

SRI VENKATESWARA UNIVERSITY: TIRUPATI
S.V.U COLLEGE OF CM & CS
DEPARTMENT OF COMPUTER SCIENCE



Course
Master of Computer Science (M.Sc.
(CS))

Choice Based Credit System (CBCS)
Academic Year 2017 – 18

VISION

To be the source of bringing out globally competent pioneering computing professionals, researchers, innovators and entrepreneurs and thereby succeed and contribute value to the knowledge-based economy and society.

MISSION

- To offer high-grade, value-based Post-graduate and Doctoral programmes in the field of Computer Applications.
- To provide conducive environments so as to achieve excellence in teaching-learning, and research and development activities.
- To bridge the gap between industry and academia by framing curricula and syllabi based on industrial and societal needs.
- To offer tasks for experiential technology-intensive knowledge through collaborative and interdisciplinary activities.
- To provide appropriate forums to develop innovative talents, practice ethical values and inculcate as enduring learners.
- To facilitate students to nurture skills to practice their professions competently to meet the ever-changing needs of society
- Achieve academic excellence in Computer Applications through innovative teaching and learning processes.
- To prepare the students to be professionally competent to face the challenges in the industry.
- Promote inter-disciplinary research among the faculty and the students to create state-of-art research facilities.
- To promote quality and ethics among the students.
- Motivate the students to acquire entrepreneurial skills to become global leaders

Program Educational Objectives (PEOs)

The graduate will

PEO1

- Domain Expertise: apply and continuously acquire knowledge, both theoretical and applied, related to core areas of computer science;

PEO2

- Computing Skills and Ethics: Demonstrate the ability to work effectively as a team member and/or leader in an ever-changing professional environment;

PEO3

- Lifelong Learning and Research: work productively as computer professionals demonstrating effective use of oral and written communication, working competently as a member of a team unit, adhering to ethical standards in the profession.

Program Outcomes (POs)

PO1

- Domain Expertise: communicate computer science concepts, designs, and solutions effectively and professionally;

PO2

- Computing Skills and Ethics: apply knowledge of computing to produce effective designs and solutions for specific problems;

PO3

- Lifelong Learning and Research: identify, analyse, and synthesise scholarly literature relating to the field of computer science

PO4

- Modern Tool Usage: use software development tools, software systems, and modern computing platforms.
- Social Contribution: an understanding of professional, ethical, legal, security and social issues and responsibilities

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 - Social Contribution: an understanding of professional, ethical, legal, security and social issues and responsibilities
- PO5**

PO6 ▪ Ethics: capable of evaluating personal and professional choices in terms of codes of ethics and ethical theories and understanding the impact of their decisions on themselves, their professions, and on society

PO7 ▪ Life Long Learning: apply design and development principles in the construction of software systems of varying complexity.

O1

▪ Demonstrate understanding of the principles and working of the hardware and software aspects of computer systems.

PSO2

▪ Ability to understand the structure and development methodologies of software systems. Possess professional skills and knowledge of software design process. Familiarity and practical competence with a broad range of programming language and open source platforms.

PSO3

Be acquainted with the contemporary issues, latest trends in technological development and thereby innovate new ideas and solutions to existing problems.

PO7

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Ethics: construction of software systems of varying complexity.

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Program Specific Outcomes (PSOs)

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1. Preamble:

M.Sc (CS) Programme is of two academic years with each academic year being divided into two consecutive (one odd + one even) semesters.

Choice-Based Credit System (CBCS) is a flexible system of learning and provides choice for students to select from the prescribed elective courses. A course defines learning objectives and learning outcomes and comprises of lectures / tutorials / laboratory work / field work / project work / viva / seminars / assignments / presentations / self-study etc. or a combination of some of these.

Under the CBCS, the requirement for awarding a degree is prescribed in terms of number of credits to be completed by the students.

The CBCS permits students to:

i.	choose electives from a wide range of courses offered by the Departments of the College/University.
ii.	opt for additional courses of interest
iii.	adopt an inter-disciplinary approach in learning
iv.	make the best use of expertise of the available faculty
v.	Skill Oriented Course and Multidisciplinary Course/Project are introduced as per Action Plan of National Education Policy-NEP-2020

2. MINIMUM QUALIFICATION:

Minimum qualification for seeking admission into M.Sc(CS) Programme is any U.G.Degree with computer science as one of the major subject, with at least 40% marks for general and pass marks for SC/ST in aggregate.

3. Branch of Study::M.Sc(CS)Programme

4. Programme Duration:

4.1 Minimum duration of the full-time M.Sc(CS) Programme is two consecutive academic years i.e. four semesters and maximum period is four academic years.

4.2 Semester:

Generally, each semester shall consist of 90 actual instruction days including sessional test days. However, instructional days may be reduced up to 72, when necessary, with increased instructional hours per course per week.

5. Credits:

Credit defines the quantum of contents/syllabus prescribed for a course and determines the number of instruction hours per week. The norms for assigning credits to a course for a duration of one semester shall be as follows:

- One credit for every one hour of lecture/tutorial per week
- One credit for every two hours of practical work/seminar per week
- 4 credits in a semester for project work.

6. **Classification of Courses:**

The courses of each specialization of study are classified into Core Courses, Elective Courses and Foundation courses. It is mandatory for a student to complete successfully all the **Core and Elective courses** pertaining to his/her of specialization of study.

SEMESTER-II											
Category	Course Code	Title of the Paper/Course	Core / Elective or Minor or Soft Skill Courses	Teaching hours/week			University Exam Duration [Hrs]	Marks			Credits
				L	T	P		IE / IA	EE / EA	Total Marks	
DSCC4	MSCS - 201C	Advanced Data Base Management System	Core	3	1	0	3	20	80	100	4
DSCC5	MSCS - 202C	Computer Networks	Core	3	1	0	3	20	80	100	4
DSCC6	MSCS - 203C	Computer Graphics	Core	3	1	0	3	20	80	100	4
DSEC2	MSCS - 204GE	1.E- Commerce	Generic Elective	3	1	0	3	20	80	100	4
		2.Accounting and Financial Management									
AECC2	MSCS - 205CF	Human Rights and Value Education	Compulsory Foundation	2	0	0	1.5	-	50	50	2
SEC2	MSCS - 206EF	1.Principles of Management	Elective Foundation	2	0	0	1.5	-	50	50	2
		2.Internet of Things									
	MSCS - 207P1		Practical I on Core	0	0	4	3	20	80	100	4

	MSCS - 208P2		Practical II on Generic Elective	0	0	4	3	20	80	100	4
								120	580	700	28

SEMESTER-III											
Category	Course Code	Title of the Paper/Course	Core / Elective or Minor or Soft Skill Courses	Teaching hours/week			University Exam Duration [Hrs]	Marks			Credits
				L	T	P		IE / IA	EE / EA	Total Marks	
DSCC7	MSCS - 301C	Data Warehousing and Data Mining	Core	3	1	0	3	20	80	100	4
DSCC8	MSCS - 302C	Web Technologies	Core	3	1	0	3	20	80	100	4
DSCC9	MSCS - 303C	Software Engineering	Core	3	1	0	3	20	80	100	4
DSEC3	MSCS - 304-GE-A	1.Systems Programming 2.Computer Algorithms 3.UID Using .Net Technologies 4.IT in Forensic Science 5.Software Testing	Generic Elective-A	3	1	0	3	20	80	100	4

DSEC4	MSCS - 305 GE-B	1.Cloud Computing 2.Big Data Analytics 3.Artificial Neural Networks 4.Cyber Security 5.Mobile App Development	Generic Elective –B	3	1	0	3	20	80	100	4
AECC3	MSCS - 306CF	Soft Skills & Personality Development	Compulsory Foundation	2	0	0	1.5	-	50	50	2
SEC3	MSCS - 307EF	1. Multimedia	Elective Foundation	2	0	0	1.5	-	50	50	2
		2.Data Science Essentials									
	MSCS - 308P1		Practical I on Core	0	0	4	3	20	80	100	4
	MSCS - 309P2		Minor Project work	0	0	8	3	20	80	100	4
			Outreach Activity/Seminar	0	0	0	--	0	0	0	0
								140	660	800	30

SEMESTER-IV												
Category	Course Code	Title of the Paper/Course	Core / Elective or Minor Or Soft Skill Courses	Teaching hours/week			University Exam Duration [Hrs]	Marks			Credits	
				L	T	P		IE / IA	EE / EA	Total Marks		
DSEC5	MSCS - 401MP	Major Project Work	Core	0	0	24	3	100	200	300	12	
All Semesters				Total							2500	100

The following are the open elective courses offered by the Department of Computer Science to other departments

1. Programming in C
2. Office Automation
3. Open-Source Tools

6.1 Core Course:-

There may be a core course in every semester. This is the course which is to be compulsorily studied by a student as a core requirement to complete the requirement of a programme in a said discipline of study.

6.2 Elective Course:- SEMESTER-I											
Category	Course Code	Title of the Course	Core/Elective/Skill Course	Teaching hours/week			Exam Duration [hrs]	Marks			Credits
				L	T	P		IE / IA	EE / EA	Total Marks	
DSCC1	MSCS - 101C	Computer Organization	Core	3	1	0	3	20	80	100	4
DSCC2	MSCS - 102C	Programming in Java & Data Structures	Core	3	1	0	3	20	80	100	4
DSCC3	MSCS - 103C	Operating Systems	Core	3	1	0	3	20	80	100	4
DSEC1	MSCS - 104GE	1.Mathematical Foundations for Computer Science 2.Computer Oriented Operational Research	Generic Elective	3	1	0	3	20	80	100	4
AECC1	MSCS - 105CF	Environmental Studies	Compulsory Foundation	2	0	0	1.5	50	50	50	2
SEC1	MSCS - 106EF	1.PC Hardware Basics	Elective Foundation	2	0	0	1.5	-	50	50	2

The main aim of Audit Course is to aware the Contemporary Societal issues. This course is under self study.

6.5 MOOCS and e-Learning:

Discipline centric elective course through MOOCS (Massive Open Online Course) platform. Students of I, II and/or III semesters can register for the course offered by authorized Institutions/Agencies through online with the approval of the DDC concerned. The certificate issued by the Institutions/Agencies after successful completion of the course will be considered for the award of the Grade to that course in open electives only. Further, 30-40% of the syllabus of any one course in I, II and III semesters may be taught through e-Learning.

7 Course Registration:

Every student has to register for the set of Courses offered by the Department in that Semester including those of Open Elective course of the other Departments and MOOCS courses with the total number of their Credits being limited by considering the permissible weekly contact hours (typically: 36/Week).

8 Credits Required for Award of Degree:

A student shall become eligible for the award of M.Sc(CS), if he/she earns a **minimum of 96** credits by passing all the core and electives along with practicals, seminars, comprehensive viva-voce prescribed for the programme.

8.1 It is mandatory for a student to complete successfully all the core courses pertaining to his/her specialization of study.

8.2 A student may choose Generic Electives from the list of elective courses offered from his/her specialization of study.

		2.Statistical Methods									
	MSCS - 107P1		Practical I On Core	0	0	4	3	20	80	100	4
	MSCS - 108P2		Practical II On Core & Generic Elective	0	0	4	3	20	80	100	4
								120	580	700	28

10. EVALUATION:
10.1 Evaluation shall be done on

8.3 Further, a student may select from a list of Elective courses from other Departments as Open Electives to "suit the required" number of credits, such that the total credits is atleast 96.

8.4 There should be a register maintained by the Head of the Department indicating for each student, the course (s) registered by the student within the department, so that "Generic Electives" opted by the student are indicated.

8.5 In the case of Open Elective, the Head of the Department should prepare a statement /register indicating the courses choosen/ opted by the students of the department in other departments.

8.6 The Head of the Department should send the list of registered papers (opted by the student) to the Principal with a copy to the controller of examinations immediately with in a week commencement of each semester.

8.7 A copy of the courses registered by the students in each semester approved by the Principal shall be sent to the Academic Branch as well as Examination Branch.

8.8 The list of students registered for Mooc's shall be furnished giving details of the programme with a copy to the Principal and Controller of Examinations.

8.9 A model of Registers to be maintained by the Head of the Department is given in the Annexure. It is mandatory on the part of the Head of the Department to maintain Register for each Course separately.

9. Scheme of Instruction :

The Board of Studies (BOS) of each specialization shall formulate the scheme of instruction and detailed syllabi. For every course learning objectives and learning outcomes should be defined. While formulating the scheme of instruction, the BOS shall facilitate to offer the minimum number of credits for the entire Programme. The syllabi of theory courses shall be organized into four/five units of equal weight. The question paper for the semester end University Examination in theory course shall consist of four / five units, two questions from each unit of syllabus carrying a total of 60 marks. There shall be short answer questions for a total of 20 marks.

Part A contains of 20 marks with two short question from each unit out of which the student has to answer five questions with each question carrying 4 marks with a total of 20 marks.

Examination in theory shall consists of five units in each paper, two questions from each unit of syllabus out of which a student shall answer one question carrying 12 marks for each question with a total of 60 marks.

continuous basis i.e. through Continuous Internal Evaluation (CIE) in the Semester and Semester End Examination (SEE). For each theory course, there shall be two internal tests of two hours duration carrying 20 marks each and one Semester end Examination of 3 hours duration carrying 80 marks. Internal marks for a maximum of 20 shall be awarded based on the average performance of the two internal tests.

10.2 The first internal test shall be held immediately after the completion of 50% of the instruction days covering 50% of the syllabus. The second internal test shall be held immediately after the completion of 90 instruction days covering the remaining the 50% of the syllabus.

10.3 It is mandatory for a student to attend both the internal tests in each theory course. The weighted average of the marks secured in two tests is awarded as sessional marks. However, 0.8 shall be assigned as weight for the best performance of the two tests whereas for the other test it shall be 0.2. If a student is absent for any of the internal test for whatsoever reason, the marks for that test shall be zero.

10.4 The students shall be permitted to verify the valuation of answer scripts of sessional tests and signature same the verification.

10.5 The valuation and verification of answer scripts of Sessional Tests shall be completed within a week after the conduct of the internal Tests. The answer scripts shall be maintained in the department until the semester end results are announced.

10.6 The valuation of End-Semester Examination answer scripts shall be arranged by the Controller of Examinations as per the University procedures in vogue.

10.7 : Evaluation of Practicals:

For each practical course, the sessional marks for a maximum of 100 shall be awarded by the teacher based on continuous assessment of practical work. The Semester end University practical Examinations carrying 100 marks shall be conducted by i) Internal examiners and ii) external examiner permitted by the Board of Studies of the Department a panel submitted to the Controller of examiners.

11 : PROJECT WORK:

11.1 The work shall be carried out in the concerned department of the student or in any recognized Educational Institutions of Higher learning/Universities/Industry/Organization as approved by the DDC. The student shall submit the outcome of the project work in the form of a report.

11.2 The Project work shall be evaluated at the end of the IV semester with 300 marks in which 100 marks are Internal and 200 marks are External evaluation of the project work.

12. Grading and Grade Points:

Grade Point: It is a numerical weight allotted to each letter grade on a 10-point scale

Letter Grade: It is an index of the performance of students in a said course. Grades are denoted by letters O, A+, A, B+, B, C, P and F.

Semester Grade Point Average (SGPA): It is a measure of performance of work done in a semester. It is the ratio of total credit points secured by a student in the courses registered in a semester and a total course credits taken during that semester. It shall be given up to two decimal places.

$$SGPA (Si) = \frac{\sum(Ci \times Gi)}{\sum Ci}$$

where C_i is the number of credits of the i th course and G_i is the grade point scored by the student in the i th course.

The CGPA is also calculated in the same manner taking into account all the courses undergone by a student over all the semesters of a programme, i.e.

Cumulative Grade Point Average (CGPA): It is a measure of overall cumulative performance of a student over all semesters. The CGPA is the ratio of total credit points secured by a student in the courses in all semesters and the sum of the total credits of all courses in all the semesters. It is given up to two decimal places.

$$CGPA = \frac{\sum(Ci \times Si)}{\sum Ci}$$

Where S_i is the SGPA of the i th semester and C_i is the total number of credits in that semester. The SGPA and CGPA shall be rounded off to two decimal points and reported in the transcripts.

Letter Grades and Grade Points:

A 10-point grading system with the following letter grades is to be followed.

Grades and Grade Points

Marks	Grade Point	Letter Grade
75-100	7.5-10	O (Outstanding)
65-74	6.5-7.4	A+ (First)
60-64	6.0-6.4	A (First)
55-59	5.5-5.9	B+ (Second)
50-54	5.0-5.4	B (Second)
40-49	4.0-4.9	C (Third)
00-39	0.0-3.9	F (Fail)

A student obtaining Grade F shall be considered failed and will be required to reappear in the examination.

12.1 In each Semester, every student who satisfies the attendance requirements should register for examination, failing which he/she shall not be promoted to the next semester. Any such student who has not registered for examination in a semester shall repeat that semester in the next academic year after obtaining the proceedings of the Principal.

- 12.2 To pass a course in M.Sc(CS) Programme, a student has to secure the minimum grade of (P) in the PG Semester end Examination. A student obtaining Grade F shall be considered failed and will be required to reappear in the examination as supplementary candidate.
- 12.3 A student is eligible to improve the marks in a paper in which he has already passed, within 4 years from the year of admission as and when it is conducted for the subsequent batches. This provision shall not be provided once the candidate is awarded Degree.
- 12.4 A student who has failed in a course can reappear for the Semester end Examination as and when it is held in the normal course. The Sessional Marks obtained by the student will be carried over for declaring the result.
- 12.5 Whenever the syllabus is revised for a course, the semester Examination shall be held in old syllabus three times. Thereafter, the students who failed in that course shall take the semester end Examination in the revised syllabus.

13. Award of Degree :

A student who has earned a minimum of 96 credits by passing in all the core courses and the minimum number of electives prescribed shall be declared to have passed the course work and shall be eligible for the award of degree.

13.1 A student who has earned extra credit shall be issued an separate certificate to that effect, mentioning the subject and grade.

14. Ranking and Award of Prizes / Medals:

14.1 Ranks shall be awarded in each branch of study on the basis of Cumulative Grade Point Average (CGPA) for top ten percent of the students or top three students whichever is higher.

14.2 The students who have become eligible for the award of PG degree by passing regularly without break, shall only be considered for the award of ranks.

14.3 Award of prizes, scholarships and other honours shall be according to the rank secured by the student as said above and in conformity with the desire of the Donor.

15. Attendance Requirements:

15.1 A student is required to complete the Programme of Study satisfying the attendance requirements in all the semesters within twice the prescribed period of study four academic years from the year of admission, failing which he/she forfeits his/her seat.

15.2 A student shall repeat the semester if he/she fails to satisfy the attendance requirements given below:

- i A student shall attend at least 60 percent of the maximum hours of instruction taken by the teacher for each course.
- ii A student shall attend at least 75 percent of the maximum hours of instruction taken for all the courses put together in that semester.

15.3 The Principal shall condone the shortage of attendance of a student provided, the student satisfies the clause 15.2 and obtain atleast 60% of overall attendance in a semester on medical grounds only.

15.4 A student who fails to satisfy the attendance requirements specified in clause 15.2 shall repeat that semester in the subsequent academic years with the written permission of the Principal.

15.5 A student shall not be permitted to study any semester more than two times during the Programme of his/her study.

15.6 A student who satisfies the attendance requirements specified in clause 15.2 in any semester may be permitted to repeat that semester after canceling the previous attendance and sessional marks of that semester with the written permission of the Principal. However, this facility shall be extended to any student not exceeding twice during the entire Programme of study provided the stipulation in clause 15.1 is met.

16. Conditions of Promotion:

A student shall be eligible for promotion to the next semester provided, if he/she satisfies the attendance requirements in the immediately preceding semester as specified in clause 15. The Principal of the concerned college will furnish the promotion list to the HOD at the beginning of II,III& IV Semester.

17. Transitory Regulations:

- 17.1 A student who has been repeated in the previous regulations for not satisfying the attendance requirements shall be permitted to join in these regulations provided the clauses 15.1 and 15.4 hold good.
- 17.2 Semester end University Examinations under the regulations that immediately precede these regulations, shall be conducted two times after the conduct of last regular examination under those regulations.
- 17.3 The students who satisfy the attendance requirements under the regulations that immediately precede these regulations, but do not pass the courses shall appear for the Semester end University Examinations in equivalent courses under these regulations as specified by the BOS concerned.

SYLLABUS

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MSCS101C:COMPUTERORGANIZATION

Department	ComputerScience	CourseType	DSCC
CourseTitle	ComputerOrganization	Course Code	MSCS101C
L-T-P	3-1-0	Credits	4
ContactHours	60Hrs	DurationofSEE	3Hrs
SEEMarks	80	CIEMarks	20

CourseObjectives:

CO1:Conceptualizethebasicsoforganizationalandarchitecturalissuesofadigitalcomputerandclassifyandcomputetheperformanceofmachines,MachineInstructions.

CO2: Understand conceptsof registertransfer logicand arithmetic operations.CO3:Explaindifferenttypesofaddressingmodesandmemoryorganization.CO4:Learnthedifferenttypesofserialcommunicationtechniques.

CO5:SummarizetheInstructionexecutionstages.

CourseLearningOutcomes:

CLO1:Understandthetheoryandarchitectureofcentralprocessingunit.

CLO2:Analyzesomeofthedesignissuesintermsofspeed,technology,cost,performance.CLO3. Design asimpleCPUwith applyingthe theory concepts.

CLO4.UseappropriatetoolstodesignverifyandtesttheCPUarchitecture.

CLO5.Learntheconceptsofparallelprocessing,pipeliningandinterprocessorcommunication.CLO6.Understandthearchitectureandfunctionalityofcentralprocessingunit.

CLO7.Exemplifyinabetterwaythel/Oandmemoryorganization.

UNITI:

LogicCircuits:Logicfunctions–synthesisoflogicfunctions–Minimizationsoflogic-

SynthesiswithNANDandNORgatesImplementationofLogicgates-Flip-flops–Registersandshiftregisters

– counters – decoders – Multiplexers – PLDs – sequential circuits. Basic Structure of Computers:FunctionalUnits-Basicoperationalconcepts–Busstructures–performance–MultiprocessorsandMulti computers: Functional Units – Basic operational concepts – Bus structures – performance –MultiprocessorsandMulticomputers–HistoricalPerspective.

UNITII:

Machine Instructions and programs: Numbers, Arithmetic operations and characters – Memorylocationsandaddress,operations–instructionsandinstruction,sequencing–addressingmodes.

UNITIII:

Input / Output organization: accessing I/O Devices – Interrupts – direct memory access – buses 240-interfacecircuits– Standard I/O Interfaces.

UNITIV:

Memory System, Concepts – semiconductor RAM memories - Read only memories – cachememories– performanceconsiderations–virtualmemoriesmanagementrequirements–

secondarystorageArithmetic:Additionandsubtractionofsignmembers–designoffastadders–multiplication of positive members – signed operand multiplication – fast multiplication – integer division – floatingpointnumbersandoperations.

UNIT V:

Basic Processing Unit: Concepts—execution of a complete instruction—Multiple—Bus organization—hardware control—microprogrammed control. Pipelining: Concepts—Data hazards—instruction hazards—influence on Instruction sets—datapath and control constructions—superscalar operation—ultraSPARCII—Performance considerations.

Text Books:

1. Hamacher C, Vranesic Z, and Zaky S. Computer Organization, 5th edition, McGraw—Hill, 2002

Reference Books:

1. Stallings W, Computer Organization and Architecture, 6th edition. Pearson Education, 2003.
2. Mano M.M. Computer System Architecture, 3rd edition. PHI, 1993.
3. Yarbrough JM, Digital Logic—Applications and Design, Thomas Lernig, 1997.
4. Heuring VP, and Jordan HF, Computer Systems Design and Architecture, Pearson Education, 1997.

MSCS102C:PROGRAMMINGINJAVAANDDATASTRUCTURES

Department	ComputerScience	CourseType	DSCC
CourseTitle	ProgrammingInJavaandData Structures	Course Code	MSCS102C
L-T-P	3-1-0	Credits	4
ContactHours	60Hrs	DurationofSEE	3Hrs
SEEMarks	80	CIEMarks	20

CourseObjectives:

- CO1:Useanintegrateddevelopmentenvironmenttowrite,compile,runandtestsimpleobject-orientedJavaprograms
- CO2:Identifyclasses,objects,memberofaclassandrelationshipsamongthemCO3:Usearraysandclassarray
- CO4:Createandaccesspackages
- CO5:DescribefeaturesofclassesandinterfacesinJava
- CO6:Demonstratetheconceptsofpolymorphismandinheritance

CourseLearningOutcomes:

- CLO1:abilitytochooseappropriatedatastructuresuchasstack,queues,linkedlist,treesandgraphstorepresentitemsinrealworld
- CLO2:abilitytoanalyzethetimeandspacecomplexitiesofalgorithms,andimplementvarioussearchingandsortingtechniques
- CLO3:Implementlinearandnon-lineardatastructures
- CLO4:Abilitytodesignprogramsusingavarietyofdatastructuresuchasstacks,queues,hashtables,binarytrees,searchtrees,heaps,graphs, andB-treesto solve specificproblems
- CLO5:Evaluatealgorithmsanddatastructuresintermsofimeandspacecomplexityofbasicoperations.

UNIT-I:

Object Oriented Programming Fundamentals & Java: Java Features, Object Oriented Programming Concepts – Abstraction, Encapsulation, Inheritance, and Polymorphism. Java Fundamentals: DataTypes,variables,arrays,Inheritance to classes: class fundamentals, Objects, References, Constructors, Overloading of methods, Access control, Nested and Inner classes. Inheritance: Inheritance basics, Using super, multilevel hierarchy, method overriding, dynamic method dispatch, abstract classes, final with inheritance.

UNIT-II:

Packages, Exceptions and Threads: Packages and Interfaces: Packages, Access protection, Importing packages, interfaces, Exception Handling: fundamentals, exception types, uncaught exceptions, using try, nested try statements, throw, throws, Java built-in exceptions, user defined exceptions. Multithreading: Thread model, main thread, creating a thread, multiple threads, thread priorities, synchronization, Interthread communication, String handling.

UNIT-III:

GUI Programming Features: Applets: Applet basics, Applet architecture, an applet skeleton, Appletdisplay method, Repainting, Using Status window, HTML APPLET tag, passing parameters to applet, Audio Clip interface. Event Handling; two event handling mechanisms, Event model, Eventclasses, sources of events, EventListener interfaces, Adapter classes.

UNITIV:

Introduction: Concept of Data Structures - Overview of Data Structures Implementation of Data Structures. Arrays: Definition - Terminology - One dimensional array - Multidimensional. Arrays - Pointer arrays. Linked Lists: Single linked lists Circular linked list - Double linked lists - Circular Double linked lists - Applications of linked lists. Stacks: Definition - Representation of stack - Operations of stack Applications of stack. Queues: Definition - Representation of Queues - Various queue structures - Application of queues.

UNIT-V:

Trees: Definition and concepts - Representation of Binary tree - Operations on Binary tree - Types of binary trees - Trees and forests - B Trees - B+ Tree Indexing
Graphs: Terminology - Representation of graphs - Operations and graphs Application of graph structures

Text Book

1. Herbert Schildt: "The Complete Reference Java 2" (Fifth Edition), TMH.
2. CLASSIC DATA STRUCTURES; by D. Samanta - PHI, 2001

Reference Books

1. Dietel & Dietel: "Java 2 How to Program", Prentice Hall.
2. Thamus Wu: "An Introduction to Object Oriented Programming With Java." TMH Balagurusamy: "Programming With Java": TMH.
3. Aho, Hopcroft, Ullman, "Data Structures and Algorithms", Addison Wesley Publishing
4. M. A. Weiss, "Data Structures and Algorithm Analysis in C++", Benjamin Cummings, 1994.
5. A.S. Tanenbaum, Langram Y, Augestein MJ, "Data Structures Using C", PHI, 1992.

MSCS103C:OPERATINGSYSTEMS

Department	ComputerScience	CourseType	DSCC
CourseTitle	OperatingSystems	Course Code	MSCS103C
L-T-P	3-1-0	Credits	4
ContactHours	60Hrs	DurationofSEE	3Hrs
SEEMarks	80	CIEMarks	20

CourseObjectives:

Studentswillbeableto

CO1:HaveathoroughunderstandingofthefundamentalsofOperatingSystems.

CO2:LearnthemechanismsofOStohandleprocessesandthreadsandtheircommunicationCO3:LearnthemechanismsinvolvedinmemorymanagementincontemporaryOS

CO4:GainknowledgeonMutualexclusionalgorithms,deadlockdetectionalgorithmsCO5:KnowthecomponentsandmanagementaspectsofconcurrencymanagementCO6:GainknowledgeonfileI/OoperationsandprotectionofvariousOS.

CourseOutcomes:

Afterthecoursethestudentsareexpectedtobeableto

CLO1:Understanddifferentstructures,servicesoftheoperatingsystemandtheuseofschedulingandoperationsonprocess.

CLO2:Understandtheuseofscheduling,operationsonprocess,theprocessschedulingalgorithmsandsynchronizationconcepts.

CLO3: Understandtheconceptsofdeadlock,memoryandvirtualmemorymanagementtechniques.

CLO4:UnderstandtheconceptsofFileSystem,Input/outputsystemsandsystemprotectionofvariousoperatingsystems

UNITI:

Introduction to Operating Systems, Types of Operating Systems, Computing Environments,Computersystemoperation,I/Ostructure,andHierarchy,Hardwareprotection,Networkstructure,Operating system components and services – system calls, Systems programs, System Structure,Virtualmachines,System design and Implantation.

UNITII:

CPU Scheduling: Scheduling criteria, Scheduling Algorithms, Multiple processors Scheduling, Real-timescheduling.ProcessSynchronization:-Thecritical-sectionproblem,Synchronizationhardware,Semaphores,ClassicproblemsofSynchronization,Criticalregions,Monitors .DeadLocks:Deadlockcharacterization,Deadlockhandling,Deadlockprevention,Deadlockavoidance,Deadlockdetection,andRecovery.

UNITIII:

Memory Management: Swapping, Contiguous memory allocation, Paging, Segmentation withparing Concept of Virtual memory Demand paging Page replacement, Allocation of frames,Thrashing. File System Interface & Implementation: File concept, Access methods, Directorystructure,FileSystemMountingFilesharingProtection,Filesystemstructure,andimplementation, Directoryimplementation,Allocationmethods.Freespacemanagement,Efficiencyandperformance,Recovery.

UNITIV:

I/O Systems: overview, I/O hardware, Application I/O interface, Kernel I/O subsystem, Transforming I/O to Hardware operations, STREAMS, Performance of I/O. Mass Storage Structure:- Disk Structure Disk Scheduling, Disk management, Swap-space Management, RAID Structure, Disk Attachment, Stable – Storage implementation, Tertiary – storage structure. Protection: Goals, Domain of protection, Access matrix and implementation, Access rights, capability – based systems, Language – based protection.

UNITV:

User authentication, program threats, system threats, security systems Facilities,. Linux system: History, Design principles, Kernel modules, process management, Scheduling Memory Management, File Systems, Input and output, IPC, Network structure, security.

Text Books:

1. Silberschatz A, Galvin P. B, and Gagne G. Operating System Concepts, 6th edition, John Wiley, 2002. 2. Tenenbaum A. S., Modern Operating Systems, 2nd edition, Pearson Education, 2001.

Reference Books:

1. Dhamdhere D. M., Operating Systems – A concept based Approach, Tata McGraw-Hill, 2002.
2. Flynn M, and McHoes A. M., Understanding Operating Systems, 3rd edition, Thomson Brooks/Cole, 2001.
3. Bhatt P. C. P., An Introduction to Operating Systems – Concepts and Practice, PHI, 2003.
4. Harris J. A., Operating Systems, Tata McGraw-Hill (Schaum's Outline series), 2002.
5. Remy Card, Eric Dumas, Linux Kernel Book, Orielly

MSCS104GE: MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE

Department	Computer Science	Course Type	DSEC
Course Title	Mathematical Foundation of Computer Science	Course Code	MSCS104GE
L-T-P	3-1-0	Credits	4
Contact Hours	60Hrs	Duration of SEE	3Hrs
SEEMarks	80	CIEMarks	20

Course Objectives:

Students will be able to

CO1: Understand set theory, relations and functions to read, understand Mathematical Induction and construct mathematical arguments.

CO2: Understand combinatorics, logic and mathematical reasoning to count and enumerate objects in systematic way.

CO3: Construct recurrence relations for elementary problems, and apply generating functions to solve recurrence relations.

CO4: Understand the concept of lattices and graph theory.

Course Outcomes:

After the course the students are expected to be able to

CLO1: Verify the correctness of an argument using propositional and predicate logic and truth tables. CLO2: Demonstrate the ability to solve problems using counting techniques and combinatorics in the context of discrete probability.

CLO3: Solve problems involving recurrence relations and generating functions.

CLO4: Understand some basic properties of graphs and related discrete structures, and be able to relate these to practical examples.

UNIT I

Mathematical Logic: Connectives Negation, Conjunction, disjunction, Statement Formulas and TT, Conditional and Biconditional, Well-formed formulas, tautologies, Equivalence of statement formulae, Duality law, Tautological implications, functionally complete set of connectives; Normal Forms Disjunctive, Conjunctive, Principal disjunctive and principal conjunctive normal forms.

UNIT II

The theory of inference for statement calculus, Validity using TT, rules of inference, consistency of premises and indirect method of proof, Automatic Theorem proving- Predicate Calculus, Predicates, the statement function, variables and quantifiers.

UNIT III

Set Theory : Basic Concepts of Set theory, Notation, Inclusion and equality , Power set, Operation on sets, Set identities, Ordered pairs and n-tuples, Cartesian products - Relations and Ordering , Relations, Properties of binary relation - relation matrix and graph of a relation, partition and covering of a set, equivalence relations, composition of binary relations, partial ordering, partially ordered set - Functions, Definition, composition, Inverse, Binary and n-ary operations, characteristic function of a set, hashing function - Recursions, Functions, sets and predicates.

UNIT IV

Lattices and Boolean Algebra: Lattices as partially ordered sets, properties of lattices, Lattices as Algebraic systems, Some special lattices-Boolean algebra, functions, representation and minimization.

UNIT V

Graph theory: Definition, Examples, Paths and Cycles, Planarity, coloring graphs

Text Books:

1. J.P.Tremblay and R.Manohar, Discrete Mathematical structures with application to Computer Science, Tata McGraw Hill publishers, 2008.
2. Robin.J.Wilson, Introduction to Graph theory. (Fourth edition)

MSCS104GE: COMPUTER ORIENTED OPERATIONS RESEARCH

Department	Computer Science	Course Type	DSEC
Course Title	Computer Oriented Operations Research	Course Code	MSCS104GE
L-T-P	3-1-0	Credits	4
Contact Hours	60Hrs	Duration of SEE	3Hrs
SEEMarks	80	CIEMarks	20

Course Outcomes:

After the course the students are expected to be able to

CLO1: Formulate a given simplified description of a suitable real-world problem as a linear programming model

CLO2: Solve the transportation problem, and assignment problem to drive their optimal solution.

CLO3: Identify the best stage of replacement and use waiting line models to estimate system performance

CLO4: Describe the functions and costs of an inventory system and determine the order quantity.

CLO5: Solve simple games using various techniques. Identify the resources required for a project and generate a plan and work schedule.

UNIT-I:

Introduction to Operations Research: Origin and Development of OR, Definition of OR, Applications of OR, Models and their classifications, Advantages and Limitations of OR

UNIT-II:

Linear programming problem (LPP): Formulation of LPP, Solution of LPP using graphical method and simplex method (inequality only).

UNIT-III:

Transportation problem: Mathematical formulation, IBFS of transportation problem using north-west corner rule, least-cost rule and Vogel's approximation method, Simple problems.

UNIT-IV:

Assignment problem: definition, mathematical formulation of assignment problem, solution of transportation problem using Hungarian Algorithm, simple problems

UNIT-V:

Job Sequencing Problem: Introduction – Definition – Terminology and Notations Principal Assumptions, Problems with n Jobs through Two Machines, Problems with n Jobs through Three Machines

Text Book:

1. Operations Research (2nd Edition) by S. Kalavathi, Vikas Publications Towers Pvt. Ltd.

Reference Books:

1. Operations Research by Kanthiswaroop, P.K. Gupta, Manmohan by Sultan Chand & Sons
2. Operations Research by Paneerselvam by Prentice Hall of India
3. Operations Research by S.D. Sarma
4. Operations Research by Taha, H.A., Ninth Edition

MSCS105CF:ENVIRONMENTALSTUDIES

Department	ComputerScience	CourseType	AECC
CourseTitle	EnvironmentalStudies	Course Code	MSCS105CF
L-T-P	2-0-0	Credits	2
ContactHours	60Hrs	DurationofSEE	1.5Hrs
SEEMarks	50	CIEMarks	00

CourseOutcomes:

Afterthecoursethestudentsareexpected tobe ableto

CLO1:Measureenvironmentalvariablesandinterpretresults.

CLO2:Evaluatelocal,regionalandglobalenvironmentaltopicrelatedtoresourceuseandmanagement

CLO3:Proposesolutionstoenvironmentalproblemsrelatedtoresourceuseandmanagement.CLO4:Interprettheresultsofscientificstudiesofenvironmentalproblems.

CLO5:Describethreatstoglobalbiodiversity,theirimplicationsandpotentialsolutions.

UnitI

Definition-Scopeandimportance.-Needforpublicawareness

UnitII

NaturalResources,Ecosystems

UnitIII

Environmental pollution

UnitIV

Social issues and the environment

UnitV

Human population and the environment

TextBooks:

1. Environmental Studies-S.N.Chary
2. A textbook on Ecology and Environmental Science—M.Prasanthrajan

MSCS106EF:PCHARDWAREBASICS

Department	ComputerScience	CourseType	SEC
CourseTitle	PcHardwareBasics	Course Code	MSCS106EF
L-T-P	2-0-0	Credits	2
ContactHours	60Hrs	DurationofSEE	1.5Hrs
SEEMarks	50	CIEMarks	00

ObjectiveoftheCourse:

To train the officials to acquire basic knowledge in computer hardware and peripherals for installation, PCassembly,troubleshootingandmaintenanceincludingssystemmanagementanditsbackupandundertakedisasterprevention,abasicknowledgeofTCP/IPnetworksworkgroup,internetandintranet.

LearningOutcomes

CLO1: Identify the hardware components of a computer such as processor, memory, disk, mainboard,peripheraldevicesetc.

CLO2: Identify Mother Board & its types and set up and configure Networking System using variousnetworkdevices.

CLO3:InstalldifferentOperatingSystemandallotherapplicationsoftware.,Printer,Scannerandtroubleshoottheirfaults.

CLO4:CustomizeOperatingSystemandmaintenanceofsystemapplicationsoftware.CLO5:AssembleandrepairDesktopComputerwithallitshardwarecomponents.

CLO6:ImplementNetworkSecuritytoprotectfromvariousattacksonnetworking.CLO7:Installandconfigure WindowsandLinuxserver.

UNITI

Basic concepts and architecture, Microprocessor, System, Memory, Control unit, Arithmetic &Logic Unit.Interrupts, Operating system, Virtual memory, Cache memory. Peripheral Devices:Keyboard, CRT, Display, Monitor, Printer. Magnetic Storage Devices: Floppy disk drive, Hard diskdrive. PC Hardware overview: Hardware, BIOS-DOS Interaction, PC Hardware, Motherboardlogic,I/ODatatransfer, PCHardwarecomponents&ICs,Computermemories.

UNITII

Mother Board: Introduction to mother boards & its types, Ports, Slots, Connectors, Add on cards,Power supply units, Cabinet types, Mother boards Problem Diagnosis. Bus Standards andNetworking: ISA, PCI, SCSI, IDE, USB – comparative study and characteristics, Network InterfaceCards,Cablesandconnectors.

UNITIII

Maintenance&Troubleshooting:Systemconfiguration,Pre-Installationplanning,Installationpractice,Preventivemaintenancetools,Procedures,Plan/schedule.

UNITIV

Troubleshooting: Computer faults, Types of faults, Diagnostic programming & tools, Systematic troubleshooting, Symptom's observation & analysis, Fault diagnosis, Rectification, Troubleshooting levels, Different troubleshooting techniques - Functional area approach, Split half method, Divergent, Convergent and feedback path Method.

UNITV

Installation and Troubleshooting: Hard drives, Operating system and software, Sound card, Videocard, HDD, FDD, CD-Rom drive, Key board and Mouse, Modem, Power supply, I/O ports, Printer interface problems, Printer problems, Attaching Add-on cards. PC Assembling, up gradation and integration, Basic data recovery & disaster recovery.

Text Books:

1. B.Govindarajalu, "IBM PC Clones Hardware, Troubleshooting and Maintenance", Tata McGraw-Hill.
2. Craig Zacker, John Rourke, "The Complete Reference: PC Hardware", Tata McGraw-Hill, New Delhi.

Reference Books:

1. Scott Mueller "Upgrading and Repairing PCs", 20th Edition, Pearson Education, New Delhi, 2012.
2. Ron Gilster, "PC Hardware - a beginner's Guide", Tata McGraw-Hill.
3. Mike Meyers, "Introduction to PC Hardware and Troubleshooting", Tata McGraw-Hill, New Delhi.
4. Dan Gookin, "Troubleshooting Your PCs for Dummies", 3rd Edition, Wiley Publishing Inc.

MSCS106EF:STATISTICALMETHODS

Department	ComputerScience	CourseType	SEC
CourseTitle	StatisticalMethods	Course Code	MSCS106EF
L-T-P	2-0-0	Credits	2
ContactHours	60Hrs	DurationofSEE	1.5Hrs
SEEMarks	50	CIEMarks	00

LearningOutcomes

Upon successful completion of this course, students will be able to:

CLO1: Calculate and interpret the correlation between two variables. CLO2: Calculate the simple linear regression equation for a set of data.

CLO3: Explain the principles of linear regression and correlation, including least square method, predicting a particular value of Y for a given value of X and significance of the correlation coefficient.

CLO4: Know the association between the attributes.

CLO5: Know the construction of point and interval estimators. • Evaluate the properties of estimators.

CLO6: Demonstrate understanding of the theory of maximum likelihood estimation. • Analyze Statistical data using MS-Excel.

UNIT-I

Introduction-scope and limitations of statistical methods-classification of data-Tabulation of data

-Diagrammatic and Graphical representation of data-Graphical determination of percentiles and quartiles.

UNIT-II

Measures of location: Arithmetic mean, median, mode, geometric mean and Harmonic mean and their properties.

UNIT-III

Measures of dispersion: Range, Quartile deviation, mean deviation, Standard deviation, combined standard deviation, coefficient of variation.

UNIT-IV

Measures of Skewness Karl Pearson's, Bowley's, Kelly's and coefficient of Skewness and kurtosis based on moments.

UNIT-V

Correlation-Karl Pearson-spearman's rank correlation-

concurrent deviation methods. Regression Analysis: Simple Regression Equations.

TextBooks

1. Fundamental of Mathematical Statistics-S.C.Gupta & V.K.Kapoor-Sultan Chand

ReferenceBooks

1. Statistical Methods-Snedecor G.W. & Cochran W.G. Oxford & DII

2. Elements of Statistics-Mode. E.B.-Prentice Hall

3. Statistical Methods-Dr.S.P.Gupta-Sultan Chand & Sons

SEMESTER-II
MSCS201C:ADVANCEDDATABASEMANAGEMENTSYSTEMS

Department	ComputerScience	CourseType	DSCC
CourseTitle	AdvancedDatabase ManagementSystems	Course Code	MSCS201C
L-T-P	3-1-0	Credits	4
ContactHours	60Hrs	DurationofSEE	3Hrs
SEEMarks	80	CIEMarks	20

CourseObjectives:

Theobjectiveofthecourseistopresentanintroductiontodatabasemanagementsystems,withanemphasisonhowtoorganize,maintainandretrieve-efficiently,andeffectively-informationfromaDBMS.

LearningOutcomes:

Uponsuccessfulcompletionofthiscourse,studentsshouldbeableto:

CLO1: Describe the fundamental elements of relational database management systems, basicconceptsofrelationaldatamodel,entity-relationshipmodel,

CLO2:Explain the relational databasedesign, relational algebraand SQL,Convert the ER-modelto relational tables, Design ER-models to represent simple database application scenariospopulaterelationaldatabaseandformulateSQLqueriesondata.

CLO3:Improvethedatabasedesignbynormalization.

CLO4:OverviewofPhysicalStorageMedia,FileOrganization,B+-TreeIndex Files–B-TreeIndexFiles,QueryProcessing,Transaction Management

CLO5:Toadministeradatabasebyrecommendingandimplementingproceduresincludingdatabasetuning,backup,queryprocessing,queryoptimizationandrecovery.

CLO6:Understandadvancedqueryinganddecisionsupportsystem.

UNIT-I

FileSystemVs.DBMS-DatabaseSystemApplications-ViewofData-Databaselanguage–
 Databasedesign – ERModel_RelationalModel–NetworkDataModel–HierarchicalDataModel
 –DataStorage&Querying–DataArchitecture.

UNIT-II

RelationalModel–StructureofRelationalDatabases–RelationalAlgebraandCalculus–SQL–Basic Structure – Set Operations – Aggregate Functions – Null Values – Nested Queries – ComplexQueries–Views–
 ModificationoftheDatabase -AdvancedSQL–Triggers.

UNIT-III

Functional Dependencies - Features of Relational designs – Decomposition and Normalizationusing Functional Dependencies and Multivalued Dependencies – Join dependencies- Domain keyNormalform.

UNIT-IV

Overview of Physical Storage Media – Magnetic disks – RAID – Territory Storage – File Organization – Organization of records in Files – Indexing and Hashing – Ordered Indices – B+ -Tree Index Files – B-Tree Index Files – multiple Key Access – Static and Dynamic Hashing – Query Processing – Transaction Management – Transactions – Concurrency.

UNIT-V

Distributed Databases – Homogeneous and Heterogeneous Databases – Distributed Data Storage – Distributed Transactions – Commit Protocols – Concurrency Control. Case Study : Oracle – Introduction – Basics elements of SQL – Operators – Expression Functions – SQL Statements – PL/SQL – Triggers – Cursor.

Text Books:

1. Abraham Silberschatz, Henry F. Korth and S. Sudarshan – “Database System Concepts”, Fifth Edition, McGraw-Hill, 2006.

References Books:

1. Raghu Ramakrishnan and Johannes Gehrke, “Database Management Systems”, Tata McGraw-Hill Publishing Company, 2003.
2. Ramez Elmasri and Shamkant B. Navathe, “Fundamental Database Systems”, Third Edition, Pearson Education, 2003.
3. Hector Garcia-Molina, Jeffrey D. Ullman and Jennifer Widom – “Database System Implementation” – Pearson Education – 2000.
4. Narang, “Database Management Systems”, 2nd ed., PHI

MSCS202C:COMPUTERNETWORKS

Department	ComputerScience	CourseType	DSCC
CourseTitle	ComputerNetworks	Course Code	MSCS 202C
L-T-P	3-1-0	Credits	4
ContactHours	60Hrs	DurationofSEE	3Hrs
SEEMarks	80	CIEMarks	20

CourseDescription:

The course introduces an overview of the concepts and fundamentals of computer networks, datacommunication concepts and techniques in a layered network architecture and their protocols,switching and routing, types of communication, various types of networks (LAN, MAN, WAN andWireless networks); bridges, routers and gateways; , network congestion, network topologies,network configuration and management, network model components, error detection and recovery;andlocalandremoteprocedures.

CourseObjectives

- Describehowcomputernetworksareorganizedwiththeconceptoflayeredapproach.
- ImplementasimpleLANwithhubs,bridgesandswitches.
- DescribehowpacketsintheInternetaredelivered.
- AnalyzethecontentsinagivenDataLinklayerpacket,basedonthelayerconcept.
- Describehowroutingprotocolswork.

CourseOutcomes(COs).

CO1: Understand fundamental underlying principles of computer networking, networkcomponents,categoriesofnetworks,OSImodelanditsfunctions.

CO2:

Understanddetailsandfunctionalityoflayerednetworkarchitecture,expresstheirknowledgeinvariouserrordetectionanddataflowcontroltechniques

CO3: Toanalyzethevariousroutingalgorithms,analyzeperformanceofvariouscommunicationprotocols.

CO5: Understandandcompare,distinguish the varioustransport and applicationlayer protocols

UNIT-I:

Introduction, Network models – Internet model, OSI model Physical Layer: Signals – Analog,Digital, Digital Transmission – Coding, Sampling, Analog Transmission – Modulation of digitaland analog signal, Multiplexing – FDM, WDM, TDM, Transmission Media – cable, wireless,CircuitswitchingandTelephonenetwork,DSLTechnology,Cablemodern,SONET.

UNIT-II:

DataLinkLayer:Errordetectionandcorrection,DatalinkcontrolandProtocols–Stopandwait,Go-back-n, Selective repeat, HDLC, point to point access, Channelization, LANS – TraditionalEthernet,FastEthernet,GigabitEthernet,WirelessLAN"s–IEEE802.11,Bluetooth,Connecting LANS – Connecting devices, Backbone networks, Virtual LANS, Cellular telephony, Satellitenetworks,Virtualcircuit switching,Framerelay,ATM.

UNIT-III:

Network Layer: Inter-networks, Addressing, Routing, Network layer Protocols—ARP, IP, ICMP, IPv6, Routing—Introduction, Unicast routing, Protocols—RIP, OSPF, BGP, Multicast Routing, Protocols—DVMRP, MOSPF, CBT, PIM.

UNIT-IV:

Transport Layer: Process-to-Process Delivery, UDP, TCP, Data traffic, Congestion and Control, Quality of service (QoS) and techniques to improve QoS, Integrated services, QoS in Switched networks. Security: Introduction. Symmetric-key cryptography, public key cryptography, Message security, Digital signature, User authentication, Key management, Kerberos. Communication Security, Authentication Protocols, E-mail Security, Web security, Social Issues.

UNIT-V:

Application Layer: Design issues, file transfer, access and management. Client-Server model, Socket interface Introduction to DNS, Distribution of namespace, DNS in the Internet. Electronic mail, SMTP, File Transfer, FTP, HTTP, World Wide web.

Text Books:

1. Forouzan BA, Data Communications and Networking, 4th edition, Tata McGraw-Hill, 2007.
2. Tanenbaum AS, Computer Networks, 4th edition, Pearson Education, 2003.

Reference Books:

1. Stallings W, Data and Computer Communications, 7th edition, Pearson Education, 2004.
2. Gallo MA, and Hancock WM, Computer Communications and Networking Technologies, Thomson Brooks/Cole, 2002.
3. Comer DE, Computer Networks—and Internets with Internet Applications, 4th edition, Pearson Education, 2004.
4. Kurose JF, and Ross KW, Computer Networking—A Top-down Approach Featuring the Internet, Pearson Education, 2001.
5. Tomasi W, Introduction to Data Communications and Networking, Pearson Education, 2004.

MSCS203C:COMPUTERGRAPHICS

Department	ComputerScience	CourseType	DSCC
CourseTitle	ComputerGraphics	Course Code	MSCS 203C
L-T-P	3-1-0	Credits	4
ContactHours	60Hrs	DurationofSEE	3Hrs
SEEMarks	80	CIEMarks	20

CourseObjectives:

1. Themainobjectiveofthecourseistointroducestudentswithfundamentalconceptsandtheoryofcomputergraphics.
2. Itpresentstheimportantdrawingalgorithm,polygonfitting,clippingand2Dtransformationcurvesandanintroductionto3Dtransformation.
3. ItprovidesthebasicsofapplicationprogramminginterfacewhichallowsstudentstodevelopprogrammingskillsinCG.

CourseOutcomes:

Uponthecompletionofthecoursestudentswillbeableto:-

CO1–Explaintheapplications,areas,andgraphicpipeline,displayandhardcopytechnologies.

CO2–Applyandcomparethealgorithmsfordrawing2Dimagesalsoexplainaliasing,anti-aliasingandhalf-toningtechniques.

CO3–Apply2D&3Dcomputergraphics.

CO4–Analyzeandapplyclippingalgorithmsandtransformationon2Dimages.

CO5–Solveproblemsonviewingtransformationsandexplaintheprojectionandhiddensurfacereovalgorithms.

CO6–Explainbasicraytracingalgorithm,shading,shadows,curvesandsurfacesandalsosolveproblemsofcurves.

UNIT I

Introduction, Application areas of Computer Graphics, overview of graphics systems, video-display devices, Raster-scan systems, random scan systems, graphics monitors and work stations and input devices Output primitives: Points and lines, line drawing algorithms, mid-point circle and ellipse algorithms. Filled area primitives: Scan line polygon fill algorithm, boundary-fill and flood-fill algorithms.

UNIT II

2-D Geometrical transforms: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems. 2-D Viewing: The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland-Hodgeman polygon clipping algorithm.

UNIT III

3-D Object representation: Polygons surfaces, quadrics surfaces, spline representation, Hermite curve, Bezier curve and B-spline curves, Bezier and B-spline surfaces. Basic illumination models, polygon rendering methods.

UNIT IV

3-D Geometric transformations: Translation, rotation, scaling, reflection and shear transformations, composite transformations, 3-D viewing: Viewing pipeline, viewing coordinates, view volume and general projection transforms and clipping.

UNIT V

Visible surface detection methods: Classification, back-face detection, depth-buffer, scan-line, depth sorting, BSP-tree methods, area sub-division and octree methods Computer animation: Design of animation sequence, general computer animation functions, raster animation, computer animation languages, keyframe systems, motion specifications

TEXTBOOKS:

1. "Computer Graphics Cversion", Donald Hearn and M. Pauline Baker, Pearson Education.
2. "Computer Graphics Principles & practice", second edition in C, Foley, Van Dam, Feiner and Hughes, Pearson Education.

REFERENCE BOOKS:

1. "Computer Graphics Second edition", Zhigang Xiang, Roy Plastock, Schaum's outlines, Tata McGraw Hill edition.
2. "Procedural elements for Computer Graphics", David F Rogers, Tata McGraw Hill, 2nd edition.
3. "Principles of Interactive Computer Graphics", Neuman and Sproul, TMH.
4. "Principles of Computer Graphics", Shalini, Govil-Pai, Springer.
5. "Computer Graphics", Steven Harrington, TMH.
6. Computer Graphics, F.S. Hill, S.M. Kelley, PHI.
7. Computer Graphics, P. Shirley, Steve Marschner & Others, Cengage Learning.
8. Computer Graphics & Animation, M.C. Trivedi, Jaico Publishing House.
9. An Integrated Introduction to Computer Graphics and Geometric Modelling, R. Goldman, CRC Press, Taylor & Francis Group.
10. Computer Graphics, Rajesh K. Maurya, Wiley India.

MSCS204GE:E-COMMERCE

Department	ComputerScience	CourseType	DSEC
CourseTitle	E-Commerce	Course Code	MSCS204GE
L-T-P	3-1-0	Credits	4
ContactHours	60Hrs	DurationofSEE	3Hrs
SEEMarks	80	CIEMarks	20

CourseDescriptionandObjectives:

This course provides an introduction to information systems for business and management. It is designed to familiarize students with organizational and managerial foundations of systems, the technical foundation for understanding information systems

LearningOutcomes

After Completion of the subject students should be able to

CLO1: Understand the basic concepts and technologies used in the field of management information systems

CLO2: Have the knowledge of the different types of management information systems

CLO3: Understand the processes of developing and implementing information systems

CLO4: Be aware of the ethical, social, and security issues of information systems

UNIT-I:

Electronic Commerce: Electronic Commerce Framework; Electronic Commerce and Media Convergence; The Anatomy of E-Commerce Application; Electronic Commerce Organization Applications- The Network Infrastructure for Electronic Commerce: Market Forces Influencing the I-Way; Components of the I-Way; Network Access Equipment; the Last Mile: Local Roads and Access Ramps; Global Information Distribution: Networks: Public Policy Issues Shaping the I-Way. Case study: B2B Commerce

UNIT-II:

The Internet as a Network Infrastructure: The Internet Terminology; Chronological History of the Internet NSFNET: Architecture and Components: Globalization of the Academic Internet; Internet Governance: The Internet Society – An Overview of Internet Applications – Electronic Commerce; World Wide Web (WWW) as the Architecture: Web Background: Hypertext Publishing; Technology behind the Web: Security and the Web- Consumer-Oriented Electronic Commerce: Oriented Applications; Mercantile Process Models Mercantile Models from the Consumer's Perspective; Mercantile Models from the Merchant's Perspective. Case study: E-Commerce/High Security (PCI)

UNIT-III:

Electronic Payment Systems: Types of Electronic Payment Systems; Smart Cards and Electronic Payment Systems; Credit Card-Based Electronic Payment systems: Risk and Electronic Payment Systems Designing Electronic Payment systems – Inter organizational Commerce and EDI: Legal, security, and Privacy Issues: EDI and Electronic Commerce – EDI Implementation, MIME, and Value-Electronic Payment Systems: Types of Electronic Payment Systems; Smart Cards and Electronic Payment Systems;

Credit Card-Based Electronic Payment systems: Risk and Electronic Payment Systems Designing Electronic Payment systems – Inter organizational Commerce and EDI: Legal, security, and Privacy Issues: EDI and Electronic Commerce – EDI Implementation, MIME, and Value- Added Networks : Standardization and EDI; EDI Software Implementation: EDI Envelope for Message Transport: Value- Added Networks (VANs); Internet – Based EDI. Case study: Social Media Marketing

UNIT-IV:

Intra organization Electronic Commerce: Internal Information System: Macro forces and Internal Commerce; Work-Flow Automation and Coordination; Customization and Internal Commerce; Supply Chain Management (SCM) – The Corporate Digital Library: Dimensions of Internal Electronic Commerce Systems; Making a Business Case for a Document Library; Types of Digital Document Library; Types of Digital Documents; Issues behind Document Infrastructure; Corporate Data Warehouses. Case study: Email Marketing, Email Personalization

UNIT-V:

M-Commerce: Introduction to Mobile Commerce, Limitations, history, applications, architecture, transaction models, payment methods, advantages, disadvantages Case study: Mobile app marketing case study: O2 Priority Moments get small businesses on side

TEXTBOOK:

1. Kalakota and Andrew B. Whinston. Frontiers of Electronic Commerce, Pearson Education.

REFERENCE BOOKS:

1. Henry Chan, Raymond Lee, Tharan Dillan and E. Chany, E-Commerce, Wiley, 2003.
2. Danjel Minoli and Emuna Mimoli, Web Commerce Technology, Tata McGraw Hill, 1999.
3. Marilyn Greenstein and Todd M Feinman, a Electronic Commerce, Tara McGraw Hill Edition.
4. Craig Patridge, Giga-bit Networking, Addison – Wesley, 1994
5. Paul M-Commerce: Book Your Business with the Power of Mobile Commerce

MSCS204GE: ACCOUNTING AND FINANCIAL MANAGEMENT

Department	Computer Science	Course Type	DSEC
Course Title	Accounting And Financial Management	Course Code	MSCS204GE
L-T-P	3-1-0	Credits	4
Contact Hours	60Hrs	Duration of SEE	3Hrs
SEEMarks	80	CIEMarks	20

Learning Outcomes: Financial Management Students will be

- Able to list, define and describe the sources of Finance, Financial Management, Working Capital, Inventory Management, and approaches of working capital finances
- Able to compare, differentiate, identify, discuss & explain proposals with the help of capital budgeting, different sets of capital structure planning, gross working capital vs net working capital, impact of discounting factors for selection of proposal, positive & negative side of excessive working capital, financial management, ratio analysis, working capital, inventory management, cash management, receivables management, capital budgeting, capital structure, leverage, cost of capital
- Able to prepare, choose, select & compute Performance of financial statement, statement of working capital requirement, statement of inventory management, more suitable proposal with the help of capital budgeting, best suitable option among different proposals with the help of capital budgeting, optimal capital structure • Able to analyze, calculate financial statements using various ratios, working capital policies, Working capital requirement, optimal capital structure.

UNIT I

1. Introduction; 2. Accounting System; 3. Inventory Control System; 4. Payroll System

UNIT II

1. Starting with Tally 7.2; 2. Creating Accounts Masters; 3. Creating Inventory Masters; 4. Entering Accounts Vouchers;

UNIT III

5. Entering Inventory Vouchers; 6. Introduction to VAT (Value Added Tax); 7. Ledgers and VAT;
8. More on VAT;

UNIT IV

9. VAT Documents and Reports; 10. Introduction to TDS; 11. Display/Reports in Tally; 12. The Collaborative Tally;

UNIT V

13. The Administrative Tally A. Fundamentals of Accounting; B. Fundamentals of Inventory

TEXTBOOKS:

1. Computer Accounting With Tally 7.2, Firewall, Firewall Media, Laxmi Publications
2. Comdex Tally 9 Course Kit by Namrata Agrawal, Dream Tech Press

REFERENCE BOOKS:

1. Tally 9 by Dinesh Maidarsani By Firewall Media
2. Tally 9.0 English Edition Google EBook By Computer World

MSCS205CF:HUMANRIGHTSANDVALUEEDUCATION

Department	ComputerScience	CourseType	AECC
CourseTitle	HumanRightsandValue Education	Course Code	MSCS205CF
L-T-P	2-1-0	Credits	2
ContactHours	60Hrs	DurationofSEE	1.5Hrs
SEEMarks	50	CIEMarks	00

CourseObjectives:

- Toteachandinculcatetheimportanceofvalue-basedliving.
- To give studentsadeeper understandingaboutthepurposeoflife.
- Explaintheevolutionandgrowthofhumanrights
- IdentifytheroleofIndianConstitutionandtheinclusionofhumanrightsinit.
- Analyzetheeffortsofeducationatvariouslevelstocreateanddevelopanawarenessonhumanrights,throughcurriculum,methods,techniques,strategiesandactivities.

CourseOutcomes:

- Studentswillemergeasresponsiblecitizenswithclearconvictiontopracticevaluesandethicsinlife.
- Studentswillcontributeinbuildingahealthynation
- Recognizetheimportanceofhumanrightstoanindividual.
- Classifyrightsintovariouscategorieswhichishelpfulforthegrowthanddevelopmentofanindividual.
- Realisehowimportanttoknowandtackleissueshataresocially,culturally,physicallyandemotionallyimportant.
- Knowabouttheirrightsandprotectthem,howrightscontributetothedignityofthehumanpersonality.

UNIT I

Value Education- Definition – relevance to present day -Concept of HumanValues – Selfintrospection – Self esteem. Family values - Components, structure and responsibilities of familyNeutralization of anger – Adjustability – Threats of family life – Status of women in family andsociety–Caringforneedyandelderly– Timeallotmentforsharingideasandconcerns.

UNIT II

Medical ethics- Views of Charaka, Sushruta and Hippocrates on moral responsibility of medicalpractitioners.Codeofethicsformedicalandhealthcareprofessionals.Euthanasia,Ethicalobligationtoanimals,Ethical issuesinrelationtohealthcareprofessionalsandpatients.Socialjusticeinhealthcare, human cloning, problems of abortion. Ethical issues in genetic engineering and Ethical issuesraisedbynewbiologicaltechnologyor knowledge.

UNIT III

Business ethics- Ethical standards of business-Immoral and illegal practices and their solutions.Characterics of ethical problems in management, ethical theories, causes of unethical behavior,ethicalabusesandworkethics.

UNITIV

Environmentalethics-Ethicaltheory,manandnature–

Ecologicalcrisis,Pestcontrol,Pollutionandwaste,Climatechange,Energyandpopulation,Justiceandenvironmentalhealth.

UNITV

Social ethics- Organ trade, Human trafficking, Human rights violation and social disparitiesFeminist ethics, surrogacy/pregnancy. Ethics of media- Impact of Newspapers, Television MoviesandInternet.

Booksforstudy:

1. JohnSMackenzie:Amanualofethics.
2. "TheEthicsofManagement"byLarueToneHosmer,RichardD.IrwinInc.
3. "ManagementEthics–integrityatwork"byJosephA.PetrickandJohnF.Quinn,ResponseBooks:NewDelhi.
4. "Ethicsinmanagement"byS.A.Sherlekar,HimalayaPublishingHouse.
5. HaroldH.Titus:EthicsforToday
6. Maitra,S.K:HinduEthics
7. WilliamLilly:IntroductiontoEthics
8. Sinha:AManualofEthics
9. Manu:ManuDharmaSastraortheInstituteofManu:ComprisingtheIndian systemofDuties:ReligiousandCivil(ed.)G.C.Haughton.
- 10.SusrutaSamhita:Tr.KavirajKunjanlal,KunjalalBrishagratha,ChowkambaSanskritseries,Vol.I, IIandIII,Varanasi,Vol IOO,16-20,21-32and 74-77only.
11. CarakaSamhita:Tr.Dr.RamKraranSarmaandVaidyaBhagavanDash,ChowkambhaSanskrit Seriesoffice,Varanasi,II,III Voll PP 183-191.
12. Ethics,TheoryandContemporaryIssues,BarbaraMackinnon,Wadsworth/ThomsonLearning,2001.
13. AnalyzingMoralIssues,JudithA.Boss,MayfieldPublishingCompany,1999.
14. An IntroductiontoAppliedEthics(Ed.)JohnH.PietandAyodhyaPrasad,CosmoPublications.
15. TextbookforIntermediatelogic,EthicsandHumanValues,boardof Intermediate Education&TeluguAcademicHyderabad.
16. I.C.SharmaEthicalPhilosophyofIndia.Nagin&coJulundhar.

MSCS206EF:PRINCIPLESOFMANAGEMENT

Department	ComputerScience	CourseType	SEC
CourseTitle	PrinciplesofManagement	Course Code	MSCS206EF
L-T-P	2-1-0	Credits	2
ContactHours	60Hrs	DurationofSEE	1.5Hrs
SEEMarks	50	CIEMarks	00

CourseObjectives:

- ToenablethestudentstostudytheevolutionofManagement,
- Tostudythefunctionsandprinciplesofmanagement.
- Tolearntheapplicationoftheprinciplesinanorganization.
- Toenabletheeffectiveandbarrierscommunicationintheorganization
- Tostudythesystemandprocessofeffectivecontrollingintheorganization.

CourseOutcomes:

Attheendofthecourse,thestudentwillbeableto:.

- Uponcompletionofthecourse,studentswillbeabletohaveclearunderstandingofmanagerialfunctions like planning, andhavesamebasicknowledgeoninternationalaspectofmanagement
- Tounderstandtheplanningprocessin theorganization
- Tounderstandtheconceptoforganization
- Demonstratetheabilitytodirecting,leadershipandcommunicateeffectively
- Toanalysisisolateissuesandformulatebestcontrolmethods.

Unit-I:IntroductiontoManagement

Management-meaning-significance-managementvsadministration–functionsofmanagement–
Leadership–LeaderVsManager-Fayol’sprinciplesofmanagement.

Unit-II:Planning

Planning-meaning-significance–StepsinPanning-Decisionmaking–Stepsindecisionmakingprocess.

Unit-III:Organization

Organizing-meaning–Principlesoforganization–LineandStaffOrganisation-Organisationchart.

Unit-IV:DelegationofAuthority

Delegation -meaning -elements-principles- difficultiesin delegation-

gationeffective- Centralization vsdecentralization

guidelinesformakingdele

Unit-V:Staffing andControlling

Staffing–selectionprocedure–Coordination-Control–meaning–QualitiesofGoodControl

TextBooks

1.R.K.SharmaandShashiKGupataBusinessOrganizationandManagement-KalayaniPublications.

ReferenceBooks:

1. Dr.C.D.Balaji and G.Prasad, BusinessOrganization and Management-Margham Publications,Chennai-17.
2. C.B.GupthaIndustrialOrganizationandManagement,SulthanChand.
3. Y.K.BushanBusinessorganizationandManagement,SulthanChand.
4. SherlekarBusinessOrganizationandManagement,HimalayaPublications.

MSCS206EF:INTERNETOFTHINGS

Department	ComputerScience	CourseType	SEC
CourseTitle	InternetofThings	Course Code	MSCS206EF
L-T-P	2-1-0	Credits	2
ContactHours	60Hrs	DurationofSEE	1.5Hrs
SEEMarks	50	CIEMarks	00

CourseDescription

The Internet of Things (IoT) is everywhere. It provides advanced data collection, connectivity, and analysis of information collected by computer everywhere—taking the concept of Machine-to-Machine communication farther than ever before.

CourseObjectives

- To understand about the fundamentals of Internet of Things and its building blocks along with their characteristics
- To understand the recent application domains of IoT in everyday life
- Discuss the architecture, operation, and business benefits of an IoT solution
- Examine the potential business opportunities that IoT can uncover
- Explore the relationship between IoT, cloud computing, and big data
- Identify how IoT differs from traditional data collection systems

CourseOutcomes

- Able to understand building blocks of Internet of Things and characteristics and associated technologies.
- The students will be able to use the IoT technologies in practical domains of society.
- The students will be able to gain knowledge about the state-of-the-art methodologies in IoT application domains.
- Able to realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks.
- Able to understand the application areas of IoT.

UNIT I**FUNDAMENTALS OF IOT**

Introduction-Characteristics-Physical design-Protocols-Logical design-Enabling technologies-IoT Levels-Domain Specific IoTs-IoT vs M2M.

UNIT II**IOT DESIGN METHODOLOGY**

IoT systems management-IoT Design Methodology-Specifications Integration and Application Development.

UNIT III**BUILDING IOT WITH RASPBERRY PI**

Physical device-Raspberry Pi Interfaces-Programming-APIs/ Packages-Webservices

UNIT IV**BUILDING IOT WITH GALILEO/ ARDUINO**

Intel Galileo Gen2 with Arduino-Interfaces-Arduino IDE-Programming-APIs and Hacks

UNITY

CASE STUDIES and ADVANCED TOPICS

Various Realtime applications of IoT-Connecting IoT to cloud-Cloud Storage for IoT-Data Analytics for IoT-Software & Management Tools for IoT

REFERENCES:

1. Arshdeep Bahga, Vijay Madiseti, "Internet of Things - A hands-on approach", Universities Press, 2015.
2. Manoel Carlos Ramon, "Intel® Galileo and Intel® Galileo Gen", Apress, 2014.
3. Marco Schwartz, "Internet of Things with the Arduino Yun", Packt Publishing, 2014.

SEMESTER-III**MSCS301C: DATA WAREHOUSING AND DATA MINING**

Department	Computer Science	Course Type	DSCC
Course Title	Data Warehousing and Data Mining	Course Code	MSCS301C
L-T-P	3-1-0	Credits	4
Contact Hours	60 Hrs	Duration of SEE	3 Hrs
SEEMarks	80	CIEMarks	20

Course Description:

This course is designed to expand students' knowledge and skills gained in database management courses and look in depth at data warehousing and data mining methods. The course examines the database architecture and technologies required for solving complex problems of data and information management, information retrieval, and knowledge discovery facing modern organizations. Case studies of organizations using these technologies to support business intelligence gathering and decision making are examined. This course also provides hands-on experience with state-of-the-art data warehousing and data mining methods and tools.

Course Objectives:

CO1: Be familiar with mathematical foundations of data mining tools.

CO2: Understand and implement classical models and algorithms in data warehouses and data mining.

CO3:

Characterize the kinds of patterns that can be discovered by association rule mining, classification and clustering.

CO4: Master data mining techniques in various applications like social, scientific and environmental context.

CO5: Develop skill in selecting the appropriate data mining algorithm for solving practical problems.

Course Outcomes (COs):

At the end of this course students will be able to...

CLO1: Understand warehousing architectures and tools for systematically organizing large database and use their data to make strategic decisions.

CLO2: Understand KDD process for finding interesting patterns from warehouse.

CLO3: Remove redundancy and incomplete data from the dataset using data preprocessing methods.

CLO4: Characterize the kinds of patterns that can be discovered by association rule mining.

CLO5: Discover interesting patterns from large amounts of data to analyze for predictions and classification.

CLO6: Develop a data mining application for data analysis using various tools.

Unit-I:

Chapter-I: Data Warehousing & OLAP Technologies [Kamber - chapter 3 (3.1, 3.2, 3.3)] Chapter

-II: Basic Data Mining Tasks: Classification-Regression-Time series Analysis Prediction-Clustering-Summarization-Association rules-Sequence discovery-Data mining Versus Knowledge discovery in databases-the development of Data Mining-Data Mining issues-Data mining Metrics-Social Implications of Data Mining-The future. [M.H. Dunham -

chapter 1(1.1 to 1.7)] Chapter- III: DataPreprocessing[Kambler–chapter 2(2.1 to 2.6)]

UNITII:

Chapter –I: Basic Data mining Tasks [M.H.Dunhum–chapter 1(1.1 to 1.7)] Chapter –II: Principlesof dimensional modeling-design decisions, Dimensional Modeling basics-R Modeling versusDimensionalmodeling-useofcasetools-Thestarschema-ReviewofasimpleSTARschema,inside a Dimension table, inside the fact table, the fact less fact table, Data Granularity. Star Schema keys-primary keys, surrogate keys, foreign keys. Advantages of star schema. Chapter – III: DimensionalModeling: Updates to the dimensional tables-Miscellaneous Dimensions-The Snowflake schema-Aggregatefacttables-Familiesofstars

UNIT-III:

Chapter–I:Classification:Introduction-Issuesinclassification-Statistical BasedAlgorithmRegression-Bayesian Classification-Distance based algorithm-Simple approach-K nearest approach-Decisiontreebasedalgorithms-ID3-C4.5&C5.0-CART-ScalableDTTechniquesNeuralnetworkbased algorithms-Propagation-NN Supervised Learning-Radial basis function works-Perceptrons-Rulebasedalgorithms [M.H.Dunhum –chapter 4(4.1 to4.6)]

UNIT-IV:

Chapter–I:Clustering:Introduction-Similarity&distancemeasures-outliers-Hierarchicalalgorithms agglomerative algorithms-Divisive clustering-Partitional Algorithms-Minimum spanningtreeSquarederrorclusteringalgorithm-K-meansclustering-nearestneighboralgorithm-PAMalgorithm-Bondenergyalgorithm-ClusteringwithGeneticAlgorithms-Clusteringwithneuralnetworks-Clusteringlargedatabases-BIRCH-DBSCAN-CUREalgorithm-Clusteringwithcategoricalattributes. [M.H.Dunhum –chapter 5(5.1 to5.7)]

UNIT-V:

Chapter –I: Associate Rules: - Introduction-Large Item sets-Basic Algorithms-Apriori Algorithm-Samplingalgorithm-Partitioning-ParallelandDistributedalgorithms-DataParallelism-Taskparallelism-ComparingApproaches-IncrementalRules-AdvancedAssociationRuleTechnique-Generalizedassociationrules-Multiplelevelassociationrules-Multiple–levelAssociationrules-Quantitative association rules-Using multiple minimum supports Measuring the Quality of a Rules.[M.H.Dunhumchapter6(6.1to6.8)]Chapter–II:Miningobjects-spatial,multimedia&textmining,wwwmining[Kamblerchapter10(10.1to10.5)]

TextBooks:

1. Data Mining – Introductory & Advanced topics by Margaret H. Dunham. Pearson Educationpublishers.
2. Dataminingconcepts&techniques-JiaweiHan&MichelineKamber
3. FundamentalsofDatawarehousing–PaulRajPonniah

ReferenceBooks:

1. DataMining–ConceptsandTechniquesbyHanandKamber,2001,MorganKaufmannPublishers
2. Oracle8i–DataWarehousingbyCohen,Abbey,Taub,TataMcGrawHill

MSCS302C:WEBTECHNOLOGIES

Department	ComputerScience	CourseType	DSCC
CourseTitle	WebTechnologies	Course Code	MSCS 302C
L-T-P	3-1-0	Credits	4
ContactHours	60Hrs	DurationofSEE	3Hrs
SEEMarks	80	CIEMarks	20

Coursedescription:

Oncompletionofthiscourse,astudentwillbefamiliarwithclientserverarchitectureandabletodevelopawebapplicationusingjavatechnologies.Studentswillgaintheskillsandproject-basedexperienceneededforentryintowebapplication anddevelopmentcareers.

CourseObjectives:

- Toteachstudentsthe basics ofserver-sidescriptingusingPHP
- Toexplainwebapplicationdevelopmentprocedures
- Toimpartservlettechnologyforwritingbusinesslogic
- TofacilitatestudentstoconnecttodatabasesusingJDBC

- To familiarize various concepts of application development using JSP

Course Outcomes:

- Students are able to develop a dynamic web page by the use of JavaScript and DHTML, JQuery and PHP.
- Apply JDBC and ODBC technologies to create database connectivity
- Students will be able to write a server-side Java application called Servlet to catch form data sent from client, process it and store it on database.
- Students will be able to write a server-side Java application called JSP to catch form data sent from client and store it on database.

UNIT-I

Introduction to Internet-Browser Architecture-IE, Chrome-Search Engines-Introduction to HTML-5-HTML-5 Tags-Audio, Video Tags-HTML-5 Forms-Controls-CSS Styling-CSS Tags Attributes.

UNIT-II

JavaScript-JQuery- JavaScript Programming Scripts- Control structures- Functions Document, Browser, Date, Math, String Objects-Events- JQuery Libraries-JQuery Objects, Functions – JQuery Events-Animations. UNIT-III
AJAX Concepts- Simple AJAX objects-Ajax Libraries-Examples, Web servers IIS, Tomcat Hosting Website in a Web servers

UNIT-IV

Introduction to PHP-Control Structures-Arrays-Functions-Database connectivity Introduction to ZEND Framework and applications

UNIT-V

Introduction to Java Servlets, Servlet classes and interfaces-Java Database Connectivity Introduction to JSP- Java Server Pages scriptlets-JSP Objects-JSP Web applications

TEXTBOOK:

1. Deitel, Deitel and Goldberg Internet & World Wide Web how to program” by End. Pearson Education
2. Ivan Bayross, Web enabled commercial Application Development in Java 2.0 BPB.
3. Nicholas C. Zakas., Jeremy McPeak, Joe Fawcett, Professional AJAX, 2nd Edition, Wiley publishing
4. HTML5 Blackbook, Kogent Learning Solutions Inc.

REFERENCE BOOKS:

1. Raj Kamal Internet and web Technologies, Tata McGraw Hill, 2002.
2. Chirs Bates, Web Programming, John Wiley, 2nd Edition
3. E.V. Kumar and S.V. Subramanyam, Web Services. Tata McGraw Hill, 2004.

MSCS303C: SOFTWARE ENGINEERING

Department	Computer Science	Course Type	DSCC
Course Title	Software Engineering	Course Code	MSCS303C
L-T-P	3-1-0	Credits	4
Contact Hours	60 Hrs	Duration of SEE	3 Hrs
SEEMarks	80	CIEMarks	20

Course Overview:

Students will gain experience on various processes used in software industry for the development of a software product. They also learn about testing and maintenance of software products

Prerequisite:

1. Basic Programming Skills
2. Innovative Thinking
3. Enthusiasm to learn Management concepts.

Course Objectives:

- CO1: To provide the idea of decomposing the given problem into Analysis, Design, Implementation, Testing and Maintenance phases.
- CO2: To provide an idea of using various process models in the software industry according to given circumstances.
- CO3: To gain the knowledge of how Analysis, Design, Implementation, Testing and Maintenance processes are conducted in a software project.

Course Outcomes:

- CLO1: Students will be able to decompose the given project in various phases of a life cycle
- CLO2: Students will be able to choose the appropriate process model depending on the user requirements
- CLO3: Students will be able to perform various lifecycle activities like analysis, design, implementation, testing and maintenance.
- CLO4: implementation, testing and maintenance.
- CLO5: Students will be able to know various process used in all the phases of the product
- CLO6: Students can apply the knowledge, techniques and skills in the development of software product.

UNIT-I:

Software Engineering – Introduction, Generic view of process, models, an agile view of process. Software Engineering practice – Software Engineering, communication, planning, modeling, construction practices and deployment.

UNIT-II:

System Engineering – Computer-based systems, the system engineering Hierarchy, business process engineering, product engineering and system modeling. Building The Analysis Model – Requirement Analysis, Modeling Approaches, Data Modeling. Behavioral Model. The web engineering process, analysis models for web apps.

UNIT-III:

Design Engineering – Design process and quality, design concepts, the design model, and pattern-used software design. Architectural design – Software architecture, data design, architectural styles and patterns, architectural design mapping data flow into a software architecture. Component-based software engineering, Critical systems development, Software reuse, User interface design, web apps design issues and architecture design.

UNIT-IV:

Testing strategies – Strategies and issues, testing strategies for and object-oriented software. Validation testing and system testing. Software testing tactics – Fundamentals, black-box and white-box testing white-box testing basis path testing. Control structure testing, black box testing, object-oriented testing methods. Testing methods applicable at the class level interclass testing case design. Testing for specialized environments, architectures and applications, web application testing – concepts, testing process, component level testing.

UNIT-V:

Product metrics – Software quality, framework, metrics for analysis model design model, source code and testing. Managing software projects – The management spectrum, the W5HH principle, metrics in process, software measurement, and metrics for software quality integrating metrics within the software process. Estimation – observations, decomposition techniques, empirical models, estimation for object-oriented projects other estimation techniques, project scheduling, risk management, reengineering, Security engineering, Service-oriented software engineering, Aspect-oriented software development.

TextBook:

1. Roger, S, Pressman, Software Engineering, APractitioner"s Approach, Six Edition, McGraw-Hill,InternationalEdition,2005.
2. IanSommerville,SoftwareEngineering,PearsonEducation,8thEdition.

ReferenceBooks:

1. JamesFPeters,SoftwareEngineering,JohnWiley
2. WaruanSJawadekar,SoftwareEngineering,TataMcGrawHill,2004.
3. CarloGhezzi,MehdiJazayeri,DinoManrioli,FundamentalsofSoftwareEngineering,PHI,2001PankajJalote,AnIntegrated approachtoSoftwareEngineeringNarosa

MSCS304-GE-A:SYSTEMSPROGRAMMING

Department	ComputerScience	CourseType	DSEC
CourseTitle	SystemsProgramming	Course Code	MSCS304-GE-A
L-T-P	3-1-0	Credits	4
ContactHours	60Hrs	DurationofSEE	3Hrs
SEEMarks	80	CIEMarks	20

Overview:

The aim of this course is to provide students with knowledge and abilities to design system programs suchas assemblers, linkers, loaders, macro-processors, editors, interpreters, compilers and operating systemsusingmodernmethodologiesandtoimplementtheirdesignusingmoderndevelopmenttools.

CourseObjectives:

- Tointroducestudentthefundamentalmodeloftheprocessingofhigh-levellanguageprogramsforexecutiononcomputersystem.
- To explain the basic operations that are performed from the time a computer is turned on until auserisableto executeprograms.
- TounderstandandimplementAssembler,Loader,Linkers,Macros&Compilers.
- Tointroducestudentstheprocessmanagementandinformationmanagementviadifferentsoftwaretools.

CourseLearningOutcomes

Bytheendofthecoursestudentswillbeableto

- Adequate knowledge in system programs (assemblers, loaders, linkers, macro-processors, texteditors,debuggers,interpreters,compilers,operatingsystems).
- Ability to use theoretical and applied information in these areas to design system software withrealisticconstraints
- Recognize operating system functions such as memory management as pertaining to run timestoragemanagement
- Ability to conduct experiments, gather data, analyze and interpret results for investigatingsolutions to real life applications with assembly language programming and Unix shellprogramming.
- Ability to devise, select, and use modern techniques and tools needed for the design andimplementation ofsystemprograms.

UNITI:

Background introduction, system software and machine architecture, SIC, RISC, and CISCarchitecture. Assembler: basic assembler functions, machine dependent and independent assemblerfeatures,assemblerdesignoptions,andimplementationexamples.

UNITII:

Loading and linkers basic loader junction, machine dependent and independent loader features,loaderdesignoptions andimplementationexamples.Macroprocessors,basicmacroprocessorfunctionsmachines-independentmacroprocessorfeatures,macroprocessoroptions,implementationexamples.

UNITIII:

Compilers:basiccompilerfunctions,machinedependentandindependentcompilerfeatures,compiler design options and

implementation examples. Other system software: text editors and interactive debugging systems

UNIT-IV

Introduction to Device Drivers, Design issues-Types of Drivers, Character driver-1 and Design issues, Character Driver-2- A/D converter and its design issues, Block driver-1 and its design issues-RAMDISK driver-Anatomy- Prologue of drivers and programming Considerations.

UNIT-V

Introduction to Linux- Linux Architecture- X-windows- Linux administration tools - Commands to use Linux OS- Executing Linux Shell scripts-Shell Programming concepts Shell scripts

Text Books:

1. Leland.Beck, System Software: An Introduction to systems Programming: 3/e, Pearson Education Asia, 2003.
2. George pajari, Writing Unix Drivers, Addison-Wesley, 1991.
3. Richard Petersen, Linux complete Reference, McGraw Hill Education (India) Private Limited; 6 edition (21 November 2007)

Reference Books:

1. Dhamdhere, System programming and operation Systems Book 2/E, Tata McGraw, Hill, 1999
2. A.V.Aho, Ravi Sethi and JDULLman, "compilers, Techniques and Tools", Addison Wesley, 1986.
3. Jhon J. Donovan, System Programming Tata McGraw Hill 2005.

MSCS304GE-A:COMPUTERALGORITHMS

Department	ComputerScience	CourseType	DSEC
CourseTitle	ComputerAlgorithms	Course Code	MSCS304GE-A
L-T-P	3-1-0	Credits	4
ContactHours	60Hrs	DurationofSEE	3Hrs
SEEMarks	80	CIEMarks	20

CourseDescription:

Introduction to the design and analysis of computer algorithms. Topics will include concepts of algorithm complexity, and various algorithmic design patterns like divide and conquer, dynamic programming and greedy algorithms. Course will also cover major algorithms and data structures for searching and sorting, graphs, and some optimization techniques.

Course objectives:

- To teach paradigms and approaches used to analyse and design algorithms and to appreciate the impact of algorithm design in practice.
- To make students understand how the worst-case time complexity of an algorithm is defined, how asymptotic notation is used to provide a rough classification of algorithms.
- To explain different computational models (e.g., divide-and-conquer), order notation and various complexity measures (e.g., running time, disk space) to analyse the complexity/performance of different algorithms.
- To teach various advanced design and analysis techniques such as greedy algorithms, dynamic programming & know the concepts of tractable and intractable problems and the classes P, NP and NP-complete problems.

Course Learning Objectives:

- Able to Argue the correctness of algorithms using inductive proofs and Analyze worst-case running times of algorithms using asymptotic analysis.
- Able to explain important algorithmic design paradigms (divide-and-conquer, greedy method, dynamic-programming and Backtracking) and apply when an algorithmic design situation calls for it.
- Able to Explain the major graph algorithms and Employ graphs to model engineering problems, when appropriate.
- Able to Compare between different data structures and pick an appropriate data structure for a design situation.
- Able to Describe the classes P, NP, and NP Complete and be able to prove that a certain problem is NP-Complete.
- Able to analyze String matching algorithms.

UNIT I:

Divide-and-Conquer and Greedy Methods.

UNIT II:

Dynamic Programming; Basic Traversal and Search Technique.

UNIT III:

Backtracking; and Branch-and-Bound Technique.

UNIT IV:

Lower bound Theory; NP-Hard and NP-Complete Problems

UNIT V:

Mesh and Hypercube Algorithms, the Fast Fourier Transform and its Applications.

Text Books:

1. Eills Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran. Computer Algorithms Galgotia Publications, 1999.

Reference Books:

1. RCT Lec, SSTeang, RC Change and YTTsai, Introduction to the Design and Analysis of Algorithms, McGraw-Hill 2005.
2. R. Johnsonbaugh and Mschaefer, Algorithms, Pearson Education 2004.
3. A. Levitin, Introduction to the Design and Analysis of Algorithms, Pearson Education 2005.
4. TH Cormen, CE Leiserson and RL Rivest, Introduction to Algorithms, PHI
5. G. Brassard and P. Bratley, Fundamentals of Algorithms, PHI

MSCS304-GE-A: USER INTERFACE DESIGN USING .NET TECHNOLOGIES

Department	Computer Science	Course Type	DSEC
Course Title	User Interface Design Using .Net Technologies	Course Code	MSCS304-GE-A
L-T-P	3-1-0	Credits	4
Contact Hours	60 Hrs	Duration of SEE	3 Hrs
SEE Marks	80	CIEMarks	20

Learning Outcomes:

On completion of this course, students will be able to:

- Understand the importance of user interface and benefits of good design.
- Understand the user interface design process and business function, Command and natural languages
- Understand the types of system menus and navigation schemes, Interaction Devices
- Understand the characteristics of windows and device-based controls.
- Understand the Dot Net technology screen-based controls and kinds of tests.

Unit-I:

Human factors of interactive software goals of system engineering and user-interface design, motivations, accommodation of human diversity goal for our profession. Theories, principles, and guidelines – High-level theories, object-action interface model, Principle 1.2 and 3, guide links for data display and data entry, balance of automation and human control. Managing design processes – Usability, design pillars, development methodologies, ethnographic observation, usability testing, surveys, and continuing assessments – expert reviews, usability testing and laboratories, surveys acceptance tests, evaluation during active use, and controlled psychologically oriented experiments.

Unit-II:

Software tools – Specification methods, interface- building tools and evaluation and critiquing tools. Direct manipulation and virtual environments – examples, explanations, programming, visual, thinking and icons home automation, remote direct manipulation, visual environments. Menu selection, form filling, and dialog boxes – Task – related organizations item presentation sequence, response time and display rate, fact movement through menus, menu layout, form fill in, and dialog boxes. Command and natural languages – Functionality to support users' tasks, command – organization strategies, the benefits of structure, naming and abbreviations, command menus, natural language in computing.

Unit-III:

Interaction Devices – Keyboards and function keys, pointing devices, speech recognition digitization and generation. Image and video displays, printers. Response time and display rate. Theoretical foundations, expectations and attitudes, user productivity, variability. Presentation styles: Balancing function and fashion – error messages, non anthropomorphic design, display design, color, Printed manuals, Online Help and tutorials – Reading from paper versus form displays, preparation of printed manuals, and preparation of online facilities.

Unit-IV:

Multiple – Window strategies – Individual – Window design, multiple-window design, Coordinator by tightly – coupled windows. Image browsing and tightly – coupled windows, personal role management and elastic windows. Computer-supported cooperative work – goals of cooperation, Asynchronous Interaction: Different time and place, Synchronous Distributed: Different place, same time, face to face: same place, same time, Applying CSCW to Edition, Information search and visualization – Database Query and phrase search in textual documents, multimedia document searches, information visualization. Advanced filtering. Hypermedia and the world wide web (www).

Unit-V:

Introduction to Dot Net technology #.Net Language – Control structures – GUI controls – Database GUI Controls and its connectivity to databases – ASP.Net Fundamentals and Web pages Interface designing.

Text Books:

1. Ben Shneiderman, Designing the user Interface, strategies for effective human-Computer interaction Third Edition, Pearson Education, 2004, (For units I, II, III and IV).
2. Beginning .NET 2.0 by Wrox publications (For Unit V).

Reference Books:

1. Hix, Deborah and Hartson, H. R. R.; Developing user Interfaces, John Wiley, 1993.
2. Galitz, Wilbert O., It's Time to Clear Your Windows: Designing GUIs that Work, John Wiley and Sons, New York (1994)
3. ASP.NET 2.0 Black Book, Dreamtech publications.
4. VB.NET 2.0 Black Book, Dreamtech publications.

MSCS304-GE-A: IT IN FORENSIC SCIENCE

Department	Computer Science	Course Type	DSEC
Course Title	IT in Forensic Science	Course Code	MSCS304-GE-A
L-T-P	3-1-0	Credits	4

ContactHours	60Hrs	DurationofSEE	3Hrs
SEEMarks	80	CIEMarks	20

UNIT I

Overview of Biometrics, Biometric Identification, Biometric Verification, Biometric Enrollment, Biometric System Security. Authentication and Biometrics: Secure Authentication Protocols, Access Control Security Services, Matching Biometric Samples, Verification by humans. Common biometrics: Finger Print Recognition, Face Recognition, Speaker Recognition, Iris Recognition, Hand Geometry, Signature Verification

UNIT II

Introduction to Information Hiding: Technical Steganography, Linguistic Steganography, Copyright Enforcement, Wisdom from Cryptography Principles of Steganography: Framework for Secret Communication, Security of Steganography System, Information Hiding in Noisy Data, Adaptive versus non-Adaptive Algorithms, Active and Malicious Attackers, Information hiding in Written Text.

UNIT III

A Survey of Steganographic Techniques: Substitution systems and Bit Plane Tools, Transform Domain Techniques: - Spread Spectrum and Information hiding, Statistical Steganography, Distortion Techniques, Cover Generation Techniques. Steganalysis: Looking for Signatures: - Extracting hidden information, Disabling hidden information.

UNIT IV

Watermarking and Copyright Protection: Basic Watermarking, Watermarking Applications, Requirements and Algorithmic Design Issues, Evaluation and Benchmarking of Watermarking system. Transform Methods: Fourier Transformation, Fast Fourier Transformation, Discrete Cosine Transformation, Mellin-Fourier Transformation, Wavelets, Split Images in Perceptual Bands. Applications of Transformation in Steganography.

UNIT V

Computer Forensics, Rules of evidence, Evidence dynamics, Evidence collection, Data recovery, Preservation of digital evidence, surveillance tools for future warfare

References:

1. Katzendbisser, Petitcolas, "Information Hiding Techniques for Steganography and Digital Watermarking", Artech House.
2. Peter Wayner, "Disappearing Cryptography: Information Hiding, Steganography and Watermarking 2/e", Elsevier
3. Bolle, Connellet, al., "Guide to Biometrics", Springer
4. John Vecca, "Computer Forensics: Crime Scene Investigation", Firewall Media
5. Christopher L.T. Brown, "Computer Evidence: Collection and Preservation", Firewall Media

MSCS304-GE-A: SOFTWARE TESTING

Department	Computer Science	Course Type	DSEC
Course Title	Software Testing	Course Code	MSCS304-GE-A
L-T-P	3-1-0	Credits	4
Contact Hours	60Hrs	Duration of SEE	3Hrs
SEE Marks	80	CIEMarks	20

Course Objectives

1. To study fundamental concepts in software testing, including software testing objectives, process, criteria, strategies, and methods.
2. To discuss various software testing issues and solutions in software unit test; integration, regression, and system testing.
3. To learn how to plan a test project, design test cases and data, conduct testing operations, manage software problem and defects, generate a testing report.
4. To expose the advanced software testing topics, such as object-oriented software testing methods, and component-based software testing issues, challenges, and solutions.
5. To gain software testing experience by applying software testing knowledge and methods to practice.

oriented software testing projects.

6. To understand software test automation problems and solutions.
7. To learn how to write software testing documents, and communicate with engineers in various forms.
8. To gain the techniques and skills on how to use modern software testing tools to support software testing projects

Learning Objectives

By the end of the course, you should:

1. Have an ability to apply software testing knowledge and engineering methods.
2. Have an ability to design and conduct a software test process for a software testing project.
3. Have an ability to identify the needs of software test automation, and define and develop a test tool to support test automation.
4. Have an ability to understand and identify various software testing problems, and solve these problems by designing and selecting software test models, criteria, strategies, and methods.
5. Have an ability to use various communication methods and skills to communicate with their teammates to conduct their practice-oriented software testing projects.
6. Have basic understanding and knowledge of contemporary issues in software testing, such as component-based software testing problems
7. Have an ability to use software testing methods and modern software testing tools for their testing projects

UNIT I

Software Engineering Evaluation

- Software Development Process Models
- Requirements Management
- Software Design
- Coding and Unit Testing
- Integration Testing
- System testing
- Installation and Acceptance
- Customer Support/Maintenance

UNIT II

System Testing Process

- System testing Process
- System Test Commencement
- System Test Planning
- Test Design
- Test Execution
- Test Reporting and Defect Tracking

UNIT III

WinRunner 8.0

- Introduction to WinRunner
- checkpoints in WinRunner
- Data Driven and Batch Testing
- Improve Test Automation in WinRunner
- GUI Mapping
- Webtest Option in WinRunner

UNIT IV

QTP 8.2

- QuickTest Pro Introduction
- Edit Test Scripts
- Improving Test Automation in QTP
- Data Driven and Batch Testing, WebTest Options in QTP

UNIT V

LoadRunner 8.0

- Introduction to Performance Testing
- Vuser Script Creation Using LoadRunner
- Vuser Script Execution and Results Analysis Test Director 8.0
- Site Administrator, Understanding Test Director

TEXTBOOK:

1. Software Testing Concepts and Tools by Nageshwar Rao Pusuluri, Dreamtech Press,

MSCS305-GE-B:CLOUDCOMPUTING

Department	ComputerScience	CourseType	DSEC
CourseTitle	CloudComputing	Course Code	MSCS305-GE-B
L-T-P	3-1-0	Credits	4
ContactHours	60Hrs	DurationofSEE	3Hrs
SEEMarks	80	CIEMarks	20

CourseObjectives:

- Identify the technical foundations of cloud systems architectures.
- Analyze the problems and solutions to cloud application problems.
- Apply principles of best practice in cloud application design and management.
- Identify and define technical challenges for cloud applications and assess their importance.

CourseOutcomes(COs)

CO1: Understand the fundamental principles of distributed computing.

CO2: Understand how the distributed computing environments known as Grids can be built from lower-level services.

CO3: Understand the importance of virtualization in distributed computing and how this has enabled the development of Cloud Computing.

CO4: Analyze the performance of Cloud Computing. CO5: Understand the concept of Cloud Security.

CO6: Learn the Concept of Cloud Infrastructure Model

UNIT I

UNDERSTANDING CLOUD COMPUTING: Cloud Computing – History of Cloud Computing

– Cloud Architecture – Cloud Storage – Why Cloud Computing Matters – Advantages of Cloud Computing – Disadvantages of Cloud Computing – Companies in the Cloud Today – Cloud Services

UNIT II

DEVELOPING CLOUD SERVICES: Web-Based Application – Pros and Cons of Cloud Service Development – Types of Cloud Service Development – Software as a Service – Platform as a Service

– Web Services – On-Demand Computing – Discovering Cloud Services Development Services and Tools – Amazon Ec2 – Google App Engine – IBM Clouds

UNIT III

CLOUD COMPUTING FOR EVERYONE: Centralizing Email Communications – Collaborating on Schedules – Collaborating on To-Do Lists – Collaborating Contact Lists – Cloud Computing for the Community – Collaborating on Group Projects and Events – Cloud Computing for the Corporation

UNIT IV

USING CLOUD SERVICES: Collaborating on Calendars, Schedules and Task Management – Exploring Online Scheduling Applications – Exploring Online Planning and Task Management – Collaborating on Event Management – Collaborating on Contact Management – Collaborating on

Project Management – Collaborating on Word Processing - Collaborating on Databases – Storing and Sharing Files

UNIT V

OTHER WAYS TO COLLABORATE ONLINE: Collaborating via Web-Based Communication Tools – Evaluating Web Mail Services – Evaluating Web Conference Tools – Collaborating via Social Networks and Groupware – Collaborating via Blogs and Wikis

References:

1. Michael Miller, Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online, Que Publishing, August 2008.
2. Kumar Saurabh, "Cloud Computing – Insights into New Era Infrastructure", Wiley Indian Edition, 2011.
3. Haley Beard, Cloud Computing Best Practices for Managing and Measuring Processes for On Demand Computing, Applications and Data Centers in the Cloud with SLAs, Emereo Pty Limited, July 2008.

MSCS 305-GE-B: BIG DATA ANALYTICS

Department	Computer Science	Course Type	DSEC
Course Title	Big Data Analytics	Course Code	MSCS305-GE-B
L-T-P	3-1-0	Credits	4
Contact Hours	60 Hrs	Duration of SEE	3 Hrs
SEEMarks	80	CIEMarks	20

Course Objectives:

- Understand the Big Data Platform and its Use cases
- Provide an overview of Apache Hadoop and hands-on Hadoop Eco System
- Apply analytics on Structured, Unstructured Data.
- Exposure to business analytics and predictive Analytics.

Learning Outcomes:

- Describe Big Data and its importance with its applications
- Differentiate various big data technologies like Hadoop MapReduce, Pig, Hive, Hbase and No-SQL.
- Apply tools and techniques to analyze Big Data.
- Design a solution for a given problem using suitable Big Data Techniques

UNIT-I

What is Big Data - Varieties of Data - Unstructured data – Trends in Data Storage- Industry Examples of Big Data

UNIT-II

Big data Technology – New and older approaches- Data Discovery – Open source technologies for Big Data Analytics- Cloud and Big Data – Big Data Foundation- Computation- Limitations Big Data Emerging Technologies

UNIT-III

Business Analytics- Consumption of Analytics- Creation to Consumption of Analytics- Data visualization by Organizations – 90/10 rule of critical thinking – Decision sciences and analytics- Learning over knowledge- Agility- Scale and convergence- Privacy and security in Big Data.

UNIT-IV

PredictiveAnalytics–LinearRegression–Decisiontrees-Neuralnetworks-ClassificationtreesEnsemblemethods-AssociationRules-Segmentation,SequenceRules,SocialNetworkanalytics.

UNIT-V

Hadoop – Components of Hadoop – Hadoop File System –Hadoop Technology Stack-DatawarehousingHadoop Concepts-Applicationsof Hadoopusing PIG,YARN,HIVE.

TextBooks

1. MichealMinnelli,AmbigaDhiraj,Chambers,BigDataandBigAnalytics,WilleyandSonsInc,.
2. BartBeasens,AnalyticsinBigDataWorld,WilleyandSonsInc
- 3SameerWadker,MadhuSidhalingaiahandJasonWinner,ApacheHadoop,APress

MSCS305-GE-B:ARTIFICIALNEURALNETWORKS

Department	ComputerScience	CourseType	DSEC
CourseTitle	ArtificialNeuralNetworks	Course Code	MSCS305-GE-B
L-T-P	3-1-0	Credits	4
ContactHours	60Hrs	DurationofSEE	3Hrs
SEEMarks	80	CIEMarks	20

UNITI

INTRODUCTION - what is a neural network? Human Brain, Models of a Neuron, Neural networksviewedasDirectedGraphs,NetworkArchitectures,KnowledgeRepresentation,ArtificialIntelligence and Neural Networks (p. no's 1 –49) LEARNING PROCESS 1 – Error Correctionlearning,Memorybased learning,Hebbianlearning,(50-55)

UNITII

LEARNINGPROCESS2:Competitive,Boltzmannlearning,CreditAssignmentProblem,Memory, Adaption, Statistical nature of the learning process, (p. no's 50 –116) SINGLE LAYERPERCEPTRONS – Adaptive filtering problem, Unconstrained Organization Techniques, Linearleast square filters, least mean square algorithm, learning curves, Learning rate annealing techniques,perception –convergence theorem, Relation between perception and Bayes classifier for a GaussianEnvironment(p.no's117–155)

UNITIII

MULTILAYERPERCEPTRON–BackpropagationalgorithmXORproblem,Heuristics,Outputrepresentation and decision rule, Computer experiment, feature detection, (p. no's 156 –201) BACKPROPAGATION - back propagation and differentiation, Hessian matrix, Generalization, Crossvalidation, Network pruning Techniques, Virtuesand limitationsofbackpropagation learning,Acceleratedconvergence,supervisedlearning.(p.no's202–234)

UNITIV

SELF ORGANIZATION MAPS – Two basic feature mapping models, Self organization map,SOM algorithm, properties of feature map, computer simulations, learning vector quantization,Adaptivepatterclassification,HierarchalVectorquantilizer,contexmelMaps(p.no's443–469,9.1 –9.8)

UNITV

NEURODYNAMICS–Dynamical systems, stability of equilibrium states, attractors, neurodynamical models, manipulation of attractors’ as a recurrent network paradigm (p. no’s 664 –680,14.1–14.6) HOPFIELD MODELS–Hopfield models, computer experiment I (p.no’s 680-701,14.7–14.8)

TEXTBOOK:

1. Neural networks A comprehensive foundations, Simon H Haykin, Pearson Education 2nd Edition 2004

REFERENCE BOOKS:

1. Artificial neural networks-B.Vegnanarayana Prentice Hall of India PLtd 2005
2. Neural networks in Computer intelligence, Li Min Fu TMH 2003
3. Neural networks James A Freeman David M Skapura Pearson Education 2004

MSCS305-GE-B:CYBERSECURITY

Department	Computer Science	Course Type	DSEC
Course Title	Cyber Security	Course Code	MSCS305-GE-B
L-T-P	3-1-0	Credits	4
Contact Hours	60 Hrs	Duration of SEE	3 Hrs
SEEMarks	80	CIEMarks	20

Course Objectives

The educational objectives of the program are:

1. To prepare students with the technical knowledge and skills needed to protect and defend computer systems and networks.
2. To develop graduates that can plan, implement, and monitor cybersecurity mechanisms to help ensure the protection of information technology assets.
3. To develop graduates that can identify, analyze, and remediate computer security breaches.

Learning Outcomes

Upon completion of the degree program, students will be able to:

1. Analyze and evaluate the cybersecurity needs of an organization.
2. Conduct cybersecurity risk assessment.
3. Measure the performance and troubleshoot cyber security systems.
4. Implement cyber security solutions.
5. Be able to use cybersecurity, information assurance, and cyber/computer forensics software/tools.
6. Identify the key cybersecurity vendors in the marketplace.
7. Design and develop a security architecture for an organization.
8. Design operational and strategic cybersecurity strategies and policies.

UNIT I

FUNDAMENTALS OF CYBERSECURITY Introduction-Cyber Security and its problem-Intervention Strategies: Redundancy, Diversity and Autarchy.

UNIT II

ISSUES IN CYBERSECURITY Private ordering solutions, Regulation and Jurisdiction for global Cyber security, Copy Right source of risks, Pirates, Internet Infringement, Fair Use, postings, criminal liability, First Amendments, Data Loss.

UNIT III

INTELLECTUALPROPERTYRIGHTSCopyRight-Sourceofrisks,Pirates,InternetInfringement, Fair Use, postings, Criminal Liability, First Amendments, Losing Data, Trademarks,Defamation, Privacy-Common Law Privacy, Constitutional law, Federal Statutes, Anonymity,Technologyexpandingprivacyrights.

UNITIV

PROCEDURALISSUESDutyofCare,CriminalLiability,Proceduralissues,ElectronicContracts&DigitalSignatures,Misappropriationofinformation,CivilRights,Tax,Evidence.

UNITY

LEGALASPECTSOFCYBERSECURITYEthics,LegalDevelopments,Late1990to2000,Cybersecurity in Society, Security in cyber laws case. Studies, General Law and Cyber Law-a SwiftAnalysis.

TextBooks:

1. JonathanRosenoer,“CyberLaw:TheLawoftheInternet”,Springer-Verlag,1997.
2. MarkFGrady,FransescoParisi,“TheLawandEconomicsofCyberSecurity”,Cambridge UniversityPress,2006.

MSCS305-GE-B:MOBILEAPPDEVELOPMENT

Department	ComputerScience	CourseType	DSEC
CourseTitle	MobileAppDevelopment	Course Code	MSCS305-GE-B
L-T-P	3-1-0	Credits	4
ContactHours	60Hrs	DurationofSEE	3Hrs
SEEMarks	80	CIEMarks	20

CourseObjectives:

- TofacilitatestudentstounderstandandroidSDK
- TohelpstudentstogainabasicunderstandingofAndroidapplicationdevelopment
- ToinculcateworkingknowledgeofAndroidStudiodevelopmenttool
- basicconceptsinmobileapplicationandunderstandtheprocessesofproducingmobileapplications.Theywillalsodevelopskill sandtechniquesindesigninganddevelopingmobileapplicationworks.

Course Outcomes:

At the end of this course, students will be able to:

- identify the basic knowledge on mobile application environment and technology
- explain the concepts and processes of mobile application development
- discuss design and development issues specific to mobile applications
- design and develop mobile applications, using development tools and environments.
- Program mobile applications for the Android operating system and iOS that use basic and advanced phone features, and Deploy applications

UNIT I

Introduction to mobile applications – Embedded systems - Market and business drivers for mobile applications – Publishing and delivery of mobile applications – Requirements gathering and validation for mobile applications

UNIT II

BASIC DESIGN: Introduction – Basics of embedded systems design – Embedded OS – Design constraints for mobile applications, both hardware and software related – Architecting mobile applications – User interfaces for mobile applications – touch events and gestures – Achieving quality constraints – performance, usability, security, availability and modifiability.

UNIT III

ADVANCED DESIGN: Designing applications with multimedia and web access capabilities – Integration with GPS and social media networking applications – Accessing applications hosted in a cloud computing environment – Design patterns for mobile applications.

UNIT IV

TECHNOLOGY I - ANDROID: Introduction – Establishing the development environment – Android architecture – Activities and views – Interacting with UI – Persisting data using SQLite – Packaging and deployment – Interaction with server-side applications – Using Google Maps, GPS and Wifi – Integration with social media applications.

UNIT V

TECHNOLOGY II - IOS : Introduction to Objective C – iOS features – UI implementation – Touch frameworks – Data persistence using CoreData and SQLite – Location aware applications using CoreLocation and MapKit – Integrating calendar and address book with social media application – Using Wifi-iPhone marketplace.

References:

1. <http://developer.android.com/develop/index.html>
2. Jeff McWherter and Scott Gowell, "Professional Mobile Application Development", Wrox, 2012
3. Charlie Collins, Michael Galpin and Matthias Kappler, "Android in Practice", DreamTech, 2012
4. James Dovey and Ash Furrow, "Beginning Objective C", Apress, 2012
5. David Mark, Jack Nutting, Jeff LaMarche and Frederic Olsson, "Beginning iOS 6 Development: Exploring the iOS SDK", Apress, 2013.

MSCS-307EF: MULTIMEDIA

Department	ComputerScience	CourseType	DSCC
CourseTitle	Multimedia	Course Code	MSCS307EF
L-T-P	2-1-0	Credits	2
ContactHours	60Hrs	DurationofSEE	1.5Hrs
SEEMarks	50	CIEMarks	00

CourseObjectives:

- To identify a range of concepts, techniques and tools for creating and editing the interactivemultimediaapplications.
- Toidentifythecurrentandfutureissuesrelatedtomultimediatechnology.
- To identify both theoretical and practical aspects in designing multimedia systems surroundingthe emergence of multimedia technologies using contemporary hardware and softwaretechnologies.

LearningOutcomes:

Uponsuccessfulcompletionofthissubject, studentsshould:

- beabletocriticallyanalyzeandsynthesizekeycomponentsofmultimediatechnologiesincluding text,graphics,voice,videoandanimation;
- be able todefinethe characteristics of eachmedia typeanddescribe their application;
- beabletodevelop,editandimproveinteractivewebpagesthatincorporateavarietyofdigitalmedia such as graphics,voice,animation and video;
- Useandapplytoolsforimageprocessing,video,soundandanimation.
- Applyacquiredknowledgeinthefieldofmultimediainpracticeandindependentlycontinuetoexpandknowledgeinthisfield.

UNIT I

INTRODUCTION

Introduction to Multimedia – Characteristics – Utilities – Creation -Uses – Promotion – DigitalRepresentation– MediaandDatastreams–MultimediaArchitecture–MultimediaDocuments

UNIT II

ELEMENTS OF MULTIMEDIA

Multimedia Building Blocks: Text, Graphics, Video Capturing, Sound Capturing, and Editing Intro to 2D & 3D Graphics - surface characteristics and texture - lights - Animation: key frames & Tweening, techniques, principles of animation, 3D animation, file formats.

UNIT III

MULTIMEDIA SYSTEMS

Visual Display Systems – CRT - video adapter card - video adapter cable – LCD – PDP - optical storage media- CD technology- DVD Technology- Compression Types and Techniques – CODEC - GIF coding standards – lossy and lossless – JPEG- MPEG-1- MPEG-2- MP3- Fractals – MMDBS

UNITIV

MULTIMEDIATOOLS

Authoring tools – features and types - card and page-based tools - icon and object-based tools - timebased tools - cross platform authoring tools – Editing tools - text editing and word processing tools -OCRsoftware-paintinganddrawingtools–

UNITYV

3Dmodelingandanimationtools-imageeditingtools–soundeditingtools-digitalmovietools–
plug-insanddeliveryvehiclesforwww

References:

1. ParekhR“PrinciplesofMultimedia”TataMcGraw-Hill,2006.
2. RalfSteinmetz,KlaraNahrstedt,“Multimedia:Computing,CommunicationsandApplications”
PrenticeHall,1995.
3. JohnVillamilandLouisMolina,“Multimedia;AnIntroduction”,PrenticeHall,NewDelhi1998.
4. TayVaughan,“Multimedia:MakingItWork”McGraw-HillProfessional,2006
5. Deitel&Deitel“Internet&WorldWideWebHowtoProgram”,Fourth Edition–PrenticeHall,2008
6. BANERJIASHOK&GHOSHANANDAMOHAN,MultimediaTechnologies,TMH,NewDelhi,2010
7. Li,Ze-Nian&Drew-Marks,“FundamentalsofMultimedia,”PhiLearningPrivateLimited,New
Delhi,2012

MSCS401P:MAJORPROJECTWORK:

Department	ComputerScience	CourseType	DSEC
CourseTitle	MajorProjectWork	Course Code	MSCS401P
L-T-P	0-0-24	Credits	12
ContactHours	60Hrs	DurationofSEE	3Hrs
SEEMarks	200	CIEMarks	100

The project will be one semester duration. The student will be advised to approach different organizationsinvolved in science communication activities as per interest and specialization of students, mostly locatedintheplaceofthestudy.Theywillhavetocarryoutaprojectworkrelatedtotheareaofinterestandsubmita project report at the end of the semester. The students shall defend their dissertation in front of expertsduringviva-voceexaminations.

1. ProjectSeminar(Internal) :50 Marks
2. ProjectReport(Internal) :50 Marks
3. National/InternationalConferencePublicationProceedings(External) : 50
Marks(Paperbasedonprojectshouldbesubmittedtoconference
andpublished in theformof proceedings)
4. National/InternationalJournalPublication(External) : 50
Marks(Paperbasedonprojectshouldbesubmittedtothejournal
andshouldbe published)
5. VivaVoce(External) : 50 Marks
6. ProjectExecution(External) : 50Marks