SYLLABUS

FACULTY OF COMPUTING

- BACHELOR OF ENGINEERING IN COMPUTER SCIENCE AND ENGINEERING

- BACHELOR OF TECHNOLOGY IN INFORMATION TECHNOLOGY

REGULATIONS 2015
CHOICE BASED CREDIT SYSTEM

Effective from the academic year 2015-2016 and applicable to the students admitted to the Degree of Bachelor of Engineering / Technology. (Eight Semesters)

1. NOMENCLATURE

Programme : Refers to the Bachelor of Engineering / Technology Stream that a student has chosen for study. Eg. B.E in Mechanical Engineering

Course : Refers to the course (Subject) that a student would have to undergo during the study in the Institution.


Faculty : Each Programme and Department of the Institution is grouped under various Faculty. Eg. Faculty of Computing consists of Departments of Computer Science, Information Technology and Computer Applications. This Faculty offers various Undergraduate and Postgraduate Programmes in Engineering like B.E (Computer Science), B.Tech (Information Technology), M.E (Computer Science), M.Tech (Information Technology)

Faculty Head : Refers to the Head of a Group of Departments under which various UG and PG Programmes are offered.

HoD : Refers to the Head of a Department (HoD) offering various UG and PG programmes. He/She will be the Head of all staff members and Students belonging to the Department

2. STRUCTURE OF PROGRAMME

2.1. Every Programme will have a curriculum with syllabi consisting of theory and practicals such as:

(i) General Foundation courses comprising English, Mathematics, Basic Sciences and Engineering Sciences.

(ii) Core courses belonging to the Major Programme of study.

(iii) Electives offered by the Faculty and the Department related to the Major programme of study.

(iv) Electives to be chosen from a group of courses offered, which can be chosen by any student of any stream.

(v) Laboratory courses such as Workshop practice, Computer Practice, Engineering Graphics, etc.

(vi) Professional Training Courses during the semester vacation.

(vii) Project Work

2.2. Each semester curriculum shall normally have a blend of lecture courses not exceeding 6 and practical courses not exceeding 2.
2.3. Each course is normally assigned certain number of credits as follows:

- **Lecture Hours (Theory)**: 1 credit per lecture hour per week, 1 credit per tutorial hour per week,
- **Laboratory Hours**: 1 credit for 2 Practical hours, 2 credits for 3 or 4 hours of practicals per week.
- **Project Work**: 1 credit for 2 hours of project work per week
- **Professional Training**: 5 credits for minimum of 3 weeks of training during summer vacations

2.4. The medium of instruction, examinations and project report will be in English Language throughout the Programme

2.5. For the award of the degree, a student has to earn the total number of credits as specified in the curriculum of the relevant branch of study.

3. **DURATION OF THE PROGRAMME**

A student is normally expected to complete the B.E/B.Tech. Programme in 8 semesters but in any case not more than 12 consecutive semesters from the time of commencement of the course (not more than 10 semesters for those who join 3rd semester under Lateral entry system) The Head of the Department shall ensure that every teacher imparts instruction as per the number of hours specified in the syllabus and that the teacher teaches the full content of the specified syllabus for the course being taught.

4. **REQUIREMENTS FOR COMPLETION OF A SEMESTER**

A candidate who has fulfilled the following conditions shall be deemed to have satisfied the requirement for completion of a semester.

4.1 He/She secures not less than 90% of overall attendance in that semester.

4.2 Candidates who do not have the requisite attendance for the semester will not be permitted to write the semester Examinations.

5. **FACULTY HEAD**

Each Faculty is headed by a Faculty Head which comprises of many Departments and Courses offered by them. The Faculty Head is responsible for all activities taking place inside the Faculty in coordination with all Department Heads and all staff members belonging to the faculty. The Faculty Head will be appointed by the Institution on rotational basis. The Faculty Head shall act as a linkage between the HoD’s, faculty members and the students. The Faculty Head makes a review of all the academic activities of Staff, Students and Research on a regular time interval and takes steps to improve the morale of all staff and students.

6. **HEAD OF THE DEPARTMENT**

Each Department offering various UG and PG programmes is headed by a Head (HoD). The HoD is responsible for allotting courses to each staff member uniformly in consultation with other HoD’s and Faculty Heads. The HoD is responsible for streamlined teaching of courses to students, improvement and Assessment of Teaching Quality within the Department on a continuous basis. Assessment of staff members, transparent conduct of Continuous Assessment Examinations, Interacting with Parents, ensuring that all academic and non academic activities of staff and students are monitored and steps taken for their improvement.
7. **BATCH COORDINATOR**

The Head of the Department shall appoint a Batch coordinator for each batch of students admitted into a programme, throughout their period of study. The Batch coordinator shall act as a linkage between the HoD, faculty members and the students. The Batch coordinator gets information about the Syllabus coverage by the staff members, requirements of the students academically and otherwise, attendance and progress of the students from the respective Class Counselors. The Batch Coordinator also informs the students of the academic schedule including the dates of assessments and syllabus coverage for each assessment, weightage for each assessment, their Continuous assessment Marks and attendance % details before the commencement of End Semester examinations.

8. **CLASS COUNSELOR**

There shall be a class counselor for each class. The class counselor will be one among the teachers of the Department. He / She will be appointed by the HoD of the department concerned. The responsibilities for the class Counselor shall be:

- To act as the channel of communication between the HoD, Faculty Head, Batch Coordinator, Course Coordinator, staff and students of the respective class.
- To collect and maintain various statistical details of students.
- To help the Batch Coordinator in planning and conduct of the Classes.
- To monitor the academic performance of the students including attendance and to inform the Batch Coordinator.
- To take care of the students’ welfare activities like industrial visits, Seminars, awards etc.

9. **COURSE COORDINATOR FOR EACH COURSE**

- Each theory course offered to more than one class or branch or group of branches, shall have a “Course coordinator” comprising all the teachers teaching the course, with one of the senior staff amongst them normally nominated as course coordinator, by the faculty head in consultation with the respective HoD’s.

- The “Course Coordinator” shall meet the teachers handling the course, as often as possible and ensure a Common Teaching Methodology is followed for the course. Study materials are prepared by the staff members and communicated to the students periodically, involving students in course based projects and assignments, common question paper for continuous assessment tests, uniform evaluation of continuous assessments Answer sheets by arriving at a common scheme of evaluation.

- The Course coordinator is responsible for evaluating the Performance of the students in the Continuous Assessments and End Semester exams and analyse them to find suitable methodologies for improvement in the performance. The analysis should be submitted to the HoD and Faculty Head for suitable action.

10. **EXAMINATIONS**

The end semester examinations shall normally be conducted between October and December during the odd semesters and between March and May in the even semesters. The maximum marks for each theory and
practical course (including the project work and Viva Voce examination in the final Semester) shall be 100 with the following breakup.

(i) **Theory Courses**
   
   Continuous Assessment : 50 Marks 
   End Semester Exams : 50 Marks

(ii) **For Practical courses**
   
   Continuous Assessment : 50 Marks 
   End Semester Exams : 50 Marks

11. CONTINUOUS ASSESSMENT EXAMS

   a. **Theory courses**

   - There will be a Minimum of two Continuous Assessment Exams, for each Theory course. Each Assessment Exam will be conducted for a Maximum of 50 Marks. The total marks secured in the Two Assessment Exams out of 100, will be converted to 45 Marks. The % -of attendance secured by the candidate in a course in a semester will carry a weightage of 5 Marks, which will be added to the Continuous Assessment Marks for each course.

   - The Continuous assessment marks obtained by the candidate in the first appearance shall be retained and considered valid for all subsequent attempts, till the candidate secures a pass.

   b. **Practical courses**

   - For Practical Courses, the student will be evaluated on a continuous basis for 25 Marks (which will include performing all experiments, submitting Observation and Record Note Book in scheduled Format and Time), 20 Marks for Model Exam at the end of the semester and 5 Marks for Attendance in the course.

   - For Practical courses, if a student has been absent for some Practical Classes or has performed poorly, then the student will have to get permission from the Lab incharge and batch coordinator to do the experiments, so that he/she meets all the requirements for the course and thereby allowed to appear for Model and End Semester Exams.

   - If a student has not done all the experiments assigned for that Lab, before the scheduled date or has attendance percentage less than 90%, the student will not be allowed to appear for the Model and end semester Practical Exam. Such students will have to redo the course again by doing all the experiments in the next semester when the course is offered.

12. ELECTIVE COURSES

   Every student has the option of choosing four elective courses during the period of study. These electives will be offered in the Prefinal and Final year of study. The student has to select atleast two electives offered by the respective department. The student also has the choice of selecting the other two electives from electives offered by Departments within the faculty in that semester and / or from the electives which can be opted as elective by all undergraduate branches of the Institution.

13. FINAL YEAR PROJECT WORK

   - Project work is to be undergone by each student in the final year. The Project work has been divided in to two Phases (Phase 1 and 2). Project work Phase 1 is to be done in the Pre-final Semester and Phase 2 during the Final Semester.
• Project work may be allotted to a single or two students as a Group. In special cases, the number of students in a Project Group cannot exceed Three, if it can be justified by the Project Supervisor and HoD, that the Project Work Content is large enough.

• For Project work, Assessment is done on a continuous basis by 3 Reviews for 50 Marks and Final Viva voce carries 50 Marks.

• There shall be three Project Reviews (Conducted during the Pre-final semester and Final Semester) to be conducted by a review committee. The student shall make presentation on the progress made, before the committee. The Head of the Department shall constitute the review committee for each branch in consultation with Faculty Head. The members of the review committee will evaluate the progress of the Project and award marks.

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<th>PROJECT REVIEWS</th>
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<td>2</td>
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<td>Max. Marks</td>
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</table>

• The total marks obtained in the three reviews, rounded to the nearest integer is the Continuous Assessment marks out of 50. There shall be a viva-voce examination for final Semester Examination conducted by one internal examiner, one external examiner and the supervisor concerned.

• A student is expected to attend all the Project Reviews conducted by the Institution on the scheduled dates. It is mandatory for every student to attend the Reviews, even if they are working on a project in an industry based outside Chennai city. It is their duty to inform the organization about the project reviews and its importance, and get permission to attend the same. If a student does not attend any of the Project Reviews, he / she shall not be allowed for the successive reviews and thereby not allowed to appear for the Final viva voce.

• The final Project viva-voce examination shall carry 50 marks. Marks are awarded to each student of the project group based on the individual performance in the viva-voce examination. The external examiner shall be appointed by the Controller of Examinations. The Internal and External Examiner will evaluate the Project for 20 Marks each. The project report shall carry a maximum of 10 marks.

• The candidate is expected to submit the project report as per the guidelines of the Institution on or before the last day of submission. If a candidate fails to submit the project report on or before the specified deadline, he / she can be granted an extension of time up to a maximum limit of 5 days for the submission of project work, by the Head of the Department.

• If he / she fails to submit the project report, even beyond the extended time, then he / she is deemed to have failed in the Project Work and shall register for the same in the subsequent semester and re-do the project after obtaining permission from the HoD and Faculty Head.

14. PASSING REQUIREMENTS

• A candidate should secure not less than 50% of total marks prescribed for the courses, subject to securing a minimum of 30% marks out of Max. Mark in End Semester Exams. Then he / she shall be declared to have passed in the Examination.

• If a candidate fails to secure a pass in a particular course, it is mandatory that he / she shall register and reappear for the examination in that course during the next semester when examination is conducted in that course. It is mandatory that he / she should continue to register and reappear for the examination till he / she secures a pass.
15. AWARD OF GRADES

All assessments of a course will be done on absolute marks basis. However, for the purpose of reporting the performance of a candidate, letter grades, each carrying certain number of points, will be awarded as per the range of total marks (out of 100) obtained by the candidate in each course as detailed below:

RANGE OF MARKS FOR GRADES

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<th>Range of Marks</th>
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<tr>
<td>Authorised Break of Study</td>
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CUMULATIVE GRADE POINT AVERAGE CALCULATION

The CGPA calculation on a 10 Point scale is used to describe the overall performance of a student in all courses from first semester to the last semester. RA, AAA and W grades will be excluded for calculating GPA and CGPA.

\[
CGPA = \frac{\sum C_i GP_i}{\sum C_i}
\]

where

- \(C_i\) – Credits for the course
- \(GP_i\) – Grade Point for the course
- \(\sum_i\) – Sum of all courses successfully cleared during all the semesters

Final Degree is awarded based on the following:

- CGPA \(\geq 9.0\) – First Class - Exemplary
- CGPA \(\geq 7.50 < 9.00\) – First Class with Distinction
- CGPA \(\geq 6.00 < 7.50\) – First Class
- CGPA \(\geq 5.00 < 6.00\) – Second Class

Minimum requirements for award of Degree, a student should have obtained a minimum of 5.0 CGPA.

16. GRADE SHEET

After revaluation results are declared, Grade Sheets will be issued to each student which will contain the following details:

- Name of the Candidate with Date of Birth and Photograph.
- The programme and degree in which the candidate has studied.
- The list of courses enrolled during the semester and the grade secured.
- The Grade Point Average (GPA) for the semester.
17. ELIGIBILITY FOR THE AWARD OF DEGREE

A student shall be declared to be eligible for the award of the B.E/B.Tech. degree, provided the student has successfully completed all the requirements of the programme, and has passed all the prescribed examinations in all the 8 semesters within the maximum period specified in clause 3.

i) Successfully gained the required number of total credits as specified in the curriculum corresponding to his/her programme within the stipulated time.

ii) Successfully completed the programme requirements and has passed all the courses prescribed in all the semesters within a maximum period of 6 years (5 Years for Lateral Entry Candidates) reckoned from the commencement of the first semester to which the candidate was admitted.

iii) Successfully completed any additional courses prescribed by the Institution.

iv) No disciplinary action pending against the student.

v) The award of Degree must have been approved by the Board of Management of the Institution.

18. CLASSIFICATION OF THE DEGREE AWARDED

1. A candidate who qualifies for the award of the Degree having passed the examination in all the courses of all the 8 semesters in his/her first appearance within a maximum of 8 consecutive semesters (maximum of 6 semesters for Lateral entry students who join the course in the third semester) securing a overall CGPA of not less than 9.0 (Calculated from 1st semester) shall be declared to have passed the examination in First Class - EXEMPLARY. Authorized Break of Study vide Clause 20, will be considered as an Appearance for Examinations, for award of First Class – Exemplary. Withdrawal from a course shall not be considered as an appearance for deciding the eligibility of a candidate for First Class – Exemplary

2. A candidate who qualifies for the award of the Degree having passed the examination in all the courses of all the 8 semesters in his/her first appearance within a maximum of 8 consecutive semesters (maximum of 6 semesters for Lateral entry students who join the course in the third semester) securing a overall CGPA of not less than 7.5 (Calculated from 1st semester) shall be declared to have passed the examination in First Class with Distinction. Authorized Break of Study vide Clause 20, will be considered as an Appearance for Examinations, for award of First Class with Distinction. Withdrawal shall not be considered as an appearance for deciding the eligibility of a candidate for First Class with Distinction.

3. A candidate who qualifies for the award of the Degree having passed the examination in all the courses of all the 8 semesters within a maximum period of 8 consecutive semesters (maximum of 6 semesters for Lateral entry students who join the course in the third semester) after his/her commencement of study securing a overall CGPA of not less than 6.0 (Calculated from 1st semester), shall be declared to have passed the examination in First Class. Authorized break of study vide Clause 20 (if availed of) or prevention from writing End semester examination due to lack of attendance will not be considered as Appearance in Examinations. For award of First class, the extra number of semesters than can be provided (in addition to four years for Normal B.E / B.Tech and 3 years for Lateral Entry)will be equal to the Number of semesters availed for Authorized Break of Study or Lack of Attendance. Withdrawal shall not be considered as an appearance for deciding the eligibility of a candidate for First Class.

4. All other candidates who qualify for the award of the Degree having passed the examination in all the courses of all the 8 semesters within a maximum period of 12 consecutive semesters (10 consecutive semesters for Lateral Entry students, who join the course in the third semester) after his/her commencement of study securing a overall CGPA of not less than 5.0, (Calculated from 1st semester) shall be declared to have passed the examination in Second Class.
5. A candidate who is absent in semester examination in a course/project work after having registered for the same, shall be considered to have appeared in that examination for the purpose of classification.

6. A candidate can apply for revaluation of his/her semester examination answer paper in a theory course, immediately after the declaration of results, on payment of a prescribed fee along with application to the Controller of Examinations through the HoD. The Controller of Examination will arrange for the revaluation and the result will be intimated to the candidate concerned through the Head of the Department. Revaluation is not permitted for practical courses and for project work.

19. WITHDRAWAL FROM EXAMINATIONS

- A candidate may, for valid reasons, (medically unfit / unexpected family situations) be granted Permission to withdraw from appearing for the examination in any course or courses in any one of the semester examination during the entire duration of the degree programme.

- Withdrawal application shall be valid only if the candidate is otherwise normally eligible (if he/she satisfies Attendance requirements and should not be involved in Disciplinary issues or Malpractice in Exams) to write the examination and if it is made within FIVE days before the commencement of the examination in that course or courses and also recommended by the Faculty Head through HoD.

- Notwithstanding the requirement of mandatory FIVE days notice, applications for withdrawal for special cases under extraordinary conditions will be considered based on the merit of the case.

- Withdrawal shall not be considered as an appearance for deciding the eligibility of a candidate for First Class – Exemplary, First Class with Distinction and First Class.

- Withdrawal is NOT permitted for arrears examinations of the previous semesters.

20. AUTHORIZED BREAK OF STUDY

- This shall be granted by the Institution Management, only once during the full duration of study, for valid reasons for a maximum of one year during the entire period of study of the degree programme.

- A candidate is normally not permitted to temporarily break the period of study. However, if a candidate would like to discontinue the programme temporarily in the middle of duration of study for valid reasons (such as accident or hospitalization due to prolonged ill health), he / she shall apply through the Faculty Head in advance (Not later than the Reopening day of that semester) through the Head of the Department stating the reasons. He /She should also mention clearly, the Joining date and Semester for Continuation of Studies after completion of break of Study. In such cases, he/she will attend classes along with the Junior Batches. A student who availed break of study has to rejoin only in the same semester from where he left.

- The authorized break of study will not be counted towards the duration specified for passing all the courses for the purpose of classification only for First Class.

- The total period for completion of the programme shall not exceed more than 12 consecutive semesters from the time of commencement of the course (not more than 10 semesters for those who join 3rd semester under Lateral entry system) irrespective of the period of break of study in order that he / she may be eligible for the award of the degree.

- If any student is not allowed to appear for Examinations for not satisfying Academic requirements and Disciplinary reasons, (Except due to Lack of Attendance), the period spent in that semester shall NOT be considered as permitted ‘Break of Study’ and is NOT applicable for Authorized Break of Study.
• In extraordinary situations, a candidate may apply for additional break of study not exceeding another one Semester by paying prescribed fee for break of study. Such extended break of study shall be counted for the purpose of classification of First Class Degree.

• If the candidate has not reported back to the department, even after the extended Break of Study, the name of the candidate shall be deleted permanently from the Institution enrollment. Such candidates are not entitled to seek readmission under any circumstances.

21. PROFESSIONAL TRAINING

• Every student is required to undergo Industrial Visits during every semester of the Programme. HoDs shall take efforts to send the students to industrial visits in every semester.

• The students will have to undergo Professional training for a Minimum period of 3 weeks during the semester Holidays at the end of second year and Third Year respectively.

• This could be internship in a industry approved by the Faculty Head or Professional Enrichment courses (like attending Summer Schools, Winter Schools, Workshops) offered on Campus or in Registered Off Campus recognised Training Centres approved by the Faculty Head for a minimum period of 3 weeks.

• A report on Training undergone by the student, duly attested by the Coordinator concerned from the industry / Organisation, in which the student has undergone training and the Head of the Department concerned, shall be submitted after the completion of training. The evaluation of report and viva voce examination can be computed as per norms for the final Semester examination.

• The evaluation of training will be made by a three member committee constituted by Head of the Department in consultation with Batch Coordinator and respective Training Coordinator. A presentation should be made by the student before the Committee, based on the Industrial Training or Professional Enrichment undergone.

22. NON CREDIT COURSES

Every student has the opportunity to enroll in any of the following Non Credit Courses, during the programme. The student will have to register for the courses with the respective coordinator before the end of First Semester.

• National Cadet Corps (NCC)
• National Service Scheme (NSS) x
• Youth Red Cross (YRC)
• SPORTS CONTRIBUTION: The student is involved in any sport and represents the Institution in Tournaments.
• PROFESSIONAL CLUBS: Any student can also involve in any of the Professional Clubs available in the Institution.

The above contribution should be completed by the end of sixth Semester (end of Pre-final year) as per the requirements. The Contribution and the Performance of the candidate, will be Printed in the Final Semester Grade sheet and Consolidate Grade Sheet under the Category “NON CREDIT COURSES” indicated as SATISFACTORY or NOT SATISFACTORY.

23. OPPORTUNITY TO GAIN EXPOSURE OUTSIDE THE INSTITUTION

• This is facilitated by the “Centre for Academic Partnerships” of Sathyabama Institute of Science And Technology consisting of a team of experienced faculty members involved in forging Partnerships with Leading Universities, Educational Institutions, Industrial and Research establishments in India and Abroad.
A student can be selected, to get Professional Exposure in his/her area of Expertise in any Reputed Research Organization or Educational Institution of repute or any Universities in India and abroad.

This is possible only with the List of Research Organizations, Educational Institutions in India and abroad approved by Sathyabama Institute of Science And Technology.

A student should have got a minimum of 6 CGPA without any arrears at the time of applying and at the time of undergoing such courses outside, to avail this facility.

The student can have the option of spending not more than three to Six months in the Final year or Pre-final year of his/her Degree. During this period, the student can do his/her Project work or register for courses which will be approved by the Centre for Academic Partnerships (CAP), under the Guidance of a Project Supervisor who is employed in the Organization and Co-guided by a staff member from our Institution.

Applications for the above should be submitted by the students to the Centre for Academic Partnerships (CAP), in the required format, with complete details of Institution, Courses and Equivalence Details and approved by the Faculty Head.

The Centre will go through the applications and select the students based on their Academic Performance and enthusiasm to undergo such courses. This will be communicated to the Universities Concerned by the Centre.

The performance of the student in the courses, registered in that Institute or University will be communicated officially to Centre for Academic Partnerships (CAP).

The students who undergo training outside the Institution (either in India or Abroad) is expected to abide by all Rules and Regulations to be followed as per Indian and the respective Country Laws, and also should take care of Financial, Travel and Accommodation expenses.

24. DISCIPLINE

Every student is required to observe disciplined and decorous behaviour both inside and outside the Institution and not to indulge in any activity which will tend to bring down the prestige of the Institution. If a student indulges in malpractice in any of the theory / practical examination, continuous assessment examinations he/she shall be liable for punitive action as prescribed by the Institution from time to time.

25. REVISION OF REGULATIONS AND CURRICULUM

The Institution may from time to time revise, amend or change the regulations, scheme of examinations and syllabi if found necessary.
# PROGRAMME: B.E
## COMPUTER SCIENCE AND ENGINEERING CURRICULUM

### SEMESTER 1

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<th>Sl. No.</th>
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# Programme: B.Tech Information Technology Curriculum

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**Total Credits: 24**

**Total Credits for the Programme: 190**
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SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY
FACULTY OF COMPUTING

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COURSE OBJECTIVE

To equip the learners with English communicative skills to handle the present and future needs by exposing them to situations and tasks in the areas of LSRW, genre and register related to EST by following content based teaching.

UNIT 1  BASIC COMMUNICATION  9 Hrs.

Listening for specific information, Self Introduction, Reading Comprehension, Kinds of Sentences, Parts of Speech, Tenses & its Types, Impersonal Passive, Elements of Effective Writing, Letter Writing, Concord, Prefixes & Suffixes

UNIT 2  NUANCES OF EST  9 Hrs.

Listening for inference, Describing a process, Cloze Reading and its types, Transcoding - Encoding & Decoding, Flow Chart, Bar chart, Pie Chart, Tabular Column, Tree Diagram, Technical Definitions, Connectives & Discourse Markers, Word Association- connotations

UNIT 3  EST NOW AND THEN  9 Hrs.

Listening and Note taking, Role-play, Reading and interpreting visual material (pictures/newspapers) Essay Writing - Note Making - WH questions - Question Tags - Types of sentences - Compound Nouns, Technical Definitions.

UNIT 4  APPLICATIONS OF EST  9 Hrs.

Listening and Classifying information, Group discussion, Reading and identifying the topic sentence, - Writing a Project Proposal, Recommendations and Instructions - Manual Writing, Use of abbreviations and acronyms, Editing (Spelling, Grammar, Punctuation) Idioms & Phrases.

UNIT 5  PREPARING FOR FUTURE  9 Hrs.

Listening and summarizing, Making presentations on given topics - Giving impromptu talks Reading and Summarizing, E-mail writing, Rearranging the Jumbled sentences Reported Speech, Homophones/Homonyms, Creative Writing & Poster making using similes/metaphors.

Max. 45 Hours

TEXT / REFERENCE BOOKS


END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 100
Exam Duration : 3 Hrs.

PART A :

10 questions of 2 marks each - No choice; with equal distribution to each unit -(10 x 2) 20 Marks
(Task types can include Multiple choice, open ended, gap filling, completion and rewriting the sentences, matching type etc.)

PART B :

2 questions from each unit with internal choice; each carrying 12 marks (5 X 10) 80 Marks
(Questions types should testing vocabulary, grammar, reading and writing with equal distribution to all. For example Reading Comprehension type can include skimming, scanning, comprehensive with evaluative, inferential and hypothetical question/ fixed type questions or cloze exercise , Academic paragraph writing based on Flow chart, Tree diagram, Bar diagram, Table and Pie chart to describe process, comparative and contrast, differentiate , Formal letter writing - Application for a Job & Resume Preparation/ Email-Letter inviting a dignitary-Accepting/Declining (or) Rearranging the jumbled sentences in the right order, (or) Requesting for Practical Training/ Letter to the Editor. Writing a Project Proposal / Project Report (or) Essay Writing- Writing an Essay on a given topic, Summary writing or Making notes in the standard format with title. Grammar Rearranging the jumbled sentences in the right order or editing the paragraph for errors based on syllabus)
COURSE OBJECTIVE
The ability to identify, reflect upon, evaluate and apply different types of information and knowledge to form independent judgments. Analytical, logical thinking and conclusions based on quantitative information will be the main objective of learning this subject.

UNIT 1 MATRICES 12 Hrs.
Characteristic equation of a square matrix - Eigen values and Eigen vectors of a real matrix- properties of Eigen values- Cayley-Hamilton theorem (without proof) - verification , finding inverse and power of a matrix - Diagonalisation of a matrix using orthogonal transformation - Reduction of quadratic form to canonical form by orthogonal transformation.

UNIT 2 GEOMETRICAL APPLICATIONS OF DIFFERENTIAL CALCULUS 13 Hrs.
Curvature -centre, radius and circle of curvature in Cartesian co-ordinates - Evolutes - Envelope of family of curves with one and two parameters. - Evolute as envelope of normals.

UNIT 3 FUNCTIONS OF SEVERAL VARIABLES 11 Hrs.
Introduction to partial derivatives - Jacobians - Taylor’s expansion - Maxima and minima of functions of two variables - Constrained maxima and minima using Lagrange’s multiplier method.

UNIT 4 ORDINARY DIFFERENTIAL EQUATIONS 11 Hrs.
First order exact differential equations - Second order linear differential equations with constant coefficients - Particular Integral for \( e^{mx}, \sin ax \) or \( \cos bx \) - Equations reducible to linear equations with constant co-efficients using \( x = e^{at} \) - Simultaneous first order linear equations with constant coefficients - Method of Variation of Parameters

UNIT 5 THREE DIMENSIONAL ANALYTICAL GEOMETRY 13 Hrs.
Direction cosines and ratios - Plane - Plane through intersection of two planes - Straight Line - Coplanar lines - Planes and Straight lines - Shortest distance between two Skew lines - Sphere -Plane section of a sphere - Great Circle.

Max. 60 Hours

TEXT / REFERENCE BOOKS

END SEMESTER EXAM QUESTION PAPER PATTERN
Max. Marks : 100
Exam Duration : 3 Hrs.
PART A : 10 questions of 2 marks each - No choice 20 Marks
PART B : 2 questions from each unit of internal choice, each carrying 16 marks 80 Marks
ENGINEERING MATHEMATICS - II

(Common to ALL branches except BIO Groups)

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COURSE OBJECTIVE
Analytical, logical thinking and conclusions based on quantitative information will be the main objective of learning this subject.

UNIT 1  MULTIPLE INTEGRALS  13 Hrs.
Double integrals in cartesian and polar co-ordinates - Change the order of integration - Change of variables from cartesian to polar coordinates - Area of plane curves using double integrals - Triple integrals - Volume using triple integrals in cartesian co-ordinates (simple applications).

UNIT 2  BETA AND GAMMA INTEGRALS  11 Hrs.
Properties of definite Integrals and problems - Beta and Gamma integrals - Relation between them - Properties of Beta and Gamma integrals with proofs - Evaluation of definite integrals in terms of Beta and Gamma function - Simple applications (evaluation of double integrals).

UNIT 3  VECTOR CALCULUS  12 Hrs.
Gradient, divergence and curl - Directional derivative - Irrotational and Solenoidal vector fields - Vector Integration - Simple problems on line, surface and volume Integrals, Green's theorem in a plane, Gauss divergence theorem and Stoke's theorem (without proofs) - Simple applications involving cubes and rectangular parallelopipeds.

UNIT 4  LAPLACE TRANSFORMS  14 Hrs.
Laplace transform - Transforms of standard functions - properties- Transforms of derivatives and integrals - Transforms of the type e^{at}f(t), tf(t), f(t)/t - Transform of periodic functions - Transform of unit step function and impulse function - Inverse Laplace transforms - Convolution theorem - Initial and final value theorems

UNIT 5  APPLICATIONS OF LAPLACE TRANSFORM  10 Hrs.
Linear ordinary differential equation with constant co-efficients - Integral equations - Integral equations of convolution type -simultaneous linear differential equations with constant co-efficients.

Max. 60 Hours

TEXT / REFERENCE BOOKS

END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 100
Exam Duration : 3 Hrs.
PART A : 10 questions of 2 marks each - No choice 20 Marks
PART B : 2 questions from each unit of internal choice, each carrying 16 marks 80 Marks
COURSE OBJECTIVE
Analytical, logical thinking and conclusions based on quantitative information will be the main objective of learning this subject.

UNIT 1 LOGIC
Statements - Truth tables - Connectives - Equivalent Propositions - Tautological Implications - Normal forms - Predicate Calculus, Inference theory for Propositional Calculus and Predicate Calculus.

UNIT 2 SET THEORY AND GROUP THEORY

UNIT 3 GRAPH THEORY
Introduction to graphs - Graph terminology - representation of graphs - Graph isomorphism - Connectivity - Euler & Hamilton paths - Tree - Binary tree - Expression tree.

UNIT 4 INTERPOLATION, NUMERICAL DIFFERENTIATION & INTEGRATION
Interpolation - Gregory Newton’s Forward and Backward Interpolation for equal intervals - Lagrange’s Interpolation for unequal intervals - Inverse Interpolation - Numerical differentiation: Newton’s forward and backward formula to compute the derivatives - Numerical Integration: Trapezoidal rule, Simpson’s 1/3rd rule and Simpson’s 3/8th rule.

UNIT 5 NUMERICAL METHODS FOR SOLVING EQUATIONS

Max. 60 Hours

TEXT / REFERENCE BOOKS

END SEMESTER EXAM QUESTION PAPER PATTERN
Max. Marks : 100
Exam Duration : 3 Hrs.
PART A : 10 questions of 2 marks each - No choice 20 Marks
PART B : 2 questions from each unit of internal choice, each carrying 16 marks 80 Marks
COURSE OBJECTIVE
The ability to identify, reflect upon, evaluate and apply different types of information and knowledge to form independent judgments.

UNIT 1 PROBABILITY CONCEPTS AND RANDOM VARIABLE 13 Hrs.

UNIT 2 PROBABILITY DISTRIBUTION 13 Hrs.
Discrete Distributions: Binomial, Poisson and Geometric - Continuous Distributions: Uniform, Exponential and Normal - Applications only (no derivation).

UNIT 3 TWO DIMENSIONAL RANDOM VARIABLES 11 Hrs.
Joint Probability distributions - Marginal and Conditional Distributions - Transformation of Random Variables

UNIT 4 CORRELATION AND REGRESSION 11 Hrs.
Correlation - Linear regression - Multiple and Partial Correlation - Curve Fitting - Method of Least Squares - Fitting of the Curve of the form \( y = a + bx \), \( y = a + bx + cx^2 \), \( z = ax + by + c \).

UNIT 5 ANALYSIS OF VARIANCE AND STATISTICAL QUALITY CONTROL 12 Hrs.

Max. 60 Hours

TEXT / REFERENCE BOOKS

END SEMESTER EXAM QUESTION PAPER PATTERN
Max. Marks : 100 Exam Duration : 3 Hrs.
PART A : 10 questions of 2 marks each - No choice 20 Marks
PART B : 2 questions from each unit of internal choice, each carrying 16 marks 80 Marks
SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY

FACULTY OF COMPUTING

SMT1206  NUMBER THEORY AND LINEAR ALGEBRA
(Common to ALL Branches B.E. / B.Tech)

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COURSE OBJECTIVE
The ability to identify, reflect upon, evaluate and apply different types of information and knowledge to form independent judgments. Analytical, logical thinking and conclusions based on quantitative information will be the main objective of learning this subject.

UNIT 1  NUMBER THEORY - I
12 Hrs.
Divisibility theory in the integers - the division algorithm, the greatest common divisor, the Euclidean algorithm, the Diophantine equation ax + by = c. Primes and their distribution. The fundamental theorem of arithmetic. The sieve of Eratosthenes. The theory of congruences. Basic properties of congruence. Binary and decimal representation of integers. Linear congruences and Chinese remainder theorem.

(Sections 2.2, 2.3, 2.4, 2.5, 3.1, 3.2, 4.2, 4.3 & 4.4 of Text 1).

UNIT 2  NUMBER THEORY - II
12 Hrs.
Fermat's little theorem and pseudo primes Wilson's theorem. The sum and number of divisors. The greatest integer function. Euler's phi-function. Euler's generalization of Fermat's theorem. Properties of the phi-function. (Sections 5.2, 5.3, 6.1, 6.3, 7.2, 7.3 and 7.4 of Text 1) (Theorems 7.6 and 7.7 only).

UNIT 3  MATRIX THEORY - I
12 Hrs.
Rank of a matrix - Elementary transformation, reduction to normal form, row reduced echelon form. Computing the inverse of a non singular matrix using elementary row transformation. (Section 4.1 to 4.13 of Text 2)

UNIT 4  MATRIX THEORY - II
12 Hrs.

UNIT 5  FUNDAMENTAL THEOREMS ON MATRIX THEORY
12 Hrs.
Characteristic roots of Hermitian, Skew Hermitian and Unitary matrices. Characteristic equation of a matrix Cayley-Hamilton theorem. (Sections 6.1 to 6.6 and 11.1 to 11.3 and 11.11).

Text / Reference Books
1. David M. Burton : Elementary Number Theory, Sixth Edn., TMH.
5. George E. Andrews : Number Theory, HPC.

Max. 60 Hours

End Semester Exam Question Paper Pattern
Max. Marks : 100

Exam Duration : 3 Hrs.

PART A : 10 questions of 2 marks each - No choice 20 Marks

PART B : 2 questions from each unit of internal choice, each carrying 16 marks 80 Marks

B.E. / B. Tech REGULAR 6 REGULATIONS 2015
COURSE OBJECTIVES
The ability to assess and interpret complex situations in mathematical methods of solution is the main objective of this subject.

UNIT 1 GRAPHS AND CONNECTIVITY 12 Hrs.
Definition of Simple and multiple graphs, Isomorphic graphs, Ramsey numbers, Independent sets and Coverings, Intersection graphs and line graphs, Operation on graphs, Walks, Trials and Paths, Connected components, Blocks, Connectivity sections 2.4, 2.5, 2.6, 2.7, 2.9, 4.0, 4.1, 4.2, 4.3, 4.4.

UNIT 2 EULER TOURS AND HAMILTON CYCLES 12 Hrs.
Eulerian paths, Eulerian circuits, Hamiltonian paths, Hamiltonian cycles (omit Fleury's Algorithm), Applications, The Chinese postman problem, The Travelling salesman problem, Trees. Sections : 5.0, 5.1, 5.2 (only upto and not including Theorem 5.5), 6.0, 6.1, 6.2.

UNIT 3 MATCHINGS AND PLANAR GRAPHS 12 Hrs.
Matchings and Planarity Sections 7.0, 7.1, 7.2, 8.0, 8.1, 8.2

UNIT 4 GRAPH COLOURING 12 Hrs.
Colourability, Chromatic numbers, Five colour theorem.

UNIT 5 DIRECTED GRAPHS 12 Hrs.
Chromatic polynomials, Directed graphs, Paths and Connectedness. Sections: 9.0, 9.1, 9.2, 9.4, 10.0, 10.1, 10.2.

Max. 60 Hours

TEXT / REFERENCE BOOKS
3. J.A. Bondy & U.S.R. Murty : Graph Theory with Applications.
5. N. Deo : Graph Theory with Application to Engineering and Computer Science, PHI.

END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 100
Exam Duration : 3 Hrs.
PART A : 10 questions of 2 marks each - No choice 20 Marks
PART B : 2 questions from each unit of internal choice, each carrying 16 marks 80 Marks
**SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY**

**FACULTY OF COMPUTING**

**SMT1208**

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**COURSE OBJECTIVE**

Analytical, logical thinking and conclusions based on quantitative information will be the main objective of learning this subject.

**UNIT 1  DESCRIPTIVE STATISTICS**

Univariate data: Skewness and kurtosis- Pearson’s and Bowley’s coefficient of skewness- moment measures of skewness and kurtosis.

**UNIT 2  CORRELATION AND REGRESSION ANALYSIS**

Analysis bi-variate data: Curve fitting-fitting of straight lines, parabola, power curve and exponential curve. Correlation- Pearson’s correlation coefficient and rank correlation coefficient - partial and multiple correlation-formula for calculation in 3 variable cases-Testing the significance of observed simple correlation coefficient. Regression- simple linear regression, the two regression lines, regression coefficients and their properties.

**UNIT 3  TIME SERIES ANALYSIS**

Time series: Components of time series-measurement of trend by fitting polynomials-computing moving averages-seasonal indices-simple average-ratio to moving average.

**UNIT 4  STATISTICAL QUALITY CONTROL**

Statistical Quality control: Concept of statistical quality control, assignable and chance causes, process control. Construction of control charts, 3 sigma limits. Control chart for variables-X-bar chart and R chart. Control chart for attributes - p chart, d chart and c chart.

**UNIT 5  DESIGN OF EXPERIMENTS**

Analysis of variance : One way and two way classifications. Null hypotheses, total, between and within sum of squares. Assumptions- ANOVATable.

**TEXT / REFERENCE BOOKS**


**END SEMESTER EXAM QUESTION PAPER PATTERN**

Max. Marks : 100  
Exam Duration : 3 Hrs.

**PART A** : 10 questions of 2 marks each - No choice  
20 Marks

**PART B** : 2 questions from each unit of internal choice, each carrying 16 marks  
80 Marks
COURSE OBJECTIVE
Understand the basic rules of logic, including the role of axioms or assumptions and appreciate the role of mathematical proof in formal deductive reasoning and able to distinguish a coherent argument from a fallacious one, both in mathematical reasoning and in everyday life.

UNIT 1 SET THEORY - I

UNIT 2 SET THEORY - II
Relations: Product set, Relations (Directed graph of relations on set is omitted). Composition of relations, Types of relations, Partitions, Equivalence relations with example of congruence modulo relation, Partial ordering relations, n-ary relations. (As in Chapter 3 of text book 2 excluding 3.7).

UNIT 3 TYPES OF FUNCTION
Functions Pre-requisites: Basic ideas such as domain, co-domain and range of functions. Equality of functions, Injection, Surjection and Bijection (Quick review). Syllabus: Identity function, constant functions, product (composition) of functions, theorems on one-one and onto functions, Mathematical functions, Recursively defined functions (As in Chapter 4 of text book 2). Indexed collection of sets, Operations on indexed collection of sets (As in 5.1, 5.2 and 5.3 of text book 2). Special kinds of functions, Associated functions, Algorithms and functions, Complexity of Algorithms (As in Chapter 5.7 of text book 2). Equipotent sets, Denumerable and countable sets, Cardinal numbers (Definitions and examples only as in 6.1, 6.2, 6.3 and 6.5 of text book 2).

UNIT 4 BASIC LOGIC - I
Basic Logic-1 Introduction, propositions, truth table, negation, conjunction and disjunction. Implications, biconditional propositions, converse, contra positive and inverse propositions and precedence of logical operators. Propositional equivalence: Logical equivalences. Predicates and quantifiers: Introduction, Quantifiers, Binding variables and Negations. (As in Chapter 1 of Text book 1).

UNIT 5 BASIC LOGIC - II
Basic Logic-2 Methods of proof: Rules of inference, valid arguments, methods of proving theorems; direct proof, proof by contradiction, proof by cases, proofs by equivalence, existence proofs, uniqueness proofs and counter examples. (As in Chapter 1 of Text book 1).

Max. 60 Hours

TEXT / REFERENCE BOOKS

END SEMESTER EXAM QUESTION PAPER PATTERN
Max. Marks : 100
Exam Duration : 3 Hrs.
PART A : 10 questions of 2 marks each - No choice 20 Marks
PART B : 2 questions from each unit of internal choice, each carrying 16 marks 80 Marks
COURSE OBJECTIVE

To expose the students to different classes of materials and present the fundamentals of materials science; to develop the understanding of the behaviour of materials, their properties and structures; to facilitate selection of suitable material for particular engineering application.

UNIT 1 CHARACTERIZATION OF MATERIALS 9 Hrs.

UNIT 2 MAGNETIC MATERIALS 9 Hrs.
Introduction, Origin of magnetic moment - orbital, spin and nuclear magnetic moments; Bohr magneton; Classification of magnetic materials based on spin- dia, para, ferro, antiferro and ferris- Curie temperature, Neel temperature.; Magnetic domains- Domain theory of Ferro magnetism (Weiss theory) - Observation of domain (bitter powder pattern), Energies involved in domain formation - magnetostatic energy, anisotropic energy, magnetostrictive energy and domain wall energy; Hysteresis Curve -based on domain theory; Types of magnetic materials - soft and hard magnetic materials; Magnetic bubbles - formation and propagation of magnetic bubbles-T-bar, read/write operation.

UNIT 3 SUPERCONDUCTING MATERIALS 9 Hrs.
Introduction to superconductivity- Properties of superconductor - electrical resistance, Meissner Effect, effect of heavy magnetic field, effect of heavy current (Silsbee’s rule), effect of high pressure, isotope effect, entropy, specific heat capacity, energy gap, London Penetration depth, Coherence Length, Ginzburg Landau Parameter, Flux Quantization and thermal conductivity. Theory of superconductivity - London Theory (Macroscopic), Bardeen, Cooper and Schrieffer Theory (Microscopic) - explanation based on formation of Cooper pairs and existence of energy gap. Types of superconductors - Type I and Type II superconductors, D.C. and A.C Josephson Effect, I-V Characteristics and applications of Josephson junction. Applications - cryotron, magnetic levitation train and SQUIDS.

UNIT 4 OPTICAL MATERIALS 9 Hrs.
Introduction, refractive index, absorption and dispersion, reflections. Classification of optical materials, absorption in metals, semiconductors and insulators (dielectrics), Excitons- Frenkel and Mott-Wannier excitons, Point defects -Frankel and Schottky defects, Traps - trapping and recombination centres - Colour Centres - types - F - Centre, R-Centre, V-Centre (V1 and V2), M -Centre. Luminescence - Principle and classification - Mechanism and working of Photo luminescence (Fluorescence and Phosphorescence).

UNIT 5 SEMICONDUCTING MATERIALS 9 Hrs.
Introduction - Band theory (qualitative), types of semiconductors- intrinsic semiconductor - carrier concentration and Fermi level in intrinsic semiconductor - extrinsic semiconductor - carrier concentration and Fermi level in extrinsic semiconductor (p type and n type) - Experimental determination Band gap of semiconductor - Hall Effect - experimental determination of Hall Voltage, Applications of Hall effect.

Max. 45 Hours
TEXT / REFERENCE BOOKS

END SEMESTER EXAM QUESTION PAPER PATTERN
Max. Marks : 100
Exam Duration : 3 Hrs.
PART A : 10 questions of 2 marks each - No choice; 2 questions from each of the five units 20 Marks
PART B : 2 questions from each unit of internal choice; each carrying 12 marks 80 Marks
(Applications” mentioned in the syllabus refer to the basic applications and not to any specific case.)
(Maximum of 20 % problems may be asked.)
COURSE OBJECTIVE
To provide the students the fundamental knowledge in fibre optics, digital electronics and devices such as sensors, display devices and nano-devices to enable understanding of its applications.

UNIT 1  FIBRE OPTICS  9 Hrs.
Introduction - principle of optical fibre transmission- fibre geometry - acceptance angle and numerical aperture - derivation, types of rays - Types of optical fibres - Optical fibre materials - plastic and glass fibres- Manufacturing processes - Double crucible technique and vapour phase deposition technique. Transmission characteristics of optical fibres - attenuation and distortion. Fibre splicing - fusion and mechanical splicing. Fibre connectors - butt joint and expanded beam connectors. Optical fibre communication system (block diagram) - advantages and its general applications. Problems of Part-A type

UNIT 2  DIGITAL ELECTRONICS  9 Hrs.
Number systems - Binary, decimal, Hexadecimal and Octadecimal - Conversion from one number system to another. Binary addition, Subtraction - Subtraction by 1’s & 2’s complement, BCD addition, Excess 3 code and gray code, ASCII code.

UNIT 3  SENSOR DEVICES  9 Hrs.
Introduction - voltage and current sensors, Light Dependent Resistor (LDR), photodiode, strain gauges, thermistor, pressure sensor - Bourdon tube, temperature sensor - thermocouple, magnetic sensor - Hall effect sensor, nanosensors and their applications.

UNIT 4  DISPLAY DEVICES  9 Hrs.
Introduction, luminescence, electroluminescence, active display devices, cathode ray tube, light emitting diode, LED materials, passive display devices, liquid crystal displays-working, comparison LED and LCD, plasma display, dynamic scattering display, Touch screen.

UNIT 5  NANO DEVICES  9 Hrs.

Max. 45 Hours

TEXT / REFERENCE BOOKS

END SEMESTER EXAM QUESTION PAPER PATTERN
Max. Marks : 100  Exam Duration : 3 Hrs.
PART A :  10 questions of 2 marks each - No choice; 2 questions from each of the five units.  20 Marks
PART B :  2 questions from each unit of internal choice; each carrying 12 marks.  80 Marks
(Applications” mentioned in the syllabus refer to the basic applications and not to any specific case.)
(Maximum of 20 % problems may be asked.)
**COURSE OBJECTIVE**

To provide the students with fundamental knowledge in Cryogenics and Acoustics, Properties of Matter such as Elasticity and Viscosity; and enable them to apply relevant principles to solve real world engineering problems.

**UNIT 1 LOW TEMPERATURE PHYSICS**

Properties of cryogenic fluids - oxygen, nitrogen, helium and hydrogen - Joule Thomson effect - Porous plug experiment - Production of low temperatures - adiabatic demagnetisation of a paramagnetic salt - Cascade process - Practical applications of low temperatures - Refrigeration and Air conditioning machines - Super fluidity and its applications (elementary ideas only)

**UNIT 2 ELASTICITY**


**UNIT 3 VISCOSITY**

Streamline and turbulent motion, coefficient of viscosity - equation of continuity, Euler's equation, critical velocity, Reynolds's number, Poiseuille's equation for flow of a liquid through a capillary tube - Stoke's law (statement only) - terminal velocity, Bernoulli's theorem and applications, Lift of an Aeroplane, Atomizer, Venturi meter, filter pump and Pitot's tube.

**UNIT 4 METAL ALLOYS**

Introduction, classification of metal alloys - Ferrous and Non Ferrous Alloys, Ferrous Alloys - classification, composition, properties and applications; Synthesization of alloy steels - Electric Arc Furnace process (Heroult furnace); Non-Ferrous Alloys - Aluminium, Copper, Titanium, Magnesium alloys - composition, properties and applications. Shape Memory Alloys - Shape memory effect, mechanism, transformation temperature, types of SMA - one way and two way shape memory effect; General applications of SMA.

**UNIT 5 ACOUSTICS OF BUILDINGS**

Introduction - musical sound and noise, characteristics of musical sound - pitch, loudness, quality - Weber-Fechner law, decibel scale, sound intensity level and sound pressure level. Sound absorption - OWU, sound absorption coefficient and its measurements - Reverberation - Reverberation time - Standard Reverberation time - Sabine's formula to determine the Reverberation time (Jaegar method), Factors affecting the acoustics of a building and the remedies, Principles to be followed in the acoustical design of a good auditorium.

**TEXT / REFERENCE BOOKS**


**END SEMESTER EXAM QUESTION PAPER PATTERN**

Max. Marks : 100

**PART A**

10 questions of 2 marks each - No choice; 2 questions from each of the five units. 20 Marks

**PART B**

2 questions from each unit of internal choice; each carrying 12 marks. 80 Marks

(Applications" mentioned in the syllabus refer to the basic applications and not to any specific case.)
(Maximum of 20 % problems may be asked.)
COURSE OBJECTIVE
- To expose the students of biology to some fundamental physics required for study of the measurements of physical properties related to biological systems.

UNIT 1 PROPERTIES OF MATTER 9 Hrs.

UNIT 2 LASER PHYSICS 9 Hrs.

UNIT 3 MICROSCOPES 9 Hrs.

UNIT 4 RADIATION BIOLOGY 9 Hrs.

UNIT 5 BIOLOGICAL TRANSDUCERS 9 Hrs.

Max. 45 Hours

TEXT / REFERENCE BOOKS
1. M. A. Subramaniam, Biophysics-principles and techniques, MJP publishers, 2005
2. S. Armugam, Biomedical instrumentation, Anuratha Agencies, 2ndEd., 2006
3. J. Kumar, S. Moorthy Babu, S. Vasudevan, Engineering Physics, Vijay Nicole Imprints Pvt. Ltd, 2006
5. Vatsala Piramal, Biophysics, Dominant Publishers and Distributors, 2006
7. P. Narayanan, Essentials of Biophysics, New Age International, 2ndEd. 2007

END SEMESTER EXAM QUESTION PAPER PATTERN
Max. Marks : 100
Exam Duration : 3 Hrs.
PART A : 10 questions of 2 marks each - No choice; 2 questions from each of the five units. 20 Marks
PART B : 2 questions from each unit of internal choice; each carrying 12 marks. 80 Marks
(Applications” mentioned in the syllabus refer to the basic applications and not to any specific case.)
(Maximum of 20 % problems may be asked)
COURSE OBJECTIVES

- To understand the properties and various synthetic methods for the preparation of nanomaterials and their applications.
- To know about the quality parameters of water and methods to estimate the toxic elements and softening methods.
- To give an overview about types of batteries and fuel cells, corrosion mechanisms and preventive methods.
- To have a basic idea about polymers and various moulding techniques.

UNIT 1  SYNTHESIS OF NANOMATERIALS  
9 Hrs.

UNIT 2  WATER TECHNOLOGY  
9 Hrs.

UNIT 3  ELECTROCHEMICAL POWER SOURCES  
9 Hrs.

UNIT 4  CORROSION SCIENCE  
9 Hrs.

UNIT 5  POLYMER CHEMISTRY  
9 Hrs.

TEXT / REFERENCE BOOKS

END SEMESTER EXAM QUESTION PAPER PATTERN
Max. Marks : 100  
Exam Duration : 3 Hrs.
PART A : 10 Questions of 2 marks each-No choice  
20 Marks
PART B : 2 questions from each unit of internal choice, each carrying 16 marks.  
(Out of 80 marks, maximum of 10% problems may be asked)  
80 Marks
COURSE OBJECTIVES

- To know the nature of conducting polymer materials used in electronic industry and to understand the recent analytical techniques for their characterization.
- To give an idea on the application of computer science in chemistry and the importance of insulating materials in electrical and electronic industries.

UNIT 1  INTRODUCTION TO MOLECULAR ELECTRONICS

9 Hrs.


UNIT 2 INSTRUMENTAL METHODS OF ANALYSIS

9 Hrs.


UNIT 3 THIN FILM TECHNIQUES

9 Hrs.


UNIT 4 INSULATING MATERIALS

9 Hrs.


UNIT 5 CHEMINFORMATICS

9 Hrs.


Max. 45 Hours

TEXT / REFERENCE BOOKS


END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 100

Exam Duration : 3 Hrs.

PART A : 10 Questions of 2 marks each-No choice

PART B : 2 questions from each unit of internal choice, each carrying 16 marks

(Out of 80 marks, maximum of 10% problems may be asked)
COURSE OBJECTIVES
- To know the different types of coal, their analysis and gaseous fuels.
- To have a basic understanding about terms related to phase rule and its applications to various systems.
- To understand the requirements, classification of explosives and propellants used in aerospace industries.
- To provide an idea about lubrication mechanisms, properties and to learn the science of composites and abrasives.

UNIT 1 FUELS

UNIT 2 PHASE EQUILIBRIA

UNIT 3 EXPLOSIVES AND ROCKET PROPELLANTS

UNIT 4 LUBRICANTS

UNIT 5 COMPOSITES AND ABRASIVES

TEXT/REFERENCE BOOKS
**COURSE OBJECTIVES**

- To understand the fundamentals of classification, synthesis, properties and structural elucidation of carbohydrates, amino acids and proteins.
- To know the classification and properties of lipids and enzymes.
- To have overall idea about the structure and biological aspects of steroids, hormones, vitamins and nucleic acids.

**UNIT 1  CARBOHYDRATES**  
9 Hrs.


**UNIT 2  AMINOACIDS AND PROTEINS**  
9 Hrs.


**UNIT 3  LIPIDS AND ENZYMES**  
9 Hrs.


**UNIT 4  STEROIDS, HORMONES AND VITAMINS**  
9 Hrs.

Steroids: Introduction - Nomenclature. Cholesterol: Constitution (excluding synthesis) and biological importance.


Vitamins: Structure and importance of Vitamin D - Folic acid - Nicotinamide.

**UNIT 5  NUCLEIC ACIDS**  
9 Hrs.


Max. 45 Hours TEXT / REFERENCE BOOKS


**END SEMESTER EXAM QUESTION PAPER PATTERN**

Max. Marks : 100  
Exam Duration : 3 Hrs.

PART A : 10 Questions of 2 marks each-No choice  
20 Marks

PART B : 2 questions from each unit of internal choice, each carrying 16 marks.  
(Out of 80 marks, maximum of 10% problems may be asked)  
80 Marks
COURSE OBJECTIVES

- To understand the fundamentals related to the phase diagrams and their applications.
- To know about the types and properties of solutions.
- To expose the students for various separation techniques for the purification of compounds.
- To provide an idea about the chemical kinetics in terms of order, molecularity and their derivations involved.
- To give an overview about the advanced electrochemical applications.

UNIT 1 PHASE RULE


UNIT 2 SOLUTIONS


UNIT 3 SEPARATION TECHNIQUES


UNIT 4 CHEMICAL KINETICS


UNIT 5 ADVANCED ELECTROCHEMISTRY


Max. 45 Hours

TEXT / REFERENCE BOOKS


END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 100

PART A : 10 Questions of 2 marks each-No choice - 20 Marks
PART B : 2 questions from each unit of internal choice, each carrying 16 marks. (Out of 80 marks, maximum of 10% problems may be asked) - 80 Marks
# SCH1101 ENVIRONMENTAL SCIENCE AND ENGINEERING

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(Common to ALL Branches of B.E/ B. Tech.)

## COURSE OBJECTIVE
- To impart knowledge on the issues related to environment and to emphasize the importance of a clean environment

## UNIT 1 INTRODUCTION TO ENVIRONMENTAL STUDIES AND NATURAL RESOURCES

10 Hrs.

Definition, scope and importance, need for public awareness, forest resources: use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams, floods, drought, conflicts over water, dams-benefits and problems, mineral resources: use effects on forests and tribal people. water resources: use and over-utilization of surface and ground water, exploitation, environmental effects of extracting and using mineral resources, case studies food resources: world food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. Energy resources: growing energy needs, renewable and non renewable energy sources, use of alternate energy sources: Case studies. Land resources: land as a resource, land degradation, man induced landslides, soil erosion and desertification, role of an individual in conservation of natural resources, equitable use of resources for sustainable lifestyles.

## UNIT 2 ECOSYSTEMS AND BIODIVERSITY

10 Hrs.

Concept of an ecosystem, structure and function of an ecosystem - producers, consumers and decomposers - energy flow in the ecosystem, ecological succession, food chains, food webs and ecological pyramids. Introduction, types, characteristic features, structure and function of the (a) forest ecosystem (b) grassland ecosystem (c) desert ecosystem (d) aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries). Introduction to biodiversity, definition: genetic, species and ecosystem diversity - biogeographical classification of India - value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values, biodiversity at global, national and local levels. India as a mega-diversity nation, hot-spots of biodiversity, threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts, endangered and endemic species of India, conservation of biodiversity, in-situ and ex-situ conservation of biodiversity.

## UNIT 3 ENVIRONMENTAL POLLUTION

9 Hrs.

Definition - causes, effects and control measures of: (a) air pollution (b) water pollution (c) soil pollution (d) marine pollution (e) noise pollution (f) thermal pollution (g) nuclear hazards. Solid waste management: causes, effects and control measures of urban and industrial wastes, role of an individual in prevention of pollution, pollution case studies, disaster management: floods, earthquake, cyclone and landslides.

## UNIT 4 SOCIAL ISSUES AND THE ENVIRONMENT

8 Hrs.

From unsustainable to sustainable development, urban problems related to energy, water conservation, rain water harvesting, watershed management, resettlement and rehabilitation of people; its problems and concerns, case studies, environmental ethics: issues and possible solutions, climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies. Wasteland reclamation, consumerism and waste products - environment protection act: air (prevention and control of pollution) act - water (prevention and control of pollution) act, wildlife protection act. Issues involved in enforcement of environmental legislation, Key initiatives of Rio declaration, Vienna convention, Kyoto protocol, Johannesburg summit and public awareness.

## UNIT 5 HUMAN POPULATION AND THE ENVIRONMENT

8 Hrs.

Population growth, variation among nations, population explosion, family welfare programme, environment and human health, human rights, value education, HIV / AIDS, women and child welfare, role of information
technology in environment and human health, case studies. Visit to a local area to document environmental assets—river/forest/grassland/hill/mountain. Visit to a local polluted site—urban/rural/industrial/agricultural—study of common plants, insects, birds—study of simple ecosystems, pond, river, hill slopes etc.

Max. 45 Hours

TEXT / REFERENCE BOOKS

END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 100
Exam Duration : 3 Hrs.
PART A : 10 questions of 2 marks each - No Choice 20 Marks
PART B : 5 questions from each of the five units of internal choice, each carrying 12 marks each 80 Marks
SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY
FACULTY OF COMPUTING

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UNIT 1 D.C. CIRCUITS 9 Hrs.

UNIT 2 A.C. CIRCUITS 9 Hrs.
Sinusoidal functions - RMS (effective) and Average values- Phasor representation - J operator - Sinusoidal excitation applied to purely resistive, inductive and capacitive circuits - RL, RC and RLC series and parallel circuits - Power and power factor.

UNIT 3 NETWORK THEOREMS (DC CIRCUITS) 9 Hrs.
Superposition Theorem - Reciprocity Theorem - Thevenin’s Theorem - Norton’s Theorem - Maximum Power Transfer Theorem.

UNIT 4 MAGNETIC CIRCUITS 9 Hrs.
Definition of MMF, Flux and reluctance - Leakage factor - Reluctances in series and parallel (series and parallel magnetic circuits) - Electromagnetic induction - Fleming’s rule - Lenz’s law - Faraday’s laws - Statically and dynamically induced EMF - Self and mutual inductance- Analogy of electric and magnetic circuits.

UNIT 5 INTRODUCTION TO MACHINES 9 Hrs.
Construction and principle of DC Generator - Emf equation - Types, Principle of DC Motor - Types, Construction and principle of single phase Transformer, Stepper motor, AC and DC servomotor.

Max. 45 Hours.

TEXT / REFERENCE BOOKS

END SEMESTER EXAM QUESTION PAPER PATTERN:

Max. Marks : 100

PART A : 10 questions of 2 marks each - No choice 20 Marks

PART B : 2 questions from each unit of internal choice, each carrying 16 marks 80 Marks
(Distribution may be 40% Theory & 60 % Numerical)

Exam Duration : 3 Hrs
COURSE OBJECTIVES
- To acquaint the students with the construction, theory and operation of the basic electronic devices such as PN junction diode, Bipolar and Field effect Transistors, special semiconductor devices and oscilloscopes. On completion of this course the student will recognize
- Acquire knowledge about the semiconductor diode
- Acquire knowledge about Transistors
- Acquire knowledge about Oscilloscopes

UNIT 1 SEMICONDUCTOR DIODE 9 Hrs.
Intrinsic and Extrinsic semiconductor - Charge density, Mobility and Conductivity in Semiconductor, Drift and diffusion current, Continuity equation, PN junction - Energy band diagram of PN junction, Current components in PN junction, Junction capacitance - Application of diode - Diode switch, Clipper, Clamper and Voltage multipliers - Zener diode - Zener voltage regulators.

UNIT 2 BIPOLAR JUNCTION TRANSISTOR 9 Hrs.

UNIT 3 FIELD EFFECT TRANSISTOR 9 Hrs.
JFET- Construction, Operation and Characteristics, Expression for pinch off voltage and drain current - MOSFET- Enhancement and Depletion mode operation and characteristics, Handling precautions of MOSFET, Gate capacitance- FET as VVR - Comparison of MOSFET and JFET - Comparison of BJT and JFET.

UNIT 4 SPECIAL SEMICONDUCTOR DEVICES 9 Hrs.

UNIT 5 PRINCIPLES OF CRT 9 Hrs.
Force on charged particle in electric field and magnetic field - Motion of charged particle in electric and magnetic field - Oscilloscopes-Features ans uses, Types and models-CRO, Dual beam oscilloscope, Analog Oscilloscope, Digital oscilloscope Principles of CRT - Deflection and focusing of electron beam in CRT -Orientation of electric and magnetic field in CRT - Applications of CRO.

Max. 45 Hours

TEXT / REFERENCE BOOKS
9. A.S. Sedra and K.C. Smith, Microelectronic Circuits, Saunder's College Publishing

END SEMESTER EXAM QUESTION PAPER PATTERN:
Max. Marks : 100
Exam Duration : 3 Hrs.
PART A : 10 questions of 2 marks each - No choice 20 Marks
PART B : 2 questions from each unit of internal choice, each carrying 16 marks 80 Marks
COURSE OBJECTIVES
- On completion of this course the student can understand
- The basics of various analog modulation techniques, transmitters, receivers, the concepts of analog communication systems
- The principles of sampling & quantization, the various Base Band signaling schemes, the concepts of digital modulation and spread spectrum techniques

UNIT 1 \hspace{1cm} BASICS OF COMMUNICATION \hspace{1cm} 9 Hrs.
Review of time and frequency domain description of signals – Communication system- point to point and broadcast – Basic model of a communication system: transmitter, receiver and channel noise, bandwidth and information capacity – Need for modulation types of modulation – classification of communication based on modulation and channel – Base band and pass band transmission sampling and quantization - Sampling theorem-Nyquist rate - Sampling process - Natural Sampling - Flat Sampling - Aliasing - Signal Reconstruction - Quantization - Uniform & non-uniform quantization

UNIT 2 \hspace{1cm} AMPLITUDE MODULATION AND DEMODULATION \hspace{1cm} 9 Hrs.
STD-AM (DSB-FC) Mathematical representation – waveform, frequency spectrum, bandwidth, power relations and Modulation index - Various schemes of AM; DSB-SC, SSBC-SC and VSB - Comparison of various schemes.
AM Generation (Modulators): DSB-FC; Collector and base modulator circuits – DSB-SC; Balanced modulator circuit using FET – SSB: Phase shift method and Filter method – AM transmitter: Low and high level modulation. AM Detection (Demodulators) – Envelope detector, Significance of RC time constant

UNIT 3 \hspace{1cm} ANGLE (FM & PM) MODULATION AND DEMODULATION \hspace{1cm} 9 Hrs.
FM: Mathematical representation, waveform, frequency spectrum, modulation index, FM: Narrowband and Wideband – Comparison of NFM and WFM - Comparison of FM and AM Phase modulation (PM): Relation between FM and PM - Conversion: FM to PM and PM to FM - Conversion: AM to PM - FM Generation: Direct method using Varactor diode and indirect method (Armstrong modulator) – Pre-emphasis – FM stereo broadcast transmitter. FM Detector: Foster seealay discriminator and Ratio detector – De-emphasis - FM stereo broadcast receiver

UNIT 4 \hspace{1cm} PULSE MODULATION & MULTIPLEXING \hspace{1cm} 9 Hrs.

UNIT 5 \hspace{1cm} DIGITAL MODULATION TECHNIQUES \hspace{1cm} 9 Hrs.

TEXT / REFERENCE BOOKS

END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 100
Exam Duration : 3 Hrs.
PART A : 10 questions of 2 marks each- No choice.
PART B : 2 questions from each unit of internal choice, each carrying 16 marks

Max. 45 Hours

B.E / B. Tech REGULAR 24 REGULATIONS 2015
COURSE OBJECTIVE

To understand the operation of microprocessors and microcontrollers, machine language programming, interfacing techniques and their applications.

UNIT 1 BASIC CONCEPTS
8085 Microprocessor - Architecture and its operation, Concept of instruction execution and timing diagrams, fundamentals of memory interface - Addressing modes

UNIT 2 8085 INSTRUCTION SET AND ASSEMBLY LANGUAGE PROGRAMMING
Instruction classifications, Writing and executing simple programs - Arithmetic and logic operations - Data transfer - Branching - Looping – Indexing - Counter and time delays - Writing subroutine - Conditional call and return instruction, simple programs.

UNIT 3 INTERFACING
Basic Interface concepts, memory mapped I/O and I/O mapped I/O, Interrupt and vectored interrupt, Programmable peripheral interface 8255 - Programmable Interval timer 8253 - Programmable interrupt controller 8259 - Programmable DMA controller 8257.

UNIT 4 8086 ARCHITECTURE

UNIT 5 8051 MICROCONTROLLER

Max. 45 Hours

TEXT / REFERENCE BOOKS

END SEMESTER EXAM QUESTION PAPER PATTERN
Max. Marks : 100
Exam Duration : 3 Hrs.
PART A : 10 Questions of 2 marks each-No choice 20 Marks
PART B : 2 Questions from each unit with internal choice, each carrying 12 marks 80 Marks
COURSE OBJECTIVE
To familiarize engineering students with the concepts of Management useful for Managing their own enterprise or to work in a professional organization in Managerial capacity and to provide them an ethical outlook.

UNIT 1    MANAGEMENT FUNCTIONS & STRUCTURE  9 Hrs.

UNIT 2    MANAGEMENT OF ORGINASATION  9 Hrs.

UNIT 3    ORGANISATIONAL BEHAVIOUR  9 Hrs.

UNIT 4    GROUP DYNAMICS  9 Hrs.
Group - Definition - Types - Determinants of Group Cohesiveness. Communication - Process - Barriers - Effective Communication. Leadership-Definition- leadership styles- Theories of leadership - Factors Contributing to Effective Leadership. Trade Unions- Role of Trade Union in Organizations - Types and Functions of Trade Unions.

UNIT 5    PROFESSIONAL ETHICS  9 Hrs.

Max. 45 Hours

TEXT / REFERENCE BOOKS

END SEMESTER EXAM QUESTION PAPER PATTERN
Max. Marks : 100  Exam Duration : 3 Hrs.
PART A : 10 questions of 2 marks each - No choice  20 Marks
PART B : 5 questions from each unit of internal choice, each carrying 12 marks  80 Marks
COURSE OBJECTIVE
To introduce the various optimization techniques and their advancements and to make use of the above techniques while modeling and solving the engineering problems of different fields.

UNIT 1 INTRODUCTION AND LINEAR PROGRAMMING 9 Hrs.

UNIT 2 TRANSPORTATION AND ASSIGNMENT MODEL 9 Hrs.

UNIT 3 RESOURCE SCHEDULING AND NETWORK ANALYSIS 9 Hrs.
Problem of Sequencing – Problem with N jobs and 2 machines N Jobs 3 machines N Jobs and m machines and 2 Jobs m machines (Graphical method). Project Management -Basic concepts–Network construction and scheduling Critical Path Method (CPM) & Program evaluation review technique (PERT) and resource leveling by network techniques, time – Cost trade off.

UNIT 4 INVENTORY CONTROL 9 Hrs.
Inventory Control – Various Types of inventory models – deterministic inventory models – Production model, Purchase model– with and without shortage- Economic Order Quantity (EOQ) – Buffer stock – Shortage quantity, Probabilistic inventory models – Quantity Discount and Price Breaks

UNIT 5 QUEUEING THEORY AND REPLACEMENT MODELS 9 Hrs.
Queueing theory – Poisson arrivals and exponential service times, Single channel models only, Replacement policy for items whose maintenance cost increases with time- Consideration of time value of money - Replacement policy- Individual, Group replacement of items that fail completely and suddenly.

Max. 45 Hours

TEXT / REFERENCE BOOKS

END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 100
Exam Duration : 3 Hrs.

PART A : 10 questions of 2 marks each – No choice 20 Marks

PART B : 2 questions from each unit of internal choice, each carrying 16 marks 80 Marks
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**COURSE OBJECTIVES**

- To understand the basics of solving a problem through computing
- To study different algorithms for solving a given problem.

**UNIT 1  PROGRAMMING TECHNIQUES**


**UNIT 2  FUNDAMENTAL ALGORITHMS**

Exchanging the Values - Counting - Summation of Set of Number - Factorial Computation - Sine Computation - Fibonacci Sequence - Reversing the Digits of an Integer - Base Conversion - Character to Number Conversion.

**UNIT 3  FACTORING METHODS**

Finding the Square Root of a Number - Smallest Divisor of an Integer - GCD of Two Integers - Generating Prime Numbers - Computing the Prime Factors of an Integer - Generation of Pseudo Random Numbers - Raising a Number to a Large Power - Computing the Nth Fibonacci Number.

**UNIT 4  ARRAY TECHNIQUES**

Array Order Reversal - Array Counting or Histogramming - Finding the Maximum Number in a Set - Removal of Duplicates from an Ordered Array - Partitioning an Array - Finding the kth Smallest Element - Longest Monotone Subsequence.

**UNIT 5  DESIGN OF ALGORITHMS- BACKTRACKING, BRANCH AND BOUND, SEARCHING**

Backtracking - 8 Queens - Hamiltonian Circuit Problem, Branch and Bound - Travelling Salesman Problem, Searching - water jug problem, tic-tac-toe problem.

Max. 45 Hours

**TEXT / REFERENCE BOOKS**


**END SEMESTER EXAM QUESTION PAPER PATTERN**

Max. Marks : 100  
Exam Duration : 3 Hrs.

**PART A**

10 questions of 2 marks each - No choice
20 Marks

**PART B**

2 questions from each unit of internal choice, each carrying 16 marks
80 Marks
COURSE OBJECTIVE

- To introduce the fundamental concepts of programming to the students and familiarize them with the art of writing programs.

UNIT 1 INTRODUCTION

Introduction: Algorithms & flowcharts - Overview of C - Features of C - Structure of C program - Compilation & execution of C program - Identifiers, variables, expression, keywords, data types, constants, scope and life of variables, and local and global variables - Operators: arithmetic, logical, relational, conditional and bitwise operators - Special operators: sizeof () & comma (,) operator - Precedence and associativity of operators - Type conversion in expressions - Input and output statements.

UNIT 2 CONTROLS STRUCTURES AND FUNCTIONS

Control structures: Conditional statements - Looping statements - Functions: Library Functions - User Defined - Function Prototype - Function Definition - Types of Functions - Functions with and without Arguments - Functions with no return and with Return Values - Nested Functions - Recursion.

UNIT 3 ARRAYS AND STRINGS

Arrays: Single and Multidimensional Arrays - Array Declaration and Initialization of Arrays - Array as Function Arguments.

Strings: Declaration - Initialization and String Handling Functions.

Structure and Union: Definition and Declaration - Nested Structures - Array of Structures - Structure as Function Argument - Function that Returns Structure - Union.

UNIT 4 STORAGE CLASS AND POINTERS

Storage Class Specifier: Auto, Extern, Static, & Register.


UNIT 5 MEMORY MANAGEMENT

DMA functions: malloc(), calloc(), sizeof(), free() and realloc(). Preprocessor directives.

File management: File operations - opening & closing a file, input and output statements, Control statements.

Max. 45 Hours

TEXT / REFERENCE BOOKS


END SEMESTER EXAM QUESTION PAPER PATTERN

Max Marks : 80
Exam Duration : 3 Hrs.

PART A : 10 questions of 2 marks each - No choice 20 Marks
PART B : 2 questions from each unit of internal choice, each carrying 16 marks 80 Marks
SCS1103  DATA STRUCTURES  

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**COURSE OBJECTIVES**
- To understand the searching and sorting techniques.
- To familiarize with stacks, queues and linked lists.

**UNIT 1  INTRODUCTION**  
9 Hrs.  
Introduction to algorithms - Recursion - Definition - Design Methodology and Implementation of recursive algorithms - Linear and binary recursion - recursive algorithms for factorial function - Fibonacci sequence - Tower of Hanoi - Tail recursion – Data Structures - Need - classification - operations - Array - characteristics - types - storage representations.

**UNIT 2  SEARCHING AND SORTING TECHNIQUES**  
9 Hrs.  

**UNIT 3  STACKS**  
9 Hrs  

**UNIT 4  QUEUES**  
9 Hrs  

**UNIT 5  LINKED LISTS**  
9 Hrs  
Introduction - Single linked list - Representation of a linked list in memory - Operations on a singly linked list - Merging two singly linked lists into one list - Reversing a singly linked list - Applications of singly linked list to represent polynomial expressions and sparse matrix manipulation - Advantages and disadvantages of singly linked list - Circular linked list - Doubly linked list - Circular Doubly Linked List.

**Max. 45 Hours**

**TEXT / REFERENCE BOOKS**

**END SEMESTER EXAM QUESTION PAPER PATTERN**
Max Marks : 80  
Exam Duration : 3 Hrs.

**PART A** : 10 questions of 2 marks each- No choice  
20 Marks

**PART B** : 2 questions from each unit of internal choice, each carrying 16 marks -  
80 Marks
COURSE OBJECTIVE
- To understand the advanced concepts such as trees, graphs, sets and tables.

UNIT 1  BASIC TREE CONCEPTS  9 Hrs.
Trees- Ordinary and Binary trees terminology, Properties of Binary trees, Implementation using Array and Linked list - Binary tree ADT representations, recursive and non recursive traversals - Binary Search tree - Insertion and Deletion.

UNIT 2  ADVANCED TREE CONCEPTS  9 Hrs.
Threaded Binary Trees, AVL Tree, B-tree Insertion and deletion, Splay trees - Heap trees - Heapify Procedure, Tries.

UNIT 3  GRAPH CONCEPTS  9 Hrs.
Terminology, Representation using Array and Linked List - Types of graphs - Graph traversals - BFS and DFS - Applications.

UNIT 4  ADVANCED GRAPH CONCEPTS  9 Hrs.
Minimum Spanning Tree - Kruskal's, Prim's and Sollin's Algorithm - Shortest path using Dijkstra's, Bellman Ford and Floyd Warshall Algorithm

UNIT 5  TABLES AND SETS  9 Hrs.

Max. 45 Hours

TEXT / REFERENCE BOOKS

END SEMESTER EXAM QUESTION PAPER PATTERN
Max. Marks : 100
Exam Duration : 3 Hrs.
PART A : 10 questions of 2 marks each- No choice  20 Marks
PART B : 2 questions from each unit of internal choice, each carrying 16 marks  80 Marks
SCS1202

OBJECT ORIENTED PROGRAMMING

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COURSE OBJECTIVES

- To understand the fundamental concepts of object oriented programming.
- Be familiar with concepts like abstraction, inheritance, polymorphism.
- To understand the concept of Classes.

UNIT 1
INTRODUCTION TO OBJECT ORIENTED PROGRAMMING
9 Hrs.
Object Oriented Programming Paradigms - Comparison of Programming Paradigms - Basic Object Oriented Programming concepts - Comparison with C - Overview of C++ - Pointers - Functions - Scope and Namespaces - Source files and programs.

UNIT 2
CLASSES AND OBJECTS
9 Hrs.
Working with classes - Classes and objects - Class specification - Defining class members - Objects Accessing member functions - Inline Functions - Data hiding - Class member accessibility - Empty classes.

UNIT 3
CONSTRUCTORS AND OVERLOADING
9 Hrs.
Default constructors - Parameterized constructors - Constructor overloading - Copy constructors - new, delete operators-"this" pointer - friend classes and friend functions - Function overloading- Unary Operator overloading - Binary Operator overloading.

UNIT 4
INHERITANCE
9 Hrs.
Base class and derived class relationship - Derived class declaration - Forms of inheritance - Inheritance and member accessibility - Constructors in derived class - Destructors in derived class - Multiple inheritance - Multi level inheritance - Hybrid inheritance - Virtual base classes - Member function overriding - Virtual functions - Abstract classes - Pure Virtual functions.

UNIT 5
I/O AND LIBRARY ORGANIZATION
9 Hrs.

Max. 45 Hours

TEXT / REFERENCE BOOKS


END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 100

PART A : 10 questions of 2 marks each- No choice 20 Marks
PART B : 2 questions from each unit of internal choice, each carrying 16 marks 80 Marks

Exam Duration : 3 Hrs.
COURSE OBJECTIVES

- To have a detailed knowledge about the fundamentals of Digital Electronics.
- To understand basics of Logic Gates.
- To develop ability to understand Combinational Logic.
- To develop ability to understand Sequential Logic.
- Also to have a knowledge about Memory units.

UNIT 1  NUMBER SYSTEMS, COMPLIMENTS AND CODES


UNIT 2  BOOLEAN ALGEBRA AND LOGIC GATES

Axiomatic definitions of Boolean Algebra - Basic Theorems and Properties of Boolean Algebra - Boolean Functions - Canonical and Standard forms - Digital Logic Gates - Simplification of Boolean Expressions: The map method - SOP and POS - NAND and NOR implementation - Don't Cares - The Tabulation Method - Determination and Selection of Prime Implicants

UNIT 3  COMBINATIONAL LOGIC


UNIT 4  SYNCHRONOUS SEQUENTIAL LOGIC


UNIT 5  ASYNCHRONOUS SEQUENTIAL LOGIC AND MEMORY

Circuits with Latches - Analysis procedure and Design Procedure - Reduction of state and Flow tables - Race - Free State Assignment

Max. 45 Hours

TEXT / REFERENCE BOOKS


END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks: 100

Exam Duration: 3 Hrs.

PART A: 10 questions of 2 marks each - No choice 20 Marks

PART B: 2 questions from each unit of internal choice, each carrying 16 marks 80 Marks
SCS1204

THEORY OF COMPUTATION

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COURSE OBJECTIVES

- To have an understanding of finite state automata and pushdown automata.
- To understand regular languages and context free languages.
- To study the Turing machine and classes of problems.

UNIT 1  
FINITE AUTOMATA AND REGULAR LANGUAGES  
15 Hrs.

Finite automata and regular languages - Regular languages and regular expressions - Finite automata - Union, intersections, and complements of automata - Non-determinism and Kleene's theorem - Non-deterministic finite automata and NFA with transition - Pumping lemma for Regular Languages

UNIT 2  
CONTEXT-FREE LANGUAGES AND NORMAL FORMS  
12 Hrs.

Context-free grammars - Definition - More examples - Including some familiar languages - Union, concatenations, and "s of CFLs - Derivation trees and ambiguity - Unambiguous CFG for algebraic expressions - Normal Forms - CNF - GNF- Pumping Lemma for CFL.

UNIT 3  
PUSH DOWN AUTOMATA  
12 Hrs.

Pushdown automata - Introduction - Definition - Deterministic pushdown automata - PDA corresponding to a given context-free grammar – Context-free Grammar corresponding to PDA.

UNIT 4  
TURING MACHINES  
14 Hrs.

Turing machines - Models of computation and the Turing thesis - Definition of TM and TM as language acceptor - Non-deterministic TM and Deterministic TM – Universal TM

UNIT 5  
RECURSIVE LANGUAGE AND UNSOLVABLE PROBLEMS  
7 Hrs.

Recursively enumerable and recursive languages - Recursively enumerable and recursive sets - Enumerating a language - Not all languages are recursively enumerable.

Unsolvable problem - An unsolvable decision problem - Reducing one problem to another (halting problem) - Other unsolvable problems in TM - Rice’s theorem and more unsolvable problems.

Max. 60 Hours

TEXT / REFERENCE BOOKS


END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 100  
Exam Duration : 3 Hrs.

PART A : 10 questions of 2 marks each - No choice  
20 Marks

PART B : 2 questions from each unit of internal choice, each carrying 16 marks  
80 Marks
COURSE OBJECTIVES

- To understand objects, classes and inheritance.
- To understand utilization of software objects to build software projects.
- To use UML in requirements elicitation and designing.
- To understand concepts of relationships and aggregations.

UNIT 1  AN OVERVIEW OF OBJECT ORIENTED SYSTEM DEVELOPMENT  9 Hrs.


UNIT 2  OBJECT ORIENTED METHODOLOGIES  9 Hrs


UNIT 3  OBJECT ORIENTED ANALYSIS  9 Hrs.


UNIT 4  OBJECT ORIENTED DESIGN  9 Hrs.


UNIT 5  SOFTWARE QUALITY  9 Hrs.


Max. 45 Hours

TEXT / REFERENCE BOOKS


END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 100  Exam Duration : 3 Hrs.

PART A : 10 questions of 2 marks each- No choice  20 Marks

PART B : 2 questions from each unit of internal choice, each carrying 16 marks.  80 Marks
COURSE OBJECTIVES

- To understand different methodologies for analyzing algorithms.
- To learn about various algorithm design techniques and their applications.
- To know about the limitations of algorithms.

UNIT 1  INTRODUCTION  9 Hrs.

UNIT 2  MATHEMATICAL FOUNDATIONS  9 Hrs.
Solving Recurrence Equations - Substitution Method - Recursion Tree Method - Master Method - Best Case - Worst Case - Average Case Analysis - Sorting in Linear Time - Lower bounds for Sorting - Counting Sort - Radix Sort - Bucket Sort

UNIT 3  DESIGN OF ALGORITHMS - BRUTE FORCE AND DIVIDE-AND-CONQUER  9 Hrs.

UNIT 4  DESIGN OF ALGORITHMS - DYNAMIC PROGRAMMING AND GREEDY APPROACH  9 Hrs.
Dynamic Programming - Floyd Warshall Algorithm - Optimal Binary Search Algorithms - Greedy Approach - Huffman Code - Kruskal’s Algorithm - Prim’s Algorithm - Dijkstra’s Algorithm

UNIT 5  DESIGN OF ALGORITHMS - BACKTRACKING AND BRANCH AND BOUND  9 Hrs.
Backtracking - 8 Queens - Hamiltonian Circuit Problem - Branch and Bound - Assignment Problem - Knapsack Problem - Travelling Salesman Problem - NP Complete Problems - Clique Problem - Vertex Cover Problem

Max. 45 Hours

TEXT / REFERENCE BOOKS

END SEMESTER EXAM QUESTION PAPER PATTERN
Max. Marks : 100  Exam Duration : 3 Hrs.
PART A : 10 questions of 2 marks each - No choice  20 Marks
PART B : 2 questions from each unit of internal choice, each carrying 16 marks  80 Marks
COURSE OBJECTIVES
- To understand the organization of a computer, and the hardware - software interface.
- To know about the various components of a computer and their internals.
- To have an overview of pipelining, vector processing and multiprocessors.

UNIT 1 INTRODUCTION
10 Hrs.

UNIT 2 DATA PATH DESIGN
10 Hrs.
Computer arithmetic : Addition - Subtraction - Multiplication and Division algorithms - Floating Point Arithmetic operations
Microprogrammed Control : Control memory - address sequencing - Microprogram Example - Design of Control unit - Example Processor design

UNIT 3 MEMORY ORGANISATION
8 Hrs.
Memory Organization : Memory Hierarchy - Main memory - auxiliary Memory - Associative Memory - Cache Memory - Virtual memory

UNIT 4 IO ORGANISATION
9 Hrs
Input - Output Organization : Peripheral Devices - I/O Interface - Modes of transfer - Priority Interrupt - DMA - IOP - Serial Communication

UNIT 5 MULTIPROCESSORS
8 Hrs.
Characteristics of multiprocessors - Interconnection Structures - Interprocessor Arbitration - Interprocessor Communication and Synchronization - Cache coherence

Max. 45 Hours

TEXT / REFERENCE BOOKS

END SEMESTER EXAM QUESTION PAPER PATTERN
Max. Marks : 100
Exam Duration : 3 Hrs.
PART A : 10 questions of 2 marks each- No choice
PART B : 2 questions from each unit of internal choice, each carrying 16 marks
COURSE OBJECTIVES
- To study the mathematical concepts required for designing system software.
- To study the basics of grammar and its importance for parser.

UNIT 1  BASICS OF MATHEMATICAL FOUNDATION RELATED TO COMPUTER SCIENCE  7 Hrs.
Set theory - Elements of languages and its operations- Relations- Types of relations- Functions and its types - Mathematical induction- Applications of mathematical induction.

UNIT 2  APPLICATIONS OF FINITE AUTOMATA IN COMPUTER SCIENCE  15 Hrs.
Regular language - properties of regular languages- Applications of regular languages - representation of regular languages - Finite automata and its applications - how finite automata is used to represent the structure of lexical phase - finite automata to regular expression.

UNIT 3  CONTEXT FREE GRAMMAR  15 Hrs.
Conversion of regular language to CFG - Structure of CFG - applications of CFG in computer science- parsing using CFG- ambiguous and unambiguous grammar.

UNIT 4  PUSH DOWN AUTOMATA  8 Hrs.
Applications of PDA- types of PDA - Design examples - CFG to PDA- PDA to CFG.

UNIT 5  TURING MACHINE  15 Hrs.
Applications of turing machine in computer science- types of turing machine - Comparison of finite automata with turing machine - UTM - Design examples of turing machine.

Max. 60 Hours

TEXT / REFERENCE BOOKS

END SEMESTER EXAM QUESTION PAPER PATTERN
Max. Marks: 100
Exam Duration: 3 Hrs.
PART A: 10 questions of 2 marks each- No choice 20 Marks
PART B: 2 questions from each unit of internal choice, each carrying 16 marks 80 Marks
SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY

FACULTY OF COMPUTING

SCS1301 OPERATING SYSTEM

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COURSE OBJECTIVES

- To have an overview of different types of operating systems.
- To understand the concept of process management.
- To understand the concept of storage management.
- To understand the concept of I/O and file systems.

UNIT 1 INTRODUCTION 8 Hrs.

Introduction - Operating system structures - System components - OS services - System calls - System structure - Resources Processes - Threads - Objects - Device management - Different approaches - Buffering device drivers.

UNIT 2 PROCESS MANAGEMENT 9 Hrs.


UNIT 3 SYNCHRONIZATION AND DEADLOCKS 9 Hrs.


UNIT 4 MEMORY MANAGEMENT 9 Hrs.


UNIT 5 I/O SYSTEM, LINUX & SHELL PROGRAMMING 10 Hrs.


Max. 45 Hours

TEXT / REFERENCE BOOKS


END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 100

Exam Duration : 3 Hrs.

PART A : 10 questions of 2 marks each - No choice 20 Marks

PART B : 2 questions from each unit of internal choice, each carrying 16 marks 80 Marks
SCS1302

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**COURSE OBJECTIVES**

- To gain knowledge to develop, design and implement two and three dimensional graphical structures.
- To enable students to acquire knowledge of Multimedia compression and animations.
- To learn creation, Management and Transmission of Multimedia objects.

**UNIT 1**

**BASICS OF COMPUTER GRAPHICS**

- Output Primitives: Survey of computer graphics
- Overview of graphics systems
- Line drawing algorithm
- Circle drawing algorithm
- Curve drawing algorithm
- Attributes of output primitives
- Anti-aliasing

**UNIT 2**

**2D TRANSFORMATIONS AND VIEWING**

- Basic two dimensional transformations
- Other transformations
- 2D and 3D viewing
- Line clipping
- Polygon clipping
- Logical classification
- Input functions
- Interactive picture construction techniques

**UNIT 3**

**3D CONCEPTS AND CURVES**

- 3D object representation methods
- B-REP
- Sweep representations
- Three dimensional transformations
- Curve generation
- Cubic splines
- Beziers
- Blending of curves
- Other interpolation techniques
- Displaying Curves and Surfaces
- Shape description requirement
- Parametric function
- Three dimensional concepts
- Introduction to Fractals and self similarity
- Successive refinement of curves
- Koch curve and Peano curves

**UNIT 4**

**METHODS AND MODELS**

- Visible surface detection methods
- Illumination models
- Halftone patterns
- Dithering techniques
- Polygon rendering methods
- Ray tracing methods
- Color models and color applications

**UNIT 5**

**MULTIMEDIA BASICS AND TOOLS**

- Introduction to multimedia
- Compression & Decompression
- Data & File Format standards
- Digital voice and audio
- Video image and animation
- Introduction to Photoshop
- Workplace
- Tools
- Navigating window
- Importing and exporting images
- Operations on Images
- Resize, crop, and rotate
- Introduction to Flash
- Elements of flash document
- Drawing tools
- Flash animations
- Importing and exporting
- Adding sounds
- Publishing flash movies
- Basic action scripts
- GoTo, Play, Stop, Tell Target

Max. 45 Hours

**TEXT / REFERENCE BOOKS**


**END SEMESTER EXAM QUESTION PAPER PATTERN**

Max. Marks : 100

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(10 questions of 2 marks each - No choice)

(2 questions from each unit of internal choice, each carrying 16 marks)
COURSE OBJECTIVES
- To study the basics and design of system software.
- To study the basic principles of compiler.

UNIT 1 INTRODUCTION
Components of system software - editor - debugger - linker - loader - assembler - case study.

UNIT 2 BASICS OF COMPILER
Compiler - Structure Of Compiler - Phases - Representation Of Lexical Phase Using Regular Expression - Representation Of Regular Expression - Finite Automata to Design Lexical Phase - Minimized DFA Algorithm.

UNIT 3 PARSER
Types Of Parser - Shift Reduce Parsing - Operator Precedence Parsing - Recursive Decent Parser - Non-Recursive Decent Parser.

UNIT 4 INTERMEDIATE CODE GENERATION
Intermediate code generation for assignment statements - boolean statements - switch case statement - symbol table generation.

UNIT 5 OPTIMIZATION
Optimization - issues related to optimization - loop optimization - peep hole optimization - three address code generation algorithm - examples.

Max. 45 Hours

TEXT / REFERENCE BOOKS

END SEMESTER EXAM QUESTION PAPER PATTERN
Max. Marks : 100
Exam Duration : 3 Hrs.
PART A : 10 questions of 2 marks each- No choice 20 Marks
PART B : 2 questions from each unit of internal choice, each carrying 16 marks 80 Marks
COURSE OBJECTIVES

- To understand, design and implement a lexical analyzer.
- To understand, design and implement a parser.
- To understand, design code generation schemes.
- To understand optimization of codes and runtime environment.
- To familiarize Assemblers, Macroprocessors and Loaders.

UNIT 1 COMPILERS - LEXICAL ANALYSIS 7 Hrs.
Structure of compiler - Role of lexical analyzer - Regular expression - Finite automata - Regular expression to finite automata - Minimizing DFA - Introduction to LEX and YACC programming

UNIT 2 PARSER 8 Hrs.
Context free grammar - Derivations - Parse trees - Capabilities of context free grammar - Types of parser - Shift reduce parsing - Operator precedence parsing - Recursive decent parser - Non-recursive decent parser.

UNIT 3 INTERMEDIATE CODE GENERATION 10 Hrs.
Syntax directed translation scheme - Types of translation scheme - Implementation of desktop calculator - Types of intermediate codes - Postfix notation - Parse trees - Syntax trees - Three address code - Quadruples - Triple - Translation of assignment statements - control flow statements - Backpatching - Boolean statements - Procedure call - switch case statements - Symbol table.

UNIT 4 CODE GENERATION AND OPTIMIZATION 10 Hrs.

UNIT 5 ASSEMBLER, MACROPROCESSORS, LOADER 10 Hrs.

Max. 45 Hours

TEXT / REFERENCE BOOKS

END SEMESTER EXAM QUESTION PAPER PATTERN
Max. Marks : 100
Exam Duration : 3 Hrs.
PART A : 10 questions of 2 marks each- No choice 20 Marks
PART B : 2 questions from each unit of internal choice, each carrying 16 marks 80 Marks
COURSE OBJECTIVES

- To gain knowledge of fundamental concepts of software engineering and design process.
- To understand different notion of complexity at both the module and system level.
- To be aware of some widely known design methods.
- To understand the role and contents of testing activities in different life cycle phases.

UNIT 1 INTRODUCTION

S/W engineering paradigm - Life cycle models - Water fall - Incremental - Spiral - Evolutionary - Prototyping - Object oriented system engineering - Computer based system - Verification - Validation - Life cycle process - Development process - System engineering hierarchy - Introduction to CMM - Levels of CMM.

UNIT 2 SOFTWARE ENGINEERING PROCESS


UNIT 3 DESIGN PROCESS AND CONCEPTS

Design process - Modular design - Design heuristic - Design model and document - Architectural design - Software architecture - Data design - Architecture data - Transform and transaction mapping - User interface design - User interface design principles.

UNIT 4 BASIC CONCEPTS OF SOFTWARE TESTING

Levels - Software Testing Fundamentals - Types of s/w test - White box testing - Basis path testing - Black box testing - Control Structure testing - Regression testing - Testing in the large - S/W testing strategies - Strategic approach and issues - UNIT testing - Integration testing - Validation testing - System testing and debugging. Case studies - Writing black box and white box testing.

UNIT 5 COST ESTIMATION & MAINTENANCE


Max. 45 Hours

TEXT / REFERENCE BOOKS


END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 100
Exam Duration : 3 Hrs.
PART A : 10 questions of 2 marks each- No choice 20 Marks
PART B : 2 questions from each unit of internal choice, each carrying 16 marks 80 Marks
SCS1306 DATABASE MANAGEMENT SYSTEM

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COURSE OBJECTIVES

- Design of database for any given problem.
- Design Logical Database Schema and Mapping it to implementation level schema through Database Language Features.
- Understand the practical problems of Concurrency control and its solutions Gain knowledge about failure and Recovery mechanisms.

UNIT 1 INTRODUCTION TO DATABASES 9 Hrs.

Databases and Databases users - Database system concepts and architecture - Data modeling using Entity Relationship (ER) Model. **Relational Model** - The Relational Data Model and Relational Database Constraints - The Relational Algebra and Relational Calculus.

UNIT 2 DATABASE DESIGN 9 Hrs.

Overview of the QBE Language - Overview of the Hierarchical Data Model - Overview of the Network Data Model - SQL-99: Schema Definition, Constraints, Queries, and Views- Functional Dependencies and Normalization for Relational Databases.

UNIT 3 QUERY PROCESSING 9 Hrs.


UNIT 4 RECOVERY AND SECURITY 9 Hrs.

Database Recovery Techniques - Database Security - Distributed databases and Client- Server Architecture

UNIT 5 OBJECT DATABASE 9 Hrs.

Concepts for Object Database - Enhanced Data Models for Advanced Application Emerging Database Technologies and Application

Max. 45 Hours

TEXT / REFERENCE BOOKS


END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 100

Exam Duration : 3 Hrs.

PART A : 10 questions of 2 marks each- No choice 20 Marks
PART B : 2 questions from each unit of internal choice, each carrying 16 marks 80 Marks
SCS1307  COMPUTATIONAL INTELLIGENCE  |  L  |  T  |  P  |  Credits  |  Total Marks  
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**COURSE OBJECTIVES**

- To gain knowledge of the concepts, paradigms, algorithms, and implementation of Computational Intelligence and its constituent methodologies
- To provide a strong foundation of fundamental concepts in Artificial Intelligence, ANN, Fuzzy systems, Genetic Algorithms and Swarm Intelligence.

**UNIT 1  ARTIFICIAL INTELLIGENCE**  
12 Hrs.

**UNIT 2  ARTIFICIAL NEURAL NETWORKS**  
12 Hrs.

**UNIT 3  FUZZY SYSTEMS**  
12 Hrs.
Introduction to fuzzy- Fuzzy sets and Fuzzy reasoning - Fuzzy matrices - Fuzzy Functions - Decomposition - Fuzzy rules and inferences - Fuzzy decision making.

**UNIT 4  GENETIC ALGORITHMS**  
12 Hrs.
Survival of the fittest - Fitness Computations - Cross over- Mutation - Reproduction - Rank method - Rank Space method.

**UNIT 5  SWARM INTELLIGENCE**  
12 Hrs.
Particle swarm optimization - Global PSO- Local PSO - Ant colony Optimization - Simple Ant Colony - Ant System - Max, Min Ant System.

Max. 60 Hours

**TEXT / REFERENCE BOOKS**
8. Elain Rich & Kevin Knight, Artificial Intelligence, Tata McGraw Hill
10. George Klir, Bo Yuan, Bo Yuan "Fuzzy Sets And Fuzzy Logic", Prentice Hall of India Pvt Ltd., 1997

**END SEMESTER EXAM QUESTION PAPER PATTERN**

Max. Marks : 100  
Exam Duration : 3 Hrs.  
PART A : 10 questions of 2 marks each- No choice  
PART B : 2 questions from each unit of internal choice, each carrying 16 marks

20 Marks  
80 Marks
COURSE OBJECTIVES

- To understand number theory used for network security.
- To understand the design concept of cryptography and authentication.
- To understand the design concepts of internet security.
- To develop experiments on algorithm used for security.

UNIT 1  NUMBER THEORY  12 Hrs.
Divisibility and the Division Algorithm - The Euclidean Algorithm - Modular Arithmetic - Groups, Rings, and Fields - Finite Fields of the Form GF(p) - Polynomial Arithmetic - Finite Fields of the Form GF(2^n) - Finite Field Arithmetic

UNIT 2  NUMBER THEORY  12 Hrs.

UNIT 3  INTRODUCTION TO CRYPTOGRAPHY  12 Hrs.
Services - Mechanisms and attacks - The OSI security architecture - A model for network security - Classical encryption technique - Symmetric cipher model - Substitution technique - Rotor machines - Steganography - Block Cipher principles

UNIT 4  ENCRYPTION ALGORITHMS AND KEY MANAGEMENT  12 Hrs.
Simplified DES - The Data Encryption Standard - The strength of DES - Confidentiality using symmetric encryption - Placement of encryption - Traffic confidentiality - Advanced Encryption Standard (AES) - Public key cryptography and RSA-

UNIT 5  AUTHENTICATION  12 Hrs.
Key Distribution - Key Management - Diffie-Hellman Key Exchange - Digital Signature Standard (DSS) Authentication requirements - Authentication functions - Message authentication codes - Hash functions - Security of hash functions and MAC’S - MD5 (Message Digest Algorithm) - HMAC - SHA1

Max. 60 Hours

TEXT / REFERENCE BOOKS

END SEMESTER EXAM QUESTION PAPER PATTERN
Max. Marks : 100  Exam Duration : 3 Hrs.
PART A : 10 questions of 2 marks each- No choice  20 Marks
PART B : 2 questions from each unit of internal choice, each carrying 16 marks  80 Marks
COURSE OBJECTIVES

- To know the basic concepts of network security and its various security issues.
- To understand the design concept of cryptography and authentication.
- To understand the design concepts of internet security.
- To develop experiments on algorithm used for security.

UNIT 1 NETWORK SECURITY DESIGN 12 Hrs.


UNIT 2 THREATS IN NETWORKS 12 Hrs.

Network Security Controls - Firewalls - Intrusion Detection Systems - Secure Email - Intruder - Intrusion detection system - Virus and related threats - Countermeasures - Firewalls design principles - Trusted systems

UNIT 3 SECURITY PRACTICE 12 Hrs.

X.509 Authentication services - E-mail security - IP security - Web security- Network perimeter security - Secured router configuration – Firewall - Design principle - Trusted systems – VPN – IDS - IPS penetration testing - NAT - Implementation of cryptography and security

UNIT 4 NETWORK SECURITY PROTOCOLS 12 Hrs.


UNIT 5 SECURITY SERVICES 12 Hrs.


TEXT / REFERENCE BOOKS


END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 100

Exam Duration : 3 Hrs.

PART A : 10 questions of 2 marks each- No choice 20 Marks

PART B : 2 questions from each unit of internal choice, each carrying 16 marks 80 Marks
COURSE OBJECTIVES

- Understand the division of network functionalities into layers.
- Be familiar with the components required to build different types of networks.
- Be exposed to the required functionality at each layer.
- Learn the flow control and congestion control algorithms.

UNIT 1 FUNDAMENTALS & LINK LAYER 12 Hrs.
Building a network - Requirements - Layering and protocols - Internet Architecture - Network software - Performance - Framing - Error Detection - Flow control

UNIT 2 MEDIA ACCESS & INTERNETWORKING 12 Hrs.
Media access control - Ethernet (802.3) - Wireless LANs - 802.11 - Bluetooth - Bridging - Basic Internetworking – IP – CIDR – ARP – DHCP - ICMP

UNIT 3 ROUTING 12 Hrs.

UNIT 4 TRANSPORT LAYER 12 Hrs.
Overview of Transport layer - UDP - Reliable byte stream (TCP) - Connection management - Flow control - Retransmission - TCP Congestion control - Congestion avoidance- QoS - Application requirements.

UNIT 5 APPLICATION LAYER 12 Hrs.
Traditional applications - Electronic Mail – SMTP - POP3 – IMAP- MIME - HTTP - DNS- SNMP.

Max. 60 Hours

TEXT / REFERENCE BOOKS

END SEMESTER EXAM QUESTION PAPER PATTERN
Max. Marks : 100
Exam Duration : 3 Hrs.
PART A : 10 questions of 2 marks each- No choice 20 Marks
PART B : 2 questions from each unit of internal choice, each carrying 16 marks 80 Marks
COURSE OBJECTIVES
- To know the importance of Socket Programming.
- To learn about the different applications using Socket.
- To understand the concept of managing simple networks.

UNIT 1 ELEMENTARY TCP SOCKETS 12 Hrs.

UNIT 2 APPLICATION DEVELOPMENT 12 Hrs.
TCP Echo Server - TCP Echo Client - Posix Signal handling - Server with multiple clients - boundary conditions:Server process Crashes, Server host Crashes, Server Crashes and reboots, Server Shutdown - I/O multiplexing - I/O Models - select function - shutdown function - TCP echo Server (with multiplexing) - poll function - TCP echo Client (with Multiplexing).

UNIT 3 SOCKET OPTIONS, ELEMENTARY UDP SOCKETS 12 Hrs.
Socket options - getsocket and setsocket functions - generic socket options - IP socket options - ICMP socket options - TCP socket options - Elementary UDP sockets - UDP echo Server - UDP echo Client - Multiplexing - TCP and UDP sockets - Domain name system - gethostbyname function - IPv6 support in DNS - gethostbyaddr function - getservbyname and getservbyport functions.

UNIT 4 ADVANCED SOCKETS 12 Hrs.

UNIT 5 SIMPLE NETWORK MANAGEMENT 12 Hrs.
SNMP network management concepts - SNMP management information - Standard MIB’s - SNMPv1 protocol and Practical issues - Introduction to RMON, SNMPv2 and SNMPv3.

Max. 60 Hours

TEXT / REFERENCE BOOKS

END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 100
Exam Duration : 3 Hrs.
PART A : 10 questions of 2 marks each- No choice 20 Marks
PART B : 2 questions from each unit of internal choice, each carrying 16 marks 80 Marks
COURSE OBJECTIVES
- Recognize the individual components of the big picture of computer networks.
- Outline the basic network configurations.
- List the layers of the OSI model and Internet model and describe the duties of each layer.

UNIT 1 DATA COMMUNICATION 9 Hrs.

UNIT 2 DATALINK LAYER 9 Hrs.
Link layer services - Framing - Flow Control - Error control - Medium Access Control - Ethernet CSMA/CD - Token Ring - FDDI - Token Passing - Wireless LAN - CSMA/CA

UNIT 3 NETWORK LAYER 9 Hrs.
Circuit Switching - Packet Switching - Routing - Distance Vector Routing - Link State Routing - Addressing - Subnetting - IPV4- IPV6- ARP - RARP - ICMP - IGMP - DHCP.

UNIT 4 TRANSPORT LAYER 9 Hrs.

UNIT 5 APPLICATION LAYER 9 Hrs.
Networking Devices - Repeaters - Switches - Bridges - Routers - Gateways - Domain Name System - FTP - WWW and HTTP - SNMP - SMTP - POP3 - IMAP - MIME.

Max. 45 Hours

TEXT / REFERENCE BOOKS

END SEMESTER EXAM QUESTION PAPER PATTERN
Max. Marks : 100
Exam Duration : 3 Hrs
PART A : 10 questions of 2 marks each - No choice 20 Marks
PART B : 2 questions from each unit of internal choice, each carrying 16 marks 80 Marks
COURSE OBJECTIVE

- To study about Rich Internet Application, ext js and gwt.

UNIT 1 RICH INTERNET APPLICATION OVERVIEW 9 Hrs

UNIT 2 INTRODUCTION TO EXT JS 9 Hrs.
Functions - Objects and Classes - Javascript in Web Browsers - Getting started with Ext JS - Creating your first Ext JS Application - MVC Basics.

UNIT 3 BUILDING RIA WITH EXT JS
Fundamental Classes - Event Handling - Panels and Grids - Layouts and Widgets - Working with data.

UNIT 4 INTRODUCTION TO GWT 9 Hrs.

UNIT 5 BUILDING RIA WITH GWT 9 Hrs.
GWT Panels and Layouts - Event Handling - Internationalisation - Advanced GWT - RPC and AJAX - Writing a service implementation - Handling browser back button functionality - MVP Design pattern.

Max. 45 Hours

TEXT / REFERENCE BOOKS

END SEMESTER EXAM QUESTION PAPER PATTERN
Max. Marks : 100
Exam Duration : 3 Hrs.

PART A : 10 questions of 2 marks each- No choice 20 Marks
PART B : 2 questions from each unit of internal choice, each carrying 16 marks 80 Marks

Max. 45 Hours
COURSE OBJECTIVES

- To understand the principles of Data warehousing and Data Mining.
- To know the Architecture of a Data Mining system and Data pre-processing Methods.
- To perform classification and prediction of data.

UNIT 1 DATA WAREHOUSING 9 Hrs.
Data warehousing components - Building a data warehouse - Multi Dimensional Data Model - OLAP Operation in the Multi-Dimensional Model - Three Tier Data Warehouse Architecture - Schemas for Multi-dimensional data Model - Online Analytical Processing (OLAP) - OLAP Vs OLTP Integrated OLAM and OLAP Architecture.

UNIT 2 DATA MINING 9 Hrs.
Introduction - Data - Types of data - Steps in KDD - System Architecture - Data mining functionalities - Classification of data mining systems - Data mining task primitives - Integration of a data mining system with a data warehouse - Issues - Data pre-processing - Data Mining Application

UNIT 3 ASSOCIATION RULE MINING 9 Hrs.
Mining frequent patterns - Associations and correlations - Mining methods - Finding Frequent itemset using Candidate Generation - Generating Association Rules from Frequent Itemsets - Mining Frequent itemset without Candidate Generation - Mining various kinds of association rules - Mining Multi-Level Association Rule-Mining Multi-Dimensional Association Rule-Mining Correlation analysis - Constraint based association mining.

UNIT 4 CLASSIFICATION AND PREDICTION 9 Hrs.
Classification and prediction - Issues Regarding Classification and Prediction - Classification by Decision Tree Induction - Bayesian classification - Baye’s Theorem - Naive Bayesian Classification - Bayesian Belief Network - Rule based classification - Classification by Backpropagation - Support vector machines - Prediction - Linear Regression - Non Linear Regression.

UNIT 5 CLUSTERING, APPLICATIONS AND TRENDS IN DATA MINING 9 Hrs.

Max. 45 Hours

TEXT / REFERENCE BOOKS

END SEMESTER EXAM QUESTION PAPER PATTERN
Max. Marks : 100
Exam Duration : 3 Hrs.
PART A : 10 questions of 2 marks each - No choice 20 Marks
PART B : 2 questions from each unit of internal choice, each carrying 16 marks 80 Marks

B.E. / B. Tech REGULAR 52 REGULATIONS 2015
SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY
FACULTY OF COMPUTING

B.E. / B. Tech REGULAR
REGULATIONS 2015

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COURSE OBJECTIVES

- Introduce students to the major Internet programming concepts.
- Provide students with a significant hands-on implementation experience of programming the Internet at different levels of abstraction.
- Provide an opportunity for students to explore in detail an Internet technology of their choice and share their findings with the class.

UNIT 1 MARKUP LANGUAGE

Introduction to HTML - Structure of HTML, HTML elements - Mark up tags for inserting URL, Images, Tables, Frames - Form and its controls - Image maps - Client and Server Side – CSS – Inline – Internal and External - Multimedia components - Audio and Video - Dynamic HTML.

UNIT 2 JAVA SCRIPT

Introduction to JavaScript, Advantages, Data Types – Variables – Operators - Control Statements – Functions - Objects – Array – Strings – Math – Boolean – Global - Date, and Number - Windows and Frames - Forms and Validation.

UNIT 3 XML TECHNOLOGIES


UNIT 4 PHP


UNIT 5 ASP.NET


Max. 45 Hours

TEXT / REFERENCE BOOKS


END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 100
Exam Duration : 3 Hrs.

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20 Marks

PART B : 2 questions from each unit of internal choice, each carrying 16 marks
80 Marks
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**COURSE OBJECTIVES**
- Understand the nature of data analytics in context.
- Explore the transformed data to derive meaningful results.
- To provide an overview of advanced machine learning, data mining and statistic techniques that arise in real data analytic applications.

**UNIT 1**
**INTRODUCTION TO DATA ANALYTICS**
10 Hrs.
Introduction-Data Analytics, Data mining and Knowledge discovery-Data and Relations-Dissimilarity measures - similarity measures - sequence relations - sampling and quantization - Analysis vs Reporting - Modern data analytic tools - Statistical Concepts - Probability - Sampling and Sampling distribution - statistical Inference - Prediction and prediction error – Resampling.

**UNIT 2**
**DATA ANALYSIS**
10 Hrs

**UNIT 3**
**CLASSIFICATION AND CLUSTERING METHODS**
10 Hrs.
Classification criteria - Naive Bayes classifier - Linear Discriminant Analysis - Support Vector Machine - Nearest neighbor classifier - Learning vector Quantization - Decision Tress - Cluster Partitions - Sequential clustering - Prototype Based Clustering - Fuzzy Clustering - Relational Clustering - Self Organizing Map.

**UNIT 4**
**DATA VISUALIZATION**
8 Hrs.
Introduction - Classification of Visual data analysis techniques - Data type to be visualized - Visualization techniques - Interaction techniques - Principle Component Analysis, Multi dimensional Scaling, Sammon Sampling, Histograms - Spectral analysis

**UNIT 5**
**FRAMEWORKS**
7 Hrs.
Distributed File system - Physical organization of Computer nodes - Large scale file system organization - Map Reduce - The map task - Grouping and Aggregation - The reduce task - Combiners - Details of map reduce Execution - Coping with Node failures.

**TEXT / REFERENCE BOOKS**
2. Thomas A. Runkler, Data Analytics, Models and Algorithms for Intelligent data Analysis,Springer 2012
4. Bill Franks, Taming the Big data tidal wave: Finding opportunities in Huge Data Streams with advanced analytics, John Wiley & sons,2012

**END SEMESTER EXAM QUESTION PAPER PATTERN**
Max. Marks : 100
Exam Duration : 3 Hrs.
**PART A**
10 questions of 2 marks each - No choice 20 Marks
**PART B**
2 questions from each unit of internal choice, each carrying 16 marks 80 Marks
SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY
FACULTY OF COMPUTING

SIT1304  CLOUD COMPUTING

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COURSE OBJECTIVES
- Gain knowledge in Basics of Cloud computing.
- Understand Cloud Computing architecture and industry frameworks such as Map Reduce.
- Discuss practical applications of cloud computing.

UNIT 1 UNDERSTANDING CLOUD COMPUTING  9 Hrs.

UNIT 2 CLOUD SERVICE MODELS  9 Hrs.
Software as a Service (SaaS) - Infrastructure as a Service (IaaS) - Platform as a Service (PaaS) - Service Oriented Architecture (SoA) - Elastic Computing - On Demand Computing.

UNIT 3 CLOUD DEPLOYMENT MODELS  9 Hrs.
Deployment of applications on the cloud - Hypervisor - Case studies - Xen, VMware, Eucalyptus, Amazon EC2, KVM, Virtual Box, Hyper-V.

UNIT 4 CLOUD COMPUTING FOR EVERYONE  9 Hrs.
Cloud data centers - Energy efficiency in data centre - Mobile cloud computing service models - Collaboration with services and applications: CRM management - Project management - Email - on line database - calendar - schedules - Word Processing - Presentation - Spreadsheet - Databases - Desktop - Social Networks and Groupware.

UNIT 5 CLOUD SECURITY  9 Hrs.

Max. 45 Hours

TEXT / REFERENCE BOOKS

END SEMESTER EXAM QUESTION PAPER PATTERN
Max. Marks : 100
Exam Duration : 3 Hrs.
PART A : 10 questions of 2 marks each - No choice 20 Marks
PART B : 2 questions from each unit of internal choice, each carrying 16 marks 80 Marks
COURSE OBJECTIVES

- To focus on the construction and study of algorithms that can learn from data.
- To emphasize on the logical, knowledge-based approach.
- To introduce the various local models of learning.

UNIT 1 INTRODUCTION TO MACHINE LEARNING 12 Hrs.

UNIT 2 DECISION THEORY 12 Hrs.

UNIT 3 CLUSTERING & REGRESSION 12 Hrs.

UNIT 4 MULTILAYER PERCEPTRONS 12 Hrs.
Structure of brain - Neural networks as a parallel processing - Perceptron - Multilayer perceptron - Backpropagation - Training procedures - Tuning the network size - Learning time.

UNIT 5 LOCAL MODELS 12 Hrs.

Max. 60 Hours

TEXT / REFERENCE BOOKS

END SEMESTER EXAM QUESTION PAPER PATTERN
Max. Marks : 100
Exam Duration : 3 Hrs.
PART A : 10 questions of 2 marks each - No choice 20 Marks
PART B : 2 questions from each unit of internal choice, each carrying 16 marks 80 Marks
COURSE OBJECTIVES
- To provide a comprehensive introduction to techniques in data mining and knowledge discovery.
- The material will be presented both from a database perspective and a machine learning perspective.
- The course will cover both basic and advanced techniques for uncovering interesting data patterns hidden in large data sets.

UNIT 1 DATA MINING 9 Hrs.
Introduction : Basic Data Mining Tasks, Types of Data, Data Mining Issues, KDD, Data Mining Task Primitives, Classification of Data Mining, Data Pre-processing.

UNIT 2 ASSOCIATION RULES 9 Hrs.

UNIT 3 CLASSIFICATION 9 Hrs.
Classification : Statistical-Based Algorithms, Distance-Based Algorithms, Decision Tree-Based Algorithms, Naive Bayesian Classification, Neural Network-Based Algorithms, Rule-Based Algorithms.

UNIT 4 CLUSTERING 9 Hrs.
Clustering : Similarity and Distance Measures, Hierarchical Algorithms, Partitional Algorithms, Model based Clustering Algorithms, Clustering High Dimensional Data.

UNIT 5 ADVANCED TECHNIQUES 9 Hrs.
Social impacts of data mining, Text Mining, Web Mining, Spatial Mining, Temporal Mining.

Max. 45 Hours

TEXT / REFERENCES BOOKS

END SEMESTER EXAM QUESTION PAPER PATTERN
Max. Marks : 100
Exam Duration : 3 Hrs.
PART A : 10 questions of 2 marks each - No choice 20 Marks
PART B : 2 questions from each unit of internal choice, each carrying 16 marks 80 Marks
COURSE OBJECTIVES
- Keeping analysis/reporting and production separate.
- Data warehouse purpose for data consistency and quality.
- Establish the foundation for decision support.

UNIT 1 BUSINESS PROCESS & MODELING 9 Hrs.

UNIT 2 DATA MODELING 9 Hrs.
Data Model: ER diagram - Logical Data Model - Physical Data Model, Development Life cycle: Gathering business Requirements - conceptual - logical - physical, Data Modeling Standards: steps in creating data model - relational VS Dimensional.

UNIT 3 DATA WAREHOUSE ARCHITECTURE 9 Hrs.
Data warehouse Architecture - System Process Architecture - design - database schema - partitioning strategy - aggregations - detonating - meta data - data warehouse process managers

UNIT 4 HARDWARE AND OPERATIONAL DESIGN 9 Hrs.
Hardware and operational design of warehouses - Hardware Architecture - Physical layout Security - Backup and recovery - Service level agreement - operating the data warehouse.

UNIT 5 PLANNING, TUNING AND TESTING 9 Hrs.
Capacity Planning - Tuning the data Warehouse - Testing the data warehouses.

Max. 45 Hours

TEXT / REFERENCE BOOKS
1. Data warehousing in the Real World - Sam Anahory, Dennis Murray - Pears Education
2. Data warehousing - Amilesh Sinha - Thomson Delman Learning
4. Decision support and Data warehouse systems by E.G. Mallach-Tata McGraw Hill

END SEMESTER EXAM QUESTION PAPER PATTERN
Max. Marks: 100
Exam Duration: 3 Hrs.
PART A: 10 questions of 2 marks each - No choice 20 Marks
PART B: 2 questions from each unit of internal choice, each carrying 16 marks 80 Marks
SIT1401  HUMAN COMPUTER INTERACTION  

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**COURSE OBJECTIVES**

- Understand the basics of human and computational abilities and limitations.
- Practice a variety of simple methods for evaluating the quality of a user interface.
- Apply appropriate HCI techniques to design systems that are usable by people.

**UNIT 1  FOUNDATIONS OF HCI**  
9 Hrs.


**UNIT 2  DESIGN & SOFTWARE PROCESS**  
9 Hrs.


**UNIT 3  MODELS AND THEORIES**  
9 Hrs.

Cognitive models - Socio-Organizational issues and stake holder requirements - Communication and collaboration models - Hypertext, Multimedia and WWW.

**UNIT 4  MOBILE HCI**  
9 Hrs.


**UNIT 5  WEB INTERFACE DESIGN**  
9 Hrs.


Max. 45 Hours

**TEXT / REFFERENCE BOOKS**


**END SEMESTER EXAM QUESTION PAPER PATTERN**

Max. Marks : 100  
Exam Duration : 3 Hrs.

**PART A** : 10 questions of 2 marks each - No choice  
20 Marks

**PART B** : 2 questions from each unit of internal choice, each carrying 16 marks  
80 Marks
SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY
FACULTY OF COMPUTING

B.E./B. Tech REGULAR
60
REGULATIONS 2015

SIT1402
MOBILE APPLICATION DEVELOPMENT

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COURSE OBJECTIVES

- To develop applications for current and emerging mobile computing devices, performing tasks at all stages of the software development life-cycle.
- To learn how to utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces.
- To design, implement and deploy mobile applications using an appropriate software development environment.

UNIT 1
INTRODUCTION AND UI INTERFACE
9 Hrs.

UNIT 2
BUILDING BLOCKS AND DATABASES
9 Hrs.
Introduction to Activities and Intents - Understanding Activity life cycle, Linking Activities, Passing Data, Toast, Displaying a Dialog Window and Notifications. Content Provider, Services, Broadcast receivers, accessing databases, sample applications, debugging and deploying app, publish in Playstore.

UNIT 3
OBJECTIVE C PROGRAMMING
9 Hrs.
Objective C - Data Types and Expressions, Decision Making and Looping, Objects and Classes, Property, Messaging, Categories and Extensions, Fast Enumeration - NSArray, NSDictionary, Methods and Selectors, Static & Dynamic objects, Exception handling, Memory management, Required Tools - Xcode, iOS Simulator, Instruments, ARC, frameworks.

UNIT 4
INTRODUCTION TO IOS
9 Hrs.
Introduction to iPhone, History, Versions, Features, MVC Architecture, View Controller - Building the UI and Event handling, Application life cycle, Tab Bars, Story Boards and Navigation Controllers, Table View, Push Notification, Database handling, Debugging and Deployment, Publishing app in Appstore, sample applications.

UNIT 5
WINDOWS MOBILE APP DEVELOPMENT
9 Hrs.
Introduction to Windows Phone 8, Application Life cycle, UI Designing and events, Building, Files and Storage, Network Communication, Push Notification, Background Agents, Maps and Locations, Data Access and storage, Introduction to silvelight and XAML, Running and Debugging the App, Deploying and Publishing.

Max. 45 Hours

TEXT / REFERENCE BOOKS

END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 100
Exam Duration : 3 Hrs.

PART A : 10 questions of 2 marks each - No choice
20 Marks

PART B : 2 questions from each unit of internal choice, each carrying 16 marks
80 Marks
SPH4051  ENGINEERING PHYSICS LAB

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COURSE OBJECTIVE

- To make the students to understand a broad range of experimental techniques and to enable them to demonstrate their ability to use the techniques in conducting scientific experiments and observations.

SUGGESTED LIST OF EXPERIMENTS: (Any Six)

1. Quincke’s method – Determination of magnetic susceptibility of a liquid.
2. Semiconductor diode - Determination of the forbidden energy gap.
4. Torsional pendulum – Determination of Moment of inertia and Rigidity modulus of the wire.
5. Young’s modulus – non-uniform bending- Determination of Young’s modulus of the material of beam.
7. Copper Voltameter – determination of electrochemical equivalent of copper.

SCY4051  ENGINEERING CHEMISTRY LAB

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COURSE OBJECTIVES

- To develop the skills for the estimation of various compounds
- To expose the students to handle the analytical equipments.

SUGGESTED LIST OF EXPERIMENTS

1. Estimation of ferrous ion by potentiometric method.
2. Determination of pK<sub>a</sub> value of glycine using pH meter.
3. Estimation of mixture of acids by conductometric method.
4. Estimation of Nickel by using photocolorimeter.
5. Determination of viscosity of polymers by using Ostwald’s viscometer.

TEXT / REFERENCE BOOKS

COURSE OBJECTIVE
- The student is expected to acquire the drafting proficiency depending on the operational function in order to perform the day to day activity.

FUNDAMENTALS

GEOMETRICAL CONSTRUCTIONS
- Dividing a given straight line into any number of equal parts – Bisecting a given angle – Trisecting a right angle – Drawing a regular pentagon and hexagon given one side – Conic sections – Construction of ellipse, parabola and hyperbola by Eccentricity method.

PROJECTION OF POINTS AND LINES
- Types of projection - Introduction to orthographic projection – Orthographic projection of points lying in four quadrants – Orthographic projection of lines in first quadrant – Parallel to both the planes – Perpendicular to one plane – Parallel to one plane and inclined to the other plane – Inclined to both the planes.

PROJECTION OF PLANES AND SOLIDS
- Projection of rectangular, square and circular planes - Orthographic projection of prisms, pyramids, cone and cylinder in first quadrant – Axis perpendicular to HP – Axis perpendicular to VP – Axis inclined to only one plane of projection – Change of position method only.

SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES
- Sectioning of prisms, pyramids, cylinder and cone in simple vertical positions with cutting planes perpendicular to one plane and parallel or inclined to other plane - Need for development of surfaces – Development of prisms, pyramids, cylindrical and conical surfaces.

ISOMETRIC PROJECTION AND ORTHOGRAPHIC PROJECTION
- Isometric scale – Isometric View and Isometric Projection of simple solids and combination of solids - Drawing orthographic views (plan, elevation and profile) of objects from their isometric views.

TEXT / REFERENCE BOOKS
4. SP 46: Engineering Drawing Practice for schools and colleges, Bureau of Indian Standards.

END SEMESTER EXAMINATION QUESTION PAPER PATTERN

By using mini drafter 100 Marks

Note: Only after submission of all drawing sheets prescribed by staff member, the students will be allowed for university practical examination.
Suggested List of Experiments

**Digital Systems Lab**

1. Verification of Boolean algebra
2. Verification of Logic Gates
3. Adder and Subtractor
4. Code Converter
5. Comparator
6. Parity generator and checker
7. Design and study of Multiplexer and Demultiplexer
8. Encoder and Decoder
9. Counter Design using flip-flop
10. Shift Register Design using flip-flop

**Electronic Devices & Digital Systems Lab**

1. Study of circuit components and equipments (Component identification, color coding, checking diode, BJT, FET, study of CRO, Audio Oscillator, Multimeter, LCR meter)
2. Characteristics of Semiconductor diode and Zener diode
3. Characteristics of CE configuration (h parameter determination)
4. Characteristics of CB configuration
5. Characteristics of JFET
6. Characteristics of CC configuration
7. Characteristics of SCR & UJT
8. Characteristics of Diac & Triac
9. Characteristics of MOSFET
10. Characteristics of Photo transistor
11. Characteristics of LDR
12. Switching Characteristic of BJT
13. Clippers and Clampers
14. Voltage multipliers

**Digital Circuits**

1. Verify the Basic gates / Boolean function using logic gates.
2. To Construct and verify the full and half adder using logic gates.
3. To Verify 2x4 Decoder and 4x2 Encoder functionally.
4. To construct and study the working of RS flip-flop, D flip-flop, T flip-flop, JK flip-flop
5. To verify various shift register
   (a) SISO
   (b) SIPO
   (c) PISO
   (d) PIPO
6. Design a counter using suitable flip-flop
   (a) MOD Counter
   (b) Ripple Counter
   (c) Up-Down Counter
SUGGESTED LIST OF EXPERIMENTS

MICROPROCESSOR- 8085
1. Programs using Arithmetic Operations.
2. Programs for Code Conversions.
3. Largest, Smallest and Sorting of an Array (8085).

MICROCONTROLLER- 8051
1. Data Transfer Programs
2. Programs using Logical Instructions.
3. Programs using Boolean Instructions.
4. Reading and Writing on a Parallel Port.
5. Stepper Motor Controller.
6. Timer in Different Modes.
7. Serial Communication Implementation.
### SUGGESTED LIST OF EXPERIMENTS

1. Program to understand the basic data types and input/output functions.
2. Program for Looping and decision statements.
3. Program on Functions.
4. Program on Arrays.
5. Program on String Manipulations.
6. Program on Structures and Union.
7. Program on Pointers.
8. Program to demonstrate the Command Line Arguments.
10. Program to implement the Random Access in Files.
11. Program to implement math function.
12. Program to Implement sorting algorithms
13. Program to Implement searching algorithms
14. Programs to solve some of the Engineering applications.

### SUGGESTED LIST OF EXPERIMENTS

1. Program to insert and delete an element from an array.
2. Program to sort the elements using insertion sort.
3. Program to sort the elements using quick sort.
4. Program to sort the elements using merge sort.
5. Program to implement operations on a Singly linked list.
6. Program to implement operations on a doubly linked list.
7. Program to implement a Stack using an array.
8. Program to implement a Stack using a Linked list.
9. Program to implement Queue using an array.
10. Program to implement Queue using a Linked list.
11. Program to convert an infix expression to postfix expression.
12. Program to implement display elements of a queue according to their priority.
SUGGESTED LIST OF EXPERIMENTS

1. Develop a C++ program to implement a class, object creation, member function invocation concept.
2. Develop a C++ program to implement the various constructors and destructor concept.
3. Develop a C++ program to implement a friend function, Inline function.
4. Develop a C++ program to implement an operator (Unary & Binary) overloading concept.
5. Develop a C++ program to implement a function overloading concept.
6. Develop a C++ program to implement a run time polymorphism.
7. Develop a C++ program to implement the following inheritance types.
   a. Single
   b. Multiple
   c. Multilevel
   d. Hierarchical
   e. Hybrid
8. Develop a C++ program to implement an Abstract class concept.
9. Develop a C++ program to implement a Virtual function.
10. Develop a C++ program to find the number of characters in a file.
11. Develop a C++ program to handle the exceptions.

Case Study
1. Categorization of living beings as humans, animals, birds, insects, etc., using inheritance.
2. Develop user defined manipulator for the following named
   a) Rupees for displaying Rs. and sets the precision to 2.
   b) Dollar for displaying $. 

SUGGESTED LIST OF EXPERIMENTS

1. Study experiment – Object Oriented Concepts
2. Study of UML diagrams – aim and scope of diagrams.
3. Study of CASE tools – ArgoUML, Rational ROSE, Altova UML
4. Practicing on the methods of identifying classes
   a. Understand – what is a class?
   b. Structure of Class – relate UML representation to programming
5. Understanding relationships
   a. Association
   b. Realization
   c. Generalization
   d. Aggregation
6. Practicing Class diagrams
   a. Designing Classes
      i. refining attributes and designing methods.
      ii. roles, multiplicity, qualifier.
   b. components
7. Identifying Use cases – scenario based approach
8. Understanding usecases
   a. identifying regular flow and alternative flow of events
   b. identifying constraints, pre and post conditions
9. Activity diagrams – components, understanding difference between flow chart and activity diagram.
10. Interaction diagrams – sequence diagrams, collaboration diagrams.
11. Deployment Diagram – scenarios of application.
   a. Student Information System
   b. Online Ticket Reservation system
   c. Employee Payroll system
   d. Online Banking Application
   e. ATM processing
   f. Stock Maintenance
   g. Library Management System
SUGGESTED LIST OF EXPERIMENTS
(Implement all the problems using UNIX System Calls)

1. Study of basic LINUX & vi Editor command
2. String and Numerical Handling Functions
3. Loop and Selection Constructs
4. File Handling Functions
5. Manipulate Date/Time/Calendar
6. Retrieve System information
9. Diner’s Philosopher Problem.
10. First Fit, Worst Fit, Best Fit allocation strategy.
11. Bankers Algorithm
12. Implement the producer consumer problem using Semaphore
13. Implement memory management Scheme

SUGGESTED LIST OF EXPERIMENTS

1. Data Definition Language (DDL)
2. Data Manipulation Language (DML)
3. Data Control Language (DCL)
4. Constraints and built-in Functions
5. Joins and Group-by Commands
6. PL/SQL Program using functions
7. PL/SQL Program to create Triggers
8. Consider any application and design using.
   a. Normalization
   b. Data Flow Diagram
   c. Entity-Relation Diagram
   d. Data Dictionary
   e. Table Structure
SUGGESTED LIST OF EXPERIMENTS

1. Implement Token Separation for a given expression using LEX.
2. Use LEX tool to implement Lexical Analyzer.
3. Use LEX and YACC to implement parser.
4. Use LEX and YACC tool to implement Desktop Calculator.
5. Construction of NFA from a regular expression.
6. Construction of DFA from a regular expression.
7. Implement Recursive Descent Parser algorithm.
8. Implement Shift Reduce Parser algorithm.
9. Implement the backend of the compiler to produce three address code.
10. Implement Symbol Table management.
11. Construct a simple compiler.

SUGGESTED LIST OF EXPERIMENTS

1. Creation of Date Server, and also print the client's address on the Server.
2. Creation of UDP Server.
3. Creation of Chat Program.
5. Program to implement HTTP Protocol.
6. Creation of Mail Client.
7. Creation of Web Server.
9. Implement FTP using TCP.
10. WiFi Simulation.
11. WiTotal Simulation.
12. Router Configuration.
1. Create a web page using HTML frames, Tables, ordered and unordered list.

2. Develop client side form validation using Jquery.

3. Create following web control using Google Web Tool Kit
   a. Checkbox
   b. Radio Button
   c. Basic Button
   d. Hyperlink

4. Create program to retrieve the Customer information using JSON & PHP

5. Creating and consuming a web service using .NET Platform

6. Implementing Semantic Elements in HTML5
   a. <article>
   b. <figure>
   c. <footer>
   d. <header>
   e. <nav>

7. Create a program to retrieve Customer informations using JSON & PHP

8. Perform BIOS troubleshooting for clearing I/O devices

9. Develop an application to fetch information from a database with AJAX

10. Implementing Semantic Elements in HTML5
   Using <article>, <figure>, <footer>, <header> and <nav>
COURSE OBJECTIVES

- To learn Object Oriented Programming concept using Java.
- To learn the essentials of the Java Class Library.
- To develop event driven graphical user Interface programming using OOP methodology.

The course covers both theoretical and practical aspects. Marks split-up for the subject is 50% Theory and 50% Practical. Award of marks for Theory section is based on the Continuous Internal Assessments and for the Laboratory section practical examination will be conducted as per the regular University norms.

The following topics are to be covered for effective coverage of the course objective:


OUTCOME

- Develop Java programs on Object Oriented Programming Concepts
- Use GUI for developing customer friendly applications
- To connect Java with different Databases
- Handling networking concepts using Java classes for networking
- Usage of utility classes

Max. 45 Hours

TEXT / REFERENCE BOOKS

2. http://docs.oracle.com/javase/tutorial/
SUGGESTED LIST OF EXPERIMENTS

1. Develop a static page using any 10 basic HTML elements.[Tags – Heading, Table, Marquee, Image, Style elements, etc.,]

2. Develop static pages (using Only HTML) of an online Book store. The website should contain the following pages.
   a. Home page
   b. Registration and user Login
   c. User Profile Page
   d. Books catalog
   e. Shopping Cart
   f. Payment By credit card
   g. Order Conformation

3. Mapping image on client & server side

4. Add a Cascading Style sheet (All types) for designing the web page.

5. Validate the Registration, user login, user profile and payment by credit card pages using JavaScript.

6. Create and save an XML document at the server, which contains users information. Write a program, which takes User Id as an input and returns the user details by taking the user information from the XML document.

7. Extracting contents of the XML document using CSS,XSLT,DOM parser

8. Simple applications using XQuery

9. Using ActiveX Components in server side scripting.

10. Create dynamic pages with database and server side scripting for any application

11. Programs using AJAX

12. Programs using Maps

13. Creation of Distributed Application using RMI

14. Usage of Cookie

15. Session Tracking using Servlets/JSP

16. Accessing Database in a Servlet/JSP

17. Database to Swing to Servlet/JSP communication
SUGGESTED LIST OF EXPERIMENTS

1. Study on Basics of Cloud computer and its Resources
2. Study about Google Apps and Microsoft Azure
3. Building a simple cloud application using Google App Engine and Microsoft Azure
4. Hosting cloud application using Google App Engine and Microsoft Azure
5. Setup a Private Cloud Using OpenStack or Eucalyptus. Develop simple applications and make it available to the intended user.
6. Install and configure OpenStack Object Storage - Swift in Ubuntu. Consider a huge storage requirements and store it in the cloud in a transparent manner.
7. Install and configure OpenStack Nova Compute. Enable a connected user to get a virtual machine of a selected performance such as CPU, Memory.
8. Implementation of Map Reduce Job processing for clients request.
9. Designing SOA Application from System Description.
10. Exploring and trouble shooting a public cloud.
11. Implementation of virtual machines, and be able to list some of their configuration options in relation to the host server

SUGGESTED LIST OF EXPERIMENTS

1. Design a drop-down list or a menu in a GUI keeping in view the serial position effect
2. Design of a Mobile Keypad focusing on size, layout and devilling (a minimum of two different layouts)
3. Design of different icons in Graphical user Interface (a minimum of four different icons)
4. Design UI screens for the elderly people with unsteady hands keeping in view the mouse sensitivity
5. Design a menu structure for ordering house-hold items from a mall directly to your home through a mobile phone interface. Categorize the items into menus and submenus. (make use of Hick’s Law)
6. Design a UI for ATM Interface
7. Design a prototype of a TV remote Control Panel
8. Design a UI prototype of an Automatic vending machine for Drinks
9. Design a Mobile Interface for a Mall Map
10. Design a Mobile Interface screens for railway enquiry system
11. Design a Web Interface for Online banking system
12. Design a Web Interface for a University website
SUGGESTED LIST OF EXPERIMENTS

1. To implement mobile application life cycle methods.
2. To implement simple calculator application.
3. To implement simple SMS application.
4. To implement authentication verification application without and with database.
5. To implement navigation application with multiple pages / activities.
6. To implement student placement registration form with database.
7. To implement a simple notification application.
8. To implement simple intent with data passing application.
9. To implement simple profile changer application through SMS.
10. To create mobile web browser application.
11. To create mobile e-mail application to sent a mail.
12. Mini project.

Note:

- Above applications have to be created and deployed in Android OS, iPhone OS, and Windows Phone OS.
- Environment Required: Android SDK in Linux Environment, Windows Phone OS SDK and iMac OS with Xcode and Objective C.
COURSE OBJECTIVES

- To understand the way to measure one or more qualities of an algorithm or a system
- To gain knowledge of the linguistics concerned with the interactions between computers and human.

UNIT 1  INTRODUCTION
An outline of English syntax - Grammars and parsing - Features and Augmented Grammar.

UNIT 2  SYNTACTIC PROCESSING
Grammar for natural language - Toward efficient parsing - Ambiguity resolution - Statistical Methods

UNIT 3  SEMANTIC INTERPRETATION
Semantic and logical form - Linking syntax and semantics - Ambiguity resolution - Other strategies for semantic interpretation - Scoping for interpretation of noun phrases.

UNIT 4  CONTEXT AND WORLD KNOWLEDGE
Knowledge representation and reasoning - Local discourse context and reference.

UNIT 5  WORLD KNOWLEDGE AND SPOKEN LANGUAGE
Using world knowledge - Discourse structure - Defining conversational agent - An introduction to logic model - Theoretic semantics - Symbolic computation - Speech recognition and spoken Language.

Max. 45 Hours

TEXT / REFERENCE BOOKS

END SEMESTER EXAM QUESTION PAPER PATTERN
Max. Marks : 100
Exam Duration : 3 Hrs.
PART A : 10 questions of 2 marks each - No choice 20 Marks
PART B : 2 questions from each unit with internal choice, each carrying 12 marks 80 Marks
COURSE OBJECTIVE

- To familiarize the students with the fundamentals of designing, design methodologies, architectural design and structural design.

UNIT 1 INTRODUCTION TO DESIGN 9 Hrs.

UNIT 2 DESIGN FUNDAMENTALS 9 Hrs.

UNIT 3 DESIGN METHODOLOGIES 9 Hrs.

UNIT 4 ARCHITECTURAL DESIGN 9 Hrs.

UNIT 5 IMPLEMENTATION, DEPLOYMENT AND MAINTENANCE 9 Hrs.

Max. 45 Hours

TEXT / REFERENCE BOOKS


END SEMESTER EXAM QUESTION PAPER PATTERN

Max Marks : 80  Exam Duration : 3 Hrs.
PART A : 10 questions of 2 marks each- No choice  20 Marks
PART B : 2 questions from each unit with internal choice, each carrying 12 marks  80 Marks
COURSE OBJECTIVES

- To understand the concept of software project management, Evaluation and planning.
- To gain an insight on the monitoring and control framework.
- To learn how to manage people and teams.

UNIT 1 INTRODUCTION TO SOFTWARE PROJECT MANAGEMENT 9 Hrs.
Project Definition - Contract Management - Activities Covered By Software Project Management - Overview Of Project Planning - Stepwise Project Planning.

UNIT 2 PROJECT EVALUATION 9 Hrs.

UNIT 3 ACTIVITY PLANNING 9 Hrs.

UNIT 4 MONITORING AND CONTROL 9 Hrs.

UNIT 5 MANAGING PEOPLE AND ORGANIZING TEAMS 9 Hrs.

Max. 45 Hours

TEXT / REFERENCE BOOKS

END SEMESTER EXAM QUESTION PAPER PATTERN

Max Marks : 80
Exam Duration : 3 Hrs.

PART A : 10 questions of 2 marks each - No choice 20 Marks
PART B : 2 questions from each unit with internal choice, each carrying 12 marks 80 Marks
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**COURSE OBJECTIVES**
- An ability to understand basic concepts of software architecture and styles
- To understand difference between software architecture and software design
- To develop ability to understand design patterns and their application
- To understand utilization of formal models to build software projects
- To understand the use of various Architecture Description Languages and their applications

**UNIT 1 SOFTWARE PROCESS AND THE ROLE OF MODELING AND ANALYSIS** 9 Hrs.
Analysis modeling and best practices, process, process modeling; process notations - traditional best practice diagrams such as DFDs and ERDs.

**UNIT 2 ARCHITECTURAL MODELING** 9 Hrs.
UML diagrams, Structural static modeling, behavioural modeling - interactions - use cases - use case, interaction & Activity diagrams. Component and deployment diagrams - analysis case studies, analysis patterns.

**UNIT 3 SOFTWARE ARCHITECTURE DESIGN** 9 Hrs.

**UNIT 4 SOFTWARE ARCHITECTURE** 9 Hrs.
Architectural styles, architectural patterns, patterns and software architecture, analysis of architectures, formal descriptions of software architectures.

**UNIT 5 ARCHITECTURAL DESCRIPTION LANGUAGES ADL AND TOOLS** 9 Hrs.
Requirements of Architecture - Description languages, Tools for Architectural design, scalability and interoperability issues, Web application architectures, case studies.

Max. 45 Hours

**TEXT / REFERENCE BOOKS**

**END SEMESTER EXAM QUESTION PAPER PATTERN**
Max Marks : 80
Exam Duration : 3 Hrs.

**PART A**
- 10 questions of 2 marks each- No choice 20 Marks

**PART B**
- 2 questions from each unit with internal choice, each carrying 12 marks 80 Marks
### COURSE OBJECTIVES
- To understand various design patterns.
- To apply design patterns to software design.
- To understand pattern oriented software architecture

### UNIT 1  INTRODUCTION TO DESIGN PATTERN AND DESIGNING DOCUMENT EDITOR  9 Hrs.
Introduction-Design Pattern-Smalltalk MVC- Describing Design Patterns- The Catalog -Organizing the Catalog- Pattern Solve Design Problems - Select a Design Pattern - Use Design Pattern - Design Problems- What makes a pattern? - Pattern Categories - Relationship between Patterns - Patterns and Software Architecture

### UNIT 2  DESIGN PATTERNS USING PATTERN ORIENTED SOFTWARE ARCHITECTURE  9 Hrs.

### UNIT 3  CREATIONAL PATTERNS & STRUCTURAL PATTERNS  9 Hrs.
Abstract Factory-Builder-Factory Method-Prototype-Singleton- Discussion of Creational Patterns - Structural Patterns - Adapter-Bridge-Composite-Decorator-Facade-Flyweight-Proxy- Discussion of Structural Patterns.

### UNIT 4  BEHAVIORAL PATTERNS  9 Hrs.
Chain of Responsibility-Command-Interpreter-Iterator-Mediator-Memento-Observer-Strategy-Template Method-Visitor- Discussion of Behavioral Patterns

### UNIT 5  BEHAVIORAL PATTERNS AND EXPECTATIONS  9 Hrs.
State - Conclusion - The Pattern Community-An Invitation-A Parting Thought.

### TEXT / REFERENCE BOOKS
4. Frank Bachmann, Regine Meunier, Hans Rohnert “Pattern Oriented Software Architecture” - Volume 1, 1996.

### END SEMESTER EXAM QUESTION PAPER PATTERN
- Max Marks : 80
- Exam Duration : 3 Hrs.
- PART A : 10 questions of 2 marks each- No choice 20 Marks
- PART B : 2 questions from each unit with internal choice, each carrying 12 marks 80 Marks
SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY
FACULTY OF COMPUTING

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COURSE OBJECTIVES
- To understand the software quality models.
- To gain knowledge on the various quality and defect analysis tools.
- To understand quality control and management.
- A brief study of the various quality standards.

UNIT 1   INTRODUCTION TO SOFTWARE QUALITY  
Software Quality - Hierarchical models of Boehm and McCall - Quality measurement - Metrics measurement and analysis - Gilb’s approach - GQM Model.

UNIT 2   SOFTWARE QUALITY ASSURANCE  

UNIT 3   QUALITY CONTROL  
Ishikawa’s basic tools - CASE tools - Defect prevention and removal - Defect Classes - Defect Analysis.

UNIT 4   QUALITY MANAGEMENT SYSTEM  
Elements of QMS - Rayleigh model framework - Reliability Growth models for QMS - Complexity metrics and models - Customer satisfaction analysis.

UNIT 5   QUALITY STANDARDS  

Max. 45 Hours

TEXT / REFERENCE BOOKS
6. ISO 9000-3 “Notes for the application of the ISO 9001 Standard to software development”.w

END SEMESTER EXAM QUESTION PAPER PATTERN
Max Marks : 80
Exam Duration : 3 Hrs.
PART A : 10 questions of 2 marks each - No choice 20 Marks
PART B : 2 questions from each unit with internal choice, each carrying 12 marks 80 Marks
COURSE OBJECTIVES
- To understand the need for modelling.
- To design software projects using UML diagrams.
- To understand the different OO Modelling techniques.
- To understand the difference between design and architecture.

UNIT 1 INTRODUCTION
9 Hrs.

UNIT 2 BASIC AND ADVANCED STRUCTURAL MODELING
9 Hrs.
Terms and Concepts - Common modeling techniques for diagrams - Class diagram Advanced classes - Advanced relationships - Interfaces - Types and roles.

UNIT 3 ADVANCED STRUCTURAL MODELING AND BASIC BEHAVIORAL MODELING
9 Hrs.
Modeling techniques for packages - Instances - Object diagrams - Interactions - Use cases - Use case diagrams - Interaction diagrams - Activity diagrams.

UNIT 4 ADVANCED BEHAVIORAL MODELING
9 Hrs.
Terms and concepts - Common modeling techniques for events and signals - State machines - Processes and threads - Time and space - State chart diagrams

UNIT 5 ARCHITECTURAL MODELING
9 Hrs.
Terms and concepts - Common modeling techniques for components - Deployment - Collaborations - Patterns and frameworks - Component diagrams - Deployment diagrams - Systems and models - Applying the UML

Max. 45 Hours

TEXT / REFERENCE BOOKS

END SEMESTER EXAM QUESTION PAPER PATTERN

Max Marks : 80
Exam Duration : 3 Hrs.
PART A : 10 questions of 2 marks each - No choice 20 Marks
PART B : 2 questions from each unit with internal choice, each carrying 12 marks 80 Marks
COURSE OBJECTIVES

- To understand the software quality assurance framework.
- To understand the software testing strategy and environment.
- To familiarize with the various software testing techniques and tools

UNIT 1 SOFTWARE QUALITY STANDARD


UNIT 2 QUALITY MEASUREMENT AND METRICS


Software Quality metrics methodology: Establish quality requirements, Identify Software quality metrics, Implement the software quality metrics, analyze software metrics results, validate the software quality metrics - Software quality indicators - Fundamentals in Measurement theory.

UNIT 3 SOFTWARE TESTINGS STRATEGIES

Software Testing Strategy and Environment: Establishing testing policy, structured approach to testing, test factors, Economics of System Development Life Cycle (SDLC) Testing

Software Testing Methodology: Defects, verification and validation, functional and structural testing, workbench concept, eight considerations in developing testing methodologies, testing tactics checklist

UNIT 4 SOFTWARE TESTING TECHNIQUES

Software Testing Techniques: Black-Box, Boundary value, Bottom-up, Branch coverage, Cause-Effect graphing, CRUD, Database, Exception, Gray-Box, Histograms, Inspections, JADs, Pareto Analysis, Prototyping, Random Testing, Risk-based Testing, Regression Testing, Structured Walkthroughs, Thread Testing, Performance Testing, White-Box Testing

UNIT 5 SOFTWARE TESTING TOOLS


Max. 45 Hours

TEXT / REFERENCE BOOKS


END SEMESTER EXAM QUESTION PAPER PATTERN

Max Marks : 80
Exam Duration : 3 Hrs.
PART A : 10 questions of 2 marks each: No choice 20 Marks
PART B : 2 questions from each unit with internal choice, each carrying 12 marks 80 Marks
COURSE OBJECTIVES

- To understand the advantage of distributed database
- To know the design issues involved in distributed database.
- To understand distributed concurrency control techniques.

UNIT 1  INTRODUCTION TO DISTRIBUTED DATABASE  9 Hrs.

UNIT 2  QUERIES AND OPTIMIZATION  9 Hrs.

UNIT 3  MANAGEMENT OF DISTRIBUTED TRANSACTIONS  9 Hrs.

UNIT 4  RELIABILITY AND PROTECTION  9 Hrs.
Reliability- Basic Concepts- Reliability and concurrency Control- Determining a Consistent View of the Network- Detection and Resolution of Inconsistency- Checkpoints and Cold Restart- Distributed Database Administration- Catalog Management in Distributed Databases- Authorization and Protection

UNIT 5  DATABASE INTEGRATION AND MANAGEMENT  9 Hrs.

Max. 45 Hours

TEXT / REFERENCE BOOKS
1. Distributed Database Principles & Systems, Stefano Ceri, Giuseppe Pelagatti, McGraw-Hill

END SEMESTER EXAM QUESTION PAPER PATTERN
Max. Marks : 100
Exam Duration : 3 Hrs.
PART A : 10 questions of 2 marks each- No choice 20 Marks
PART B : 2 questions from each unit of internal choice, each carrying 16 marks 80 Marks
COURSE OBJECTIVES
- To initiate and develop the knowledge and skills required to develop business software Applications.
- Hands-on experience with the Oracle family of databases, and define, design, and implement databases.
- Students learn how to use object-oriented technologies to design relational databases, and how to design relational databases to support object-oriented applications.

UNIT 1  INTRODUCTION  9 Hrs.

UNIT 2  PARALLEL DBMS  9 Hrs.

UNIT 3  DATABASE CONCEPTS  8 Hrs.
Active Database Concepts and Triggers - Temporal Databases - Spatial Databases - Deductive Databases - XML Databases: XML Data Model - Geographic Information Systems - Genome Data Management.

UNIT 4  OBJECT & MULTIMEDIA DATABASE SYSTEMS  9 Hrs.
Object Databases - Advantages and disadvantages compared to Relational Databases - Abstract data types, Objects identity and reference types-Inheritance Database design for ORDBMS ODMG data model and ODL OQL. MULTIMEDIA DATABASES: Nature of Multimedia data and applications Data management issues - Components of Multimedia database management system.

UNIT 5  BIG DATA & HADOOP  10 Hrs.

Max. 45 Hours

TEXT / REFERENCE BOOKS
5. O'Reilly, “ Hadoop - The Definitive Guide “,O'Reilly Media

END SEMESTER EXAM QUESTION PAPER PATTERN
Max. Marks : 100
Exam Duration : 3 Hrs.
PART A : 10 questions of 2 marks each- No choice 20 Marks
PART B : 2 Questions from each unit with internal choice, each carrying 12 marks 80 Marks
COURSE OBJECTIVES

- Understand the fundamentals of next generation computer networks
- Understand the principles of network security
- Understand the issues of wireless networking, current standards, and new application areas

UNIT 1 INTRODUCTION


UNIT 2 LAYER 2 AND LAYER 3 VPN

Layer 2 Internetworking, VPN Service, Provisioning-Benefits of L2VPN, Inter-AS L2VPN, Supported IETF Standards- Technology Overview-Intranet Corporate-Internet Access-Scaling MPLS VPNs to Multi-AS, Multi-Provider, and Hierarchical Networks-Heterogeneous Networks-Managed Central Services

UNIT 3 WIRE LINE & WIRELESS NETWORKS


UNIT 4 MULTISERVICE NETWORKS


UNIT 5 NETWORK SECURITY

Network security at various layers. Secure- HTTP, SSL, ESP, Authentication header, Key distribution protocols. Digital signatures, digital certificates

Max. 45 Hours

TEXT/REFERENCE BOOKS


END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 100

Exam Duration : 3 Hrs.

PART A : 10 questions of 2 marks each- No choice

PART B : 2 Questions from each unit with internal choice, each carrying 12 marks
COURSE OBJECTIVE

- To understand the principle components like fuzzy logic, neural networks and genetic algorithm

UNIT 1    NEURAL NETWORKS  9 HRS.


UNIT 2    FUZZY LOGIC  9 Hrs.

Fuzzy sets - Fuzzy rules and fuzzy reasoning - Fuzzy inference system - Mamdani fuzzy model - Sugeno fuzzy model - Tsukamoto fuzzy model.

UNIT 3    NEURO FUZZY  9 Hrs.


UNIT 4    GENETIC ALGORITHM  9 Hrs.

Introduction - Implementation of GA - Reproduction - Crossover - Mutation - Coding - Fitness scaling - Application of GA.

UNIT 5    ARTIFICIAL INTELLIGENCE  9 Hrs.

Introduction - Searching techniques - First order Logic - Forward reasoning - Backward reasoning - Semantic - Frames.

Max. 45 Hours

TEXT / REFERENCE BOOKS


END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 100

Exam Duration : 3 Hrs.

PART A : 10 questions of 2 marks each- No choice  20 Marks
PART B : 2 Questions from each unit with internal choice, each carrying 12 marks  80 Marks
SCS1617  WIRELESS SENSOR NETWORKS  |  L  |  T  |  P  |  Credits  |  Total Marks  
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COURSE OBJECTIVES
- To understand the challenges of developing operating systems, wireless networking
- Students will learn to design and implement a wireless sensor network system using motes (small devices that integrate a microcontroller and an 802.15.4 radio) or mobile phones

UNIT 1  OVERVIEW OF WIRELESS SENSOR NETWORKS  |  9 Hrs.

UNIT 2  ARCHITECTURES  |  9 Hrs.

UNIT 3  NETWORKING SENSORS  |  9 Hrs.

UNIT 4  INFRASTRUCTURE ESTABLISHMENT & NETWORK BOOTSTRAPING  |  9 Hrs.
Sensor deployment mechanisms - Issues of coverage - Node discovery protocols - Localization schemes - Network clustering.

UNIT 5  DEPENDABILITY ISSUES  |  9 Hrs.
Security Challenges - Threat and attack models - Quality of service provisioning - Clock synchronization - Supporting fault tolerant operation.

MAX. 45 Hours

TEXT / REFERENCE BOOKS

END SEMESTER EXAM QUESTION PAPER PATTERN
Max. Marks : 100
PART A : 10 questions of 2 marks each- No choice  |  20 Marks
PART B : 2 Questions from each unit with internal choice, each carrying 12 marks |  80 Marks

Exam Duration : 3 Hrs.
COURSE OBJECTIVES

- To introduce the architecture of the Unix Operating System.
- To study system boot and the Init process.
- To study IPC mechanisms

UNIT 1 SYSTEM ARCHITECTURE AND ADMINISTRATION 9 Hrs.
General review of the system - History - System structure - User perspective - Operating system services - Assumptions about hardware - Introduction to the kernel - Architecture system concepts - Data structures - System administration.

UNIT 2 BUFFER CACHE AND DISK BLOCKS 9 Hrs.
The buffer cache - Headers - Buffer pool - Buffer retrieval - Reading and writing disk blocks - Advantages and disadvantages - Internal representation of files - Inodes - Structure - Directories - Path name to Inode - Super block - Inode assignment - Allocation of disk blocks - Other file types.

UNIT 3 FILE SYSTEMS 9 Hrs.
System calls for the file system - Open - Read - Write - Lseek - Close - Create - Special files creation - Change directory and change root - Change owner and change mode - Stat - Fstat - Pipes - Dup - Mount - Unmount - Link - Unlink - File system abstraction - Maintenance.

UNIT 4 PROCESS CONTROL 9 Hrs.
The system representation of processes - States - Transitions - System memory - Context of a process - Saving the context - Manipulation of a process address space - Sleep process control - signals - Process termination - Awaiting - Invoking other programs - The Shell - system Boot and the INIT process.

UNIT 5 MEMORY MANAGEMENT 9 Hrs.
Memory management policies - Swapping - Demand paging - A Hybrid System - I/O subsystem - Driver interfaces - Disk drivers - Terminal drivers.

Max. 45 Hours

TEXT / REFERENCE BOOKS

END SEMESTER EXAM QUESTION PAPER PATTERN
Max. Marks : 100
Exam Duration : 3 Hrs.
PART A : 10 questions of 2 marks each - No choice - 20 Marks
PART B : 2 questions from each unit with internal choice, each carrying 12 marks 80 Marks
COURSE OBJECTIVES

- How to integrate knowledge from different business functions to create a business plan
- The process for developing large scale enterprise applications
- How to hone their critical thinking and presentation skills by developing the business plan and presenting their work to a professional audience

UNIT 1
XML
9 Hrs.

UNIT 2
AJAX
9 Hrs.
Javascript Fundamentals - Evolution of AJAX - AJAX framework - Web applications using AJAX - AJAX with JSP, PHP, ASP.NET and Database.

UNIT 3
ENTERPRISE JAVA BEANS
9 Hrs.

UNIT 4
MODEL VIEW CONTROLLER FRAMEWORK
9 Hrs.

UNIT 5
OBJECTION / RELATIONAL MAPPING
9 Hrs.

Max. 45 Hours

TEXT / REFERENCE BOOKS

END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 100
Exam Duration : 3 Hrs.
PART A : 10 questions of 2 marks each - No choice - 20 Marks
PART B : 2 questions from each unit with internal choice, each carrying 12 marks 80 Marks
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COURSE OBJECTIVES

- To provide the student with knowledge and skills about a new trend in computing.
- Creating a ubiquitous environment that combines processors, RFID’s & sensors with network technologies.
- To make the students learn about intelligent software to create a congenial environment.

UNIT 1 INTRODUCTION

Pervasive Computing - Principles, Characteristics - interaction transparency, context aware, automated experience capture. Architecture for pervasive computing - Pervasive devices - embedded controls - smart sensors and actuators - Context communication and access services

UNIT 2 PROTOCOLS

Open protocols - Service discovery technologies - SDP, Jini, SLP, UpnP protocols - datasynchronization - SyncML framework - Context aware mobile services - Context aware sensor networks, addressing and communications - Context aware security.

UNIT 3 TECHNOLOGIES


UNIT 4 ARCHITECTURE


UNIT 5 EXAMPLES


Max. 45 Hours

TEXT / REFERENCE BOOKS


END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 100
Exam Duration : 3 Hrs.
PART A : 10 questions of 2 marks each - No choice - 20 Marks
PART B : 2 questions from each unit with internal choice, each carrying 12 marks 80 Marks
COURSE OBJECTIVES

- OS-level and language-level virtual machines.
- Virtual networking, Virtual machine mobility, Virtualization for cloud and grid computing, Virtualization for distributed system security.
- Virtualization for autonomic service provisioning and power management.

UNIT 1 OVERVIEW OF VIRTUALIZATION 8 Hrs.

UNIT 2 SERVER CONSOLIDATION 8 Hrs.
Hardware Virtualization - Virtual Hardware Overview - Server Virtualization - Physical and Logical Partitioning - Types of Server Virtualization - Business cases for Server Virtualization - Uses of Virtual server Consolidation - Planning for Development - Selecting server Virtualization Platform

UNIT 3 NETWORK VIRTUALIZATION 10 Hrs.

UNIT 4 VIRTUALIZING STORAGE 10 Hrs.

UNIT 5 VIRTUAL MACHINES PRODUCTS 9 Hrs.

Max. 45 Hours

TEXT / REFERENCE BOOKS
2. Chris Wolf, Erick M. Halter, Virtualization: From the Desktop to the Enterprise, APress 2005

END SEMESTER EXAM QUESTION PAPER PATTERN
Max. Marks : 100
Exam Duration : 3 Hrs.
PART A: 10 questions of 2 marks each - No choice - 20 Marks
PART B: 2 Questions from each unit with internal choice, each carrying 12 marks 80 Marks
COURSE OBJECTIVES

- Understand controls in windows applications and delegates, Events
- Generics
- Understand data access with .Net.
- Understand web services.

UNIT 1 INTRODUCTION
Overview of .NET - Advantages of .NET over the other languages - Overview of .NET binaries - Intermediate Language - Metadata - .NET Namespaces - Common language runtime - Common type system - Common language specification - C# fundamentals - C# class - object - string formatting - Types - scope - Constants - C# iteration - Control flow - Operators - Array - String - Enumerations - Structures - Custom namespaces

UNIT 2 ASSEMBLIES
Assemblies - Versioning - Attributes - Reflection - Viewing metadata - Type discovery - Reflecting on a type - Marshaling - Remoting - Understanding server object types - Specifying a server with an interface - Building a server - Building the client - Exception handling - Garbage collector.

UNIT 3 INTERFACE AND COLLECTIONS
Object oriented programming concepts - Class - Encapsulation - Inheritance - Polymorphic - Casting .Interfaces and collections - Enumerator - Clonable objects - Comparable objects - Collections - Indexes - Delegates - Events - Multithreaded programming.

UNIT 4 WINDOWS FORM CONTROLS AND IO NAME SPACE

UNIT 5 ADO.NET AND ASP .NET
Introduction to ADO .NET - Building data table - Data view - Data set - Data relations - ADO.NET managed Providers - OleDb managed provider - SQL. Web development and ASP.NET - Web applications and web servers - HTML form development - Client side scripting - GET and POST - ASP.NET application - ASP.NET namespaces - creating sample C# web Applications. Understanding Web Security - Windows authentication - Forms authentication - Web services - Web services - Web service clients - The City View application.

Max. 45 Hours

TEXT / REFERENCE BOOKS

END SEMESTER EXAM QUESTION PAPER PATTERN
Max. Marks : 100
Exam Duration : 3 Hrs.
PART A : 10 questions of 2 marks each - No choice - 20 Marks
PART B : 2 questions from each unit with internal choice, each carrying 12 marks 80 Marks
COURSE OBJECTIVES

- To understand the dominant software systems and algorithms for coping with Big Data.
- Apply appropriate analytic techniques and tools to analyze big data, create statistical models, and identify insights that can lead to actionable results.
- To explore the ethical implications of big data research, and particularly as they relate to the web.

UNIT 1 INTRODUCTION

UNIT 2 HDFS, HADOOP AND HADOOP INFRASTRUCTURE

UNIT 3 HADOOP MAP REDUCE FRAMEWORK
Relationship between MapReduce and HDFS - Relationship between MapReduce and HDFS - Clients, Data Nodes, and HDFS Storage - MapReduce workloads.

Hadoop framework - Hadoop data types - Hadoop map reduce Paradigm - Map and Reduce Tasks - Map reduce Execution framework - Partitioners and Combiners - Input formats (Input Splits and Records, Text Input, Binary Input, Multiple Inputs)- Output Formats (TextOutput, BinaryOutPut, Multiple Output)- Hadoop Mapreduce programming - Advanced Map reduce concepts - Counters, Custom Writables - Unit testing framework - Error Handling - Tuning - Advanced Map reduce.

UNIT 4 HADOOP IMPLEMENTATION AND HADOOP ECO SYSTEM TOOLS
Hadoop Implementation - · Job Execution - · Hadoop Data Types - · Job Configurations - · Input and Output Formats
ECO system tools - Pig's Data Model, Pig Latin, Developing & Testing Pig Latin Scripts - Writing Evaluation, Filter, Load & Store Functions - Hive - Hive Architecture - Comparison with Traditional Database - HiveQL: Data Types, Operators and Functions - Hive Tables - Querying Data - Advance Hive, NoSQL Databases - HBase - Loading Data in Hbase - Querying Data in Hbase

UNIT 5 HADOOP PROJECT ENVIRONMENT
HBase: Introduction to HBase, Client API's and their features, Available Client, HBase Architecture, MapReduce Integration. HBase: Advanced Usage, Schema Design, Advance Indexing, Coprocessors, Hadoop 2.0-MRv2 - YARN - NameNode High Availability, HDFS Federation, MRv2, YARN, Running MRv1 in YARN, Upgrade your existing MRv1 code to MRv2, Programming in YARN framework-cover Apache Oozie Workflow Scheduler for Hadoop

Max. 45 Hours

TEXT / REFERENCES BOOKS

END SEMESTER EXAM QUESTION PAPER PATTERN
Max. Marks : 100
Exam Duration: 3 Hrs.
PART A: 10 questions of 2 marks each - No choice 20 Marks
PART B : 2 Questions from each unit with internal choice, each carrying 12 marks 80 Marks
COURSE OBJECTIVES

- Students will be provided with an up-to-date survey of developments in High Speed Networks.
- Enable the students to know techniques involved to support real-time traffic and congestion control.
- Students will be provided with different levels of quality of service (QoS) to different applications.

UNIT 1 HIGH SPEED NETWORKS 9 Hrs.

UNIT 2 CONGESTION AND TRAFFIC MANAGEMENT

UNIT 3 TCP AND ATM CONGESTION CONTROL 9 Hrs.

UNIT 4 INTEGRATED AND DIFFERENTIATED SERVICES 9 Hrs.

UNIT 5 PROTOCOLS FOR QOS SUPPORT 9 Hrs.

Max.45 Hours

TEXT / REFERENCE BOOKS

END SEMESTER EXAM QUESTION PAPER PATTERN
Max. Marks : 100
Exam Duration: 3 Hrs.
PART A : 10 questions of 2 marks each - No choice - 20 Marks
PART B : 2 questions from each unit with internal choice, each carrying 12 marks 80 Marks
SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY
FACULTY OF COMPUTING

COURSE OBJECTIVES
- To study about existing green computing strategies
- Fundamental challenges in achieving green operations of computing units
- Assess enterprise-wide and personal computing and computing related energy consumption.

UNIT 1 GREEN COMPUTING FUNDAMENTALS 9 Hrs.

UNIT 2 GREEN ASSETS AND MODELING 9 Hrs.

UNIT 3 GRID FRAMEWORK 9 Hrs.
Virtualizing of IT systems - Role of electric utilities, telecommuting, teleconferencing and teleporting - Materials recycling - Best ways for green PC - Green data center - Green grid framework.

UNIT 4 GREEN COMPLIANCE 9 Hrs.

UNIT 5 CASE STUDIES 9 Hrs.
The Environmentally Responsible Business Strategies (ERBS) - Case study scenarios for trial runs - Case studies - Applying green IT strategies and applications to a home, hospital, packaging industry and telecom sector.

Max. 45 Hours

TEXT / REFERENCE BOOKS

END SEMESTER EXAM QUESTION PAPER PATTERN

Max Marks : 80
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PART A : 10 questions of 2 marks each - No choice - 20 Marks
PART B : 2 questions from each unit with internal choice, each carrying 12 marks 80 Marks

B.E. / B. Tech REGULAR 95 REGULATIONS 2015
COURSE OBJECTIVES

- To provide introductions to event driven programming, game engine scripting, game engine class structures.
- Learning to plan and to report on a significant programming project.
- Learn to work in programming in teams, and learn to use standard game development environments, in particular the Unity3d development platform.

UNIT 1 3D GRAPHICS FOR GAME PROGRAMMING 9 Hrs.

UNIT 2 GAME DESIGN PRINCIPLES 9 Hrs.
Character development, Story Teling, Naration, Game Balancing, Core mechanics, Principles of level design, Genres of Games, Colision Detection, Game Logic, Game AI, Path Finding.

UNIT 3 GAMING ENGINE DESIGN 9 Hrs.
Renderers, Software Rendering, Hardware Rendering, and Controler based animation, Spatial Sorting, Level of detail, colision detection, standard objects, and physics

UNIT 4 GAMING PLATFORMS AND FRAMEWORKS 9 Hrs.
Flash, DirectX, OpenGL, Java, Python, XNA with Visual Studio, Mobile Gaming for the Android, iOS, Game engines - Adventure Game Studio, DXStudio, Unity.

UNIT 5 GAME DEVELOPMENT 9 Hrs.
Developing 2D and 3D interactive games using OpenGL, DirectX - Isometric and Tile Based Games, Puzle games, Single Player games, Multi Player games.

Max. 45 Hours

TEXT / REFERENCE BOOKS
2. JungHyun Han, “3D Graphics for

END SEMESTER EXAM QUESTION PAPER PATTERN

Max Marks : 80
Exam Duration: 3 Hrs.
PART A : 10 questions of 2 marks each - No choice - 20 Marks
PART B : 2 questions from each unit with internal choice, each carrying 12 marks 80 Marks
SIT1610  SOCIAL NETWORK ANALYSIS

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COURSE OBJECTIVES

- To make the students be able to formulate meaningful research questions concerning social network analysis;
- To formulate agent-based models which from local behaviour of agents can generate networks with diverse global structures;
- To know how to conduct computer simulations to analyze properties of such models;

UNIT 1  INTRODUCTION  9 Hrs.
Introduction to Semantic Web: Limitations of current Web - Development of Semantic Web - Emergence of the Social Web
Social Network Analysis: Social Networks Perspective - Analysis of Network Data - Interpretation of Network Data - Social Network Analysis in the Social and Behavioral Sciences - Metrics in social network analysis.

UNIT 2  SOCIAL NETWORK ANALYSIS SOFTWARE, TOOLS AND LIBRARIES  9 Hrs.

UNIT 3  CLIQUES, CLUSTERS AND COMPONENTS  9 Hrs.
Components and Subgraphs: Sub graphs - Ego Networks, Triads, Cliques, Hierarchical Clustering, Triads, Network Density and conflict. Density: Egocentric and Socioecentric - Digression on Absolute Density - Community structure and Density, Centrality : Local and Global - Centralization and Graph Centres, Cliques and their intersections, Components and Citation Circles - Positions, Sets and Clusters.

UNIT 4  PREDICTING HUMAN BEHAVIOUR AND PRIVACY ISSUES  9 Hrs.

UNIT 5  GRAPH DATA IN THE REAL WORLD AND APPLICATION OF SOCIAL NETWORKS  9 Hrs.
Medium data - Tradition, Big Data, Small Data - Flat File Representations, Medium Data - Data Representation, Working with 2-Mode Data, Social Networks and Big Data, Big Data at work. Visualizing online social networks, Advances in Network Visualization - Elites, Communities and Influence, Applications of Social Network Analysis.

Max.45 Hours

TEXT / REFERENCE BOOKS


END SEMESTER EXAM QUESTION PAPER PATTERN

Max Marks : 80  Exam Duration: 3 Hrs.
PART A: 10 questions of 2 marks each - No choice  20 Marks
PART B: 2 Questions from each unit with internal choice, each carrying 12 marks  80 Marks
COURSE OBJECTIVES

- To introduce concepts of metrics, and models in software quality assurance.
- To understand the components of software quality assurance systems before, during, and after software development.
- To develop an understanding of software quality frameworks and approaches to assure software quality.

UNIT 1  QUALITY STANDARDS


UNIT 2  QUALITY METRICS AND MEASUREMENT

Software Quality Assurance Metrics and Measurement Software Quality Metrics: Product Quality metrics, In-process Quality Metrics, Metrics for Software Maintenance, Examples of Metric Programs

Software Quality metrics methodology: Establish quality requirements, Identify Software quality metrics, Implement the software quality metrics, analyze software metrics results, validate the software quality metrics - Software quality indicators - Fundamentals in Measurement theory.

UNIT 3  TESTING METHODOLOGY AND ENVIRONMENT

Software Testing Strategy and Environment: Establishing testing policy, structured approach to testing, test factors, Economics of System Development Life Cycle (SDLC) Testing

Software Testing Methodology: Defects, verification and validation, functional and structural testing, workbench concept, eight considerations in developing testing methodologies, testing tactics checklist

UNIT 4  TESTING STRATEGIES

Software Testing Techniques: Black - Box, Boundary value, Bottom - up, Branch coverage, Cause - Effect graphing, CRUD, Database, Exception, Gray - Box, Histograms, Inspections, JADs, Pareto Analysis, Prototyping, Random Testing, Risk - based Testing, Regression Testing, Structured Walkthroughs, Thread Testing, Performance Testing, White - Box Testing

UNIT 5  TESTING TOOLS


Max. 45 Hours.

TEXT / REFERENCE BOOKS


END SEMESTER EXAM QUESTION PAPER PATTERN

Max Marks : 80
Exam Duration: 3 Hrs.
PART A : 10 questions of 2 marks each - No choice - 20 Marks
PART B : 2 questions from each unit with internal choice, each carrying 12 marks 80 Marks
COURSE OBJECTIVES

- Demonstrate a working knowledge of computers, storage devices, and digital data
- Plan and prepare for an incident requiring computer forensic skills
- Seize a computer from a crime scene without damaging it or risking it becoming inadmissible in a court of law

UNIT 1  INTRODUCTION TO COMPUTER FORENSICS  9 Hrs.


UNIT 2  MOBILE AND SMART PHONE FORENSICS  9 Hrs.


UNIT 3  NETWORK SECURITY  9 Hrs.


UNIT 4  EVIDENCE COLLECTION AND FORENSICS TOOLS  9 Hrs.


UNIT 5  ANALYSIS AND VALIDATION  9 Hrs.

Current Computer Forensic tools: evaluating computer forensic tool needs, validating and testing forensics software computer forensics hardware tools, validating and testing forensics software Cell phone and mobile device forensics: Understanding mobile device forensics, understanding acquisition procedures for cell phones and mobile devices.

Max. 45 Hours

TEXT / REFERENCE BOOKS


END SEMESTER EXAM QUESTION PAPER PATTERN

Max Marks : 80
Exam Duration: 3 Hrs.
PART A: 10 questions of 2 marks each - No choice 20 Marks
PART B: 2 Questions from each unit with internal choice, each carrying 12 marks 80 Marks
COURSE OBJECTIVES

- To simulate the robot functions and joint movements to learn a simulation package
- Graphic animation sequences for robot movement.
- To provide knowledge of sensors used in Robotics

UNIT 1 ROBOTIC MANIPULATION


UNIT 2 DYNAMIC OF ROBOTS


UNIT 3 ROBOT CONTROL

Robot control: The control problem - State equation - Constant solutions - Linear feedback systems - Single-axis PID control - PD-Gravity control - Computed-Torque control - Variable - Structure control - Impedance control

UNIT 4 SENSORS AND ACTUATORS


UNIT 5 VISION AND TASK PLANNING


Max. 45 Hours

TEXT / REFERENCE BOOKS


END SEMESTER EXAM QUESTION PAPER PATTERN

Max Marks : 80
Exam Duration: 3 Hrs.
PART A : 10 questions of 2 marks each - No choice - 20 Marks
PART B : 2 questions from each unit with internal choice, each carrying 12 marks 80 Marks
COURSE OBJECTIVES
- To understand the components on the motherboard
- To understand different storage media
- To introduce the features of different I/O peripheral devices and their interfaces.

UNIT 1 CPU AND MEMORY
- CPU Essentials - Processor Modes - Modern CPU Concepts - Architectural Performance Features - The Intel's CPU - CPU Over Clocking - Over Clocking Requirements - Over Clocking The System - Over Clocking The Intel Processors - Essential Memory Concepts - Memory Organizations - Memory Packages - Modules - Logical Memory Organizations - Memory Considerations - Memory Types - Memory Techniques - Selecting And Installing Memory

UNIT 2 MOTHERBOARDS
- Active Motherboards - Sockets And Slots - Intel D850GB - Pentium4 Mother Board - Expansion Slots - Form Factor - Upgrading A Mother Board - Chipsets - North Bridge - South Bridge - CMOS - CMOS Optimization Tactics - Configuring The Standard CMOS Setup - Motherboard BIOS - POST - BIOS Features - BIOS And Boot Sequences - BIOS Shortcomings And Compatibility Issues - Power Supplies And Power Management - Concepts Of Switching Regulation - Potential Power Problems - Power Management

UNIT 3 STORAGE DEVICES

UNIT 4 I/O PERIPHERALS

UNIT 5 BUS ARCHITECTURE

Max. 45 Hours

TEXT / REFERENCE BOOKS

END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 100
Exam Duration: 3 Hrs.

PART A : 10 questions of 2 marks each - No choice - 20 Marks

PART B : 2 questions from each unit with internal choice, each carrying 12 marks 80 Marks
COURSE OBJECTIVES

- Understand the basic concepts of Wireless Communication and be familiar with the network protocol stack.
- Learn the basics of mobile telecommunication system.
- Be exposed to Mobile Ad-Hoc networks and gain knowledge about different mobile platforms and application development.

UNIT 1 WIRELESS COMMUNICATION FUNDAMENTALS 9 Hrs.

UNIT 2 TELECOMMUNICATION NETWORKS 9 Hrs.

UNIT 3 MOBILE NETWORK LAYER 9 Hrs.
Mobile IP (Goals, assumptions, entities and terminology, IP packet delivery, agent advertisement and discovery, registration, tunneling and encapsulation, optimizations), Dynamic Host Configuration Protocol (DHCP).

UNIT 4 MOBILE AD HOC NETWORKS (MANETS): 9 Hrs.
Overview, Properties of a MANET, spectrum of MANET applications, routing and various routing algorithms, security in MANETs.

UNIT 5 PROTOCOLS AND TOOLS 9 Hrs.
Wireless Application Protocol - WAP. (Introduction, protocol architecture, and treatment of protocols of all layers), Bluetooth (User scenarios, physical layer, MAC layer, networking, security, link management) and J2ME.

TEXT / REFERENCE BOOKS

END SEMESTER EXAM QUESTION PAPER PATTERN
Max. Marks : 100
Exam Duration : 3 Hrs.
PART A : 10 questions of 2 marks each - No choice - 20 Marks
PART B : 2 questions from each unit with internal choice, each carrying 12 marks 80 Marks
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**COURSE OBJECTIVES**

- Identify and discuss various software licensing models.
- Understand the motivation, theory, strengths and weaknesses of open source software.
- Become familiar with Linux, MySQL, PHP, Perl

**UNIT 1**  
OVERVIEW OF FREE/OFFER SOURCE SOFTWARE  
9 Hrs.
Overview of Free/Open Source Software - Definition of FOSS & GNU - History of GNU/Linux and the free software movement - Advantages of free software and GNU/Linux - FOSS usage - Trends and potential - global and Indian - GNU/Linux OS installation - Detect hardware - Configure disk partitions & file systems and install a GNU/Linux distribution - Basic shell commands - logging in, Listing files, editing files, copying/moving files, viewing file contents, changing file modes and permissions, process management - User and group management - File ownerships and permissions - PAM authentication - Introduction to common system configuration files & log files - Configuring networking - Basics of TCP/IP networking and routing - Connecting to the Internet (through dialup, DSL, Ethernet, leased line).

**UNIT 2**  
ADDITIONAL HARDWARE AND E-MAIL SERVERS  
9 Hrs.
Configuring additional hardware - Sound cards - Displays & display cards - Network cards - Modems - USB drives - CD writers - Understanding the OS boot up process - Performing every day tasks using gnu/Linux - Accessing the Internet - Playing music - Editing documents and spreadsheets - Sending and receiving email - Copy files from disks and over the network - Playing games - Writing CDs - X Window system configuration and utilities - Configure X windows - Detect display devices - Installing software - From source code as well as using binary packages - Setting up email servers - Using postfix - (SMTP services) - Courier (IMAP & POP3 services) - Squirrel mail (web mail services) - Setting up web servers - Using apache (HTTP services) - PHP (server-side scripting) - Perl (CGI support) - Setting up file services - Using samba (file and authentication services for windows networks) - Using NFS (file services for gnu/Linux / Unix networks) - Setting up proxy services - Using squid (http / ftp / https proxy services) - Setting up printer services - Using CUPS (print spooler) - Foomatic (printer database).

**UNIT 3**  
SETTING UP A FIREWALL  
9 Hrs.
Using netfilter and ip tables - Using the GNU compiler collection - GNU compiler tools - The C preprocessor (cpp) - The C compiler (gcc) and the C++ compiler (g++) - Assembler (gas) - Understanding build systems - Constructing make files and using make - Using autoconf and autogen to automatically generate make files tailored for different development environments - Using source code versioning and management tools - Using CVS to manage source code revisions, patch & diff.

**UNIT 4**  
UNDERSTANDING THE GNU LIBC LIBRARIES AND LINKER  
9 Hrs.
Linking against object archives (.a libraries) and dynamic shared object libraries (.so libraries) - Generating statically linked binaries and libraries - Generating dynamically linked libraries - Using the GNU debugging tools - Gdb to debug programs - Graphical debuggers like ddd - Memory debugging/profiling libraries mpatrol and valgrind - Review of common programming practices and guidelines for GNU/Linux and FOSS - Introduction to Bash, sed & awk scripting.

**UNIT 5**  
PROGRAMMING TECHNIQUES  
9 Hrs.
Application Programming - Basics of the X Windows server architecture - Qt programming - Gtk+ programming - Python programming - Programming GUI applications with localisation support, Open Source Equivalent of existing commercial software.

**TEXT / REFERENCE BOOKS**


**END SEMESTER EXAM QUESTION PAPER PATTERN**

Max. Marks : 100
Exam Duration : 3 Hrs.
PART A : 10 questions of 2 marks each - No choice - 20 Marks
PART B : 2 questions from each unit with internal choice, each carrying 12 marks 80 Marks

B.E. / B. Tech REGULAR 103 REGULATIONS 2015
COURSE OBJECTIVE
To impart knowledge of signal representation in time domain, Fourier transform, sampling theorem, linear time-invariant system, discrete convolution, Z-transform, discrete Fourier transform, discrete filter design, finite word length effects and multi-rate signal processing and to analyze signal processing and designing a signal processor.

UNIT 1 SIGNALS AND SYSTEMS
Basic elements of DSP, concepts of frequency in Analog and Digital Signals, sampling theorem, Discrete-time signals and systems - Analysis of discrete time LTI systems - Z transform - Convolution (linear and circular) - Correlation (auto and cross).

UNIT 2 DISCRETE FOURIER TRANSFORM (DFT) AND FAST FOURIER TRANSFORM (FFT)
DFT and its properties, Relation between DTFT and DFT, IDFT and its properties, FFT computations using Decimation in time (DIT) algorithms and Decimation in frequency (DIF) algorithms, Realization of recursive and non-recursive systems - Direct Form I and Form II - Cascade and parallel realization.

UNIT 3 DESIGN OF INFINITE IMPULSE RESPONSE (IIR) FILTER

UNIT 4 DESIGN OF FINITE IMPULSE RESPONSE (FIR) FILTER
Structures of FIR, Linear phase FIR filter, Filter design using windowing techniques - Hamming, Hanning and Rectangular window, Frequency sampling techniques, and Finite word length effects in digital Filters

UNIT 5 APPLICATIONS
Multirate signal processing, Speech compression, Adaptive filter, Musical sound processing, Image enhancement

TEXT / REFERENCE BOOKS

END SEMESTER EXAM QUESTION PAPER PATTERN
Max. Marks : 100
Exam Duration : 3 Hrs.
PART A : 10 Questions of 2 marks each-No choice 20 Marks
PART B : 2 Questions from each unit with internal choice, each carrying 12 marks 80 Marks
COURSE OBJECTIVES

- To understand the basic principles and methods of digital image processing
- To have a comprehensive background in image filtering
- To develop analytic skill to process images

UNIT 1 DIGITAL IMAGE FUNDAMENTALS

Elements of Visual Perception; Image Sensing and Acquisition; Image Sampling and Quantization; Basic Relationships between Pixels; Monochromatic Vision Models; Colour Vision Models; Colour Fundamentals; Colour Models

UNIT 2 IMAGE ENHANCEMENT


UNIT 3 IMAGE RESTORATION

A Model of Image Degradation/Restoration Process; Noise Models; Inverse Filtering, Minimum Mean Square Error Filtering, Constrained Least Square Filtering; Geometric Mean Filter; Geometric Transformations - Spatial Transformations, Gray-Level Interpolation.

UNIT 4 MORPHOLOGICAL PROCESSING & SEGMENTATION

Morphological Image Processing - Logic Operations involving Binary Images; Dilation and Erosion; Opening and Closing; Basic Morphological Algorithms - Boundary Extraction, Region Filling, Thickening, Thinning; Image Segmentation - Detection of Discontinuities; Edge Linking; Boundary Detection; Thresholding - Global and Adaptive; Region based Segmentation.

UNIT 5 COLOUR IMAGE PROCESSING & APPLICATIONS

Conversion of Colour Models; Basic of Full-Colour Image Processing; Colour Transformations; Smoothing; Sharpening; Segmentation; Applications of Image Processing - Motion Analysis, Image Fusion, Image Classification.

Max. 45 Hours.

TEXT / REFERENCE BOOKS


END SEMESTER EXAM QUESTION PAPER PATTERN

Max Marks : 80
Exam Duration : 3 Hrs.

PART A : 10 Questions of 2 marks each - No choice 20 Marks
PART B : 2 questions from each unit of internal choice, each carrying 16 marks 80 Marks

B.E. / B. Tech REGULAR 105 REGULATIONS 2015
COURSE OBJECTIVES

- To study the basic introduction to Embedded System
- To explain the various development tools in embedded System
- To get a knowledge in embedded programming and acquire a knowledge in embedded system application

UNIT 1 INTRODUCTION TO EMBEDDED SYSTEM

Embedded system characteristics of embedded system- categories of embedded system- requirements of embedded systems- challenges and design issues of embedded system- trends in embedded system- system integration- hardware and software-partition- applications of embedded system- control system and industrial automation-biomedical-data communication system-network information appliances- IVR systems- GPS systems.

UNIT 2 EMBEDDED SOFTWARE DEVELOPMENT AND TOOLS


UNIT 3 EMBEDDED NETWORKING


UNIT 4 EMBEDDED PROGRAMMING


UNIT 5 EMBEDDED SYSTEM TESTING/ AND APPLICATION

Introduction to embedded system testing - Types of testing: Unit testing, Regression testing, Functional testing, Coverage tests, Gray box test and performance testing - Embedded applications: Case study of Smart card, Interfacing stepper motor, RFID-system, Application, Tag Reader - Handheld Device - Washing Machine.

Max. 45 Hours

TEXT / REFERENCE BOOKS

9. Sriram V Iyer, Pankaj Gupta, TMH,2004

END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 100
Exam Duration : 3 Hrs.

PART A : 10 Questions of 2 marks each-No choice 20 Marks
PART B : 2 Questions from each unit with internal choice, each carrying 12marks 80 Marks

B.E. / B. Tech REGULAR 106 REGULATIONS 2015
COURSE OBJECTIVES

- To understand the evolution and basics of Nanoelectronics
- To understand the different physical deposition techniques for thin film deposition
- To learn the different types of chemical vapour decomposition techniques
- To learn about the various characterization techniques
- To understand the basics of elementary quantum devices

UNIT 1  FUNDAMENTALS OF NANOELECTRONICS  9 Hrs.

Moore’s Law, Wave functions, wave packets, Schrodinger’s wave equation, potential barriers and tunneling, Fermi-Dirac statistics, Density of states, Limitations of conventional FET in nano scales, Quantum Well, Quantum wire, Quantum dot, current flow in two terminal Quantum dots, ballistic transport, Single Electron Transistor

UNIT 2  PHYSICAL DEPOSITION (THIN FILM) TECHNIQUES  9 Hrs.

Basics of physical methods, Glow discharge DC Sputtering, Triode sputtering, Getter sputtering, Radio frequency sputtering, Magnetron sputtering, Ion beam sputtering, AC sputtering, Vacuum evaporation, Resistive heat Evaporation, Flash Evaporation, Electron Beam Evaporation, LASER evaporation

UNIT 3  CHEMICAL DEPOSITION (THIN FILM) TECHNIQUES  9 Hrs.

Fundamentals of chemical methods, Chemical Vapour Deposition, LASER chemical Vapour Deposition, Photo Chemical Vapour Deposition, Plasma enhanced Vapour Deposition, Metal Organo Chemical Vapour Deposition, Chemical Bath Deposition, Electro less Deposition, Anodisation, Liquid Phase Epitaxy, Sol-Gel method, Spin Coating, Spray-Pyrolysis Technique, Polymer Assisted Deposition

UNIT 4  THIN FILM CHARACTERIZATION TECHNIQUES  9 Hrs.

Cyclic Voltammetry and Linear Sweep Techniques, Thickness measurement Techniques, X-Ray Diffraction Technique, Raman Spectral Study, Scanning Electron Microscopy, Energy Dispersive Analysis by X-rays measurements, Atomic Force Microscopy

UNIT 5  NANOELECTRONIC DEVICES  9 Hrs.

Digital and Switching abstraction, Quantum Cellular Automata (QCA), Realization of logic gates using QCA, Types and synthesis of molecular bundles, principle and types of spin wave devices, Array minimum/ maximum computation with spin wave devices.

Max. 45 Hours

TEXT / REFERENCE BOOKS


END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 100  Exam Duration : 3 Hrs.

PART A : 10 Questions of 2 marks No choice  20 Marks
PART B : 2 Questions from each unit with internal choice, each carrying 12 marks  80 Marks
COURSE OBJECTIVE
- To enable the students to understand about tools used in Bioinformatics & how to use them. This will facilitate the students to undertake projects in the modern biology.

UNIT 1 INTRODUCTION
Introduction to bioinformatics, biological information, the Central Dogma, Bioinformatics: Definition and overview Bioinformatics, Branches of Bioinformatics, Aim, Scope and Research areas of Bioinformatics. Genome projects, human genome project- Databases and human chromosomes, role of Bioinformatics in biological sequences. Biological data- DNA sequence protein sequence, macromolecular structure. Challenges in bioinformatics.

UNIT 2 COMPUTING IN BIOINFORMATICS

UNIT 3 BIOLOGICAL DATABASES
Databases and programs, Information retrieval from databases of nucleic acid and proteins. Pair wise alignment and database searching, Multiple Sequence Alignment database searching, DNA analysis, protein analysis, Data information and Knowledge Management, Concepts in Bioinformatics, Databases and Data Warehouses in Bioinformatics. Challenges, combining multiple types of data, Information Retrieval system in bioinformatics

UNIT 4 TOOLS APPLICATIONS IN BIOINFORMATIC

UNIT 5 SOFTWARES IN BIOINFORMATICS
Basic software tools used in bioinformatics - Sequence analysis- GCG, Emboss - Cn3D viewer- Rasmol, Swiss pdb viewer, Pymol, Jmol. Modeling- Discovery studio 2.0, Docking -Auto dock,HEX.

Max. 45 Hours

TEXT / REFERENCE BOOKS

END SEMESTER EXAM QUESTION PAPER PATTERN
Max. Marks : 100
Exam Duration : 3 Hrs.
PART A : 10 questions of 2 marks each – No choice 20 Marks
PART B : 2 questions from each unit of internal choice, each carrying 16 marks 80 Marks
COURSE OBJECTIVE
To learn to appreciate the programming language that can be used for a wide variety of programming tasks and to expose the student to the standard scripting language. At the end of the course, the student will be developing adequate skills in programming and will be known to understand the implementation of various applications using powerful assortment of built-in types in python.

UNIT 1 INTRODUCTION TO PYTHON 9 Hrs.
Introduction to PYTHON - History - Features - installation - Setting up path - Working with Python - Basic Syntax -- Operator

UNIT 2 VARIABLE AND DATA TYPES 9 Hrs.
Native datatypes – Booleans – Numbers – Strings - Bytes and byte arrays - Lists - Tuples – Sets - Dictionaries

UNIT 3 REGULAR EXPRESSIONS 9 Hrs.
Python regular expressions – Match function - Search function - Matching VS Searching - Modifiers - Patterns.

UNIT 4 CONTROL STATEMENTS 9 Hrs.
Conditional Statements - If, If-else, Nested if-else - Looping - For, While, Nested loops - Control Statements - Break, Continue, Pass

UNIT 5 FUNCTIONS AND MODULES 9 Hrs.
Functions - Defining a function - Calling a function - Types of functions - Function Arguments - Anonymous functions - Global and local variables, Modules - Importing module - Math module - Random module - Packages – Composition

TEXT / REFERENCE BOOKS
Mark Pilgrim, “Dive Into Python”, Apress, 2004

END SEMESTER EXAM QUESTION PAPER PATTERN
Max. Marks : 100
Exam Duration : 3 Hrs.
PART A : 10 questions of 2 marks each – No choice 20 Marks
PART B : 2 questions from each unit of internal choice, each carrying 16 marks 80 Marks
COURSE OBJECTIVES

- The course provides an intriguing insight in chemistry, engineering, biology and medicine that has a significant impact on biomaterials.
- It highlights the way in which modern biology and medicine is inextricably linked to scientific discipline and helping us to understand the complex world of biomaterials.

UNIT 1 INTRODUCTION AND METALS 9 Hrs.
Biomaterials - Overview, Classification of biomaterials, Interfacial Phenomena and tissue response to biomaterials, Metals and alloys for orthopedic implants - Stainless steel, Cobalt chromium alloy, Titanium and its alloys, Precious metal alloys, Other metal alloys. Dental implants – materials, types and designs

UNIT 2 REPLACEMENT AND FIXATION DEVICES 9 Hrs.

UNIT 3 POLYMERS AND APPLICATIONS 9 Hrs.
Polymers in biomedical use, Hydrogels, silicone rubber, biodegradable polymers, Polymer sterilization, Deterioration of polymers

UNIT 4 BIOCERAMICS AND COMPOSITES 9 Hrs.
Bioceramics, types and – bioactive resorbable, non – resorbable, bioceramic coatings on metallic and implants and bone bonding reactions on implantation. Hydroxyapatite – properties and applications. Composites – Types and Applications, Bioglass

UNIT 5 OPHTHALMOLOGY, CORROSION AND TESTS 9 Hrs.

Max. 45 Hours

TEXT / REFERENCE BOOKS

END SEMESTER EXAM QUESTION PAPER PATTERN
Max. Marks : 100
Exam Duration : 3 Hrs.
PART A : 10 questions of 2 marks each – No choice 20 Marks
PART B : 2 questions from each unit of internal choice, each carrying 16 marks 80 Marks
SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY
FACULTY OF COMPUTING

B.E. / B. Tech REGULAR
REGULATIONS 2015

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COURSE OBJECTIVES

- The paper provides opportunities for training and research in all aspects of hospital / health administration. It helps promote scientific management of hospital and advancement of health care systems so as to make it rational, responsive and cost efficient.
- The student is thus educated in the development of high quality of hospital care in the community and the country so as to provide a satisfactory environment to the patient and clinical research.

UNIT 1      STANDARD OF HOSPITAL  
9 Hrs.
Concept of Hospital Management – Role of Administrator – Responsibilities of Administrator – Hospital Design – Outlines for establishing Departmental Zones – Hospital Engineering

UNIT 2      HOSPITAL ORGANIZATION  
9 Hrs.
Organization of Out-Patient Services – Problems encountered in functioning of O.P Department – Organization of In- Patient Services – Casualty & Emergency Services - Organization and management of Operation theatres

UNIT 3      SERVICES IN HOSPITAL  
9 Hrs.
Organization of Ancillary Services: Lab Services – Department of Physiotherapy & Occupational Therapy – Organization of Blood Transfusion Services – Department of Radio – diagnosis – Hospital Pharmacy

UNIT 4      STERILIZATION AND HOSPITAL SAFETY  
9 Hrs.
Disease transmission, Sterilization and disinfection methods, Hospital safety – Radiation Safety, hazardous safety, safety disposal of biological waste - Maintenance of Equipments & Instruments.

UNIT 5      SUPPORTIVE SERVICES IN HOSPITAL  
9 Hrs.
Organization and management of Nursing services and Dietary Services in hospital – House-keeping and maintenance –Medical Records - Staffing the hospital - Human resources management in hospital - Management Assisted by Computers: Reservation, Admission, Registration & Discharge Module

Max. 45 Hours

TEXT / REFERENCE BOOKS

Dr. L.L. Rao, “Hospital Management.”

END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 100
Exam Duration : 3 Hrs.

PART A : 10 questions of 2 marks each – No choice
20 Marks

PART B : 2 questions from each unit of internal choice, each carrying 16 marks
80 Marks
COURSE OBJECTIVE
- To enable the student to acquire adequate knowledge on micro mechanical devices and their applications in drug delivery and nanotechnology.

UNIT 1 INTRODUCTION 9 Hrs.

UNIT 2 PROCESSING: MICRO MACHINING TECHNOLOGY 9 Hrs.

UNIT 3 MICROSYSTEMS AND MICROFLUIDS 9 Hrs.

UNIT 4 APPLICATION IN MEDICINE 9 Hrs.

UNIT 5 BIOMEDICAL NANOTECHNOLOGY 9 Hrs.

Max. 45 Hours

TEXT / REFERENCE BOOKS
L.Yahia (Editor), L'HocineYahia, “Shape Memory Implants.”

END SEMESTER EXAM QUESTION PAPER PATTERN
Max. Marks : 100
Exam Duration : 3 Hrs.
PART A : 10 questions of 2 marks each – No choice 20 Marks
PART B : 2 questions from each unit of internal choice, each carrying 16 marks 80 Marks
COURSE OBJECTIVE

- To understand the basics of Perl programming and its role and applications in Bioinformatics discipline.

UNIT 1  INTRODUCTION TO PERL PROGRAMMING  9 Hrs.

Introduction to Perl for Bioinformatics- Comprehensive PERL Archive Network-Variables in Perl: Scalars, Arrays and Hashes. Basic structure of Perl language- a functional approach – constructing atgc.pl. tr/// function –text formatting – formatting numerical output with printf – trapping errors at run time – the s/// operator – the chop and chomp operators.

UNIT 2  INTRODUCTION TO ARRAYS AND HASHES  9 Hrs.


UNIT 3  PERL REGULAR EXPRESSIONS AND CONTROL STRUCTURES.  9 Hrs.


UNIT 4  FILES AND DIRECTORY MANIPULATIONS  9 Hrs.

Files- Operating modes: read, write, append function- File variable, Die function– terminating a program, Reading complete file, Reading a file line by line, Closing a file. File test operators (d, e, l, r, s, w, x, B, T)-Manipulation Functions –link, unlink, rename, truncate, removing files. Directory Manipulation functions – mkdir, chdir, opendir, readdir, closedir, rmdir, chmod.

UNIT 5  INTRODUCTION TO PERL MODULES  9 Hrs.

Introduction to modules and Subroutines- BioPerl module, Getopt: Long module and LWP: Simple Module-Cwd module – creating perl module tree, system function –Perl subroutines and functions. Introduction and applications of Common Gateway Interfaces (CGI).

Max. 45 Hours

TEXT / REFERENCE BOOKS


END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 100

PART A : 10 questions of 2 marks each – No choice  20 Marks

PART B : 2 questions from each unit of internal choice, each carrying 16 marks  80 Marks

Exam Duration : 3 Hrs.
COURSE OBJECTIVE
- To introduce students about Good manufacturing practices quality concepts which would expose them to industrial scenario.

UNIT 1 INTRODUCTION 9 Hrs.

UNIT 2 GMP 9 Hrs.

UNIT 3 GLP 9 Hrs.

UNIT 4 INSPECTION 9 Hrs.
Inspections, Quality Audit and Quality System Reviews: Inspections, role of quality audit, role of inspectors, methods of inspection- routine, concise, follow-up and special inspections, frequency and duration of inspections, preparations for inspections, conduct, report and regulatory actions.

UNIT 5 REGULATION 9 Hrs.

Max. 45 Hours

TEXT / REFERENCE BOOKS

END SEMESTER EXAM QUESTION PAPER PATTERN
Max. Marks : 100
Exam Duration : 3 Hrs.
PART A : 10 questions of 2 marks each – No choice 20 Marks
PART B : 2 questions from each unit of internal choice, each carrying 16 marks 80 Marks
COURSE OBJECTIVE

- To understand the essentials of basic biological principles

UNIT 1  INTRODUCTION TO CELLS  9 Hrs.

Cell-Functional unit of live organisms - Cell theory - Prokaryotic and eukaryotic cell - plant, animal, bacterial cell - cell components - functions- cell organization – tissues - basic types -cell division: Mitosis, meiosis, cell cycle regulation

UNIT 2  SOCIAL IMPORTANCE  9 Hrs.

Application of biological sciences and biotechnology to the society - human health care and medicines - pharmaceuticals and nutraceuticals -food and agriculture- pollution management and environment - Biofuels

UNIT 3  INTRODUCTION TO BIOMOLECULES  9 Hrs.

Biomolecules - classification, salient features - biological significance - carbohydrates, proteins and amino acids - lipids and fats - nucleic acids - vitamins-Enzymes

UNIT 4  HUMAN PHYSIOLOGY  9 Hrs.

Human Physiology - Different systems associated with human- Tissues, organ and physiology of the various systems: Digestive, respiratory, circulatory, skeletal, nervous, excretory and reproductive system - Artificial memory and neural net work

UNIT 5  MEDICAL IMPORTANCE  9 Hrs.

Infectious and non infectious diseases- causative agents, epidemiology, pathogenicity, control and prevention, treatment of AIDS, tuberculosis, Pathology of non infectious and genetic diseases and disorders - cancer, diabetes mellites, cardiac diseases- neurological disorders-Parkinson’s disease

Max. 45 Hours

TEXT / REFERENCE BOOKS


END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 100  Exam Duration : 3 Hrs.
PART A : 10 questions of 2 marks each – No choice  20 Marks
PART B : 2 questions from each unit of internal choice, each carrying 16 marks  80 Marks
COURSE OBJECTIVE

- To provide a basic understanding of the EIA process as it is used for research, planning, project or program evaluation, monitoring, and regulatory enforcement and to introduce students to the legal, economic, administrative and technical process of preparing and/or evaluating environmental impact documents.

UNIT 1  INTRODUCTION  9 Hrs.
Historical development of Environmental Impact Assessment (EIA). EIA in Project Cycle. Legal and Regulatory aspects in India. Types and Limitations of EIA, Cross sectoral issues and terms of reference in EIA – Public Participation in EIA. EIA process.

UNIT 2  METHODS FOR EIA  9 Hrs.
Methods of EIA – Check lists – Matrices – Networks – Cost-benefit analysis – Analysis of alternatives.

UNIT 3  PREDICTION AND ASSESSMENT  9 Hrs.
Assessment of Impact on land, water, air, social & cultural activities and on flora & fauna- Mathematical models- Public participation – Rapid EIA.

UNIT 4  ENVIRONMENTAL MANAGEMENT PLAN  9 Hrs.

UNIT 5  LIFE CYCLE ASSESSMENT & EXECUTIVE SUMMARY  9 Hrs.

Max. 45 Hours

TEXT / REFERENCE BOOKS
World Bank –Source book on EIA

END SEMESTER EXAM QUESTION PAPER PATTERN:
Max. Marks : 100
Exam Duration : 3 Hrs.
PART A : 10 questions of 2 marks each – No choice  20 Marks
PART B : 2 questions from each unit of internal choice, each carrying 16 marks  80 Marks
COURSE OBJECTIVE

- To create an awareness towards natural and man-made disasters, disaster preparedness and disaster management

UNIT 1  INTRODUCTION TO DISASTERS

12 Hrs.
Natural resources and its importance - understanding on fragile eco-system - characteristics and types of Disasters, Geological and Mountain Area Disasters: Earthquakes, Volcanic eruption, landslides - Wind and Water Related Natural Disaster: Floods, Droughts, Cyclones, Tsunamis - Man Made Disasters: Forest fires, Nuclear, Biological and Chemical disaster - Causes and effects - Disaster Profile of India - Disaster Management cycle.

UNIT 2  DISASTER PREPAREDNESS

8 Hrs.
Disaster management, mitigation and preparedness: Disaster Preparedness for People and Infrastructure, Community based Disaster Preparedness Plan - Roles & Responsibilities of Different Agencies and Government: Education, Communication & Training, Central, State, District and local administration, Armed Forces, Police, Para Military Forces, International Agencies, and NGO's - Disaster Mitigation: Strategies, Emerging Trends, Mitigation management and Role of Team and Coordination.

UNIT 3  REHABILITATION, RECONSTRUCTION & RECOVERY

10 Hrs.
Damage assessment – Development of Physical and Economic Infrastructure - Nature of Damage to Houses and Infrastructure due to Disasters - Funding Arrangements for Reconstruction - Monitoring and Evaluation of Rehabilitation Work: Training, Rescue and planning the rescue activities and rehabilitations - Role of Government and NGO’s - Participative Rehabilitation Process: Case Studies

UNIT 4  DISASTER RESPONSE AND DISASTER MANAGEMENT

8 Hrs.

UNIT 5  RISK ASSESSMENT AND VULNERABILITY ANALYSIS

7 Hrs.

TEXT / REFERENCE BOOKS

4. Sahni, Pardeep et.al. (eds.), “Disaster Mitigation Experiences and Reflections”, Prentice Hall of India, New Delhi, 2002

Websites
8. NOAA Coastal Services Center, “Linking People Information and Technology”,

END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 100
Exam Duration : 3 Hrs.

PART A : 10 questions of 2 marks each – No choice
20 Marks

PART B : 2 questions from each unit of internal choice, each carrying 16 marks
80 Marks
COURSE OBJECTIVE

- To make the students to understand the basic concepts about the analytical techniques

UNIT 1 UV-VIS SPECTROSCOPY 9 Hrs.

UNIT 2 IR AND RAMAN SPECTROSCOPY 9 Hrs.

UNIT 3 1H NMR AND 13C SPECTROSCOPY 9 Hrs.

UNIT 4 MASS SPECTROMETRY 9 Hrs.

UNIT 5 IMAGING TECHNIQUES 9 Hrs.

Max. 45 Hours

TEXT / REFERENCE BOOKS

END SEMESTER EXAM QUESTION PAPER PATTERN:
Max. Marks : 100
Exam Duration : 3 Hrs.
PART A : 10 questions of 2 marks each – No choice 20 Marks
PART B : 2 questions from each unit of internal choice, each carrying 16 marks (10% problems may be asked) 80 Marks
COURSE OBJECTIVE

- To know the various sources of energy available and to face the future challenges arising due to energy crisis.

UNIT 1   GLOBAL AND INDIAN ENERGY SCENARIO  9 Hrs.

UNIT 2   HYDROGEN ENERGY  9 Hrs.

UNIT 3   ELECTROCHEMICAL ENERGY  9 Hrs.

UNIT 4   BIOENERGY  9 Hrs.

UNIT 5   NUCLEAR ENERGY  9 Hrs.

Max. 45 Hours

TEXT / REFERENCE BOOKS

END SEMESTER EXAM QUESTION PAPER PATTERN
Max. Marks : 100
Exam Duration : 3 Hrs.
PART A : 10 questions of 2 marks each – No choice   20 Marks
PART B : 2 questions from each unit of internal choice, each carrying 16 marks   80 Marks
(10% problems may be asked)
COURSE OBJECTIVES

- The course aims at equipping students to be competent in facing the challenges in today's globalized context, by providing an insight to soft skills for success and life skills for survival at the workplace.

UNIT 1 ACHIEVEMENT MOTIVATION 9 Hrs.
Time Management - Positive and negative aspects of time log - Formula for successful time management.

UNIT 2 SELF-AWARENESS AND EMPATHY 9 Hrs.
Work-Life Balance – Project completion Techniques – Effective Planning and Organisation - Strategies to improve team communication.

UNIT 3 DECISION MAKING 9 Hrs.
Decision making techniques- types of decisions- Setting Goals and Plans - Problem Solving Techniques.

UNIT 4 EFFECTIVE COMMUNICATION 9 Hrs.
Non-verbal communication - means of communication – Personality development – Language and body language for interviews- Self Empowerment.

UNIT 5 NEGOTIATION SKILLS 9 Hrs.
Negotiation skills – skill acquisition strategies – effective persuading skills.

Max. 45 Hours

TEXT / REFERENCE BOOKS

END SEMESTER EXAM QUESTION PAPER PATTERN
Max. Marks : 100
Exam Duration : 3 Hrs.

PART A : 10 questions of 2 marks each – No choice 20 Marks
PART B : 2 questions from each unit of internal choice, each carrying 16 marks 80 Marks
COURSE OBJECTIVE

- To provide with an introduction to professional writing as a disciplinary field.

UNIT 1 INTRODUCTION TO TECHNICAL WRITING
Technical Writing – Principles and procedure of technical writing; Role of a Technical writer, Various forms of Technical Writing

UNIT 2 ONLINE TOOLS
Printed documentation and Online Help Systems, Working with images and illustrations, designing graphic aids.

UNIT 3 PROCESS OF WRITING
Collecting and Organizing information, Drafting information verbally and visually, Producing Information, Documentation Process.

UNIT 4 REACHING THE AUDIENCE
Technical Writing Process Templates and Page design, Audience Profiling.

UNIT 5 PRESENTATION
Writing specialized forms as abstracts, instructions, proposals and project and lab reports

Max. 45 Hours

TEXT / REFERENCE BOOKS

END SEMESTER EXAM QUESTION PAPER PATTERN:

Max. Marks : 100
Exam Duration : 3 Hrs.
PART A : 10 questions of 2 marks each – No choice 20 Marks
PART B : 2 questions from each unit of internal choice, each carrying 16 marks 80 Marks
COURSE OBJECTIVE
- To educate the learners on written communication and provide exposure to practical aspects of writing for wider audience and for scientific community.

UNIT 1 BASICS OF PROFESSIONAL COMMUNICATION 9 Hrs.
Technical Writing and Business communication (process, networks, importance, cultural variations, today’s globalized workplaces), Practical aspects of communication, Principles and procedure of technical writing, Role of a Technical writer, attention to analyzing audience and purpose, Understanding and Inventing Pedagogies for Professional Writing.

UNIT 2 PROCESS OF PROFESSIONAL COMMUNICATION 9 Hrs.

UNIT 3 PRACTICAL ASPECTS OF PROFESSIONAL COMMUNICATION 9 Hrs.
Drafting and Documentation, Collecting and Organizing information, Drafting information verbally and visually, Producing Information, Documentation Process, Argument, Persuasion, Propaganda, Audience and Style, Readers and Context of Use, The participatory model of writing.

UNIT 4 PROFESSIONAL ETHICS & STRATEGIES IN CHANGING SCENARIO 9 Hrs.
Ethics in Professional Communication, Applying theory to practice- analysis of papers and speeches, Writing on line-Principles while designing web sites, Creating effective presentation slides, Speech writing- basics, scrutiny and observation, Speech writing techniques and application.

UNIT 5 PROFESSIONAL COMMUNICATION & FUTURE 9 Hrs.
Future of Technical Communication, multimedia genre, Identity, Authority, and Learning to Write in New Workplaces, Writing work, technology, and pedagogy in the present era

Max. 45 Hours

TEXT / REFERENCE BOOKS
2. Hawk, Byron. “Toward a Post-Techne: or, Inventing Pedagogies for Professional Writing.” (TCQ)

END SEMESTER EXAM QUESTION PAPER PATTERN
Max. Marks : 100
Exam Duration : 3 Hrs.
PART A : 10 questions of 2 marks each – No choice 20 Marks
PART B : 2 questions from each unit of internal choice, each carrying 16 marks 80 Marks
SPH1601
ENERGY PHYSICS

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COURSE OBJECTIVE

- To expose the students to the basic principles of energy conversions, materials for energy conversion and energy storage devices.

UNIT 1 ENERGY AND THERMODYNAMICS 9 Hrs.
Forms of Energy, Conservation of Energy, Entropy, Heat capacity, Thermodynamic cycles: Brayton, Carnot Diesel, Otto and Rankin cycle; Fossil fuels, time scale of fossil fuels and solar energy as an option..

UNIT 2 ENERGY CONVERSION MATERIALS 9 Hrs.
Single, poly – and amorphous silicon, GaAs, Cds, Cu2S, CulnSe2, CdTe etc. technologies for fabrication of single and polycrystalline silicon solar cells, amorphous silicon solar cells and tandem cells, solar cell modules, photovoltaic systems, space quality solar cells

UNIT 3 PHOTOVOLTAIC CONVERTORS 9 Hrs.
Introduction- Photovoltaic effect-conversion of solar energy into electrical energy- behaviour of solar cells-basic structure and characteristics of solar cells-single, multi and thin film silicon solar cells-solar cell arrays- PV modules, generators-interfacing PV modules to loads, direct connection of load to PV modules and connection of PV modules to a battery and load together-energy storage alternatives to PV systems..

UNIT 4 THERMOELECTRIC CONVERTERS 9 Hrs.
Thermoelectric effects, solid state description of thermoelectric effect, Kelvin’s thermodynamic relations, analysis of thermoelectric generators, basic assumptions, temperature distribution and thermal energy transfer for generator, co-efficient of performance for thermoelectric cooling..

UNIT 5 ENERGY STORAGE DEVICES 9 Hrs.
Cuprates and MgB2 superconductors and their properties, superconducting wires, Role of superconductor in Electric generator, Magnetic energy storage devices and power transmission. Energy storage systems, Faradaic and non-Faradaic processes, Types of capacitors and batteries, Comparison of capacitor and battery, Charge-discharge cycles, experimental evaluation using Cyclic voltammetry, and other techniques.

Max. 45 Hours

TEXT / REFERENCE BOOKS

END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 100
Exam Duration : 3 Hrs.

PART A : 10 questions of 2 marks each – No choice
20 Marks

PART B : 2 questions from each unit of internal choice, each carrying 16 marks - (10% problems may be asked)
80 Marks
COURSE OBJECTIVE

- To provide a qualitative idea on the fundamentals of seismology and theoretical understanding of various physical properties of earth.

UNIT 1 SEISMOLOGY

Introduction-Seismology-P-waves-S waves, their velocities-the location of epicenters-Effect of Boundaries-Major discontinuities-Seismic energy sources-Detectors-Interpretation of time and distance curves.-Derivation of properties from the velocities.

UNIT 2 INTERNAL STRUCTURE OF EARTH

Introduction-Seismic waves-Rayleigh waves and love waves-Study of earth by seismic waves-Earthquake seismology-Horizontal and vertical seismograph-Seismograph equation-Internal structure of earth..

UNIT 3 EARTHQUAKES AND GRAVITY

Earthquakes: Focus, Magnitude, Frequency-Detection and prediction-Gravity-Absolute and relative measurements of gravity-Worden gravimeter-Application of gravity methods.

UNIT 4 GEOMAGNETISM

Geomagnetism-Definitions, magnetic field.-Measurements Proton precession magnetometer, Alkali vapour magnetometer-The theory of Earth magnetism-Dynamo theory of earth magnetism-Magnetic surveying-applications.

UNIT 5 GEOCHRONOLOGY AND GEOTHERMAL PHYSICS

Geochronology-Radioactivity of the earth-Radioactive dating of rocks and minerals-Geological time scale Geothermal Physics: Flow of heat to the surface of earth-Sources of heat within earth-Process of heat transport-Internal temperature of earth..

Max. 45 Hours

TEXT / REFERENCE BOOKS


END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 100
Exam Duration : 3 Hrs.

PART A : 10 questions of 2 marks each – No choice
20 Marks

PART B : 2 questions from each unit of internal choice, each carrying 16 marks -
80 Marks
SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY
FACULTY OF COMPUTING

SPH1603 SPACE PHYSICS

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COURSE OBJECTIVE
- To provide the Windows to the Universe, Solar System, and Planetary Atmospheres and also to expose the students to the instruments related with space physics.

UNIT 1 ASTRONOMY FUNDAMENTALS, TELESCOPES FOR ASTRONOMY 9 Hrs.
Radiation from space, radiation laws, Basic terminology used in astronomy, Introduction to the various types of astronomy: optical, radio, IR, UV, X-ray, γ ray, Gravitational etc. Introduction to Optical, IR, X ray, γ ray telescopes, brief description of the various instruments.

UNIT 2 RADIO TELESCOPES AND RECEIVERS 9 Hrs.
Antennas, Types of interferometers, array, Radio telescopes of the world including GMRT, OOTY, PRL, Radio telescope receivers, total power receiver, Dicke receiver, correlation receiver, noise temperature. Noise sources.

UNIT 3 SOLAR SYSTEM, TERRESTRIAL AND JOVIAN PLANETS 9 Hrs.
Origin of solar system, occurrence of planetary systems, celestial mechanics, properties of the sun. Orbital and physical characteristics, atmosphere, Studies of Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune and their moons. Recent explorations of various planets.

UNIT 4 SCINTILLATION, PLASMA, IONIZATION 9 Hrs.
Interplanetary scintillation, interstellar scintillation, methods for probing solar wind, use of IPS in measurement of solar wind, study of irregularities in the interplanetary medium, properties of plasma at different distances from earth, photoionisation, cosmic ray ionization, meteoric ionization, various resonances in plasma, various waves in plasma, measurement procedures.

UNIT 5 DIAGNOSTIC TECHNIQUES FOR PROBING IONOSPHERE 9 Hrs.

Max. 45 Hours

TEXT / REFERENCE BOOKS

END SEMESTER EXAM QUESTION PAPER PATTERN
Max. Marks : 100
Exam Duration : 3 Hrs.
PART A : 10 questions of 2 marks each – No choice 20 Marks
PART B : 2 questions from each unit of internal choice, each carrying 16 marks 80 Marks
COURSE OBJECTIVE

- To provide qualitative description of interesting astronomical aspect and evolution of structures in the Universe.

UNIT 1  GRAVITY  9 Hrs.

Newtonian gravity and basic potential theory, Simple orbits – Kepler’s laws and precession, flat rotation curve of galaxies and implications for dark matter, virial theorem and simple applications, role of gravity in different astrophysical systems.

UNIT 2  RADIATIVE PROCESSES  9 Hrs.

Overview of radiation theory and Larmor formula, Different radiative processes: Thomson and Compton scattering, Bremsstrahlung, Synchrotron [detailed derivations are not expected] Radiative equilibrium, Planck spectrum and properties; line widths and transition rates in QT of radiation, qualitative description of which radiative processes contribute in which waveband/astrophysical system, distribution function for photons and its moments, elementary notion of radiation transport through a slab, concept of opacities.

UNIT 3  GAS DYNAMICS  9 Hrs.

Equations of fluid dynamics; equation of state in different regimes [including degenerate systems]; Models for different systems in equilibrium, Application to White dwarfs/Neutron stars, Simple fluid flows including supersonic flow, example of SN explosions and its different phases.

UNIT 4  STELLAR SYSTEM  9 Hrs.

Basic equations of stellar structure, Stellar energy sources; qualitative description of numerical solutions for stars of different mass, homologous stellar models, Stellar evolution, Evolution in the HR-Diagram.

UNIT 5  GALACTIC DYNAMICS  9 Hrs.

Milky Way Galaxy, Spiral and Elliptical galaxies, Galaxies as self gravitating systems; spiral structure, Supermassive black holes, Active galactic nuclei.

Max. 45 Hours

TEXT / REFERENCE BOOKS


END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 100

PART A : 10 questions of 2 marks each – No choice  20 Marks
PART B : 2 questions from each unit of internal choice, each carrying 16 marks  80 Marks
COURSE OBJECTIVE

- To enable the students understand the laws that govern the structure and properties of the atom, molecules and the nucleus. Also to provide an introduction to the elementary particles.

UNIT 1  IONS, ELECTRONS AND ATOMIC STRUCTURE  9 Hrs.
Detection of charged particles in electric and magnetic fields-Dunnigton's method for e/m-positive ray analysis:
Thomson's parabola method-Bohr's atom model-Sommerfeld's relativistic atom model-the Vector atom model and the
quantum numbers-comparison with quantum model. Coupling schemes: L-S coupling and j-j coupling–Pauli's exclusion
principle-Magnetic moment due to (i) orbital motion of the electron (ii) due to spin-Stern and Gerlach experiment

UNIT 2  ATOMIC AND MOLECULAR SPECTRA  9 Hrs.
Spin-orbit interaction in atomic spectra-fine structure and sodium doublet-Zeeman effect: experiment-classical
result-Quantum mechanical explanation-anomalous Zeeman effect-Paschen Back effect-Stark effect (qualitative)
Origin of a pure rotational spectra of a rigid linear molecule-vibrating diatomic molecule as a quantum harmonic
oscillator-pure vibrational spectra-Spectroscopy (Schematic): Ultraviolet-Infrared-absorption-Raman.

UNIT 3  PROPERTIES OF NUCLEI AND RADIOACTIVITY  9 Hrs.
Isobars, isotopes, mirror nuclei-Nuclear mass and binding energy-Parity-Nuclear spin–Mass defect and packing
fraction-Stable nuclei–Nuclear size, nuclear magnetic moment-Electric quadrupole moment-Nuclear energy levels.
Radioactivity: Range and stopping power of alpha particles.-Geiger-Nuttal law-Feature of alpha decay Tunnelling–Beta
ray spectrum-Energetic of beta decay-Detection of neutrino-Gamma ray absorption in matter.

UNIT 4  NUCLEAR MODELS, FISSION AND FUSION  9 Hrs.
Neutron: Discovery, Mass, Half life, Magnetic Moment, sources and detection–Shell model, Liquid drop theory-
Nuclear fission–Spontaneous fission and potential barrier-Self sustaining Chain Reaction–Neutron balance in Nuclear
Reactor-Uncontrolled chain reaction-Nuclear Fusion–radiation hazards and safety measures-Controlled fusion-Fusion
in stars..

UNIT 5  ELEMENTARY PARTICLE PHYSICS  9 Hrs.
Discovery of cosmic rays-primary and secondary rays-cosmic ray showers-discovery of positron–the mesons–
origin of cosmic rays-the Big-Bang theory-thermal history of the Universe-Hubble’s law–the future of the universe-dark
matter. Particles and anti-particles-antimatter-the fundamental interactions–elementary–particle numbers–
conservation laws and symmetry–the Quark model-quantum chromodynamics-the standard model– unification of
interactions–Grand unified theories. (Qualitative).

Max. 45 Hours

TEXT / REFERENCE BOOKS


END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 100
Exam Duration : 3 Hrs.
PART A : 10 questions of 2 marks each – No choice 20 Marks
PART B : 2 questions from each unit of internal choice, each carrying 16 marks 80 Marks