M.D. UNIVERSITY, ROHTAK
SCHEME OF STUDIES AND EXAMINATION
B.TECH- Computer Science and Engineering (Internet of Things and Cyber Security Including Block Chain Technology)
3rd Year

SEMESTER 5th and 6th Semester
Scheme effective from 2022-23

COURSE CODE AND DEFINITIONS

COURSE CODE	DEFINITION
L	LECTURE
T	TUTORIAL
P	PRACTICAL
BSC	BASIC SCIENCE COURSE
PCC	PROFESSIONAL CORE COURSES
PEC	PROFESSIONAL ELECTIVE COURSE
ESC	ENGINEERING SCIENCE COURSE
LC	LAB COURSE
MC	MANDATORY COURSE
PT	PRACTICAL TRAINING
S	SEMINAR

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5th SEMESTER

Scheme of Studies/Examination w.e.f. 2022-23

Sr No	Category	Course Code	Course Title	Hours per Week			TotalContact Hrs. per week	Credit	Examination Schedule				Duration of Exams (Hours)
				L	T	P			Internal Assessment	Theory	Practical	Total	
1	Engineering Science Course	ECS-CSE-301G (Common With CSE)	Microprocessor	3	0	0	3	3	25	75		100	3
2	Professional Core Course	PCC-CSE-303G (Common With CSE)	Computer Networks	3	0	0	3	3	25	75		100	3
3	Professional Core Course	PCC-CSE-305G (Common With CSE)	Formal Languages & Automata	3	0	0	3	3	25	75		100	3
4	Professional Core Course	PCC-CSE-307G (Common With CSE)	Design and Analysis of Algorithms	3	0	0	3	3	25	75		100	3
5	Professional Core Course	PCC-CSE-309G (Common With CSE)	Programming in Java	3	0	0	3	3	25	75		100	3
6	Professional Core Course	PCC-IOT-301G	Internet of Things	3	0	0	3	3	25	75		100	3
7	Engineering Science Course	LC-CSE-321G (Common With CSE)	Microprocessor Lab	0	0	2	2	1	25	-	25	50	3
8	Professional Core Course	LC-IOT-323G	Internet of Things Lab	0	0	3	3	1.5	25	-	25	50	3
9	Professional Core Course	LC-CSE-325G (Common With CSE)	Design and Analysis of Algorithm Lab using C++	0	0	3	3	1.5	25	-	25	50	3
10	Professional Core Course	LC-CSE-327G (Common With CSE)	Programming in Java Lab	0	0	4	4	2	25	-	25	50	3
11	Training	PT-IOT-329G	Practical Training – I	-	-	-	-	-	-	-	Refer Note 1		
		TOTAL CREDIT						24	250	450	100	800	

Note: 1

The evaluation of Practical Training-I will be based on seminar, viva-voce, reportsubmitted by the students. According to performance, the students are awarded gradesA, B, C, F. A student who is awarded 'F' grade is required to repeat Practical Training.

Excellent: A; Good: B; Satisfactory: C; Not Satisfactory: F.

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6TH SEMESTER

Scheme of Studies/Examination w.e.f. 2022-23

Sr No	Category	Course Code	Course Title	Hours per Week			Total Contact Hrs. per week	Credit	Examination Schedule				Duration of Exams (Hours)
				L	T	P			Internal Assessment	Theory	Practical	Total	
1	Professional Core Course	PCC-CSE-302G (Common with CSE)	Compiler Design	3	0	0	3	3	25	75		100	3
2	Professional Core Course	PCC-CSE-304G (Common with CSE)	Artificial Intelligence	3	0	0	3	3	25	75		100	3
3	Professional Core Course	PCC-CSE-306G (Common with CSE)	Advanced Java	3	0	0	3	3	25	75		100	3
4	Professional Core Course	PCC-IOT-308G	Sensors and Actuators for IoT	3	0	0	3	3	25	75		100	3
5	Professional Core Course	PCC-IOT-310G	Cyber Security and Blockchain	3	0	0	3	3	25	75		100	3
6	Engineering Science Course	ESC-IOT- 312G	Signals and Systems	3	0	0	3	3	25	75		100	3
7	Professional Core Course	LC-CSE-324G	Compiler Design Lab	0	0	3	3	1.5	25		25	50	3
8	Professional Core Course	LC-CSE-328G	Advanced Java Lab	0	0	3	3	1.5	25		25	50	3
9	Professional Core Course	LC-IOT-326G	Sensors and Actuators Lab	0	0	2	2	1	25		25	50	3
10	Project	PROJ-CSE-322G	PROJECT-1	0	0	4	4	2	25		25	50	3
11	Mandatory Course	MC-317G (Common with all)	Constitution of India	2	0	0	2						
		TOTAL CREDIT						24	250	450	100	800	

The evaluation of Constitution of India (MC-317G) will be based on grades A, B, C, F. The student who is awarded 'F' grade is required to repeat the subject.

NOTE: At the end of 6th semester each student has to undergo Practical Training of 4/6 weeks in an Industry/ Institute/ Professional Organization/ Research Laboratory/ training centre etc. and submit typed report along with a certificate from the organization & its evaluation shall be carried out in the 7th Semester.

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5th SEMESTER

MICROPROCESSOR

Coursecode	ESC-CSE-301G				
Category	EngineeringScience Course				
Course title	Microprocessor				
Schemeand Credits	L	T	P	Credits	Semester5
	3	0		3	
Class work	25 Marks				
Exam	75 Marks				
Total	100Marks				
Durationof Exam	03Hours				

CourseObjecti ves:

- Tomakeunderstandarchitectureandworkingof Intel8085 microprocessorin depth.
- Tomakeunderstandarchitectureandworkingof Intel8086 microprocessorin depth.
- Familiarizationwith theassembly languageprogramming.
- Familiarizationwithvarious peripheraloperations

Note:Examinerwillset nine questionsin total. Questiononewillbecompulsory.Question onewillhave6 partsof2.5markseach fromall units andremainingeightquestions of15 markseachto besetby takingtwo questionsfromeachunit. Thestudentshavetoattempt fivequestionsin total,first beingcompulsory andselectingonefromeachunit.

Unit: 1

THE8085PROCESSOR:Introduction tomicroprocessor,8085 microprocessor:Architecture, instruction set,interrupt structureandAssemblylanguageprogramming.

Unit: 2

THE8086MICROPROCESSORARCHITECTURE: Architecture,blockdiagramof8086,details ofsub-blockssuchas EU,BIU;memorysegmentationandphysicaladdresscomputations, programrelocation,addressingmodes,instructionformats, pindiagramanddescriptionof various signals.

Unit: 3

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INSTRUCTIONSETOF8086: Instructionexecutiontiming,assemblerinstructionformat,data transferinstructions, arithmeticinstructions, branchinstructions,looping instructions, NOP andHLTinstructions, flagmanipulationinstructions, logical instructions,shiftandrotate instructions,directivesandoperators,programmingexamples.

Unit: 4

INTERFACINGDEVICE:8255Programmable peripheral interface,interfacingkeyboard and sevensegment display, 8254(8253)programmableinterval timer, 8259Aprogrammable interruptcontroller,DirectMemory Accessand8237DMA controller.

TEXT BOOKS:

1. Microprocessor Architecture, Programming &Applications with 8085: Ramesh S Gaonkar;WileyEasternLtd.
2. IntelMicroprocessors8086- Pentiumprocessor: Brey;PHI

REFERENCEBOOKS:

1. Microprocessorsandinterfacing: D VHall;TMH
2. The 8088 &8086 Microprocessors-Programming, interfacing, Hardware & Applications:Triebel& Singh;PHI
3. Microcomputersystems: the8086/8088Family:architecture,Programming&Design: Yu-ChangLiu& GlennAGibson;PHI.
4. Advanced Microprocessors andInterfacing: BadriRam;TMH

CourseOutcomes:

- Understandtheoperationandarchitectureof Intel8085microprocessorincluding InstructionSetArchitecture,assemblylanguage programming,timingandspeedof operation.
- Learntheoperationofcircuitsforuserinteractionthroughswitches,keyboardand displaydevices.
- Understandtheoperationandarchitectureof Intel8086microprocessorincluding InstructionSetArchitecture,assemblylanguage programming,timingandspeedof operation.
- Understandthemotivationandneedforperipheraloperationscircuitsfordigital dataexchange, timer, serialcommunication, meritsofdirectmemoryaccess,interruptcontrollerandothercircuits.

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COMPUTER NETWORKS

Coursecode	PCC-CSE-303G				
Category	ProfessionalCoreCourse				
Course title	ComputerNetworks				
Schemeand Credits	L	T	P	Credits	Semester5
	3	0	0	3	
Class work	25 Marks				
Exam	75 Marks				
Total	100Marks				
Durationof Exam	03Hours				

CourseObjectives

- Todevelopan understandingof modern network architecturesfromadesignand Performanceperspective.
- Tointroducethestudenttothemajorconceptsinvolvedinwide-area Networks(WANs),localareanetworks (LANs) andWirelessLANs (WLANs).
- Toprovidean opportunity todoNetwork programming
- ToprovideaWLANmeasurement idea.

Note:Examinerwillset nine questionsin total. Questiononewillbecompulsory.Question onewill have6 partsof2.5markseach fromall units andremainingeightquestions of15 markseachto besetby takingtwo questionsfromeachunit. Thestudentshavetoattempt fivequestionsin total,first beingcompulsory andselectingonefromeachunit.

Unit: 1

Introduction: Data communication, Components, Computernetworksanditshistorical development, distributedprocessing,Internet

NetworkModels:OSI modelandTCP/IPModel

PhysicalLayer– physical layer functions,DataRepresentation, Simplex,Half DuplexandFull DuplexTransmission, Modulationand Multiplexing, Packetand circuitswitching, Transmissionmedia,Topologies,connectionlessandconnection-oriented services.

DataLinkLayer: Datalinklayerfunctionsandservices,MACAddressing,Framing,Stopand Wait,Goback –NARQ,SelectiveRepeat ARQ,SlidingWindow Protocol.

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Unit: 2

MediumAccessControl: MAC layer functions,Randomaccess,ControlledAccessand channelization protocols.

Network Layer: Networklayerfunctionsandservices,Logicaladdressing,IPv4classful and classlessaddressing,subnetting, NAT,IPv4,ICMPv4, ARP,RARPandBOOTP,IPv6,IPv6 addressing, DHCP.

NetworkDevices: Repeater,hub,switch,routerandgateway.

Unit: 3

RoutingAlgorithms:introduction torouting,Shortest PathAlgorithm,Flooding, HierarchicalRouting,Link Stateand DistanceVectorRouting
TransportLayer: Transportlayer functionsandservices,Processto Process Communication, UserDatagram Protocol(UDP),TransmissionControlProtocol(TCP),TCP connection management
ApplicationLayer: Applicationlayerfunctionsandservices,DomainNameSpace (DNS), EMAIL,FileTransferProtocol(FTP), HTTP,SNMP

Unit: 4

CongestionControl,Quality of Service,QoSImproving techniques.
LAN:Ethernet,TokenBus, TokenRing, MANArchitecture- DQDB, WANArchitectures- FrameRelay,ATM,SONET/SDH
NetworkSecurity:Firewalls,securitygoals,typesofattack,Introductionto cryptography, Typesofciphers: symmetric andasymmetric keyciphers.

Suggested books:

1. DataCommunicationandNetworking,4thEdition,BehrouzA.Forouzan,McGraw- Hill.
2. DataandComputerCommunication,8thEdition,WilliamStallings,PearsonPrentice HallIndia.

Suggested reference books:

1. ComputerNetworks,8thEdition,AndrewS.Tanenbaum,PearsonNewInternational Edition.
2. InternetworkingwithTCP/IP,Volume1,6thEditionDouglasComer,PrenticeHallof India.
3. TCP/IPIllustrated,Volume1,W.RichardStevens,Addison-Wesley,UnitedStatesof America.

CourseOutcomes:

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- Explain thefunctionsof thedifferent layerof theOSI Protocol.
- Draw the functional block diagram of wide-area networks (WANs), local area networks (LANs) andWireless LANs(WLANs) anddescribe thefunctionof each.
- Identify and connectvarious connectingcomponents ofa computernetwork.
- ConfigureDNSDDNS,TELNET,EMAIL,File TransferProtocol(FTP),WWW,HTTP, SNMP, Bluetooth,Firewalls usingopensourceavailablesoftware andtools.

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5th SEMESTER

FORMAL LANGUAGES AND AUTOMATA

Coursecode	PCC-CSE-305G				
Category	ProfessionalCoreCourse				
Course title	FormalLanguages &Automata				
Schemeand Credits	L	T	P	Credits	Semester5
	3	0		3	
Class work	25 Marks				
Exam	75 Marks				
Total	100Marks				
Durationof Exam	03Hours				

CourseObjectives:

- Tounderstandbasic concepts offormallanguages andautomatatheory.
- To studythe types of Automata i.e. NFA, DFA, NFA with ϵ-transition and their interconversionmethodsandimportance.
- To Study formal languages of different kinds, such as regular and context-free languages.Understandtheconceptofgrammar andits types.Removalofambiguity andreduced formand Normalformsofgrammar.
- Todeveloptheconceptsanddesignofhigher-levelautomatatoacceptthelanguage not accepted by finiteautomatasuchasPDA&Turingmachine.
- Tostudythevarious propertiesof turingmachineandtheir designing.

Note:Examinerwillset nine questionsin total. Questiononewillbecompulsory.Question onewill have6 partsof2.5markseach fromall units andremainingeightquestions of15 markseachto besetby takingtwo questionsfromeachunit. Thestudentshavetoattempt fivequestionsin total,first beingcompulsory andselectingonefromeachunit.

Unit1:

FiniteAutomata: Introduction:Set, PowerSet,SuperSet, Alphabet,languagesand grammars,productions and derivation, Deterministicfiniteautomata(DFA), Non-Deterministic finiteautomata(NDFA),Equivalenceof DFA and NDFA, Conversion of NFA to DFA,minimizationoffiniteautomata,Finiteautomatawithϵ-moves,Acceptability of a stringby afiniteAutomata.

IntroductiontoMachines: PropertiesandlimitationsofFiniteAutomata,MealyandMooreMachines, EquivalenceofMealy andMooremachines.

Unit2:

RegularExpression: StateandproveArden's Method,RegularExpressions,Recursive definitionofregular expression, Regular expressionconversion to Finite Automata andvice versa.

Propertiesof regular languages: Regularlanguage, pumping lemmaforregular sets/languages,Applicationofregularlanguages.

Unit3:

Grammars: Chomsky hierarchy oflanguages,Relation between different typesofgrammars, Context-freegrammar,Derivationtree/Parse tree, Ambiguity inregulargrammarandtheir removal,ReducedForms:Removalof uselesssymbols,nulland unit productions, Normal Form:Chomsky Normal form(CNF) andGreibachNormalForm(GNF),

PushDownAutomata: Introduction toPDA, Deterministicand Non-DeterministicPDA, DesignofPDA:Transitiontable,Transitiondiagramandacceptability of strings by designed PDA,Pushdownautomata(PDA) andequivalencewithCFG.

Unit4:

Turingmachines: The basicmodelforTuringmachines(TM), DeterministicandNon-DeterministicTuringmachinesand theirequivalence,DesignofTuring Machines:Transition table,Transitiondiagramandacceptabilityofstringsbydesignedturingmachine.Variants ofTuringmachines,HaltingproblemofTuringmachine,PCPProblem ofTuringMachine, LinearBounded Automata,TMsasenumerators.

Undecidability: Church-Turing thesis, universalTuringmachine,the universaland diagonalizationlanguages,reductionbetweenlanguagesandRicetheorem,undecidable problemsaboutlanguages.

Suggested books:

1. IntroductiontoAutomataTheory,Languages,andComputation,3ndEdition,John E. Hopcroft,RajeevMotwani,JeffreyD. Ullman,PearsonEducation.
2. Introduction to the Theory of Computation, Michael Sipser, 3rd edition, CengageLearning.

Suggested reference books

1. K.L.PMishra,N.Chandrashekaran(2003),TheoryofComputerScience-Automata Languagesand Computation,2ndedition,PrenticeHallofIndia,India.
2. RaymondGreenlaw,H.JamesHoover,FundamentalsoftheTheoryofComputation, PrinciplesandPractice,Morgan Kaufmann,1998.
3. JohnC.Martin:IntroductiontoLanguagesandAutomataTheory,3rdedition,Tata Mcgraw-Hill,2007

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CourseOutcomes:

- Touse basic conceptsof formallanguages of finiteautomatatechniques.
- ToDesignFiniteAutomata'sfordifferent RegularExpressionsandLanguages.
- ToConstructcontext freegrammarforvarious languages.
- To solve various problems of applying normal form techniques, push down automataandTuringMachines.

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DESIGN AND ANALYSIS OF ALGORITHMS

Coursecode	PCC-CSE-307G				
Category	ProfessionalCoreCourse				
Course title	Design andAnalysisofAlgorithms				
	L	T	P	Credits	
Schemeand Credits	3	0		3	Semester5
Class work	25 Marks				
Exam	75 Marks				
Total	100Marks				
Durationof Exam	03Hours				

CourseObjectives:

- Analyze theasymptotic performanceofalgorithms.
- Writerigorous correctness proofsforalgorithms.
- Demonstrateafamiliarity withmajoralgorithmsanddatastructures.
- Apply importantalgorithmic design paradigms andmethods ofanalysis.
- Synthesizeefficientalgorithmsincommon engineeringdesign situations.

Note:Examinerwillset nine questionsin total. Questiononewillbecompulsory.Question onewill have6 partsof2.5markseach fromall units andremainingeightquestions of15 markseachto besetby takingtwo questionsfromeachunit. Thestudentshavetoattempt fivequestionsin total,first beingcompulsory andselectingonefromeachunit.

Unit1:

Introductionto Algorithms: Algorithm,PerformanceAnalysis(TimeandSpacecomplexity), AsymptoticNotation(BigOH,Omega andTheta)-best, average andworst-case behaviour. Elementary DataStructures(Basicterminology ofStacksandQueues,Tree,Graph),Setsand DisjointSetUnion.

DivideandConquer: Generalmethod,Binary Search,MergeSort,QuickSort,andother sortingalgorithmswith divideandconquerstrategy,Strassen's MatrixMultiplication algorithmsandanalysisof theseproblems.

Unit2:

Greedy Method: General method, Fractional Knapsack problem, Job Sequencing withDeadlines,Minimum CostSpanningTrees,Singlesourceshortest paths.

DynamicProgramming: Generalmethod,OptimalBinarySearchTrees,0/1knapsack,TheTravelingSalespersonproblem.

Unit3:

BackTracking: Generalmethod,The8-Queen'sproblem,Sumofsubsets,GraphColouring,HamiltonianCycles.

BranchandBound:Themethod,0/1knapsack problem,TravelingSalespersonproblem, Efficiency considerations

Unit4:

NPHardandNPCompleteProblems: Basicconcepts,Cook'stheorem,NP hardgraph problems,NP hardschedulingproblems, NPhardcodegenerationproblems, andSome simplifiedNPhardproblems.

Suggested TextBooks:

1. FundamentalofComputeralgorithms,EllisHorowitzandSartajSahni,1978,Galgotia Publication
2. IntroductiontoAlgorithms,ThomasHCormen,CharlesELeisersonandRonaldL Rivest:1990,TMH

SuggestedReference Books:

1. The Designand Analysis of Computer Algorithm, AhoA.V. Hopcroft J.E., 1974, AddisonWesley.
2. Algorithms-TheConstruction,ProofandAnalysisofPrograms,Berlion,P.Bizard,P., 1986.JohanWiley& Sons,
3. WritingEfficientPrograms,Bentley,J.L., PHI
4. IntroductiontoDesignandAnalysisofAlgorithm,Goodman,S.E.&Hedetnieni,1997, MGH.
5. IntroductiontoComputersScience-Analgorithmsapproach,JeanPaulTrembley, RichardB.Bunt,2002,T.M.H.
6. FundamentalsofAlgorithms:TheArtofComputerProgrammingVolKnuth,D.E.: 1985,Naresh Publication.

CourseOutcomes:

- Toidentifyand justifycorrectnessofalgorithmsandtoanalyserunningtimeof algorithms based on asymptotic analysis.
- Tounderstandwhenanalgorithmicdesignsituationcallsforthedivide-and-conquer paradigm.Synthesize divide-and-conqueralgorithms.

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- Describethegreedyparadigmanddynamic-programmingparadigm.Explainwhen analgorithmic designsituationcallsforit.
- Developinggreedyalgorithms/dynamicprogrammingalgorithms,andanalyzeitto determineitscomputationalcomplexity.
- TowritethealgorithmusingBacktrackingandBranchandBoundstrategytosolve theproblemsforanygivenmodelengineeringproblem.

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PROGRAMMING IN JAVA

Coursecode	PCC-CSE-309G				
Category	Professional CoreCourse				
Course title	ProgramminginJAVA				
Schemeand Credits	L 3	T 0	P 0	Credits 3	Semester5
Class work	25 Marks				
Exam	75 Marks				
Total	100Marks				
Durationof Exam	03Hours				

CourseObjectives:

- Programmingin the Javaprogramminglanguage.
- Knowledgeof object-orientedparadigmintheJava programminglanguage.
- Theuseof Javain avariety of technologies andondifferent platforms.

Note:Examinerwillset nine questionsintotal. Questiononewillbecompulsory.Question onewill have6 partsof2.5markseach fromall units andremainingeightquestions of15 markseachto besetby takingtwo questionsfromeachunit. Thestudentshavetoattempt fivequestionsin total,first beingcompulsory andselectingonefromeachunit.

Unit 1:

IntroductiontoJava: EvolutionofJava,Object OrientedProgrammingStructure,Overview andcharacteristicsofJava,JavaprogramCompilationandExecutionProcess,Organization oftheJavaVirtual Machine,ClientsideProgramming,PlatformIndependency&Portability, Security, Relationb/wJVM,JREandJDK,Introduction toJAR format,NamingConventions, Datatypes&Typecasting,operators,SecurityPromisesoftheJVM,SecurityArchitecture andSecurity Policy,security aspects, sandboxmodel

Unit 2:

OOPS Implementation: Classes,Objects,attributes,methods,data encapsulation,reference variables,Constructors,Anonymous block, MethodOverloading,Static Datamembers,Block&methods; Memory Structure:Stack,Heap,Class &MethodareaClassloading &Executionflow:Staticvs DynamicClassloading,implicitvs explicitclass loading,class

loadingoperations;Argument Passing Mechanism: Passing primitive arguments, passing objects, WrapperClasses;

Thiskeyword:Referencinginstancemembers, Intraclassconstructorchaining, Method chaining;

Inheritance&codereusability:Extendingclassesforcodereusability, Usageofsuper keyword, MethodOverriding,Objectclass

Inheritance&RuntimePolymorphism: Static &Dynamicbinding,InheritanceandIs-A relation,RuntimePolymorphism andGeneralization,Abstractclasses&methods,Final Keyword;

InterfacesandRolebasedInheritance:Feature& Role basedInheritance,Static&Dynamic classingEnvironment,classes&interfaces,interfaceapplicationsinreal scenarios;Has-A relation: Aggregation &Composition, Nested classes, Inner classes, Anonymous Inner classes,StringBufferClass, tokenizer,applets,Lifecycleof applet andSecurity concern

Unit 3:

Threads: Creating Threads, Thread Priority, Blocked States, Extending Thread Class, RunnableInterface,StartingThreads,ThreadSynchronization, SynchronizeThreads,Sync CodeBlock,OverridingSyncedMethods,ThreadCommunication,wait,notify andnotifyall.

Swing &AWT:

Swingclasshierarchy, containers, userinterfacecomponents,graphicscontext, AWT Components, ComponentClass,ContainerClass, Layout ManagerInterfaceDefaultLayouts, Insetsand Dimensions,Border Layout,FlowLayout,Grid Layout,Card LayoutGrid Bag LayoutAWTEvents,Event Models,Listeners,ClassListener,Adapters, ActionEvent Methods Focus EventKeyEvent,MouseEvents,Window Event

Package&Scopes: NeedofPackages,associatingclasses to Packages,Classpath environmentvariable,ImportKeywordandFeatureofstaticimport, Public,protected, private& default scope,PrivateInheritance;

ExceptionHandling:exceptionand error, ExceptionHandling&Robustness,Common ExceptionsandErrors,Tryandcatchblock,Exceptionhandlers,throwkeyword,Checked andUnchecked Exceptions, Roleof finally,Userdefined Exceptions;

Unit 4:

CollectionFramework: RoleandImportanceofCollectionFramework, List&Setbased collection, Iterator& ListIterator, Maps,Searchingelements inList, HashandTree based collections, Role of equals and hashCode() methods, Comparable and Comparator Interfaces,ThreadSafetyandVector, Difference b/wEnumerationandIterator, Typesafety andGenerics,CommonalgorithmsandCollectionsclass,UsingProperties classformanaging propertiesfiles;

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DatabaseConnectivityUsingJDBC:OverviewofnativeandODBCDrives,Introductionto JDBC,Typeof JDBC drivers,Usageofdrivers,Definingproperties-basedConnection Factory; Basic databaseoperations:Insert,Delete,Update,andSelect;PreparedStatement:Statement,PreparedStatement,SettingQueryparameters,ExecutingQueries;

CallableStatement: CreatingPL/SQLStoredproceduresandfunctions,CreatingCallable statements, Executing procedures &functions, Batch Updation, Transacting Queries, Programmatic initializationofdatabase,ResultSetMetaData,DatabaseMetaData; Input/OutputStream,StreamFilters,BufferedStreams,DatainputandOutputStream,Print StreamRandomAccessFile,

Reflection:reflectionAPI,newInstance()method,javaptool,creatingjavaptool,creating appletviewer,callprivatemethod,java9features;

TextBooks:

1. PatrickNaughton andHerbertzSchidt,"Java-2thecomplete Reference",TMH
2. Sierra&bates,"HeadFirstJava",O'Reilly.

Reference Books:

1. E.Balaguruswamy, "Programming withJava",TMH
2. Horstmann,"ComputingConceptswith Java2Essentials",John Wiley.
3. Decker&Hirshfield,"Programming.Java",VikasPublication.

CourseOutcomes:

- Knowledge ofthe structure and model of the Java programming language, (knowledge)
- Use the Java programming language for various programming technologies(understanding)
- DevelopsoftwareintheJava programminglanguage

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INTERNET OF THINGS

Coursecode	PCC-IOT-301G				
Category	Professional Core Course				
Course title	Internet of Things				
Schemeand Credits	L	T	P	Credits	Semester5
	3	0		3	
Class work	25 Marks				
Exam	75 Marks				
Total	100Marks				
Durationof Exam	03Hours				

Course Objectives:

1. To understand the basics of IoT.
2. To learn IoT Architecture and enabling technologies
3. To know about IoT protocols at different layers
4. To know about the application areas of IoT

Unit 1

Introduction to Internet of Things: Internet of Things, IoT Conceptual Framework, IoT Architecture View, Technology behind IoT, Sources of IoT, M2M Communication, IoT/M2M Systems Layers and Design Standardization, Communication Technologies, Data Enrichment, Data Consolidation and Device Management at Gateway, Ease of Design and Affordability.

Design Principles for Web Connectivity: Web Communication Protocols for Connected Devices, Message Communication Protocols for Connected Devices, Web Connectivity for Connected Devices Networks using Gateway, SOAP, REST, HTTP RESTful, and WebSockets

Unit 2

Protocols and Data Processing in IoT

IoT Connectivity: Internet based communication, IP Addressing in IoT, Media Access Control, Application Layer Protocols: HTTP, HTTPS, FTP, and Telnet

Data Acquiring and Storage, Organizing the Data, Transaction, Business Process, Integration and Enterprise Systems, Data Analytics in IoT, Knowledge Acquiring, Managing, and Storing Process

Cloud Computing Paradigm for Data Collection, Storage and Computing, Everything as a Service, IoT Cloud-Based Services Using the Xively and Nimbits.

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Unit 3

Introduction to Sensors Technology, Participatory Sensing, Industrial IoT, Automotive IoT, Actuators, Sensors Data Communications Protocol, RFID Technology, Prototyping the Embedded Devices for IoT and M2M,
Embedded device software, Programming Embedded Device Arduino Platform using IDE, Reading data from sensors and devices, Devices, Gateways, Internet and Web/Cloud services software development.

IoT Security:
Introduction to IoT privacy and security, Vulnerabilities, Security requirements and threat analysis, IoT Security Tomography and layered attacker model.

Unit 4

WSN Architecture and Protocols

Wireless Sensor Networks: Overview of WSNs, Challenges for Wireless Sensor Networks, Enabling Technologies for Wireless Sensor Networks. Architectures: Single-Node Architecture - Hardware Components, Energy Consumption of Sensor Nodes, Operating Systems and Execution Environments, Network Architecture-Sensor Network Scenarios, Optimization Goals and Figures of Merit, Design principles for WSNs, Service interfaces of WSNs, Gateway Concepts.
Communication Protocols: Physical Layer and Transceiver Design Considerations, MAC Protocols for Wireless Sensor Networks, Low Duty Cycle Protocols And Wakeup Concepts - S-MAC, The Mediation Device Protocol, Wakeup Radio Concepts, Contention based protocols (CSMA, PAMAS), Schedule based protocols (LEACH, SMACS, TRAMA) Address and Name Management in WSNs, Assignment of MAC Addresses, Routing Protocols- Energy-Efficient Routing, Geographic Routing, Hierarchical Networks by Clustering.

TEXT/REFERENCES:

1. Vijay Madisetti, ArshdeepBahga, “Internet of Things: A Hands-OnApproach”
2. WaltenegusDargie,ChristianPoellabauer, "Fundamentals of Wireless Sensor Networks: Theory andPractice"
3. Cuno Pfister, Getting Started with the Internet of Things, O‟Reilly Media, 2011, ISBN: 978-1-4493- 9357-1.
4. David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Robert Barton, Jerome Henry, “IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things”, CISCO Press, 2017
5. Hersent, Olivier, David Boswarthick, and Omar Elloumi. The internet of things: Key applications and protocols. John Wiley & Sons, 2011.
6. Buyya, Rajkumar, and Amir Vahid Dastjerdi, eds. Internet of Things: Principles and paradigms. Elsevier, 2016.
7. Dr. Guillaume Girardin , Antoine Bonnabel, Dr. Eric Mounier, 'Technologies & Sensors for the Internet of Things Businesses & Market Trends 2014 - 2024',Yole Développement Copyrights ,2014
8. Editors OvidiuVermesan Peter Friess,'Internet of Things – From Research and Innovation to Market 4. 4.Deployment', River Publishers, 2014

9. Raj Kamal: Internet of Things-Architecture and design principles, McGraw Hill Education.

Course Outcomes:

On successful completion of the course, the student will:

1. Comprehend the essentials of IoT
2. Understand IoT Architecture & enabling technologies
3. Understand various IoT protocols
4. Understand IoT applications in different domain and be able to analyze their performance.

B.Tech. Computer Science and Engineering (Internet of Things and Cyber Security Including Block Chain Technology)
5th SEMESTER

MICROPROCESSOR LAB

Coursecode	LC-ESC-321G				
Category	EngineeringScience Course				
Course title	MicroprocessorLab				
Schemeand Credits	L	T	P	Credits	Semester5
	0	0	2	1	
Class work	25 Marks				
Exam	25 Marks				
Total	50 Marks				
Durationof Exam	03Hours				

Hands-on experiments relatedto the coursecontentsofESC-CSE-301G.

B.Tech. Computer Science and Engineering (Internet of Things and Cyber Security Including Block Chain Technology)
5th SEMESTER

INTERNET OF THINGS LAB

Coursecode	LC-IOT-323G				
Category	ProfessionalCoreCourse				
Course title	INTERNET OF THINGS LAB				
Schemeand Credits	L	T	P	Credits	Semester5
	0	0	2	1.5	
Class work	25 Marks				
Exam	25 Marks				
Total	50 Marks				
Durationof Exam	03Hours				

Hands-onexperimentsrelatedtothecoursecontentsofPCC-IOT-321Gusinghardware resourcesandusingsimulationtool.

B.Tech. Computer Science and Engineering (Internet of Things and Cyber Security Including Block Chain Technology)
5th SEMESTER

DESIGN & ANALYSIS OFALGORITHMS LAB USING C++

Coursecode	LC-CSE-325G				
Category	ProfessionalCore Course				
Course title	Design&Analysis ofAlgorithms UsingC++				
	L	T	P	Credits	
Schemeand Credits	0	0	3	1.5	Semester5
Class work	25 Marks				
Exam	25 Marks				
Total	50 Marks				
Durationof Exam	03Hours				

CourseObjectives:

- Implementation of various algorithmsandtoanalyzetheperformanceof algorithms.
- Demonstrateafamiliarity withmajoralgorithmsanddatastructures.
- Apply importantalgorithmic design paradigms andmethods ofanalysis.
- Synthesizeefficientalgorithmsincommon engineeringdesign situations.

Listofprograms:

1. WriteaProgramforiterativeandrecursive Binary Search.
2. Write a Program to sort a given set of elements using the Quick Sort/Merge Sort/SelectionSort methodanddeterminethe timerequiredtosort theelements.
3. WriteaProgramforimplementationofFractionalKnapsackproblemusingGreedy Methodand0/1Knapsack problemusingDynamic Programming.
4. WriteaProgramtofindtheshortestpathfromagivenvertextootherverticesina weighted connectedgraph usingDijkstra'salgorithm.
5. WriteaProgramto findtheminimumcostspanningtree(MST)ofagivenundirected graph usingKruskal'salgorithm/Prim'sAlgorithms.
6. WriteaProgramtoimplement N-Queensproblem usingbacktracking.
7. WriteaProgramtocheckwhetheragivengraphisconnectedornotusingDFS method.
8. WriteaprogramtoimplementtheTravellingSalesmanProblem(TSP).

Note: Atleast 5to10moreexercisestobegiven by theteacherconcerned.

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5th SEMESTER

CourseOutcomes:

- Thecoursewillhelpinimprovingtheprogrammingskillsof thestudents.
- The design of algorithms for any problem will inculcate structured thinking processin thestudents andimprove theanalytical power.

B.Tech. Computer Science and Engineering (Internet of Things and Cyber Security Including Block Chain Technology)
5th SEMESTER

PROGRAMMING IN JAVA LAB

Coursecode	LC-CSE-327G				
Category	Professional CoreCourse				
Coursetitle	Java ProgrammingLab				
	L	T	P	Credits	Semester5
	0	0	4	2	
Classwork	25Marks				
Exam	25Marks				
Total	50Marks				
Duration of Exam	03Hours				

ListofExperiments:

1. Createajava programtoimplement stack andqueueconcept.
2. Writeajavapackagetoshowdynamicpolymorphismand interfaces.
3. Writeajavaprogramtoshowmultithreadedproducerandconsumerapplication.
4. Createacustomized exception and alsomakeuseof all the5 exception keywords.
5. Convert thecontent ofagiven fileinto theuppercasecontentof thesamefile.
6. Develop ananalogclock usingapplet.
7. Developascientific calculatorusingswings.
8. Createan editorlikeMS-wordusingswings.
9. Createaservlet that usesCookies tostore thenumber of timesauser hasvisited yourservlet.
10. Createa simplejavabean havingboundandconstrainedproperties.

B.Tech. Computer Science and Engineering (Internet of Things and Cyber Security Including Block Chain Technology)
5th SEMESTER

PRACTICAL TRAINING 1

Coursecode	PT-IOT-329G				
Category	Professional CoreCourse				
Coursetitle	PRACTICALTRAINING1				
Schemeand Credits	L	T	P	Credits	Semester5
	0	0	0		
Classwork	-				
Exam	-				
Total	-				
Duration of Exam	-				

TheevaluationofPracticalTraining-Iwillbebasedonseminar,viva-voce,report submitted bythestudents.Accordingtoperformance,the studentsareawardedgradesA,B,C,F.A student whois awarded 'F'gradeis required torepeatPracticalTraining.

Excellent: A;Good :B;Satisfactory:C; NotSatisfactory:F.

B.Tech. Computer Science and Engineering (Internet of Things and Cyber Security Including Block Chain Technology)
6th SEMESTER

COMPILER DESIGN

Coursecode	PCC-CSE-302G				
Category	ProfessionalCoreCourse				
Course title	CompilerDesign				
Schemeand Credits	L	T	P	Credits	Semester6
	3	0	0	3	
Class work	25 Marks				
Exam	75 Marks				
Total	100Marks				
Durationof Exam	03Hours				

Objectivesof the Course:

1. Tounderstandandlist the differentstagesin theprocessofcompilation.
2. Identifydifferent methods of lexicalanalysis.
3. Design top-downandbottom-upparsers.
4. Identify synthesizedandinheritedattributes.
5. Developsyntax directedtranslation schemes.

Note:Examinerwillset nine questionsin total. Questiononewillbecompulsory.Question onewill have6 partsof2.5markseach fromall units andremainingeightquestions of15 markseachto besetby takingtwo questionsfromeachunit. Thestudentshavetoattempt fivequestionsin total,first beingcompulsory andselectingonefromeachunit.

UNIT1

IntroductiontoCompilers: LanguageProcessors,TheStructure ofcompiler:its different phases,Compiler Construction Tools,Applications ofCompiler Technology.

LexicalAnalysis: Role oflexicalanalyzer,InputBuffering, Specificationandrecognitionof tokens,
designoflexicalanalyzer,regularexpressions,Alanguagespecifyinglexicalanalyzer,
Finite automata,conversionfromregular expressiontofiniteautomata,and viceversa, minimizingnumberof states of DFA,Implementation of lexicalanalyzer.

UNIT2

Syntax Analysis: Roleofparsers,contextfreegrammars.

Parsing Technique: Shift-reduceparsing,Operatorprecedenceparsing, Top downparsing, Predictive parsing.

UNIT3

LR parsers,SLR,LALR andCanonicalLRparser.

SyntaxDirectedTranslations: Syntax directed definitions,constructionofsyntax trees, syntaxdirectedtranslationscheme, implementationofsyntaxdirectedtranslation, Intermediate-CodeGeneration:threeaddresscode,quadruplesandtriples.

UNIT4

SymbolTable& Error DetectionandRecovery: Symbol tables:its contents anddata structure forsymboltables;trees,arrays,linkedlists,hashtables.Errors, lexicalphaseerror, syntactic phaseerror,Semanticerror.

Code Optimization&CodeGeneration: Codegeneration, forms ofobjectscode, machine dependentcode,optimization,registerallocationfortemporaryanduser definedvariables.

Suggested TextBooks:

1. CompilersPrinciple,Techniques&Tools- AlfreadV. AHO, Ravi Sethi&J.D. Ullman;1998 Addison Wesley.

SuggestedReference Books:

1. Theoryandpracticeofcompiler writing,Tremblay & Sorenson,1985,Mc.Graw Hill.
2. Systemsoftware by Dhamdere,1986,MGH.
3. PrinciplesofcompilerDesign,NarosaPublication
4. Elementscompiler Design,Dr.M. Joseph,University SciencePress

CourseOutcomes:

1. Todevelop thelexicalanalyser foragivengrammarspecification.
2. Foragivenparserspecification design top-downandbottom-upparsers.
3. ToDevelopsyntax directed translationschemes

B.Tech. Computer Science and Engineering (Internet of Things and Cyber Security Including Block Chain Technology)
6th SEMESTER

ARTIFICIALINTELLIGENCE

Coursecode	PCC-CSE-304G				
Category	ProfessionalCoreCourse				
Course title	Artificialand Computational Intelligence				
Schemeand Credits	L	T	P	Credits	Semester6
	3	0	0	3	
Class work	25 Marks				
Exam	75 Marks				
Total	100Marks				
Durationof Exam	03Hours				

Objectivesof the course:

- Toprovidehistoricalperspectiveof AIandits foundation.
- Toprovidethemostfundamentalknowledgetothestudentssothattheybecome familiarwithbasic principlesofAItowardsproblemsolving,inference,knowledge representationandlearning.
- ExploreapplicationofAItechniquesin Expertsystems, NeuralNetworks.
- Explorethecurrent trends, potential,limitations,andimplications ofAI.

Note:Examinerwillset nine questionsin total. Questiononewillbecompulsory.Question onewill have6 partsof2.5markseach fromall units andremainingeightquestions of15 markseachto besetby takingtwo questionsfromeachunit. Thestudentshavetoattempt fivequestionsin total,first beingcompulsory andselectingonefromeachunit.

Unit-1

Introduction: Definition of AI, History of AI, nature of AI problems, examples of AI problems

Problem-solving by search: Problem-Solving Agents, Uninformed Search: Depth First Search (DFS), Breadth First Search (BFS); Informed Search: Best First Search, A*; Heuristic Functions; Local Search: Hill Climbing. Problem Reduction Search: AO*. Population-Based Search: Ant Colony Optimization; Genetic Algorithm; Game Playing: Min Max Algorithm, Alpha-Beta Pruning.

Unit-2

Knowledge Representation: Knowledge-based Agents, Types of Knowledge, Knowledge acquisition and its techniques; Knowledge Representation Techniques/schemes: Propositional Logic, Predicate Logic, Semantic nets, Frames; Knowledge representation issues, Rule-based systems.

Unit-3

Reasoning under Uncertainty: Basics of Probability Theory, Probabilistic Reasoning, Bayesian Reasoning, Dempster-Shafer Theory.

Planning: Introduction to Planning, Representation of Planning, Partial-order Planning.

Unit-4

Learning: Introduction to Learning, Types of Learning: Learning by Induction, Rote Learning, Symbol Based Learning, Identification Trees, Explanation Based Learning, Transformational Analogy, Introduction to Neural Networks, Expert Systems, Current trends in ArtificialIntelligence.

Suggested Testbooks:

1. ArtificialIntelligence:AModern ApproachThirdEditionStuartRussellandPeter Norvig,2010,PearsonEducation.

Suggested reference books:

1. ElaineRich,Kevin Knight,& ShivashankarBNair,ArtificialIntelligence,McGraw Hill, 3rded.,2009.
2. Introduction toArtificialIntelligence&Expert Systems,Dan WPatterson,PHI.,2010.
3. Artificialintelligence,Patrick Henry Winston,1992,Addition Wesley3Ed.

CourseOutcomes:

1. Displaythe understandingof thehistoricalperspectiveof AIanditsfoundation.
2. Applybasicprinciples ofAIinsolutionsthatrequireproblemsolving,inference, knowledgerepresentationandlearning.

3. DemonstratefundamentalunderstandingofvariousapplicationofAItechniquesinExpert systems,Neural Networks.

4. Demonstrate an ability to share in discussion of AI, it's the current trends,limitations,andimplications ofAI.

B.Tech. Computer Science and Engineering (Internet of Things and Cyber Security Including Block Chain Technology)
6th SEMESTER

ADVANCEDJAVA

Coursecode	PCC-CSE-306G				
Category	Professional Course Code				
Coursetitle	AdvancedJava				
Schemeand Credits	L	T	P	Credits	Semester6
	3	0	0	3	
Classwork	25Marks				
Exam	75Marks				
Total	100Marks				
Duration of Exam	03Hours				

Objectives ofthecourse:

1. Programmingin theJava programminglanguage,
2. Knowledgeof object-orientedparadigmin theJavaprogramminglanguage,
3. Theuseof Javainavarietyof technologiesand on different platforms.

Note:Examinerwillset nine questionsin total. Questiononewillbecompulsory.Question onewill have6 partsof2.5markseach fromall units andremainingeightquestions of15 markseachto besetby takingtwo questionsfromeachunit. Thestudentshavetoattempt fivequestionsin total,first beingcompulsory andselectingonefromeachunit.

UNIT1

Servlet: Servletintroduction,web terminology,servletAPI,servlet Interface,generic servlet,Http servlet,servlet lifecycle,servletwithIDE(eclipse,My eclipse,Netbeans),servletrequest,servlet collaboration,servletconfiguration, context,attributein servlet,sessiontechniqueinservlet, event and listener,servlet filter,CRUD,pagination,input outputstream,annotation,singlethread model,SSI;

JSP: Lifecycleof JSP,JSP, API,scriptingelements, 9ImplicitObjects,directiveelements, Exceptions, actionelements, expression language, MVC in JSP, JSTL, custom tags,pagination,CRUD,JSTLfunction, formatting,XML,SQL tags,

UNIT2

Struts: Introduction,features,models,components,struts2architecture,action,configuration, interceptors, validation method,awareInterfaces, stuts2withI18N,zeroconfiguration, struts2withtiles,hibernatewith struts2,springwithstruts2,UItags;

MailAPI:javamailintroduction,methodsofsendingemail,sendingmailbyGmail,receiving email,sendingattachment,receivingattachment,sendinghtml,forwarding,deletingemail

UNIT3

Hibernate(HB): Introduction,architecture,HBwithIDE, HBLog4j, inheritancemapping, HB mapping, transactionmanagement, HBquerylanguage, HBcriteria query language, named query,HB caching,integration,HB lifecycle;

Spring: Introduction,modules,spring withIDE, dependencyinjectionmethods,spring AOP, springJdbctemplate,springORM,SPEL, MVC taglibrary,applications,springremoting, springOXM,springweb, securitymodels,springboot,springwithangular;

UNIT 4

Android: Introduction,history & versions,architecture, buildingblocks,emulator,android widgets,activityand intents,androidfragments,android menu,androidservice,SQLite, XML&JSON,androidspeech,multimedia,telephony,maps;

Design Pattern:javadesign pattern,creational,structural,behavioral,J2EEpatterns, presentationlayers.

Course Outcome:

1. Knowledgeof thestructureandmodel of theJavaprogramminglanguage, (knowledge)
2. Use theJavaprogramminglanguageforvariousprogrammingtechnologies

   (understanding)
3. Develop softwarein theJava programminglanguage,

SuggestedTextBooks:

1. Patrick Naught onandHerbertzSchidt,“Java-2thecomplete Reference”,TMH
2. Sierra&bates,“Head First Java”,O’Reilly.

SuggestedReferenceBooks:

1. E. Balaguruswamy, “ProgrammingwithJava”,TMH
2. Horstmann,“ComputingConceptswithJava2Essentials”,John Wiley.
3. Decker&Hirshfield,“Programming.Java”,

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6th SEMESTER

Sensors and Actuators for IoT

Coursecode	PCC-IOT-308G				
Category	ProfessionalCoreCourse				
Course title	Sensors and Actuators for IoT				
Schemeand Credits	L	T	P	Credits	Semester6
	3	0	0	3	
Class work	25 Marks				
Exam	75 Marks				
Total	100Marks				
Durationof Exam	03Hours				

Unit -1

Introduction to Sensors and Actuators, Definitions, Classification of Sensors and Actuators, Requirements for Interfacing, Units of Sensors, Performance Characteristics of Sensors and Actuators, Input and Output Characteristics, Transfer Function, Impedance and Impedance Matching, Range, Span, Input and Output Full Scale, Resolution,and Dynamic Range, Accuracy, Errors, and Repeatability, Sensitivity and Sensitivity Analysis, Hysteresis, Nonlinearity, and Saturation, Frequency Response, Response Time, and Bandwidth, Calibration, and others.

Unit 2

Temperature Sensors and Thermal Actuators

Thermistors, Resistance Temperature Sensors, And Silicon Resistive Sensors, Thermoelectric Sensors, Others Temperature Sensors, Optical Sensors, Effects of Optical Radiation, Quantum-Based Optical Sensors, Photoelectric Sensors, Coupled Charge (CCD) Sensors AndDetectors, Thermal-Based Optical Sensors, Active Far Infrared (AFIR) Sensors, Optical Actuators

Unit-3

Electric and Magnetic Sensors and Actuators

The Electric Field: CapacitiveSensors and Actuators, Magnetic Fields: SensorsAnd Actuators, Magnetohydrodynamic (Mhd) SensorsAnd Actuators, Magnetoresistance AndMagnetoresistive Sensors, Magnetostrictive SensorsAnd Actuators, Magnetometers, Magnetic Actuators, Voltage And Current Sensors, Mechanical Sensors And Actuators, Force Sensors, Accelerometers, Pressure Sensors, Inertial Sensors: Gyroscopes,

Unit – 4

Acoustic Sensors and Actuators

Elastic Waves and Their Properties, Elastic Waves and Their Properties, Microphones, The Piezoelectric Effect, Acoustic Actuators, Ultrasonic Sensors and Actuators: Transducers, Piezoelectric Actuators, Piezoelectric Actuators

Chemical Sensor and Actuators

Electrochemical Sensors, Potentiometric Sensors, Thermochemical Sensors, Optical Chemical Sensors, Mass Sensors, Humidity and Moisture Sensors, Chemical Actuation, Others Sensors Like Radiation, Mems and Smart Sensors, Interfacing Methods and Circuits, Interfacing to Microprocessors,

Text/Reference Books

1. Jacob Fraden, “Hand Book of Modern Sensors: physics, Designs and Applications”, 2015, 3rd edition, Springer, New York
2. Jon. S. Wilson, “Sensor Technology Hand Book”, 2011, 1st edition, Elsevier, Netherland.
3. GerdKeiser,”Optical Fiber Communications”, 2017, 5th edition, McGraw-Hill Science, Delhi.
4. John G Webster, “Measurement, Instrumentation and sensor Handbook”, 2017, 2nd edition, CRC Press, Florida.
5. Eric Udd and W.B. Spillman, “Fiber optic sensors: An introduction for engineers and scientists”, 2013, 2nd edition, Wiley, New Jersey.
6. Bahaa E. A. Saleh and Malvin Carl Teich, “Fundamentals of photonics”, 2012, 1st edition, John Wiley, New York.

Cyber Security and Blockchain

Coursecode	PCC-IOT-304G				
Category	ProfessionalCoreCourse				
Course title	Sensors and Actuators for IoT				
Schemeand Credits	L	T	P	Credits	Semester6
	3	0	0	3	
Class work	25 Marks				
Exam	75 Marks				
Total	100Marks				
Durationof Exam	03Hours				

UNIT - I

Introduction to Cyber Security: Overview of Cyber Security, Internet Governance – Challenges and Constraints; Cyber Threats: Cyber Warfare, Cyber Crime, Cyber terrorism, Cyber Espionage; Need for a Comprehensive Cyber Security Policy.

Introduction to Vulnerability Scanning: Overview of vulnerability scanning, Open Port/Service Identification, Banner/Version Check, Traffic Probe, Vulnerability Probe, Vulnerability Examples, OpenVAS, Metasploit.

Network Vulnerability Scanning: Netcat, Socat; understanding Port and Services tools - Datapipe, Fpipe, WinRelay; Network Reconnaissance – Nmap, THC-Amap and System tools, Network Sniffers and Injection tools – Tcpdump and Windump, Wireshark, Ettercap, Hping, Kismet.

Unit -2

Network Defense Tools: Firewalls and Packet Filters - Firewall Basics, Packet Filter Vs Firewall; Network Address Translation (NAT) and Port Forwarding; Basics of Virtual Private Networks, Linux Firewall, Windows Firewall.

Web Application Tools: Scanning for web vulnerabilities tools- Nikto, W3af; HTTP utilities - Curl, OpenSSL; and Stunnel, Application Inspection tools – Zed Attack Proxy, Sqlmap. DVWA, Webgoat; Password Cracking and Brute-Force Tools – John the Ripper, L0htcrack, Pwdump, HTCHydra.

UNIT – 3

Cyber Crimes and Law: Introduction to Cyber Crimes, Types of Cybercrime, Hacking, Attack vectors, Cyberspace and Criminal Behavior, Digital Forensics, Realms of the Cyber world, Recognizing and Defining Computer Crime, Contemporary Crimes, Computers as Targets, Contaminants and Destruction of Data, Indian IT ACT 2000.

Cyber Crime Investigation: Firewalls and Packet Filters, password Cracking, Keyloggers and Spyware, Virus and Warms, Trojan and backdoors, Steganography, DOS and DDOS attack, SQL injection, Buffer Overflow, Attack on wireless Networks.

UNIT - 4

Blockchain Technology: Cryptography - Hash function, Digital Signature - ECDSA, Memory Hard Algorithm, Zero Knowledge Proof; Blockchain Overview: Introduction, Advantage over conventional distributed database, Blockchain Network, Mining Mechanism, Distributed Consensus, Merkle Patricia Tree, Gas Limit, Transactions and Fee, Anonymity, Reward, Chain Policy, Life of Blockchain application, Soft & Hard Fork, Private and Public blockchain.

Cryptocurrency: History, Distributed Ledger, Bitcoin protocols - Mining strategy and rewards, Ethereum - Construction, DAO, Smart Contract, GHOST, Vulnerability, Attacks, Sidechain, Namecoin.

Blockchain Applications: Internet of Things, Medical Record Management System, Domain Name Service and future of Blockchain.

Suggested Readings:

1. Mike Shema: Anti-Hacker Tool Kit, McGraw Hill

2. Nina Godbole and SunitBelpure: Cyber Security Understanding Cyber Crimes, ComputerForensics and Legal Perspectives, Wiley.

3. Achyut S.Godbole: Data Communication and Networking, McGraw –Hill Education New Delhi.

4. Forouzan: Data Communication and Networking (Global Edition) 5/e, McGraw Hill Education India.

5. Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder: Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction, Princeton University Press.

6. Wattenhofer: The Science of the Blockchain.

7. Antonopoulos: Mastering Bitcoin - Unlocking Digital Cryptocurrencies.

8. Satoshi Nakamoto: Bitcoin: A Peer-to-Peer Electronic Cash System

9. Forouzan, B.A.: Cryptography & Network Security. Tata McGraw-Hill Education.

10. Kahate, A. Cryptography and Network Security. McGraw-Hill Higher Ed.

11. Peter Szor , The Art of Computer Virus Research and Defense, Symantec Press.

12. Markus Jakobsson and Zulfikar Ramzan, Crimeware, Understanding New Attacks and Defenses, Symantec Press, 2008, ISBN: 978-0-321-50195-0.

13. S. Shukla, M. Dhawan, S. Sharma, S. Venkatesan, 'Blockchain Technology: Cryptocurrency and Applications', Oxford University Press, 2019.

14. Josh Thompson, 'Blockchain: The Blockchain for Beginnings, Guild to Blockchain Technology and Blockchain Programming', CSI Publishing Platform, 2017.

15. Any other book(s) covering the contents of the paper in more depth.

SIGNALS AND SYSTEM

Coursecode	ESC-IOT- 312G				
Category	Engineering Science Course				
Course title	Signals and System				
Schemeand Credits	L	T	P	Credits	Semester6
	3	0	0	3	
Class work	25 Marks				
Exam	75 Marks				
Total	100Marks				
Durationof Exam	03Hours				

B.Tech. Computer Science and Engineering (Internet of Things and Cyber Security Including Block Chain Technology)
6th SEMESTER

CourseObjectives:

The aimof the courseis for:

1. Understandingthe fundamental characteristicsofsignals andsystems.
2. Understandingthe concepts of vector space, innerproduct space and orthogonal series.
3. Understandingsignals and systems in terms of both the time and transform domains, taking advantageof the complementaryinsights and tools thatthesedifferent perspectives provide.
4. Development of the mathematical skills to solve problems involving convolution, filtering, modulation andsampling.

Note: Examiner will set ninequestions in total. Question onewillbe compulsory. Question onewillhave6 parts of2.5 marks each from all units and remaining eight questions of 15 marks each to be set bytakingtwo questions from each unit. Thestudents haveto attempt fivequestions in total, first beingcompulsoryandselectingonefromeachunit.

UNIT-I

INTRODUCTIONTOSIGNALSANDSYSTEMS:

Signalsandsystemsasseenineveryday life,andinvariousbranchesofengineeringand science. Signal properties: periodicity, absoluteintegrability, determinism and stochastic character.Somespecialsignalsofimportance:theunitstep,theunitimpulse,thesinusoid, thecomplexexponential,somespecialtime-limitedsignals;continuousanddiscrete time signals, continuous and discrete amplitudesignals. System properties: linearity: additivityand homogeneity, shift-invariance,causality, stability,realizability. Examples.

UNIT-2

BEHAVIOROFCONTINUOUSANDDISCRETE-TIMELTISYSTEMS

Impulse response andstep response, convolution,input-outputbehavior withaperiodic convergentinputs,cascadeinterconnections.Characterizationofcausalityandstabilityof LTI systems.Systemrepresentationthroughdifferentialequationsanddifferenceequations. State-space Representationofsystems.State-Space Analysis,Multi-input,multi-output representation.StateTransitionMatrixanditsRole.PeriodicinputstoanLTI system,the notion ofafrequencyresponse and its relation to the impulse response.

UNIT-3

FOURIER,LAPLACEANDZ-TRANSFORMS

Fourier seriesrepresentation of periodic signals, WaveformSymmetries,Calculation of FourierCoefficients.Fourier Transform,convolution/multiplicationandtheir effectinthe frequency domain,magnitudeandphaseresponse,Fourierdomainduality.TheDiscreteTimeFourier Transform(DTFT) andthe DiscreteFourier Transform(DFT). Parseval'sTheorem. Review of theLaplace Transformforcontinuoustime signalsandsystems,systemfunctions, poles and zeros of systemfunctionsand signals,Laplacedomain analysis, solutionto differentialequationsandsystembehavior.Thez-Transformfor discretetimesignalsand systems, system functions, poles and zeros ofsystems and sequences, z-domainanalysis.

UNIT- 4

SAMPLINGANDRECONSTRUCTION

TheSamplingTheoremanditsimplications.Spectraofsampledsignals.Reconstruction: idealinterpolator,zero-orderhold,first-orderhold.Aliasing anditseffects.Relationbetween continuousanddiscretetime systems.Introductiontotheapplicationsofsignalandsystem theory: modulation for communication, filtering,feedback control systems.

CourseOutcomes:

At the end ofthis course,students will demonstrate the abilityto

a. Understand theconceptsof continuous time and discrete time systems.

b. Analyse systems in complexfrequencydomain.

c. Understand samplingtheorem and itsimplications.

REFERENCES:

1. A. V. Oppenheim, A. S. Willsky and S. H. Nawab, "*Signals and systems*", PrenticeHall India, latest edition
2. J. G.Proakis andD. G.Manolakis, "*DigitalSignal Processing: Principles, Algorithms, and Applications*", Pearson,latest edition.
3. H. P. Hsu, "*Signals andsystems*", Schaum's series, McGrawHill Education,latest edition.
4. S. HaykinandB. V. Veen, "*Signals and Systems*", JohnWiley and Sons, latest edition.
5. A.V.OppenheimandR.W.Schafer,"Discrete-TimeSignal

Processing",PrenticeHall,latestedition.
6. M. J. Robert "*Fundamentals of Signals andSystems*", McGrawHill Education,latest edition.
7. B.P.Lathi,"LinearSystemsandSignals",OxfordUniversity Press,latestedition.

PROJECT- I

Coursecode	PROJ-CSE-322G				
Category	ProfessionalCoreCourse				
Course title	PROJECT-I				
Schemeand Credits	L	T	P	Credits	Semester6
	0	0	4	2	
Class work	25 Marks				
Exam	25 Marks				
Total	50 Marks				

B.Tech. Computer Science and Engineering (Internet of Things and Cyber Security Including Block Chain Technology)
6th SEMESTER

Durationof Exam	03Hours

Studentswillbeassignedprojectsindividuallyorinagroupofnotmorethan3students dependingon the efforts requiredforcompletionof project.

Theprojectwillhave4stages:

(*Marks forinternalevaluationaregivenin brackets)

- Synopsis submission(5marks),
- 1st midtermprogressevaluation(5marks)
- 2ndmid termprogressevaluation(5marks)
- Finalsubmissionevaluation(10marks).

The external examiner will evaluate the project on the basis of idea/quality of project,implementationof theproject,projectreport andviva.

B.Tech. Computer Science and Engineering (Internet of Things and Cyber Security Including Block Chain Technology)
6th SEMESTER

COMPILER DESIGNLAB

Coursecode	LC-CSE-324G				
Category	ProfessionalCoreCourse				
Course title	CompilerDesignLab				
Schemeand Credits	L	T	P	Credits	Semester6
	0	0	3	1.5	
Class work	25 Marks				
Exam	25 Marks				
Total	50 Marks				
Durationof Exam	03Hours				

Objectivesof the course:

- Implementation of different concepts oflexicalanalysis.
- Implementation of parsers.
- Studyanduseofcompiler designtools.

Listofprograms:

1. WriteaProgramforTokenseparation withagivenexpression.
2. WriteaProgramforTokenseparation withagivenfile.
3. WriteaProgramforLexicalanalysis usingLEXtools.
4. WriteaProgramtoidentify whetheragivenlineis acomment ornot.
5. WriteaProgramtocheck whetheragivenidentifierisvalidor not.
6. WriteaProgramtorecognizestrings under‘a’,‘a*b+’,‘abb’.
7. WriteaProgramtosimulatelexicalanalyserforvalidatingoperators.
8. WriteaProgramforimplementationofOperatorPrecedenceParser.
9. Studyof LEXandYACC tools:
   i) WriteaProgramforimplementationofcalculatorusingYACC tool.
   ii) WriteaProgramforimplementationofRecursiveDescentParserusingLEX tool.
10. WriteaProgramforimplementationofLL(1) Parser.
11. WriteaProgramforimplementationofLALR Parser

Note: Atleast 5to10moreexercises tobegiven bytheteacher concerned.

CourseOutcomes:

- Thecoursewillhelpinimprovingtheprogrammingskillsof thestudents.
- Theimplementationof differentparsers willhelpinunderstandingofcompiler designing.

B.Tech. Computer Science and Engineering (Internet of Things and Cyber Security Including Block Chain Technology)
6th SEMESTER

ADVANCEDJAVALAB

Coursecode	LC-CSE-328G				
Category	ProfessionalCoreCourse				
Course title	Advanced JavaLab				
Schemeand Credits	L 0	T 0	P 2	Credits 1	Semester6
Class work	25 Marks				
Exam	25 Marks				
Total	50 Marks				
Durationof Exam	03Hours				

Students havetowriteatlist 15 programsbasedon the coursePCC-CSE-306G

B.Tech. Computer Science and Engineering (Internet of Things and Cyber Security Including Block Chain Technology)
6th SEMESTER

Coursecode	MC-317G			
Category	MandatoryCourse			
Coursetitle	**Constitution ofIndia**			
Scheme and credits	L	T	P	Credits
	2	0	0	0

CourseObjectives:

Students will be able to:

1.Understandthepremisesinformingthetwinthemesoflibertyandfreedomfromacivil rights perspective.

2.ToaddressthegrowthofIndianopinionregarding modernIndianintellectuals' constitutionalrole andentitlementtocivilandeconomic rightsas wellastheemergence of nationhood in the early years ofIndian nationalism.

3. To address the role ofsocialism in India afterthe commencement ofthe Bolshevik

Revolution in 1917 and its impact on theinitial draftingof theIndian Constitution.

Unit – I

Philosophy ofIndianConstitution: Salient features ofIndian Constitution, Preamble, and

NatureofIndian Constitution, Procedurefor amendment ofthe Constitution.

Unit – II

Federal structure and distribution oflegislative and financial powers betweenthe Union and the States

Unit – III

Organs ofGovernance: President – Qualification and Powers ofthe President, Governor- Qualification and Powers ofGovernor, Parliament: Composition, Qualifications and Disqualifications, Judiciary: Appointment, Tenure and Removal ofJudges.

Unit – IV

Fundamental Rights: Origin and development ofFundamental rights, Need forfundamental rights.Introduction to Right to equality, Right tofreedom, Right against exploitation, Right to freedom ofreligion, Cultural and Education rights and Fundamental duties.

References:

1. TheConstitution ofIndia, 1950 (BareAct), Government Publication.
2. Dr.S.N. Busi, Dr.B.R.Ambedkar framingofIndian Constitution, latestEdition
3. M.P.Jain,Indian ConstitutionLaw,Lexis Nexis, latest edition
4. D.D. Basu,Introduction to Constitution ofIndia,Lexis Nexis, latest edition.

CourseOutcomes:

Students will be able to:

1.Discussthegrowthofthedemandforcivilrightsin Indiaforthebulkof Indiansbefore the arrival ofGandhi inIndian politics.

2.Discusstheintellectualoriginsof theframework of argumentthatinformedthe conceptualization ofsocial reforms leadingto revolution in India.

3.Discussthecircumstancessurroundingthefoundationof theCongressSocialistParty [CSP]under theleadershipof JawaharlalNehruandtheeventual failureof theproposalof direct elections throughadultsuffragein theIndian Constitution.

4. Discuss thepassageofthe Hindu CodeBill of 1956.

Theexaminationoftheregularstudentswillbeconductedby theconcernedcollege/Institute internally.Eachstudentwillberequiredtoscoreminimum40%markstoqualifyinthe paper.Themarkswillnotbeincludedindeterminingthepercentageofmarksobtainedfor the award ofdegree.However,these markswillbe showninthedetailedmarkscertificateof the students

B.Tech. Computer Science and Engineering (Internet of Things and Cyber Security Including Block Chain Technology)
6th SEMESTER

Sensors and Actuators Lab

Coursecode	LC-IOT-326G				
Category	ProfessionalCoreCourse				
Course title	Advanced JavaLab				
Schemeand Credits	L	T	P	Credits	Semester6
	0	0	2	1	
Class work	25 Marks				
Exam	25 Marks				
Total	50 Marks				
Durationof Exam	03Hours				

1. Sense the Available Networks Using Arduino
2. Measure the Distance Using Ultrasonic Sensor and Make Led Blink Using Arduino
3. Detect the Vibration of an Object Using Arduino
4. Connect with the Available Wi-Fi Using Arduino
5. Sense a Finger When it is Placed on Board UsingArduino
6. Temperature Notification Using Arduino
7. LDR to Vary the Light Intensity of LED UsingArduino
8. MySQL Database Installation in Raspberry Pi
9. SQL Queries by Fetching Data from Database inRaspberry Pi
10. Switch Light On and Off Based on the Input ofUser Using Raspberry Pi

Note : More Experiments may be conducted on the basis of Syllabus of IoT and Sensors and Actuators for IoT