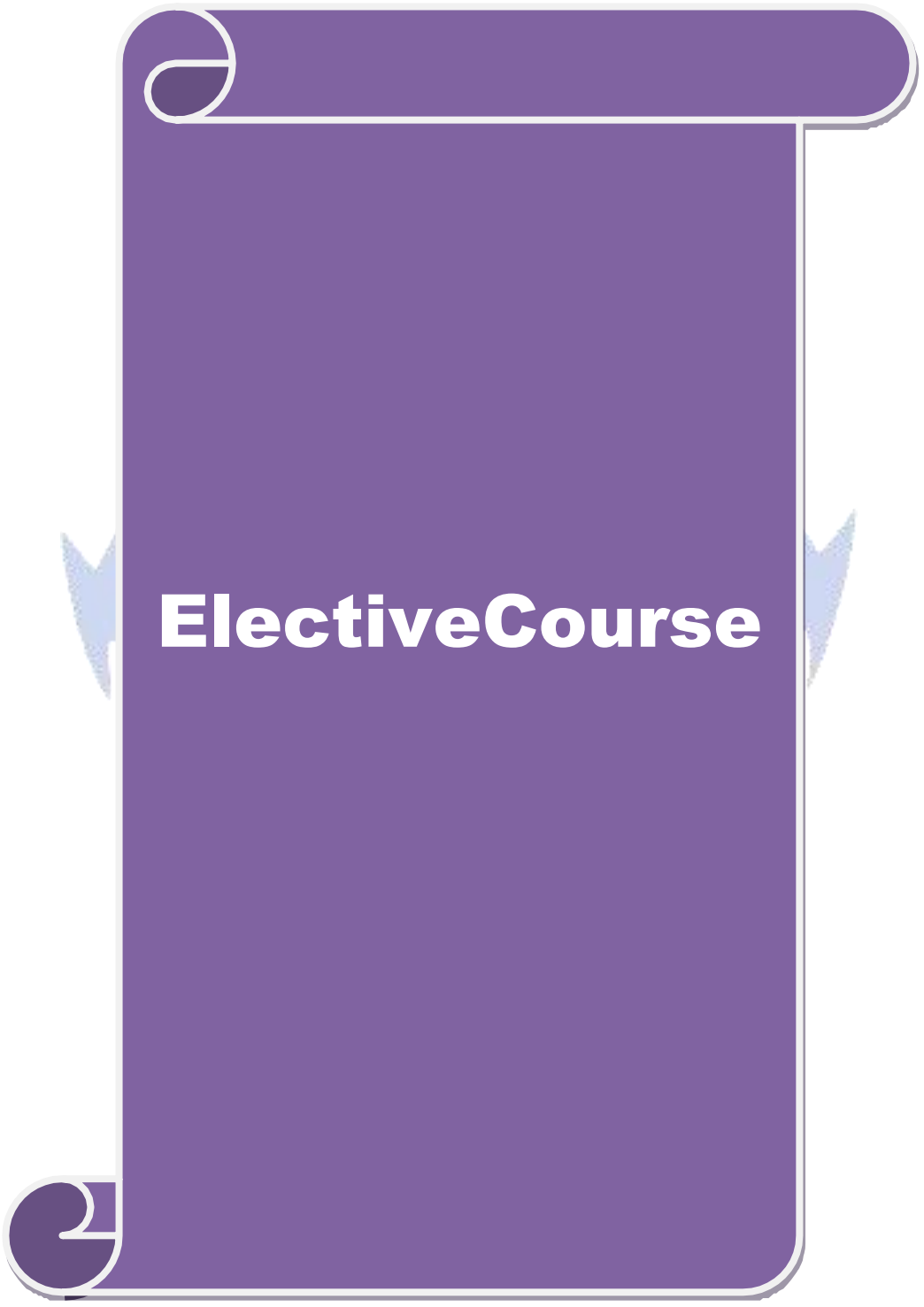
2. Definingaclasswiththefollowingattributes1.xname2.DateofBirth3.Dateonwhichleginjection has to be given (sixty days from date of birth) 4. X date on which polio dropsis to be given (45 days from Date of birth). Write a constructor to construct the babyobject. The constructor must find out the leg and polio drops dates from the date ofbirth.In the main program define ababyand displayits details.
3. Programto create anddisplayamessageon thewindow
4. Programtodrawseveralshapesinthecreatedwindow.
5. Programtocreatean appletanddrawgridlines.
6. Java program to create a frame with two buttons called father and mother. When weclick the father button the name of the father, his age and designation must appear.Whenweclick mother similardetails of motherappear.
7. Java program to create a frame with four textfields for name, age and qualificationandatext field ofmultiplelines foraddress.
8. Programtodraw circle, ellipse,squareandrectangleatthemouseclickposition.
9. Java program to create four text fields for the name, street, city and pin code withsuitable labels. Also add a button called my details, when you click the button yourname,street,cityand pin codemust appear in thetext fields.
10. Javaprogramtodemonstratethemultipleselectionlistboxes.
11. Program to create a canvas which displays a clock with hour hand and a minute handdepending upon an int variable minutes. Write another program with a frame, whichdisplays the clock canvas. It must also have three buttons, tick, reset and close. Whenweclick reset, theclockmust reset to 12 hrs.When weclick close, theframe closes.
12. Javaprogramtocreatea menubarandpulldownmenus.
13. Java program to create a window when we press M or m the window displays GoodMorningAorthewindowdisplaysGoodAfternoonEorethewindowdisplaysGood EveningNorn thewindow displaysGood Night.
14. Javaprogramtomovedifferentshapes(Circle,Ellipse,Square,andRectangle)accordingto thearrow keypressed.
15. Programto handlethedivide byzeroexception.
16. Program to explain the multithreading with the use of multiplication tables. Threethreads must be defined and each one must create one multiplication table; they are 5tables,7 tables and 13table.
17. Program to illustrate thread priority. Create three threads and assign three differentpriorities.

CourseDesignedBy:M.Baskaran,AssistantProfessor,KSG CollegeofArtsandScience&
Dr.NOmMuruga, AssistantProfessor,GovernmentArts College,Ooty.

MappingwithProgrammeOutcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10
CO1	M	M	S	S	S	M	S	M	M	S
CO2	S	S	S	M	M	M	S	M	L	L
CO3	S	S	M	M	M	L	L	L	S	M
CO4	S	S	M	S	S	S	L	L	S	M
CO5	M	M	S	S	S	L	L	L	S	M

*S-Strong;M-Medium;L-Low


ElectiveCourse

CourseCode	5EA	ASICDESIGN	L	T	P	C
Core/Elective/Supportive	ElectiveI -A		6	0	0	4
Pre-requiests	BasicElectronic		Syllabus Version		2020-2021	

CourseObjectives:

TheMain Objectivesof thiscourseareto:

1. Topreparethestudentto beanentry-levelindustrialstandardASICor FPGAdesigner.
2. TounderstandtheissuesandtoolsrelatedtoASIC/FPGAdesignandimplementationandbasics ofSystem onChip and Platformbaseddesign.

ExpectedCourseOutcomes:

OntheSuccessfulcompletionofthe course,studentwill beableto:

1	Knowtheconceptsofdatatransmissionsystems	K1
2	AnalyzetheModelof Communicationsystem	K6
3	FamiliarizeDigital carrierModulationSchemes.	K4
4	Understandpulsemodulationandquantizationtechniques	K2
5	Analyzethecellularsystemdesign andtechnical challenges.	K4

K1-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**–Create

Unit:1	IntroductionTo ASICS	16hours

TypesofASICS:Full-CustomASIC–StandardCell-BasedASIC–Gate ArrayBasedASIC ChanneledGateArray-StructuredGateArray–ProgrammableLogicDevices–FPGA,DesignFlow – CaseStudy

Unit:2	CMOS Logic	18hours

CMOSTransistors–DesignRules–CombinationalLogicCells:PushingBubbles–DriveStrength– TransmissionGates–EX-ORCell,SequentialLogicCells:FF–ClockedInverter,Data Path LogicCells:DataPathElements

Unit:3	ASICDesign	18Hours

ProgrammableASICS:Antifuse–StaticRAM–EPROMandEEPROMTechnology- ProgrammableASICLogicCells:ActelACT-XilinxLCAandAlteraFLEXArchitectures- ProgrammableASICI/OCells:DCOutput– DCInput,ProgrammableASICDesignSoftware:LogicSynthesis– FPGASynthesis.

Unit:4	VHDL	18hours

IntroductiontoVHDL–Behavioral,DataFlowandStructuralModel-Operators–Data Objects-DataTypes - DesignExamples

Unit:5	VERILOG	18hours

Introduction - Language Elements- Gate-Level modeling- Data Flow- Behavioral- StructuralModeling– ModelingExamples

Unit:6	ContemporaryIssues	2hours

SeminaronASICdesign, CMOSlogic,DemoprogrammeonVHDL,Verilog

TotalLecturehours	90hours

TextBook(s)	
1	Michael John Sebastian Smith, **"Application Specific Integrated Circuits"**,Addition-Wesley,2nd reprint, 2000.
2	Bhasker.J,**"VHDLPrimer",**BSPublications,2001
3	Bhasker.J."**AVerilogHDLPrimer**",BSPublications,2001
ReferenceBooks	
1	Charles.J.Roth,**"DigitalSystemDesignUsingVHDL"**,PWSPublishing (Thomsonlearning),2002.
2	Stephen Brown, ZvonkoVranesic, **"Fundaments Of Digital Logic With VHDLDesign"** Tata McGraw-Hill, 2002
RelatedOnlineContents[MOOC,SWAYAM, NPEL,Websiteetc.]	
1	https://nptel.ac.in/courses/106/105/106105161/VLSIPhysicalDesign
CourseDesigned By: R.Archana,Assistantprofessor,NehruArtsandScienceCollege.&Dr.NOm Muruga,AssistantProfessor, GovernmentArtsCollege,Ooty, C.NOmprakashAnand,AssistantProfessor,GovernmentArtsCollege,Ooty.	
MappingwithProgrammeOutcomes	

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10
CO1	S	S	M	M	M	M	S	M	M	S
CO2	S	M	M	M	M	M	S	L	L	L
CO3	S	S	S	M	M	L	L	L	M	M
CO4	M	M	M	S	S	S	L	L	M	M
CO5	M	M	S	S	M	L	M	M	S	M

*S-Strong;M-Medium;L-Low

CourseCode	5EB	REMOTESENSING	L	T	P	C
Core/Elective/Supportive		ElectiveI -B	6	0	0	4
Pre-requiest:		BasicElectronics	Syllabus Version		2020-2021	

CourseObjectives:

TheMain Objectivesof thiscourseareto:

1. Todesignfullyequippedwithconcepts,methodologiesandapplicationsofRemoteSensingTechnology.
2. ToDefineanddescriberemotesensingandexplainitsapplications,history,electromagneticspectrum and interactionswith various typesof media.

ExpectedCourseOutcomes:

OntheSuccessfulcompletionofthe course,studentwill beableto:

1	Knowtheconceptsofdatatransmissionsystems	K1
2	AnalyzetheModelofCommunicationsystem	K6
3	FamiliarizeDigital carrierModulationSchemes.	K4
4	Understandpulsemodulationandquantizationtechniques	K2
5	Analyzethecellularsystemdesign andtechnical challenges.	K4

K1:Remember; **K2**-Understand; **K3**-Apply; **K**4-Analyze;**K5**-Evaluate; **K6**-Create

Unit:1	PrinciplesOf RemoteSensing	16hours

RemoteSensingSystemanditsComponents-ElectromagneticSpectrum-DefinitionofEmissivity - Reflectance - Absorbance and Transmittance - Spectral Signature - AtmosphericWindow-ActiveandPassiveRemoteSensingSystems-InteractionofElectromagnetic EnergywithAtmosphereandEarthFeatures- FactorsAffectingtheReflectance

Unit:2	PlatformsAndSensors	18hours

AirborneandSpacePlatforms-AdvantagesandDisadvantagesofeachPrincipleandFunctioning of Camera - Films, Multi-Spectral, Thermal & Line Scanners, Side Looking AirBorneRadars–HyperspectralSensors-DifferentSatelliteandSensorCombinations: LANDSAT–SPOT- IRSSeriesofSatellitesandSensors.

Unit:3	ImageCharacteristicsAndInterpretation	18hours

DifferencesbetweenAerialandSpaceBorneImagery-ElementsofVisualInterpretation of Images - RadiometricProcessingIncludingCorrectionofInstrumentalArtifacts-AtmosphericCorrections;GeometricCorrections-Registration.GeometricEnhancementincludingSpatial Filtering-EdgeDetectionandEnhancement.

Unit:4	DigitalImageProcessing	18hours

ImageTransformations-Subtraction–Rationing-NDVIandPCA-ThematicClassificationandClusteringtoIncludeUnsupervisedandSupervisedClassificationBased on MinimumDistanceandMaximumLikelihoodClassification-AccuracyAssessmentof Classification-ConceptsofHyperspectralImageAnalysis

Unit:5	ANCILLARYDATASOURCESANDINTEGRATION	18hours

GroundTruth-GeographicandRadiometric-IntroductionofGIS-IntegrationofRemoteSensingand GIS-DigitalTerrainModels-GPS anditsRoletoRemoteSensingData.

Unit:6	ContemporaryIssues	2hours
GroupdiscussiononDigital ImageProcessing, Imageinterpretation		
	TotalLecturehours	**90hours**
TextBook(s)		
1	Lillesand,T.M.andKiefer,R.W.,**REMOTESensingAnd ImageInterpretation**.	
2	Curran,PaulJ., **PrinciplesOf RemoteSensing**	
3	Campbell,J.B.**,IntroductionOfRemoteSensing**	
ReferenceBooks		
1	Sabins,F.F.,**RemoteSensing:PrinciplesAndInterpretations**	
2	Reddy,M.Anji,**RemoteSensingAndGeographicInformationSystem**	
RelatedOnlineContents[MOOC,SWAYAM, NPEL,Websiteetc.]		
1	https://www.coursera.org/lecture/gis-applications/remote-sensing-basics-wr6KdRemote sensingBasics	
CourseDesigned By: R.Archana,Assistantprofessor,NehruArtsandScienceCollege.&Dr.NOm Muruga,AssistantProfessor,GovernmentArtsCollege,Ooty, C.NOmprakashAnand,AssistantProfessor, GovernmentArtsCollege,Ooty		

MappingwithProgrammeOutcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10
CO1	S	S	M	M	M	M	S	M	M	S
CO2	S	M	M	M	M	M	S	L	L	L
CO3	S	S	S	M	M	L	L	L	M	M
CO4	M	M	M	S	S	S	L	L	L	L
CO5	M	L	S	S	M	L	L	L	S	M

*S-Strong;M-Medium;L-Low

CourseCode	5EC	MOBILECOMPUTING	L	T	P	C
Core/Elective/Supportive		ElectiveI -C	6	0	0	4
Pre-Requisite:		BasicElectronics	Syllabus Version		2020-2021	

CourseObjectives:

TheMain Objectivesof thiscourseareto:

1. ToLearnthecontextofwirelessnetworksystemssuchas2G/3G/4Gmobiletelephony,Datanetworks,and otherwirelessnetworksand infrastructure.
2. Toemphasizetheinterfacebetweenmobilecomputingdevicesandprogrammingthosedevices

ExpectedCourseOutcomes:

OntheSuccessfulcompletionofthe course,studentwill beableto:

1	Mobileenvironmentsandcommunicationssystems.	K1
2	Hardwaredevices andinteractingwiththesedevices.	K6
3	Mobileoperatingsystemsavailable.	K6
4	Programmingapplicationsonamobilesystem.	K2
5	Dataandknowledgemanagement	K4

K1:Remember; **K2**-Understand; **K3**-Apply; **K**4-Analyze;**K5**-Evaluate; **K6**-Create

Unit:1	Introduction	16hours

Mobile and WirelessDevices– Simplified Reference Model–Need for Mobile Computing – WirelessTransmissions–Multiplexing–SpreadSpectrumandCellularSystems–Medium AccessControl–SDMA–FDMA–TDMA–CDMA-ComparisonofAccessMechanisms

Unit:2	WirelessNetworks	18hours

Wireless LAN: Infrared Vs Radio Transmission – Infrastructure Networks- Ad hoc Networks-IEEE 802.11– HIPERLAN – Bluetooth- Wireless ATM: Working Group- Services-ReferenceModel–Functions–RadioAccessLayer–Handover-LocationManagement-Addressing MobileQualityof Service-Access Point ControlProtocol

Unit:3	MobileNetworkLayer	18hours

MobileIP:Goals–AssumptionsandRequirement–Entities–IPPacketDelivery-AgentAdvertisementandDiscovery–Registration–TunnelingandEncapsulation–Optimization–ReverseTunneling–Ipv6–DHCP-Ad HocNetworks

Unit:4	MobileTransportLayer	18hours

TraditionalTCP-IndirectTCP-SnoopingTCP-MobileTCP-FastRetransmit/FastRecovery-Transmission/TimeoutFreezing–SelectiveRetransmission-TransactionOrientedTCP

Unit:5	WAP	18hours

Architecture–DatagramProtocol-TransportLayerSecurity-TransactionProtocol-Session Protocol-ApplicationEnvironment-WirelessTelephonyApplication

Unit:6	ContemporaryIssues	2hours

Workshopon wirelessnetworks, mobilenetwork

TotalLecturehours	90hours

TextBook(s)	
1	J.Schiller,**MobileCommunication**,AddisonWesley,2000.
2	WilliamStallings, **WirelessCommunicationAndNetworks**,PearsonEducation, 2003.
ReferenceBooks	
1	WilliamC.Y.Lee, **MobileCommunicationDesignFundamentals**,JohnWiley, 1993.
2	Singhal,**WAP-Wireless Application Protocol**,PearsonEducation,2003.
RelatedOnlineContents[MOOC,SWAYAM, NPEL,Websiteetc.]	
1	https://nptel.ac.in/courses/106/106/106106147/MobileComputing
CourseDesigned By: R.Archana,Assistantprofessor,NehruArtsandScienceCollege.&Dr.NOm Muruga,AssistantProfessor,GovernmentArtsCollege,Ooty, C.NOmprakashAnand,AssistantProfessor, GovernmentArtsCollege,Ooty	

MappingwithProgrammeOutcomes										
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P10**
CO1	S	S	M	M	M	M	S	M	M	S
CO2	S	L	M	L	M	M	S	L	L	L
CO3	S	L	S	L	M	L	L	L	L	M
CO4	M	L	M	S	L	S	L	L	M	L
CO5	M	M	S	S	M	L	L	M	S	M

*S-Strong;M-Medium;L-Low

Coursecode	5ED	INDUSTRIALANDPOWERELECTRONICS	L	T	P	C
Core/Elective/Supportive		ELECTIVE1-D	6	0	0	4
Pre-requisite		BasicknowledgeofElectronicCircuitsorpermission of instructor	Syllabus Version		2020-2021	

CourseObjectives:

Themain objectivesof thiscourseareto:

1. Topresentstheprinciples andapplicationsofindustrial andpower electronics.
2. Toenablethestudentstolearnanddesignindustrial &powerelectronic circuits.

ExpectedCourseOutcomes:

Onthesuccessful completionofthecourse,student willbe ableto:

1	DevelopedtheCircuitdesigningskillspowerelectronics.Understoodthe concept industrialelectronicssystemdesign.	K2
2	Acquireknowledgeaboutfundamentalconcepts andtechniquesusedinpowerelectronics.	K2
3	Abilitytoanalyzevarioussinglephaseandthreephasepowerconvertercircuitsand understandtheirapplications.	K3
4	Fosterabilityto identifybasic requirementsforpowerelectronicbaseddesignapplication.	K4
5	Todevelopskillstobuild,andtroubleshootpowerelectronicscircuits.	K5

K1:Remember; **K2**-Understand; **K3**-Apply; **K**4-Analyze;**K5**-Evaluate; **K6**-Create

Unit:1	Introduction	14hours

PrinciplesofSinglePhaseInverter,Converter,CycloConverterAndDCChopper–UPS–HVDC Static Circuit Breaker –Battery Charging Circuit– SCR CurrentLimiting Circuit Breaker– Static ACandDCSwitches–FlasherCircuits-TimeDelayCircuits–FanRegulatorusingTRIACThyristorProtection Circuits:OverCurrentProtection –OverVoltage Protection–GateProtection

Unit:2	WeldingAndHeating	14hours

Resistance Welding – Types of Resistance Welding – Electronic Control in Resistance Welding:Ignitron Contractor – Heat Control – Non Synchronous Timer Synchronous Weld Timer – SequenceTimer–EnergyStorageWeldingSystems–InductionHeating–ApplicationsofInductionHeating– DielectricHeating–ApplicationofDielectricHeating

Unit:3	WavesAnd Measurement	14hours

GenerationofUltrasonicWaves–ApplicationsofUltrasonic–ProductionofXRays–Applications– MeasurementofNon-ElectricalQuantities:PressureMeasurements–DisplacementMeasurements– LevelMeasurements –FlowMeasurements –MeasurementofThickness

Unit:4	ApplicationInIndustrialSystems	14hours

ThermistorControlOfQuenchOilTemperature–ProportionalModePressureControlSystem–Strip TensionController–AutomaticWeighingSystem– ControlOfRelativeHumidityInATextileMoisteningProcess– WarehouseHumidityController

Unit:5	**IndustrialRoboticSystems**	**14hours**
Parts of Robotic Systems – Classifications of Robotic Systems – Robotic System ConfigurationsDegreesofFreedomofRoboticSystem–ProgrammingRoboticSystems– MotionsofRoboticSystems–SensorforRoboticSystems–MechanicalParts– ControlSystems.MicroprocessorBasedIndustrialApplications:SpeedControlofDCMotor– MeasurementofPhysicalQuantities WaterLevel Indicator – FiringAngleControlof Thyristor		
Unit:6	**ContemporaryIssues**	**2hours**
SeminaronRoboticsanditsapplications		
TotalLecturehours		**72hours**

TextBook(s)

1	HarishCRai,"**IndustrialandPowerElectronics**"10thedition,Umeshpublications2002
2	TimothyJ Maloni,"**IndustrialSolidStateElectronicDevicesandCircuits**"2ndedition1986

ReferenceBooks

1	PSBimbhra,"PowerElectronics",KhannaPublishers.
2	M.H.Rashid,"PowerElectronicsCircuits,Devices &Applications,PearsonEducation.

RelatedOnlineContents[MOOC,SWAYAM, NPTEL,Websitesetc.]

1	https://www.youtube.com/watch?v=1Auay7ja2oY
2	https://www.youtube.com/watch?v=oqnLQVFaqYI
3	https://www.youtube.com/watch?v=naxnRkOfh2Q

CourseDesigned By:
M.Baskaran, Assistant Professor , KSG College of Arts and Science&Dr.NOmMuruga,AssistantProfessor,GovernmentArtsCollege, Ooty,
C.NOmprakashAnand,AssistantProfessor, GovernmentArtsCollege,Ooty.

MappingwithProgrammeOutcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10
CO1	S	S	S	M	M	M	S	L	L	S
CO2	S	S	S	M	M	M	S	L	L	L
CO3	S	S	S	M	M	L	L	S	S	M
CO4	M	M	M	S	S	S	L	L	M	M
CO5	M	M	S	S	S	L	M	M	S	S

*S-Strong;M-Medium;L-Low

CourseCode	5EE	ROBOTICSANDAUTOMATION	L	T	P	C
Core/Elective/Supportive	ElectiveII -E		6	0	0	4
Pre-requiste:	BasicElectronics		Syllabus Version	2020-2021		

CourseObjectives:

TheMain Objectivesof thiscourseareto:

1. TolearntheconceptsofRobots.
2. Toknowabout thesensors, actuatorsusedin Robotsdesigning.
3. Tofamiliarizethestudentswith theapplicationsofRobots.

ExpectedCourseOutcomes:

OntheSuccessfulcompletionofthe course,studentwill beableto:

1	Studythefundamentals of robots and components	K1
2	Illustratesensorsandvisionsystems.	K3
3	Applyprogrammingtechniques inAutomation.	K6
4	FamiliarizeprogrammableLogicControllers.	K2
5	AnalyzeComputerNumericalControl	K4

K1:Remember; **K2**-Understand; **K3**-Apply; **K**4-Analyze;**K5**-Evaluate; **K6**-Create

Unit:1	ClassificationOfRoboticSystems	10hours

BasicStructureofaRobot-ClassificationofRobots:Cartesian,Cylindrical,Spherical,Articulated-.Accuracy,ResolutionandRepeatabilityofRobots-RobotApplicationinManufacturing:MaterialTransfers-MachineLoadingandUnloading-ProcessingOperations-AssemblyandInspection.DrivesandControlSystems:HydraulicandPneumaticSystems:Cylinders, Control Valves, Hydro Moto-Robot End Effectors.

Unit:2	SensorsAndVisionSystems	9hours

TypesofSensors:TactileSensors-ProximitySensors-SpeedSensors–Encoder,Resolvers. Vision Systems:ImageProcessingAndAnalysis–Segmentation-FeatureExtraction-Object Recognition**.**

Unit:3	RobotProgramming& Automation	10hours

Lead through Programming - Textual Programming -Programming Examples – Social andEconomicAspectsofRobots-TypicalLayoutsofRobotsinIndustries.**Automation:**AdvantagesofAutomation-BuildingBlocksofAutomation.Automatic Feeding

Lines-Material-HandlingDevices–ASRS-TransferLines-AutomaticInspection-IntelligentAutomation. IntroductiontoArtificialIntelligence

Unit:4	**ProgrammableLogicControllers (PLC)**	**9hours**
Basics of PLC - Architecture of PLC – Advantages - Types of PLC - Types of Programming-SimpleProcessControlProgram'sUsingRelayLadderLogic.IntroductiontoPLCNetworking-Introductionto HMI-DCs andSCADA Systems		
Unit:5	**ComputerNumericalControl (CNC)**	**9hours**
Block Diagram of ACNC Control System–Advantages-Power Supply–CPU-CNC and PLCInterfacing - Control Loops - Feedback Devices in CNC Machine - Analog and Digital CNCSystems-Introduction to FMS		
Unit:6	**Contemporaryissues**	**2hours**
Workshopon Roboticautomation		
	TotalLecturehours	**48Hours**

TextBook(s)

1	MikellP.Groover,**"Automation ProductionSystems And ComputerIntegrated Manufacturing**", Prentice-Hall India, New Delhi, 1987. / PearsonEducation,NewDelhi
2	K.S. Fu, R.C. Gonzalez and C S G Lee, "**Robotics: Control, Sensing, Vision AndIntelligence**",McGrawHill,NewDelhi, 1987

ReferenceBooks

1	W.Bolton, **"Mechatronics"**,PearsonEducationAsia,2002.
2	MikellP.Groover,"**IndustrialRobotics-Technology,ProgrammingAndApplications**",McGrawHill,NewDelhi, 1986

RelatedOnlineContents[MOOC,SWAYAM, NPEL,Websiteetc.]

1	HTTPS://NPTEL.AC.IN/COURSES/112/101/112101098/ROBOTICS

CourseDesigned By:

R.Archana, Assistantprofessor,NehruArtsandScienceCollege&
Dr.NOmMuruga,AssistantProfessor, GovernmentArtsCollege,Ooty,
C.NOmprakashAnand,AssistantProfessor,GovernmentArtsCollege,Ooty.

MappingwithProgrammeOutcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10
CO1	S	S	L	M	L	M	S	L	M	S
CO2	S	L	M	M	L	M	S	L	L	L
CO3	L	S	S	L	M	L	L	L	M	M
CO4	M	L	M	S	S	S	L	L	M	M

CO5	M	M	S	S	M	L	M	M	S	M

*S-Strong;M-Medium;L-Low

Coursecode	5EF	PROGRAMMABLELOGICCONTROL	L	T	P	C
Core/Elective/Supportive		ElectiveII - F	6	0	0	4
Pre-requisite		DigitalElectronicsandcomputerArchitectureandOrganization	Syllabus Version		2020-2021	

CourseObjectives:

Themain objectives ofthis courseareto:

1. ToprovideknowledgelevelsneededforPLCprogrammingandoperatinginputandoutputmodules.
2. Totrainthestudentstocreateladderdiagramsfromprocesscontroldescriptionandunderstandvarious typesofPLC registers
3. ApplyPLCTimersandCountersforthecontrolofindustrialprocesses,PLCfunctionsandDataHandlingFunctions.

ExpectedCourseOutcomes:

Onthesuccessful completionofthecourse,student willbe ableto:

1	GainknowledgeonProgrammableLogicControllersandwillunderstanddifferenttypes ofDevices towhich PLCinput andoutput modules	K1
2	GainknowledgeaboutvarioustypesofPLCregisters,ladderdiagramsfromprocess controldescriptions	K2
3	Developa coilandcontactcontrolsystemandanalogPLCoperations	K4
4	ApplytimedelayonPLC operations	K3
5	AnalyzethePLCcomponents	K4

K1:Remember; **K2**-Understand; **K3**-Apply; **K4**-Analyze;**K5**-Evaluate; **K6**-Create

Unit:1	IntroductionToPLC	9hours

Programmable Logic – Introduction - Programmable Logic Structures - Programmable Logic Arrays(PLAS),ProgrammableArrayLogic(Pals),ProgrammableGateArrays(PGAS),FieldProgrammable Gate Arrays(FPGAS) - Sequential Network Design with Programmable Logic Devices(PLDs)-DesignofSequentialNetworksUsingROMsandFlash-TrafficLightControllerUsingPAL

Unit:2	HardwareAndSoftwareComponents	9hours

ProgrammableLogic Controllers (PLCS)- Introduction Parts Of PLC - Principles of Operation -PLC Sizes - PLC Hardware Components - I/O Section - Analog I/O Section - Analog I/O Modules,DigitalI/O Modules CPU- Processor Memory Module - Programming Devices-DiagnosticsofPLCSwith Computers

Unit:3	InstructionsAndRelays	9hours

PLCProgramming-SimpleInstructions-ProgrammingEXAMINE ON And EXAMINEOFFInstructions-ElectromagneticControl Relays-MotorStarters -ManuallyOperated Switches -Mechanically Operated and Proximity Switches- OutputControl Devices- Latching Relays-PLCLadderDiagram -ConvertingSimpleRelayLadder DiagramintoPLCRelayLadderDiagram

Unit:4	CounterAnd Timer	9hours

TimerInstructionsON DELAY Timer And OFF DELAY Timer- CounterInstructions-Up/DownCounters-TimerandCounterApplications-ProgramControlInstructions-DataManipulating Instructions-MathInstructions

Unit:5	Applications	9hours
Applications of PLC - Simple Materials Handling Applications - Automatic Control of WarehouseDoor - Automatic Lubricating Oil Supplier Conveyor Belt - Motor Control Automatic Car WashingMachine-BottleLabel Detection-Process Control Application		
Unit:6	**ContemporaryIssues**	**2hours**
WorkshoponPLCanditsapplications		
	TotalLecturehours	**48hours**

	TextBook(s)
1	CharlesH.Roth,Jr**"FundamentalsofLogicDesign ",** FourthEdition,JaicoPublishinghouse, 1999,
2	Frank D.Petruzella"**ProgrammableLogicControllers",**McGraw-Hillbook,company,1989
3	**Siemens"PLCHandbook"**.
	ReferenceBooks
1	1.WilliamI. Fletcher**"AnEngineeringApproachtoDigitalDesign"**,Prentice,Hallof India Ltd.,NewDelhi,1999.
	RelatedOnlineContents[MOOC,SWAYAM, NPTEL,Websitesetc.]
1	https://unitronicsplc.com/what-is-plc-programmable-logic-controller/
CourseDesigned By: K.Manikantan, AssistantProfessor,GovernmentArtsCollege,Ooty& Dr.NOmMuruga,AssistantProfessor,GovernmentArts College,Ooty,C.NOmprakashAnand ,Assistant Professor,GovernmentArts College,Ooty		

MappingwithProgrammeOutcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	M	M	S	M	M	S
CO3	S	M	M	M	M	M	S	L	L	L
CO3	S	S	S	M	M	L	L	L	M	M
CO4	M	M	M	S	S	S	L	L	M	M

*S-Strong;M-Medium;L-Low

Coursecode	5EG	AUTOMOTIVEELECTRONICS	L	T	P	C
Core/Elective/Supportive		ElectiveII–G	6	0	0	4
Pre-requisite		ConceptsofAutomotiveElectronics	Syllabus Version		2020-2021	

CourseObjectives:

Themain objectivesof thiscoursearet o:

1. TounderstandtheconceptsofAutomotiveElectronicsanditsevolutionandTrendsautomotivesystems &subsystems overview.
2. To understandsensorsand sensormonitoring mechanismsalignedtoautomotive Systems,differentsignalconditioningtechniques,interfacingtechniques and actuator
3. Tounderstand,designandmodelvariousautomotivecontrolsystemsusingModelbaseddevelopmenttechnique.

ExpectedCourseOutcomes:

Onthesuccessful completion ofthecourse,student willbe ableto:

1	Obtain an overview of automotive componentsandsubsystems.	K2
2	Interfaceautomotivesensorsandactuatorswithmicrocontrollers	K3
3	Understandthedesigncycles,communicationprotocols andsafetysystems employedintoday'sautomotiveindustry.	K2
4	Understandtheenginemanagementsystems	K4
5	Applythe knowledgeof electronicinstrumentsystems	K3

K1:Remember; **K2**-Understand; **K3**-Apply; **K**4-Analyze;**K5**-Evaluate; **K6**-Create

Unit:1	Introduction	9hours

Automotive Component, Operation, Electrical Wiring Terminals and Switching, Multiplexed WiringSystems,CircuitDiagramsandSymbols.ChargingSystemsandStartingSystems:ChargingSystems Principles, Alternations and Charging Circuits, New Developments, Requirements of theStartingSystem,Basic StartingCircuit

Unit:2	IgnitionSystems	10hours

Ignition Fundamental, Electronic Ignition Systems. Programmed Ignition, Distribution Less Ignition,DirectIgnition,SparkPlugs.ElectronicFuelControl:BasicsofCombustion,EngineFuellingand ExhaustEmissions,ElectronicControlofCarburetionPetrolFuel Injection, DieselFuel Injection

Unit:3	InstrumentationSystems	10hours

Introduction to Instrumentation Systems, Various Sensors Used for Different Parameters, SensingDriverInstrumentationSystems,VehicleConditionMonitoringTripComputer,DifferentTypes of
VisualDisplay

Unit:4	ElectronicControlOfBrakingAndTraction	9hours

IntroductionandDescriptionControlElementsandControlMethodology,ElectronicControlofAutomaticTransmission:IntroductionandDescriptionControlofGearShiftandTorqueConverter Lockup, ElectricPowerSteering,ElectronicClutch

Unit:5	EngineManagementSystems	10hours

Combined Ignition and Fuel Management Systems, Exhaust Emission Control, Digital ControlTechniques, Complete Vehicle Control Systems, Artificial Intelligence and Engine Management,Automotive Microprocessor Uses. Lighting and Security Systems: Vehicles Lighting Circuits,Signaling Circuit, Central Locking and Electric Windows Security Systems, Airbags and Seat BeltTensioners,Miscellaneous Safetyand Comfort Systems		
Unit:6	**ContemporaryIssues**	**2hours**
Aninteractivesessiononignitionsystem,engine managementsystems		
	TotalLecturehours	**48hours**

TextBook(s)	
1	TOMDENTON,**AutomobileElectricalandElectronicSystems**,EdwardArnoldpb.,1995
ReferenceBooks	
1	1.DONKNOWLES**,AutomotiveElectronicandComputercontrolledIgnitionSystems, DonKnowles,**PrenticeHall,Englewood Cliffs,NewJersey1988.
2	WILLIAM,T.M., **AutomotiveMechanics**,McGrawHillBookCo.,
3	WILLIAM,T.M., **AutomotiveElectronicSystems**,Heiemann Ltd., London,1978.
4	RonaldKJurgen,**AutomotiveElectronicsHandbook**,McGrawHill,Inc, 1999.
RelatedOnlineContents[MOOC,SWAYAM,NPTEL,Websitesetc.]	
1	https://nptel.ac.in/courses/107/103/107103084/
2	https://nptel.ac.in/courses/107/106/107106088/
3	https://www.youtube.com/watch?v=vJ4EfyGXehg
4	https://www.youtube.com/watch?v=BG4N2dBgJrQ
Course Designed By: K.Mnikantan , Assistant Professor, Government Arts College ,Ooty&Dr.NOmMuruga, AssistantProfessor,Government Artscollege,Ooty.	

MappingwithProgrammeOutcomes										
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	S	S	L	L	L	M	S	M	M	S
CO3	S	L	M	L	M	M	S	L	L	L
CO3	L	S	L	M	M	L	L	L	M	M
CO4	M	L	M	S	S	S	L	L	M	M
CO5	M	M	S	S	M	L	M	M	S	M

*S-Strong;M-Medium;L-Low

CourseCode	5EH	SATELLITECOMMUNICATIONS	L	T	P	C
Core/Elective/Supportive:		ElectiveII-H	6	0	0	4
Pre-requisite:		PRINCIPLESOFCOMMUNICATION	Syllabus version		2020-21	

CourseObjectives:

Theobjectivesofthiscourseare:

1. Toprovideknowledgeonfundamentalsof AdvancedComputerdesign.
2. Tounderstandtheconceptofinstructionlevelparallelism,pipeliningandmemoryhierarchyassociatedwith it.
3. Toenhancetheknowledgeonadvancedprocessors.

ExpectedCourseOutcomes:

Onsuccessfulcompletionofthe course,studentwillbeable to:

1	Gaintheknowledgeon advanced computerdesign principles.	K1
2	Abletoanalyzetheparallelcomputermodelwithinstructionlevelparallelism.	K4
3	Gaintheknowledgeonpipelining.	K2
4	Understandthe memoryhierarchyin developinganadvanced computer.	K2
5	Applythe multiprocessor concepts inadvanced processors.	K3

K1:Remember;**K2**-Understand;**K3**-Apply;**K**4-Analyze; **K5**-Evaluate;**K6**-Create

Unit:1	SatelliteSystems -Overview	9Hours

Introduction-BasicconceptsofSatellitecommunications-Frequencyallocationsforsatellite systems.Advantagesandapplicationsofsatellitecommunicationsoverothercommunications

Unit:2	OrbitalAspectsOfSatelliteSystems	9Hours

OrbitalMechanics-lookangledetermination-orbitperturbations-Orbitaldetermination-launches andlaunchvehicles-orbitaleffectsincommunicationsystemsperformance.

Unit:3	TheSpaceSegment	10Hours

Introduction-spacecraftsubsystems-attitudeandorbitcontrolsystems-Telemetry-trackingand command-powersystems-communicationsubsystems.

Unit:4	SatelliteLinkDesign	9Hours

Basictransmissiontheory-systemnoisetemperatureandG/Tratio-Designofdownlinks-uplink design-designofsatellite linkforspecifiedC/N.

Unit:5	ApplicationsOfSatelliteSystems	9Hours

INTELSATSeries-INSAT-VSAT-GSM-GPS-INMARSAT-DirectBroadcastsatellites(DBS)-DirecttohomeBroadcast(DTH)-Digitalaudiobroadcast(DAB)-Worldspaceservices-Business TV(BTV)-GRAMSAT.

Unit:6	ContemporaryIssues	2Hours

Seminaronsatellitecommunication,satellitesystems

TotalLectureHours	48Hours

TextBooks

1	TimothyPratt,CharlesBostian,JeremyAllnutt,**SatelliteCommunications**,2nd edition,John

	willey,2006.
2	W.L.Pritchard,H.G.SuyderhoudandR.A.Nelson,**SatelliteCommunicationsystems Engineering**,2nd edition,Pearson educational pblishers, NewDelhi, 2003.
ReferenceBooks	
1	DennisRoddy,**SatelliteCommunications**,3rd edition,McGrawHill, International,2001.
2	DrD.C.Agrwal,**SatelliteCommunications**,4thedition,KhannaPublications,NewDelhi, 2001.
RelatedOnlineContents[MOOC,SWAYAM, NPTEL,Websitesetc.]	
1	https://nptel.ac.in/courses/117/105/117105131/
2	https://www.youtube.com/watch?v=hXa3bTcIGPU
3	https://www.youtube.com/watch?v=BvjlBpP4zU8
CourseDesignedby: Dr.S.Vijayakumar,AssociateProfessorinECE,SreenivasaInstituteofTechnologyandManagementStudies, Autonomous, Chittoor.& Dr.NOmMuruga,AssistantProfessor,GovernmentArtsCollege,Ooty, C.NOmprakashAnand,AssistantProfessor,GovernmentArtsCollege,Ooty.	

MappingwithProgramOutcomes										
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	S	L	L	L	L	L	L	L	L	L
CO2	S	M	L	M	M	L	L	L	L	M
CO3	S	M	M	L	L	L	L	L	L	L
CO4	S	S	M	M	M	M	L	L	L	M
CO5	S	L	L	L	L	L	L	L	L	M

*S-Strong;M-Medium;L-Low

CourseCode :	6EI	INTERNETOFTHINGS	L	T	P	C
Core/Elective/Supportive:		ElectiveIII-I	4	0	0	4
Pre-Requisite:		BasicElectronics	Syllabus Version		2020-21	

CourseObjectives:

TheMain Objectives of thiscourseareto:

1. Toenablethestudentstolearnabout IoTandalsotounderstandtheconceptofembeddeddevicesandInterfacingsensors.

ExpectedCourseOutcomes:

OntheSuccessfulcompletionofthe course,studentwill beableto:

1	Studytheconcept of basicIoT	K1
2	Familiarizetheprincipleofconnecteddevices	K2
3	Gainknowledge aboutembeddeddevices	K3
4	Analyzedifferentsensor Interfacetechnology	K4
5	AnalyzetheIoTapplications	K4

K1:Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**-Create

Unit:1	IOTFundamentals	16hours

IntroductiontoIoT:EvolutionofIoT–Definition&CharacteristicsofIoT-ArchitectureofIoT–TechnologiesforIoT–DevelopingIoTApplications–ApplicationsofIoT–IndustrialIoT–Security inIoT

Unit:2	DesignPrinciplesForConnectedDevices	18hours

Introduction-IoT/M2msystems-CommunicationTechnologies-Datamanagement,dataconsolidation andDevicemanagement-Easeof DesigningandAffordability.

Unit:3	Programming FundamentalsWithCUsingArduinoIDE	18hours

Arduino IDE – Basic Syntax – Data Types/ Variables/ Constant – Operators – Conditional StatementsandLoops –UsingArduino CLibraryFunctions forSerial, delayand otherinvokingFunctions– StringsandMathematics LibraryFunctions.

Unit:4	SensorsAndActuators	18hours

AnalogandDigitalSensors –Interfacingtemperaturesensor,ultrasoundsensorand infrared (IR)sensorwithArduino – InterfacingLEDandBuzzerwithArduino.

Unit:5	SendingSensorDataOverInternet	18hours

Introduction to ESP8266 NODEMCU WiFi Module – Programming NODEMCU using Arduino IDE – UsingWiFiand NODEMCUto transmitdatafrom temperaturesensor toOpen SourceIoTcloud platform.

Unit:6	ContemporaryIssues	2hours

Workshopon IoTanditsapplications

	TotalLecturehours	**90hours**
TextBook(s)		
1	ArshdeepBahga,VijayMadisetti,"**InternetofThings:AHands-OnApproach**", 2014. ISBN:978-0996025515	
2	BorisAdryan,DominikObermaier,PaulFremantle,"**TheTechnicalFoundationsOf Iot**",Artech HouserPublishers,2017.	
ReferenceBooks		
1	MichaelMargolis,"**ArduinoCookbook**",O"Reilly,2011	
2	MarcoSchwartz,"**Internetof ThingswithESP8266**",PacktPublishing, 2016	
RelatedOnlineContents[MOOC,SWAYAM, NPEL,Websiteetc.]		
1	https://nptel.ac.in/courses/106/105/106105166/IntroductiontoIoTPartI– Lecture1	
2	-https://ocw.cs.pub.ro/courses/iot/courses/02ElectronicsforInternetofThings–LectureII	
3	https://nptel.ac.in/courses/106105166/ IntroductiontoArduino–I–Lecture22	
CourseDesigned By: R.Archana, Assistantprofessor,NehruArtsandScienceCollege,Coimbatore.&Dr.NOm Muruga, AssistantProfessor, GovernmentArts College,Ooty.		
MappingwithProgrammeOutcomes		

COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P10**
CO1	S	S	M	M	M	M	S	M	M	S
CO2	S	M	M	M	M	M	S	L	L	L
CO3	S	S	S	M	M	L	L	L	M	M
CO4	M	M	M	S	S	S	L	L	M	M
CO5	M	M	S	S	M	L	M	M	S	M

*S-Strong;M-Medium;L-Low

Coursecode	6EJ	VIRTUAL INSTRUMENTATION	L	T	P	C
Core/Elective/Supportive		ElectiveIII –J	4	0	0	4
Pre-requisite		DigitalElectronics,MicroprocessorandComputerfundamentals	Syllabus Version		2020-2021	

CourseObjectives:

Themain objectivesof thiscourseareto:

2. Toprovidebasic conceptsin virtualinstruments
3. Toknowabout theprogrammingmethodsinsoftwareusedin virtualinstrumentation
4. Tofamiliarizethestudentswiththeapplicationsofvirtual instrumentation

ExpectedCourseOutcomes:

Onthesuccessfulcompletion ofthe course, studentwill beable to:

1	Understandthebasicsconceptsandprograminginvirtualinstrumentation	K2
2	Applyvirtual instrumentationtool set foragivenproblem	K3
3	Applyvirtualinstrumentationconceptfor agiven applications	K3
4	UnderstandtheLabVIEWconcepts	K2
5	Learntheprogrammingstructure	K1

K1-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**–Create

Unit:1	Introduction	9hours

General Functional Description of a digital instrument - Block Diagram ofaVirtual Instrument - Physical quantities and Analog Interfaces - Hardware and Software- User Interfaces - Advantages ofVirtual Instruments Over Conventional Instruments - Architecture of a Virtual Instrument and itsRelationto the Operating System

Unit:2	SoftwareOverview	9hours

Lab VIEW-GraphicalUserinterfaces-ControlsandIndicators-'G'programming– Labels and Text - Shape, Size and Color - Owned and Free Labels - Data Type, Format, Precision andRepresentation-DataTypes- Data flowprogramming- Editing-DebuggingandRunningaVirtualInstrument-GraphicalProgrammingPalettesandtools-FrontPanelObjects-FunctionsandLibraries

Unit:3	ProgrammingStructure	10hours

FOR Loops,WHILELoops,CASEStructure,FormulaNodes,Sequence Structures-Arrays and Clusters - Array Operations - Bundle - Bundle/Unbundle by Name, Graphs and Charts - Stringand File I/O - High level and Low Level File I/O's - Attribute Modes Local and Global Variables.**OPERATINGSYSTEMANDHARDWAREOVERVIEW**:PCArchitecture,CurrentTrends, OperatingSystemRequirements,Drivers–InterfaceBuses–PCIBus–InterfaceCards–Specification–AnalogandDigitalInterfaces– Power,SpeedandtimingConsiderations

Unit:4	HardwareAspects	9hours

Installing hardware, Installing Drivers - Configuring the Hardware - Addressing the hardwarein LabVIEW-DigitalandAnalog I/Ofunction - DataAcquisition-Buffered I/O-Realtime

Unit:5	LABVIEWApplications	9hours

Datalogging(DAQ)–OPC-Hardwareinloop-Databasesystem-userinterfaceforthecontrol applications

Unit:6	ContemporaryIssues	2hours

Analysisover thesoftwareandhardwareonvirtural instrumentation

	TotalLecturehours	**48hours**
TextBook(s)		
1	GarryMJohnson,"**Labview GraphicalProgramming**",TataMcGrawHill,NewDelhi,2nd Edition, 1996	
2	**Labview:BasicsI&IIManual,NationalInstruments,2005**	
ReferenceBooks		
1	LisaKWells,"**LabviewforEveryone**",PrenticeHallof India,NewDelhi,1996	
2	BarryParon, "**Sensor,TransducersandLabview**",PrenticeHall,New Delhi,2000	
CourseDesignedBy:K.Manikantan,AssistantProfessor,GovernmentArtsCollege,Ooty& Dr.NOmMuruga, AssistantProfessor,GovernmentArts College,Ooty.		

MappingwithProgrammeOutcomes										
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	L	L	M	M	M	L	L	M	S	M
CO3	L	M	M	L	L	M	L	S	L	S
CO3	L	L	S	L	M	L	L	M	M	L

*S-Strong;M-Medium;L-Low

Coursecode	6EK	BIOMEDICALINSTRUMENTATION	L	T	P	C
Core/Elective/Supportive		ElectiveIII–K	4	0	0	4
Pre-requisite		Highersecondarybiology	Syllabus Version		2020-2021	

CourseObjectives:

Themain objectivesof thiscourseareto:

1. Topresents variousbio-potentialsand workingprinciplesof medicalinstruments
2. Toenable thestudents tolearn aboutbio-potentials andmedical instruments

ExpectedCourseOutcomes:

Onthesuccessful completionofthecourse,student willbe ableto:

1	Understandt he Conceptof bio-potential	K2
2	Understandtheconceptofmedicalinstruments	K4
3	DevelopthetroubleshootingSkills ofmedical instruments	K3
4	Understandtheconcepts ofsignal conditioners&diagnosticequipments	K2
5	Applytheknowledgegainedontransducersandelectrodes	K3

K1-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**–Create

Unit:1	BasicPhysiology	9hours

CellsandtheirStructures-TransportofIonsthroughCellMembrane -Restingand Excited StateTransmembranePotential-ActionPotential-PropagationofBioelectricPotential-NervousSystem-PhysiologyofMuscles-Heart andBlood Circulation

Unit:2	ElectrodesAndTransducers	9hours

Basic Electrode Theory - Micro Electrodes - Skin Surface Electrodes - Needle Electrodes - EquivalentCircuit - Electrode Materials- Chemical Electrodes- Reference Electrodes - The pH Electrode -BloodGasElectrode- ActiveTransducersandPassiveTransducers-StrainGauges–Thermistor

Unit:3	SignalConditioners&DiagnosticEquipments	9hours

InstrumentationAmplifiers -CurrentAmplifiers- IsolationAmplifier-NeedforFilters-Low Pass, High Pass and Band Pass Active Filters - Notch Filters - Heated Stylus and Ink Pen Recorders.DIAGNOSTIC EQUIPMENTS: Typical Electrocardiogram (ECG) - Electrocardiograph - Bipolar andUnipolar Leads - Einthoven Triangle - Electrical Activities of the Brain - Electroencephalogram(EEG)-Muscle Response -Electromyograph(EMG)

Unit:4	DiagnosticEquipments&Biotelemetry	10hours

X-ray Imaging - Radio Fluoroscopy - Image Intensifiers - Angiography - Endoscopy–Diathermy.BIOTELEMETRYANDPATIENTSAFETY:NeedforBiotelemetry-ElementsofTelemetrySystem-RadioTelemetrySystem-PhysiologicalSignalsusedinTelemetry-TDMandFDM–
ImplantableUnits

Unit:5	PhysiologicalAssistDevices	9hours

NeedforPacemakers-PacemakerParameters andCircuits -DifferentModesofOperation-DC Defibrillator - Artificial Heart Valves - Heart Lung Machines - Artificial Lung Machines - Artificial Kidney Machine - Nerve and Muscle Stimulator. COMPUTER APPLICATIONS: DataAcquisitionSystems- AnalysisofECGsignals-ComputerizedAxialTomography(CAT)Scanner -UltrasonicScanner-MagneticResonanceImaging-ComputerBasedPatientMonitoringSystem

Unit:6	**ContemporaryIssues**	**2hours**
Seminarondiagnosticequipmentsandphysiologicalassistdevices		
	TotalLecturehours	**48hours**

TextBook(s)	
1	JosephJ.CarrandJohnM.Brown,**"IntroductiontoBiomedicalEquipmentTechnology",** PearsonEducationAsia,NewDelhi,4thEducation,2001
2	Leslie Cromwell.,FredJ. Webell., Erich A. Pfeffer.,**"Bio-medicalInstrumentation andMeasurements"**,PrenticeHallofIndia,NewDelhi,1990
ReferenceBooks	
1	Khandpur,**"HandbookonBiomedicalInstrumentation",**TataMcGrawHillCompany,New Delhi,1989
2	Ohn G Webster, Ed., **"Medical Instrumentation Application and Design",** Third Edition,JohnWiley&Sons, Singapore, 1999
3	Arumugam.M,**"BiomedicalInstrumentation",**AnuradhaAgenciesPublishers,Chennai, 1992
RelatedOnlineContents[MOOC,SWAYAM, NPTEL,Websitesetc.]	
1	https://www.youtube.com/watch?v=i2mZylgP1Fk
2	https://www.youtube.com/watch?v=4ldv98F7Zng
3	https://nptel.ac.in/courses/108/105/108105101/
4	https://nptel.ac.in/courses/108/105/108105091/
CourseDesignedBy:K.Manikantan,AssistantProfessor,GovernmentArtsCollege,Ooty& Dr.NOmMuruga, AssistantProfessor,GovernmentArts College,Ooty.	

MappingwithProgrammeOutcomes										
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	L	L	M	M	M	L	L	M	S	M
CO2	L	M	M	L	L	M	L	S	L	S
CO3	M	L	S	L	M	L	L	M	M	L
CO4	L	L	S	M	S	S	L	S	M	L

*S-Strong;M-Medium;L-Low

CourseCode	6EL	VLSIDESIGN	L	T	P	C
Core/Elective/Supportive:		Elective–III-L	4	0	0	4
Pre-requisite:		DigitalPrinciplesandApplications	Syllabus version		2020-21	

CourseObjectives:

Theobjectivesofthiscourseare:

1. To provide knowledgeonFabricationProcessofNMOS,PMOS,CMOSAND BICMOS,Superintegrationconcepts.
2. Todeveloptheskilltoanalyzetheelectricalpropertiesof MOStransistor,designstickdiagramsand layout diagrams forMOStransistors, contacts and wires.
3. Toinvestigatetheeffectoffloorplanning,placement,routingandpowerdelayestimationinphysicalde sign of digitalcircuits andmemorydesign.
4. Toapplythe conceptofCombinationalandSequentialCircuitTesting.

ExpectedCourseOutcomes:

Onsuccessfulcompletionofthecourse,studentwillbeableto:

1	Gaintheknowledgeon fabricationprinciples.	K1
2	AbletoanalyzetheelectricalpropertiesofMOStransistors.	K4
3	Applythe appropriate layoutdesign ruletocreateaVLSIlayoutfor adesign.	K6
4	Understandthephysicaldesignstepsandgainthe knowledgeontypesof VLSIdesign styles.	K2
5	Gaintheknowledge,analyzeandapplytestprinciplesto evaluatetheVLSIdesigns.	K5

K1–Remember; K2 –Understand;K3–Apply;K4–Analyze; K5 –Evaluate;K6–Create

Unit:1	VLSITechnology	9hours

Fabricationsequence–processflow–Testing–Superintegrationconcepts–IntegratedPassivecomponents–MOSResistorsandcapacitors–Crossovers–NMOS–PMOS–CMOS–BICMOS fabricationprocesses– comparison.

Unit:2	ElectricalPropertiesOfMOSDevices	9hours

Draintosourcecurrent(I_{ds})versusDraintosourcevoltage(V_{ds})relationships–MOStransistorthresholdvoltage(V_t)–MOStransistortrans-conductance$g_m$andoutputconductanceg_{ds}–figureof merit(ω_0)–pass transistor-pull–up topull –down ratio.

Unit:3	DesignProcesses	10hours

VLSIdesignflow-stickdiagramdesignruleswithexamples-DesignrulesforLayoutdiagramsofdigitalcircuits–sheetresistanceR_s–standardunitofcapacitance–Inverterdelays–Propagation delays-scalingofMOScircuits–limitationsofscaling.

Unit:4	VLSIPhysicalDesignAnd Styles	9hours

PHYSICALDESIGN:

FloorPlanning– Placement – Routing–Power DelayEstimation – Clock Routing– Power Routing.

VLSIDESIGNSTYLES:

FullCustom–Semicustom–StandardCells–GateArrays–FPGAs –CPLDs.

Unit:5	TestingOfVLSICircuits	9Hours

TestPrinciples-BIST-TestBench-CombinationalCircuitTesting,SequentialCircuitTesting,Test

BenchTechniques.		
Unit:6	**ContemporaryIssues**	**2Hours**
SeminaronVLSIsystem andtechnology		
	TotalLectureHours	**48Hours**

TextBooks	
1	**BasicVLSIDesign**,Douglas,3rdEdition,A.Pucknell,KamranEshraghian,PHI,NewDelhi, 2011.
2	**ModernVLSIdesign**,WayneWolf,3rdEdition,PearsonEducation,New Delhi,4th impression2008.
ReferenceBooks	
1	**IntroductiontoVLSICircuitsandSystems**,John.P.Uyemura,JohnWiley,StudentEdition, NewDelhi,Reprint2006.
2	**PrinciplesofCMOSVLSIDesign**,N.H.EWeste,K.Eshraghian,AdissonWesley,2nd Edition,NewDelhi.
3	ApplicationSpecificIntegratedCircuits,MichelJohnSebastianSmith,AddisonWesley, Indian Edition,4thIndianReprint2001,NewDelhi.
RelatedOnlineContents[MOOC,SWAYAM, NPTEL,Websitesetc.]	
1	https://nptel.ac.in/courses/117/101/117101058/
2	https://www.youtube.com/watch?v=9SnR3M3CIm4
3	https://www.youtube.com/watch?v=Y8FvvzcocT4
CourseDesignedby:Dr.S.Vijayakumar,AssociateProfessorinECE,SreenivasaInstituteofTechnologyand Management Studies, Autonomous,Chittoor.& Dr.NOmMuruga,AssistantProfessor,GovernmentArtsCollege,Ooty.	

MappingwithProgramOutcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	L	L	L	L	L	L	L	L	L
CO2	S	S	L	S	M	L	M	L	L	L
CO3	S	M	S	L	S	L	M	M	L	S
CO4	S	L	M	L	S	L	L	L	M	L
CO5	S	S	M	M	S	L	L	L	M	S

*S-Strong;M-Medium;L-Low

Annexure

BHARATHIAR UNIVERSITY: COIMBATORE 641046DEPARTMENT OF ELECTRONICS ANDCOMMUNICATIONSYSTEMS

MISSION

- Todevelopappropriatefacilitiesforpromotingresearchactivities
- Toinculcateleadershipqualitiesamongstudentsforselfandsocietalgrowth
- Tonurturestudentsonemergingtechnologiesforservingindustryneedsthrough industryinstituteinterface
- Toenrichteachinglearningprocessbytransformingyoungmindstoberesourceful engineers

ListofElectivepapers(Collegescanchooseanyoneofthepaperaselectives)		
Elective–I	A	ASICDesign
	B	RemoteSensing
	C	MobileComputing
	D	IndustrialandPowerElectronics
Elective –II	E	RoboticsandAutomation
	F	ProgrammableLogicControl
	G	AutomotiveElectronics
	H	SatelliteCommunications
Elective–III	I	InternetofThings
	J	VirtualInstrumentation
	K	BiomedicalInstrumentation
	L	VLSIDesign