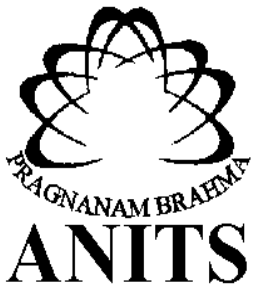
ANIL NEERUKONDA
INSTITUTE OF TECHNOLOGY & SCIENCES
(AUTONOMOUS)

Affiliated to Andhra University



M.Tech
(Computer Science and Engineering Department)

Academic Regulations
Curriculum &
Syllabi (First Year I-Sem)

ACCREDITED BY NBA & NAAC WITH 'A' GRADE

ACADEMIC REGULATIONS FOR M.TECH PROGRAMME UNDER AUTONOMOUS STATUS
W.E.F. THE ADMITTED BATCH OF 2015-16

I. Admissions:

Admissions into first year of M.Tech Programme of the Institute will be as per the norms stipulated by Andhra University & Andhra Pradesh State Council for Higher Education (APSCHE), Govt. of Andhra Pradesh.

II. Programmes Offered:

The following are the M.Tech. programmes offered by the Institute.

01. Control Systems Engineering – EEE Department
02. Computer Science and Technology – CSE Department
03. Communication Systems – ECE Department
04. Machine Design – Mech. Engg Department

III. Structure Of The M. Tech. Programme:

The normal duration of the course is 2 academic years for M.Tech Degree. Candidates should pursue a regular course of study, as detailed below, for not less than two academic years which consists of 4 semesters and should fulfil the academic requirements and pass all the prescribed examinations for the award of the degree.

The curriculum of M.Tech programme is designed to have a total of about 80 credits of which a student should acquire a minimum of 74 credits to get the degree awarded. If a student earns all the total credits, then the best 74 credits are considered to determine the final CGPA. However, the credits which a student can forego will be in accordance with the mandatory courses and electives offered by the individual departments.

IV. Duration of the Programme:

The duration of the programme is 2 academic years consisting of 2 semesters in each academic year. A student is permitted to complete the Programme in a stipulated time frame of 4 consecutive academic years from the date of initial admission and if fails will forfeit his seat in M. Tech Programme.

V. Medium of Instruction:

The medium of instruction and examination is English.

VI. Minimum Instruction Days:

Each semester normally consists of a minimum of 16 weeks of instruction.

VII. Academic Calendar:

The dates of all important events, such as commencement of class work, examinations, vacations, etc., during the academic year will be specified in the Academic Calendar of the Institute, as approved by the Academic Council.

VIII. Examinations & Evaluation Process:

The performance of a student in each semester shall be evaluated course-wise with a maximum of 100 marks each for theory and practical courses.

(a) Theory Course:

For all lecture based theory courses, the assessment shall be for 40 marks through internal evaluation and 60 marks through external semester-end examination of three hours duration.

The sessional marks shall be awarded through internal evaluation by the teachers concerned based on the continuous assessment which includes class tests, quiz, viva-voce, assignments, student regularity, two mid-examinations etc., according to a scheme notified by the department at the beginning of the semester.

Out of the 40 internal evaluation marks, 20 marks are assigned for 2 internal-mid exams, 10 marks are assigned for assignments, 5 marks are assigned for projects/ case studies

/quiz/tests and 5 marks are assigned for attendance. The average of 2 internal-mid exams is considered for the 20 marks allocated.

Under any circumstances, no re-examination shall be conducted for the internal mid examinations.

ii) External evaluation:

The question paper shall be set externally and the answer scripts are valued through a double valuation system.

The average of the two valuations will be taken for award of marks. In case, the difference of the marks obtained in the two valuations is more than 20% then a third examiner shall value the script. Out of the three valuations, the average of marks obtained in third valuation and the marks obtained nearer to third valuation out of first two valuations shall be considered. No revaluation for any subject/course shall be entertained as already double valuation system is in existence. However, recounting is allowed on the request of the candidate on payment of specified fee. Challenge valuation shall also be entertained on payment of specified fee.

(b) Laboratory Course:

Each student will perform about 10 to 12 experiments in each laboratory course. Laboratory course will be evaluated for 100 marks, out of which 50 marks are for external examination and 50 marks are for internal evaluation. The internal marks are awarded based on continuous assessment, record work, internal lab examination and student regularity. The external examination will be conducted by two examiners, one of them being laboratory class teacher as internal examiner (nominated by the Principal on recommendation of HOD) and an external examiner nominated by the Principal from the panel of experts recommended by the HOD.

A candidate shall be declared to have passed in any theory subject/course if he secures not less than 40% in external theory examination and also a minimum of 50% of total marks of that course which assures a minimum of 'E' grade.

A candidate shall be declared to have passed in any practical course if he secures not less than 50% of total marks of that course which assures a minimum of 'E' grade.

Any student appearing for the semester-end practical examination is eligible only if he submits the bonafide record certified by the laboratory class teacher and the HOD.

(C) Thesis Work:

The thesis work shall be carried out in two semesters of one full academic year. The students will be allotted for thesis by the Department committee to various faculty members who act as guides. However, a student can carry-out his thesis work either in the Department or in any other industry / research institute. In any such request to carryout thesis work outside the college, the permission of the Principal and an internal guide is mandatory. Such students should report to the internal guide once in a week essentially through mail or other communication.

The progress report of such work is to be submitted by the guide/external guide every month to the HOD. If the work is not found satisfactory, the HOD has the right to call back the student with the permission of the Principal. In any case the time and conditions for submission of the thesis will be same as for the regular candidates working in the college.

The third semester work is evaluated internally by the committee nominated by the HOD consisting a minimum of four members (concerned in area of specialization) including the HOD. If the work is not satisfactory, the candidate has to improve to the satisfaction of the committee within one month from the end of the semester to carry on his fourth semester work. If he fails to satisfy the committee in the second attempt he has to get readmitted into the third semester as per college norms. The grades will be awarded just as in the case of laboratory work. An internal viva voce by a committee nominated by the HOD is a prerequisite for the submission of the thesis. The fourth semester evaluation will be done through the viva voce examination on the thesis by a board consisting of the following four examiners after submission of the thesis by the candidate duly certified by the Guide and the HOD.

1. The Head of the Department as Chairman
2. Senior Professor in the Department

3. Internal Guide and External Guide (if any)
4. External examiner nominated by the Principal from a panel recommended by the HOD.

The panel of the external subject experts shall be submitted to the Principal by the HOD in mutual consent with the guide and other subject experts of the Department.

The valuation of the thesis shall be as specified in the scheme of examination of the laboratory course.

If the candidate fails in the viva voce examination of the thesis he has to reappear for the viva voce. The candidate has to bear the charges for re-conducting the viva voce.

The prerequisite for submission of the M.Tech. thesis is that one should have published a paper in a reputed international journal/ proceedings of an annual conference.

(d) Supplementary Exam:

There will be **NO** Supplementary examination for M.Tech courses.

IX. Attendance Regulations:

Attendance of a student is computed by considering total number of periods conducted in all courses as the denominator and the total number of periods actually attended by the student in all courses, as the numerator. It is desirable for a student to put in 100% attendance in all the subjects. However, a candidate shall be permitted to appear for the semester end examination provided he/she maintains a minimum of 75% overall attendance in the semester.

The shortage of attendance on medical grounds can be condoned up to a maximum of 9% provided the student puts in at least 66% attendance and provided the Principal is satisfied with the genuineness of the reasons. The Medical Certificates are to be submitted to the Head of the Department when the candidate reports to the classes immediately after the leave. Certificates submitted afterwards shall not be entertained. Condonation fee as fixed by the college for those who put in attendance between $\geq$ 66% and <75% shall be charged before the semester-end examinations.

In the case of students who participate in co-curricular, extra-curricular activities like student seminars, N.S.S, N.C.C, Inter-collegiate tournaments and any such other activities involving the representation of the Institute, with the prior approval of the Principal, the candidate may be deemed to have attended the classes during the actual period of such activity, solely for the purpose of attendance.

A student, who could not satisfy the minimum attendance requirement of 66% in any semester, shall be declared 'Detained'. He/she is not eligible to appear for the semester end examinations. He will not be promoted to the next semester and shall have to repeat that semester with the next batch(es) of students. Such students who are detained and seek readmission, should submit undertaking/declaration that they will abide by the regulations existing at the time of readmission.

X. Minimum Academic Requirements:

The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in item No. IX.

- A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory subject if only he secures not less than 40% marks in the semester-end examination and a minimum of 50% marks in the sum of the internal evaluation and semester-end examination taken together. In the labs/projects, the student should secure a minimum of 50% marks in the external examination and a minimum of 50% marks in the sum of internal evaluation and external examination evaluation taken together.

- A student will be promoted to the next semester, if only he satisfies the minimum attendance requirement.
- Students, who fail to complete their two year course study within Four academic years from the year of their admission or fail to acquire the credits stipulated for the course shall forfeit their seat in M. Tech course and their admission shall stand cancelled.

XI. Award Of Grades:

The absolute grading system is adopted as follows:

S.No.	Range of Marks {%}	Grade	Description	Grade Points
1	90-100	O	Outstanding	10
2	80-89	A	Excellent	9
3	70-79	B	Very Good	8
4	60-69	C	Good	7
5	55-59	D	Fair	6
6	50-54	E	Satisfactory	5
7	49 and below	F	Fail	0
8	The grade 'I' represents absent (subsequently changed into pass or higher grades.)	I	Absent	0

The performance of a student at the end of the each semester is indicated in terms of Semester Grade Point Average (SGPA). The SGPA is calculated as below:

$$SGPA = \frac{\Sigma \text{ (Credits of a course x Grade points awarded for a course)}}{\Sigma \text{ (Credits of a course)}}$$

SGPA is calculated for the candidates who have passed in all the courses in that semester.

Cumulative Grade Point Average (CGPA) will be calculated from II semester onwards up to the final semester and its calculation is similar to that of SGPA, considering all the courses offered from the first semester onwards.

CGPA is calculated for those who clear all the courses in all the previous semesters.

XII. Award of Class:

For the award of class, a total of best 74 credits are considered. A candidate, who becomes eligible for the award of M.Tech. Degree, shall be placed in one of the following classes.

S.No.	Class	CGPA
1	First Class with Distinction	7.5 or more*
2	First Class	6.5 or more but less than 7.5
3	Second Class/Pass	5.0 or more but less than 6.5

***First class with Distinction will be awarded only to those students who clear all the subjects of the program in first attempt of regular examinations.**

The CGPA can be converted to aggregate percentage by multiplying CGPA with 10, in case of requirement by any other university or for any other purpose.

XIII. Eligibility for Award of M.Tech. Degree:

A student shall be eligible for the award of the M.Tech degree if he/she fulfils all the following conditions:

1) Registered and successfully completed all the components prescribed for eligibility in the programme of study to which he/she is admitted within the stipulated period,
2) Obtained CGPA greater than or equal to 5.0 (Minimum requirement for Pass),
3) No disciplinary action is pending against him/her and
4) Has no dues to the Institute including hostels.

XIV. Malpractices:

The Controller of Examinations/Dean of Examinations shall refer the cases of suspected malpractices in mid examinations and semester-end examinations to Malpractice Enquiry Committee constituted by the Institute. Such committee shall follow the approved scales of punishment. The Principal shall take necessary final action against the erring students based on the recommendations of the committee.

XV. Amendments to Regulations:

The Institute may, from time to time, revise, amend, or change the Regulations, Schemes of Examinations, and / or Syllabi and the changes or amendments made shall be applicable to all the students with effect from the dates notified by the Institute.

XVI. General:

(i) Where the words 'he', 'him', 'his', occur in the regulations, they include 'she', 'her', 'hers'.

(ii) The academic regulation should be read as a whole for the purpose of any interpretation.

(iii) In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Principal is final.

COURSE STRUCTURE FOR M TECH (CST)

DEPT. OF COMPUTER SCIENCE & ENGINEERING: ANITS

I Year – I Semester

CODE	SUBJECT NAME	Instruction Period per week		MAX MARKS		CREDITS
		LECTURE	PRACTICAL	SESSIONAL MARKS	SEMESTER END MARKS	
PCSECST111	Theory of Computation	3	-	40	60	4
PCSECST112	Software Project Management	3	-	40	60	4
PCSECST113	Advances in DataBase Management Systems	3	-	40	60	4
PCSECST114	Elective -I	3	-	40	60	3
PCSECST115	Advances in Operating System	3	-	40	60	4
PCSECST116	Computer Networks	3	-	40	60	4
PCSECST117	Network Programming & Web Programming Lab	-	3	50	50	2
PCSECST118	Mini Project(i.e. Application Development)	-	3	50	50	2
	TOTAL	18	6	340	460	27

I Year – II Semester

CODE	SUBJECT NAME	Instruction Period per week		MAX MARKS		CREDITS
		LECTURE	PRACTICAL	SESSIONAL MARKS	SEMESTER END MARKS	
PCSECST121	Machine Learning	3	-	40	60	4
PCSECST122	Data ware Housing &Data Mining	3	-	40	60	4
PCSECST123	High Performance Computing	3	-	40	60	4
PCSECST124	Elective II	3	-	40	60	3
PCSECST125	Elective III	3	-	40	60	3
PCSECST126	Knowledge Engineering Lab	-	3	50	50	2
PCSECST127	Seminar & Technical Writing	-	3	100	-	2
	TOTAL	15	6	350	350	22

II Year – I Semester

NOTE:- MOOC-I & MOOC-II each of 4 credits subjects are optional.
Student can take MOOC-I & MOOC-II in any semester of two years academic time

Subject Code	Subject Name	Periods/Week		Program Evaluation			Credit
		T	P	Internal	External	Total	
MTCST21	Thesis Work Part 1	-	-	Grade	-	Grade	10
TOTAL							10

1. Candidates can do their thesis work within the department or in any industry/research organization for two semesters (i.e. 3rd and 4th semesters). In case of thesis done in an industry/research organization, one advisor (Guide) should be from the department and one advisor(CO-Guide) should be from the industry/research organization.

2. Thesis part I should be submitted at the end of 3rd semester and it will be evaluated by a committee consisting of Chairman Board of Studies, Head of the Department and thesis guide.

3. The candidate should give one seminar in III semester on his research work/advanced topics in the related fields. Seminar marks & credits are evaluated internally by the guide and added to the CGPA.

4. Although credits are allotted for the thesis work they will not be taken for the calculation of CGPA.

II Year – II Semester

Subject Code	Subject Name	Periods/Week		Program Evaluation			Credit
		T	P	Internal	External	Total	
MTCST22	Thesis Work Part 2	-	-	-	Grade	Grade	15
TOTAL							15

1. The candidate should give one seminar in the IV Semester on his research before submission of the thesis. Seminar marks & credits are evaluated internally by the guide and added to the CGPA.

2. A publication of a paper on the thesis work in a National/International Conference proceedings with presentation certificate or a paper on the thesis work be communicated to a National/International Journal & accepted for publication for the submission of thesis at the end of 4th semester is mandatory.

3. Final Thesis with Part I & Part II should be submitted at the end of 4th semester and it will be evaluated by a committee consisting of Chairman Board of Studies, Head of the Department , External Examiner and thesis guide.

4. The candidate has to defend his thesis in a Viva-voce examination to be conducted by the above committee. The committee should submit a report, with signatures of all the members, candidate wise, with grade A-Excellent/ Grade B-Good/Grade C- fair/ Grade D- Reappear.

5. The external examiner shall be nominated by the Hon'ble Vice Chancellor as per the norms of the University.
6. Although credits are allotted for the thesis work they will not be taken for the calculation of CGPA.

Maximum offered credit by the Program = 82

Minimum credits required to award the degree = 74

List of Elective I:

1. Image Processing
2. Semantic Web
3. Embedded Systems
4. Wireless Sensor & Actuator Networks

List of Elective II:

1. Cloud Computing
2. Mobile Computing
3. Soft Computing
4. Big Data Analysis

List of Elective III:

1. Information Security & Management
2. Internet of Things
3. Computer Graphics &Visual Computing
4. Distributed Operating System

I YEAR – I SEMESTER

THEORY OF COMPUTATION

Course Code: PCSECST111

Credits	Instruction periods per Week			Exam Hrs.	SESSIONAL MARKS	SEMESTER END MARKS	Total Marks
	LECTURE	TUTORIAL	PRACTICAL				
4	3	0	0	3	40	60	100

UNIT-I

Finite Automata, Deterministic finite automata, Non deterministic finite automata, finite automata with epsilon transitions. Application of finite automata.

UNIT-II

Regular Expressions, finite automata and regular expressions, algebraic laws of regular expressions, Application of regular expression.

UNIT-III

Context free grammars, The language of a grammar, sentential form, parse trees, ambiguity in grammars and languages, Applications of context free grammar.

UNIT-IV

Normal forms for context free grammer, Chomsky normal form, The pumping lemma for context free languages. Decision properties of context free language.

UNIT-V

Push down automata, Languages of a PDA,. parsing and pushdown automation.
Turing machine, Programming techniques for turing machine, restricted turing machines, turing machine and computers.

Text Books

1. Introduction to automata theory, language & computations- Hopcroft & O.D. Ullman, R. Mothwani. AW, 2001
2. Theory of Computer Science(automata, languages, and computation): K.L.P Mishra and N. Chandrasekaran, PHI,2000
3. Introduction to formal languages & automata- Peter Linz, Narosa Pub. 2001.
4. Fundamentals of the theory of computation- principles and practice by Ramond Greenlaw and H . James Hoover, Harcourt India Pvt. Ltd.1998.
5. Elements of theory of computation by H.R. Lewis & C.H. Papaditriou, PHI,1998.

I YEAR – I SEMESTER

SOFTWARE PROJECT MANAGEMENT

Course Code: PCSECST112

Credits	Instruction periods per Week			Exam Hrs.	SESSIONAL MARKS	SEMESTER END MARKS	Total Marks
	LECTURE	TUTORIAL	PRACTICAL				
4	3	0	0	3	40	60	100

UNIT I Software Process Maturity Software maturity Framework**,** Principles of Software Process Change, Software Process Assessment, The Initial Process, The Repeatable Process, The Defined Process, The Managed Process, The Optimizing Process. Process Reference Models Capability Maturity Model (CMM)**,** CMMI, PCMM, PSP, TSP.

UNIT II Software Project Management Renaissance Conventional Software Management, Evolution of Software Economics, Improving Software Economics, The old way and the new way.
Life-Cycle Phases and Process artifacts Engineering and Production stages, inception phase, elaboration phase, construction phase, transition phase, artifact sets, management artifacts, engineering artifacts and pragmatic artifacts, model based software architectures.

UNIT III Workflows and Checkpoints of process Software process workflows, Iteration workflows, Major milestones, Minor milestones, Periodic status assessments. Process Planning Work breakdown structures, Planning guidelines, cost and schedule estimating process, iteration planning process, Pragmatic planning.

UNIT IV Project Organizations Line-of- business organizations, project organizations, evolution of organizations, process automation. Project Control and process instrumentation The seven core metrics, management indicators, quality indicators, life-cycle expectations, Pragmatic software metrics, and metrics automation.

UNIT V CCPDS-R Case Study and Future Software Project Management Practices Modern Project Profiles, Next-Generation software Economics, Modern Process Transitions.

TEXT BOOKS:

1. Managing the Software Process, *Watts S. Humphrey*, Pearson Education.
2. Software Project Management, *Walker Royce,* Pearson Education.
3. Effective Project Management: Traditional, Agile, Extreme, Robert Wysocki, Sixth edition, Wiley
India, rp2011.
4. An Introduction to the Team Software Process, Watts S. Humphrey, Pearson Education, 2000
5. Process Improvement essentials, James R. Persse, O'Reilly, 2006

I YEAR – I SEMESTER

ADVANCE DATABASE MANAGEMENT SYSTEM

Course Code: PCSECST113

Credits	Instruction periods per Week			Exam Hrs.	SESSIONAL MARKS	SEMESTER END MARKS	Total Marks
	LECTURE	TUTORIAL	PRACTICAL				
4	3	0	0	3	40	60	100

Unit I Introduction, Parallel database architecture, speedup, scale-up I/O parallelism, Inter-query and Intra-query parallelism, Inter-operational and Intra-operational parallelism, parallel query evaluation, Design of parallel systems, Implementation issues of Parallel query evaluation, Design of parallel systems, Comparison of Inter-query and Intra-query parallelism.

Unit II Distributed Databases, Study of DDBMS architectures, Comparison of Homogeneous and Heterogeneous Databases, Analysis of Concurrency control in distributed databases, Implementation of Distributed query processing. Distributed data storage, Distributed transactions, Commit protocols, Availability, Distributed query processing, Directory systems-ldap, Distributed data storage and transactions.

Unit III Overview of client server architecture, Databases and web architecture, N-tier architecture, XML, Introduction, Structure of XML Data, XML Document Schema, DTD, Querying and Transformation: XQuery, FLOWR, XPath, XML validation, Web server, API to XML, Storage of XML Data, XML Applications: web services, Web based system, Implementation of XML validations, Use of web servers. XML and DTD implementation, Use of Web service like Amazon web service or Microsoft Azure.

Unit IV Introduction to Decision Support, Data Warehousing, Creating and maintaining a warehouse. Introduction to Data warehouse and OLAP, Multidimensional data model, Data Warehouse architecture, OLAP and data cubes, Operations on cubes, Data preprocessing need for preprocessing, Multidimensional data model, OLAP and data cubes, Data warehousing Concepts, Study of Data preprocessing need for preprocessing, Simulating and maintaining a Warehouse, Analysis of Data preprocessing.Introduction to data mining , Data mining functionalities, clustering - k means algorithm, classification - decision tree, Baysian classifiers, Outlier analysis, association rules - apriori algorithm, Introduction to text mining, Implementing Clustering - k means algorithm, Analysis of Decision tree.

Unit V Information retrieval - overview, Relevance ranking using terms and hyperlinks, synonyms, homonyms, ontologies, Indexing of documents, measuring retrieval effectiveness, web search engines, Information retrieval and structured data. Information Retrieval, Study and Comparison of Synonyms, Homonyms, Ontologies. Implementation issues of Relevance ranking Algorithm.

Text Books:

1. Database System Concepts, Avi Silberschatz , Henry F. Korth , S. Sudarshan McGraw-Hill, Sixth Edition, ISBN 0-07-352332-1.
2. Database Management Systems, Raghu Ramakrishnan, Johannes Gehrke,McGraw-Hill.

I YEAR – I SEMESTER

IMAGE PROCESSING (Elective-I)

Course Code: PCSECST114

Credits	Instruction periods per Week			Exam Hrs.	SESSIONAL MARKS	SEMESTER END MARKS	Total Marks
	LECTURE	TUTORIAL	PRACTICAL				
3	3	0	0	3	40	60	100

UNIT-I

DIGITAL IMAGE FUNDAMENTALS : What Is Digital Image Processing?, Examples of Fields that Use Digital Image Processing, Fundamental Steps in Digital Image Processing, Image Sensing and Acquisition, Some Basic Relationships between Pixels, An Introduction to the Mathematical Tools Used in Digital Image Processing.

UNIT-II

Intensity Transformations and Spatial Filtering: Background, Some Basic Intensity Transformation Functions, Histogram Processing, Fundamentals of Spatial Filtering, Smoothing Spatial Filters, Sharpening Spatial Filters.

UNIT-III

Filtering in the Frequency Domain: Background, Preliminary Concepts, DFT, Some Properties of the 2-D Discrete Fourier Transform, The Basics of Filtering in the Frequency Domain, Image Smoothing Using Frequency Domain Filters, Image Sharpening Using Frequency Domain Filters, Selective Filtering.

UNIT-IV

Morphological Image Processing & Image Compression: Preliminaries, Erosion and Dilation, Opening and Closing, The Hit-or-Miss Transformation, Some Basic Morphological Algorithms, JPEG Compression model, Huffman coding.

UNIT-V

Image Segmentation: Fundamentals, Point, Line, and Edge Detection, Thresholding, Region-Based Segmentation.

Text Books:

Title: "Digital Image Processing". Author(s)/Editor(s): R. C. Gonzalez and R. E. Woods. Publisher: Pearson-Prentice-Hall, 2008 ISBN: 0-13-168728-x, 978-0-13-168728-8 Edition: third.

Title: "Digital Image Processing using Matlab". Author(s)/Editor(s): R. C. Gonzalez, R. E. Woods, S. L. Eddins. Publisher: Pearson-Prentice-Hall, 2004 ISBN: 0-13-008519-7 Edition: 2nd.

I YEAR – I SEMESTER

SEMANTIC WEB (Elective-I)

Course Code: PCSECST114

Credits	Instruction periods per Week			Exam Hrs.	SESSIONAL MARKS	SEMESTER END MARKS	Total Marks
	LECTURE	TUTORIAL	PRACTICAL				
3	3	0	0	3	40	60	100

UNIT-I

Introduction to Semantic Web and Ontologies: Today's Web, From Today's Web to the Semantic Web, Semantic Web Technologies, A Layered Approach, Differences Among Taxonomies, Thesauri and Ontologies, Classifying Ontologies, Knowledge Representation in Description Logic.

UNIT-II

Describing Web Resources in RDF: XML Essentials like elements/attributes and URIs and Namespaces, RDF (statements and vocabularies, RDF Triples and Graphs) and RDF Schema (Classes, Properties, Individuals).

UNIT-III

Querying the Semantic Web: SPARQL Infrastructure, Basics Matching Patterns, Filters, Organizing result sets, Other forms of SQL Queries, Querying Schemes, Adding Information with SPARQL Update.

UNIT-IV

Web Ontology Language (OWL): Introduction, Requirements for Web Ontology Description Languages, Header Information, Versioning and Annotation Properties, Properties, Classes and Individuals.

UNIT-V

Logic and Inference Rules: Introduction, Example of Monotonic Rules: Family Relationships, Monotonic Rules: Syntax, Monotonic Rules: Semantics, Semantic Web Rule language (SWRL), Rules in SPARQL: SPIN, Non-monotonic Rules: Motivation and Syntax.

Case Studies: Applications: Software Agents, Semantic Desktop, Ontology Applications in Art.

Text Books:

1. Grigoris Antoniou, Frank Van Harmelen, A Semantic Web Primer, MIT Press, 2008 (Second Edition) ISBN: 9780262012423
2. Grigoris Antoniou, Frank Van Harmelen, A Semantic Web Primer, MIT Press, 2012 (Third Edition) ISBN: 9780262018289

Reference Books:

1. Karin K. Breitman and Marco Antonio Casanova, Semantic Web: Concepts, Technologies and Applications, Springer, 2010, ISBN:9788184893977

I YEAR – I SEMESTER

EMBEDDED SYSTEMS (Elective-I)

Course Code: PCSECST114

Credits	Instruction periods per Week			Exam Hrs.	SESSIONAL MARKS	SEMESTER END MARKS	Total Marks
	LECTURE	TUTORIAL	PRACTICAL				
3	3	0	0	3	40	60	100

Unit -I

A First look at Embedded systems- Examples of Embedded Systems - Telegraph development challenges, **Hardware fundamentals for software engineers**- Logic gates, Advanced Hardware Fundamentals- microprocessor, D-flip flop, memories, Buses, Watch Dog Timer, DMA, UART and PLD's, ASIC, FPGA.

Interrupts basics, ISR; Context saving, shared data problem. Atomic and critical section, Interrupt latency.

Unit -II

Survey of software architectures- Round Robin, Round Robin with Interrupt, Function queue scheduling architecture, Use of real time operating system and their comparison.

Unit-III

RTOS- concept, Tasks and Task structures , Scheduler, Shared data, Reentrancy, Priority Inversion, Mutex binary semaphore and counting semaphore. **Inter task communication methods** and their comparison- message queue, mailboxes and pipes, timer functions, events.

Unit- IV

Interrupt routines in an RTOS environment-Rule1 and Rule2, No Blocking, Solutions to Break the Rules,

Basic Design of Embedded Software using an RTOS- Hard real time and soft real time system principles, Task division, need of interrupt routines, shared data.

Unit -V

Embedded Software Development Tools- Host and target systems, Cross Compilers/Cross Assembler, linkers/locators for embedded systems. Getting embedded software into the target system.

Debugging techniques- Testing on host machine, Instruction set Simulators, logic analyzers. In-circuit Emulators and Software-Only Monitors.

Text Books:

1. David A. Simon, An Embedded Software Primer, Pearson Education, Inc., 1999

2. Sriram V Iyer and Pankaj Gupta, Embedded Real Time Systems programming, TMH,2004

3. Frank Vahid/ Tony Givargis, Embedded Systems Design – A Unified Hardware/Software Introduction, John Wiley & Sons, Inc., 2002

4. Raj Kamal, Embedded Systems, Architecture, Programming and Design, TMH, 2003

I YEAR – I SEMESTER

WIRELESS SENSOR & ACTUATOR NETWORKS (Elective-I)

Course Code: PCSECST114

Credits	Instruction periods per Week			Exam Hrs.	SESSIONAL MARKS	SEMESTER END MARKS	Total Marks
	LECTURE	TUTORIAL	PRACTICAL				
3	3	0	0	3	40	60	100

UNIT-I

Review of Wireless sensor and actuator networks, Introduction to wireless sensor Networks and wireless sensor actuator networks,Terminology WSN architecture,requirements and standards, Topologies uses in Wireless sensor and actuator network,Software framework

UNIT-II

Applications of wireless sensor networks, ,requirement for wireless sensor network deployment various standards for WSAN Development of sensor network.Overview of boardcasting techniques,backbone and broadcasting in sensor actuator networks,coverage and connectivity criteria.

UNIT-III

Placement and deployment of sensors in wireless sensor networks.Static sensors and mobile sensors placements.Different methods used for sensor placement and deployment, Issues with the wireless sensor network deployment

UNIT-IV

Routing in Wireless Sensor and Actuator Networks, Study of types of routing used in wirless sensor network,networks,multicasting,geocasting and anycasting in sensor network,

UNIT-V

Sink Mobility in Wireless Sensor Networks, Introduction to sink mobility,energy problems, Topology Control in Sensor, Actuator, Introduction and detection of critical nodes and links

Text Books:

1.Wireless Sensor and Actuator Networks Algorithms and Protocols for Scalable Coordination and Data Communication, Edited by Amiya Nayak and Ivan Stojmenovic A JOHN WILEY & SONS, INC., PUBLICATION,2010.

2. Wireless Communications & Networks, 2nd Edition, William Stallings ,Pearson Education India,2009

3. Wireless Sensor Networks: An Information Processing Approach,Feng Zhao and Leonidas Guibas ,Morgan Kauffman Publication,2004

I YEAR – I SEMESTER

ADVANCE OPERATING SYSTEM

Course Code: PCSECST115

Credits	Instruction periods per Week			Exam Hrs.	SESSIONAL MARKS	SEMESTER END MARKS	Total Marks
	LECTURE	TUTORIAL	PRACTICAL				
4	3	0	0	3	40	60	100

UNIT-I Process Synchronization: Functions of an operating system, Design approaches, why advanced operating system, Types of advanced operating systems, synchronization mechanisms-concept of a process, concurrent processes, the critical-section problem, other synchronization problems, language mechanisms for synchronization.**Process Deadlocks:** Preliminaries, models of deadlock, models of resources, graph-theoretical model of a system state, necessity conditions for a deadlock, system with single-unit resources and reusable resources.

UNIT-II Distributed Operating Systems: Architecture of a Distributed Systems, system architecture types, issues in distributed operating systems, communication networks, and communication primitives. Limitations of distributed systems, Lamport's logical clocks, vector clocks, casual ordering of messages, global state.**Distributed Mutual Exclusion:** Introduction, preliminaries, Lamport's Algorithm, Ricart-Agrawala Algorithm, generalized non-token based algorithm, token-based algorithm, Suzuki-kasami broadcast algorithm.

UNIT-III Distributed Deadlock Detection: Introduction, preliminaries, deadlock handling strategies, distributed deadlock detection, centralized-deadlock detection algorithms, distributed deadlock detection algorithms, hierarchical deadlock detection algorithms, Agreement protocols-classification-solutions-Applications.

UNIT-IV Distributed Resource Management: Distributed file systems, mechanisms, design issues, distributed shared memory architecture-algorithms-memory coherence, coherence protocols, design issues. Distributed scheduling-issues, components, load distribution, performance comparision.

UNIT-V Failure Recovery and Fault Tolerance: Recovery-concepts, classifications, error recovery, basic approaches, recovery in concurrent systems, Synchronous and Asynchronous Check pointing and Recovery; Check pointing in Distributed Database Systems; Fault Tolerance; Issues - Two-phase and Nonblocking Commit Protocols; Voting Protocols; Dynamic Voting Protocols.

Text Book:

Advanced Concepts in Operating Systems by Mukesh Singhal and N.G. shivaratri, McGraw Hill, 2000.
Operating System concepts by Abraham Silberschatz, Peter B. Galvin, G. Gagne, sixth edition, Addision Wesley Publishing co., 2003.
Modern Operating Systems by Andrew S. Tanenbaum, Second Edition, Addision Wesley, 2001.

I YEAR – I SEMESTER

COMPUTER NETWORKS

Course Code: PCSECST116

Credits	Instruction periods per Week			Exam Hrs.	SESSIONAL MARKS	SEMESTER END MARKS	Total Marks
	LECTURE	TUTORIAL	PRACTICAL				
4	3	0	0	3	40	60	100

UNIT- I:
Introduction to Computer Networks: Introduction, Network Hardware, Network Software, Reference Models, TCP / IP protocol suite, Guided and Unguided Transmission media, Understanding of Delay, Loss and Throughput in the packet switching network.

UNIT- II:
Introduction and link layer services, error-detection and correction techniques, Multiple access protocols, Sliding Window Protocols, Multiplexing, Switching, Broad Band ISDN , ATM Networks.

UNIT- III:
Design Issues in Networks: Routing Algorithms, Congestion Control Algorithms, Network Layer in the Internet, IP Protocol, IP Address, Subnets, and Internetworking.

UNIT -IV:
TRANSPORT Service, Elements of Transport Protocols, TCP and UDP Protocols, Quality of Service Model, Best Effort Model, Network Performance Issues.

UNIT-V:
Domain Name System (DNS) , E-mail, FTP,TFTP,WWW ,HTTP,– Multimedia Network Security: Cryptography – Symmetric key and Public Key algorithms - Digital signature – Management of Public keysAdvanced Concepts in Networks: Over View of Cellular Networks, Adhoc Networks, Mobile Adhoc Networks, Sensor Networks, Virtual Private Networks .Delay Tolerant Networks DTN, .

Text Book:
1. Computer Networks, Andrews S Tanenbaum,, Edition 5, PHI, ISBN:-81-203-1165-5
2.Computer Networking Top Down approach 3rd edition By Jim kurose and keith ross
3.Computer networks, Mayank Dave, CENGAGE.
4. Computer networks, A system Approach, 5th ed, Larry L Peterson and Bruce S Davie, Elsevier.
5.Understanding communications and Networks, 3rd Edition, W.A. Shay, Thomson.

I YEAR – I SEMESTER

Network Programming and Web Programming Lab

Course Code: PCSECST 117

Credits	Instruction periods per Week			Exam Hrs.	SESSIONAL MARKS	SEMESTER END MARKS	Total Marks
	LECTURE	TUTORIAL	PRACTICAL				
2	0	0	3	3	50	50	100

Part I:

Network programming

1.Identifying well known ports on a Remote System :By trying to listen to the various well known ports by opening client connections. If the exception does not occur then the remote port is active else the remote port is inactive.

2. Writing a Chat application :

i). One-One: By opening socket connection and displaying what is written by one party to the other.

ii). Many-Many (Broad cast): Each client opens a socket connection to the chat server and writes to the socket. Whatever is written by one party can be seen by all other parties.

3. SMTP Client : Gives the server name, send e-mail to the recipient using SMTP commands.

4.TFTP- Client:To develop a TFTP client for file transfer.

5. HTTP-Server: Develop a HTTP server to implement the following commands. GET, POST, HEAD, DELETE. The server must handle multiple clients.

Part II:

Web Programming

1.Design of the Web pages using various features of HTML and DHTML

2. Design of the Web pages using client side scripting (javascript) for page validation.

3.Client server programming using servlets and JSP on the server side and java script on the client side.

4. Multimedia effects on web pages design using Flash

References

1. Java Network Programming, Harol, Orielly Publications

I YEAR – I SEMESTER

Mini Project LAB

Course Code: PCSECST118

Credits	Instruction periods per Week			Exam Hrs.	SESSIONAL MARKS	SEMESTER END MARKS	Total Marks
	LECTURE	TUTORIAL	PRACTICAL				
2	0	0	3	3	50	50	100

Mini Projects based on DATABASE and SOFTWARE PROJECT MANAGEMENT Techniques

Course Objectives :

1. Application of knowledge and techniques learnt in theoretical classes for developing the s/w for real problems.
2. The objective of the course is to deliver a maximum learning experience. To understand as hot the software is developed.
3. Gives an insight into the working of the real organizations/companies.
4. Gaining deeper understanding in specific functional areas.
5. Helps in exploring career opportunities in their areas of interest.