Sl No. KSAWUV/DCS/2021-22/   Date: 22-12-2021

M.SC. IN COMPUTER SCIENCE FOR THE ACADEMIC YEAR 2015-16

Programme Outcomes (PO):

The master of science in Computer Science Program provides the students with knowledge, general competence, and analytical skills on an advanced level, needed in academics, industry, research.

PO1: Be technology-oriented with the knowledge and ability to develop creative solutions, and better understand the effects of future developments of computer systems and technology on people and society.

PO2: Get some development experience within a specific field of Computer Science, through project work.

PO3: Get ability to apply knowledge of Computer Science to the real-world issues.

PO4: Be familiar with current research within various fields of Computer Science.

PO5: Use creativity, critical thinking, analysis and research skill.

PO6: Learn new technology, grasping the concepts and issues behind its use and the use of computers.

PO7: Get prepared for placement by developing personality & soft skills.

PO8: Communicate scientific information in a clear and concise manner.

PO9: Build up programming, analytical and logical thinking abilities.

PO10: Be able to understand the role of Computer Science in solving real time problems in society.

PO11: Know the recent developments IT, future possibilities and limitations, and understand the value of lifelong learning.

PO12: Get an ability to participate in debates, discussions in the society constructively.

ProgrammeSpecific Outcomes (PSO):

PSO1: Enrich the knowledge in the areas like Artificial Intelligence, Web Services, Cloud Computing, Paradigm of Programming language, Design and Analysis of Algorithms, Database Technologies Advanced Operating System, Mobile Technologies, Software Project Management and core computing subjects. Choose to study any one subject among recent trends in IT provided in the optional subjects.

PSO2: Students understand all dimensions of the concepts of software application and projects.

PSO3: Students understand the computer subjects with demonstration of all programming and theoretical concepts with the use of ICT.

PSO4: Developed in-house applications in terms of projects.

PSO5: Interact with IT experts & knowledge by IT visits.

CourseOutcomes (CO):

CourseCode	CourseName	CourseOutcomes
1HCT-CS-1.1	Discrete Mathematical Structures	• Studentscompletingthiscoursewillhaveunderstanding of the computational and algorithmicaspectsofSets,Relations,Mathematical Logic,Booleanalgebra,Graphs,TreesandAlgebraic Structure in the field of Computer sciences and itsapplications. • Abletoapply theminproblemsolving
1HCT-CS-1.2	Digital Logic and ComputerDesign	• Students completing this course will able to performtheconversionamongdifferentnumbersystems;familiarwithbasiclogicgates,buildsimplelogic circuitsusingbasicgates.Studentswillbeabletodesigncombinationalandsequentialcircuitsusingdiscrete components, Use basic structural HardwareDescription Languages to implement digital circuits,designandconductexperimentsrelatedtodigitalsystemsandto analyzetheir outcomes. • Studentswillgainunderstandingofbasicorganizationofcomputersystem.
1HCT-CS-1.3	DataStructureusingC++	• Students completing this course will be able todescribe the properties, interfaces, and behaviors ofbasicabstract datatypeslist,stack andqueue. • Willhaveabilitytoimplementandanalyze Various searchingtechniques • Will have ability to implement and analyze textprocessingtechniques
1HCL-CS-1.4	Practical-I: Data StructureUsingCPPLab	• StudentsunderstandOOPsconcepts;usethemtorepresentthedata structure. • Ability to code sorting methods, including selection,mergesort, heapsortandQuick sort.

		• Understanddynamicmemorymanagementtechniq ues using pointers, constructors, destructors,etc • Ability to implement Stack ADT and Queue ADT usingarray andlinked-listimplementationinC++. • Chooseappropriatedatastructurestorepresentdatai tems inrealworldproblems
1HCL-CS-1.5	Practical-II:DigitalLogicLab	• Hands-on experiments to study logic gates andrealization of OR, AND, NOT AND XOR Functionsusinguniversal gates. • Understand the relationships between combinationlogic and Boolean algebra, and between sequentiallogicandfinitestatemachines; • Abilitytodesignandimplementcombinationalcircu its like half adder/full adder, half subtractor/fullsubtractor,codeconverters,compara tors,MUX/DEMUX c). • Designandimplementsequentialcircuitslikeflip-flops, counters and shift registers d) Study of 8-bitDAC and8-bitADC
1SCT-CS-1.6	**Elective(anyone)** 1.6.1. UNIX and ShellProgramming	• The students completing this course will beunderstandsUNIXOperatingsystemfeat ures • Will be able to do shell programming in UNIXenvironment. • UnderstandandhandleUNIXsystemcalls. • Understand filters using Regular Expression: grep&sedgrep. • Ability to use Vi editor and Awk programming to solveprogrammingproblems.
	1.6.2. Computer OrientedNumericalM ethods	• Students will be able to demonstrate understandingofcommonnumerical methodsandhowtheyareused to obtain approximate solutions to otherwiseintractablemathematical problems. • Derive numerical methods for various mathematicaloperationsandtasks,suchasinterpolat ion,differentiation, integration, the solution of linear andnonlinear equations, and the solution of differentialequations. • ImplementnumericalmethodsinC/C++
M.Sc. II Semester:		
1HCT-CS-2.1	Advanced ComputerNetworks	• Afterthecompletionof thecoursethestudentswillbeabletoillustratereferenc emodelswithlayers,protocols andinterfaces. • Understands the functionalities of different Layers,Routingalgorithmandits applications. • They will be able to describe and analyze the basicprotocols of computer networks, and how they canbeusedtoassistinnetworkdesignandimplementa tion. • Explain and identify security and ethical issues

		incomputernetworking.
		• Abilitytosimulatekeynetworkingtechniques/algori thms.
1HCT-CS-2.2	Relational DatabaseManagemen tSystems(RDBMS)	• After completing this course students will have aclear understanding of RDBMS componentsand itspracticaluses.
		• DesignER- modelstorepresentsimpledatabaseapplicationscen arios
		• Write SQL commands to create tables and indexes,insert/update/deletedata,andquerydatainar elationalDBMS.
		• Improvethedatabasedesignbynormalization.
		• Explainconcurrencyrelatedissuesandsolutionstosol veconcurrencyproblem.
1HCT-CS-2.3	Design and Analysis ofAlgorithms	• The outcome of this course will help the studentstoanalyzetheperformanceofrecursiveandit erative algorithms.
		• Understandingandperformingsimpleproofsofalgor ithmiccomplexityandcorrectness.
		• Anunderstandingofavarietyofwell- knownalgorithms on some of the data structuresincludingthegraspingapproach,dividean dovercome,dynamicprogramming, backtracking.
		• TounderstandPandNPclasses.
		• Abilitytounderstandhowthechoiceofdatastructures andthealgorithmdesignmethodsimpacttheperform anceofprograms.
1HCL-CS-2.4	Practical- I:RDBMSLab	• Studentswillbeabletoconstructproblemdefinition statements for real life applications andimplementa databaseforthesame.
		• Design conceptual models of a database using ERmodelingforreallifeapplicationsandalsoconstru ct queriesinRelational Algebra.
		• Createandpopulate aRDBMS,usingSQL.
		• WritingqueriesinSQLtoretrieveinformationfroma database.
		• To Analyze and apply concepts of normalization todesignanoptimal database.
1HCL-CS-2.5	Practical-II: Design andAnalysisofAlgorit hmsLab	• Students will be able todesigning algorithms usingtheconceptsofdynamicprogramming,greedy method,Backtracking,BranchandBoundstrategy.
		• Able to compare, contrast, and choose appropriatealgorithmicdesigntechniquestopresenta nalgorithmthatsolvesa givenproblem.
		• Abletodeveloptheefficientalgorithmsfortheproble mswithsuitabledesigningtechniques.
1SCT-CS-2.6	**Elective(anyone)** 2.6.1. Advanced OperatingSystem Concepts	• Students will be able explain the structure of OSand basic architectural components involved in OSdesign
		• Able to analyze and design the applications to runin parallel either using process or thread

		models ofOS. • Analyzethevariousdeviceandresourcemanagement techniquesintimesharinganddistributedenvironme nt. • UnderstandtheMutualexclusion,Deadlockdetectio n and agreement protocols of Distributedoperatingsystem. • Interpret the mechanisms adopted for file sharingindistributedApplications. • Conceptualizethecomponentsinvolvedindesigning a contemporaryOS.
M.Sc. III Semester:		
2HCT-CS-3.1	SoftwareEngineering	• Thestudents willbeabletodemonstratetheminimumrequirement sforthedevelopmentofapplication. • Abilitytodevelop,maintain,efficient,reliableandco steffectivesoftwaresolutions. • Able to demonstrate and understand how to applycurrenttheories,models,andtechniquesthatpr ovidea basis forthesoftware lifecycle. • Ability to critically thinking and evaluate assumptionsforthetechniquesandtools necessaryforengineeringpractice.
2HCT-CS-3.2	ProgramminginJAVA A	• Knowledgeofthestructureandmodelofthejavaprog ramminglanguage. • UsetheJavaprogramminglanguageforproblemsolvi ng. • Designobjectorientedsolutionsforsmallsystemsinv olvingmultipleobjects.
2HCL-CS-3.3	DataMining	• The outcome of the course will help the students tounderstandthedataminingprinciplesandtechniqu es. • Understand the strengths and limitations of variousdatamininganddatawarehousingmodels.
2HCL-CS-3.4	Practical-I: JAVA and DataMiningusingWe ka/RLab	• The student will be able to demonstrate the workingofvariousdataminingtechniquesinWEKA environment. • Ability to apply mining techniques for realistic data inWekaandanalyzeandinterprettheresults. • AbilitytowritejavaprogramsusingvariousJavacons tructs. • ExtendJavaclasseswithinheritanceanddynamicbin ding • TodesignGUIcomponentswiththeJavaSwingAPI. • Towritethreadbasedjavaprogram • Designandprogramstand-aloneJavaapplications • □ □ ToreadandwritefilesinJava
2SCT-CS-3.5	**Elective(anyone)** 3.5.1. TheoryofComp utation	Aftercompletingthe course,thestudentwillbeableto: • Acquireafundamentalunderstandingofthecoreconc eptsinautomatatheory andformallanguage • Applyformalmathematicalmethodstoproveopropert iesoflanguages,grammarsandautomata. • Studentswillbetoconstructfinitestatemachinesandt heequivalent regularexpressions.

		• Studentswillbeabletoconstructpushdownautomata andtheequivalent contextfree grammars.
	3.5.2.SystemSoftware	• Studentswillbeabletodescribetheinternalsofassemblers,loader, linkersandcompilersand Ability to designandwritesimplecompiler. • Demonstrate the ability to analyze, design programsto demonstrate basic knowledge of systems softwareandoperatingsystems. • Handle toolslikeLEX&YACC
	3.5.3Computer OrganizationandArchitecture	• Describebasicorganizationofcomputerandthearchitectureof 8086microprocessor. • Implementassemblylanguageprogramforgiventask for8086microprocessor. • Demonstrate control unit operations andconceptualizeinstructionlevelparallelism. • Demonstrateandperformcomputerarithmeticoperationsoninteger andrealnumbers • Categorizememoryorganizationandexplainthefunctionofeachelementof amemory hierarchy. • Identify and compare different methods forcomputerI/Omechanisms
2OE-CS-3.6	**OpenElective**Computer Concepts andOffice Automation	• Upon completion of this course, the student will bedescribe the components of a typical computer andexplainthecharacteristicsof eachofthem. • Understand the working of Windows operatingsystemandtheservicesitprovides. • Understand the importance of computers in businessandsociety. • Solve common business problems using WordProcessorsandSpreadsheetspackages. • Identify categories of programs, system software andapplications. • Organizeandworkwithfilesandfolders. • Describe various types of networks network standardsandcommunicationsoftware.
M.Sc. IV Semester:		
2HCT-CS-4.1	WebTechnology	• Understand.NETplatform • Studentsareabletodevelopastaticanddynamicwebpage bytheuseof HTML,XMLandjavascript. • UnderstandanddemonstratetheuseofPHPelements throughprogramming. • AbilitytoestablishJDBCconnectivityandmanipulatetable entries usingJava code • LearnAJAXConcepts • HowtouseJavaScript tomakeAJAX requests • UseAJAXcallbackstorespondto serverresponses
2HCT-CS-4.2	Practical-I:WebProgrammingLab	• At the end of this lab the students will be able toanalyzeawebpageandidentifyitselementsandattributes. • CreatewebpagesusingtagsandCascadingStyleShee

		ts.
		• Builddynamicwebpagesusing JavaScript(Clientside programming).
		• Gain the PHP programming skills needed tosuccessfullybuildinteractive,data-drivensites.
		• Use cookies and sessions Workwithregularexpressions,handleexceptions, andvalidatedata
2HCL-CS-4.3	Practical-II:ProjectWork	• On successful completion the project student will beable to demonstrate a sound technical knowledge oftheirselectedprojecttopic.
		• Design engineering solutions to complex problemsutilizinga systemsapproach.
		• Toreportandpresent thefindingsofthestudyconductedinthepreferreddomain.
2SCT-CS-4.4	**Elective(anyone)** 4.4.3.EmbeddedSystems	• Studentswillacquireknowledgeaboutmicrocontrollersembeddedprocessorsandtheirapplications.
		• Ability to understand the internal architecture andinterfacingofdifferentperipheraldeviceswith Microcontrollers.
		• Abilitytowritetheprogramsformicrocontroller.
		• Abilitytounderstandtheroleofembeddedsystemsinindustry.
		• Abilitytounderstandthedesignconceptofembeddedsystems.
2OE-CS-4.5	**OpenElective** InformationTechnology	• Studentswillbe abletodevelopsimplewebpage.
		• Understandwhatblogsareandcreate blogs.
		• Familiaritywithadvancedconceptsofspreadsheets.
		• Understandthebasicconceptsofdatabasesandability to create tablesandformsinteractively.