PRASAD V. POTLURI SIDDHARTHA INSTITUTE OF TECHNOLOGY AUTONOMOUS

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INFORMATION TECHNOLOGY ACADEMIC RULES AND REGULATIONS (PVP-19) AND **SYLLABUS**



Sponsored by

SIDDHARTHA ACADEMY OF GENERAL AND TECHNICAL EDUCATION, VIJAYAWADA





Prasad V. Potluri Siddhartha Institute of Technology (Autonomous) Approved by AICTE and Affiliated to JNTUK Accredited by NAAC : A+ All UG programs accredited by NBA, ISO 9001-2015 Certified Institute Vijayawada, Andhra Pradesh, India.

ACADEMIC RULES & REGULATIONS (PVP19)

AND

FOUR YEAR B.TECH COURSE STRUCTURE AND SYLLABUS

DEPARTMENT OF INFORMATION TECHNOLOGY

PREFACE

PVP Siddhartha Institute of technology, established in 1998, is one of the seventeen educational institutions sponsored and run by Siddhartha Academy of General & Technical Education. The 250 members of the Academy are a group of industrialists, educationists, auditors and philanthropists with vast experience in their respective fields and above all with an ardent desire to spread quality Education. All the academic organizations of Siddhartha Academy stand symbolic of the pragmatic vision of its founders. PVP Siddhartha Institute of Technology has the advantage of inheriting the higher academic standards. The college is approved by AICTE and is permanently affiliated to JNTUK. It is certified by ISO 9001-2015 for its quality standard. It is accredited by the National Board of Accreditation and NAAC with A^+ grade. Moreover, it is an Autonomous College.

The curriculum is revised continuously to address the challenges of industry and academia and to foster the global competencies among the students. The curriculum is revised two times since 2012. The present curriculum(PVP19) is designed incorporating the features such as outcome based approach, Choice Based Credit System, encouraging self-learning through MOOCs platforms i.e., Swayam, Coursera, EDX, NPTEL, etc., Transformation of creative ideas into a prototype through project phase I & phase II, enhancing depth & breadth by introducing more number of programs, open & interdisciplinary electives in core and multi-disciplinary areas, offering courses by industry experts to improve Industry Institute Interaction in addition to internships at industry and introduction of wide range of value added courses beyond curriculum to choose according to their interest to enhance their skills and employability.

VISION OF THE INSTITUTE

To provide rich ambience for academic and professional excellence, research,

employability skills, entrepreneurship and social responsibility.

MISSION OF THE INSTITUTE

To empower the students with technical knowledge, awareness of up- to-date technical trends, inclination for research in the areas of human needs, capacity building for employment/entrepreneurship, application of technology for societal needs.

VISION OF THE DEPARTMENT

To be a model center for Education and Training in the frontier areas of Information Technology.

MISSION OF THE DEPARTMENT

Offer High Quality Teaching and Learning in Information Technology to prepare students for higher studies and professional career in industry.

PROGRAM EDUCATIONAL OBJECTIVES

- 1. **PEO I** Shine as IT Expert with Proficiency in designing solutions to Information Engineering problems.
- 2. **PEO II Pursue** higher studies with the sound knowledge of fundamental concepts and skills in basic sciences and IT disciplines.
- 3. **PEO III -** Showcase professionalism, team work and expose to current trends towards continuous learning.
- 4. **PEO IV-** Equipped with integrity, ethical values and become responsible Engineers.

PROGRAM OUTCOMES

Engineering Graduates will be able to:

- 1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- 2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- 3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- 4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- 5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- 6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- 7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- 8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

- 9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- 10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- 11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- 12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs)

- 1. **PSO1-** Ability to understand, analyze and develop computer programs in the areas related to Algorithms, system software, application software, web design, big data analytics, database design and networking for efficient design of computer based systems of varying complexity.
- 2. **PSO2-** Ability of analyzing the general business functions to design and develop with appropriate Information Technology solutions.

QUALITY POLICY

At PVPSIT, We commit ourselves to offer quality professional education in Engineering & Management by adhering to applicable statutory and regulatory requirements and through continuous improvement in the Quality of our services by,

- Regular upgradation of knowledge and skills of faculty
- Improving the teaching methods and strategies
- Providing state of art infrastructure
- Recruiting competent faculty and maintaining prescribed Teacher Student ratio
- Improving the employability of students
- Enhanced Collaboration with industry and institutions of National Repute

ACADEMIC RULES & REGULATIONS (PVP19)

1. SHORT TITLE AND COMMENCEMENT

- a. The regulations listed under this head are common for all degree level undergraduate programmes (B.Tech.), offered by the college with effect from the academic year 2019-20 and they are called as "PVP19" regulations.
- b. The regulations hereunder are subjected to amendments as may be made by the Academic Council of the college from time to time, keeping in view of the recommendations of the Board of Studies. Any or all such amendments will be effective from such date and to such batches of candidates including those already undergoing the programme, as may be decided by the Academic Council.

2. **DEFINITIONS**

- a. "Commission" means University Grants Commission (UGC);
- b. "Council" means All India Council for Technical Education (AICTE);
- c. "University" means Jawaharlal Nehru Technological University Kakinada (JNTUK);
- d. "College" means Prasad V Potluri Siddhartha Institute of Technology, Vijayawada;
- e. An **Academic Programme** means any combination of courses and/or requirements leading to award of a degree.
- f. "**Course**"meansasubjecteithertheoryorpracticalidentifiedbyitscourse title and code number and which is normally studied in a semester.
- g. "**Degree**" means an academic degree conferred by the university upon those who complete the undergraduate curriculum.
- h. "CBCS" means Choice Based Credit System
- i. "MOOC" means Massive Open Online Course
- j. "**Regular Students**" means students enrolled into the four year programme in the first year.
- k. "Lateral Entry Students" means students enrolled into the four year programme in the second year.

3. ACADEMIC PROGRAMMES

Nomenclature of Programmes

The nomenclature and its abbreviation given below, shall continue to be used for the Degree programmes under the University, as required by the Council and the Commission.

Bachelor of Technology(B.Tech)

Besides, the name of specialization shall be indicated in brackets after the abbreviation, for example, engineering degree in Information Technology programme is abbreviated as B.Tech (Information Technology).

Bachelor of Technology(B.Tech.)degree programme is offered in:

- 1. Civil Engineering(CE)
- 2. Computer Science and Engineering(CSE)
- 3. Electronics and Communication Engineering(ECE)
- 4. Electrical and Electronics Engineering(EEE)
- 5. Information Technology(IT)
- 6. Mechanical Engineering(ME)

4. DURATION OF THE PROGRAMMES

Normal Duration

The duration of an academic programme shall be four years consisting of eight semesters.

The duration of the programme for lateral entry students who are admitted in II year shall be three years that consists of six semesters.

Maximum Duration

4.2.1 The maximum period for which a student can take to complete a full time academic programme shall be double the normal duration of the programme, i.e., for regular students eight years, for lateral entry students six years.

Minimum Duration of a Semester

Each semester consists of a minimum of 90 instruction days excluding examination days with about minimum 26 and maximum 35 contact hours per week.

5. ADMISSION CRITERIA

The eligibility criteria for admission into UG Engineering programmes are as per the norms approved by Government of Andhra Pradesh from time to time.

The sanctioned seats in each programme in the college are classified into CATEGORY-A, and CATEGORY-B at I year level and only CATEGORY-A at Lateral Entry II year level.

The percentages of Category–A, Category-B and Lateral Entry Seats are decided from time to time by the Government of Andhra Pradesh.

CATEGORY-A Seats

Category - A seats are filled as per the norms approved by the Government of Andhra Pradesh.

CATEGORY–B Seats

Category - B seats are filled by the College as per the norms approved by the Government of Andhra Pradesh.

CATEGORY-Lateral Entry Seats

Lateral entry candidates shall be admitted into the III semester directly as per the norms approved by Government of Andhra Pradesh.

6. CREDITSYSTEMANDGRADEPOINTS

Credit Definition

'Credit' means quantified and recognized learning. Credit is measured in terms of contact hours per week in a semester. Typically one credit is given to:

- (a) Theory/Tutorial course conducted for one contact period.
- (b) Laboratory course conducted for two contact periods.

Each course is assigned a certain number of credits depending upon the number of contact hours (Lectures/Tutorials/Practical) per week.

The curriculum of the eight semesters B.Tech program is designed to have a total of 160 credits for the award of B.Tech degree.

For lateral entry students, the curriculum of six semesters B.Tech program is designed to have a total of 121.5 credits for the award of B.Tech degree.

Grade Points and Letter Grade for a Course

The grade points and letter grade will be awarded to each course based on student's performance as per the grading system shown in the Table1.

Theory/Drawing	Laboratory/Project	Grade	Letter
% of Marks	% of Marks	Points	Grade
≥90%	≥90%	10	S
80 - 89%	80 - 89%	9	А
70 -79%	70 -79%	8	В
60 -69%	60 -69%	7	С
50 -59%	55 -59%	6	D
40 -49%	50 - 54%	5	E
<40%	<50%	0	F(FAIL)
ABSENT	ABSENT	0	AB

Table1: Grading System for B.Tech Programme

Semester Grade Points Average(SGPA)

The performance of each student at the end of the each semester is indicated in terms of SGPA calculated as shown in equation (1).

 $SGPA \square \square \square CR \square GP \square$

 $\Box CR \Box$ for all courses offered in the semester \Box

--(1)

Where CR=Credits of a course

GP=Grade points awarded for a course

Cumulative Grade Point Average(CGPA)

The Cumulative Performance of each student at the end of each semester is indicated in terms of CGPA which is calculated as shown in equation (2).

CGPA =

 $\sum CRXGP$

 $\sum CR(for all courses of fere dup to that semester/entire program)$

-- (2)

Where CR = Credits of a course

GP=Grade points awarded for a course

Percentage equivalent of CGPA = (CGPA - 0.5) * 10

7. CURRICULUM FRAME WORK

General Issues

Curriculum framework is important in setting the right direction for a degree programme as it takes into account the type and quantum of knowledge necessary to be acquired by a student in order to qualify for the award of degree in his/her chosen branch or specialization.

Besides, this also helps in assigning the credits for each course, sequencing the courses semester-wise and finally arriving at the total number of courses to be studied and the total number of credits to be earned by a student in fulfilling the requirements for conferment of degree.

Each theory course shall consist of five units.

Curriculum Structure

The curriculum is designed to facilitate CBCS and incorporates courses required to attain the expected knowledge, skills and attitude by the time of graduation as per the needs of the stakeholders. The curriculum structure consists of various course categories (as described in 7.2.1 to7.2.6) to cover the depth and breadth required for the programme and for the attainment of programme outcomes of the corresponding programme.

Institutional Core

Institutional Core consists of the courses required for all UG Engineering Programmes offered in this college. The courses offered under this category cover the required knowledge in the following areas:

(a) **Basic Sciences:**

Basic Science courses include Engineering Physics, Applied Physics, Engineering Physics Lab, Applied Physics Lab Engineering Chemistry, Chemistry of Materials, Engineering Chemistry Lab, Chemistry of Materials Lab, Mathematics I (calculus and Algebra), Engineering Mathematics II (ODE, PDE and Multivariable Calculus), Engineering Mathematics III, Engineering Mathematics IV, Life Sciences for Engineers and Life Sciences for Engineers Lab.

(b) Engineering Sciences:

Engineering Science courses include Problem Solving and Programming, AI Tools, Internet of Things, Design Thinking & Product Innovation, Basic Electrical and Electronics Engineering, Engineering Graphics, Problem Solving & Programming Lab, Basic Electrical & Electronics Engineering Lab, AI Tools Lab, Internet of Things Lab, Design Thinking and Product Innovation Lab and Basic Workshop.

(c) Humanities and Social Sciences:

Humanities and Social Science Courses consist of Communicative English I, Communicative English II, HS-I (Engineering Economics & Management), HS-II (Organizational Behavior), Communicative English I Lab and Communicative English II Lab.

Elective Courses

Elective courses are offered across the programmes to enhance the knowledge breadth and professional competency of the students.

Courses	Branch Specific	Compulsory
	Program Electives	Supportive to the discipline courses with expanded scope in a chosen track of specialization or Cross track courses
Elective courses	Interdisciplinary Electives	Interdisciplinary exposure & nurture the student interests in other department courses
	Open Electives	Common to all disciplines that helps general interest of a student

Greater flexibility to choose variety of courses is provided through Massive Open Online Courses (MOOCs) during the period of study. Students without any backlog courses upto III semester are permitted to register for MOOCs from IV semester onwards upto a maximum of 15 credits from Program Elective/Interdisciplinary Elective/Open Elective Courses. However, the Departmental Committee (DC) has to approve the courses under MOOCs. The Departmental committee consists of Head of the Department, Program coordinator and Module Coordinator.

Students can register and complete the opted course in approved MOOCs platform on or before the last instruction day of IV/V/VI/VII semester. They have to submit the pass certificate before the last instruction day of that concerned semester.

Programme Core

The Programme core consists of set of courses considered which are necessary for the students of the specific programme. The courses under this category satisfy the Programme Specific Criteria prescribed by the appropriate professional societies.

Project

Project Phase I & Project Phase II will be initiated in VII semester and completed before the end of VIII semester.

Project Phase I can be done by a group of students, working under the guidance of a faculty member and carrying out a detailed feasibility study, literature survey and submit are port regarding work plan for the project phase II.

Project Phase II involves continuation of Project Phase I. The objective is to complete the work as per the prepared work plan and submit a detailed project report.

Industry Interaction

The students may register for either Internship or Industry offered course during the summer break after VI semester to secure 2 credits.

Internship/Industry offered courses are purely meant for internal Assessment which will be evaluated for 75 marks during the VII semester.

a) Internships

The students may undergo Internship for 3 to 6 weeks duration in the industry approved by respective head of the department at the end of VI semester.

b) Industry offered courses

The students can opt for the courses under this category that are offered by the Industry experts whose minimum academic qualification is Bachelor of Engineering or equivalent.

Mandatory Learning Courses

According to the guidelines given by statutory bodies, Courses on Environmental Science, Constitution of India and Engineering Ethics shall be offered.

Induction program shall be offered in I semester for all the branches.

NCC/NSS/NSO/YOGA shall be offered in I & II semesters.

Environmental Science and Constitution of India shall be offered in III & IV semesters.

Engineering Ethics shall be offered in V/VI semesters.

Course Numbering Scheme

The Course code consists of Eight/Nine characters. The following is the structure of the course Code (Figure 1).

19	CS		1	2	0	3	Α
Regulation	Course Category		Kind of course	Semester	Туре	Course Number	[Elective code]
Last two digits of Regulation	HS-Humanities and Social Sciences including Management courses	1.	Institutional Core (i.e.HS, BS, ES, MC)	1- First 2- Second	0 - Theory 0- Theory	i.e. Course sequence Number in that	Incase if the course is Elective then this field will specify the
offered (i.e. 19 for	BS-Basic Science courses	2.	Inter Disciplinary	3- Third	studied in MOOCS	semester	elective code (i.e. A, B, C.)
PVP19 regulations)	ES - Engineering Science		Elective	4- Fourth	Mode		
	MC - Mandatory Courses	3.	Program Core	5- Fifth	5 - Practical		
	In case of Professional Core/ Professional Elective courses department code is placed:	4. 5	Program Elective	6- Sixth	6 - Project Work		
	CE-Civil Engineering CS-Computer Science & Engineering	5.	openElective	7- Seventh	7 - Industrial Training/		
	EC -Electronics and Communication Engineering			8- Eight	Internship		
	EE-Electrical &Electronics Engineering IT - Information Technology ME-Mechanical Engineering						

Figure 1: Course numbering scheme

Medium of Instruction and Examination

The medium of instruction and examinations shall be English.

Registration

Every student has to register himself/herself for the courses in each semester individually at the time as specified in academic calendar.

8. Choice Based Credit System(CBCS)

Choice Based Credit System (CBCS) shall be introduced with effect from 2019-20 academic year, based on guidelines of the statutory bodies in order to promote:

- Activity based learning
- o Student centered learning
- o Students to choose courses of their choice
- Learning at their own pace
- Inter disciplinary learning

Flexibility is extended to the fast learning students to take the courses of higher semesters in advance as per their convenience to concentrate on their placement activity/ project work, etc., during the VII/VIII semesters.

CBCS Course Registration Policy

Fast learning students can register for additional courses from higher semesters by satisfying the pre-requisite course(s) to a maximum of 8 credits in each of the semesters from III semester onwards along with the regular semester courses as prescribed. There is no minimum limit to the credits for taking additional courses.

Eligibility for choosing CBCS flexibility:

- **Regular Students (4 Year duration),** entering the nth semester with no backlog courses up to (n-1)thsemester, are only eligible to opt for this flexibility.
- Lateral entry students (3 year duration) with 70% Marks in their Diploma are eligible to opt for this flexibility during III and IV Semesters. Those students entering into V/ VI /VII semester with no backlog courses

up to (n-1) semester, are only eligible to opt for this flexibility

The list of additional courses offered in the even & odd semesters, registration dates will be notified by the respective departments well in advance.

A student can withdraw from the respective course within 15 days after the commencement of the course.

The choice of utilizing this flexibility is purely optional to the students.

A minimum number of students required to register for an additional course shall be twenty (20). In case, the registered strength for the additional course is less than twenty (20), the course may be offered on the recommendation of the Head of the Department and subsequent approval of the Principal.

Continuous Internal Evaluation(CIE)for CBCS opted Courses

The contact hours, continuous assessment pattern, eligibility criteria to write end semester examinations and revaluation scheme for these additional courses will be as per the current academic regulations [PVP19].

Eligibility to appear CBCS registered courses for Semester End Examinations

The registered additional courses will be dealt separately as individual courses for the calculation of attendance and continuous assessment of marks for assessing the eligibility to write the end semester examinations for these courses.

The performance of the student in the registered additional courses will be separately mentioned in the semester end grade card and it will not be taken into account for the calculation of the SGPA for that semester.

The performance of the student in the registered additional courses will be taken into account in the corresponding semesters.

CBCS Course Detention

In case, the student is detained for want of minimum specified attendance and continuous assessment marks criterion either in the regular semester or in the additional courses, he/she will forfeit the eligibility for registering additional courses from that semester onwards. However, the additional courses completed by the students in the earlier semesters will be valid and taken into consideration.

In case, the student is detained for want of minimum specified attendance and continuous assessment marks criterion in the regular semester but meets minimum specified attendance and continuous assessment marks criterion in the registered additional courses, he/she shall write the end semester examinations for these additional courses along with the regular students in the corresponding semester only.

In case, the student fails/is absent in the end semester examinations of the registered additional courses or in the regular semester courses in a particular semester, he will forfeit the eligibility for registering additional courses from that semester onwards. However, the additional courses completed by the students in the earlier semesters will be valid and taken into consideration. They can write the end semester examinations for additional courses in which they failed/were absent, along with regular students in the corresponding semesters only.

The criterion for the promotion to higher semesters will be as per PVP19 regulations, taking only the regular semester courses into consideration for the fast learners.

Additional courses, in which the fast learning student fails, will not be considered as backlogs for them.

The fast learning students shall register for all the courses of a regular semester excluding the courses completed in the previous semesters.

The credits scored by students through CBCS subjects shall not be considered for credit promotion from II year to III year or from III year to IV year B.Tech.

The student opting for the said flexibility will be considered for the award of the division on par with other regular students.

The students who have earlier history of indulging in malpractices in semester end examinations are not eligible for opting CBCS

If the student fails to register for opted CBCS courses for semester end examination, he/she will forfeit the eligibility for registering additional courses from that semester onwards and marks secured through continuous assessment will not be considered.

The choice of utilizing this flexibility is purely optional to the students.

If a student fails/absent in a CBCS course, he/she is bound to appear in the same course when studied in regular semester.

9. EXAMINATIONS & SCHEME OF EVALUATION

Description of Evaluation

Continuous Internal Evaluation (CIE): The performance of the student in each course is evaluated by the faculty/course coordinator all through the semester; with mid-term tests (sessional-1and sessional-2), assignments, project reviews, viva-voce, laboratory assessment and other means covering the entire syllabus of the course.

Semester End Examination (SEE): It shall be conducted by chief controller of examinations at the end of each semester, as per the academic calendar and with a written examination for theory courses and practical/project examination with built-in oral part for laboratory/project.

Continuous Internal Evaluation(CIE)

Theory Courses

Each course is evaluated for 30 marks (a+b+c)

a) Two assignment tests (Assignment Test-1 & Assignment Test-2) for 10 marks each will be conducted with1 hour duration. Assignment-1 shall be conducted from Unit-1 and Assignment-2 shall be conducted from Unit-4. The assignment test marks shall be awarded taking the average of two Assignment tests.

The Assignment test shall be held in the zero hour and the class work will be conducted as usual in those days.

The Question bank with minimum number of 6 comprehensive questions from the concerned UNIT of the syllabus will be given to students at least a week in advance before the commencement of Assignment Test.

The question paper shall contain 2 comprehensive questions, each one is meant for 5 Marks. The student is required to answer all the questions.

- b) Home assignment shall be conducted for 5 marks from Unit-3. The question bank with 10 to 15 comprehensive questions from unit-3 shall be given to students. Each student has to answer 3 questions from the question bank which will be assigned by the concerned faculty.
- c) Two Mid-term(Sessional -1and Sessional -2)examinations with 15 Marks each shall be conducted with **90 minutes** duration.

The Mid-term examinations shall be held in the zero hour and class work shall be conducted as usual in those days.

The Mid-term marks shall be awarded taking the average of two Mid-term examinations.

The question paper shall be given in the following pattern:

- **Part A:** Contains two questions, one from each unit. The student shall answer all questions. Each question is for 2.5 marks.
- **Part B:** Contains four questions. Two questions shall be given from each unitwithinternalchoice. The student shall answer 1 question from each unit. Each question carries 5 marks.

Syllabus for CIE

Name of the Test	Syllabus
AssignmentTest-1	UNIT–I
Sessional-1	UNIT-I&UNIT–II
Home Assignment	UNIT–III
AssignmentTest-2	UNIT–IV
Sessional-2	UNIT–IV&UNIT–V

The questions shall be framed in Assignment tests and Sessional examinations in line with the Course Outcomes defined and cognitive levels.

Mandatory Learning Courses

Each course is evaluated for 100 marks(a+b)

a) Two Mid-term(Sessional-1 and Sessional-2)examinations each for 40 Marks shall be conducted with **90 minutes** duration.

The Mid-term examinations shall be held in the zero hour and the class work shall be conducted as usual in those days.

The question paper shall be given in the following pattern:

The question paper contains four questions. Two questions shall be given from each unit with internal choice. The student shall answer one question from each unit. Each question carries 20 marks.

b) Home assignment for 20 marks shall be conducted from Unit-3. The question bank with 10 to 15 comprehensive questions from unit-3 shall be given to students. Each student has to answer 4 questions from the question bank which will be assigned by the concerned faculty.

The Mid-term marks shall be awarded as sum of two Mid-term examinations and home assignment.

Syllabus for CIE

Name of the Test	Syllabus
Sessional-1	UNIT–I&II
Home Assignment	UNIT–III
Sessional-2	UNIT–IV&V

Laboratory Courses

For Laboratory courses, there shall be continuous evaluation during the semester for 25 marks and semester end evaluation for 50 marks. The distribution of marks for continuous internal evaluation is given in the Table 2:

Table2:Distribution of Marks(CIE)

S.No.	Criterion	Marks
1	Day to Day work	10
2	Record	05
3	Internal Exam	10

Project Phase I

For Project Phase I, there shall be continuous internal evaluation during the semester for 100 marks. The continuous internal evaluation for the Project Phase I shall be on the basis of day to day assessment by the project guide and two reviews conducted by the Project Review Committee (PRC). The PRC consists of Head of the Department, Programme Coordinator, Senior Faculty member of the department and Project guide. The distribution of continuous internal evaluation marks is given in the Table 3:

Table3: Distribution of Marks(CIE)

S.No.	Criterion	Marks
1	Day to Day Assessment	40
2	Two Reviews	30+30

Project Phase II

For Project Phase II, there shall be continuous internal evaluation during the semester for 100 marks and semester end evaluation for 100 marks. The continuous internal evaluation for the Project Phase II shall be on the basis of day to day assessment by the project guide and two reviews conducted by the Project Review Committee (PRC). The PRC consists of Head of the Department, Programme Coordinator, Senior Faculty member of the department and Project guide. The distribution of marks is given in the Table 4:

Table 4: Distribution of Marks(CIE)

S.No.	Criterion	Marks
1	Day to Day Assessment	40
2	Two Reviews	30+30

MOOCs Courses

Students who have qualified in the examination conducted by the MOOCs providers as specified in 7.2.2 are exempted from appearing in the continuous and semester end evaluations conducted by the institution.

In case, a student fails to complete the MOOCs course offered by MOOC's providers, he/she may be allowed to register again for the same with any of the

providers from the list provided by the department or the student may be allowed to register for the course as and when offered by the college as supplementary candidate.

Students Registered and cleared the opted courses in MOOC's are exempted from appearing Semester end examinations conducted by the Institute.

The Scheme of Evaluation for MOOCs courses shall be scaled to continuous internal evaluation as 30 marks and semester end examination as 70 marks.

Semester End Examination

Theory Courses: 70 Marks

The Semester end examination shall be conducted with 3 hours duration at the end of the semester. The question paper shall be given in the following pattern:

- a) **Part A:** Contains 5 questions of 2 marks each to test the knowledge level of the student. One question shall be given from each unit of the prescribed syllabus included in five units. The student shall answer all questions.
- b) Part B: Contains 10 questions. Two questions from each unit shall be given with internal choice. Each question carries 12 marks. Each course shall consist of five units of syllabus. The student shall answer one question from each unit.

The questions shall be framed in line with the Course Outcomes defined and cognitive levels.

Laboratory Courses: 50 marks

i. The Semester end examination for laboratory courses shall be conducted with three hour duration at the end of semester for 50 marks as given below:

S.No.	Criterion	Marks
1	Procedure	10
2	Experiment/Programme	20
	Execution	
3	Result	10
4	Viva-Voce	10

Table 5: Distribution of Marks(SEE)

ii. Each Semester end Laboratory Examination shall be conducted by an External Examiner along with the Internal Examiner.

Project Phase II: 100 marks

The semester end examination for project phase II shall be held for 100 marks by a committee consisting of an external examiner, Head of the Department, Programme coordinator and Project guide. The evaluation of the project work shall be conducted at the end of the VIII Semester.

The average of the marks awarded by the committee members shall be taken into consideration in case of variation among the members.

The evaluation of 100 marks is distributed as given in Table 6:

Table6: Distribution of Marks in Project Phase II

Sl.No.	Criterion	Marks
1	Report	40
2	Presentation	30
3	Viva–Voce	30

Internship/Industry Interaction: 75Marks

a) Internships:

The candidate shall submit the comprehensive report to the department. The report will be evaluated for 75 marks by the Review Committee consisting of Head of the department, Programme Coordinator and Concerned Industry Representative/ Industry Institute Interaction Coordinator.

b) Industry Offered Courses:

The semester end examination for the courses under this category is evaluated for 75 marks and it shall be conducted and evaluated by the industry expert who has delivered the lecture or by the faculty nominated by the head of the department in consultation with the industry expert. The question paper pattern shall be decided by the industry expert at the beginning of the course and the same is to be approved by the Principal.

There will not be continuous internal evaluation for the courses under this category.

Conditions for Pass Marks

A candidate shall be declared to have passed in individual theory/drawing

Course if he/she secures a minimum of 40% aggregate marks(Continuous Internal Evaluation & Semester End Examination marks put together), subject to a minimum of 35% marks in semester end examination.

A candidate shall be declared to have passed in individual laboratory course/project if he/she secures a minimum of 50% aggregate marks (Continuous Internal Evaluation &Semester End Examination marks put together), subject to a minimum of 40% marks in semester end examination.

Mandatory Courses are assessed for PASS or FAIL only. No grade will be assigned to these courses. If a candidate secures more than 40 out of 100 marks, he / she will be declared PASS or else FAIL.

Mandatory courses NCC/NSS/NSO/YOGA are assessed for satisfactory or not satisfactoryonly.Nogradewillbeassigned.Acandidatehastoundergotwohours training per week in any one of the above in both I and II semesters.

The student has to get pass marks in the failed course by appearing the supplementary examination as per the requirement for the award of degree.

The student shall earn assigned credits for the course on passing a course of a programme.

Revaluation

Continuous Internal Evaluation

The continuous Evaluation scripts shall be shown to the students before finalizing the marks. However, if the student has any concern, not addressed before the finalization of marks, he/she may submit the application for revaluation to the concerned head of the department.

The Head of the Department may constitute a two member committee for re-evaluating the script. The evaluation of the committee is final and binding.

Semester End Examination

- 1. As per the notification issued by the Controller of Examinations, the students can submit the applications for revaluation, along with the requisite fee receipt for revaluation of his/her answer script(s) of theory course(s), if he/she is not satisfied with the marks obtained.
- 2. The Controller of Examinations shall arrange for re-evaluation of those answer script(s).
- 3. A new external examiner, other than the first examiner, shall reevaluate the answer script(s).

- 4 Revaluation marks will be taken into consideration only if the difference between the two valuations is more than or equal to 15%. Better marks between the two shall be taken into consideration. However, if the revaluation marks facilitates passing of the candidate, then the revaluation marks will be considered even if the difference of marks is less than 15%.
- 5 If the difference of marks between the two valuations is more than 20%, theanswerscriptwillbereferredtothirdvaluation.Theaverageofnearest two marks will be awarded.

With holding of Results

If the student has not paid the dues to the college, or if any case of malpractice or indiscipline is pending against him, the result of the student will be kept as withheld and he/she will not be allowed to enter the next semester. His/her degree shall be considered as withheld in such cases.

10 CRITERIATOATTENDSEMESTERENDEXAMINATIONAND PROMOTION TO HIGHER SEMESTER

Eligibility for Semester End Examinations

Students shall put in a minimum average attendance of 75% in the courses from category 7.2.1 to 7.2.6 put together, computed by totaling the number of periods of lectures, tutorials, drawing, practical and project work as the case may be, held in every courseas the denominator and the total number of periods attended by the student in all the courses put together as the numerator, to be eligible to write semester end examinations.

Condonation of shortage in attendance may be recommended by respective Heads of Departments on genuine medical grounds, provided the student puts in at least 65% attendance as calculated above and provided the Principal is satisfied with the genuineness of the reasons and the conduct of the student.

Students, having more than 65% and less than 75% of attendance, shall have to pay requisite fee towards condonation.

Conditions for Promotion

A student shall be eligible for promotion to next Semester of B.Tech. programme, if he/she satisfies the conditions as stipulated in Regulations **10.1**.

Further, a student shall be eligible for promotion to V / VII Semester of B.Tech. programme, if he/she completes the academic

Requirements of 50% of the credits upto IV/VI semesters.

Promotion to V Semester

For Four Year B.Tech Course candidates

A four year programme student shall be promoted from IV semester to V semester only if he/she earns 50% credits of the designed programme credits from I semester to IV semester.

Promotion to VII Semester

i) For Four Year B.Tech Course candidates

A four year programme student shall be promoted from VI semester to VII semester only if he/she earns 50% credits of the designed programme credits from I semester to VI semester.

ii) For Lateral Entry candidates

A lateral entry student shall be promoted from VI semester to VII semester only if he/she earns 50% credits of the designed programme credits from III semester to VI semester.

For Detained Students

- a) Students who are already detained for want of credits shall be promoted to V Semester if he/she fulfills the 50 % of the credit requirements from all the regular and supplementary examinations held upto IV Semester till the commencement of next academic year.
- b) Students who are already detained for want of credits shall be promoted to VII Semester if he/she fulfills the 50 % of the credit requirements from all the regular and supplementary examinations held upto VI Semester till the commencement of next academic year.

11. SUPPLEMENTARYEXAMINATIONS

General

Semester end Supplementary examinations shall be conducted along with regular semester end examinations.

Advanced Supplementary Exams

Candidate(s), who fails in Theory or Laboratory courses of VIII semester, can appear for advanced supplementary examination conducted within one month after declaration of the revaluation results. However, those candidates who fail in the advanced

supplementary examinations of VIII semester shall appear for subsequent examinations along with regular candidates conducted at the end of the respective academic year.

12. READMISSION CRITERIA

A candidate, who is detained in a semester due to lack of attendance/credits, has to obtain written permission from the Principal for readmission into the same semester after duly fulfilling all the required norms stipulated by the college in addition to paying an administrative fee of **Rs. 1,000/-**

Rules for calculation of attendance for readmitted students

- a) Number of classes conducted shall be counted from the commencement day of the semester concerned, irrespective of the date of payment of tuition fee.
- b) They shall submit a written request to the principal of the college, along with a challan paid towards tuition and other fee, for readmission before the commencement of the class work.
- c) They can get the information regarding date of commencement of class work for each semester that will be made available in the college notice boards/website from time to time.

13. BREAK IN STUDY

Student, who discontinues the studies for valid reason permitted by the principal, shall get readmission into appropriate semester of B.Tech. programme after break-in study, with the prior permission of the Principal and following the transitory regulations applicable to such batch in which he/she joins. An administrative fee of **Rs**. 1000/-per each year of break in study, in addition to the prescribed tuition and special fee has to be paid by the candidate to condone his/her break in study.

14. TRANSITORY REGULATIONS

A candidate, who is detained or discontinued in a semester, on re-admission, the academic regulations under which he/she has originally admitted will continue to be applicable to him/her on re-admission.

15. ELIGIBILITY FOR A WARD OF B.TECH. DEGREE

The B.Tech. Degree shall be conferred on a candidate who satisfies the following requirements.

ARegularstudent(fouryearprogramme)shallregisterandsecurehimself/her self for **160** Credits from the categories 7.2.1 to 7.2.6

A Lateral Entry student (three year programme) shall register and secure himself/herself for **121.5** credits from the categories 7.2.1 to 7.2.6

Award of Division

The criteria for award of division, after successful completion of programme is as shown in table 6

CGPA	DIVISION
≥7.5	First Class with distinction*
≥6.5-<7.5	First Class
≥5.5-<6.5	Second Class
≥5.0-<5.5	Pass Class
<5.0	Fail

Table6:Criteria for Award of Division

- *Awarded only if all the courses prescribed are cleared in single attempt within four years for regular candidates and three years for lateral entry candidates
- * Detained and break-in study candidates are not eligible for the award of First Class with Distinction
- * The cases of students who are absent for semester end examination only once in his/her duration of B.Tech. programme on valid medical grounds/humanitarian grounds shall also be considered for the award of First class with Distinction subject to the recommendations of the committee constituted by the Principal.

For the purpose of awarding First, Second and Pass Class CGPA obtained in the examinations appeared within the maximum period allowed for the completion of the programme shall be considered.

Consolidated Grade Card

A consolidated grade card containing credits & grades obtained by the students will be issued after successful completion of the four year B.Tech Programme.

16. CONDUCT AND DISCIPLINE

Students shall conduct themselves within and outside the premises of the Institute in a manner befitting the students of our Institution.

As per the order of Honorable Supreme Court of India and AICTE guidelines, ragging in any form is considered a criminal offence and is

banned. Ragging within or outside any educational institution is prohibited. Ragging means doing an act, that causes or is likely to cause insult or annoyance or fear of apprehension or threat or intimidation or outrage of modesty or injury to a student. Any form of ragging will be severely dealt with as per AP Prohibition of Ragging Act-1997 section-4.

Nature of ragging	Punishment
Teasing, embarrassing and humiliating	Imprisonmentupto6monthsorfine upto Rs.1,000/- or both
Assaulting or using criminal Force or criminal intimidation	Imprisonmentupto1yearorfine uptoRs.2,000/-or both
Wrongfully restraining or Confining or causing hurt	Imprisonmentupto2yearsorfine uptoRs.5,000/-or both
Causing grievous hurt kidnapping or raping or committing unnatural offence	Imprisonmentupto5yearsandfine upto Rs.10,000/-
Causing death or abetting suicide	Imprisonmentupto10yearsandfine uptoRs.50,000/-

Table–7: Punishments for Ragging

A student who is convicted of an offence and punished with imprisonment for a term of more than six months shall not be admitted into the institution.

Whenever any student complains of ragging to the head or manager of an educational institution, such head or manager should inquire into the complaint and if the complaint is prima-facie found true, should suspend the student or students complained against.

If the head or manager of an educational institution fails or neglects to take action in the manner specified in the Act, the person shall be deemed to have abetted the offence and shall be punished with the punishment provided for the offence.

If a student commits suicide due to or in consequence of ragging, the person who commits such ragging shall be deemed to have abetted such suicide.

The following acts of omission and/or commission shall constitute gross violation of the code of conduct and are liable to invoke disciplinary measures.

i. Lack of courtesy and decorum; indecent behaviour anywhere within or outside the campus.

 Possession, consumption or distribution of alcoholic drinks or any kind of narcotics or hallucinogenic drugs.

The following activities are not allowed within the campus:

- Mutilation or unauthorized possession of library books.
- ▶ Noisy and unseemly behavior, disturbing studies of fellow students.
- Hacking computer systems (such as entering into other person's areas without prior permission, manipulation and/or damage of computer hardware and software or any other cybercrime etc.)
- Use of mobile phones.
- Plagiarism of any nature.
- > Any other act of gross indiscipline as decided by the Institute from time to time.
- Commensurate with the gravity of offense, the punishment may be reprimand, fine, expulsion from the institute/ hostel, debarment from a examination, disallowing the use of certain facilities of the Institute, rustication for a specified period or even outright expulsion from the Institute, or even handing over the case to appropriate law enforcement authorities or the judiciary, as required by the circumstances.
- For an offence committed in (i) a hostel, (ii) a department or in a class room and (iii) elsewhere, the Chief Warden, the Head of the Department and the Principal, respectively, shall have the authority to reprimand or impose fine.
- Cases of adoption of unfair means and/or any malpractice in an examination shall be reported to the Principal for taking appropriate action.
- ▶ Unauthorized collection of money in any form is strictly prohibited.
- Detained and break-in-study candidates are allowed into the campus for academic purposes only with the permission from authorities.
- Misconduct committed by a student outside the Institute campus but having the effect of damaging, undermining & tarnishing the image & reputation of the institution will make the student concerned liable for disciplinary action commensurate with the nature and gravity of such misconduct.

- The disciplinary action committee constituted by the Principal, shall be the authority to investigate the details of the offence, and recommend disciplinary action based on the nature and extent of the offence committed.
- Grievance redressal committee, constituted by the Principal, shall deal with all grievances pertaining to the academic/ administrative and disciplinary matters.
- > All the students must abide by the code and conduct rules of the Institute.

17 MALPRACTICES

The Principal shall refer the cases of malpractices by students in internal assessment tests and end semester examinations, to a malpractice enquiry committee constituted for the purpose. The committee shall follow the approved scales of punishment.

The committee consists of:

- 1. Heads of Department(Three)
- 2. Controller of Examinations
- 3. Deputy Controller of Examinations

Table-8: Disciplinary action for malpractices/improper conduct in examinations

	Nature of Malpractices/Improper	Punishment
	conduct	
1 (a)	If the candidate possesses or keeps accessible, any paper, note book, programmable calculators, mobile phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in the examination hall but has not made use of (material shall include any marks on the student's body that can be used as an aid in the subject of the examination)	Expulsion from the examination hall and cancellation of the performance in that subject only.
(b)	If the candidate gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through mobile phones with any candidate or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. In case of an outsider, he will be handed over to the police and a case is registered against him.
2	If the candidate has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of Material relevant to the subject of the	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and Project work. He shall not be permitted to

	examination(theory or practical)in	Appear for the remaining examinations of the subjects of that semester/year. The hall ticket
	which the candidate is appearing.	Of the candidate is to be cancelled.
3	If the candidate impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred and forfeits the seat. The performance of the original candidate, who has been impersonated, shall be cancelled in all the subjects of the examination (including practicals and project work) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the imposter is an outsider, he will be handed over to the police and a case is registered against him.
4	If the candidate smuggles in an answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all other examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
5	If the candidate uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner Requesting him to award pass marks.	Cancellation of the performance in that subject.
6	If the candidate refuses to obey the orders of the Chief Superintendent/Assistant - Superintendent/any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in charge or any person on duty in or outside the Examination hall of any injury to his	In case of students of the Institute, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has(have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The candidates also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.

	person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer-in- charge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which results in damage to or destruction of property in the examination hall or any part of the Institute campus or engages	
	in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	
7	If the candidate leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all other examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
8	If the candidate possesses any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred And forfeits the seat.
9	If student of the Institute, who is not a candidate for the particular examination or any person not connected with the Institute indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the Institute: Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work. He shall not be permitted for the remaining examinations of the subjects of that semester/ year. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the Institute: Will be handed over to police and a police case Will be registered against them.

10	If the candidate comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work. He shall not be permitted for the remaining examinations of the subjects of that semester/year.
11	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject and all other subjects the candidate has appeared including practical examination sand project work of that semester/year examinations.
12	If any malpractice is detected which is not covered in the above clauses 1 to 11,shallbeawardedsuitable punishment.	

Note: Special squads maybe formed to oversee the proper conduct of examinations.

18 OTHER MATTERS

Scribe facility is extended to B Tech students strictly following the guidelines issued under F. No. 16-110/2003-DD.III Dt. 26-02-2013 by the Ministry of Social Justice and Empowerment, Department of Disability Affairs, Govt. of India.

Students who are suffering from contagious diseases are not allowed to appear either continuous internal assessment or semester end examinations.

The students who participate in coaching/tournaments held at State/National/International levels through University/Indian Olympic Association during semester end examination period will be promoted to subsequent semesters till the entire programme is completed as per the guidelines of University Grants Commission Letter No. F.1-5/88 (SPE/PES), dated18-08-1994.

Based on the recommendations of HOD & Principal, exemption from attending the class work shall be given to those students who secure placement and intend to join as the employer in VIII semester of B.Tech. Special Continuous Internal Evaluation (Assignment Tests, Sessional, etc.,) will be arranged to such candidates separately if necessary.

However, they shall appear for Semester End Examinations as per the Academic Calendar

The Principal shall deal with any academic problem, which is not covered under these rules and regulations, in consultation with the Heads of the Departments in an appropriate manner, and subsequently such actions shall be placed before the academic council for ratification. Any emergency modification of regulation, approved in the Heads of the Departments Meetings, shall be reported to the academic council for ratification.

19 GENERAL

- 1 Wherever the words "he", "him", "his", occur in the regulations, theymay include "she", "her", "hers".
- 2 Theacademicregulationsshouldbereadasawholeforthepurposeofanyinterpretation.
- 3 In case of any doubt or ambiguity in the interpretation of above rules, the decision of the principal is final.

20 INSTITUTE RULES AND REGULATIONS

- 1 Use of **Mobile phones** is strictly prohibited inside the Institute academic area.
- 2 Students should come to Institute in **proper dress**.
- 3 All students should wear **identity cards** in the Institute premises.
- 4 Students should be present in their respective classrooms before the commencement of class sharply.
- 5 Students should not leave the Institute premises without prior permission of their respective Heads of the departments during Institute working hours.
- 6 Students should maintain silence in the classrooms during working periods.
- 7 Sitting / wandering of the students at the stair cases, corridors, cycle stands or the areas within the Institute premises is strictly prohibited.
- 8 Usage of Vehicle horn inside the Institute premises is prohibited.

21 AMENDMENTS TO REGULATIONS

The Academic Council may, from time to time, revise, amend or change the regulations, schemes of examination and/or syllabi.

Oratory

PRINCIPAL

PVP19 FOUR YEAR B.TECH COURSE STRUCTURE
I B.TECH - I – SEMESTER												
S.No ·	Course Code	Course Title	L	Т	Р	С	Intern als	Extern als	Tota l			
1	19HS1101	Communicative English I	2	0	0	2	30	70	100			
2	19BS1101	Engineering Mathematics I (Calculus and Algebra)	3	0	0	3	30	70	100			
3	19BS1104	Engineering Physics	3	0	0	3	30	70	100			
4	19ES1101	Basic Electrical and Electronics Engineering	3	1	0	4	30	70	100			
5	19ES1103	Engineering Graphics	1	0	3	2.5	30	70	100			
6	19HS1151	Communicative English I Lab	0	0	3	1.5	25	50	75			
7	19BS1153	Engineering Physics Lab	0	0	3	1.5	25	50	75			
8	19ES1151	Basic Electrical and Electronics Engineering Lab	0	0	3	1.5	25	50	75			
9	19IT3151	Information Technology Workshop	0	0	3	1.5	25	50	75			
10	19MC1151	NCC/NSS/YOGA/Activit y Clubs	0	0	2	0	100	-	100			
	r -	Fotal	12	1	17	20.5	350	550	900			
		I B.TECH - II –	SEM	EST	ER							
S.No.	Course Code	Course Title	L	Т	Р	С	Intern als	Extern als	Tota l			
1	19HS1201	Communicative English II	2	0	0	2	30	70	100			
2	19BS1202	Engineering Mathematics II (Probability and Statistics)	3	0	0	3	30	70	100			
3	19BS1203	Engineering Chemistry	3	0	0	3	30	70	100			
4	19ES1202	Problem Solving and Programming	3	1	0	4	30	70	100			
5	19HS1251	Communicative English II Lab	0	0	3	1.5	25	50	75			
6	19BS1251	Engineering Chemistry Lab	0	0	3	1.5	25	50	75			
6 7	19BS1251 19ES1252	Engineering Chemistry Lab Problem Solving and Programming Lab	0	0	3	1.5 1.5	25 25	50 50	75 75			
6 7 8	19BS1251 19ES1252 19ES1253	Engineering Chemistry Lab Problem Solving and Programming Lab Basic Workshop	0 0 0	0 0 0	3 3 3	1.5 1.5 1.5	25 25 25	50 50 50	75 75 75			
6 7 8 9	19BS1251 19ES1252 19ES1253 19MC1251	Engineering Chemistry Lab Problem Solving and Programming Lab Basic Workshop NCC/NSS/YOGA/Activit y Clubs	0 0 0 0	0 0 0	3 3 3 2	1.5 1.5 1.5 0	25 25 25 100	50 50 50 -	75 75 75 100			

DEPARTMENT OF INFORMATION TECHNOLOGY

		II B.TECH - I	– SEN	1EST	ER						
S.No.	Course Code	Course Title	L	Т	P	С	Interna ls	Extern als	Total		
1	19BS1302	Engineering Mathematics III(Discrete Mathematical Structures)	3	0	0	3	30	70	100		
2	19ES1301	AI Tools	2	0	0	2	30	70	100		
3	19ES1302	Design Thinking	2	0	0	2	30	70	100		
4	19IT3301	Fundamentals of Digital Logic Design	3	0	0	3	30	70	100		
5	19IT3302	Object Oriented Programming using C++	3	0	0	3	30	70	100		
6	19IT3303	Data Structures	3	1	0	4	30	70	100		
7	19MC1302	Constitution of India	3	0	0	0	100		100		
8	19ES1351	AI Tools Lab	0	0	2	1	25	50	75		
9	19ES1352	Design Thinking Lab	0	0	2	1	25	50	75		
10	19IT3351	Object Oriented Programming using C++ Lal	b 0	0	3	1.5	25	50	75		
11	19IT3352	Data Structures Lab	0 0 3 1.5 25			50	75				
	TOTAL				10	22	380	620	1000		
II B.TECH - II- SEMESTER											
S.No.	Course Code	Course Title	L	Т	Р	C	Interna ls	Extern als	Total		
1	19BS1403	Engineering Mathematics-IV (Number Theory and Cryptography)	3	0	0	3	30	70	100		
2	19BS1404	Life Sciences for Engineers	2	0	0	2	30	70	100		
3	19IT3401	Computer Organization and Architecture	3	0	0	3	30	70	100		
4	19IT3402	Operating Systems	3	0	0	3	30	70	100		
5	19IT3403	Software Engineering Paradigms	3	0	0	3	30	70	100		
6	19IT3404	Design and Analysis of Algorithms	3	0	0	3	30	70	100		
7	19IT3405	Programming with JAVA	3	0	0	3	30	70	100		
8	19MC1401	Environmental Sciences	3	0	0	0	100		100		
9	19BS1451	Life Sciences for Engineers Lab	0	0	3	1.5	25	50	75		
10	19IT3451	Design and Analysis ofAlgorithms Lab	0	0	3	1.5	25	50	75		
11	19IT3452	Programming with JAVA Lab		0	3	1.5	25	50	75		
	ТО	TAL	23	0	7	23.5	385	640	1025		

III B.TECH - I - SEMESTER											
S.No.	Course Code	Course Title	e Title L T P C Inter Extended								
1	19ES1501	Internet of Things	2	0	0	2	30	70	100		
2	19IT3501	Data Communication &Computer Networks	3	0	0	3	30	70	100		
3	19IT4501	Program Elective-I	3	0	0	3	30	70	100		
4	19IT3502	Formal Languages and Automata Theory	3	0	0	3	30	70	100		
5	19IT3503	Database Management Systems	3	0	0	3	30	70	100		
6		Interdisciplinary Elective -I	3	0	0	3	30	70	100		
7		Open Elective -I	3	0	0	3	30	70	100		
8	19ES1552	Internet of Things Lab	0	0	2	1	25	50	75		
9	19IT3551	Database Management Systems Lab	0	0	2	1	25	50	75		
TOTAL 20 0 4 22 260 590								850			

III B.TECH - II - SEMESTER

S.No.	Course Code	Course Title	L	Т	Р	С	Inter nals	Exte rnals	Tota l
1	19HS1601	Engineering Economics and Management	3	0	0	3	30	70	100
2	19IT3601	Compiler Design	3	0	0	3	30	70	100
3	19IT4601	Program Elective-II	3	0	0	3	30	70	100
4	19IT3602	Web Technologies	3	0	0	3	30	70	100
5	19IT4602	Program Elective-III	3	0	0	3	30	70	100
6	19MC1601	Engineering Ethics	3	0	0	0	100		100
7		Open Elective -II	3	0	0	3	30	70	100
8	19IT3651	Compiler Design Lab	0	0	2	1	25	50	75
9	19IT3652	Web Technologies Lab	0	0	3	1.5	25	50	75
10	19IT3653	Python Programming Lab	0	0	3	1.5	25	50	75
	ТО	TAL	- 21 0 8 22 355 570 ·				925		

		IV B.TECH - 1	I - SEI	MES	TER				
S.No.	Course Code	Course Title	L	Т	Р	С	Inter nals	Exte rnals	Tota l
1	19HS1701	Organization Behavior	3	0	0	3	30	70	100
2	19IT3701	Cryptography and Network Security	3	0	0	3	30	70	100
3	19IT4701	Program Elective-IV	3	0	0	3	30	70	100
4	19IT4702	Program Elective-V	3	0	0	3	30	70	100
5	19IT2701C	Interdisciplinary Elective II	3	0	0	3	30	70	100
6	19IT3761	Project Phase-I	0	0	4	2	100		100
7	19IT3771	Industrial Training/Internship/Resea rch Projects in National Laboratories/Academic Institutions	0	0	0	2	75		75
	TC	DTAL	15	0	4	19	325	350	675
		IV B.TECH - I	I - SE	MES	STER				
S.No.	Course Code	Course Title	L	Т	Р	С	Inter nals	Exte rnals	Tota l
1	19IT4801	Program Elective - VI	3	0	0	3	30	70	100
2		Inter disciplinary Elective - III	3	0	0	3	30	70	100
3	19IT3861	Project Phase - II	0	0	14	7	100	100	200
	тс	DTAL	6	0	14	13	160	240	400
		PROGRAM	ELEC	TIVE	S				
		Program	Electi	ve- I		-		•	
S.No.	Course Code	Course Title	L	Т	Р	С	Inter nals	Exte rnals	Tota l
1	19IT4501A	Advanced Computer Networks	3	0	0	3	30	70	100
2	19IT4501B	Distributed Systems	3	0	0	3	30	70	100
3	19IT4501C	Computer Graphics	3	0	0	3	30	70	100
4	19IT4501D	Software Requirements Management	3	0	0	3	30	70	100
5	19IT4501E	Artificial Intelligence and Expert Systems	3	0	0	3	30	70	100
6	19IT4501F	Fundamentals of big data analytics	3	0	0	3	30	70	100

		Program I	Electiv	ve- II	[
1	19IT4601A	Steganography and Biometrics	3	0	0	3	30	70	100
2	19IT4601B	Advanced Operating Systems	3	0	0	3	30	70	100
3	19IT4601C	Image Processing	3	0	0	3	30	70	100
4	19IT4601D	Software Project Management	3	0	0	3	30	70	100
5	19IT4601E	Machine Learning	3	0	0	3	30	70	100
6	19IT4601F	Data Visualization	3	0	0	3	30	70	100
		Program E	lectiv	e- II	I				
1	19IT4602A	Wireless Sensor Networks	3	0	0	3	30	70	100
2	19IT4602B	Cloud Computing	3	0	0	3	30	70	100
3	19IT4602C	Speech Processing	3	0	0	3	30	70	100
4	19IT4602D	Object Oriented Software Engineering	3	0	0	3	30	70	100
5	19IT4602E	Data ware Housing and Data Mining	3	0	0	3	30	70	100
6	19IT4602F	Mining Massive Datasets	3	0	0	3	30	70	100
		Program B	Electiv	e- IV	7			1	
1	19IT4701A	Adhoc Networks	3	0	0	3	30	70	100
2	19IT4701B	Service Oriented Architecture	3	0	0	3	30	70	100
3	19IT4701C	Video Processing	3	0	0	3	30	70	100
4	19IT4701D	Agile Software Development	3	0	0	3	30	70	100
5	19IT4701E	Natural Language Processing	3	0	0	3	30	70	100
6	19IT4701F	Information Retrieval Systems	3	0	0	3	30	70	100
		Program I	Electiv	ve- V					
1	19IT4702A	Fundamentals of Blockchain Technology	3	0	0	3	30	70	100
2	19IT4702B	Cloud Security And Privacy	3	0	0	3	30	70	100
3	19IT4702C	Computer Graphics for Virtual Reality	3	0	0	3	30	70	100
4	19IT4702D	Software Testing	3	0	0	3	30	70	100

5191T4702ENeural Networks and Puzzy Systems300330701006191T4702FReploratory Data Analysis300033007001007Program: Ever-Ver-Ver-Ver-Ver-Ver-Ver-Ver-Ver-Ver-V										
619Tt4702FExploratory Data Analysis30033070100Program Elective-VI119TT4801ACyber Security and Ethical Hacking30033070100219TT4801BCloud Infrastructure Management300330070100319TT4801BCloud Infrastructure Techniques300330070100419TT4801DSoftware Reliability Techniques300330070100519TT4801FDeep Learning300330070100619TT4801FWeb Analytics30033007010019ES5501ABiotechnology Bociety and Society30033007010019ES5501BElectrical Safety Elevince30033007010019ES5501CFundamentals of Cyber Iaw30033007010019ES5501BIndian National Elevinger for Diversonalty Personalty30033007010019HS501BIndian Matement30033007010019HS501BIndian Personalty Personalty Personalty Personalty Personalty3003307010019HS50	5	19IT4702E	Neural Networks and Fuzzy Systems	3	0	0	3	30	70	100
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5 19TT4801E Deep Learning 3 0 0 3 30 70 100 6 19TT4801F Web Analytics 3 0 0 3 30 70 100 LIST OF OPEN ELECTURES LIST OF OPEN ELECTURES IPES5501A Biotechnology and Society 3 0 0 3 30 70 100 19ES5501B Electrical Safety 3 0 0 3 30 70 100 19ES5501C Fundamentals of Cyber law 3 0 0 3 30 70 100 19ES5501D Environment environment and so 0 0 3 30 70 100 19HS5501A Contemporary Relevance of Indian 3 0 0 3 30 70 100 19HS5501B Indran National 3 0 0 3 30 70 100 19HS5501C Engineering	4	19IT4801D	Software Reliability Techniques	3	0	0	3	30	70	100
6 19T4801F Web Analytics 3 0 0 3 30 70 100 LIST OF OPEN ELECTIVES IPES5501A Biotechnology and Society 3 0 0 3 30 70 100 IPES5501A Biotechnology and Society 3 0 0 3 30 70 100 IPES5501B Electrical Safety 3 0 0 3 30 70 100 19ES5501D Fundamentals of Cyber Loclogy 3 0 0 3 30 70 100 19ES5501D Environment and Ecology 3 0 0 3 30 70 100 19HS5501A Relevance of Indian Sational Movement 3 0 0 3 30 70 100 19HS5501B Indram Mational Mational Movement 3 0 0 3 30 70 100 19HS5501C E	5	19IT4801E	Deep Learning	3	0	0	3	30	70	100
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Image: constraint of the second sec		19ES5501A	Biotechnology and	3	0	0	3	30	70	100
Image: second		19ES5501B	Electrical Safety	3	0	0	3	30	70	100
Homework Image: Solution Image: Solution <thimage: solution<="" th=""> Image: Solution<td></td><td>19ES5501C</td><td>Fundamentals of Cyber</td><td>2</td><td>0</td><td>0</td><td>3</td><td>30</td><td>70</td><td>100</td></thimage:>		19ES5501C	Fundamentals of Cyber	2	0	0	3	30	70	100
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Image: https://www.stature/stat	IVI		Contemporary	3	0	0	3	30	70	100
Indian National 3 0 0 3 30 70 100 19HS5501B Indian Movement 3 0 0 3 30 70 100 19HS5501C Engineering for 3 0 0 3 30 70 100 19HS5501D Development 3 0 0 3 30 70 100 19HS5501E Introduction to 1 3 0 0 3 30 70 100 19HS5501G Indian History 3 0 0 3 30 70 100 19HS5601G Indian History 3 0 0 3 30 70 100 19ES5601B Telecommunication for Society 3 0 0 3 30 70 100 19HS5601C Analytical Essay for Vriting 3 0 0 3 30 70 100 <t< td=""><td>ECJ</td><td>19HS5501A</td><td>Relevance of Indian Epics</td><td>3</td><td>0</td><td>0</td><td>3</td><td>30</td><td>70</td><td>100</td></t<>	ECJ	19HS5501A	Relevance of Indian Epics	3	0	0	3	30	70	100
Vertice 19HS5501C Engineering Community Service 3 0 0 3 30 70 100 19HS5501D Personality Development 3 0 0 3 30 70 100 19HS5501E Introduction International Business 3 0 0 3 30 70 100 19HS5501G Indian History 3 0 0 3 30 70 100 19HS5501G Indian History 3 0 0 3 30 70 100 19ES5601A Environmental Management 3 0 0 3 30 70 100 19ES5601B Telecommunication for Society 3 0 0 3 30 70 100 19HS5601C Analytical Essay for Writing 3 0 0 3 30 70 100 19HS5601E Public Administration 3 0 0 3 30 70 100	EL	19HS5501B	Indian National Movement	3	0	0	3	30	70	100
Image: https://image: htttps://image: https://image: https://image: https://image: https	PEN	19HS5501C	Engineering for Community Service	3	0	0	3	30	70	100
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Indian History 3 0 0 3 30 70 100 19ES5601A Environmental Management 3 0 0 3 30 70 100 19ES5601B Telecommunication for Society 3 0 0 3 30 70 100 19ES5601B German for Beginners 3 0 0 3 30 70 100 19ES5601C Analytical Essay for Writing 3 0 0 3 30 70 100 19HS5601D Indian Economy 3 0 0 3 30 70 100 19HS5601E Public Administration 3 0 0 3 30 70 100 19HS5601F National Scheme Service 3 0 0 3 30 70 100 19HS5601G Professional Communication 3 0 0 3 30 70 100 19HS5601H <t< td=""><td></td><td>19HS5501E</td><td>Introduction to International Business</td><td>3</td><td>0</td><td>0</td><td>3</td><td>30</td><td>70</td><td>100</td></t<>		19HS5501E	Introduction to International Business	3	0	0	3	30	70	100
Image: second		19HS5501G	Indian History	3	0	0	3	30	70	100
Image: Non-Sectivity Image: No		19ES5601A	Environmental Management	3	0	0	3	30	70	100
Image: heat of the state of the st		19ES5601B	Telecommunication for Society	3	0	0	3	30	70	100
Image: Note of the second se	II -	19HS5601A	German for Beginners	3	0	0	3	30	70	100
Image Image <th< td=""><td>VE -</td><td>19HS5601C</td><td>Analytical Essay for Writing</td><td>3</td><td>0</td><td>0</td><td>3</td><td>30</td><td>70</td><td>100</td></th<>	VE -	19HS5601C	Analytical Essay for Writing	3	0	0	3	30	70	100
Interference Public Administration 3 0 0 3 30 70 100 19HS5601F National Scheme Service 3 0 0 3 30 70 100 19HS5601F National Scheme Service 3 0 0 3 30 70 100 19ES5601G Professional Communication 3 0 0 3 30 70 100 19HS5601H Basics of Finance 3 0 0 3 30 70 100 19HS5601H Basics of Marketing 2 0 0 3 30 70 100	CTI	19HS5601D	Indian Economy	3	0	0	3	30	70	100
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E 19ES5601G Professional Communication 3 0 0 3 30 70 100 19HS5601H Basics of Finance 3 0 0 3 30 70 100 19HS5601H Basics of Marketing 2 0 0 3 30 70 100	ENE	19HS5601F	National Service Scheme	3	0	0	3	30	70	100
19HS5601H Basics of Finance 3 0 0 3 30 70 100 19HS5601I Basics of Marketing 2 0 0 2 20 70 100	IdO	19ES5601G	Professional Communication	3	0	0	3	30	70	100
19HS56011 Basics of Marketing 2 0 0 2 20 70 100		19HS5601H	Basics of Finance	3	0	0	3	30	70	100
		19HS5601I	Basics of Marketing	3	0	0	3	30	70	100

		LIST OF INTERDISCI	PLIN	ARY	ELE	CTIVE	S		
ry	19CS2501A	Data Base Management	3	0	0	3	30	70	100
iplina ve – I	19HS2501A	Quantitative Techniques for Management	3	0	0	3	30	70	100
erdisc	19IT2501C	OOP with C++	3	0	0	3	30	70	100
Inte	19ME2501A	Computational Methods	3	0	0	3	30	70	100
ury I	19EE2701C	Renewable Energy Resources	3	0	0	3	30	70	100
iplina ve - I	19IT2701C	Web Technologies	3	0	0	3	30	70	100
erdisc Electi	19ME2701B	Optimization Techniques	3	0	0	3	30	70	100
Inte	19ME2701C	Project Management & Optimization	3	0	0	3	30	70	100
	19CS2801D	Introduction to Python programming	3	0	0	3	30	70	100
isciplinary tive – III	19EC2801B	Instrumentation and Sensor Technologies of Civil Engineering Applications	3	0	0	3	30	70	100
nterdi Elec	19HS2801A	Logistics and Supply Chain Management	3	0	0	3	30	70	100
I	19ME2801B	Total Quality Management	3	0	0	3	30	70	100

I SEMESTER

Communicative English - 1

Course Code	19HS1101	Year	Ι	Semester	Ι
Course Category	Humanities	Branch	IT	Course Type	Theory
Credits	2	L-T-P	2-0-0	Prerequisites	Nil
Continuous Internal Evaluation:	30	Semester End Evaluation:	70	Total Marks:	100

	Course Outcomes							
Upon su	Upon successful completion of the course, the student will be able to							
CO1	Comprehend how to apply parts of speech in a sentence and construct a paragraph. (L2)							
CO2	Apply grammar to formulate text using punctuation. (L3)							
CO3	Evaluate reading texts and use correct tense forms for effective communication. (L5)							
CO4	Analyze reading texts and to write summaries based on comprehension of the texts. (L4)							
CO5	Create awareness on how to write correct sentences in English and comprehend the							
	text. (L6)							

C	Contribution of Course Outcomes towards achievement of Program Outcomes &												
	Strength of correlations (H:High, M: Medium, L:Low)												
	PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO1 PO11 PO1 PSO1 2												
CO 1										3		3	1
CO 2										3		3	1
CO 3										3		3	1
CO 4										3		3	1
CO 5										3		3	1

Syllabus						
Unit	Contents	Mapped				
No.		CO				
Ι	 Reading: Skimming to get the main idea of a text; Scanning to look for specific pieces of information. Reading for Writing: Beginnings and endings of paragraphs - Introducing the topic, summarizing the main idea and/or providing a transition to the next paragraph. Grammar and Vocabulary: Content words and function words; Word forms: Verbs, Nouns, Adjectives and Adverbs; Nouns: countables and uncountables; singular and plural; Basic sentence structures; Simple question form - wh-questions; Word order in sentences. 	CO1				

II	Reading: Identifying sequence of ideas; recognizing verbal techniques that help	
	to linkthe ideas in a paragraph together.	
	Writing: Paragraph writing (specific topics) using suitable cohesive devices;	CO2
	Mechanicsof writing - punctuation, capital letters.	
	Grammar and Vocabulary: Cohesive devices - linkers, sign posts and transition	
	signals;Use of articles and zero article; prepositions	
III	Reading: Reading a text in detail by making basic inferences - recognizing and	
	interpreting specific context clues; strategies to use text clues for comprehension.	a a
	Writing: Summarizing - identifying main idea/s and rephrasing what is read;	CO3
	avoiding redundancies and repetitions.	
	Grammar and Vocabulary: Verbs - Tenses; Subject-verb agreement; Direct and	
	indirect speech, Reporting verbs for academic purposes.	
IV	Reading: Studying the use of graphic elements in texts to convey information,	
	reveal trends/patterns/relationships, communicate processes or display	
	complicated data. Writing: Information transfer; describe, compare, contrast,	CO4
	identify significance/trends based on information provided in	
	figures/charts/graphs/tables.	
	Grammar and Vocabulary: Quantifying expressions - adjectives and adverbs;	
	comparing and contrasting; Degrees of comparison; Use of antonyms	
V	Reading: Reading for comprehension.	
	Writing: Writing structured essays on specific topics using suitable claims and	
	evidences	CO5
	Grammar and Vocabulary: Editing short texts – Identifying and correcting	
	common errors in grammar and usage (Articles prepositions Tenses Subject-	
	work agreement)	
	verb agreement)	

Text Books

Prabhavathy Y, M.Lalitha Sridevi, Ruth Z. Hauzel, "English all round communication skills for undergraduate students", Orient Black Swan, 2019

Reference Books

- 1. Bailey, Stephen. Academic writing: A handbook for international students. Routledge, 2014.
- 2. Skillful Level 2 Reading & Writing Student's Book Pack (B1) Macmillan Educational.
- 3. Hewings, Martin. *Cambridge Academic English (B2)*. CUP, 2012

e- Resources & other digital material

Grammar/Listening/Writing http://www.5minuteenglish.com/ 1-language.com; https://www.englishpractice.com/ Grammar/Vocabulary http://www.bbc.co.uk/learningenglish/ English Language Learning Online; http://www.better-english.com/; http://www.nonstopenglish.com/ https://www.vocabulary.com/; **BBC** Vocabulary Games Free Rice Vocabulary Game Reading https://www.usingenglish.com/comprehension/; https://www.englishclub.com/reading/shorthttps://www.english-online.at/ stories.htm; All Skills https://www.englishclub.com/; http://www.world-english.org/ http://learnenglish.britishcouncil.org/ **Online Dictionaries** Cambridge dictionary online; MacMillan dictionary; Oxford learner's dictionaries

Course Code	19BS1101	Year	Ι	Semester	Ι
Course Category	Basic Sciences	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	Nil
Continuous Internal Evaluation:	30	Semester End Evaluation:	70	Total Marks:	100

Engineering Mathematics – 1 (Calculus and Algebra)

	Course Outcomes					
Upon su	Upon successful completion of the course, the student will be able to					
CO1	Utilize the techniques of matrix algebra that is needed by engineers for practical					
	applications (L3)					
CO2	Apply mean value theorems to engineering problems (L3)					
CO3	Utilize functions of several variables in optimization (L3)					
CO4	Employ the tools of calculus for calculating the areas (L3)					
CO5	Calculate volumes using multiple integrals (L3)					

C	Contribution of Course Outcomes towards achievement of Program Outcomes &													
			Streng	gth of c	orrela	tions (H:Hig	h, M: I	Mediu	m, L:L	ow)			
	РО 1	PO 2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO2
CO 1	3	2											1	
CO 2	3	2											1	
CO 3	3	2											1	
CO 4	3	2											1	
CO 5	3	2											1	

	Syllabus	
Unit No.	Contents	Mapped CO
Ι	Matrices : Rank of a matrix by echelon form, solving system ofhomogeneous and non-homogeneous linear equations. Eigen values, Eigen vectors and their properties, Cayley-Hamilton theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton theorem, diagonalisation of a matrix, quadratic forms and nature of the quadratic forms, reduction of quadratic form to canonical forms by orthogonal transformation.	CO1
II	Mean Value Theorems : Rolle's Theorem, Lagrange's mean value theorem, Cauchy's mean value theorem, Taylor's and Maclaurin's theorems with remainders (without proof).	CO2
III	Multivariable Calculus :Partial derivatives, total derivatives, chain rule, change of variables, Jacobian, maxima and minima of functions of two variables, method of Lagrange multipliers.	CO3
IV	Multiple Integrals-I :Double integrals, change of order of integration, double integration in polar coordinates, areas enclosed by plane curves.	CO4
V	Multiple Integrals-II : Evaluation of triple integrals, change of variables between Cartesian, cylindrical and spherical polar co-ordinates, volume as triple integral.	CO5

Engineering Physics

Course Code	19BS1104	Year	Ι	Semester	Ι
Course Category	Basic Sciences	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	Nil
Continuous Internal Evaluation:	30	Semester End Evaluation:	70	Total Marks:	100

	Course Outcomes				
Upon su	accessful completion of the course, the student will be able to				
CO1	Apply the fundamental laws of electricity and magnetism to currents and propagation				
	of EM waves. (L2)				
CO2	Identify the propagation of light and demonstrate the loss mechanisms in optical				
	fibers. (L3)				
CO3	Explain the principles of physics in dielectrics, magnetic materials and identify the mechanisms of polarization for useful engineering applications. (L5)				
CO4	Classify solids and calculate carrier concentration and conductivity in semiconductors. (L4)				
CO5	Demonstrate the functioning of solar cell, photodiode, and semiconductors devices for engineering applications. (L2)				

	Contribution of Course Outcomes towards achievement of Program Outcomes &													
			Stre	ength o	of corre	elation	s (H:H	ligh, M	I: Med	ium, L	:Low)			
	РО 1	PO 2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO2
CO 1	3	3												
CO 2	3	3												
CO 3	3	3											1	
CO 4	3	3												
CO 5	3	3											1	

	Syllabus	
Uni t No.	Contents	Mappe d CO
Ι	Basics of Electromagnetics: Electrostatic field: Coulombs law and Gauss law, derivation of Coulombs law from Gauss law, applications of Gauss law (line charge, thin sheet of charge and solid charged sphere), Gauss law of electrostatics in dielectric medium, divergence and curl of electric fields, electric potential, relation between potential and force, Poisson's and Laplace equations. Magneto static field: Biot–Savart law, divergence and curl of magnetic fields, Faraday's and Ampere's laws in integral and differential form, displacement current, continuity equation, Maxwell's equations	CO1
Π	Fiber Optics: Introduction, advantages of optical fibers, principle and structure, acceptance angle, numerical aperture, modes of propagation, classification of fibers, fiber optic communication, importance of V- number, fiber optic sensors (Temperature, displacement and force), applications.	CO2
Ш	Dielectric and Magnetic materials: Dielectric materials: Introduction, electric polarization, dielectric polarizability, susceptibility and dielectric constant, types of polarizations (qualitative treatment only), frequency dependence of polarization, Lorentz (internal) field (quantitative), Clausius-Mossotti equation. Magnetic materials: Introduction, magnetic dipole moment, magnetization, magnetic susceptibility and permeability, origin of permanent magnetic moment, classification of magnetic materials, Weiss theory of ferromagnetism (qualitative), domain theory, hysteresis, soft and hard magnetic materials.	CO3
IV	Semiconductor physics: Introduction, origin of energy band, intrinsic and extrinsic semiconductors, mechanism of conduction in intrinsic semiconductors, generation and recombination, carrier concentration in intrinsic semiconductors, variation of intrinsic carrier concentration with temperature, n-type and p-type semiconductors, carrier concentration in n type and p type semiconductors.	CO4
V	Semiconductor devices: Drift and diffusion currents in semiconductors, Hall effect and its applications, magnetoresistance, p-n junction layer formation and V-I characteristics, direct and indirect band gap semiconductors, construction and working of photodiode, LED, solar cell	CO5

Text Books

- 1. Engineering Physics, R.K.Gaur& S.L.Gupta, Dhanpatrai Publications.
- 2. Solid State Physics , S.O.Pillai, New Age International.

Reference Books

- 1. A Text Book Of Engineering Physics, M.N.Avadhanulu & P.G.Kshrisagar, S.ChandPublications
- 2. Semiconductor Devices & Physics, S.M.Sze, Wiley, 2008.
- 3. Applied Physics, P.K. Palanai Swamy, Scitech Publications.
- 4. Engineering Physics, Dr.M.Arumugam, Anuradha Publications.
- 5. Introduction To Electrodynamics, David.J.Griffths, Pearson Education.

e- Resources & other digital material

http://physicsforidiots.com/physics/electromagnetism/

https://www.arcelect.com/fibercable.htm

http://freevideolectures.com/Course/3048/Physics-of-Materials/36

https://www.iitk.ac.in/mse/electronic-materials-and-devices

https://link.springer.com/chapter/10.1007/978-3-319-48933-9_35

Basic Electrical & Electronics Engineering

Course Code	19ES1101	Year	Ι	Semester	Ι
Course Category	Engineering Sciences	Branch	IT	Course Type	Theory
Credits	4	L-T-P	3-1-0	Prerequisites	Nil
Continuous Internal Evaluation:	30	Semester End Evaluation:	70	Total Marks:	100

	Course Outcomes				
Upon su	accessful completion of the course, the student will be able to				
CO1	Familiarize the basic DC and AC networks used in electrical and electronic circuits.				
	(L2)				
CO2	Explain the concepts of electrical machines and their characteristics. (L2)				
CON					
CO3	Identity the importance of transformers in transmission and distribution of electric power.				
	(L1)				
CO4	Impart the knowledge about the characteristics, working principles and applications of				
	semiconductor diodes, metal Oxide semiconductor field effect ransistors (MOSFETs), (L3)				
CO5	Expose basic concepts and applications of Operational Amplifier and				
	configurations. (L2)				

C	Contribution of Course Outcomes towards achievement of Program Outcomes &													
			Streng	gth of c	orrela	tions (H:Hig	h, M: 1	Mediu	m, L:L	ow)			
	РО 1	PO 2	PO3	PO4	PO5	PO 6	РО 7	PO8	РО 9	PO10	PO1 1	PO1 2	PSO 1	PSO 2
CO 1	3	2					1		1		2	1		
	3	2				1	1		1		2	1		
CO 3	3	2				1	1		1		2	1		
CO 4	3	2					1		1		2	1	1	1
CO 5	3	2					1		1		2	1	1	1

	Syllabus	
Unit No.	Contents	Mapped CO
Ι	Basic laws and Theorems : Ohms law, Kirchoff's Laws, series and parallel circuits, source transformations, delta-wye conversion. Mesh analysis, nodal analysis. Linearity and superposition theorem, Thevenin's and Norton's theorem with simple examples, maximum power transfer theorem with simple examples.	CO1
II	DC Machines : Constructional features, induced EMF and torque expressions, different types of excitation, performance characteristics of different types of dc machines, Starters: 2-point, 3-point starters, losses and efficiency, efficiency by direct loading.	CO2
III	Transformers : Constructional details, EMF equation, voltage regulation, losses and efficiency, open/short- circuit tests and determination of efficiency. Three Phase Induction Motors: Construction, working principle of three phase induction motor, Torque and Torque-Slip characteristics.	CO3
IV	Semiconductor Devices: p-n Junction diode - Basic operating principle, current- voltage characteristics, rectifier circuits (half-wave, full-wave, rectifier with filter capacitor), Zener diode as Voltage Regulator; Metal oxide semiconductor field effect transistor (MOSFET): Operation of NMOS and PMOS FETs, MOSFET as an amplifier and switch.	CO4
V	Operational Amplifiers : The Ideal Op Amp, The Inverting Configuration, The closed loop gain, Effect of Finite open-loop gain, The Noninverting Configuration, The closed loop gain, Characteristics of Non Inverting Configuration, Effect of finite open loop gain, the voltage follower, Difference amplifiers, A Single Op-amp difference amplifier.	CO5

Text Books 1. D.P.Kothari, I.J.Nagrath, Basic Electrical and Electronics Engineering, 1stedition,McGraw Hill Education (India) Private Limited, 2017.

2 B.L.Theraja, Fundamentals of Electrical Engineering and Electronics, 1stedition, S.Chand Publishing, New Delhi, 2006.

3. Adel S. Sedra and Kenneth C. Smith, Microelectronic Circuits 6th edition, OxfordUniversity Press, 2014.

Reference Books

S.K. Bhattacharya, Basic Electrical and Electronics Engineering, Pearson Education,2011.
 Dharma Raj Cheruku, B T Krishna, Electronic Devices and Circuits, 2/e, PearsonEducation, 2008.

3. R.K.Rajput, Basic Electrical and Electronics Engineering, University Science Press, New Delhi,2012.

e- Resources & other digital material

http://202.53.81.118/course/view.php?id=122 https://nptel.ac.in/courses/108105112/

Engineering Graphics

Course Code	19ES1103	Year	Ι	Semester	Ι
Course Category	Engineering Sciences	Branch	IT	Course Type	Theory
Credits	2.5	L-T-P	1-0-3	Prerequisites	Nil
Continuous Internal Evaluation:	30	Semester End Evaluation:	70	Total Marks:	100

	Course Outcomes				
Upon su	Upon successful completion of the course, the student will be able to				
CO1	Develop Conic sections and curves used in engineering practice. (L6)				
CO2	Draw Orthographic projections of points, lines, planes and solids. (L6)				
CO3	Draw Isometric and orthographic views. (L6)				
CO4	Develop of lateral surfaces of solids. (L6)				
CO5	Demonstrate features of CAD packages. (L2)				

	Contribution of Course Outcomes towards achievement of Program Outcomes &													
			Stre	e ngth o	of corr	elation	s (H:H	ligh, M	I: Med	ium, L	:Low)			
	РО 1	PO2	PO3	PO4	РО 5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO12	PSO 1	PSO2
CO 1	3									3	1		1	
$\begin{array}{c} \text{CO}\\ 2 \end{array}$	3									3	1		1	
CO 3	3									3	1		1	
	3									3	1		1	
CO 5	3				3					3	1		1	

	Syllabus	
Unit No.	Contents	Mapped CO
Ι	 Introduction to Engineering Graphics: Principles of Engineering Graphics and their significance- Conventions in drawing, lettering, dimensioning, BIS conventions. a) Conic sections: Construction of ellipse, parabola and hyperbola (general method only) b) Cycloidal curves: Cycloid, Epicycloid and Hypocycloid c) Involutes: Involute of regular polygons and Circle. 	CO1
II	Projection of points, lines and planes: Projection of points in different quadrants, lines inclined to one and both the referenceplanes, finding true length and inclination made by the line. Projections of regular plane surfaces.	CO2
ш	Projections of solids: Projections of regular solids such as cube, prism, p cylinder and cone (Treatment limited to solids inclined to one of the referen Sections of solids: Section planes and sectional view of right regular solids- cube, prism, cylinder, pyramid and cone. True shape of the section. (Treatment limited to the solids perpendicular to one of the principal planes)	CO3
IV	Orthographic Views: Systems of projections, conversion of isometric view to orthographic view. Isometric Projections: Principles of isometric projection- isometric scale; isometric views: lines, planes and solids. (Treatment is limited tosimple objects only)	CO4
V	Development of surfaces: Development of lateral surfaces of rightregular solids-prism, cylinder, pyramid, cone and their sectional parts. (Treatment limited to solids perpendicular to one of the principal planes) Introduction to CAD: Basic drawing, editing and dimensioning commands: line, circle, rectangle, erase, view, undo, redo, snap, edit, move, copy, rotate, scale, mirror, layer, template, polyline, trim, extend, stretch, fillet, array, dimension.	CO5

Text Books

- 1. N.D. Bhatt, Engineering Drawing, 53/e, Charotar Publishers, 2016.
- 2. K.L. Narayana & P. Kannaiah, Engineering Drawing, 3/e, Scitech Publishers, 2012.

Reference Books

- 1. Dhanajay A Jolhe, Engineering Drawing, Tata McGraw-Hill, 2009.
- 2. Shah and Rana, Engineering Drawing, 2/e, Pearson Education, 2009.
- 3. K. Venugopal, Engineering Drawing and Graphics, 6/e, New Age Publishers, 2011.
- 4. K.C. John, Engineering Graphics, 2/e, PHI, 2013.
- 5. Basant Agarwal and C.M. Agarwal, Engineering Drawing, Tata McGraw Hill, 2008.

e- Resources & other digital material

- 1. http://www.youtube.com/watch?v=XCWJ XrkWco, Accessed On 01-06-2017.
- 2. http://www.me.umn.edu/courses/me2011/handouts/drawing/blanco-tutorial.html# isodrawing, Accessed On 01-06-2017.
- 3. http://www.slideshare.net, Accessed On 01-06-2017.
- 4. http://edpstuff.blogspot.in, Accessed On 01-06-2017.

Communicative English – 1 Lab

Course Code	19HS1151	Year	Ι	Semester	Ι
Course Category	Humanities	Branch	IT	Course Type	Lab
Credits	1.5	L-T-P	0-0-3	Prerequisites	Nil
Continuous Internal Evaluation:	25	Semester End Evaluation:	50	Total Marks:	75

	Course Outcomes						
Upon su	accessful completion of the course, the student will be able to						
CO1	Remember and understand the different aspects of the English language proficiency with emphasis on LSRW skills. (L1)						
CO2	Apply communication skills through various language learning activities. (L3)						
CO3	Analyze the comprehensive ability and logical thinking for better listening and speaking. (L4)						
CO4	Evaluate and exhibit acceptable etiquette essential in social and professional situations. (L5)						
CO5	Create awareness on how to improve presentation skills in English. (L6)						

0	Contribution of Course Outcomes towards achievement of Program Outcomes &													
			Streng	gth of c	correla	tions (H:Hig	h, M: I	Mediu	m, L:L	ow)			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO11	PO1 2	PSO 1	PSO2
CO 1									2	3		3	1	
CO 2									2	3		3	1	
CO 3									2	3		3	1	
CO 4									2	3		3	1	
CO 5									2	3		3	1	

	Syllabus	
Expt. No.	Contents	Mapped CO
Ι	Identifying the topic, the context and specific pieces of information by listening to short audio texts and answering a series of questions	
II	Asking and answering general questions on familiar topics such as home, family, work, studies and interests; introducing oneself and others.	CO1
III	Answering a series of questions about main idea and supporting ideas after listening to audio texts.	CO2
IV	Discussion in pairs/ small groups on specific topics followed by short structured talks.	
V	Listening for global comprehension and summarizing what is listened to.	CO3
VI	Discussing specific topics in pairs or small groups and reporting what is Discussed	
VII	Making predictions while listening to conversations/transactional dialogues without video; listening with video.	CO4
VIII	Role plays for practice of conversational English in academic contexts	
	(formal and informal) - asking for and giving information/directions.	
IX	Identifying key terms, understanding concepts and answering a series of relevant questions that test comprehension.	CO5
Х	Formal oral presentations on topics from academic contexts -without the use of PPT slides.	

1. Chase, Becky Tarver. Pathways: Listening, Speaking and Critical Thinking. Heinley ELT;2nd Edition, 2018.

2. Skillful Level 2 Reading & Writing Student's Book Pack (B1) Macmillan Educational.

3. Hewings, Martin. Cambridge Academic English (B2). CUP, 2012

e- Resources & other digital material

Reference Books

Grammar/Listening/Writing1- language.com

http://www.5minuteenglish.com/ https://www.englishpractice.com/Listening https://learningenglish.voanews.com/z/3613;

http://www.englishmedialab.com/listening.htmlSpeaking

 $https://www.talkenglish.com/BBC; \ Learning \ English - Pronunciation \ tips$

Merriam-Webster – Perfect pronunciation Exercises

All Skills https://www.englishclub.com/; http://www.world-english.org/

http://learnenglish.britishcouncil.org/Online Dictionaries

Cambridge dictionary online; MacMillan dictionary; Oxford learner's dictionaries

Engineering Physics Lab

Course Code	19BS1153	Year	Ι	Semester	Ι
Course Category	Basic Sciences	Branch	IT	Course Type	Lab
Credits	1.5	L-T-P	0-0-3	Prerequisites	Nil
Continuous Internal Evaluation:	25	Semester End Evaluation:	50	Total Marks:	75

	Course Outcomes
Upon su	accessful completion of the course, the student will be able to
CO1	Assess the intensity of the magnetic field of circular coil carrying current with
	varying distance and utilize four probe set up to measure resistance. (L6)
CO2	Evaluate the acceptance angle of an optical fiber and numerical aperture and loss. (L6)
CO3	Demonstrate the importance of dielectric material and measure magnetic parameters. (L6)
CO4	Identify the type of semiconductor using hall effect and determine the band gap of a
	semiconductor. (L6)
CO5	Understand the characteristics of photodiode, p-n junction diode and solar
	cell.Type equation here. (L2)

C	Contribution of Course Outcomes towards achievement of Program Outcomes &													
			Streng	gth of c	orrela	tions (H:Hig	h, M: I	Mediu	m, L:L	ow)			
	РО 1	PO2	PO 3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO 1	3		3											
CO 2	3		3											
CO 3	3		3											
CO 4	3		3											
CO 5	3		3											

	Syllabus	
Expt. No.	Contents	Mapped CO
Ι	To Determine The Magnetic Field Along The Axis Of A Circular Coil	001
	Carrying Current	COI
II	To Determine The Magnetic Susceptibility By Gouy's Method	
III	To Determine The Numerical Aperture Of A Given Optical Fibre And	CO2
	Hence To Find Its Acceptance Angle	001
IV	To Determine The Dielectric Constant Of A Substance By Resonance	CO3
	Method	005
V	To Determine The Resistivity Of Semiconductor By Four Probe Method	
VI	To Determine The Hall Coefficient Using Hall Effect Experiment.	CO4
VII	To Determine The Energy Gap Of A Semiconductor	
VIII	To Study The Characteristics Of Photo Diode	
IX	To Study The Characteristics Of PN Diode	CO5
Х	To Study The Characteristics Of Solar Cell	

Learning Resources	
Text Books	
RamaraoSri, Choudary Nityanand and Prasad Daruka, "Lab Manual of Eng	gineering
Physics"., Vth ed., Excell Books, 2010	
Reference Books	
Semiconductor Devices & Physics, S.M.Sze, Wiley, 2008.	
e- Resources & other digital material	
https://www.niser.ac.in/sps/teaching-laboratories	

Basic Electrical & Electronics Engineering Lab

Course Code	19ES1151	Year	Ι	Semester	Ι
Course Category	Engineering Sciences	Branch	IT	Course Type	Lab
Credits	1.5	L-T-P	0-0-3	Prerequisites	Nil
Continuous Internal Evaluation:	25	Semester End Evaluation:	50	Total Marks:	75

	Course Outcomes
Upon su	accessful completion of the course, the student will be able to
CO1	Familiarize the basic DC and AC networks used in electrical and electronic circuits.
	(L2)
CO2	Explain the concepts of electrical machines and their characteristics. (L2)
CO3	Identify the importance of transformers in transmission and distribution of electric
	power. (L2)
CO4	Impart the knowledge about the characteristics, working principles and
	applications of semiconductor diodes, metal Oxide semiconductor field effect transistors
	(MOSFETs). (L2)
CO5	Expose basic concepts and applications of Operational Amplifier and
	Configurations(L2)

C	Contribution of Course Outcomes towards achievement of Program Outcomes &													
			Streng	gth of c	orrela	tions (H:Hig	h, M: 1	Mediu	m, L:L	ow)			
	РО 1	PO 2	PO 3	PO 4	PO5	PO6	РО 7	PO8	РО 9	PO10	PO1 1	PO1 2	PSO1	PSO 2
CO 1	3	2	2	1					1		1	1		1
	3	2	2	1			1		1		1	1		
CO 3	3	2	2	1			1		1		1	1		
CO 4	3	2	2	1			1		1		1	1		1
CO 5	3	2	2	1			1		1		1	1		1

	Syllabus	
Expt.	Contents	Mapped
No.		CO
Ι	Verification of Kirchhoff's Laws KVL and KCL.	
II	Verification of DC Superposition Theorem.	CO1
III	Verification of Thevenin's Theorem and Norton's Theorem	
IV	Swinburne's tests on a DC shunt motor.	CO2
V	OC and SC Tests on single phase transformer.	CO3
VI	Brake Test on DC shunt motor.	CO2
VII	Current Voltage Characteristics of a p-n Junction Diode/LED	
VIII	Diode Rectifier Circuits.	CO4
IX	Voltage Regulation with Zener Diodes.	
Х	Inverting and Non-inverting Amplifier Design with Op-amps	CO5

1. D.P.Kothari, I.J.Nagrath, Basic Electrical and Electronics Engineering, 1stedition,McGraw Hill Education (India) Private Limited, 2017.

2 B.L.Theraja, Fundamentals of Electrical Engineering and Electronics, 1stedition,S.Chand Publishing, New Delhi, 2006.

3. Adel S. Sedra and Kenneth C. Smith, Microelectronic Circuits 6th edition, OxfordUniversity Press, 2014.

Reference Books

Text Books

1. S.K. Bhattacharya, Basic Electrical and Electronics Engineering, Pearson Education, 2011.

2. Dharma Raj Cheruku, B T Krishna, Electronic Devices and Circuits, 2/e, PearsonEducation, 2008.

3. R.K.Rajput, Basic Electrical and Electronics Engineering, University Science Press, New Delhi,2012.

Information Technology Workshop

Course Code	19IT3151	Year	Ι	Semester	Ι
Course Category	Program Core	Branch	IT	Course Type	Lab
Credits	1.5	L-T-P	0-0-3	Prerequisites	Nil
Continuous Internal Evaluation:	25	Semester End Evaluation:	50	Total Marks:	75

	Course Outcomes								
Upon su	Upon successful completion of the course, the student will be able to								
CO1	Identify the basic computing device peripherals								
CO2	Gain knowledge on operating system concepts and its installations.								
CO3	Gain knowledge on basics of networking and internet.								
CO4	Learn productive tools like word, excel, and power point								
CO5	Gain knowledge on Raptor tool and designing flow charts								

	Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (H:High, M: Medium, I:Low)													
	PO1	PO2	PO3	PO 4	PO 5	PO6	PO7	PO8	PO9	PO1 0	PO11	PO12	PSO 1	PSO 2
CO 1				2	3					3			3	2
CO 2				2	3					3			3	2
$\begin{bmatrix} CO\\ 3 \end{bmatrix}$				2	3					3			3	2
CO 4				2	3					3			3	2
CO 5				2	3					3			3	2

	Syllabus	
Unit No.	Contents	Mapped CO
Ι	Task-1: Identify various kinds of computing devices, different peripherals, ports and connecting cables and Assemble and disassemble the PC.Task 2: Students have to be given a PC which does not boot due to improper assembly or defective peripherals. They should identify the problem and fix it to get the computer back to working condition.	CO1
II	 Task-3: Installation of MS-Windows. Task-4: Installation of Linux. Task-5: Practice on basic Linux OS commands. Students have to be givena malfunctioning CPU due to system software problems. They shouldidentify the problem and fix it to get the computer back to working condition. 	CO2
Ш	 Task-6: Connecting to their Local Area Network and access the Internet, Configure the TCP/IP setting and accessing the websites and email. Task-7: Usage of search engines. Configure Plug-ins like MacromediaFlash and JRE for applets, Skype and Video Conferencing setup. Task-8: Awareness on threats on Internet, Install antivirus software, configure their personal firewall and windows update on their computer, customize their browsers to block pop-ups, block ActiveX downloads toavoid viruses and/or worms 	CO3
IV	 Task-9: Exploring MS-Word and sample tasks. Document creation and editing text documents in your web browser using Google docs. Task-10: Excel orientation and sample tasks. Handle task lists, create project plans, analyze data with charts and filters using Google Sheets Task-11: PPT Orientation and sample tasks, project presentation- Google Slides, Manage event registrations, create quizzes; analyze responses- Google Forms, Web-based service providing detailed information about geographical regions and sites around the world. Explore the globe by entering addresses and coordinates-Google Maps and Earth. 	CO4
V	Task-12 : Basics on RAPTOR and designing flowcharts. Task-13 : Demonstrate problem solving skills by developing algorithms tosolve problems using Raptor tool.	CO5

Learning Resources
Text Books
Introduction to Computer-Peter Norton
Reference Books
Information Technology Workshop, 3rd Edition G Praveen Babu, MV Narayana BS
Publications
e- Resources & other digital material
1. https://www.vmware.com/pdf/VMwarePlayerManual10.pdf
2. https://zorinos.com/help/
3. https://zorinos.com/help/install-zorin-os/
4. http://www.googleguide.com/advanced_operators_reference.html
5. https://www.alexa.com/find-similar-sites

- 7. 8. https://en.wikipedia.org/wiki/File_archiver . https://raptor.martincarlisle.com/

II SEMESTER

Communicant ve english - II								
Course	19HS1201	Year	Ι	Semester	II			
Course Category	Humanities	Branch	IT	Course Type	Theory			
Credits	2	L-T-P	2-0-0	Prerequisites	Basic knowledge of grammar and fundamental concepts of Reading and Writing			
Continuous Internal Evaluation	30	Semester End Evaluation	70	Total Marks	100			

COMMUNICATIVE ENGLISH - II

	Course Outcomes				
Upon successful completion of the course, the student will be able to:					
CO1	Demonstrate good writing skills for effective paraphrasing and synthesizing	L2			
	information				
CO2	Analyze facts from opinions while reading and writing formal letters and e mails	L4			
02	using arange of vocabulary in formal writing				
	Evaluate reading texts and learn good writing skills for effective argumentative	L5			
CO3	essays and formal correspondence.				
CO4	Understand the structure of project reports applying grammatically correct	L2			
04	structures				
	and knowledge of grammar				
CO5	Develop advanced reading skills for deeper understanding of texts and	L6			
05	employability				
	skills.				

Co	Contribution of Course Outcomes towards achievement of Program Outcomes& Strength of correlations (H-High, M-Medium, L- Low)													
	PO1	PO2	PO3	P04	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1		1		1				1		3		3		1
CO2		1	í T	1				1		3		3		1
CO3				1						3		3		1
CO4				1						3		3		1
CO5			l l	i T						3		3		1

SYLLABUS							
UNIT NO.	CONTENT	Mapped CO					
	Reading: Reading for presenting - strategies to select, compile and synthesize						
	information for presentation-Comprehending a wide range of texts -Reading to recognize academic style						
Ι	Reading for Writing: Paraphrasing - using quotations and in-text references; using academic style - avoiding colloquial words and phrases - Writing an essay after researching a topic - Citing the sources used	CO1					
	Grammar and Vocabulary: Academic verbs in context; formal words and						

	phrases-Awareness about Root words	
II	Reading: Recognizing formal and informal styles -Recognizing the difference between facts and opinions - Identifying and understanding different perspectives Writing: Letter writing and e mail writing - Structure, Conventions and Etiquette – Informal, semi-formal and formal (enquiry, complaints, seeking permission, seeking internship - Re-draft a piece of text from a different perspective - Writing brief critical reviews of short texts Grammar and Vocabulary: Agreement: Subject-verb, Noun-pronoun; Editing short texts - Phrasal verbs - Phrasal prepositions - Avoiding clichés	CO2
ш	 Reading: Identifying claims, evidences, views/opinions, purpose, and stance/position -Understand the correlation between a talk and a reading text based on inferences made. Writing: Writing structured analytical and argumentative essays on general topics using suitable claims and evidences with the sources cited-Peer review of the essays written Grammar and Vocabulary: Language for different functions such as stating a point, expressing opinion, Agreeing/disagreeing, Adding information to what someone has stated, and asking for clarification - Modifiers and misplaced modifiers 	CO3
IV	 Reading: Reading varied text types - Structure and contents of a formal report -Sections in a report and understanding the purpose of each section-Significance of references Writing: Writing reports Grammar and Vocabulary: Active and passive voice - Use of passive verbs in academic writing 	CO4
v	Reading: Reading for inferential comprehension Writing: Writing one's CV and cover letter - Applying for a job/internship Grammar and Vocabulary: Reinforcing learning - Edit one's writing to correct common errors in grammar and usage - Use appropriate vocabulary for speaking and writing – Various purposes	CO5

LEARNING RESOURCES

Reference Books:

1. Bailey, Stephen. Academic writing: A handbook for international students. Routledge, 2014.

- 2. Skillful Level 2 Reading & Writing Student's Book Pack (B1) Macmillan Educational.
- 3. Hewings, Martin. *Cambridge Academic English (B2)*. CUP, 2012(Student Book, TeacherResource Book, CD & DVD)

e- Resources & other digital material:

Grammar/Listening/Writing:

1-language.com;

http://www.5minuteenglish.com/

https://www.englishpractice.com/

Grammar/Vocabulary:

English Language Learning Online;

http://www.bbc.co.uk/learningenglish/

http://www.better-english.com/;

http://www.nonstopenglish.com/ https://www.vocabulary.com/;

BBC Vocabulary Games

Free Rice Vocabulary GameReading: https://www.usingenglish.com/comprehension/; https://www.englishclub.com/reading/short-stories.htm; https://www.english-online.at/

All Skills: https://www.englishclub.com/; http://www.world-english.org/ http://learnenglish.britishcouncil.org/Online Dictionaries: Cambridge dictionary online; MacMillan dictionary; Oxford learner's dictionaries

Engineering	Mathematics -	2 (Probability	and Statistics)
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Course Code	19BS1202	Year	Ι	Semester	II
Course Category	Basic Sciences	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	Nil
Continuous Internal Evaluation:	30	Semester End Evaluation:	70	Total Marks:	100

Course					
	Outcomes				
Upon s	successful completion of the course, the student will be able to				
CO1	Classify the concepts of data science and its importance	L2			
CO2	Apply discrete and continuous probability distributions	L3			
CO3	Explain the association of characteristics through correlation and regression	L2			
	tools				
CO4	Identify the components of a classical hypothesis test	L2			
CO5	Infer the statistical inferential methods based on small and large sampling	L3			
	tests				

(Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (H:High, M: Medium, L:Low)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2											1	
CO2	3	2											1	
CO3	3	2											1	
CO4	3	2											1	
CO5	3	2											1	

Syllabus					
Unit	Contents	Mapped			
No.		CO			
Ι	Data Science and Probability:				
	Data Science: Statistics introduction, Population vs Sample, collection of				
	data, primary and secondary data, types of variable: dependent and	CO1			
	independent Categorical and Continuous variables, data visualization,				
	Measures of central tendency, Measures of dispersion (variance).				
	Probability: Probability axioms, addition law and multiplicative law of				
	probability, conditional probability, Baye's theorem (without proof).				
II	Random Variable and Probability Distributions:				
	Random variables (discrete and continuous), probability density functions,	CO^{2}			
	probability distribution - Binomial, Poisson and normal distribution-their	002			
	properties (mathematical expectation and variance).				
III	Correlation, Regression and Estimation:				
	Correlation, correlation coefficient, rank correlation, regression, lines of				
	regression, regression coefficients, principle of least squares and curve	CO3			
	fitting (straight Line, parabola and exponential curves). Estimation:	COS			
	Parameter, statistic, sampling distribution, point estimation, properties of				
	estimators, interval estimation.				

IV	Testing of Hypothesis and Large Sample Tests:	CO4
	Formulation of null hypothesis, alternative hypothesis, the critical region,	
	two types of errors, level of significance, and power of the test. Large	
	Sample Tests: Test for single proportion, difference of proportions, test for	
	single mean and difference of means. Confidence interval for parameters in	
	one sample and two sample problems	
V	Small Sample Tests:	
	Student t-distribution (test for single mean, two means and paired t-test),	COS
	testing of equality of variances (F-test), $\chi 2$ - test for goodness of fit, $\chi 2$ -	COS
	test for independence of attributes.	

Text Books

1. Miller and Freunds, Probability and Statistics for Engineers, 7/e, Pearson, 2008.

2. S.C. Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, 11/e, Sultan Chand & Sons Publications, 2012.

Reference Books

1 S. Ross, A First Course in Probability, Pearson Education India, 2002.

2.W. Feller, An Introduction to Probability Theory and its Applications, 1/e, Wiley, 1968

e- Resources & other digital material

1.https://nptel.ac.in/courses/111105041/

2.https://nptel.ac.in/courses/111102111/

3.https://nptel.ac.in/courses/111105090/

Engineering Chemistry

Course Code	19BS1203	Year	Ι	Semester	Ι
Course Category	Basic Sciences	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	Nil
Continuous Internal Evaluation:	30	Semester End Evaluation:	30	Total Marks:	100

Course						
	Outcomes					
Upon s	successful completion of the course, the student will be able to					
CO1 List various sources of renewable energy.						
CO2	Compare different types of cells.	L2				
CO3	Explain the merits of fuel cells.	L2				
CO4	Identify suitable methods for metal finishing.	L2				
CO5	Distinguish between nanoclusters and nanowires, polymers, molecular	L2				
	machines & Switches					

(Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (H:High, M: Medium, L:Low)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3													
CO2	3													1
CO3	3		2											
CO4	3		2											1
CO5	3													1

Syllabus					
Unit No.	Contents	Mapped CO			
Ι	ELECTROCHEMICAL ENERGY SYSTEMS Introduction-Origin of electrode potential, Electrode Potentials, Measurement of Electrode Potentials, Nernst Equation for a single electrode, EMF of a cell, Types of Electrodes or Half Cells-Hydrogen and Calomel electrode, Electrochemical Cell, Galvanic Cell vs Electrolytic Cell, Electrochemical conventions, Types of Ion Selective Electrodes- glass membrane electrode, polymer membrane electrodes, solid state electrodes, gas sensing electrodes (classification only), Concentration Cells.	CO1			
II	BATTERY TECHNOLOGY Basic concepts, battery characteristics, classification of batteries, Important applications of batteries, Classical batteries-dry/Leclanche cell, Modern batteries-zinc air, lithium cells-Li MnO2 cell- challenges of battery technology. Fuel cells- Introduction - classification of fuel cells – hydrogen and oxygen fuel cell, propane and oxygen fuel cell- Merits of fuel cell.	CO2			
III	RENEWABLE SOURCES OF ENERGY Introduction- sources of renewable energy Solar energy – Introduction - Physical and Chemical properties of Silicon- Production of Solar Grade Silicon from Quartz - Doping of Silicon- p and n	CO3			

	type semi conductors- PV cell / solar cell- Manufacturing of Photovoltaic	
	Cells using Chemical Vapor Deposition Technique-applications of solar	
	energy	
IV	METAL FINISHING	
	Technological importance of metal finishing, methods of metal finishing,	
	manufacturing of electronic components, electrochemical techniques of	CO4
	forming, machining and etching, electrolytic cell, principle of	004
	electroplating, nature of electrodeposits, electroplating process,	
	Electroplating of chromium, gold etc. Electroless plating of copper, nickel	
V	POLYMERS, NANOMATERIALS AND MOLECULAR MACHINES &	
	SWITCHES: Polymers: Introduction thermoplastic and thermo setting	
	resins, Preparation, properties and uses of polystyrene and	
	Polyphosphazines., differences between	
	Nanomaterials: Introduction to nanomaterial: nanoparticles, nanocluster,	
	carbon nanotube (CNT) and nanowires. Chemical synthesis of	CO5
	nanomaterials: sol-gel method. Characterization: Principle and applications	
	of scanning electron microscope (SEM) and transmission electron	
	microscope (TEM). Molecular machines & Molecular switches: Rotaxanes	
	and Catenanes as artificial molecular machines; Molecular switches -	
	cyclodextrin-based switches	

Text Books

1. P.C. Jain and M. Jain, Engineering Chemistry, 15/e, DhanapatRai& Sons, Delhi (2014).

2. B.K. Sharma, Engineering Chemistry, Krishna Prakashan, Meerut.

3. O G Palanna, Engineering Chemistry, Tata McGraw Hill (2009).

Reference Books

1. Sashichawla, A Textbook of Engineering Chemistry, DhanapathRai and sons, (2003)

2. B.S Murthy and P. Shankar, A Text Book of NanoScience and NanoTechnology, University Press (2013).

3. S.S. Dara, A Textbook of Engineering Chemistry, S.Chand& Co, (2010)

4. N.Krishna Murthy and Anuradha, A text book of Engineering Chemistry,

M murthyPublications (2014).

5. K. SeshaMaheshwaramma and Mridula Chugh, Engineering Chemistry, Pearson India Edn services, (2016).

e- Resources & other digital material

https://nptel.ac.in/courses/105105178/

http://202.53.81.118/course/view.php?id=82

Problem Solving and Programming

Course Code	19ES1202	Year	Ι	Semester	II
Course Category	Engineering Sciences	Branch	IT	Course Type	Theory
Credits	4	L-T-P	3-1-0	Prerequisites	Nil
Continuous Internal Evaluation:	30	Semester End Evaluation:	70	Total Marks:	100

Course Outcomes					
Upon s	successful completion of the course, the student will be able to				
CO1 Develop algorithm and flowchart for simple problems.					
CO2	Understand the structure, fundamentals and decision making statements in	L2			
	C.				
CO3	Choose suitable iterative statements and arrays to solve the problems.	L3			
CO4	Solve problems using functions and pointers.	L3			
CO5	Apply the structures, unions and file operations in a specific need.	L3			

(Contribution of Course Outcomes towards achievement of Program Outcomes &													
	Strength of correlations (H:High, M: Medium, L:Low)													
	PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12 PSO1 PSO2													
C01	2	2										1	3	3
CO2	1	1											3	3
CO3	2	2	2									1	3	3
CO4	2	2	2									1	3	3
CO5	2	2	2									1	3	3

Syllabus					
Unit No.	Contents	Mapped CO			
Ι	Introduction to Computer Problem-Solving – Introduction, The Problem- Solving Aspect, Top-Down Design, Fundamental Algorithms – Exchanging the values of two variables, Counting, Summation of a Set of Numbers, Factorial Computation, Sine Function Computation, Generation of the Fibonacci Series. Basics of Flow charts.	CO1			
II	Introduction to C: Introduction, Structure of C Program, A Simple C Program, C-Tokens, Basic Data types, Variables, Constants, Input / Output statements, Operators, Type conversion and Type casting. Conditional Branching Statements: if, if-else, if-else-if Statements and Switch case.	CO2			
III	 Iterative Statements: while, for and do - while loops, Nested loops, break and continue statements. Arrays: Declaration, Accessing array elements, Storing values, Operations on arrays, Multi-dimensional arrays. Strings: Introduction, String manipulation functions. 	CO3			

IV	Functions: Introduction, Using Functions, Function declaration, Function definition and Function call, Parameter passing, Passing arrays to functions, Recursion, Storage classes.	CO4
	arithmetic, Pointers and arrays, Pointer to pointer Variables, Pointer arithmetic, Pointers and arrays, Pointer to pointer, Array of pointers, Pointers and functions, Dynamic memory allocation.	
V	Structures: Introduction, Nested structures, Array of structures, Structures and functions, Unions.Files in C: Using Files in C, Read data from files, Writing data to files, Random access to files of records.	CO5

Text Books

R.G. Dromey, How to Solve it by Computer, 1/e, Pearson Education, 2006. (for Unit I).
 Reema Thareja, Programming in C, Oxford University Press, AICTE Edition, 2018.

Reference Books

1. B. A. Forouzan and R. F. Gilberg, Computer Science: A Structured Programming Approach Using C, 3/e, Cengage Learning, 2007.

- 2. Pradip Dey, Manas Ghosh, Programming in C, Oxford University Press, AICTE Edition,
- 3. B. Gottfried, Programming with C, 3/e, Schaum's outlines, McGraw Hill (India), 2017.
- 4.Jeri R. Hanly, Ellot B. Koffman, Problem Solving and Program Design in C, 5/e,

Pearson.

e- Resources & other digital material

1. http://cprogramminglanguage.net/

2. https://www.geeksforgeeks.org/c-programming-language/

3. https://nptel.ac.in/courses/106105085/4
COMMUNICATIVE ENGLISH - II LAB

Course Code	19HS1251	Year	Ι	Semester	II
Course Category	Humanities	Branch	IT	Course Type	Lab
Credits	1.5	L-T-P	0-0-3	Prerequisites	Fundamental knowledge of Listening and Speaking skills
Continuous Internal Evaluation	25	Semester End Evaluation	50	Total Marks	75

	Course Outcomes	
Upon succe	essful completion of the course, the student will be able to:	
CO1	Understand the purpose of a presentation and learn strategies to present the text.	L2
CO2	Comprehend talks/lectures and answer inferential questions using PPTs/audio-visualAids	L2
CO3	Analyze the comprehensive ability and logical thinking for better listening and speaking.	L4
CO4	Facilitate active listening to enable inferential learning through expert lectures and talks and team up with a colleague to participate well in role plays.	L3
CO5	Develop advanced listening skills for an in-depth understanding of complex texts and collaborate with a partner for effective performance in mock interviews	L5

Co	Contribution of Course Outcomes towards achievement of Program Outcomes& Strength of correlations (H-High, M-Medium, L- Low)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1									2	3		3	1	
CO2									2	3		3	1	
CO3									2	3		3	1	
CO4									2	3		3	1	
CO5									2	3		3	1	

SYLLABUS							
EXPERIMENT	CONTENT	Mapped					
NO.		CO					
1	Listening for presentation strategies and answering questions on the	CO1					
	speaker, audience, and key points						
2	Formal presentations using PPT slides (individual)						
3	Relating a reading text to a talk/presentation – understanding different perspectives and drawing inferences	CO2					
4	Formal team presentations using PPT slides/audio- visual aids						
5	Identifying views and opinions expressed by different speakers while listening to discussions	CO3					

6	Group discussion on general topics	
7	Processing of information using context clues while listening to talks/lectures	CO4
8	Role plays – people from various fields of work	
9	Processing of explicit information presented in the text and implicit information inferable from the text or from previous/background Knowledge	CO5
10	Mock interviews for jobs/internships	

LEARNING RESOURCES

Reference Books:

- 1. Chase, Becky Tarver. *Pathways: Listening, Speaking and Critical Thinking.* Heinley ELT; 2nd Edition, 2018.
- 2. Skillful Level 2 Reading & Writing Student's Book Pack (B1) Macmillan Educational.
- 3. Hewings, Martin. *Cambridge Academic English (B2)*. CUP, 2012(Student Book, Teacher Resource Book, CD & DVD)
- e- Resources & other digital material:

Grammar/Listening/Writing:

1-language.com

http://www.5minuteenglish.com/

https://www.englishpractice.com/

Listening:

https://learningenglish.voanews.com/z/3613;

http://www.englishmedialab.com/listening.html

Speaking:

https://www.talkenglish.com/BBC; Learning English - Pronunciation tips

Merriam-Webster – Perfect pronunciation Exercises

All Skills:

https://www.englishclub.com/;

http://www.world-english.org/

http://learnenglish.britishcouncil.org/

Online Dictionaries:

Cambridge dictionary online; MacMillan dictionary; Oxford learner's dictionaries

Engineering Chemistry Lab

Course Code	19BS1251	Year	Ι	Semester	II
Course Category	Basic Sciences	Branch	IT	Course Type	Lab
Credits	1.5	L-T-P	0-0-3	Prerequisites	Nil
Continuous Internal Evaluation:	25	Semester End Evaluation:	50	Total Marks:	75

	Course	
	Outcomes	
Upon s	successful completion of the course, the student will be able to	
CO1	Explain the functioning of the instruments such as pH, Conductometric	L2
	andPotentiometric methods.	
CO2	Identify different ores (Cr & Cu) and their usage in different fields	L2
	(industry, software devices, electronic goods).	
CO3	Experiment with the physical parameter of organic compounds.	L2
CO4	Compare the viscosities of oils.	L2
CO5	List the preparation of polymers and nano materials.	L2

(Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (H:High M: Medium I:Low)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3		2											
CO2	3		2											
CO3	3		2											
CO4	3		2											
CO5	3		2											

	Syllabus						
Expt.	Contents	Mapped					
N0.		CO					
Ι	Determination of strength of an acid by pH metric method	CO1					
II	Determination of conductance by conductometric method	COI					
III	Determination of viscosity of a liquid	CO4					
IV	Determination of surface tension of a liquid	CO3					
V	Determination of chromium (VI) in potassium dichromate	CO^{2}					
VI	Determination of Zinc by EDTA method	02					
VII	Estimation of active chlorine content in Bleaching powder	CO3					
VII	Preparation of Phenol-Formaldehyde resin	COS					
IX	Preparation of Urea-Formaldehyde resin	005					
X	Thin layer chromatography	CO3					

Text Books

N.KBhasin and Sudha Rani Laboratory Manual on Engineering Chemistry 3/e, DhanpatRai Publishing Company (2007).

Reference Books

Mendham J, Denney RC, Barnes JD, Thosmas M and Sivasankar B Vogel's Quantitative Chemical Analysis 6/e, Pearson publishers (2000).

e- Resources & other digital material

https://nptel.ac.in/courses/105105178/

http://202.53.81.118/course/view.php?id=82

Problem Solving and I	Programming Lab
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Course Code	19ES1252	Year	Ι	Semester	II
Course Category	Engineering Sciences	Branch	IT	Course Type	Lab
Credits	1.5	L-T-P	0-0-3	Prerequisites	Nil
Continuous Internal Evaluation:	25	Semester End Evaluation:	50	Total Marks:	75

	Course	
	Outcomes	
Upon s	successful completion of the course, the student will be able to	
CO1	Build algorithm and flowchart for simple problems.	L3
CO2	Use suitable control structures to solve problems.	L3
CO3	Use suitable iterative statements and arrays to solve the problems.	L3
CO4	Implement Programs using functions and pointers.	L3
CO5	Develop code for complex applications using structures, unions and file	L3
	handling features.	

(Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (H:High, M: Medium, L:Low)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2										1	3	3
CO2	2	2	2		2							1	3	3
CO3	2	2	2		2							1	3	3
CO4	2	2	2		2							1	3	3
CO5	2	2	2		1							1	3	3

Syllabus							
Expt. No.	Contents	Mapped CO					
Ι	Draw flowcharts for fundamental algorithms.	CO1					
II	C Programs to demonstrate C-tokens.						
III	C Programs on usage of operators.	CO2					
IV	C Programs to demonstrate Decision making and branching (Selection)						
V	C programs to demonstrate different loops.						
VI	C programs to demonstrate 1-D arrays.	-					
VII	C programs to demonstrate multi-dimensional arrays.	CO3					
VIII	C programs to perform operations on strings with String handling						
	functions and without String handling functions.						
IX	C programs to demonstrate functions.	CO4					
Х	C programs on pointers.	04					
XI	C programs on structures and unions.	COS					
XII	C programs to demonstrate files.						

Text Books

1. R.G. Dromey, How to Solve it by Computer, 1/e, Pearson Education, 2006.

2. Reema Thareja, Programming in C, Oxford University Press, AICTE Edition, 2018. **Reference Books**

1. B. A. Forouzan and R. F. Gilberg, Computer Science: A Structured Programming Approach Using C, 3/e, Cengage Learning, 2007.

2. Pradip Dey, Manas Ghosh, Programming in C, Oxford University Press, AICTE Edition,

- 3. B. Gottfried, Programming with C, 3/e, Schaum's outlines, McGraw Hill (India), 2017.
- 4. Jeri R. Hanly, Ellot B. Koffman, Problem Solving and Program Design in C, 5/e,

Pearson.

e- Resources & other digital material

1. http://cprogramminglanguage.net/

- 2. https://www.geeksforgeeks.org/c-programming-language/
- 3. https://nptel.ac.in/courses/106105085/4

Basic Workshop

Course Code	19ES1253	Year	Ι	Semester	II
Course Category	Engineering Sciences	Branch	IT	Course Type	Lab
Credits	1.5	L-T-P	0-0-3	Prerequisites	Nil
Continuous Internal Evaluation:	25	Semester End Evaluation:	50	Total Marks:	75

	Course Outcomes						
Upon s	successful completion of the course, the student will be able to						
CO1	Apply wood working skills in real world applications	L3					
CO2	Build different parts with metal sheets in real world applications.	L3					
CO3	Apply fitting operations in various applications.	L3					
CO4	Apply different types of basic electric circuit connections and demonstrate	L3					
	soldering.						

0	Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (H:High, M: Medium, L:Low)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3					1			3		1			
CO2	3					1			3		1			
CO3	3					1			3		1			
CO4	3					1			3					

	Syllabus	
Job Type	Contents	Mapped CO
Wood Working	 Familiarity with different types of woods and tools used in wood working and make following joints i) Half – Lap joint. ii) Mortise and Tenon joint. iii) Corner Dovetail joint or Bridle joint. 	CO1
Sheet Metal Working	Familiarity with different types of tools used in sheet metal working, Developments of following sheet metal job from GI sheets i) Tapered tray ii) Conical funnel ii) Elbow pipe	CO2
Fitting	 Familiarity with different types of tools used in fitting and do the following fitting exercises i) V-fit ii) Semi-circular fit iii) Bicycle tire puncture and change of two wheeler tire 	CO3
Electrical	Familiarities with different types of basic electrical circuits and make the following connections	CO4

Wiring	i) Preparation of a circuit for Parallel and series connection.	
	and tube light.	
	iii) Soldering of wires	

Learning Resources
Text Books
1. Work shop Manual - P.Kannaiah/ K.L.Narayana/ Scitech Publishers.
2. Workshop Manual / Venkat Reddy/ BS Publications/Sixth Edition

III SEMESTER

Engineering Mathematics III (Discrete Mathematical Structures) (Common with CSE)

Course Code	19BS1302	Year	II	Semester	Ι
Course Category	Basic Sciences	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	Basic Maths they studied at school level
Continuous Internal Evaluation	30	Semester End Evaluation	70	Total Marks	100

	Course Outcomes	Blooms Taxonomy Level
Upon	successful completion of the course, the student will be able to	
CO1	Interpret the logical sentences using connectives and predicates.	L2
CO2	Apply rules of inference and methods of proof on Mathematical Logic and Predicate Calculus.	L3
CO3	Apply recurrence relations to solve problems in different domains.	L3
CO4	Construct Hasse diagram and various lattices from Partial Ordered Sets.	L3
CO5	Apply the concepts of trees and graphs for solving problems.	L3

Contr correl	Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:Substantial, 2: Moderate, 1:Slight)													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
C01	3	3	1										2	
CO2	3	3												
CO3	3	2	2										2	
CO4	3	2	1										2	
CO5	3	3	2										2	

	Syllabus	
Unit No.	Contents	Mapped CO
I	 Mathematical Logic: Introduction-Statements and Notations- Connectives-Statement formulas and Truth Tables. Normal Forms: Disjunctive Normal Forms (DNF), Conjunctive Normal Forms (CNF), Principal of Disjunctive Normal Forms (PDNF), Principal of Conjunctive Normal Forms (PCNF). 	CO1
П	 Theory of Inference for Statement Calculus: Validity using Truth Tables-Rules of Inference – Consistency of Premises and Indirect Method Proof Predicate calculus: Introduction to Predicates - Statement functions, Variable and Quantifiers- Predicate Formulas-Free and Bound Variables-Universe of Discourse. 	CO2
III	Recurrence Relations -The Method of Characteristic Roots-Solutions in Inhomogeneous Recurrence Relation.	CO3
IV	Relations and Directed Graphs -Special Properties of Binary Relations- Equivalence Relations- Ordering Relations, Lattices, and Enumerations- Operations on Relations- Paths and Closures-Directed Graphs and Adjacency Matrices	CO4,CO5
V	Graphs- Basic Concepts- Isomorphism's and Sub graphs-Trees and Their Properties - Spanning Trees-Planar Graphs-Euler's Formula- Multigraphs and Euler Circuits-Hamiltonian Graphs- Chromatic Numbers.	CO5

Text Books

- **1.** Discrete Mathematical Structures with Applications to Computer Science, J P Trembly and R Manohar, 1988, McGraw-Hill (**Unit-I,II**)
- **2.** Discrete Mathematics for Computer Scientists & Mathematicians, Joe L. Mott. Abraham Kandel and Theodore P. Baker, Second Edition, 2017, PHI. (**Unit-III,IV,V**)

References

1. Discrete Mathematics and its Applications, Kenneth H. Rosen, Seventh Edition, 2017, McGraw-Hill.

e-Resources & other digital material

- 1. https://www.geeksforgeeks.org/engineering-mathematics-tutorials/
- 2. https://www.tutorialspoint.com/discrete_mathematics/index.htm
- 3. http://www.alas.matf.bg.ac.rs/~mi10164/Materijali/DS.pdf
- 4. https://nptel.ac.in/courses/111107058/

AI Tools

(Common to all)

Course Code	19ES1301	Year	II	Semester	Ι
Course Category	ES	Branch	IT	Course Type	Theory
Credits	2	L-T-P	2-0-0	Prerequisites	-
Continuous Internal		Semester End			
Evaluation	30	Evaluation	70	Total Marks:	100

	Course Outcomes	Blooms Taxonomy Level
Upon	Successful completion of course, the student will be able to	
CO1	Understand the Fundamentals of Artificial Intelligence and	L2
	its Applications.	
CO2	Summarize various machine learning methods.	L2
CO3	Identify different machine learning applications.	L3
CO4	Compare Machine Learning & Deep Learning and Outline	L2
	basic Deep Learning Algorithm.	
CO5	Make use of Deep Learning Concepts for various	L3
	Applications.	

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (H:High, M: Medium, L:Low)														
	PO1	01 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12 PSO1 PSO2												
CO1	2	2											1	2
CO2	2	2											2	2
CO3	2	2		2									2	3
CO4	2	2											2	2
CO5	2	2	2	2		1						2	2	3

	Syllabus							
Unit		Mapped						
No	Contents							
I	Introduction to Artificial Intelligence: What is AI, Foundations of AI, Goals of AI, and Applications of AI.	CO1						
II	Machine Learning: Definition, Learning Methods: Supervised Learning, Unsupervised Learning, Semi-Supervised Learning, Reinforcement Learning	CO2						
III	Machine Learning Applications: Computer vision, Speech Recognition, Natural Language Processing, Decision Making process.	CO3						
IV	Deep Learning: Basics of Deep Learning, Machine Learning Vs Deep Learning, Fundamental Deep Learning Algorithm-Convolution Neural Network (CNN).	CO4						
V	Deep Learning Applications: Computer vision, Speech Recognition, Natural Language Processing, Decision Making process.	CO5						

Text Books

- **1.** Artificial Intelligence: A Modern Approach, Stuart Russell and Norvig, Third Edition, 2015, Pearson Education. (**Unit-1**)
- 2. Machine Learning: A Probabilistic Perspective, Kevin P. Murphy, 2012, MIT Press (Unit-2&3)
- **3.** Deep Learning (Adaptive Computation and Machine Learning series), Ian Goodfellow , Yoshua Bengio, Aaron Courville, Francis Bach, 2017, MIT Press. (**Unit-4&5**)

e-Resources & other digital material

1. <u>https://swayam.gov.in/nd1_noc19_cs52/preview</u>

- 2. https://swayam.gov.in/nd1_noc19_cs85/preview
- 3. https://emerj.com/ai-sector-overviews/machine-learning-healthcare-applications/

DESIGN THINKING

(Common to all)

Course code	Course code 19ES1302		II	Semester	Ι
Course	ES	Branch	IT	Course Two	Theory
category	ES		11	Course Type	Theory
Credits	2	L-T-P	2-0-0	Prerequisites	
Continuous		Semester			
Internal	30	End	70	Total marks	100
evaluation		Evaluation			

Upon suc	Course Outcomes Upon successful completion of the course, the student will be able to								
CO1	Explain the principles of design thinking and its approaches.	L2							
CO2	Identify the empathy, define phases in human centered design problems.	L3							
CO3	Develop an idea, build a prototype and test in design thinking context.	L3							
CO4	Apply design thinking techniques for product innovation.	L3							
CO5	Implement design thinking in business process models.	L3							

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:Substantial, 2: Moderate, 1:Slight)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	-					-								
CO1			3									1	2	2
CO2			3	2		2			2	2		1	2	2
CO3			3	2		2			3	2		1	2	2
CO4			3	2		2			2	2		1	2	2
CO5			3	2		2			2	2	1	1	2	2

	Syllabus							
Unit No.	Contents	Mapped CO						
I	INTRODUCTION TO DESIGN THINKING: An insight into Design, origin of Design thinking, Design thinking Vs Engineering thinking, importance of Design thinking, Design Vs Design thinking, understanding Design thinking and its process models, application of Design thinking	CO1						
II	EMPATHIZE IN DESIGN THINKING: Human-Centered Design (HCD) process - Empathize, Define, Ideate, Prototype and Test and Iterate. Role of Empathy in design thinking, methods and tools of empathy, understanding empathy tools. Explore define phase state users' needs and problems using empathy methods	CO2						
ш	IDEATION, PROTOTYPING AND TESTING : Ideation methods, brain storming, advantages of brain storming, methods and tools of ideations, prototyping and methods of prototyping, user testing methods, Advantages and disadvantages of user Testing/ Validation	CO3						
IV	PRODUCT INNOVATION: Design thinking for strategic innovation, Definition of innovation, art of innovation, teams for innovation, materials and innovation in materials, definition of product and its classification. Innovation towards product design Case studies	CO4						
V	DESIGN THINKING IN BUSINESS PROCESSES: Design Thinking applied in Business & Strategic Innovation, Design Thinking principles that redefine business – Business challenges: Growth, Predictability, Change, Maintaining Relevance, Extreme competition, Standardization. Design thinking to meet corporate needs.	CO5						

Text Books:

- 1. Change by design, Tim Brown, 2009, Harper Collins.
- 2. Engineering design, George E Dieter,4th Revised edition, 2009 McGraw Hill.

Reference Books

- 1. Design Thinking for Strategic Innovation, Idris Mootee, 2013, John Wiley & Sons.
- 2. Design Thinking-The Guide Book Facilitated by the Royal Civil service Commission, Bhutan
- 3. Design Methods: A Structured Approach for Driving Innovation in Your Organization, Vijay Kumar, First Edition, 2012, Wiley.
- 4. Human-Centered Design Toolkit: An Open-Source Toolkit to Inspire New Solutions in the Developing World, IDEO, Second Edition, 2011, IDEO.

e-Resources & other digital material

- 1. <u>https://www.interaction-desiqn.ora/literature/topics/desiqn-thinking</u>
- 2. <u>https://www.interaction-desiqn.prq/literature/article/how-tq-<eve'op-an-empath\capproach-in-design-thinking</u>

Fundamentals of Digital Logic Design

(Common with CSE)

Course Code	19IT3301	Year	II	Semester	Ι
Course Category	PC	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	
Continuous Internal		Semester End			
Evaluation :	30	Evaluation:	70	Total Marks:	100

	Blooms Taxonomy Level						
Upon successful completion of the course, the student will be able to							
CO1	Understand various types of number systems and their conversions.	L2					
CO2	Apply different methods to simplify Boolean functions.	L3					
CO3	Design Combinational logic circuits.	L3					
CO4	Design sequential circuits using flip-flops.	L3					
CO5	Construct Registers and Counters using flip-flops.	L3					

Cont corre	Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:Substantial, 2: Moderate, 1:Slight)													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2
CO 1	2													
CO 2	2	1											2	1
CO 3	2	2	2										2	1
CO 4	2	2	2										2	1
CO 5	2	2	2										2	1

	Syllabus								
Unit No	Contents	Mapped CO							
I	Digital Systems and Binary Numbers: Decimal, Octal, Hexadecimal number systems, Conversions, Complements, Binary codes, Arithmetic with signed and unsigned numbers (addition, subtraction), Logic Gates.	C01							
II	 Boolean Algebra: Introduction, Axioms and Laws of Boolean Algebra, Boolean functions, Minterms (SOP) and Maxterms (POS), Canonical and Standard Forms Gate–Level Minimization: Introduction, Two, Three, Four Variable K-map's, Don't Care Conditions, NAND and NOR implementation. 	CO2							
III	Combinational Logic: Introduction to combinational logic circuits, Binary adder and subtractor, Look Ahead Carry Adder, Decoders, Encoders, Multiplexers, Demultiplexers.	CO3							
IV	Sequential Logic: Introduction to sequential circuits, Latch–FlipFlop– SR, JK, T, D Flip Flops–Flip Flop excitation tables.	CO4							
V	Registers and Counters: Registers, Shift registers, Synchronous and Asynchronous (ripple) counters, BCD counter (synchronous and asynchronous), Ring counter, Johnson counter.	CO5							

Learning Recourses

Text Books

1. Digital Design, M. Morris Mano, Michael D.Ciletti, Fifth Edition, 2013, Pearson.

References

- 1. Switching Theory and Finite Automata, Zvi. Kohavi, Niraj K. Jha, Third Edition, 2010, Cambridge, University Press.
- 2. Fundamentals of Digital circuits, A. Anand Kumar, Third Edition, 2013, PHI.

e-Resources & other digital material

- 1. <u>https://nptel.ac.in/courses/106/108/106108099/ http://nptel.ac.in/courses/117106086/1</u>
- 2. https://nptel.ac.in/courses/117/105/117105080/
- 3. <u>https://www.udemy.com/course/digital-electronics-logic-design/</u>
- 4. <u>https://learnabout-electronics.org/Digital/dig20.php</u>
- 5. <u>https://www.tutorialspoint.com/digital_circuits/digital_circuits_logic_gates.htm</u>
- 6. <u>https://www.geeksforgeeks.org/digital-electronics-logic-design-tutorials/</u>

Object Oriented Programming Using C++

Course Code	19IT3302	Year	II	Semester	Ι
Course Category	PC	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	C Language
Continuous Internal		Semester End			
Evaluation :	30	Evaluation:	70	Total Marks:	100

	Course Outcomes							
Upon	Successful completion of course, the student will be able to	BloomsTaxonomy Level						
CO1	Illustrate general principles and basics of C++.	L2						
CO2	Outline the features of OOP.	L2						
CO3	Make use of arrays, pointers and polymorphism in writing programs.	L3						
CO4	Develop programs using files and generic programming concepts.	L3						
CO5	Identify programs using string functions and exception handling mechanism.	L3						

Cont corre	Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (H:High, M: Medium, L:Low)														
	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	
CO1	2	2	2	2				2		1			2	2	
CO2	2	2	2	2				2		1			2	2	
CO3	2	2	2	2				2		1			2	2	
CO4	2	2	2	2				2		1			2	2	
CO5	2	2	2	2				2		1			2	2	

	Syllabus	
Unit No	Contents	Mapped CO
I	Introduction to C++ (Chapter 1): Difference between C and C++, Evaluation of C++, ANSI Standard, Programming Paradigms, Key concepts of OOP, Advantages of OOP, Usage of OOP Input and Output in C++ (Chapter 3): Streams in C++ and Stream Classes, Pre-defined streams, Buffering, Stream Classes, Unformatted	CO1

	-	
	 console I/O operations, Formatted console I/O operations Declarations (Chapter 4): Tokens, Variable declaration and initialization, Data types in C++, Operators in C and C++, Scope access operator, Name Space, Memory management operators, Comments, Comma operator Decision Statements (Chapter 5): Introduction, The if statement, Multiple ifs, Nested if-else, else-if ladder, unconditional control transfer statements, the switch statement, nested switch-case. Control Loop Structures (Chapter 6): Introduction, What is loop, The for loop, Nested for loops, the while loop, The do-while loop, the dowhile loop statement with while loop. Functions in C++(Chapter 7): Introduction, Parts of a function, Passing arguments, Return by reference, Returning more values by reference, Default arguments, const arguments, Inline functions, Function overloading Recursion 	
Π	Classes and Objects(Chapter 8): Introduction, Structure in C, Structure in C++, Classes in C++, declaring Objects, The public keyword, The private keyword, The Protected keyword, Access specifiers and their scope, Defining member functions, Characteristics of member functions, Outside member function as inline, Rules for inline functions, Encapsulation, Static member variable, static member functions , object as function arguments, friend functions Constructors and Destructors (Chapter 9): Introduction, Constructors and destructors, Characteristics, Applications of constructors, Parameterized constructor, Overloading constructors, Array of objects using constructors, Constructors with default arguments, Copy constructors, The const objects, Destructors Operator Overloading (Chapter10): Introduction, The keyword operator, Overloading unary operators, Operator return type, Constraint on increment and decrement operator, Overloading binary operator, Overloading assignment operator Inheritance (Chapter11): Introduction, Reusability, Access Specifiers and Simple inheritance, Protected data with private inheritance, Types of inheritance, Single, Multiple, Hierarchical, Hybrid, Multipath inheritances, Virtual base classes	CO2
ш	 Arrays(Chapter12): Introduction, One-dimensional array declaration, characteristics of arrays, Accessing array elements through pointers, Array of pointers, Passing array elements to a function, Passing complete array elements to a function, Initialization of arrays using functions, two dimensional arrays, Pointers and Two dimensional arrays, Pointers(Chapter13):Introduction, Features of pointers, Pointer Declaration, Pointer to pointer, void pointer, wild pointer, The this pointer, Pointers to derived class and base class Memory Models (Chapter14): Introduction, Memory models, Dynamic memory allocation, The new and delete operators Binding and Polymorphism and Virtual Functions(Chapter15): Introduction, Binding in C++, Pointer to base class and derived class objects, Virtual functions, Rules for virtual functions, Array of pointers, Pure virtual functions, Abstract classes 	CO3

IV	Files (Chapter 16):Introduction, File stream classes, Steps for file operations, Checking for errors, Finding end of file, File opening modes, File pointers and manipulators, Error handling functions. Templates (chapter 17): Introduction, need for templates, Definition of class templates, Working of function templates, Class templates with more parameters, Function templates with more arguments, Overloading of template function, Member function templates, Recursion with function templates.	CO4
V	 Strings(Chapter 18): Introduction, Moving from C string to C++ string, Declaring and Initializing string objects, Relational operators, Handling string objects, String attributes, Accessing elements strings, Comparing and exchanging Exception Handling (Chapter19): Introduction, Principles of exception handling, the keywords try, throw and catch, Guidelines, Multiple catch statements, Re-throwing an exception, Specifying exceptions. 	CO5

Learning Recourses

Text Books

Programming in C++, Second Edition, by Ashok N Kamthane, Pearson Education.

References

1.	C++	How	То	Program,	Dietel and	Dietel,	Prentice	Hal.
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2. C++ The Complete Reference, 5th Edition, by Herbert Schildt, TMH.

E-Recourses and other Digital Material

http://www.cplusplus.com https://www.w3schools.com/cpp/

Data Structures

(Common with CSE)

Course Code	19IT3303	Year	II	Semester	Ι
Course Category	PC	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	C Language
Continuous Internal		Semester End			
Evaluation :	30	Evaluation:	70	Total Marks:	100

	Course Outcomes								
Upon	Upon successful completion of the course, the student will be able to								
CO1	Understand the concept of Recursion & Iteration with examples.	L2							
CO2	Select appropriate sorting and searching algorithms for various applications.	L3							
CO3	Apply appropriate linear data structures to solve problems.	L3							
CO4	Solve problems using suitable nonlinear data structures.	L3							

Contr correl	Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:Substantial, 2: Moderate, 1:Slight)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO12	PS O1	PS O2
CO1	2	2	2									1	2	2
CO2	2	2	2									1	2	2
CO3	2	2	2									1	2	2
CO4	2	2	2									1	2	2

	Syllabus						
Unit No	Contents	Mapped CO					
I	 Introduction: Algorithm Specification, Time complexity & space complexity and their notations. Recursion: What is Recursion, Why Recursion, Format of a Recursive function, Recursion and memory, Recursion Vs Iteration, Examples. Sorting and Searching: Searching- Linear and Binary search algorithms, Sorting- Bubble, Insertion, Selection, Merge, Quick sort algorithms. 	CO1, CO2					
II	Linked lists: Single linked list, double linked list, circular linked list, and operations on linked lists.	CO1, CO3					
III	 Stacks: Definition, operations: array implementation, linked list implementation and applications. Queues: Definition, operations: array implementation, linked list implementation and applications, Circular Queue. 	CO1, CO3					
IV	Trees: Introduction- Terminology, representation of trees, binary trees abstract data type, Properties of binary trees, binary tree representation, binary tree traversals In order, preorder, post order, Binary search trees Definition, searching BST, insert into BST, delete from a BST, Height of a BST.	CO1, CO4					
V	Graphs: The Graph ADT Introduction, definition, graph representation, elementary graph operations BFS, DFS, Minimum Spanning Tree.	CO1, CO4					

- Text Books
 - 1. Data Structures and Algorithm Analysis in C, Mark Allen Weiss, Second Edition, 2002, Pearson.
 - 2. Introduction to Algorithms, Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, Third Edition, 2010, PHI.
 - 3. Data Structures and Algorithms Made Easy by Narasimha Karumanchi, 2020, CareerMonk Publications.

References

- 1. Fundamental of Data Structures in C, Horowitz, Sahani, Anderson-Freed, Second Edition, 2008, Universities Press.
- 2. Classic Data Structures, Debasis Samantha, Second Edition, 2009, PHI.

e-Resources & other digital material

- 1. http://cse.iitkgp.ac.in/pds/
- 2. http://cmpe.emu.edu.tr/bayram/courses/231/LectureNotesSlides/IQBAL/Lecture%20Notes
- 3. https://www.geeksforgeeks.org/data-structures/
- 4. https://www.programiz.com/dsa
- 5. https://www.tutorialspoint.com/data_structures_algorithms/index.htm
- 6. https://www.youtube.com/watch?v=zWg7U0OEAoE&list=PLBF3763AF2E1C572F
- 7. https://www.youtube.com/watch?v=S47aSEqm_0I&list=PLgj_V-

ZKxRKrxgFyOutPJpoLFBaQMOpK-

Constitution of India

(Common to all)

Course Code	19MC1302	Year	II	Semester	Ι
Course Category	ES	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	
Continuous Internal Evaluation :	100	Semester End Evaluation:		Total Marks:	100
Evaluation :	100	Evaluation:		I otal Marks:	100

	Syllabus							
Unit No	Contents							
Ι	Introduction to Indian Constitution: Constitutional history, constituent assembly, salient features of the constitution, significance of preamble, amending process of the constitution.							
II	Rights and Duties: Citizenship, fundamental rights and directive principles, fundamental duties.							
III	Union Government: President and vice president, election, removal and powers, prime minister and council of ministers, parliament, supreme court, union, state relations, emergency provisions.							
IV	State and Local Governments: Governor, state legislature, assembly and council, chief minister and council of ministers, high court, rural and urban local governments with special reference to 73rd and 74th constitutional amendment acts.							
V	Other Constitutional and Statutory Bodies: Comptroller and auditor general, election commission, finance commission, attorney general and advocate general, union public service commission (UPSC), state public service commissions (SPSCs), tribunals, national human rights commission (NHRC).							

Learning Resources

Text Books

- 1. J. C. Johari, Indian Government and Politics, Vishal Publications, Delhi, 2009.
- 2. M. V. Pylee, Introduction to the Constitution of India, 5/e, Vikas Publishing House, Mumbai, 2007.

References

References:

- 1. D.D. Basu, Introduction to the Indian Constitution, 21/e, Lexis Nexis, Gurgaon, India, 2011.
- 2. Subhas C. Kashyap, Our Constitution, 2/e, National Book Trust India, New Delhi, 2013.

AI Tools Lab

(Common to all)

Course Code	19ES1351	Year	II	Semester	Ι
Course Category	ES	Branch	IT	Course Type	Practical
Credits	1	L-T-P	0-0-2	Prerequisites	-
Continuous Internal		Semester End			
Evaluation :	25	Evaluation:	50	Total Marks:	70

Course Outcomes					
Upon successful completion of the course, the student will be able to					
CO1	Apply various preprocessing techniques on different datasets.	L3			
CO2	Construct Machine learning programs for Supervised, Unsupervised and Semi supervised learning models.	L3			
CO3	Develop Deep learning programs for Supervised & Unsupervised learning models.	L3			
CO4	Identify and Apply Artificial Intelligence concepts to solve real world problems.	L3			

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (H:High, M: Medium, L:Low)														
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2
CO 1	3	3	2	1	2					1		2	1	2
CO 2	3	3	2	1	2					1		2	1	2
CO 3	3	3	2	1	2					1		2	1	2
CO 4	2	2	3	1	2		1			1		2	1	3

	Syllabus						
Expt		Mapped					
No	Contents	CO					
Ι	Apply Data preprocessing techniques.	CO1					
II	Construct a Machine Learning model using supervised learning method.	CO2					
III	Construct a Machine Learning model using Unsupervised learning	CO2					
	method.						
IV	Construct a Machine Learning model using Semi supervised learning	CO2					
	method.						
V	Develop a Deep Learning model using supervised learning method.	CO3					
VI	Develop a Deep Learning model using Unsupervised learning method.	CO3					
VII	Apply a Convolutional Neural Network for Image Classification.	CO3					
VIII	Build an AI application.	CO4					

Text Books

- 1. Artificial Intelligence: A Modern Approach, Stuart Russell and Norvig, Third Edition, 2015, Pearson Education.
- 2. Machine Learning: A Probabilistic Perspective, Kevin P. Murphy, 2012, MIT Press
- 3. Deep Learning (Adaptive Computation and Machine Learning series), Ian Goodfellow, Yoshua Bengio, Aaron Courville, Francis Bach, 2017, MIT Press.

e-Resources & other digital material

- 1. <u>https://github.com/atinesh-s/Coursera-Machine-Learning-Stanford</u>
- 2. <u>https://github.com/Kulbear/deep-learning-coursera</u>

DESIGN THINKING & PRODUCT INNOVATION LAB

(Common to all)

Course code	19ES1352	Year	II	semester	Ι
Course	Engineering	Dranah	Common to	Course Type	Lah
category	science	Dranch	all	Course Type	Lau
Credits	2	L-T-P	0-0-2	prerequisites	nil
Continuous		Semester			
Internal	25	End	50	Total marks	75
evaluation		Evaluation			

	Course outcomes						
Upon successful completion of the course the student will able to							
CO1	Develop a mind maps for design thinking process						
CO2	Prepare empathy maps and journey maps for problems.						
CO3	Construct mock-up models through ideation and innovation techniques						
CO4	Use software for design thinking problems						

	Contribution of course outcomes towards achievement of program outcomes & strength of correlation													
		1:	Slight (I	low), 2:	Modera	ate (medi	lum)			5: Sut	stantiai (I	nign)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1			2	2					3					2
CO2			2	2					3					2
CO3			2	2					3					2
CO4			2	2					3					2

Any 12 of the following:

syllabus						
Exp No.	List of Experiments	Mapped CO				
1	Design a mind map of design thinking	CO1				
2	Thirty circle Exerciseideation	CO3				
3	Prepared a toothpick bridge (mock-up model)	C01,C03				
4	Prepared a marble maze (mock up model)	C01,C03				
5	Build a wind power car (mock up model)	C01,C03				
6	Make a hydraulic elevator (mock up models)	C01,C03				
7	Construct empathy maps for a given case study-1	CO2				
8	Develop customer journey map for a given case	CO2				
9	Construct empathy maps for a given case study-2	CO2				
10	Develop customer journey map for a given case -2	CO2				
11	Make a paper prototype for user testing (mock-up model)	CO2				
12	Design and development of cell phone wallet (mock-up model)	C01,C02,C03				
13	Design thinking using sprintbase software	CO4				
14	Design thinking using sprintbase software	CO4				

Learning Resources						
Text Books:						
1.Idris Mootee, "Design Thinking for Strategic Innovation", John Wiley & Sons						
(2013).						
2."Change by design", Tim Brown, Harper Collins, 2009						
3."Design Thinking- The Guide Book" – Facilitated by the Royal Civil service						
Commission, Bhutan						
4.Engineering design by George E Dieter						
REFERENCE BOOKS						
1.Design Methods: A Structured Approach for Driving Innovation in Your Organization by						
Vijay Kumar						
2.Human-Centered Design Toolkit: An Open-Source Toolkit To Inspire New Solutions in						
the Developing World by IDEO						
ADDITIONAL LEARNING RESOURCES						
https://www.interaction-design.ora/literature/topics/design-th/nking						
https://www.interaction-desiqn.prg/literature/article/how-tq- <eve'op-an-empath\capproach-< td=""></eve'op-an-empath\capproach-<>						
in-design-thinking						

Object Oriented Programming Using C++ Lab -- 19IT3351

Course Code	19IT3351	Year	II	Semester	Ι
Course Category	PC	Branch	IT	Course Type	Lab
Credits	1.5	L-T-P	0-0-3	Prerequisites	C Language
Continuous Internal		Semester End			
Evaluation :	25	Evaluation:	50	Total Marks:	75

	Course Outcomes							
Upon	Successful completion of course, the student will be able to	BloomsTaxonomy						
		Level						
C01	Illustrate the programs using basic concepts in C++.	L2						
CO2	Construct programs using the concepts of class, inheritance and	L3						
	polymorphism.							
CO3	Implement programs with streams and pointers	L3						
CO4	Develop applications using template programming.	L3						
CO5	Develop programs using strings and exception handling mechanism	L3						

Cont	Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of													
corre	correlations (H:High, M: Medium, L:Low)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	2				2	1	1			2	2
CO2	2	2	2	2				2	1	1			2	2
CO3	2	2	2	2				2	1	1			2	2
CO4	2	2	2	2				2	1	1			2	2
CO5	2	2	2	2				2	1	1			2	2

	Syllabus	
Expt No	Contents	Mapped CO
I	 a) Write a C++ program to convert decimal to binary b) A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1.Subsequent terms are found by adding the preceding two terms in the sequence. Write a C++ program to generate the 	CO1
	 first n terms of the sequence. c) Write a C++ program to generate all the prime numbers between 1 and n, where n is a value supplied by the user. d) Write a program to find transpose of 2-D matrix by allocating memory dynamically to the matrix. Initialize and display contents of the matrix and deallocate memory. 	
II	Implement the C++ programs by using the concepts of a) Function overloading. b)Static data members c)Static member functions	CO1
III	Implement the C++ programs by using the concepts of a)Classes and Objects	CO2

1		,
	b) Arrays of Objects	
	c)Constructors d) Constructor overloading	
IV	Implement the C++ programs by using the concepts of	CO2
	a) Binary operator overloading b)Unary operator overloading	
	c) Friend function d) Friend class	
V	Implement the C++ programs by using the concepts of	CO2
	a)Simple inheriatnce	
	b)Multilevel inheritance	
	c)Multiple inheritance	
	d)Hybrid inheritance through virtual base class	
VI	Implement the C++ programs by using the concepts of	CO2
	a)Virtual function	
	b) Run Time polymorphism	
	c) Abstract class	
VII	a) Write a C++ program to display elements of an array using pointer and	CO3
	also display addresses of elements.	
	b) Write a C ++ program to pass elements of an array to a function by using	
	call by value.	
	c) Write a $C++$ program to pass elements of an array to a function by using	
	call by reference.	
VIII	a) Write a C++ program to display the contents of text file	CO3
	b) Write a C++ program by accepting two file names and produces a new	
	file that contains the contents of two accepted files	
	c) Write a C++ program that produces the sum of all the numbers in a file of	
	white space separated integers.	
IX	Write a C++ program to illustrate	CO4
	a) Class templates	
	b) Class templates with multiple parameters	
	c) Function templates	
X	a) Write a C++ program to declare string objects and Perform assignment	CO5
	and concatenation operations with the string objects.	
	b) Write a C++ program to compare two strings using standard function	
	compare().	
	c) Write a C++ program to remove specified characters from the string.	
	d) Write a program to display the capacity of the string object. Use member	
	function capacity().	
XI	a. Write a C++ program to illustrate	CO5
	i. Division by zero ii. Array index out of bounds exception	
	b. Write a C++ program to illustrate the concept of multiple catch block	
	c. Write a C++ program to illustrate rethrowing an exception.	

Learning Recourses
Text Books
Programming in C++, Second Edition, by Ashok N Kamthane, Pearson Education.
References
1. C++ How To Program, Dietel and Dietel, Prentice Hal.
2. C++ The Complete Reference, 5th Edition, by Herbert Schildt, TMH.
E-Recourses and other Digital Material
http://www.cplusplus.com , https://www.w3schools.com/cpp/

Data Structures Lab (Common with CSE)

Course Code	19IT3352	Year	II	Semester	Ι
Course Category	PC	Branch	IT	Course Type	Lab
Credits	1.5	L-T-P	0-0-3	Prerequisites	C Language
Continuous Internal		Semester End			
Evaluation :	25	Evaluation:	50	Total Marks:	75

Course Outcomes									
Upon successful completion of the course, the student will be able to									
CO1	Demonstrate the concept of Recursion for solving a problem.								
CO2	Develop programs for searching and sorting algorithms.	L3							
CO3	CO3 Choose and implement linear data structure to solve problems.								
CO4	Select and implement suitable nonlinear data structure for solving a problem.	L3							

Contr correl	Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:Substantial, 2: Moderate, 1:Slight)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2									1	2	2
CO2	2	2	2									1	2	2
CO3	2	2	2									1	2	2
CO4	2	2	2									1	2	2

	Syllabus	
Exerc ises	Contents	Mapped CO
1.	Demonstrate recursive algorithms with examples.	CO1
2.	Implement various searching techniques.	CO2
3.	Develop programs for different sorting techniques	CO2
4.	Implement and perform different operations on Single, Double and Circular Linked Lists.	CO3
5.	Develop a program to perform operations of a Stack using arrays and linked Lists.	CO3
6.	Develop programs to implement Stack applications.	CO3
7.	Develop a program to perform operations of Linear Queue using arrays and linked Lists.	CO3
8.	Implement Circular Queues.	CO3
9.	Develop a program to represent a tree data structure.	CO4
10.	Develop a program to demonstrate operations on Binary Search Tree.	CO4
11.	Demonstrate Graph Traversal Techniques.	CO4
12.	Develop a program to find Minimum cost Spanning tree.	CO4

Text Books

- 1. Data Structures and Algorithm Analysis in C, Mark Allen Weiss, Second Edition, 2002, Pearson.
- 2. Introduction to Algorithms, Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, Third Edition, 2010, PHI.
- 3. Data Structures and Algorithms Made Easy by Narasimha Karumanchi, 2020, CareerMonk Publications.

e-Resources & other digital material

- 1. https://www.cs.usfca.edu/~galles/visualization/Algorithms.html
- 2. <u>http://www.algomation.com/algorithm/single-linked-list-insert-delete</u>
- 3. <u>http://www.algomation.com/algorithm/binary-tree-insert-delete-display</u>
- 4. <u>https://www.youtube.com/watch?v=AfYqN3fGapc</u>
- 5. <u>https://www.youtube.com/watch?v=7vw2iIdqHIM</u>
- 6. <u>http://littlesvr.ca/dsa-html5-animations/sorting.php</u>

IVSEMESTER

Engineering Mathematics - IV (Number Theory and Cryptography) (Common to CSE, IT)

Course Code	19BS1403	Year	II	Semester	II
Course Category	BS	Branch	IT	Course Type	Theory
					Mathematics,
Credits	3	L-T-P	3-0-0	Prerequisites	Algebra
Continuous Internal		Semester End			
Evaluation :	30	Evaluation:	70	Total Marks:	100

	Course Outcomes	Blooms
		Taxonomy
		Level
Upon S	Successful completion of course, the student will be able to	
CO1	Understand the fundamental concepts of number theory and	L2
	cryptography	
CO2	Apply substitution/transposition techniques to design classical	L3
	encryption ciphers	
CO3	Apply appropriate cryptographic algorithm for a given scenario and	L3
	make an effective report	
CO4	Apply cryptographic hash functions for message authentication.	L3

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:High, 2: Medium, 1:Low)														
	P01	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3													
CO2	3													
CO3	3								3	3				
CO4	3													
CO5	3													

	Syllabus	
Unit No	Contents	Mapped CO
I	Basic Concepts in Number Theory : Divisibility and the Division Algorithm, The Euclidean Algorithm, Modular arithmetic, Prime numbers, Fermat's Theorem and Euler's Theorems (without proofs), Testing for Primality, The Chinese Remainder Theorem (without proofs), Discrete Logarithms.	CO1
II	Classical Encryption Techniques : Symmetric Cipher Model, Substitution Techniques-Caesar Cipher, Monoalphabetic Cipher: Playfair, Hill Ciphers, Polyalphabetic Ciphers, Onetime Pad, Transposition Techniques.	CO2
III	Block Ciphers : Traditional Block Cipher Structure, The Data Encryption Standard, Advanced Encryption Standard, Block Cipher modes of operations.	CO2
IV	Public Key Cryptography : Principles of Public-Key Cryptosystems, The RSA Algorithm, Diffie-Hellman Key Exchange- The Algorithm, Key Exchange Protocols, Man-in-the-Middle Attack.	CO3
V	Cryptographic Hash Functions : Applications of Cryptographic Hash Functions, Two Simple Hash Functions, Message Authentication Requirements, Message Authentication Functions, MACs based on Hash functions: HMAC	CO4

Learning Recourses

Text Books

1. Cryptography and Network Security- Principles and Practice, William Stallings, Sixth Edition, 2014, Pearson.

References

- 1. An Introduction to the Theory of Numbers, Ivan Niven, Herbert S. Zukerman, Hugh L. Montgomery, Fifth Edition, 2008, Wiley.
- 2. Cryptography: Theory and Practice, Stinson. D, Third Edition, 2012, Chapman & Hall/CRC.

E-Recourses and other Digital Material

1. https://nptel.ac.in/courses/106/105/106105162/

- 2. https://nptel.ac.in/courses/106/103/106103015/
- 3. <u>https://nptel.ac.in/courses/106/105/106105031/https://www.coursera.org/learn/number</u> <u>theory-cryptography</u>

LIFE SCIENCES FOR ENGINEERS

(Common to all)

Course Code	19BS1404	Year	II	Semester	II
	Basic				
Course Category	Sciences	Branch	IT	Course Type	Theory
Credits	2	L-T-P	2-0-0	Prerequisites	Nil
Continuous Internal		Semester End			
Evaluation :	30	Evaluation:	70	Total Marks:	100

	Blooms Taxonomy Level	
Upon S	Successful completion of course, the student will be able to	
CO1	Understand the concepts of biology to create tangible and economically viable engineering goods.	L2
CO2	Analyze the mechanism of energy transfer between cells.	L4
CO3	Apply the knowledge of biology to improve the living standards of societies.	L3
CO4	Apply the basic knowledge of genetics and DNA technology for disease diagnostics and therapy.	L3
CO5	Analyze new technologies in biotechnology, pharmaceutical, medical and agricultural fields from the knowledge gained from DNA technology	L4

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:High, 2: Medium, 1:Low)														
	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3						2							
CO2	3						2							
CO3	3						2							
CO4	3						2							
CO5	3						2							

	Syllabus						
Unit No	nit Io Contents						
I	Introduction to Biology Comparison of Biological organisms with manmade systems- eye and camera, flying bird and aircraft. Classification of living organisms- Cellular basis of life, differences between prokaryotes and eukaryotes , classification on the basis of carbon and energy sources	CO1 CO2 CO3					
II	Bio-molecules Structure and functions of proteins and nucleic acids, hemoglobin, antibodies.Enzymes-Industrial applications , Fermentation and its industrial applications.	CO1 CO2 CO3					
III	Bioenergetics and Respiration Glycolysis and TCA cycle, Electron transport chain and oxidative phosphorylation, Mechanism of photo synthesis. Human physiology.	CO1 CO2 CO3					
IV	Genetic Engineering Mendel's laws, gene mapping, Mitosis and Meiosis, Epistasis, single gene disorders in humans. Genetic code.	CO1 CO4 CO5					
V	Recombinant DNA Technology Recombinant vaccines, transgenic microbes, plants and animals. Animal cloning, biosensors, biochips.	CO1 CO4 CO5					

Learning Recourses

Text Books

1. N. A. Campbell, J. B. Reece, L. Urry, M. L. Cain and S. A. Wasserman, "Biology: A global approach", Pearson Education Ltd, 2018.

2. Arthur T Johnson, Biology for Engineers, CRC press, 2011.

References

- 1. Alberts et al., The molecular biology of the cell, 6/e, Garland Science, 2014.
- 2. E. E. Conn, P. K. Stumpf, G. Bruening and R. H. Doi, "Outlines of Biochemistry", John Wiley and Sons, 2009.
- 3. John Enderle and Joseph Bronzino Introduction to Biomedical Engineering, 3/e, 2012.
Computer Organization and Architecture (Common to CSE, IT)

Course Code	19IT3401	Year	II	Semester	II
Course Category	PC	Branch	IT	Course Type	Theory
					Fundamentals
					Digital Logic
Credits	3	L-T-P	3-0-0	Prerequisites	Design
Continuous Internal		Semester End			
Evaluation :	30	Evaluation:	70	Total Marks:	100

	Course Outcomes								
		Taxonomy							
		Level							
Upon	Upon Successful completion of course, the student will be able to								
CO1	Understand the basic functional units of a computer system and its	L2							
	organization								
CO2	Apply appropriate instructions for processing various types of	L3							
	computer operations.								
CO3	Applying various types of organizations on registers and make an	L3							
	effective report								
CO4	Analyze memory hierarchy, I/O communication and pipelining.	L4							

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:High, 2: Medium, 1:Low)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3													
CO2	3													
CO3	3								3	3				
CO4		3												

	Syllabus	
Unit No	Contents	Mapped CO
I	Register Transfer and Micro-Operations: Register Transfer Language, Register Transfer, memory Transfers, Bus construction with Multiplexers, Arithmetic Micro-operations, Logic Micro-Operations, Shift Micro-operations, Arithmetic Logic Shift Unit.	CO1,CO2
п	Basic Computer Organization : Instruction codes, Computer Registers, Computer Instructions, Timing and Control, InstructionCycle, Memory-Reference Instructions, Input- Output and Interrupt.	CO1, CO2
III	Central Processing Unit : General registers Organization, StackOrganization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control.	C01,C03
IV	Computer Arithmetic: Introduction, Addition and Subtraction, BoothMultiplication Algorithm. Memory Organization: Memory Hierarchy, Main Memory, Auxiliarymemory, Associative Memory, Cache Memory, Virtual Memory.	CO1, CO2, CO4
V	 Input-Output Organization: Peripheral Devices, Input-output Interface, Asynchronous Data Transfer, Priority Interrupt, Direct Memory Access (DMA), Input-Output Processor. Pipeline and Parallel Processing: Parallel processing, Pipelining, Arithmetic pipeline, Instruction pipeline. 	CO1,CO4

Text Books

1. Computer System Architecture, Morris M. Mano, Third Edition, 1992, Pearson. **References**

- 1. Computer Organization and Architecture, William Stallings, Eighth Edition, 2010, PHI.
- 2. Computer Organization, Carl Hamachar, Vranesic, 2002, McGraw Hill.

E-Recourses and other Digital Material

1. <u>https://nptel.ac.in/courses/106/106/106106092/</u>

Operating Systems (Common to CSE, IT)

Course Code	19IT3402	Year	II	Semester	II
Course Category	PC	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	Problem Solving and Programming, Data Structures, Computer Organization and Architecture
Continuous Internal	•	Semester End	-0		100
Evaluation :	30	Evaluation:	70	Total Marks:	100

	Course Outcomes	Blooms Taxonomy
II C		Level
Upon S	Successful completion of course, the student will be able to	
CO1	Understand the structure and functionalities of operating systems.	L2
CO2	Apply various concepts to solve problems related to process synchronization, deadlocks and make an effective report.	L3
CO3	Apply different algorithms of CPU scheduling, Page replacement and disk scheduling.	L3
CO4	Analyze process, memory and storage management strategies.	L4

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:High, 2: Medium, 1:Low)														
	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3													
CO2	3								3	3				
CO3	3													
CO4		3												

	Syllabus	
Unit No	Contents	Mapped CO
I	Overview: Introduction: What Operating Systems Do, Computer- System Organization, Computer-System Architecture, Operating- System Structure, Operating-System Operations. Operating System Structures: Operating-System Services, User and Operating-System Interface, System Calls, Types of System Calls.	CO1,CO2,CO3, CO4,CO5
II	 Process Management: Process Concept, Process Scheduling, Operations on Processes, Interprocess Communication. Threads: Overview, Multi-core Programming, Multithreading Models. Process Scheduling: Basic Concepts, Scheduling Criteria, Scheduling Algorithms (First-Come, First-Served Scheduling, Shortest-Job-First Scheduling, Priority Scheduling, Round-Robin Scheduling.) 	CO1,CO3,CO4
ш	 Process Synchronization: Background, The Critical-Section Problem, Peterson's Solution, Synchronization Hardware, Mutex Locks, Semaphores, Classic Problems of Synchronization, Monitors. Deadlocks: System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock. 	CO1, CO2
IV	Memory Management: Main Memory: Background, Swapping, Contiguous Memory Allocation,Segmentation, Paging,Structure of the Page Table Virtual Memory: Background, Demand Paging, Copy-on-Write, Page Replacement, Basic Page Replacement, FIFO Page Replacement, Optimal Page Replacement, LRU Page Replacement, LRU-Approximation Page Replacement, Allocation of Frames, Thrashing.	CO1, CO3,CO4
V	 Storage Management: File–System Interface: File Concept, Access Methods, Directory and Disk Structure. File–System Implementation: File-System Structure, File-System Implementation, Directory Implementation, Allocation Methods. Mass-Storage Structure: Overview of Mass-Storage Structure, Disk Structure, Disk Attachment, Disk Scheduling, FCFS Scheduling, SSTF Scheduling, SCAN Scheduling, C-SCAN Scheduling, LOOK Scheduling, Selection of a Disk-Scheduling Algorithm. 	CO1, CO3,CO4

Text Books

1. Operating System Concepts, Abraham Silberchatz, Peter Baer Galvin, Greg Gagne, Ninth Edition, 2016, Wiley India.

References

- 3. Operating Systems Internal and Design Principles, William Stallings, Ninth Edition, 2018, Pearson.
- 4. Operating Systems Harvey M.Deitel, Paul J Deitel and David R.Choffnes, Third Edition, 2019, Pearson.
- 5. Operating Systems A Concept based Approach- D.M. Dhamdhere, Second Edition, 2010, McGraw Hill.

E-Recourses and other Digital Material

- 4. <u>https://onlinecourses.nptel.ac.in/noc19_cs50/</u>
- 5. http://www.youtube.com/watch?v=MaA0vFKtew&list=PL88oxI15Wi4Kw1aEY2bC 51_4pouojjtd4

SOFTWARE ENGINEERING PARADIGMS

Course Code	19IT3405	Year	II	Semester	II
Course Category	PC	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	Basics of IT
Continuous Internal		Semester End			
Evaluation :	30	Evaluation:	70	Total Marks:	100

	Course Outcomes	Blooms						
		Taxonomy						
		Level						
Upon S	Upon Successful completion of course, the student will be able to							
CO1	Understand the process of software engineering and various process	1.2						
	models.	LZ						
CO2	Design the requirements of software system.	L3						
CO3	Use various design elements to prepare software system.	L3						
CO4	Analyze various testing techniques.	L3						

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (H:High, M: Medium, L:Low)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	1	1				1				1		3	1
CO2	1	1	1				1				1		3	2
CO3	1	2	2				2				2		3	2
CO4	1	1	1				1				1		3	2

	Syllabus	
Unit No	Contents	Mapped CO
I	 Software and Software Engineering: The Nature of Software, The Unique Nature of WebApps, Software Engineering, Software Process, Software Engineering Practice, Software Myths. Process Models: A Generic Process Model : Defining a frame work activity, Prescriptive Process Models: The Waterfall Model ,Incremental Process Model, Evolutionary Process Model, The Unified Process, What is an Agile Process?, XP Process. 	CO1
П	 Requirements Analysis And Specification: Requirements Gathering and Analysis, Software Requirement Specification (SRS): Characteristics of good SRS, Functional Requirements, Organization of SRS. Software Design: Overview of the Design Process, How to Characterize of a Design?, Cohesion and Coupling, Approaches to Software Design. 	CO2,CO3
ш	Function-OrientedSoftwareDesign:OverviewofSA/SDMethodology, Structured Analysis, Structured Design, Detailed Design, Design Review.Design Review.User Interface Design: Concepts, Types of User Interfaces, A User Interface Design Methodology.	CO1,CO3
IV	Coding And Testing: Coding, Code Review, Software Documentation, Testing, Unit Testing, Black-Box Testing, White-Box Testing, Debugging, Integration Testing, System Testing.	CO1,CO4
V	 Software Reliability And Quality Management: Software Reliability, Statistical Testing, Software Quality, Software Quality Management System. Software Maintenance: Software maintenance, Maintenance Process Models, Maintenance Cost. Software Reuse: what can be reused? Why almost No Reuse So Far? Basic Issues in Reuse Approach. 	CO1,CO4

Text Books	
1.	Software Engineering - A Practitioner's Approach, Roger S. Pressman,
	Seventh Edition McGrawHill International Edition.
2.	Fundamentals of Software Engineering, Rajib Mall, Third Edition, PHI.
D. C.	
Keierences	
1.	Software Engineering : A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008
References	Software Engineering : A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008 Software Engineering, A Precise Approach, PankajJalote, Wiley India,2010.
1. 2. 3.	Software Engineering : A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008 Software Engineering, A Precise Approach, PankajJalote, Wiley India,2010. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press

Design and Analysis of Algorithms

(Common to CSE, IT)

Course Code	19IT3404	Year	II	Semester	II
Course Category	PC	Branch	IT	Course Type	Theory
					Discrete Mathematics and probability,
Credits	3	L-T-P	3-0-0	Prerequisites	Data Structure
Continuous Internal		Semester End			
Evaluation :	30	Evaluation:	70	Total Marks:	100

	Course Outcomes					
Upon S	Successful completion of course, the student will be able to					
CO1	Understand the fundamental concepts of algorithm analysis and design techniques.	L2				
CO2	Apply various algorithm design techniques for solving problems	L3				
CO3	Analyze the performance of different algorithms in divide and conquer.	L4				
CO4	Analyze the feasible solutions to find optimal one for the given problem.	L4				

Cont corre	Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:High, 2: Medium, 1:Low)													
	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3													
CO2	3													
CO3		3												
CO4		3							3	3				

Syllabus						
Unit No	Contents	Mapped CO				
Ι	 Introduction: Notion of Algorithm, Fundamentals of Algorithmic Problem Solving. Fundamentals of the Analysis of Algorithm Efficiency: Analysis framework and Asymptotic Notations and Basic Efficiency Classes. Introduction to Brute Force Technique, Exhaustive Search. 	CO1, CO2				
II	Divide and Conquer: Introduction, Merge sort, Quick sort, Binary Search, Finding Maximum and Minimum, Strassen's Matrix Multiplication.	CO1, CO2,CO3				
III	The Greedy Method: Introduction, Huffman Trees and codes, Minimum Coin Change problem, Knapsack problem, Job sequencing with deadlines, Minimum Cost Spanning Trees, Single Source Shortest paths.	CO1, CO2,CO4				
IV	Dynamic Programming : Introduction, 0/1 Knapsack problem, All pairs shortest paths, Optimal Binary search trees, Travelling salesman problem.	CO1, CO2				
V	 Back Tracking: Introduction, n-Queens problem, Sum of subsets, Hamiltonian cycle. Branch and Bound: Introduction, Assignment problem, Travelling Salesman problem. Introduction to Complexity classes: P and NP Problems, NP-Complete Problems. 	CO1, CO2				

Learning Recourses
Text Books
1. Introduction to the Design & Analysis of Algorithms, Anany Levitin, Third
Edition, 2011, Pearson Education.
2. Data Structures and Algorithm Analysis in C, Mark Allen Weiss, 2002, Pearson.
3. Algorithm Design Techniques, NarasimhaKarumanchi, CareerMonk Publications,
2018.
References
1. Introduction to Algorithms, Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, Third Edition, 2012, MIT Press.
2. Fundamentals of computer algorithms, Ellis Horowitz, SartaiSahni, S. Rajasekharan.
Second Edition, 2008, Universities Press.
E-Recourses and other Digital Material
1. https://nptel.ac.in/courses/106/106/106106131/
2. <u>https://www.cmi.ac.in/~madhavan/</u>
3. <u>https://www.coursera.org/lecture/analysis-of-algorithms/resources-jMWPy</u>
4. https://www.geeksforgeeks.org/fundamentals-of-algorithms/

Programming with JAVA

Course Code	19IT3405	Year	II	Semester	II
Course Category	PC	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	C Language
Continuous Internal		Semester End			
Evaluation :	30	Evaluation:	70	Total Marks:	100

	Blooms Taxonomy	
		Level
Upon S	uccessful completion of course, the student will be able to	
CO1	Illustrate the need, principles and basics of JAVA.	L2
CO2	Apply the knowledge of Java constructs to develop applications	L3
CO3	Analyze and the behavior of programs involving fundamental	L4
	programming concepts in JAVA.	
CO4	Apply object-oriented concepts to design, code and debug	L3
	simple programs.	
CO5	Apply the use of Java in a variety of technologies and on	L3
	different platforms.	

Cont	Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:High, 2: Medium, 1:Low)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	2									2	2
CO2	2	2	2	2									2	2
CO3	2	2	2	2									2	2
CO4	2	2	2	2									2	2
CO5	2	2	2	2									2	2

Syllabus					
Unit No	Contents	Mapped CO			
Ι	 Java Evolution & Environment: History and Evaluation of Java, Overview of Java language, Java's magic code: Byte code, Java Buzzwords, Three OOP principles, simple program. Java programming environment: Data types, variables and Arrays, Operators, control statements. Classes, Objects and Methods: Introduction, defining a class, declaring objects, assigning object reference variables, introducing methods, accessing class members, returning a value, constructors, CO1- CO5 parameterized constructors, this keyword, garbage collection, overloading constructors and methods, recursion, understanding static, introducing final, Using command line arguments. 	CO1- CO5			
п	 Strings : String, StringBuffer and StringTokenizer classes. Basic I/O: DataInputStream, DataOutputStream, BufferedReader, InputStreamReader, Scanner classes. Inheritance: Basics, Using super, creating multilevel hierarchy, order of constructor execution, method overriding, dynamic method dispatch, applying method overridden, Abstract classes, Using final with inheritance, The Object class. Interfaces : Introduction, defining an interface, implementing interfaces. Accessing interfaces through interface references, nested interfaces, variables in interfaces, interfaces can be extended. 	CO1- CO5			
ш	 Package: Defining a package, CLASSPATH, Packages and member access, importing packages. Exception Handling: Fundamentals, types, uncaught exceptions, using try and catch, multiple catch clauses, nested try statement, throw, throws, finally, built-in exceptions, creating your own exception subclasses. Multi Threaded programming: Thread model, Creating a Thread: implementing runnable, extending Thread, creating multiple threads, using isAlive() and join(), Thread Priorities, synchronization. 	CO1- CO5			
IV	 Event handling: Event handling mechanisms, delegation event model, Event classes, sources of events, event listener interfaces, Handling mouse and keyboard events, adapter classes, inner class. Graphics Programming with AWT: Introduction, abstract window toolkit classes, Window fundamentals. AWT controls: AWT Control fundamentals - labels, buttons, check boxes, choice lists, lists, scroll bars, text field, text area, layout managers 	CO1- CO5			
V	 Swing: Origins, key features, MVC connection, Components and Containers Exploring Swing- JLabel, JTextField, JButton, JCheckBox, JRadioButton, JList, JComboBox. Applets: Two types of Applets, The Applet Class, Applet Architecture, An Applet Skelton, Swing Applets. 	CO1- CO5			

Text Books

1. The Java Complete Reference, Herbert Scheldt, 10/e, TMH Publications, 2018.

References

- 1. E. Balagurusamy, Programming with JAVA, 2/e, TMH Publications, 2014.
- 2. Core Java: An Integrated Approach, New: Includes All Versions up-to Java 8, by R. Nageswara Rao, Dream-Tech Publishers.
- 3. Kathy Sierra, Head First Java, 2/e, Shroff Publishers, 2012.

E-Recourses and other Digital Material

- 1. <u>https://nptel.ac.in/courses/106/105/106105191/</u>
- 2. https://www.w3schools.com/java/java_intro.asp
- 3. https://www.tutorialspoint.com/java/index.htm

ENVIRONMENTAL SCIENCES (Common to All)

Course Code	19MC1401	Year	II	Semester	II
Course Category	MC	Branch	IT	Course Type	Theory
Credits	0	L-T-P	3-0-0	Prerequisites	Nil
Continuous Internal		Semester End			
Evaluation :	100	Evaluation:	-	Total Marks:	100

Upon Su		
CO1	Apply advanced solutions to measure the threats and hazards	L3
	in environment to link with human natural systems	
CO2	Analyze the ethical ,cultural and historical interactions between	L4
	man and environment	
CO3	Analyze various environmental assets and record for better	L4
	management	
CO4	Analyze global issues to design and evaluate policies	L4
CO5	Apply system concepts to methodological social and environmental	L3
	issues	

Cont	Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of													
corre	correlations (3:High, 2: Medium, 1:Low)													
	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3						2							
CO2	3						2							
CO3	3						2							
CO4	3						2							
CO5	3						2							

	Syllabus						
Unit No	Contents	Mapped CO					
	INTRODUCTION TO ENVIRONMENT AND NATURAL	CO1					
Ι	RESOURCES Introduction to environment: Definition scope importance need for public awareness. Natural resources: Renewable and non renewable resources, natural resources and associated problems. Forest resources: Uses, Reasons for over-exploitation, deforestation effects case studies. Water resources: Use and over – utilization of surface and ground water, floods, drought, conflicts over water, dams- benefits and problems. Mineral resources: Uses, environmental effects of extracting and using mineral resources, case studies. Food resources: World food problems, Impacts of overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. Energy resources: Growing energy needs, use of renewable and non renewable energy sources case studies	CO2					
	energy sources, case studies.	<u>CO1</u>					
Π	ECOSYSTEMS AND BIODIVERSITY Structure components of ecosystem: Biotic and Abiotic components. Functional components of an ecosystem: Food chains, Food webs, Ecological pyramids, Energy flow in the ecosystem, Ecological succession. Biogeochemical cycle: Nitrogen, carbon, Phosphorus cycle.	CO2					
	Biodiversity: Definition, Levels of biodiversity: genetic, species and ecosystem diversity. Bio-geographical classification of India, Values of biodiversity: consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega – diversity nation. Hot-spots of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. Conservation of biodiversity: In– situ and Ex-situ conservation of biodiversity.						
	ENVIRONMENTAL POLLUTION AND CONTROL	CO3					
ш	Environmental Pollution: Definition, causes, effects and control measures: Air Pollution, Water pollution, Soil pollution, Marine pollution, Thermal pollution, Nuclear hazards, Solid waste Management, e-waste, Pollution case studies.						
	SOCIAL ISSUES AND GLOBAL ENVIRONMENT PROBLEMS	CO4					
	AND EFFORTS	CO5					
	From Unsustainable to Sustainable development. Urban problems						
IV	management, Remote sensing and GIS methods. Environmental ethics:						
	Issues and possible solutions. Green building concept, Environmental						
	Impact Assessment Environmental Management Plan, Climate change:						
	global warming, acid rain, ozone layer depletion.						

	HUMAN POPULATION AND ENVIRONMENT LEGISLATION	CO4					
	Population growth,. Environment and human health. HIV/AIDS,. Value						
	Education. Women and Child Welfare. Role of Information Technology						
\mathbf{V}	in Environment and human health. Environment Legislation. Air						
	(Prevention and Control of Pollution) Act. Water (Prevention and						
	Control of Pollution) Act. Wildlife Protection Act. Forest Conservation						
	Act. Environmental Protection Act.						

Text Books

- 1. Anubha Kaushik and C.P. Kaushik, Text book of environmental studies New Age International Publisher (2014).
- 2. Erach Barucha, Text book of environmental studies for undergraduates courses, published by University Grants Commission, University Press (2005)
- 3. Anindita Basak, Environmental Studies. Pearson (2009)

References

- 1. D.K. Asthana and Meera Asthana, A Text book of Environmental Studies, S. Chand (2010).
- 2. P.M Cherry Solid and Hazardous waste Management, CBS Publisher (2016).
- 3. Charles H. Ecclestion, Environmental Impact Assessment, CRC Press (2011).

LIFE SCIENCES FOR ENGINEERS LAB (Common to all)

Course Code	19BS1451	Year	II	Semester	II
Course Category	BS	Branch	IT	Course Type	Lab
Credits	1	L-T-P	0-0-2	Prerequisites	Nil
Continuous Internal		Semester End			
Evaluation :	25	Evaluation:	50	Total Marks:	75

	Course Outcomes	Blooms Taxonomy Level					
Upon Successful completion of course, the student will be able to							
CO1	Apply techniques/procedures of life sciences principles to solve problems	L3					
CO2	Analyze the result of the conducted experiment for a given Sample	L4					
CO3	Conduct experiments as a team / individual by using equipment available in the laboratory	L3					
CO4	Infer an effective report based on experiments	L4					

Cont corre	Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:High, 2: Medium, 1:Low)													
	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3						2							
CO2	3						2							
CO3	3						2							
CO4	3						2							

Syllabus								
Expt.No	Contents	Mapped CO						
Ι	Microscopy	CO1,CO2,CO3, CO4						
II	Dissect & mount different parts of plants using Microscope	CO1, CO2,CO3, CO4						
III	Estimation of Proteins by using Biuret method	CO1, CO2,CO3, CO4						
IV	Estimation of enzyme activity.	CO1, CO2,CO3, CO4						
V	Estimation of chlorophyll content in some selected plants.	CO1, CO2,CO3, CO4						
VI	Nitrogen Cycle: Estimation of Nitrates /Nitrites in soil by using Spectrophotometer	CO1, CO2,CO3, CO4						
VII	Mendal's laws	CO1, CO2,CO3, CO4						
VIII	Solve Problems based on Mapping .	CO1, CO2,CO3, CO4						

Text Books

- 1 N. A. Campbell, J. B. Reece, L. Urry, M. L. Cain and S. A. Wasserman, "Biology: A global approach", Pearson Education Ltd, 2018.
- 2. Arthur T Johnson, Biology for Engineers, CRC press, 2011.

References

- 1. Alberts et al., The molecular biology of the cell, 6/e, Garland Science, 2014.
- 2. E. E. Conn, P. K. Stumpf, G. Bruening and R. H. Doi, "Outlines of Biochemistry", John Wiley and Sons, 2009.
- 3. John Enderle and Joseph Bronzino Introduction to Biomedical Engineering, 3/e, 2012.

Design and Analysis of Algorithms Lab

(Common to CSE, IT)

Course Code	19IT3451	Year	II	Semester	II
Course Category	PC Lab	Branch	IT	Course Type	Practical
					Data Structures,
					Programming
					for Problem
Credits	1	L-T-P	0-0-2	Prerequisites	Solving
Continuous Internal		Semester End			
Evaluation :	25	Evaluation:	50	Total Marks:	75

	Course Outcomes						
		Level					
Upon S	Upon Successful completion of course, the student will be able to						
CO1	Apply different design techniques for solving problems.	L3					
CO2	Implement programs as an individual on different IDEs/ online platforms.	L3					
CO3	Develop an effective report based on various programs implemented.	L3					
CO4	Apply technical knowledge for a given problem and express with an effective oral communication.	L3					
CO5	Analyze outputs using given constraints/test cases.	L4					

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:High, 2: Medium, 1:Low)														
	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3											2		
CO2	3													
CO3	3								3	3				
CO4		2												

	Syllabus	
Expt No	Contents	Mapped CO
1.	Develop and implement an algorithm using Divide and Conquer strategy for a given set of problems.	CO1,CO2,CO3,CO4,CO5
2.	Make use of Greedy method to implement a solution for a given problem.	CO1,CO2,CO3,CO4,CO5
3.	Develop and implement an efficient solution using Dynamic Programming.	CO1,CO2,CO3,CO4,CO5
4.	Use Backtracking design technique to implement a solution for a given problem.	CO1,CO2,CO3,CO4,CO5
5.	Develop and implement an algorithm using Branch and Bound technique for solving a given problem.	CO1,CO2,CO3,CO4,CO5
6.	Case Study-1: Apply the most appropriate design technique to develop and implement an efficient solution for a given problem.	CO1,CO2,CO3,CO4,CO5
7.	Case Study-2: Develop and implement an optimal solution for a given problem by applying a suitable design technique.	CO1,CO2,CO3,CO4,CO5

Text Books

- 1. Introduction to the Design & Analysis of Algorithms, Anany Levitin, Third Edition, 2011, Pearson Education.
- 2. Data Structures and Algorithm Analysis in C, Mark Allen Weiss, 2002, Pearson.
- 3. Algorithm Design Techniques, Narasimha Karumanchi, CareerMonk Publications, 2018.

E-Recourses and other Digital Material

- 1. <u>https://www.cs.usfca.edu/~galles/visualization/Algorithms.html</u>
- 2. http://littlesvr.ca/dsa-html5-animations/sorting.php
- 3. <u>https://www.youtube.com/watch?v=AfYqN3fGapc</u>

Programming with JAVA Lab

Course Code	19IT3452	Year	II	Semester	II
Course Category	PC	Branch	IT	Course Type	Lab
Credits	1.5	L-T-P	0-0-3	Prerequisites	C Language
Continuous Internal		Semester End			
Evaluation :	25	Evaluation:	50	Total Marks:	75

	Course Outcomes	Blooms Taxonomy
		Level
Upon S	Successful completion of course, the student will be able to	
CO1	Implement the programs by using basics and fundamental concepts	L3
	of JAVA.	
CO2	Analyze the given Java program to identify bugs and write correct	L4
	code.	
CO3	Use APIs (Application Programmer Interfaces) to develop applications	L3
	in Java.	

Cont corre	Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:High, 2: Medium, 1:Low)													
	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	2					1				2	2
CO2	2	2	2	2					1				2	2
CO3	2	2	2	2					1				2	2

	Syllabus	
Experiment No	Contents	Mapped CO
1	 a. Java Program to print largest of three numbers b. Java program to calculate sum of all the numbers divisible by 3 from 0 to n. Print the sum. c. Write a Java program to calculate the sum of first "n" even integer numbers and "n" odd integer numbers excluding 0; d. Write a Java program to read the size of an array from keyboard. You have to initialize the integer array and insert the elements into it. You have to find the minimum number in that array and print the same. e. Write a Java program to find the average of all odd numbers present in the array and print the same. 	CO1- CO3
2	Implement the programs by using the concepts of a. returning value from a method b. constructors c. overloading methods d. overloading constructors e. passing objects as a parameters.	CO1- CO3
3	Develope applications using the concepts of a. String class and its methods b. String Buffer and its methods c. StringTokenizer and its methods	CO1- CO3
4	Implement the programs by using the concepts of a. Method overriding b. dynamic method dispatch c. Abstract class d. Using final in inheritance	CO1- CO3
5	Implement the programs by using the concepts of a. Implementing interfaces b. Nested interfaces c. Interface references d. Extending interfaces	CO1- CO3
6	 A. Create a user defined package and demonstrate different ways of importing packages. B. Implement the programs by using the concepts of a. multiple catch clauses b. finally c. Creating user defined exceptions 	CO1- CO3
7	Implement the programs using a. Creating threads (two –ways) b. Creation of multiple threads c. Thread synchronization	CO1- CO3
8	Develop applications that demonstrate by using a. Key board event handling b. Mouse event handling	CO1- CO3

	Develop applications by using AWT controls	C01-
9	a. Buttons	CO3
	b. TextField and TextArea	
	c. GridLayoutManager	
	Develop applications by using Swing componets	C01-
10	a. JLabel	CO3
10	b. JTextField	
	c. JButton	
	d. JComboBox.	

Text Books

1. The Java Complete Reference, Herbert Scheldt, 10/e, TMH Publications, 2018.

References

1. E. Balagurusamy, Programming with JAVA, 2/e, TMH Publications, 2014.

2. Core Java: An Integrated Approach, New: Includes All Versions up-to Java 8, by R. Nageswara Rao, Dream-Tech Publishers.

3. Kathy Sierra, Head First Java, 2/e, Shroff Publishers, 2012.

V SEMESTER

Internet of Things

Course Code	19ES1504	Year	III	Semester	Ι
Course Category	ES	Branch	All Branches	Course Type	Theory
Credits	3	L-T-P	2-0-2	Prerequisites	Nil
Continuous Internal Evaluation:	30	Semester End Evaluation:	70	Total Marks:	100

	Course Outcomes
Upon s	successful completion of the course, the student will be able to
CO1	Summarize the genesis and impact of IoT applications, architectures in real world.(L2).
CO2	Illustrate diverse methods of deploying smart objects and connect them to network (L3).
CO3	Construct simple applications using Arduino. (L3).
CO4	Interpret different protocols and select which protocol can be used for a specific application
	(L2).
CO5	Identify and develop a solution for a given application using APIs (L3).

Mapping	Mapping of course outcomes with Program outcomes (CO/ PO/PSO Matrix)													
Note: 1-	Note: 1- Weak correlation 2-Medium correlation 3-Strong correlation													
* - Average value indicates course correlation strength with mapped PO														
COa	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO1	PO1	PO1	PSO	PSO
COS	1	2	3	4	5	6	7	8	9	0	1	2	1	2
CO1	2		2	2	2	3	3					2	3	3
CO2	2		2	2	2	3	3					2	3	3
CO3	2	3	2	2	3	3	3					2	3	3
CO4	3	3	3	3			2					2	3	3
CO5	3	3	3	3	3	3	2	2			3	3	3	3
Averag														
e*														
(Round	3	3	3	3	3	3	3	2			3	3	3	3
ed to	5	5	5	5	5	5	5	4			5	5	5	5
nearest														
integer)														
Syllabus														
Unit No	C	ntent	2									M	anned	$\overline{\mathbf{C}}$

Contents	Mapped CO
Genesis of IoT, IoT and Digitization, IoT Impact, Convergence of	CO1
IT and IoT, IoT Challenges, IoT Network Architecture and Design,	
Drivers Behind New Network Architectures, Comparing IoT	
Architectures, A Simplified IoT Architecture, The Core IoT	
Functional Stack, IoT Data Management and Compute Stack.	
Smart Objects: The Things in IoT, Sensors, Actuators, and Smart	CO2
Objects, Sensor Networks, Connecting Smart Objects,	
Communications Criteria, IoT Access Technologies.	
Embedded Computing Basics, Microcontrollers, System-on-Chips,	CO3
Choosing Your Platform, Arduino, Developing on the Arduino,	
Some Notes on the Hardware, Openness	
Communication in the IoT: Internet Principles, Internet	CO4
Communications: An Overview, IP, TCP, The IP Protocol Suite	
(TCP/IP), UDP, IP Addresses, DNS, Static IP Address Assignment,	
Dynamic IP Address Assignment, IPv6, MAC Addresses, TCP and	
	ContentsGenesis of IoT, IoT and Digitization, IoT Impact, Convergence ofIT and IoT, IoT Challenges, IoT Network Architecture and Design,Drivers Behind New Network Architectures, Comparing IoTArchitectures, A Simplified IoT Architecture, The Core IoTFunctional Stack, IoT Data Management and Compute Stack.Smart Objects: The Things in IoT, Sensors, Actuators, and SmartObjects, Sensor Networks, Connecting Smart Objects,Communications Criteria, IoT Access Technologies.Embedded Computing Basics, Microcontrollers, System-on-Chips,Choosing Your Platform, Arduino, Developing on the Arduino,Some Notes on the Hardware, OpennessCommunications: An Overview, IP, TCP, The IP Protocol Suite(TCP/IP), UDP, IP Addresses, DNS, Static IP Address Assignment,Dynamic IP Address Assignment, IPv6, MAC Addresses, TCP and

	UDP Ports, An Example: HTTP Ports, Other Common Ports,	
	Application Layer ProtocolsHTTP, HTTPS: Encrypted HTTP,	
	Other Application Layer Protocols.	
V	Prototyping Online Components: Getting Started with an API,	CO5
	Mashing Up APIs, Scraping, Legalities, Writing a New API,	
	Clockodillo, Security, Implementing the API, Using Curl to Test,	
	Going Further, Real-Time Reactions, Polling, Comet, Other	
	Protocols, MQ Telemetry Transport, Extensible Messaging and	
	Presence Protocol, Constrained Application Protocol.	

Learning Resources

Text Books

- 1. Adrian McEwen, Hakim Cassimally Designing the Internet of Thing Wiley Publications, 2012.
- David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Robert Barton, Jerome Henry,"IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things, 1stEdition, Pearson Education (Cisco Press Indian Reprint). (ISBN: 978-9386873743)

Reference Books

- 1. ArshdeepBahga, Vijay Madisetti Internet of Things: A Hands-On Approach, Universities Press, 2014
- 2. Srinivasa K G, Internet of Things, CENGAGE Leaning India, 2017

e- Resources & amp; other digital material

1. <u>https://nptel.ac.in/courses/106/105/106105166/</u>

DATA COMMUNICATION AND COMPUTER NETWORKS

Course Code	19IT3501	Year	III	Semester	Ι
Course Category	PC	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	Computer Fundamentals
Continuous Internal		Semester End			
Evaluation :	30	Evaluation:	70	Total Marks:	100

	Course Outcomes	Blooms Taxonomy Level
Upon S	Successful completion of course, the student will be able to	
CO1	Understand the basic concepts of data communication, Network topologies and Protocols.	L2
CO2	Analyze various protocols in Data link, Network, Transport layers and their mechanisms.	L3
CO3	Implement various Routing algorithms.	L3

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations

1: Slight (low), 2: Moderate (medium) 3: Substantial (High)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1				3									2	1
CO2	3	3		3									2	1
CO3	3	3		3									2	1

	Syllabus	
Unit No	Contents	Mapped CO
I	Overview of Networks and Data Communication : Data Communication, components, data representation, data flow; Networks: physical structures, network models, categories of network, inter connection of networks, Network Models: Layered Tasks, sender, receiver, carrier, and hierarchy. The OSI models: layered architecture, peer to peer process, encapsulation, Layers in OSI model, TCP/IP protocol suite, Addressing: physical address, logical address, port address, specific address.	CO1
II	Datalink Layer: fixed size framing, variable size framing, Flow control, Error control Error detections Error correction: block coding, linear block codes, cyclic codes: cyclic redundancy check, polynomials, cyclic code analysis, advantages, Checksum: idea, one"s complement internet check sum, Elementary Data link Layer protocols: Noiseless Channels, Simplest protocol, Stop-and Wait protocol.	CO2
ш	Data Link Control &Network Layer: Noisy Channels, Stop and Wait Automatic repeat request, Go Back N Automatic Repeat Request, Selective Repeat Automatic Repeat Request, and Piggybacking, Network Layer, IPV4 Addresses, Address space, Notations, Classful addressing, Classless Addressing, Internetworking, IPV4, Datagram, fragmentation, checksum, options, IPV6, advantages, packet format, Extension Headers	CO2
IV	Network Layer: Delivery, forwarding: Forwarding Techniques, and, Forwarding Process, Routing Table routing, Unicast Routing Protocols: Optimization, Intra and Inter domain Routing distance vector routing algorithm, Link State Routing Algorithm, Multicast Routing Algorithms: Unicast, Multicast, Broadcast, Multicast Routing.	CO3
V	Transport Layer: Process to process Delivery: Client/Server Paradigm, Multiplexing and Demultiplexing, Connectionless Versus Connection-Oriented Service, Reliable Versus Unreliable, User datagram Protocol: Well known ports for UDP, User Datagram, Checksum, UDP Operations, and Transmission Control Protocol (TCP): TCP Services, TCP Features, Segment, A TCP Connection, Flow Control, Congestion Control.	CO2

Learning Resources
Text Books
 Data communications and networking 4th Edition Behrouz A Fourzan, TMH Computer networks 4th Edition Andrew S Tanenbaum, Pearson
References
1. Computer networks, A system Approach, 5 th Edition, Larry L Peterson and Bruce
S Davie, Elsevier

E-Resources and other Digital Material

1. http://nptel.iitm.ac.in/courses/Webcoursecontents/IIT%20Kharagpur/Computer%20networks/New_index1.html

Advanced Computer Networks

Course Code	19IT4501A	Year	III	Semester	Ι
Course Category	PE	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	Computer Networks
Continuous Internal Evaluation :	30	Semester End Evaluation:	70	Total Marks:	100

	Course Outcomes							
Upon	successful completion of the course, the student will be able to							
CO1	Understand the working principle of Transport and Application layers along with related protocols and Concepts of Network management protocols.	L2						
CO2	Apply the knowledge of various Client-Server Models, protocol Software, networkcommunication approaches in building client- server applications and TCP/IP socket programs.	L3						
CO3	Analyse the functionalities of various Application layer Protocol like HTTP (HyperText Transfer Protocol), Domain Name System (DNS), Electronic Mail (SMTP, POP, IMAP, MIME Voice And Video Over IP and Simple Network Management Protocol.	L4						
CO4	Devise solutions for real time applications by executing client server programs using advanced library for different services of Application Layer Protocols.	L4						

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (H:High, M: Medium, L:Low)														
	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2												1	
CO2	2		3										1	
CO3	2	3											1	
CO4	2		3	2									1	

Syllabus							
Unit		Mapped					
No	Contents	CO					
Ι	The Transport Layer : Services provided to the upper layers, Transport service primitives, Elements of transport protocols: Addressing, Connection establishment, Connection release, Error control and flow control, Introduction to UDP, Remote procedure call, The Internet Transport Protocols: TCP - protocol, segment header, Connection establishment, connectionrelease, Sliding window, Congestion control.	CO1 CO4					

Π	 Application layer –I Socket Programming: Client-Server Model Of Interaction, The Client-Server Model, A Trivial Example: UDP Echo Server, Time And Date Service, Sequential And Concurrent Servers, Server Complexity, Broadcasting Requests, Client-Server Alternatives And Extensions. The Socket API: Introduction, Versions Of The Socket API, The UNIX I/O Paradigm And Network I/O, Adding Network I/O to UNIX, The Socket Abstraction And Socket Operations, Obtaining And Setting Socket Options, How A Server Accepts TCP Connections, Servers That Handle Multiple Services, Obtaining And Setting The Host Name, Library Functions Related To Sockets, An Example Client, An Example Server. 	CO1 CO2 CO4
ш	 The Domain Name System (DNS), Introduction, Names For Computers, Flat Namespace, Hierarchical Names, Delegation Of Authority For Names ,Subset Authority, Internet Domain Names, Top-Level Domains Name Syntax And Type, Mapping Domain Names To Addresses, Domain Name Resolution, Efficient Translation ,Caching: The Key To Efficiency, Domain Name System Message Format, Compressed Name Format, Abbreviation Of Domain Names, Inverse Mappings, Pointer Queries, Object Types And Resource Record Contents, Obtaining Authority For A Subdomain ,Server Operation And Replication ,Dynamic DNS Update And Notification, DNS Security Extensions (DNSSEC), Multicast DNS And Service Discovery. Electronic Mail (SMTP, POP, IMAP, MIME), Electronic Mail, Mailbox Names And Aliases, Alias Expansion And Mail Forwarding, TCP/IP Standards For Electronic Mail Service, Simple Mail Transfer Protocol (SMTP), Mail Retrieval And Mailbox Manipulation Protocols, The MIME Extensions For Non-ASCII Data, MIME Multipart Masageres 	CO1 CO2 CO3 CO4
IV	Voice And Video Over IP (RTP, RSVP, QoS), Introduction, Digitizing And Encoding, Audio And Video Transmission And Reproduction, Jitter And Playback Delay, Real-time Transport Protocol (RTP), Streams, Mixing, And Multicasting, RTP Encapsulation, RTPControl Protocol (RTCP), RTCP Operation, IP Telephony And Signaling, Quality Of Service Controversy, QoS, Utilization, And Capacity, Emergency Services And Preemption, IntServ And Resource Reservation, DiffServ And Per-Hop Behavior, Traffic Scheduling, TrafficPolicing And Shaping.	CO1 CO2 CO3 CO4
V	Network Management (SNMP): Introduction, The Level OfManagement Protocols, Architectural Model, Protocol Framework,Examples of MIB Variables, The Structure Of Management Information,Formal Definitions Using ASN.1, Structure And Representation OfMIBObject Names, MIB Changes And Additions For IPv6, Simple NetworkManagement Protocol, SNMP Message Format, An Example EncodedSNMP Message.	CO1 CO2 CO3 CO4

Learning Resources

Text Books

1. Computer Networks, Andrew S Tannenbaum and David J wetherall, Pearson, 5thEdition,2014

Internetworking with TCP/IP: Principles Protocols and Architecture Douglas E Commer-

Prentice Hall Edition 6th Edition, 2014.

References

- 1. Ying-Dar Liu, Ren-Hung Hwang, Fred Baker, "Computer Networks: An Open SourceApproach", McGraw-Hill, 2011.
- 2. W. Richard Stevens, Bill Fenner and Andrew Rudoff, "Unix Network Programming", Volumes 1 and 2, Third Edition, Addison-Wesley Professional, 2003.
- 3. Michael Donahoo, Ken Calvert, Pocket Guide to TCP/IP Socket Programming in C,Morgan Kaufmann Series in Networking, 2000.

4. Behrouz A. Forouzan, Data Communication and Networking, McGraw-Hill.

E-Resources and other Digital Material

- 1. http://www.nptelvideos.in/2012/11/computer-networks.html
- 2. https://www.coursera.org/learn/tcpip

DISTRIBUTED SYSTEMS

Course Code	19IT4501B	Year	III	Semester	Ι
Course Category	PE	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	Computer Networks.
Continuous Internal Evaluation :	30	Semester End Evaluation:	70	Total Marks:	100

Course Outcomes	Blooms Taxonomy Level
Upon successful completion of the course, the student will be able to	
CO1 Understand the conceptual model and architectural model of a distributed system	L2
CO2 Illustrate remote invocation methods and file service architectures	L3
CO3 Analyze concurrency control and synchronization mechanisms.	L4

Course Outcomes					
Upon Successful completion of course, the student will be able to					
CO1	Understand the conceptual model and architectural model of a distributed system				
CO2	Illustrate remote invocation methods and file service architectures				
CO3	Analyze concurrency control and synchronization mechanisms.				

Cont	Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of													
corre	correlations (H:High, M: Medium, L:Low)													
	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3												1	
CO2	2	3		2									1	
CO3	2	3		2									1	

Syllabus							
Unit No	Contents	Mapped CO					
I	Introduction: Examples of Distributed Systems, Trends in Distributed Systems, Focus on resource sharing, Challenges. Case study: World Wide Web.	CO1					

П	Communication in distributed system: System Model, Inter process Communication, the API for internet protocols, External data representation and Multicast communication. Network virtualization: Overlay networks. Case study: MPI Remote Method Invocation and Objects: Remote Invocation, Introduction, Request-reply protocols, Remote procedure call, Remote method invocation. Case study: Java RMI, Group communication, Publish- subscribe systems, Message queues, Shared memory approaches, Distributed objects, Case study: Enterprise Java Beans: from objects to components.	CO1 CO2
ш	Peer to peer services and file system: Peer-to-peer Systems, Introduction, Napster and its legacy, Peer-to-peer, Middleware, Routing overlays. Overlay case studies: Pastry, Tapestry- Distributed File Systems: Introduction, File service architecture, Andrew File system. File System: Features, File model, File accessing models, File sharing semantics Naming: Identifiers, Addresses, Name Resolution, Name Space Implementation, Name Caches–LDAP.	CO1 CO2
IV	Synchronization and replication: Introduction, Clocks, events and process state, synchronizing physical clocks, Logical time and logical clocks, Global states, Coordination and Agreement, Introduction, Distributed mutual exclusion, Elections, coordination and agreement in group communication.	CO1 CO3
V	Transactions and Concurrency Control: Transactions, Nested transactions, Locks, Optimistic concurrency control, Timestamp ordering, Atomic Commit protocols, Distributed deadlocks, Replication, fault tolerant services, transactions with replicated data, Case study: Coda.	CO1 CO3

Learning Resources

Text Books

1. George Coulouris, Jean Dollimore and Tim Kindberg, "Distributed Systems Concepts and Design", Fifth Edition, Pearson Education, 2012

References

- 1. Pradeep K Sinha, "Distributed Operating Systems: Concepts and Design", Prentice Hall of India,2007.
- 2. Tanenbaum A.S., Van Steen M., "Distributed Systems: Principles and Paradigms", Pearson Education, 2007.
- 3. Liu M.L., "Distributed Computing, Principles and Applications", Pearson Education, 2004.
- 4. Nancy A Lynch, "Distributed Algorithms", Morgan Kaufman Publishers, USA, 2003.

E- Resources and other Digital Material

- 1. https://nptel.ac.in/courses/106/106/106106168/
- 2. https://www.ejbtutorial.com/distributed-systems/introduction-to-distributed-systems

COMPUTER GRAPHICS

Course Code	19IT4501C	Year	III	Semester	Ι
Course Category	PE	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	C Language
Continuous Internal		Semester End			
Evaluation :	30	Evaluation:	70	Total Marks:	100

	Blooms Taxonomy Level	
Upon		
CO1	Understand working of different display devices and techniques.	L2
CO2	Apply Different Primitive Plotting techniques.	L3
CO3	Analyze different 2D and 3D Object Transformation and Viewing.	L4
CO4	Determine strategies for various Projection and Clipping algorithms	L3

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (H:High, M: Medium, L:Low)														
	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2											1	
CO2	2	2	2										1	
CO3	2	2	2										1	
CO4	2	2											1	

Syllabus								
Unit No	Contents	Mapped CO						
Ι	 Introduction and overview of Graphics Systems Applications of Computer graphics, Video Display Devices: Refresh Cathode- Ray Tubes, Raster and Random Scan Displays, Colour CRT Monitors. Output Primitives Line-Drawing Algorithms: Simple DDA, Symmetrical DDA and, Bresenham's Line generation Algorithm, Circle generating Algorithms: Properties of circle. 	CO1 CO2						

п	Two-Dimensional Geometric Transformations Basic Transformations: Translation, Rotation and, Scaling; Matrix representation and Homogeneous coordinates, Composite Transformations: Translations, Rotations, Scaling, General Pivot-Point Rotation, General Fixed-Point Scaling, Concatenation Properties; Other Transformations: Reflections and shear.	CO1 CO2 CO3
III	 Two Dimensional Viewing The viewing Pipeline-Viewing Coordinate Reference Frame- Window to View port transformation. Polygons Introduction-Polygons-An Inside-Outside Tests-Scan-Line Polygon Fill Algorithm- Boundary Fill Algorithm- Flood Fill algorithm. 	CO1 CO2 CO3
IV	Line Clipping The Cohen-Sutherland Line Clipping Algorithm; Polygon Clipping: The Sutherland Hodgman Algorithm Three Dimensional Geometric And Modelling Transformations Translation-Rotation- General Three Dimensional Rotations – scaling - Other Transformations- Reflections and Shears-Composite Transformations	CO1 CO3 CO4
V	Three Dimensional ViewingViewing Pipeline- Viewing Coordinates- Projections: ParallelProjection and Perspective projectionComputer AnimationDesign of Animation Sequence, General computer Animationfunctions, Raster animation, Computer animation languages, key framesystems, motion specifications.	CO1 CO3 CO4

Learning Resources

Text Books

1. Donald Hearn & M. Pauline Baker, Computer Graphics C Version Pearson Education, New Delhi,2014

References

- 4. David F. Rogers , Procedural Elements for Computer Graphics , Tata McGraw Hill Book Company, New Delhi, 2003
- 5. J. D. Foley, S. K Feiner, A Van Dam F. H John , Computer Graphics: Principles & Practice in C,Pearson Education, 2004
- 6. Franscis S Hill Jr, Computer Graphics using Open GL Pearson Education, 2004.
- 7. Richard Hartley and Andrew Zisserman, Multiple View Geometry in Computer Vision, CambridgeUniversity Press, 2/e, 2004.
- 8. Richard Szeliski, Computer Vision: Algorithms and Applications, Springer, 2010.

E- Resources and other Digital Material

- 1. Dr. Sukhendu das, —Computer Graphics, IIT Madras http://nptel.iitm.ac.in/video.php?subjectId=106106090
- 2. Prof.Dr.Prem Kalra, —Computer Graphicsl, IIT Delhi http://www.learnerstv.com/Free-Computer-Science-Video-lectures-ltv046- Page1.htm

Prasad.V.Potluri Siddhartha Institute of Technology, Kanuru, Vijayawada

Course Code	19IT4501D	Year	III	Semester	Ι
Course Category	PE	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	Software Engineering
Continuous Internal Evaluation :	30	Semester End Evaluation:	70	Total Marks:	100

Software Requirements Management

	Course Outcomes	Blooms Taxonomy Level
Upon	successful completion of the course, the student will be able to	
C01	Understand software requirements and estimation according to industry standards	L2
CO2	Analyze the quality of requirements and requirements specifications	L4
CO3	Interpret current requirements engineering practices in a software project	L3

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (H:High, M: Medium, L:Low)														
	P01	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1												1	
CO2	1	2											1	1
CO3	1		3											2

	Syllabus									
Unit No	Contents	Mapped CO								
I	Introduction, requirements, requirement engineering, requirements document, best way to write requirements, detailed requirements ,difference between functional and nonfunctional requirements, system stakeholders, requirements engineering process, recognizing requirements engineering process problems, suggesting a good requirements engineering process. Practical process improvement: Process maturity, process assessment, process improvement, top ten guidelines.	CO1								
Π	Requirements Elicitation: Assess system feasibility, identify and consult system stakeholders, record requirement sources, system's operating environment, using business concerns to drive requirements elicitation, domain constraints, collect requirements from multiple view points, use scenarios to elicit requirements, operational process. Requirements Analysis and Negotiation: System boundaries prioritize requirements, assess requirements risk.	CO1 CO2								
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Ш	Describing Requirements: Standard templates use language, use diagrams, supplement natural language requirements, specifying requirements quantitatively.									
IV	Requirements Management: Uniquely identify each requirement, policies for requirements management, traceability policies, maintaining a traceability manual, change management policies, identify global system requirements, identify volatile requirements, record rejected requirements.	CO1 CO2								
V	Software Size Estimation: Software estimation, size based estimation, two views of sizing, function point analysis, mark II FPA, full function points, loc estimation, and conversion between size measures.	CO1 CO3								

Text Books

- 1. Ian Sommerville and Pete Sawyer, Requirements Engineering: A good practice guide, John Wiley,1997.
- 2. Rajesh Naik ,Swapna Kishore, Software Requirements and Estimation, TMH, 2001.

References

- 1. Don, Managing Software Requirements, A Use Case Approach, 2/e, Dean, Addison- Wesley, 2003.
- 2. Ian Graham, Requirements Engineering and Rapid Development, Addison Wesley, 1998
- 3. S.Robertson, J.Robertson, Mastering the Requirements Process, 2/e, Pearson, 2006

E-Resources and other Digital Material

1. Requirements Engineering / Specification, NPTEL

Prasad. V.Potluri Siddhartha Institute of Technology, Kanuru, Vijayawada

Artificial Intelligence and	l Expert Systems
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Cours	se Code	19IT4501E	Year	III	Semester	Ι		
Course Category		PE	Branch	IT	Course Type	Theory		
Credi	ts	3	L-T-P	3-0-0	Prerequisites	Discrete		
						Mathematics		
Conti	nuous Internal		Semester End					
Evalu	ation :	30	Evaluation:	70	Total Marks:	100		
	Blooms Taxonomy							
Upon	successful comple	etion of the c	course, the stude	nt will be a	ble to			
CO1	tions of	L2						
CO2	CO2 Represent Knowledge by using various rules.							
CO3	chniques.	L4						
CO4	Examine the key knowledge.	aspects of	Expert Systems	for handlin	g uncertain	L3		

Cont corre	Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (H:High, M: Medium, L:Low)													
	PO1	PO2	PO3	PO4	PO5	PO6	P07	P08	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3												1	
CO2	2	2	2										1	
CO3	2		2			2							1	
CO4		2	1			2							1	

	Syllabus	
Unit No	Contents	Mapped CO
I	Introduction: What is AI? Intelligent Agents: How agent should act, Structure of Intelligent Agents, Environments Problem Solving: Formulating problems, Example problems Uniformed-search strategies: Breadth-First Search, Uniform Cost Search, Depth-FirstSearch, Depth Limited Search, Iterative Deepening Search.	CO1

II	Heuristic Search Strategies: Generate-and-Test, Hill Climbing, Best- first Search. Problem Reduction. Constraint Satisfaction. Means-ends Analysis	CO1 CO2						
	Knowledge Representation: Propositional Logic – Syntax	CO1						
	and Semantics, Using Propositional Logic, First-Order Logic –	CO2						
	Syntax and Semantics, Using First-Order Logic Representing Knowledge	CO3						
	using Rules: Procedural Versus Declarative Knowledge, Forward Versus	CO4						
111	Backward Reasoning.							
	Uncertain Knowledge & Reasoning: Acting under Uncertainty, Basic							
	Probability notation, The Axioms of Probability, Bayes' Rule and its	CO2						
	Use, Where do Probabilities come from?, Representing Knowledge in an	CO3						
IV	Uncertain Domain, The Semantics of Belief Networks.	CO4						
	Introduction to Expert Systems: Definition, Features of an Expert	CO1						
	System, Organization, Characteristics, Prospector, Knowledge	CO2						
\mathbf{V}	Representation in Expert Systems, Expert System tools – MYCIN,	CO3						
	EMYCIN.	CO4						

Text Books

1. Artificial Intelligence - A Modern Approach, Stuart Russell and Peter Norvig, Third edition, Pearson, 2014.

References

- 1. Artificial Intelligence, Elaine Rich, Kevin Knight and Shivashankar B Nair, Thirdedition, McGraw-Hill Education, 2015.
- 2. Introduction to Artificial Intelligence and Expert Systems, Dan W Patterson, Pearson, 2015.

E- Resources and other Digital Material

- $1. \ https://www.edx.org/course/artificial-intelligence-uc-berkeleyx-cs188-1x$
- 2. https://www.udacity.com/course/intro-to-artificial-intelligence--cs271
- 3. https://www.class-central.com/subject/ai

Prasad.V.Potluri Siddhartha Institute of Technology, Kanuru, Vijayawada

Fundamentals of Big data Analytics

Course Code	19IT4501F	Year	III	Semester	Ι
Course Category	PE	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	Data Mining
Continuous Internal		Semester End			
Evaluation :	30	Evaluation:	70	Total Marks:	100

	Course Outcomes							
Upon	successful completion of the course, the student will be able to							
C01	Understand the concepts of Hadoop, HDFS, Map Reduce, Hadoop I/O, Cassandra and Spark operations for analytics of bigdata.	L2						
CO2	Apply the knowledge of Hadoop distributed file system, Cassandra and Spark for solving real time problems	L3						
CO3	Identify the appropriate concepts of big data to solve a given application.	L2						
CO4	Devise solutions for real world use cases using appropriate big data concepts.	L4						

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (H:High, M: Medium, L:Low)														
	PO1	PO2	PO3	PO4	PO5	PO6	P07	P08	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3												1	
CO2	3				2								1	
CO3	3	2			2								1	
CO4	3		3		2								1	

	Syllabus								
Unit		Mapped							
No	Contents	СО							
	Types of Digital Data: Classification of Digital Data. Introduction to Big	CO1							
	Data: Characteristic of Data, Evolution of Big Data, Definition of Big Data, Challenges with Big Data, What is Big Data? Big Data Analytics								
Т	Where do we Begin? What is Big Data Analytics? What Big Data								
•	Analytics isn't?, Classification of Analytics, Terminologies Used in Big								
	Data Environments. The Big Data Technology Landscape: NoSQL,								
	Introduction to Cassandra: Apache Cassandra – An Introduction, Features	CO1							
	Collections Using a Counter Time to Live Alter Commands Import and	CO2							
II	Export.	CO3							

Ш	 Hadoop Overview, HDFS (Hadoop Distributed File System), Processing Data with Hadoop, Managing Resources and Applications with Hadoop YARN (Yet another Resource Negotiator). Introduction to MAPREDUCE Programming: Introduction, Mapper, Reducer, Combiner, Partitioner, Searching, Sorting, Compression. 	CO1 CO2 CO3
IV	Introduction to Data Analysis with Spark: What ia Apache Spark, A unified Spark, Who uses Spark and for what?, A Brief Historyof Spark, Spark version and releases, Storage layers for Spark. Programming with RDDs: RDD Basics, Creating RDDs, RDD Operations, Passing functions to Spark, Common Transformationsand Actions, Persistence. Spark SQL: Linking with Spark SQL, Using Spark SQL in Applications, Loading and Saving Data, JDBC/ODBC Server, User-defined functions, Spark SQL Performance.	CO1 CO2 CO3
V	Use case Study: Recommendation Systems: Introduction, A Model for Recommendation Systems, Collaborative Filtering System and Content Based Recommendations.	CO1 CO2 CO3 CO4

Text Books

- 1. Big Data and Analytics, Seema Acharya, Subhashini Chellappan ,First Edition,Wiley,2015
- 2. Learning Spark Lightning-Fast Big Data Analysis, Andy Konwinski, Holden Karau, MateiZaharia, Patrick Wendell , First Edition, O'Reilly, 2015
- 3. Big Data Analytics, Radha Shankarmani, M VijayaLakshmi, Second Edition, Wiley, 2017

References

- 1. Tom White, Hadoop: The Definitive Guide, Fourth Edition, O'Reilly, 2015
- 2. Hrushikesha Mohanty, Prachet Bhuyan, Deepak Chenthati Editors Big Data A PremierSpringer Volume 11
- 3. Using Flume: Flexible, Scalable, and Reliable Data Streaming by Hari Shreedharan

E- Resources and other Digital Material

- 1. https://www.coursera.org/courses?query=introduction%20to%20big%20data%20anal ytics
- 2. https://www.edx.org/learn/big-data
- 3. https://swayam.gov.in/nd1_noc20_cs46/

Formal Languages and Automata Theory

Course Code	19IT3502	Year	III	Semester	Ι
Course Category	PC	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	Discrete Mathematics
Continuous Internal Evaluation :	30	Semester End Evaluation:	70	Total Marks:	100

	Course Outcomes	
Upon su	ccessful completion of the course, the student will be able to	
CO1	Understand the fundamental concepts of Formal Languages and Automata.	L2
CO2	Apply the knowledge of Automata Theory, Grammars & Regular Expressions for solving various problems.	L3
CO3	Analyze automata and their computational power to recognize languages.	L4
CO4	Analyze different Turing machines techniques to solve problems	L4

	Syllabus	
Unit No.	Contents	Mapped CO
I	Fundamentals: Strings, Alphabet, Language, Operations, Chomsky hierarchy of languages Finite Automata: Definitions, finite automation model, Deterministic Finite Automata, Non-Deterministic Finite Automata, Finite Automata with Epsilon Transitions, and Finite Automata with Output.	CO1,CO3
П	Regular Expressions and Languages : Regular Expressions, identity Rules, Finite Automata and Regular Expressions, Applications of Regular Expressions, Closure Properties of Regular Sets, Pumping Lemma for Regular Languages, Equivalence and Minimization of Finite Automata .	CO1,CO2
III	Grammars: Context–free grammars; Parse trees; Applications; Ambiguity in grammars and Languages, Simplification of Context Free Grammars, Normal Forms, Pumping Lemma For Context Free Languages	CO1,CO2

IV	Pushdown Automata: Definition of the Pushdown Automaton, The Language of Push Down Automaton, Equivalence between Acceptance by Empty Store and Acceptance by Final State, Equivalence of CFG and PDA, Deterministic Pushdown Automaton, Closure Properties of Context Free Languages.	CO1,CO2, CO3
V	Turing Machines: Turing Machine as Acceptor, Turing Machine as a Computing Device, Programming Techniques for Turing Machine, Extensions to the Basic Turing Machine, Universal Turing Machines (UTM), Halting Problem, Post Correspondence Problem	CO1,CO3, CO4

Text Books

- 1. Introduction to Automata Theory, Languages and Computations, H.E.Hopcroft, R.Motwani and J.D Ullman, Second Edition, Pearson Education.
- 2. Introduction of the Theory and Computation, Michael Sipser, 1997, Thomson Brokecole.

References

- 1. Theory of Computer Science, Automata languages and computation, Mishra, Chandra Shekaran, Second edition, PHI
- 2. Elements of The theory of Computation, H.R.Lewis and C.H.Papadimitriou, Second Edition, 2003, Pearson Education/PHI.
- 3. Formal Languages and Automata Theory, Basavarj S. Anami, Karibasappa K.G, WILEY-INDIA.
- 4. Introduction to Languages and the Theory of Computation, J.C.Martin, Third Edition, TMH, 2003.

Database Management Systems

Course Code	19IT3503	Year	III	Semester	Ι
Course Category	PC	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	Engineering Mathematics -1, Data Structures
Continuous Internal Evaluation :	30	Semester End Evaluation:	70	Total Marks:	100

	Course Outcomes						
Upon suc	ccessful completion of the course, the student will be able to						
CO1	Understand the basic concepts of database management systems	L2					
CO2	Apply SQL as well as Relational Algebra to find solutions to a broad range of queries	L3					
CO3	Apply various data models for database design	L3					
CO4	Apply normalization techniques to improve database design	L3					
CO5	Analyze a given database application scenario to use ER model for conceptual design of the database and make an effective report	L4					

	Syllabus		
Unit No.	Contents	Mapped CO	
I	Introduction to Databases: Characteristics of the Database Approach, Advantages of using the DBMS Approach, A Brief History of Database Applications. Overview of Database Languages and Architectures: Data Models, Schemas and Instances, Three-Schema Architecture and Data Independence, Database Languages and Interfaces, Database System environment, Centralized and Client-Server Architecture for DBMSs.	CO1	
П	 Relational Model: The Relational Model Concepts, Relational Model Constraints and Relational Database Schemas. SQL: Data Definition, Constraints, and Basic Queries and Updates, SQL: Advanced Queries, Assertions, Triggers, and Views Formal Relational Languages: Relational Algebra: Unary Relational Operations: Select and Project, Relational Algebra Operations from Set Theory, Binary Relational Operations: Join and Division, Examples of 	CO1,CO2, CO3	

		Queries in Relational Algebra.	
	Ш	Conceptual Data Modeling: High-Level Conceptual Data Models for Database Design, A Sample Database Application, Entity Types, Entity Sets, Attributes and Keys, Relationship Types, Relationship Sets, Roles, and Structural Constraints, Weak Entity Types, Refining the ER Design, ER Diagrams, Naming Conventions and Design Issues, Relationship Types of Degree Higher Than Two. Relational Database Design Using EP to Pelational Mapping	CO1,CO3, CO5
-	IV	Database Design Theory: Functional Dependencies, Normal forms based on Primary Keys, Second and Third Normal Forms, Boyce-Codd Normal Form, Multi valued Dependencies and Fourth Normal Form, Join Dependencies and Fifth Normal Form.	CO1,CO4
	V	Transaction Processing: Introduction, Transaction and System Concepts, Desirable Properties of Transactions, Characterizing Schedules Based on Recoverability &Serializability, Transaction Support in SQL. Introduction to Concurrency Control: Two-Phase Locking Techniques: Types of Locks and System Lock Tables, Guaranteeing Serializability by Two-Phase Locking. Introduction to Recovery Protocols: Recovery Concepts, No- UNDO/REDO Recovery Based on Deferred Update, Recovery Techniques Based on Immediate Update, Shadow Paging.	CO1

Text Books

1. Database Systems Models, Languages, Design and Application Programming, Ramez Elmasri, Shamkant B. Navathe, Sixth edition, Pearson.

References

1. Data base System Concepts, Abraham Silberschatz, Henry F Korth, S. Sudarshan, Fifth Edition, McGraw Hill.

2. Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, Third Edition, TMH.

3. Introduction to Database Systems, C.J.Date, Eigth Edition, Pearson

e-Resources and other Digital Material:

1. https://nptel.ac.in/courses/106/105/106105175/

2. <u>https://onlinecourses.nptel.ac.in/noc21_cs04/</u>

3. <u>https://nptel.ac.in/courses/106/106/106106093/</u>

INTERDISCIPLINARY ELECTIVE - I QUANTITATIVE TECHNIQUES FOR MANAGEMENT

Course Code	19HS2501C	Year	III	Semester	Ι
Course Category	IDE-1	Branch	IT	Course Type	Theory
Credits	0	L-T-P	3-0-0	Prerequisites	Nil
Continuous Internal Evaluation:	30	Semester End Evaluation:	70	Total Marks:	100

	Course Outcomes					
Upon s	uccessful completion of the course, the student will be able to -					
CO1	Understand the basic concepts for solutions to business problems (L2)					
CO2	Apply the analytical techniques in business transactions that would help in making					
	effective business decisions (L3)					
CO3	Analyze problems in business transactions that would help in making effective					
	business (L4)					
CO4	Apply the least square technique to find the equation of the curve. (L3)					
CO5	Apply the various methods to find the deviations and submit a report (L3)					

	Contribution of Course Outcomes towards achievement of Program Outcomes &													
			St	rengtl	ı of co	rrelat	ions (3	-High,	2: M	edium,	1:Low)			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO	PO10	PO11	PO12	PSO1	PSO2
CO1													1	
CO2	3												1	
CO3		3											1	
CO4	3												1	
C05									2	2			1	

	SYLLABUS	
Unit No.	Contents	Mapped CO
Ι	Introduction to Statistics: Meaning, Definition, Functions, Importance,	CO1,CO2,CO3
	Limitations of Statistics, Collection of Primary and Secondary Data.	
II	Measures of Central Tendency: Definition, Objectives, Characteristics and	CO1,CO2,CO3
	Techniques: Mean Median, Mode, Geometric Mean and Harmonic Mean.	
III	Measures of dispersion: Definition, Objectives, Characteristics and	CO1,CO2,CO3,CO
	Techniques: Range, Quartile Deviation, Mean Deviation, Standard Deviation	5
	and Coefficient of Variation.	
IV	Measures of Skewness & Kurtosis: Definition, types of skewness, types of	CO1 CO2 CO2
	kurtosis, Karl-Pearson's Co-efficient, Bowley's Co-efficient, Kelly Co-	01,002,003
	efficient, Calculation of Raw Moments and Central Moments	
V	Curve Fitting: Method of least squares, straight line, parabola, exponential	CO1,CO4
	curve, power curve	

Learning Resources				
Text Books:				
1. S.C. Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, 11/e, Sultan				
Chand & Sons Publications, 2012.				
2. Dr.T.K.V. Iyengar, Dr.B.Krishna Gandhi, S. Ranganatham, Dr. M.V.S.S.N. Prasad,				
"Probability & Statistics", Publications: S.Chand, 4th Revised Edition, 2012.				
Reference Books:				
1. S. Ross, a First Course in Probability, Pearson Education India, 2002.				
2. Miller and Freunds, Probability and Statistics for Engineers, 7/e, Pearson, 2008.				
e- Resources & other digital material:				
1. www.nptelvideos.com/mathematics/(Math Lectures from Mit,Stanford,IIT'S				
2. nptel.ac.in/courses/111/106/111106150/				

- a. nptel.ac.in/courses/111105035
 FED Moodle

INTERNET OF THINGS LABORATORY

Course	19ES1552	Year	III	Semester	Ι
Code					
Course	ES	Branch	All	Course Type	Lab
Category			branches		
Credits	3	L-T-P	0-0-2	Prerequisites	Nil
Continuous	25	Semester	50	Total	75
Internal		End		Marks:	
Evaluation:		Evaluation:			

	Course Outcomes										
Upon	Upon successful completion of the course, the student will be able to										
CO1	Develop various sensor interfacing using Visual Programming Language(L6)										
CO2	Analyze various Physical Computing Techniques(L4)										
CO3	Evaluate Wireless Control of Remote Devices(L5)										
CO4	Design and develop Mobile Application which can interact with Sensors and										
	Actuators(L6)										

Mappin	Mapping of course outcomes with Program outcomes (CO/ PO/PSO Matrix)													
Note: 1-	Note: 1- Weak correlation 2-Medium correlation 3-Strong correlation													
* - Aver	* - Average value indicates course correlation strength with mapped PO													
CO.	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PS	PS
COs	1	2	3	4	5	6	7	8	9	10	11	12	01	02
CO1	2	2	3		3	2	2		3	3		3	3	3
CO2	2	3				2	2		3	3		2	3	3
CO3	3	3				2	2		3	3		2	3	3
CO4	3	3	3	3	3	2	2		3	3		3	3	3
Averag e*														
(Roun														
ded to	3	3	3	3	3	2	2		3	3		3	3	3
nearest														
integer														
)														

Syllabus										
Expt. No.	Contents	Mapped CO								
Ι	Digital I/O Interface - Multicolour Led, IR Sensor, PIR, SlotSensor.	CO1								
II	Analog Read and Write - Potentiometer, Temperature Sensor, Led Brightness Control.	CO1								
III	Dc Motor Control - Dc Motor Speed and Direction Control.	CO2								
IV	Read data from sensor and send it to a requesting client. (using socket communication) Note: The client and server should be connected to same local area network.	CO2								
V	Fabrication and direction control of wheeled robot using Arduino.	CO2								
VI	Serial Communication - Device Control.	CO2								
VII	Wireless Module Interface - Bluetooth and Wifi.	CO3								
VIII	Wireless Control of wheeled Robot using Bluetooth/Wifi.	CO3								
IX	Basic Android App Development using MIT App Inventor.	CO4								
X	Smart Home Android App Development using App Inventor and Arduino.	CO4								

 Learning Resources

 Text Books

 1. Sylvia Libow Martinez, Gary S Stager, "Invent To Learn: Making, Tinkering, and Engineering in the Classroom", Constructing Modern Knowledge Press, 2016.

 Reference Books

 1. Michael Margolis, "Arduino Cookbook", Oreilly, 2011.

e- Resources & amp; other digital material

1. https://nptel.ac.in/courses/108/108/108108098/

Database Management Systems Lab

Course Code	19IT3551	Year	III	Semester	Ι
Course Category	Program Core	Branch	IT	Course Type	Practical
Credits	1	L-T-P	0-0-2	Prerequisites	Problem Solving and Programming Lab
Continuous Internal Evaluation :	25	Semester End Evaluation:	50	Total Marks:	75

	Course Outcomes									
Upon suc	Upon successful completion of the course, the student will be able to									
CO1	Apply database management techniques to solve problems	L3								
CO2	Implement experiments by using modern tools like MYSQL, Oracle									
CO3	Develop an effective report based on various constructs implemented.									
CO4	Apply technical knowledge for a given problem and express with an effective oral communication.	L3								
CO5	Analyze outputs of queries for a given problem	L4								

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:Substantial, 2: Moderate, 1:Slight)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2
CO1	3											2		
CO2					3				3					
CO3										3				
CO4	3									3				
CO5		3												

	Syllabus	
EXP No.	Contents	Mapped CO
1	Introduction to MySQL Workbench. How to use MySql Workbench to run SQL Statements.	C01,C02,C03,C04,C05
2	 Examples on i) DDL Commands: CREATE , ALTER, DROP and TRUNCATE a Table ii) Implementation of Constraints PRIMARY KEY, FOREIGN KEY, CHECK,NOT NULL, UNIQUE. 	CO1,CO2,CO3,CO4,CO5
3	Examples on i) DML Commands. INSERT, UPDATE and DELETE ii) DCL Commands: COMMIT, ROLLBACK and SAVEPOINT.	CO1,CO2,CO3,CO4,CO5
4	Examples on retrieving data from a single table using i)SELECT statement ii) SELECT statement with where clause(Comparison Operators, AND, OR, NOT, IN, BETWEEN,LIKE) iii) ORDER BY clause(sort by column name) iv) LIMIT clause	CO1,CO2,CO3,CO4,CO5
5	Examples on Functions in MySQL: String, Numeric, Date, Time and Other Functions.	C01,C02,C03,C04,C05
6	Examples on Summary Queries: Queries using Aggregate functions, GROUP By and Having Clauses, ROLLUP Operator.	C01,C02,C03,C04,C05
7	Examples on Inner join, outer join using USING, NATURAL Keywords	C01,C02,C03,C04,C05
8	Examples on SUB/SUMMARY Queries Using IN, ANY, SOME, ALL, EXISTS and NOT EXISTS functions	CO1,CO2,CO3,CO4,CO5
9	Examples on i) Creating INDEXES and VIEWS ii) INSERT, DELETE and DROP on VIEWS	CO1,CO2,CO3,CO4,CO5
10	Examples on i) Create and Call STORED PROCEDURE (IN,OUT,INOUT Parameters), Drop a STORED PROCEDURE. ii) Create,call and Drop a FUNCTION. iii) Create and Drop a TRIGGER	CO1,CO2,CO3,CO4,CO5
11	Case Study using real world database applications	C01,C02,C03,C04,C05
.earnin	g Resources	
ext Bo		
1. Mur Referen	ach's MySQL, JUEL MUKACH, 2012, Shrott Publishers & Distribu	itors Pvt.Ltd.
The C	omplete Reference MYSOL, VikramVaswani, 2017, McGrawHill Ed	lucation.
. DAT	ABASE SYSTEMS Models, Languages, Design and Application Prog	gramming,
lamezE	Imasri, ShamkantB. Navathe, Sixth Edition, Pearson.	
. Data	base System Concepts, Abraham Silberschatz, Henry F Korth, S. Sud	arshan, Fifth Edition,
/IcGrav	/ Hill.	

VI SEMESTER

Engineering Economics and Management

Course Code	19HS1601	Year	III	Semester	II
Course Category	HS	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	-
Continuous Internal		Semester End			
Evaluation :	30	Evaluation:	70	Total Marks:	100

	Course Outcomes	Blooms Taxonomy
Upon	Successful completion of course, the student will be able to	Level
CO1	To understand the fundamental concepts of Managerial economics and demand.	L2
CO2	Apply knowledge to evaluate future demand and theory of production.	L3
CO3	To understand the foundational concepts of cost, market structure and role of pricing methods in business.	L2
CO4	To understand about the principles of management and human resource management function in an organization.	L2
CO5	To understand the broad scope of marketing, societal, ethical and other diverse aspects of marketing and production.	L2

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of
correlations (H:High, M: Medium, L:Low)

	DO1	DO1	DO2	DO4	DO 5	DOC	D07	DOP	DOO	DO10	DO11	DO12	DCO1	DCO1
	POI	PO2	P05	PO4	P05	PUo	P07	PUð	P09	POIO	POII	P012	P501	P502
CO1	3			2								3	3	
CO2	3			2								3	3	
CO3	3			2								3	3	
CO4	3			2								3	3	
CO5	3			2								3	3	

Syllabus						
Unit No	Contents	Mapped CO				
I	Introduction to Managerial Economics & Demand Analysis: Definition of Managerial Economics, Nature and Scope – Managerial Economics and its relation with other subjects. Demand Analysis: Meaning - Demand determinants- Law of Demand and its exceptions.	CO1				
П	Elasticity of Demand, Demand Forecasting & Theory of Production: Definition -Types of Elasticity of demand - Measurement of price elasticity of demand. Demand Forecasting: Meaning - Factors governing demand forecasting - Methods of demand forecasting. Production: Production Function- Law of variable proportions- Isoquants, Law of returns to scale.	CO2				
III	Cost Analysis, Market Structures & Pricing: Cost concepts - Break- Even Point - Managerial Significance and limitations of BEP - (simple problems). Market: meaning characteristics of market and Types of market competition – Pricing strategies	CO3				
IV	Introduction to Management & Human Resource Management: Meaning, nature, importance and Functions of Management, Henri Fayol principles. HRM: objective and function, manpower planning, sources of recruitment.	CO4				
V	IntroductiontoMarketingManagement&Productionmanagement:Meaning,ConceptsofMarketing,MarketingMix,MarketingSegmentation.Productionmanagement:objectives,TypesofPlantLayout,location – Factors effectingit	CO5				

Learnin	Learning Resources -							
Refe	References							
1.	Managerial Economics and Financial Analysis, J.V.PrabhakarRao, Maruthi Publications, 2011							
2.	Managerial Economics and Financial Analysis, N. AppaRao. & P. Vijaya Kumar, Cengage Publications, New Delhi, 2011.							
3.	Managerial Economics and Financial Analysis, A R Aryasri, TMH, 2011.							
4.	Management Science, Aryasri, TMH,2004.							

5. Management Science, Rajesh C. Jampala, P. Adi Lakshmi, Duvuri Publications, Machilipatnam, 2010.

COMPILER DESIGN

Course Code	19IT3601	Year	III	Semester	II
Course Category	PC	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	Formal Language & Automata Theory
Continuous Internal		Semester End			
Evaluation :	30	Evaluation:	70	Total Marks:	100

	Course Outcomes					
		Taxonomy				
		Level				
Upon Successful completion of course, the student will be able to						
CO1	Understand about language processors and its phases.	L2				
CO2	Demonstrate about scanning of tokens and perform the syntax analysis by using parsing techniques	L3				
CO3	Perform Symantec analysis using attribute grammar and compare different memory management techniques in runtime environment	L3				
CO4	Ascertain optimization techniques for intermediate code forms and code generation	L3				

Contr correl	Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (H:High, M: Medium, L:Low)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2											2	1
CO2	3	3	2	1	3							1	2	1
CO3	2	3		1	3							1	2	2
CO4	2	3	2		3							1	3	3

	Syllabus	
Unit No	Contents	Mappe d CO
I	 Overview of language processing: preprocessors – compiler – assembler – Linkers & loaders, difference between compiler and interpreter- structure of a compiler –phases of a compiler. Lexical Analysis: Role of Lexical Analysis – Input Buffering – Specification of Tokens – Recognition of Token – The Lexical Analyzer Generator Lex. 	CO1
II	Syntax Analysis: Role of a parser – Context Free Grammar – Top Down Parsing – Recursive Descent Parsing — Non recursive Predictive Parsing- FIRST and FOLLOW – LL(1) Grammar – Error Recovery in Predictive Parsing.	CO1, CO2
III	 Bottom up Parsing: Reductions – Handle Pruning - Shift Reduce Parsing – Introduction to simple LR – Why LR Parsers – Model of an LR Parsers — Construction of SLR Tables. More powerful LR parsers: Construction of CLR (1) - LALR Parsing tables. 	CO1, CO3
IV	Runtime Environment: Storage organization - Stack allocation - Static allocation - Heap management - Parameter passing mechanisms. Intermediate code: DAG - Three address code - Quadruples - Triples - Indirect Triples.	CO1, CO3, CO4
V	 Basic Blocks: DAG representation of Block. Machine independent code optimization - Common sub expression elimination - Constant folding - Copy propagation -Dead code elimination - Strength reduction - Loop optimization. Machine dependent code optimization: Peephole optimization - Register allocation - Instruction scheduling - Inter Procedural Optimization - Garbage collection via reference counting. 	CO1, CO4

Learning Resources	
Text Books	
1. Compilers: Principles, Techniques and Tools: 2nd Edition, Alf	red V. Aho, Monica S. Lam,
Ravi Sethi, J effrey D. Ulman; 2nd Edition, Pearson Education	n.
 Modern Compiler Implementation in C- Andrew N. Appel, Ca First edition. 	mbridge University Press,
References	
1. lex &yacc – John R. Levine, Tony Mason, Doug Brown, O"re	eilly, 2 nd edition, 2017.
2. Modern Compiler Design- Dick Grune, Henry E. Bal, Cariel T	[°] . H. Jacobs, Wileyream tech,
2012.	
3. Engineering a Compiler-Cooper & Linda, Elsevier, Third editi	on.
4. Compiler Construction, Louden, Thomson, First edition.	
5. Principles of compiler design, V. Raghavan, 2 nd edition, TMH,	, 2011.
E-Resources and other Digital Material	
1. http://www.nptel.iitm.ac.in/downloads/106108052/	/

WEB TECHNOLOGIES

Course Code	19IT3602	Year	III	Semester	II
Course Category	PC	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	Java
Continuous Internal		Semester End			
Evaluation :	30	Evaluation:	70	Total Marks:	100

	Course Outcomes	Blooms Taxonomy Level					
Upon s	Upon successful completion of the course, the student will be able to						
CO1	Apply concepts of HTML,CSS,XML,JDBC connectivity, Servlets and JSP in developing efficient programs	L3					
CO2	Analyze Java applications Comprising of Java Beans, Servlets and JSP	L4					
CO3	Develop web applications to use Database Connection using JDBC, servlet and JSP application.	L3					

Contr corre	Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (H:High, M: Medium, L:Low)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1			2		2								2	2
CO2			2		2								2	2
CO3			2		2								2	2

	Syllabus						
Unit No	Contents	Mapped CO					
I	 INTRODUCTION TO WEB TECHNOLOGIES: History of the web, Overview of HTTP, HTML Introduction, HTML Basic, HTML Links, Images, Tables, Lists, HTML Block &Inline, HTML classes, Id, Iframes, HTML forms. CSS: Levels of Style Sheets, Style Specification Formats, Selector Forms, the Box Model. THE BASIC OF JAVASCRIPT: JS Data Types, functions, Objects, Events, Strings, Arrays, Functions, Pattern Matching using Regular Expressions 	CO1,CO 3					
п	 WORKING WITH XML: Introduction to XML, XML Basics, XML Technologies, Extensible HTML (XHTML), Java API for XML Processing, Document Object Model (DOM), Extensible Style Sheet Language Transformation (XSLT). WORKING WITH JAVA BEANS: Introducing Java Beans, Introspection Design Patterns for properties, methods, events, bean API. 	CO1,CO 2					
III	WORKING WITH DATABASE: Getting started with JDBC, Defining ODBC, Introduction to JDBC, Components of JDBC, JDBC Architecture, Types of Drivers, Working with JDBC APIs, Creating a Simple Application, Working with Prepared Statement, Using Callable Statement.	CO1,CO 3					
IV	 WORKING WITH SERVLETS: Introducing the MVC architecture, Describing Servlets, Understanding Servlets, What are servlets, Introducing the Servlet API, Servlet Life Cycle, Developing First Servlet Application, Generic Servlet Class. WORKING WITH REQUESTS & RESPONSES: Understanding Request Processing and HTTP Describing the Servlet Request Interface, Working with Initialization Parameters, Describing Request Attributes, request dispatcher interface, Describing HTTP basics, Problem with Servlets. 	CO1,CO 2,CO3					
V	WORKING WITH JSP : Introduction to JSP, Understanding JSP, Describing the JSP Life Cycle, Creating a Simple JSP pages, working with JSP basic tags and implicit objects, working with Java Beans and Action tags in JSP, Working with JSP standard Tag Library (JSTL)	CO1,CO 2,CO3					

Text books

- 1. Web Technologies, Black Book, Kogent Learning Solutions Inc, Dreamtech Press, 2018.
- 2. JDBC, Servlets, and JSP, New Edition, Santhosh Kumar K, Kogent Learning Solutions Inc, Dreamtech Press, 2018.

References

- 1. Web Technologies ,Uttam K. Roy, Volume 2 , Oxford University, 2010
- 2. An Introduction to Web Design and Programming -Wang-Thomson
- 3. Professional Java Server Programming S.AllamRaju and othersApres(dreamtech)
- 4. Java Server Programming ,Ivan Bayross and others, The X Team, SPD
- 5. Beginning Web Programming-Jon Duckett WROX.
- 6. Java Server Pages, Pekowsky, Pearson.

e-Resources and other Digital Material

- 1. http://nptel.ac.in/courses/106105084/13
- 2. http://www.w3schools.com/
- 3. https://www.javatpoint.com/html-tutorial

STEGANOGRAPHY AND BIOMETRICS

Course Code	19IT4601A	Year	III	Semester	II
Course Category	PC	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	DCCN
Continuous Internal		Semester En			
Evaluation :	30	Evaluation:	70	Total Marks:	100

	Course Outcomes	Blooms Taxonomy Level
Upon su		
CO1	Understand the basics of Steganography	L1
CO2	Summarize the Biometric benefits and solutions	L2
CO3	Finger Scan, Facial Scan and Iris Scan Technologies and identify different Biometric Applications.	L3
CO4	Analyze Voice Scan, other physiological Biometrics and Behavioral Biometrics.	L4

Contr corre	Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:Substantial, 2: Moderate, 1:Slight)													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2
CO 1			2	2		2							2	2
CO 2			2	2		2							2	2
CO 3			2	2		2							2	2
CO 4			2	2		2							2	2

	Syllabus	
Unit No	Contents	Mapped CO
Ι	Steganography: Overview, History, Methods for hiding (text, images, audio, video, speech etc.), Issues: Security, Capacity and Imperceptibility. Steganalysis: Active and Malicious Attackers, Active and passive steganalysis.	CO1
П	Introduction: Benefits of biometric security – Verification and Identification – Basic working of Biometric matching – Accuracy – False match rate – False non-match rate – Failure to enroll rate – Derived metrics – Layered biometric solutions.	CO2
III	Finger Scan: Features – Components – Operation (Steps) – Competing finger Scan technologies – Strength and weakness. Types of algorithms used for interpretation.	CO3
IV	Facial Scan : Features – Components – Operation (Steps) – Competing facial Scan technologies – Strength and weakness. Iris Scan : Features – Components – Operation (Steps) – Competing iris Scan technologies – Strength and weakness.	CO3
V	Voice Scan: Features – Components – Operation (Steps) – Competing voice Scan (facial) technologies – Strength and weakness. Other physiological Biometrics: Hand scan – Retina scan – AFIS (Automatic Finger Print Identification Systems)-DNA Scan – Behavioral Biometrics – Signature scan keystroke scan.	CO4

Learn	ing Resources
Text b	ooks
1.	Peter Wayner, Disappearing Cryptography - Information Hiding: Steganography &
	Watermarking, Morgan Kaufmann Publishers, New York, 2002.
2.	Biometrics – Identity Verification in a Networked World – Samir Nanavati,
	Michael Thieme, Raj Nanavati, WILEY- Dream Tech, 2007.
3.	Biometrics for Network Security- Paul Reid, Pearson Education, 2004.
	References
1.	Introduction to Biometrics, Anil K. Jain, Arun A. Ross and Karthik Nanda kumar,
	2011.
2.	Guide to Biometrics, Ruud Bolle, Jonathan Connell, Sharanth Chandra Pankanti,
	Nalini Ratha and Andrew Senior, 2003.
3.	Biometric Systems Technology, Design and Performance Evaluation, by James L.
	Wayman, Anil K. Jain, Davide Maltoni and Dario Maio, 2004.
4.	Handbook of Face Recognition, Stan Z. Li and Anil K. Jain, 2005
e-Reso	ources and other Digital Material
1.	http://freevideolectures.com/Course/3252/Biometrics
2.	http://nptel.ac.in/courses/106104119/

ADVANCED OPERATING SYSTEMS

Course Code	19IT4601B	Year	III	Semester	II
Course Category	PC	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	OPERATING SYSTEM
Continuous Internal Evaluation	30	Semester End Evaluation:	70	Total Marks:	100

	Course Outcomes	Blooms Taxonomy Level
Upon s	uccessful completion of the course, the student will be able to	
CO1	Outline the fundamentals of Operating Systems	L2
CO2	Illustrate Distributed operating system concepts that includes architecture, Mutual exclusion algorithms, Deadlock detection algorithms and agreement protocols	L3
CO3	Demonstrate the distributed resource management components viz. the algorithms for implementation of distributed shared memory, recovery and commit protocols	L3
CO4	Outline the components and management aspects of Real time, Mobile operating systems	L1

Contr (3:Sul	Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:Substantial, 2: Moderate, 1:Slight)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2		2	2								1	2	1
CO2	2		2	2								1	2	1
CO3	2		2	2								1	2	1
CO4	2		2	2								1	2	1

	Syllabus	
Unit No	Contents	Mapped CO
I	Fundamentals Of Operating Systems Overview – Synchronization Mechanisms – Processes and Threads - Process Scheduling –Deadlocks: Detection, Prevention and Recovery – Models of Resources – Memory Management Techniques.	CO1
п	Distributed Operating Systems : Issues in Distributed Operating System – Architecture – Communication Primitives –Lamport's Logical clocks – Causal Ordering of Messages – Distributed Mutual Exclusion Algorithms – Centralized and Distributed Deadlock Detection Algorithms – Agreement Protocols.	CO2
ш	Distributed Resource Management : Distributed File Systems – Design Issues - Distributed Shared Memory – Algorithms for Implementing Distributed Shared memory–Issues in Load Distributing – Scheduling Algorithms	CO3
IV	Failure Recover and Fault Tolerance Synchronous and Asynchronous Check Pointing and Recovery – Fault Tolerance – Two-Phase Commit Protocol – Nonblocking Commit Protocol – Security and Protection.	CO3
v	Real Time And Mobile Operating Systems Basic Model of Real Time Systems - Characteristics- Applications of Real Time Systems –Real Time Task Scheduling - Handling Resource Sharing - Mobile Operating Systems –Micro Kernel Design - Client Server Resource Access – Processes and Threads - Memory Management File system.	CO4

Text books

- 1. Mukesh Singhal and Niranjan G. Shivaratri, "Advanced Concepts in Operating Systems – Distributed, Database, and Multiprocessor Operating Systems", Tata McGraw-Hill, 2017.
- 2. Abraham Silberschatz; Peter Baer Galvin; Greg Gagne, "Operating System Concepts", Tenth Edition, John Wiley & Sons, 2018.

References

- 1. Daniel P Bovet and Marco Cesati, "Understanding the Linux kernel", 3rd edition, O'Reilly,2005.
- 2. Rajib Mall, "Real-Time Systems: Theory and Practice", Pearson Education India, 2006.

e-Resources and other Digital Material

- 1. https://www.youtube.com watch?v=GTObrKKbRww&list=PLAwxTw4SYaPkKfusBLVfklgfdcB3BNpwX
- 2. https://omscs.gatech.edu/cs-6210-advanced-operating-systems-course-videos

IMAGE PROCESSING

Course Code	19IT4601C	Year	III	Semester	II
Course Category	PC	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	
Continuous Internal		Semester End			
Evaluation :	30	Evaluation:	70	Total Marks:	100

	Course Outcomes	Blooms Taxonomy Level					
Upon successful completion of the course, the student will be able to							
CO1	Analyze different types of images and color models	L4					
CO2	Analyze the quality of images using Spatial and frequency domain filtering.	L4					
CO3	Apply the restoration techniques to improve the fidelity of images.	L3					
CO4	Apply the techniques for image compression, image Segmentation for various applications and color image processing.	L3					

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:Substantial, 2: Moderate, 1:Slight)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2		2		2	2							1	1
CO2	2		2		2	2							1	1
CO3	2		2		2	2							1	1
CO4	2		2		2	2							1	1

	Syllabus	
Unit No	Contents	Mapped CO
I	Digital Image fundamentals Digital Image Representation, Fundamental steps in image processing, Concept of gray levels, Gray level to binary image conversion, Sampling and quantization, Resolution, types of images, Relationship between pixels.	CO1
п	Image Enhancement in Spatial Domain Histogram processing, Image smoothing & Image sharpening. Image Enhancement in frequency Domain: Steps involved in frequency domain filtering, Image smoothing & Image sharpening.	CO2
Ш	Image compression Redundancies and their removal methods, Fidelity criteria, Image compression models, lossy and lossless compression.	CO3
IV	Image segmentation Detection of discontinuities, edge linking and boundary detection, thresholding, region – oriented segmentation.	CO4
V	Colour image processing Colour fundamentals, Colour models, Pseudo colour image processing, full colour image processing.	CO4

Learning Resources
Text book
Digital Image processing – R.C. Gonzalez & R.E. Woods, Addison Wesley/ Pearson
education, Fourth Edition, 2018.
References
1. Fundamentals of Digital Image processing – A.K.Jain, PHI. 1989 2.
2. Digital Image processing- S Jayaraman, S Esakkirajan and T. Veerakumar. TMH 3rd
Edition,2010.
3. Digital Image Processing – William K. Pratt, John Wilely, 3 rd Edition, 2004.
4. The Essential Guide to Image Processing-Alan c. Bovik, Academic Press, 2009.
e-Resources and other Digital Material

http://nptel.iitm.ac.in/courses/Webcoursecontents/IITKANPUR/Digi_Img_Pro/ui/TOC.htm
 http://nptel.iitm.ac.in/video.php?subjectId=117105079
 http://en.wikipedia.org/wiki/Digital_image_processing.
 http://www.filestube.com/d/digital+image+processing+gonzalez+solution.

SOFTWARE PROJECT MANAGEMENT

Course Code	19IT4601D	Year	III	Semester	II
Course Category	PE	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	SE
Continuous Internal Evaluation:	30	Semester End Evaluation:	70	Total Marks:	100

Course Outcomes						
Upon successful completion of the course, the student will be able to						
CO1	Understand the basic concepts and issues of software project management	L2				
CO2	Develop the skills for tracking and controlling software deliverables	L5				
CO3	Conduct activities necessary to successfully complete and close the Software projects	L3				
CO4	Evaluate project plans that address real-world management challenges	L5				

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:Substantial, 2: Moderate, 1:Slight)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1							2						2	3
CO2							2	2						
CO3											3			2
CO4								2			3	2	1	3

	Syllabus						
Unit No	Contents	Mapped CO					
I	Introduction to Project Management : Software Project Management activities, Challenges in software projects, Stakeholders, Objectives & goals Project Planning: Step-wise planning, Project Scope, Project Products & deliverables, Project activities, Effort estimation, Infrastructure.	CO1					
п	Project Approach : Lifecycle models, Choosing Technology, Prototyping Iterative & incremental Process Framework: Lifecycle phases, Process Artifacts, Process workflows (Book 2) Effort estimation & activity Planning Estimation techniques, Function Point analysis, SLOC, COCOMO, Use case- based estimation, Activity Identification Approaches, Network planning models, Critical path analysis	CO2					
III	Risk Management : Risk categories, Identification, Assessment, Planning and management, PERT technique, Monte Carlo approach.	CO2,CO 3					
IV	Project Monitoring & Control : Resource Allocation Creating a framework for monitoring & control, Progress monitoring, Cost monitoring, Earned value Analysis, Defects Tracking, Issues Tracking, Status reports, Types of Resources, Identifying resource requirements, Resource scheduling	CO2,CO 3					
V	Software Quality : Planning Quality, Defining Quality – ISO 9016, Quality Measures, Quantitative Quality Management Planning, Product Quality & Process Quality Metrics, Statistical Process Control Capability Maturity Model, Enhancing software Quality (Book3)	CO4					

Learning Resources Text books 1. Software Project Management, Bob Hughes & Mike Cotterell, TATA Mcgraw-Hill,2017 2. Software Project Management, Walker Royce: Pearson Education, 2005. 3. Software Project Management in practice, Pankaj Jalote, Pearson,2015. Reference 1. Project Management for Business, Engineering and Technology Nicholas, J. and Steyn 5th edition, ELSEVIER. 2017 2. Project Planning, Analysis, Selection, Implementation and Review Prasanna Chandra 9th edition, New Delhi, Tata McGraw Hill Publications 2019 e-Resources and other Digital Material

1. <u>http://ebooks.lpude.in/management/mba/term_4/D_CAP304_DCAP515_SO_</u> <u>FTWARE_PROJECT_M_ANAGEMENT.pdf</u>

 Information Technology Project Management Kathy Schwalbe 8th Edition Thompson 2015

3. https://files.transtutors.co m/cdn/upload assignment s/2411827_1_informatio n-technology-project management--8-edition- .pdf

MACHINE LEARNING

Course Code	19IT4601E	Year	III	Semester	II
Course Category	PC	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	DATA MINING
Continuous Internal Evaluation :	30	Semester End Evaluation:	70	Total Marks:	100

	Blooms Taxonomy Level	
Upon s		
CO1	Apply the different learning algorithms.	L2
CO2	Analyze the learning techniques for given dataset	L3
CO3	Evaluate a model using machine learning to solve a problem	L5

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:Substantial, 2: Moderate, 1:Slight)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2												2	2
CO2		3											2	2
CO3			3	3	3								2	2

	Syllabus	
Unit No	Contents	Mapped CO
I	Introduction : Well Posed Learning Problems, Designing a Learning system, Perspectives and Issues in Machine Learning Concept Learning: Concept Learning as search, Find-S, Version Spaces and Candidate Elimination Algorithm, Inductive bias. Decision Tree Learning: Decision Tree Representation, Decision Tree Learning Algorithm, Hypothesis Space Search.	CO1,CO2, CO3
II	Evaluating Hypothesis : Motivation, Estimating hypothesis accuracy, Basics of sampling theorem, General approach for deriving confidence intervals, Difference in error of two hypothesis, Comparing learning algorithms.	CO1,CO2, CO3
III	Bayesian Learning : Bayes Theorem and Concept Learning, Maximum Likelihood, Minimum Description Length Principle, Bayes Optimal Classifier, Gibbs Algorithm, Naïve Bayes Classifier, Bayesian Belief Network, EM Algorithm.	CO1,CO2, CO3
IV	Instance Based Learning : K-Nearest Neighbor Learning, Locally Weighted Regression, Radial Basis Functions, Case Based Reasoning, Lazy and Eager learning.	CO1,CO2, CO3
V	Learning Set of Rules: Sequential covering algorithms, Learning Rule Sets, Learning First Order Rules, Learning Sets of First Order Rules, Induction as Inverted Deduction, Inverting Resolution.	CO1,CO2, CO3

Learning Resources
Text books
1. Machine Learning M M. Mitchell Indian Edition Mc Graw Hill 2013
References
1. Introduction to Machine Learning with Python Andreas C Muller & Sarah Guido First Shroff
Publishers 2019
2. Thoughtful Machine learning Mathew Kirk First Shroff Publishers 2019
e-Resources and other Digital Material
1. Hands-On Machine Learning With Scikit-learn and Tensorflow Aureliene Geron First
Oreilly 2017
https://www.kaggle.c om/general/95287
2. The Elements of Statistical Learning Trevor Hastie, Robert Tibshirani, Jerome H.

2. The Elements of Statistical Learning Trevol Hastie, Robert Toshirani, Jerome Friedman Second -----2009 https://web.stanford.edu/~hastie/Papers/ES LII.pdf

DATA VISUALIZATION

Course Code	19IT4601F	Year	III	Semester	II
Course Category	PE	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	Data structures and Algorithms
Continuous Internal Evaluation :	30	Semester End Evaluation:	70	Total Marks:	100

Course Outcomes						
Upon successful completion of the course, the student will be able to						
CO1	Apply knowledge of perception and cognition to evaluate visualization design alternatives.	L3				
CO2	Conduct exploratory data analysis using visualization and Craft visual presentations of data for effective communication.	L3				
CO3	Apply data transformations such as aggregation and filtering for visualization.	L3				
CO4	Evaluate and create data visualizations	L5				

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:Substantial, 2: Moderate, 1:Slight)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2												2	2
CO2		2											2	2
CO3					2								2	2
CO4			2										2	2

Syllabus						
Unit No	Contents	Mapp ed CO				
I	"What's Vis, and Why Do It?", Data Abstraction-Data Types, Dataset Types, Attribute Types, semantics, Task Abstraction- Why Analyze Tasks Abstractly? Who: Designer or User, Actions, Targets, Analysis: Four Levels for Validation -The Big Picture Why Validate? Four Levels of Design ,Angles of Attack, Threats and Validation Approaches, Validation Examples	C01				
п	Marks and Channels-The Big Picture Why Marks and Channels? Defining Marks and Channels, Using Marks and Channels, Channel Effectiveness, Relative vs. Absolute Judgments, Arrange Tables-The Big Picture Why Arrange? Classifying Arrangements by Keys and Values, Express: Quantitative Values, Separate, Order, and Align: Categorical Regions, Spatial Axis Orientation, Spatial Layout Density	CO2, CO3				
ш	Arrange Spatial Data The Big Picture Why Use Given?, Geometry, ScalarFields: 1 Value, Vector Fields: Multiple Values, Tensor Fields: Many ValuesArrangeNetworksAndTreesThe Big Picture Connection: Link Marks, Matrix Views, Costs and Benefits:Connection vs. Matrix, Containment: Hierarchy, Map Color and OtherChannels The Big Picture, Color Theory, Color maps, Other Channels	CO1, CO3				
IV	Manipulate View The Big Picture Why Change?, Change View over Time Select Elements, Navigate: Changing Viewpoint ,Navigate: Reducing Attributes, Facet into Multiple Views-The Big Picture Why Facet? Juxtapose and Coordinate Views, Partition into Views, Superimpose Layers, Reduce Items and Attributes The Big Picture Why Reduce?, Filter, Aggregate	CO2, CO3				
v	Embed: Focus + Context The Big Picture Why Embed? ,Elide, Superimpose, Distort, Costs and Benefits: Distortion Analysis Case Studies Graph-Theoretic Scagnostics, VisDB, Hierarchical Clustering Explorer Pivot Graph ,Interring, Constellation	CO3, CO4				

Text books

1. Visualization Analysis & Design by Tamara Munzner (2014) (Links to an external site.) (ISBN 9781466508910)

References

- 1. Interactive Data Visualization for the Web by Scott Murray 2nd Edition (2017)
- 2. D3.js in Action by Elijah Meeks 2nd Edition (2017)
- 3. Semiology of Graphics by Jacques Bertin (2010)
- 4. The Grammar of Graphics by Leland Wilkinson
- 5. ggplot2 Elegant Graphics for Data Analysis by Hadley Wickham

e-Resources and other Digital Material:

1. https://medium.com/analytics-vidhya/how-to-learn-data-visualization-for-freecf21ffe06b45

Program Elective-III

WIRELESS SENSOR NETWORKS

Course Code	19IT4602A	Year	III	Semester	II
	Program				
Course Category	Elective	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	DCCN
Continuous Internal		Semester End			
Evaluation :	30	Evaluation:	70	Total Marks:	100

	Blooms Taxonomy Level					
Upon successful completion of the course, the student will be able to						
CO1	Understand the basic concepts of wireless sensor networks, sensing, computing, communication tasks and architectures.	L2				
CO2	Demonstrate knowledge of MAC protocols developed for WSN	L3				
CO3	Demonstrate knowledge of routing protocols developed for WSN.	L3				
CO4	Analyze mobile data-centric networking and security considerations	L3				

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:Substantial, 2: Moderate, 1:Slight)														
	PO 1	PO 2	РО 3	PO 4	РО 5	PO 6	РО 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO2
CO 1	2												1	
CO 2	2		2	2									1	
CO 3	2		2	2									1	
CO 4	2	2		2			1						1	

Syllabus									
Unit No	Contents	Mapped CO							
I	Overview of wireless sensor networks: The vision of ambient intelligence, application example, types of applications, challenges for wireless sensor networks, enabling technologies for wireless sensor networks	CO1							
II	Architectures: Single node architecture, hardware components,	CO1							
	operating systems and execution environments, network architecture, sensor network scenarios.								
--	--	----------------	--	--	--	--	--	--	--
ш	 Physical Layer: Introduction, wireless channel and communication fundamentals, physical layer and transceiver design considerations in WSNs. MAC protocols, contention based protocols, schedule based protocols. 								
IV	Link layer protocols: Fundamentals: Tasks and requirements, error control, causes and characteristics of transmission errors, ARQ techniques, FEC techniques, framing, adaptive schemes, intermediate checksum schemes, combining packet size optimization and FEC, link management, link quality characteristics, link quality estimation.	CO1,CO 3							
V	Advanced application support: Advanced, network processing, going beyond mere aggregation of data, distributed signal processing, distributed source coding. Security, fundamentals security considerations in wireless sensor networks, denial of service attacks.								
Learning	Recourses								
Text Book	ζS								
1. Holger	Karl & Andreas Willig, Protocols And Architectures for Wireless Senso	or							
Networks,	John Wiley, 2011.								
Reference	le se								
1. Feng Processing 2. Raghave	Zhao & Leonidas J. Guibas, Wireless Sensor Networks, An Information g Approach, Elsevier, 2007. endra, Cauligi S, Sivalingam, Krishna M., ZantiTaieb, Wireless Sensor N	on Ietwork,							
Springer 1 3. Kazems Protocols a 4. N. P.	/e, 2004 (ISBN: 978,4020,7883,5). Sohraby, Daniel Minoli, &TaiebZnati, Wireless Sensor Networks, Tech and Applications, John Wiley, 2010. Mahalik, Sensor Networks and Configuration: Fundamentals, Standar	nology, ds,							
Platforms,	and Applications, Springer Verlag, 2010.								
e-Resourc	res & other digital material								
1. NPTEL	L VIDEO LECTURES								

CLOUD COMPUTING

Course Code	19IT4602B	Year	III	Semester	II
	Program				
Course Category	Elective	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	DCCN
Continuous Internal		Semester End			
Evaluation :	30	Evaluation:	70	Total Marks:	100

	Course Outcomes						
Upon suc							
CO1	Understanding Fundamental Concepts and Models of Cloud Computing and Cloud Enabling Technologies, Infrastructure Mechanisms	L2					
CO2	Determine Cloud Infrastructure Mechanisms	L3					
CO3	Determine different Cloud Maintenance strategies	L3					
CO4	Analyze Cloud Architectures and Delivery Model	L4					

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:Substantial, 2: Moderate, 1:Slight)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO1	PSO 2
CO 1	2												1	
CO 2	2			2									1	
CO 3	2			2									1	
CO 4	2	2											1	
	Syllabus													
Unit	t	Contents							Ma	pped				

Unit No	Contents								
Ι	Understanding Cloud Computing: Cloud origins and influences, basic concepts and terminology, goals and benefits, risks and challenges. Fundamental Concepts and Models: Roles and boundaries, cloud characteristics, cloud delivery models, cloud deployment models								
п	Cloud Enabling Technology: Data center technology, virtualization technology, web technology, multitenant technology, service technology.	CO1							

	Cloud Infrastructure Mechanisms: Logical network perimeter virtual	CO1
III	server, cloud storage device, cloud usage monitor, resource replication	CO1, CO2
IV	Specialized Cloud Mechanisms: Automated Scaling Listener, Load Balancer, SLA Monitor, Pay-Per- Use Monitor, Audit Monitor, Failover System, Hypervisor, Resource Cluster, Multi-Device Broker, State Management Database. Case Studies.	CO3
V	Fundamental Cloud Architectures: Workload distribution architecture, resource pooling architecture, dynamic scalability architecture, elastic resource capacity architecture, service load balancing architecture, cloud bursting architecture, elastic disk provisioning architecture, redundant storage architecture. Cloud Delivery Model Considerations: The cloud provider perspective: Building IaaS environments, equipping PaaS environments, optimizing SaaS environments, the cloud consumer perspective: Working with IaaS environments, working with PaaS environments, working with SaaS services.	CO1,CO 4
Learn	ing Recourses	
Text E	Books	
1. The	mas Erl, Ricardo Puttini, ZaighamMahmood, Cloud Computing: Concepts,	
Techno	ology & Architecture, Prentice Hall, 2013.	
Refere	ences	
1. Joh	n W. Rittinghouse, James F. Ransome, Cloud Computing: Implementation,	
Manag	gement and Security, CRC Press, 2012.	
2. An	nony I. veite, Toby J Veite Robert Eisenpeter, Cloud Computing a pra	ctical
approa	the Miller Cloud Computing: Web based Applications That Change the	Way
You W	Vork and Collaborate Online. Que Publishing, 2008.	•• ay
e-Keso	burces & other digital material	
NPTE	L VIDEO LECI URES	

SPEECH PROCESSING

Course Code	19IT4602C	Year	III	Semester	II
Course Category	Program Elective	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	AI Tools
Continuous Internal		Semester End			
Evaluation :	30	Evaluation:	70	Total Marks:	100

	Course Outcomes						
Upon suc	Upon successful completion of the course, the student will be able to						
CO1	Understanding of Fundamentals Concepts of Speech Processing	L2					
CO2	Compare and Contrast on speech analysis and synthesis technologies, and their strengths and limitations	L2					
CO3	Design and evaluate simple studies that utilize speech processing methods	L3					
CO4	Analyze Speech Recognition models and applications	L3					
CO5	Analyze Speech Synthesis applications	L3					

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:Substantial, 2: Moderate, 1:Slight)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2
CO 1	2					2							1	
CO 2	2	3				2							1	
CO 3	2					2							1	
CO 4	2	2				2							1	
CO 5	2	2				2							1	

	Syllabus						
Unit No	Contents	Mappe d CO					
_	Basic Concepts Speech Fundamentals: Articulatory Phonetics –	CO1					
Ι	Production and Classification of Speech Sounds; Acoustic Phonetics –						

Acoustics of speech production; Review of Digital Signal Processing	
concepts; Short-Time Fourier Transform, Filter-Bank and LPC	
Methods.	
Speech Analysis: Features, Feature Extraction and Pattern	
Comparison Techniques: Speech distortion measures- mathematical	
and perceptual – Log-Spectral Distance, Cepstral Distances,	
II Weighted Cepstral Distances and Filtering, Likelihood Distortions,	CO2
Spectral Distortion using a Warped Frequency Scale, LPC, PLP and	
MFCC Coefficients, Time Alignment and Normalization – Dynamic	
Time Warping, Multiple Time – Alignment Paths	
Speech Modeling: Hidden Markov Models: Markov Processes,	
HMMs – Evaluation, Optimal State Sequence – Viterbi Search,	CO3
Baum-Welch Parameter Re-estimation, Implementation issues	
Speech Recognition: Large Vocabulary Continuous Speech	
Recognition: Architecture Of A Large Vocabulary Continuous Speech	
IV Recognition System – Acoustics And Language Models – N-Grams,	CO4
Context Dependent Sub-Word Units; Applications And Present	
Status.	
Speech Synthesis : Text-To-Speech Synthesis: Concatenative And	
Waveform Synthesis Methods, Sub-Word Units For TTS,	
V Intelligibility And Naturalness – Role Of Prosody, Applications And	CO5
Present Status	
Learning Recourses	<u> </u>
Text Books	
1. Lawrence Rabiner and Bling-Hwang Juang, "Fundamentals of Speech Recognition" Pearson Education 2003	-
2. Daniel Jurafsky and James H Martin, "Speech and Language Processing	
– An Introduction to Natural Language Processing, Computational	
Linguistics, and Speech Recognition", Pearson Education, 2002.	
References	
1. Steven W. Smith, "The Scientist and Engineer's Guide to Digital Signal	
Processing", California Technical Publishing, 1997.	
2. Thomas F Quatteri, Discrete-Time Speech Signal Flocessing – Principles and Practice" Pearson Education 2004	
e-Resources & other digital material	

OBJECT ORIENTED SOFTWARE ENGINEERING

Course Code	19IT4602D	Year	III	Semester	II
	Program				
Course Category	Elective	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	SE paradig
Continuous Internal		Semester End			
Evaluation :	30	Evaluation:	70	Total Marks:	100

Course Outcomes					
Upon successful completion of the course, the student will be able to					
CO1	Understand the fundamental phases of software development and the principles underlying Object-Oriented software design.	L2			
CO2	Employ formal methods and differentroles played to produce effective software designs as solutions to specific tasks.	L3			
CO3	Develop structured sets of simple user-defined classes using Object- Oriented principles to achieve overall programming goals.	L3			
CO4	Develop error identification and testing strategies for code development.	L3			
CO5	Understand modeling for a given problem for better development of thesoftware product to have a high quality	L3			

Contr corre	Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:Substantial, 2: Moderate, 1:Slight)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1													2
CO2	1		3											2
CO3	1				2									2
CO4	1					2								2
CO5	1					2				3				2
	•									•		•		

Syllabus						
Unit No	Contents	Mapped CO				
_	Software engineering: software related problems, software engineering,					
I	concepts, development activities,	CO1				

	Project communications : Project communication, modes, mechanisms and activities.	
II	Requirements: Requirements elicitation, concepts , activities and managing requirements elicitation.Analysis: Analysis overview, concepts, activities and managing analysis	CO2
III	 System design: Design overview, concepts, activities and managing system design. Object design: Object design overview, concepts, activities and managing object design 	CO3
IV	Rationale management: Rational overview, concepts, activities and managing rationaleTesting: Testing overview, concepts, activities and managing testing.	CO4
V	Software configuration management:Configuration managementoverview, concepts, activities and managing configuration managementProject management:project management overview, concepts, activitiesand managing project management models and activities.	CO5

Learning Recourses

Text Books

1. Object-oriented Software engineering: Conquering complex and changing systems, Bernd Bruegge and Allen H. Dutoit. Pearson Education Asia., First edition.

References

1. Object–oriented software engineering: Practical software development using UML and JavaTimothy C. lethbridge and Robert Langaniere Mcgraw–Hill Higher Education.

e-Resources & other digital material

NPTEL VIDEO LECTURES

DATAWAREHOUSING AND DATA MINING

Course Code	19IT4602E	Year	III	Semester	II
Course Category	PE	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	DBMS
Continuous Internal		Semester End			
Evaluation :	30	Evaluation:	70	Total Marks:	100

Course Outcomes					
Upon successful completion of the course, the student will be able to					
CO1	Understand the basic principles of Data Mining and data preprocessing.	L2			
CO2	Differentiate the concepts of data warehousing and OLTP.	L3			
CO3	Relate the learned algorithms in association and pattern mining to the practical issues.	L3			
CO4	Describe and utilize a range of techniques for classifying the data and accuracy improvements.	L3			
CO5	Analyze the data and develop some clustering and outlier methods.	L3			

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:Substantial, 2: Moderate, 1:Slight)

				-		,	0	,						
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2
CO 1	3	2			3								2	2
CO 2		2		2									2	2
CO 3	3	2		3	3								2	2
CO 4		3			3								2	2
CO 5		3			3								2	2

	Syllabus	
Unit No	Contents	Mappe d CO
Ι	Data warehousing - Data warehouse: Basic Concepts, Data warehouse Modeling: Data Cube and OLAP. Data Mining-What is	C01

	1	1	
	data mining? What kinds of data can be mined? What kinds of pattern		
	can be mined? Which technologies are used? Which kinds of		
	applications are targeted?		
	Getting to know your data - Data objects and Attribute Types, Basic		
тт	statistical descriptions of data, Measuring Data Similarity and	CO2	
11	Dissimilarity. Data Preprocessing- An overview, Data Cleaning, Data	02	
	integration, Data Reduction, Data Transformation and Discretization.		
	Mining frequent patterns, Associations and Correlations - Basic		
	Concepts, Frequent item set Mining methods- Apriori Algorithm,		
III	Generating association rules from frequent item sets, improving the	CO3	
	efficiency of Apriori, A pattern growth approach for mining frequent		
	item sets. Which patterns are interesting- pattern evaluation methods		
	Classification: Basic Concepts – Basic concepts, Decision Tree		
	Induction, Baye's Classification Methods, Rule based Classification,		
	Classification by Back propagation, Support Vector Machines,	~~ (
IV	Classification using frequent patterns, Lazy Learners, Other	CO4	
	classification methods, Model evaluation and Selection, Techniques to		
	improve Classification Accuracy		
	Cluster Analysis - Basic Concepts and Methods- Cluster Analysis,		
V	partitioning methods, Hierarchical Methods, Density-based methods,	CO5	
	Grid-based methods and evaluation of Clustering		
	-		

Learning Recourses					
Text Books					
1. Jiawei Han, MichelineKamber and Jian Pei, Data Mining Concepts and					
Techniques, 3/e, Morgan Kaufmann Publishers, Third edition, 2011.					
References					
1. Michael Steinbach, Vipin Kumar, Pang-Ning Tan, Introduction to data					
mining, 1/e, Addison Wesley, 2006					
 Margaret H. Dunham, Data Mining Introductory and Advanced Topics, 1/e, Pearson Publishers, 					
2006					
e-Resources & other digital material					

NPTEL VIDEO LECTURES

MINNING MASSIVE DATASETS

Course Code	19IT4602F	Year	III	Semester	II
Course Category	PE	Branch	IT	Course Type	Theory
					DBMS,
Credits	3	L-T-P	3-0-0	Prerequisites	DS
Continuous Internal		Semester End			
Evaluation :	30	Evaluation:	70	Total Marks:	100

Course Outcomes					
Upon successful completion of the course, the student will be able to					
CO1	Understating the fundamentals of concepts Distributed file systems, Data Streams and Social Networks	L2			
CO2	Determine the Concepts of Data Streams and Link Analysis	L3			
CO3	Compare and Contrast the Concepts Link Analysis	L4			
CO4	Deduce Graph concepts for Social Networks	L4			

Contro corre	Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:Substantial, 2: Moderate, 1:Slight)													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2
CO 1	2												1	
CO 2	2		2	2									1	
CO 3	2			2									1	
CO 4	2	2											1	

	Syllabus	
Unit No	Contents	Mappe d CO
I	Data Mining : What is data Mining? Statistical Limits on Data Mining, Things Useful to Know MapReduce and the new software stack: Distributed file systems, MapReduce, Algorithms usingMap Reduce, and complexity theory for Map Reduce	C01

II	Finding similar items: Application for near-neighbor search, shingling of documents, Similarity- preserving summaries of sets, locality-sensitive hashing for documents and distance measures				
III	Mining Data Streams: The Stream Data Model, Sampling data in a stream, filtering streams and counting distinct elements in a stream	CO1, CO2			
IV	Link Analysis: Page Rank, Efficient computation of Page Rank, Topic-sensitive Page Rank, Link Spam, Hubs and Authorities	CO1, CO2, CO3			
V	Mining Social Network Graphs: Social Networks as Graphs, Clustering of Social-Network Graphs, Direct Discovery of Communities, Partitioning of graphs, Simrank and Neighborhood properties of graphs	CO1,C 04			

Learning Recourses					
Text Books					
1. Jure Leskovec, Anand Rajaraman and Jeffrey D. Ullman, Mining of					
Massive Datasets, Third edition, 2020.					
References					
1. H. Garcia-Molina, J. D. Ullman, and J. Widom. Database Systems: The					
Complete Book. Second Edition. Pearson Prentice Hall, 2009					
2. J.Lin and Ch. Dyer. Data-Intensive Text Processing with MapReduce.					
Morgan and Claypool Publishers, 2010					
http://lintool.github.com/MapReduceAlgorithms/					
3. T. Hastie, R. Tibshirani, and J. Friedman. Elements of Statistical Learning:					
Second Edition. Springer, 2009					
e-Resources & other digital material					
http://www-stat.stanford.edu/~tibs/ElemStatLearn/					

COMPILER DESIGN LAB

Course Code	19IT3651	Year	III	Semester	II
Course Category	PC Lab	Branch	IT	Course Type	Theory
Credits	1	L-T-P	0-0-3	Prerequisites	C - Language
Continuous Internal		Semester End			
Evaluation :	25	Evaluation:	50	Total Marks:	75

	Course Outcomes	Blooms Taxono my Level
Upon S	Successful completion of course, the student will be able to	
CO1	Design Lexical analyzer for given language using C and LEX tools.	L3
CO2	Design and convert BNF rules into YACC form to generate various parsers.	L3
CO3	Generate machine code from the intermediate code forms	L3
CO4	Implement Symbol table	L3

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of	
correlations (H:High, M: Medium, L:Low)	

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	1								1	2	1
CO2	3	3	2	1	2							1	2	1
CO3	3	3	2	1	2							1	2	1
CO4	3	3	2	1	2							1	2	1

	Syllabus					
Program No	Exercise	Mapped CO				
I	Design a Lexical analyzer for the given language. The lexical analyzer should ignore redundant spaces, tabs and new lines. It should also ignore comments. Although the syntax specification states that identifiers can be arbitrarily long, you may restrict the length to some reasonable value.	CO1				
II	Implement the lexical analyzer using JLex, flex or lex or other lexical analyser generating tools.	CO1				
III	Design Predictive parser for the given language.	CO2				
IV	Design LALR bottom up parser for the given language.	CO2				
V	Convert the BNF rules into Yacc form and write code to generate abstract syntax tree.	CO2				
VI	Write program to generate machine code from the abstract syntax tree generated by the parser.	CO2				
VII	Implementation of Symbol Table.	CO4				
VIII	Generation of Code for a given Intermediate Code.	CO3				

Learning Res	ources
Text Books	
1.	Compilers: Principles, Techniques and Tools: Second Edition, Alfred V. Aho, Monica
	S. Lam, Ravi Sethi, J effrey D. Ulman; 2nd Edition, Pearson Education.
2.	Modern Compiler Implementation in C- Andrew N. Appel, Cambridge University
	Press, First Edition.
References	
1.	lex&yacc – John R. Levine, Tony Mason, Doug Brown, O"reilly, Scond edition, 2017
2.	Modern Compiler Design- Dick Grune, Henry E. Bal, Cariel T. H. Jacobs,
	Wileyreamtech, Second edition, 2012.
3.	Engineering a Compiler-Cooper & Linda, Elsevier, Third edition.
4.	Compiler Construction, Louden, Thomson, First edition.
5.	Principles of compiler design, V. Raghavan, Second edition, TMH, 2011.
E-Resources	and other Digital Material
1.	http://www.nptel.iitm.ac.in/downloads/106108052/

WEB TECHNOLOGIES LAB

Course Code	19IT3652	Year	II	Semester	Ι
Course Category	PC Lab	Branch	IT	Course Type	Theory
Credits	1.5	L-T-P	0-0-3	Prerequisites	JAVA
Continuous Internal		Semester End			
Evaluation :	25	Evaluation:	50	Total Marks:	75

	Course Outcomes	Blooms Level
Upon		
CO1	Design and develop web applications using HTML, CSS, Java script,	L6
	XML in a team environment.	
CO2	Develop Server side programming that demonstrate the advanced Java	L6
	concepts(JDBC, Servlets, JSP)	

Contr Stren	Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (H:High, M: Medium, L:Low)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1			2		2								2	2
CO2			2		2								2	2

Exercise No	Exercise	Mapped CO
1	Design and development of Online Book Shop	CO1
2	Write an HTML page that contains a selection box with a list of 5 countries. When the user selects a country, its capital should be printed next to the list. Add CSS to customize the properties of the font of the capital (color, bold and font size).	CO1
3	users information. Write a program which takes User Id as input and returns the user details by taking the user information from the XML document	CO1
4	Write a HTML page that has one input, which can take multi-line text and a submit button. Once the user clicks the submit button, it should show the number of characters, words and lines in the text entered using an alert message. Words are separated with white	CO1

	spaces and lines are separated with new line character.	
4	Create dynamic application using JDBC and Servlet	CO2
(5 Authentication using Java Servlet	CO2
-	7 Authentication using JSP	
8	B Develop JSP application using JSTL and Custom Tags.	CO2
	Students are encouraged to propose innovative ideas in the field of	CO2
Ģ	E-commerce as projects.(online banking, online job portal, online	
	library, online ticket reservation ,online banking etc).(optional)	
Learn	ing Resources	
Text b	ooks	
1.	Web Technologies, Black Book, Kogent Learning Solutions Inc, Dreamtech	Press,
	2018.	
2.	JDBC, Servlets, and JSP, New Edition, Santhosh Kumar K, Kogent Learnin	ng Solutions
	Inc, Dreamtech Press, 2018.	
Refe	rences	
1.	Core Servlets and Java Server Pages Volume 2 Core Technologies, Second	ond Edition,
	Marty Hall and Larry Brown Pearson	
2.	Professional Java Server Programming S.AllamRaju and othersApres(dreamt	ech)
3.	Java Server Programming ,IvanBayross and others, The X Team, SPD	
4.	Beginning Web Programming-Jon Duckett WROX, 2013, Second Edition.	
e-Reso	ources and other Digital Material	
1.	http://nptel.ac.in/courses/106105084/13	
2.	http://www.w3schools.com/	
3.	https://www.javatpoint.com/html-tutorial	

PYTHON PROGRAMMING LAB

Course Code	19IT3653	Year	III	Semester	II
Course Category	PC Lab	Branch	IT	Course Type	LAB
Credits	1.5	L-T-P	0-0-3	Prerequisites	JAVA
Continuous Internal		Semester End			75
Evaluation :	25	Evaluation:	50	Total Marks:	

Course Outcomes							
Upon Successful completion of course, the student will be able to							
CO1	Design python programs that appropriately utilize built-in functions and objects of Python	L6					
CO2	Use functions for structuring efficient Phython programs	L3					
CO3	Relate data using phython lists, tuples, dictionaries	L2					

Cont of co	Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:High, 2: Medium, 1:Low)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	2	2								2	2
CO2	2	2	2	2	2								2	2
CO3	2	2	2	2	2								2	2

Exercise No	Exercise	Mapped CO
1	Write a program to demonstrate different number data types in Python	CO1
2	Write a program to perform different Arithmetic Operations on numbers in Python.	CO1
3	Write Python programs demonstrate to control flow statements.	CO1
4	Write a program to create, concatenate and print a string and accessing sub-string from a given string.	CO1
5	Write a program to create, append, and remove lists in python	CO1,CO3
6	Write a program to demonstrate tuples in python.	C01,C03

7	Write a program to demonstrate dictionaries in python.	C01,C03
8	Write a python program to find factorial of a number using	CO1,CO2
0	Recursion.	
0	Write a python program to define a module to find Fibonacci	CO1,CO2
9	Numbers and import the module to another program.	
	Write a script named copyfile.py. This script should prompt the user	CO1,CO2
10	for the names of two text files. The contents of the first file should be input and written to the second file.	

Learning Recourses

Text Books

- 1. James Payne, "Beginning Python: Using Python and Python 3.1, First Edition, Wrox Publication
- 2. Dr. R. Nageswara Rao, Core Python Programming, Dreamtech Press, Wiley Publication, 2017.

Reference Books

- 1. Wesley J Chun, Core Python Applications Programming, Third Edition, Pearson Publication.
- 2. E. Balguruswamy, Introduction to Computing and Problem Solving using Python, McGraw Hill Publication

e-Resources and other Digital Material

1.https://www.geeksforgeeks.org/python-programming-language/

VII SEMESTER

Organization Behaviour

Course Code	19HS1701	Year	IV	Semester	Ι
Course Category	HS	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	-
Continuous Internal		Semester End			
Evaluation :	30	Evaluation:	70	Total Marks	100

	Upon successful completion of the course, the student will be able to:															
		CO	Den	nonsti	rate t	he ap	plical	oility	of the	e con	cept o	of orga	nizati	onal b	ehavio	our to
		1	und	erstan	nd the	beha	viour	and	cultur	e of p	people	e in th	e orga	nizatio	on.	
		CO	Den	nonsti	rate t	he ap	plicat	oility	of an	alysin	g the	comp	lexitie	es asso	ociated	l with
		2	man	agem	nent o	of indi	ividua	al beh	aviou	r in t	he org	ganiza	tion.			
Course	e (CO	Ana	lyse	the o	comp	lexiti	es as	socia	ted	with	mana	gemer	nt of	the g	group
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		CO	Den	nonsti	rate	how	the	org	ganiza	ationa	l be	ehavio	ur c	an ir	ntegrat	te in
	4	4	und	Inderstanding the motivation for creating positive work culture.												
		CO	Demonstrate how the organizational behaviour can influence in													
		5	understanding the importance of learning and leadership for an											or an		
		-	orga	ınizat	ion to	o crea	te po	sitive	impa	ct.						r
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Outcom	es	CO								3	3		2			3
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	2.	Sharma V.S., Veluri: "Organizational Behavior", JAICO Publishing House, New
		Delhi, 2009.
	3.	Mary Ann Von Glinow, Radha R. Sharma, Steven L. McShane, "Organizational
		Behavior", Tata McGraw Hill Education, New Delhi, 2008.

Cryptography and Network Security

Course Code	1 9IT3701	Year	IV	Semester	Ι
Course Category	PC	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	Number Theory and Cryptography
Continuous Internal		Semester End			
Evaluation :	30	Evaluation:	70	Total Marks:	100

	Course Outcomes									
Upon	Successful completion of course, the student will be able to	Blooms Taxono								
		Level								
CO1	Understand basic concepts of security over the network	L2								
CO2	Illustrate the issues in Key Management and Distribution	L2								
CO3	Demonstrate the fundamentals of Transport-Level Security and Email security	L2								
CO4	Apply various cryptographic concepts in developing security related applications	L3								

Contr corre	Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (H:High, M: Medium, L:Low)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3												2	2
CO2	3												2	2
CO3	3												2	2
CO4			3										2	2

	Syllabus	F				
Unit No	Contents	Mapped CO				
Ι	Security Concepts: Introduction, The OSI Security Architecture, Security Attacks, Security Services, Security Mechanisms, A Model for Network Security Symmetric Key Ciphers: Block Ciphers, DES, Block Cipher Principles, Stream Ciphers, RC4	CO1				
п	CO1, CO4					
III	Key Management and Distribution : Symmetric Key Distribution Using Symmetric Encryption, Symmetric Key Distribution Using Asymmetric Encryption, Distribution of Public Keys, X.509 Certificates. Public-Key Infrastructure.	CO1,CO2,CO4				
IV	Transport-Level Security : Web Security Considerations, Secure Sockets Layer, Transport Layer Security, HTTPS, Secure Shell(SSH)	CO1,CO3,CO4				
V	Email Security : Pretty Good Privacy, S/MIME IP Security : IP Security Overview, IP Security Policy, Encapsulating Security Payload, Combining Security Associations, Internet Key Exchange	CO1,CO3,CO4				
	Learning Resources					
Text B1. WillPearReference	ooks liam Stallings. Cryptography and Network Security – Principles and Prac rson Education, 2014. nce Books	tice, 6/e.				
 Keterence Books Atul Kahate, Cryptography and Network Security, 3/e. Mc Graw Hill, 2013. C K Shyamala, N Harini, Dr T R Padmanabhan. Cryptography and Network Security, 1/e. Wiley India, 2011. Forouzan and Mukhopadhyay. Cryptography and Network Security, 3/e. Mc Graw Hill, 2015. Mark Stamp. Information Security, Principles, and Practice. Wiley India, 2011. WM. Arthur Conklin and Greg White. Principles of Computer Security. TMH, 2016. Neal Krawetz . Introduction to Network Security. CENGAGE Learning, 2007. 						
e-Resou	urces & Other Digital Material					
1. http:// Muk 2. http:// and-prace	//nptel.ac.in/courses/106105031/lecture by Dr. Debdeep chopadhyay, IIT Kharagpur /www.cs.vsb.cz/ochodkova/courses/kpb/cryptography-and-network-securitypr ctice-7th-global-edition.pdf	rinciples-				

ADHOC NETWORKS

Course Code	19IT4703A	Year	IV	Semester	Ι
Course Category	PE	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	Computer Networks, Database Concepts
Continuous Internal		Semester End			
Evaluation :	30	Evaluation:	70	Total Marks:	100

Course	Outcomes	Blooms Taxonomy Level
Upon S	Successful completion of course, the student will be able to	
CO1	Understand the principles of Ad Hoc wireless networks.	L2
CO2	Apply principles of different access control protocols.	L3
CO3	Use the concepts of different routing protocols in real scenarios.	L3
CO4	Analyze the concepts of transport layer and security protocols.	L4

ContributionofCourseOutcomestowardsachievementofProgramOutcomes&Strengthof correlations(H:High,M:Medium,L:Low)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3												3	
CO2	3												3	
CO3		3											3	
CO4		3											3	

Syllabus								
Unit No	Contents	Mapped CO						
I	Ad Hoc Wireless Networks: Introduction, Issues in Ad Hoc Wireless Networks, Ad Hoc Wireless Internet	CO1						
II	Mac Protocols For Ad Hoc Wireless Networks – Design Goals of A Mac Protocol For Ad Hoc Wireless Networks, Classifications of MAC protocols, Contention-Based Protocols, Contention-Based Protocols With Reservation Mechanisms, Contention-Based MAC protocols With Scheduling Mechanisms, Other MAC protocols.	CO1 CO2						

	Routing Protocols: Issues In Designing A Routing Protocol For Ad Hoc Wireless	CO1CO3
III	Networks, Classifications of Routing Protocols, Table-Driven Routing Protocols,	
	On-Demand Routing Protocols.	
	Multicast Routing In Ad Hoc Wireless Networks – Issues in designing multicast	CO1CO3
	routing protocols, Classification of Multicast Routing Protocols, Tree-Based	
	Multicast Routing Protocols, Mesh-Based Multicast Routing Protocols.	
IV		
• •		
	Transport Layer And Security Protocols For Ad Hoc Wireless	CO1
	Networks – Issues In Designing A Transport Layer Protocol For Ad Hoc	CO4
V	Wireless Networks, Design Goals of A Transport Laver Protocol For Ad Hoc	
	Wireless Networks Classification of Transport Laver Solutions TCP Over Ad	
	Hog Wireless Networks, Other Transport Layer Drotocols for Ad Hog Wireless	
	not wheless hetworks, other many one Layer Protocols for Au not wheless	
	Networks, Security In Ad Hoc Wireless Networks.	

Learning Resources

Text Books

1. C.Siva Ram Murthy, B.S. Manoj, "Ad hoc wireless networks-Architectures and protocols" Pearson Education, 2014

References

1. Stefano Basagni, Marco Conti, "Mobile ad hoc networking", Wielyinterscience 2004

2. Charles Kadushin, Understanding Social Networks: Theories, Concepts, and Findings

E- Resources and other Digital Material

- 1. https://www.coursera.org/learn/social-network-analysis
- 2. https://onlinecourses.nptel.ac.in/noc20_cs78/

SERVICE ORIENTED ARCHITECTURE

Course Code	19IT4703B	Year	IV	Semester	Ι
Course Category	PE	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	JAVA, Web Technologies
Continuous Internal		Semester End			
Evaluation :	30	Evaluation:	70	Total Marks:	100

	Course Outcomes							
τ	Jpon successful completion of the course, the student will be able to							
C01	Learn basic principles of Service-Oriented Architecture and apply these concepts to develop applications.	L2						
CO2	Demonstrate the applicability of Service-Oriented Architecture in various domains.	L2						
C03	Analyze the issues related to web services security and policies.	L2						

Co	Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (H:High, M: Medium, L:Low)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2		1							1	2	2
CO2	2	2	2		2							1	2	2
CO3	2	2	2		1							1	2	2

	Syllabus	
Unit No	Contents	Mapped CO
Ι	Fundamentals of SOA : Introduction, defining SOA, evolution of SOA, service oriented enterprise, comparing SOA to client, server and distributed internet architectures, basic SOA architecture concepts, key service characteristics, technical benefits, business benefits.	CO1, CO2
п	Combining SOA and Web Services : Web services, service descriptions, messaging with SOAP, message exchange patterns, web service platform, service contract, service level data model, service discovery, service level security, service level interaction patterns, atomic and composite services, service enabling legacy system, enterprise service bus pattern.	CO1, CO2
III	Multi Channel Access and Web Services Composition: SOA for multi, channel access, business benefits, tiers, business process management, web service composition, BPEL, RESTFUL services, comparison of BPEL and RESTFUL services.	CO1, CO2
IV	Java Web Services : SOA support in J2EE , Java API for XML based Web Services(JAX,WS), Java Architecture For Xml Binding (JAXB), Java API for XML registries(JAXR), Java API for XML based RPC (JAX,RPC), web services interoperability, SOA support in .NET, ASP.NET web services, case studies, Web Services Enhancements (WSE)	CO1, CO2
V	Web Services Security and Transaction: Meta data management, advanced messaging, addressing, reliable messaging, policies, WS- policy, security, WS- security, notification and eventing, transaction management.	CO3

Learning Resources

Text Books

1. Eric Newcomer, Lomow, Understanding SOA with Web Services, Pearson Education, 2005.

2. James McGovern, Sameer Tyagi, Michael E Stevens, Sunil Mathew, Java Web Services Architecture, Elsevier, 2003.

References

- 1. Thomas Erl, Service Oriented Architecture, Pearson Education, 2005.
- 2.Sandeep Chatterjee, James Webber, Developing Enterprise Web Services, An Architect's Guide, Pearson Education, 2005.
- 3. Dan Woods and Thomas Mattern, Enterprise SOA Designing IT for Business Innovation, O'REILLY, 2006.
- 4. Frank Cohen, FastSOA, Elsevier, 2007.
- 5. Jeff Davies, The Definitive Guide to SOA, Academic Press, 2007

E- Resources and other Digital Material

1. <u>https://www.coursera.org/learn/service-oriented-architecture</u>

Video Processing

Course Code	19IT4703C	Year	IV	Semester	Ι
Course Category	PE	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	Computer Graphics
Continuous Internal Evaluation :	30	Semester End Evaluation:	70	Total Marks:	100

	Blooms Taxonomy Level	
Upon successful co	ompletion of the course, the student will be able to	
CO1 Understand the ba	asic concepts of Video processing techniques	L2
CO2 Interpret various v	video signals, modeling and coding	L3
CO3 Analyze dimensio	onal motion models of video processing	L4

Co	Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (H:High, M: Medium, L:Low)													
	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1		1		2	2								2	
CO2		1		2	3								2	
CO3		1		2	2								2	

	Syllabus	
Unit		Mapped
No	Contents	СО
	Video Formation, Perception, and Representation: Color Perception	CO1,
	and Specification, Video Capture and Display, Analog Video Raster,	CO2
	Analog Color Television Systems, Digital Video,	
Ι	Fourier Analysis of Video Signals and Frequency Response of the	
	Human Visual System: Multidimensional Continuous-Space Signals	
	and Systems, Multidimensional Discrete-Space Signals and Systems,	
	Frequency Domain Characterization of Video Signals, Spatial and	
	Temporal Frequencies, Temporal Frequencies Caused by Linear Motion,	
	Frequency Response of the Human Visual System, Temporal Frequency	
	Response and Flicker Perception,	
	Video Sampling : Basics of the Lattice Theory, Sampling over Lattices,	CO1,
	Sampling Process and Sampled-Space Fourier Transform, The	CO2
	Generalized Nyquist Sampling Theorem , Sampling Efficiency,	
	Sampling of Video Signals, Filtering Operations in Cameras and	
II	Display Devices	

	Video Modeling: Camera Model, Illumination Model, Object Model,	
	Scene Model, Two-Dimensional Motion Models,	CO2,
	Two-Dimensional Motion Estimation: Optical Flow, General	CO3
	Methodologies, Pixel-Based Motion Estimation, Block-Matching	
III	Algorithm. Deformable Block-Matching Algorithms. Mesh-Based	
	Motion Estimation Global Motion Estimation	
	Three-Dimensional Motion Estimation: Feature-Based Motion	CO2,
	Estimation, Direct Motion Estimation, Iterative Motion Estimation,	CO3
	Foundations Of Video Coding: Overview of Coding Systems, Basic	000
IV	Notions in Probability and Information Theory.	
	Waveform-Based Video Coding: Block-Based Transform Coding,	CO2,
	Predictive Coding, Video Coding Using Temporal Prediction and	CO3
V	Transform Coding.	005
•	C	

Learning Resources

Text Books
1. YaoWang, JornOstermann, Ya-Qin Communications', Prentice Hall, 2002Zhang, 'Video Processing and
2. Alan C.Bovik, 'The Essential Guide to Video Processing', Elsevier Science, edition 2,
2009
References
1. A. Murat Tekalp, 'Digital Video Processing', Prentice Hall, edition 1, 1996
2. Relf, Christopher G., "Image acquisition and processing with LabVIEW", CRC press
3. Anerozdemi R, "Inverse Synthetic Aperture Radar Imaging with
MATLAB Algorithms", John Wiley & Sons
4. Chris Solomon, Toby Breckon, "Fundamentals of Digital Image
Processing A PracticalApproach with Examples in Matlab", John Wiley

Processing A I & Sons

AGILE SOFTWARE DEVELOPMENT

Course Code	19IT4703D	Year	IV	Semester	Ι
Course Category	PE	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	Software
					Engineering
Continuous Internal	30	Semester End Evaluation:	70	Total Marks:	100
Evaluation :					

	Blooms Taxonomy Level	
τ	Jpon successful completion of the course, the student will be able to	
CO1	Understand the basics of Agile, extreme Programming and RUP	L2
CO2	Sketch software modules using Agile methods	L3
CO3	Experiment with Agile tools	L4

Co	Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (H:High, M: Medium, L:Low)													
	P01	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1					2			1	2		3		2	3
CO2					1			2	2		3		2	3
CO3					3			2	2		3		2	3

	Syllabus	
Unit		Mapped
No	Contents	CO
	Introduction: What is Agile? The Agile manifesto, agile methods, XP:	CO1
Ι	Extreme Programming, DSDM, SCRUM, Feature-Driven Development,	
	modeling misconceptions, agile modeling, tools of misconceptions,	
	updating agile models.	
	Extreme Programming: Introduction, core XP values, the twelve XP	CO1,
	practices, about extreme programming? Planning XP projects, test first	CO2
11	coding, making pair programming work.	
II	Agile Modeling and XP: Introduction, the fit, common practices,	001
	modeling specific practices, XP objections to agile modeling, agile	COI,
	modeling and planning XP projects, XP implementation phase.	CO 2
	Feature-Driven Development: Introduction, incremental software	CO2,
	development, Regaining Control: The motivation behind FDD, planning	CO3
IV	an iterative project, architecture centric, FDD and XP.	
	Agile Methods with RUP and PRINCE2 and Tools and Obstacles: Agile	CO1,
	modeling and RUP, FDD and RUP, agile methods and prince2, tools to help	CO3
V	with agile development, Eclipse: An agile IDE, obstacles to agile software	
	development, management intransigence, the failed project syndrome,	
	contractual difficulties, familiarity with agility.	

Learning Resources

Text Books

1. Craig Larman, Agile and Iterative Development, Addison-Wesley, Pearson Education, 2004.

References

1. Agile Software Development, Principles, Patterns and Practices, PearsonNew International Edition, 2013.

2. Pearson, Robert C. Martin, Juli, James Shore, Chromatic, the Art of Agile Development, O'Reilly Media, 2013.

NATURAL LANGUAGE PROCESSING

Course Code	19IT4703E	Year	IV	Semester	Ι
Course Category	PE	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	Data Mining
Continuous Internal Evaluation :	30	Semester End Evaluation:	70	Total Marks:	100

	Course Outcomes	Blooms Taxonomy Level
	Upon successful completion of the course, the student will be able to	
C01	Understand the theoretical foundations of natural language processing in linguistics and formal language theory.	L2
CO2	Apply existing language models and machine learning algorithms to build and solve NLP applications.	L3
CO3	Analyze NLP tasks like text pre-processing, part-of-speech tagging, syntax parsing and semantic role labeling using existing algorithms and frameworks.	L4

Co	Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (H:High, M: Medium, L:Low)													
	PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12 PSO1 PSO2													
CO1	2												1	
CO2	2		2	1		1							1	
CO3	2	2		1									1	

	Syllabus	
Unit		Mapped
No	Contents	CO
	Introduction: What is Natural Language Processing (NLP), Origins of	CO1
Ι	NLP, Language and Knowledge, The Challenges of NLP, Language and	CO3
	Grammar, Regular Expressions, Words, Corpora, Text Normalization,	
	Minimum Edit Distance, N-Grams, Evaluating Language Models	
	POS tagging: English Word Classes, The Penn Treebank Part-of-Speech	CO1
	Tagset, Part-of- Speech Tagging, HMM Part-of-Speech Tagging,	CO3
11	Maximum Entropy Markov Models, Bidirectionality, Part-of-Speech	
	Tagging for Morphological Rich Languages.	
	Syntax Analysis: Constituency, Context-Free Grammars, Some	
	Grammar Rules for English, Treebanks, Grammar Equivalence and	
	Normal Form, Lexicalized Grammars, Dependency Parsing.	
	Semantic Analysis: Lexical Semantics, Vector Semantics, Words and	CO1
III	Vectors, Cosine for measuring similarity, TF-IDF: Weighing terms in the	~~ ^
	vector, Applications of the TF-IDF vector model, Word2vec, Visualizing	CO3
	Embeddings, Semantic properties of embeddings, Bias	
	and Embeddings, Evaluating Vector Models.	
	Statistical NLP: Naive Bayes and Sentiment Classification, Logistic	CO1
IV	Regression, Neural Network and Neural Network language models.	CO2
	Applications of NLP: Information Retrieval Information	CO1
	Extraction. Automatic Summarization. Automatic Text categorization.	CO2
V	Machine Translation, Speech technologies.	CO3

Learning Resources

Text Books											
1. Speech and Language Processing: An introduction to Natural Language Processing.											
Computational Linguistics and Speech Recognition by Daniel Jurafsky and James H											
Martin, 3rd Edition, Prentice Hall, 2019.											
2. Natural Language Processing: An information Access Perspective by Kavi Narayana											
Murthy, Ess Ess Publications, 2006.											
References											
 Applied Text Analysis with Python by Benjamin Bengfort, Tony Ojeda, Rebecca Bilbro, O'Reilly Media, June 2018. Natural Language Processing Recipes by Akshay Kulkarni, Adarsha Shivananda, Apress, 2019 											
E-Resources and other Digital Material											
1. Natural Language Processing by Pawan Goyal, IIT Kharagpur, https://swayam.gov.in/nd1_noc19_cs56/preview											
2. Natural Language Processing offered by deeplearning.ai on											
Coursera https://www.coursera.org/specializations/natural-language-processing											

INFORMATION RETRIEVAL SYSTEMS

Course Code	19IT4701F	Year	IV	Semester	Ι	
Course Category	PE	Branch	IT	Course Type	Theory	
Credits	3	L-T-P	3-0-0	Prerequisite	Database Management	
				S	Systems, Data	
					Structures	
Continuous		Semester				
Internal	30	End	70	Total	100	
Evaluation :		Evaluati		Marks:		
		on:				

Course Outcomes	Blooms Taxonomy Level
Upon successful completion of the course, the student will be able to	
CO1 Understand the theoretical foundations of Information Retrieval Systems.	L2
CO2 Analyze the process of indexing and Information Extraction	L3
CO3 Apply various data structures, techniques and text search algorithms freal world scenarios.	for L4

Co	Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (H:High, M: Medium, L:Low)													
	PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12 PS01 PS03												PSO2	
CO1	3												3	
CO2	3		3	2		2							3	
CO3	3	3		2									3	

	Syllabus	
Unit No	Contents	Mapped CO
I	Introduction : Definition of Information Retrieval systems, Objectives of Information Retrieval systems, Functional Overview, Relationshipto DBMS, Digital libraries and Data Warehouses.	CO1
II	Information Retrieval System Capabilities: Search Capabilities, Browse Capabilities, Miscellaneous Capabilities, Z39.50 and WAIS Standards	CO1 CO2 CO3
III	Cataloging and Indexing : History and Objectives of Indexing, Indexing Process, AutomaticIndexing, Information Extraction.	CO1 CO2
IV	Data Structures : Introduction to Data Structures, Stemming Algorithms, Inverted filestructures, N- gram data structure, PAT data structure, Signature file structure, Hypertext data structure, Hidden Markov Model.	C01 C03
v	Automatic Indexing: Classes of Automatic Indexing, Statistical indexing: Probabilistic Weighting, Vector Weighting, Natural language, Concept indexing	CO1 CO3

Learning Resources
Text Books
[1] M. T. M. Gerald J Kowalski, Information Storage and Retrieval Systems: Springer International Edition, 2018
References
[1]W. B. Frakes, Ricardo Baeza-Yates, Information Retrieval Data Structures and Algorithms: Prentice Hall PTR, 2015.
[2]R. Baeza-Yates, Modern Information Retrieval: Pearson Education, 2012.
E-Resources and other Digital Material
[1] https://nlp.stanford.edu/IR-book/pdf/01bool.pdf
[2]http://shodhganga.inflibnet.ac.in/jspui/bitstream/10603/141878/10/10_chapter 02.pdf

FUNDAMENTALS OF BLOCK CHAIN TECHNOLOGY

Course Code	19IT4704A	Year	IV	Semester	Ι
Course Category	PE	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	Computer Networks.
Continuous Internal Evaluation :	30	Semester End Evaluation:	70	Total Marks:	100

	Course Outcomes	Blooms Taxonomy Level
τ	Jpon successful completion of the course, the student will be able to	
CO1	Understand Blockchain architecture and design	L2
CO2	Establish the role of consensus protocol in blockchain	L3
CO3	Determine the functioning of bitcoins	L3
CO4	Analyze security and privacy aspects of bitcoins	L4

Co	Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (H:High, M: Medium, L:Low)														
	PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12 PSO1 PSC														
CO1	2												1		
CO2	2	2											1		
CO3	2		2				2						1		
CO4	2			2									1		

	Syllabus									
Unit No	Contents	Mapped CO								
I	 Blockchain: Introduction, Structure of a Block, Block Header, Block Identifiers - Block Header Hash and Block Height, The Genesis Block, Linking Blocks in the Blockchain, Merkle Trees, Merkle Trees and Simplified Payment Verification (SPV). Mining and Consensus I: Introduction, Bitcoin Economics and Currency Creation, De-centralized Consensus, Independent Verification of Transactions, Mining Nodes, Aggregating Transactions into Blocks, Transaction Age, Fees, and Priority 	CO1								
II	Mining and Consensus II : The Generation Transaction, Coinbase Reward and Fees, Structure of the Generation Transaction, Coinbase Data, Constructing the Block Header, Mining the Block, Proof-of-Work Algorithm, Difficulty Representation, Difficulty Target and Re-Targeting, Successfully Mining the Block, Validating a New Block, Assembling and Selecting Chains of Blocks, Blockchain Forks, Mining and the Hashing Race, The Extra Nonce Solution, Mining Pools, Consensus Attacks. Bitcoin: Introduction, History, Bitcoin Uses, Users and Their Stories, Getting Started, Quick Start, Getting your first bitcoins, Sending and receiving bitcoins,	CO1 CO2								
ш	Bitcoin Functioning : Transactions, Blocks, Mining, and the Blockchain, Bitcoin Overview, Buying a cup of coffee, Bitcoin Transactions, Common Transaction Forms, Constructing a Transaction, Getting the right inputs, Creating the outputs, Adding the transaction to the ledger, Bitcoin Mining, Mining transactions in blocks, Spending the transaction	CO1 CO3								
	Bitcoin Transactions : Bitcoin Transactions, Common Transaction Forms, Constructing a Transaction, Getting the right inputs, Creating the outputs, Adding the transaction to the ledger, Bitcoin Mining, Mining transactions in blocks, Spending the transaction									
IV	Bitcoin Network : Peer-to-Peer Network Architecture, Nodes Types and Roles, The Extended Bitcoin Network, Network Discovery, Full Nodes, Exchanging —Inventory ^{II} , Simplified Payment Verification (SPV) Nodes, Bloom Filters, Bloom Filters and Inventory Updates, Transaction Pools, Alert Messages	CO1 CO3								
V	Bitcoin Security : Security principles, Developing Bitcoin Systems Securely, The Root of Trust, User Security Best Practices, Physical Bitcoin Storage, Hardware Wallets, Balancing Risk (loss vs. theft), Diversifying Risk, Multi- sig and Governance, Survivability Alternative Chains, Currencies, and Applications: A taxonomy of alternative currencies and chains, Meta-Coin Platforms, Colored Coins, Master coin, Counterparty, Alt-coins, Evaluating an alt-coin, Alt-Coins: Crypto Note, Byte coin, Monero, Zero cash/Zero coin, Dark coin, Name coin, Bit message, Ethereum	CO1 CO3 CO4								
Text Books

1. Andreas M. Antonopoulos, - Mastering Bitcoinl, O'Reilly, 2016

References

- [1] Melanie Swan, Blockchain -Blueprint For a New economy, 1st Edition, O'Reilly, 2018
- [2] Don TapScott, Alex Tapscott, -Block chain Revolution II. 2nd Edition, Penguin publisher, 2018

E- Resources and other Digital Material

[1] <u>https://onlinecourses.nptel.ac.in/noc18_cs47/announcements?force=true</u>

Marco Iansiti, Karim R. Lakhani, — Truth About Blockchainl, Harvard Bsiness Review, Harward University, Jan 2017

CLOUD SECURITY AND PRIVACY

Course Code	19IT4704B	Year	IV	Semester	Ι
Course Category	PE	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	Cloud
					Computing
Continuous Internal		Semester			
Evaluation :	30	End	70	Total Marks:	100
		Evaluation:			

	Course Outcomes	Blooms Taxonomy Level						
ι	Upon successful completion of the course, the student will be able to							
CO1	Understand the underlying security concepts in cloud platforms	L2						
CO2	Determine multi-tenancy issues, virtualization system-specific attacks	L3						
CO3	Analyze the technologies for virtualization-based security enhancement and legal compliance issues	L4						

Co	Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (H:High, M: Medium, L:Low)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2											1	
CO2	1		2										1	
CO3	1		2					2					1	

	Syllabus	
Unit No	Contents	Mapped CO
I	Security concepts : Confidentiality, privacy, integrity, authentication, non- repudiation, availability, access control, defence in depth, least privilege, how these concepts apply in the cloud, what these concepts mean and their importance in PaaS, IaaS and SaaS. e.g. User authentication in the cloud; Cryptographic Systems- Symmetric cryptography, stream ciphers, block ciphers, modes of operation, public-key cryptography, hashing, digital signatures, public-key infrastructures, key management, X.509 certificates, Open SSL.	CO1
п	Multi-Tenancy Issues: Isolation of users/VMs from each other. How the cloud provider can provide this; Virtualization System Security Issues- e.g. ESX and ESXi Security, ESX file system security, storage considerations, backup and recovery; Virtualization System Vulnerabilities- Management console vulnerabilities, management server vulnerabilities, administrative VM vulnerabilities, guest VM vulnerabilities, hypervisor vulnerabilities, hypervisor escape vulnerabilities, configuration issues, malware (botnets)	CO1 CO2
ш	Virtualization System-Specific Attacks: Guest hopping, attacks on the VM (delete the VM, attack on the control of the VM, code or file injection into the virtualized file structure), VM migration attack, hyperjacking	CO1 CO2
IV	Technologies For Virtualization-Based Security Enhancement IBM : security virtual server protection, virtualization-based sandboxing; Storage Security- HIDPS, log management, Data Loss Prevention. Location of the Perimeter.	CO1 CO3
V	Legal And Compliance Issues : Responsibility, ownership of data, right to penetration test, local law where data is held, examination of modern Security Standards (eg PCIDSS), how standards deal with cloud services and virtualization, compliance for the cloud provider vs. compliance for the customer.	CO1 CO3

Text Books

1. Tim Mather, SubraKumaraswamy, ShahedLatif, "Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance" O'Reilly Media; 1 edition [ISBN: 0596802765], 2009 **References**

- 1. Ronald L. Krutz, Russell Dean Vines, "Cloud Security" [ISBN: 0470589876], 2010.
- 2. John Rittinghouse, James Ransome, "Cloud Computing" CRC Press; 1 edition [ISBN: 1439806802], 2009.
- 3. J.R. ("Vic") Winkler, "Securing the Cloud" Syngress [ISBN: 1597495921] 2011 1st Edition, Kindle Edition

COMUTER GRAPHICS WITH VIRTUAL REALITY

Course Code	19IT4704C	Year	IV	Semester	Ι
Course Category	PE	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	Computer Graphics
Continuous Internal Evaluation :	30	Semester End Evaluation:	70	Total Marks:	100

	Course Outcomes	Blooms Taxonomy Level							
U	Upon successful completion of the course, the student will be able to								
CO1	Understand the basics of computer graphics	L2							
CO2	Articulate various transformations, surface and curve generation techniques.	L3							
CO3	Analyze the virtual reality concepts in computer graphics	L4							

Co	Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (H:High, M: Medium, L:Low)													
	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1												1	
CO2	1	2	2										1	
CO3	1		2										1	

	Syllabus	
Unit No	Contents	Mapped CO
I	Introduction to Computer Graphics and Display Systems : Introduction, Image and Objects Image Representation, Basic Graphics Pipeline, Raster and vector-based graphics, Applications of computer graphics, Display devices, Cathode ray tubes, Flat Panel display, 3D display technology, Input technology, Hard-copy output devices, Coordinate system overview, Introduction to graphics libraries in C.	CO1
п	Curve Generation : Introduction, Curve continuity, Conic curves, Piecewise curve design, Parametric curve design, LeGrange interpolated curves, Spline curve representation, Non- uniform rational B-spline curves, Fractal curves. Area Filling and Solid Area Scan-Conversion: Introduction, Inside-outside test, Winding number method, Coherence, Polygon filling, Scan conversion of character, Aliasing, Anti- Aliasing, Halftoning, threshold and dithering.	CO1 CO2
ш	Two-Dimensional Transformation : Introduction, Transformation matrix, Types of Transformations in two-dimensional graphics, Combined transformation, Homogeneous coordinates, Two-Dimensional Viewing and Clipping: Introduction, Viewing transformation in two dimensions, Introduction to Clipping, Two-Dimension Clipping, Text Clipping. Three-Dimensional Transformation, Viewing and Projection : Introduction, Objects in homogeneous coordinates, Three-dimensional transformations, World coordinates and viewing coordinates, Three-dimensional viewing transformation, Projection, Viewing and Clipping in three dimensions.	CO1 CO2
IV	 Surface Generation: Introduction, Bilinear Surfaces, Ruled Surfaces, Developable Surfaces, Coons Patch, Sweep Surfaces, Surfaces of Revolution, Quadric Surfaces, Constructive Solid Geometry, Bezier Surfaces, B-spline Surfaces, Rational B-spline Surfaces, Subdivison Surfaces. Visible and Hidden Surfaces: Introduction, Coherence, Extents and bounding volumes, Back face culling, Painter's algorithm, Z-Buffer algorithm, Newell's algorithm, Scan line rendering, Appel's algorithm, Warnock's area subdivison algorithm, Binary space partitioning trees, Floating Horizon algorithm, Roberts algorithm, Haloed lines. 	CO1 CO2
V	Introduction to Virtual Reality : Introduction, Classical components and design of a VR system, Important Factors in a Virtual Reality system, Types of virtual reality systems, Advantages of virtual Reality, VR Input devices, Graphics display interfaces, Sound display and interface, Examples of input devices, Haptic feedback, Graphical rendering pipeline, Haptic rendering pipeline, OpenGL rendering pipeline, Applications of virtual reality, Modelling techniques in virtual reality.	CO1 CO3

Learning Resources								
Text Books								
1. Computer Graphics with Virtual Reality, by Rakesh K.Maurya, 2/e, 2013								
References								
1. Virtual Reality System by John Vince, Pearson Publication.								

 Computer Graphics with Virtual Reality, Roy Lathum, Springer-Verlag New York Inc Publication, Second edition.

SOFTWARE TESTING METHODOLOGIES

Course Code	19IT4704D	Year	IV	Semester	Ι
Course Category	PE	Branch	IT	Course Type	Theory
Credits	3	L-T-P 3-0-0 Pro		Prerequisites	Software
					engineering
Continuous Internal Evaluation :	30	Semester End Evaluation:	70	Total Marks:	100

	Course Outcomes	Blooms Taxonomy Level						
U	Upon successful completion of the course, the student will be able to							
CO1	Discuss various types of software testing	L2						
CO2	Analyze software test management practices	L3						
CO3	Analyze software quality assessment models	L3						

Co	Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (H:High, M: Medium, L:Low)													
	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2												1	
CO2	2	2	2										1	
CO3	2	2	1										1	

	Syllabus	
Unit No	Contents	Mapped CO
I	Introduction : Software testing definition, evaluation of software testing, software testing myths and facts, goals and model of software testing, software testing terminology, software testing life cycle, testing methodology, verification and validation activities.	C01
Π	Dynamic testing : Black-Box testing: Boundary value analysis, equivalence class testing. White-box testing: Introduction, basic path testing, loop testing. Static testing: inspections, structured walkthroughs, technical reviews	C01
III	 Validation activities: Unit validation testing, integration testing, function testing, system testing, accepting testing. Regression Testing: Objectives of regression testing, regression testing types, regression testing techniques. 	CO1
IV	 Test management: Test organization, structure of testing group, test planning, test design and test specification. Efficient test suite management: Introduction, minimizing the test suite and its benefits, defining test suite minimization problem, test suite prioritization, types of test case prioritization, prioritization techniques. 	CO1 CO2
V	Software Quality Management : Software quality, quality cost, quality control and quality assurance, quality management, QM and project management, quality factors, methods of quality management, software quality metrics, SQA models, measurement and improvement of testing process, test process maturity models.	CO1 CO3

Text Books

1. Naresh Chauhan, Software Testing: Principles and Practices, 1/e, Oxford University Press, 2010

References

1. William E. Perry, Effective Methods for Software Testing, 3/e, Wiley, 2006. 2. Paul C. Jorgensen, Software Testing: A Craftsman's Approach, 3/e, Auerbach publication, 2015.

NEURAL NETWORKS AND FUZZY SYSTEMS

Course Code	19IT4704E	Year	IV	Semester	Ι
Course Category	PE	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	Artificial Intelligence.
Continuous Internal Evaluation :	30	Semester End Evaluation:	70	Total Marks:	100

T	Course Outcomes Upon successful completion of the course, the student will be able to									
	Understand types of neural networks and fuzzy logic.	12								
	Determine various Neural Network topologies and paradigms	L3								
CO3	Apply Concepts of Fuzzy Logic and Fuzzy Neural Networks	L3								

Co	Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (H:High, M: Medium, L:Low)													
	P01	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1											1	
CO2	1	2	2										1	
CO3	2			2			2						1	

	Syllabus								
Unit No	Contents	Mapped CO							
I	Biological Neural Networks : Neuron Physiology, Neural Diversity, Specifications of the Brain, The Eye's Neural network, Areas for further Investigation.	C01							
Π	Artificial Neural Networks: Concepts Neural attributes, Modelling, Basic Models of Neuron, and Learning in ANN, Characteristics of ANNs, and Important Parameters.								
III	Artificial Neural Network Topologies: Modelling ANNs, ANNs Learning and Program, Learning Algorithm, Discrimination ability, ANN adaptability, The stability-Plasticity Dilema	CO1 CO2							
IV	Neural Networks Paradigms : McCulloch-Pitts Model, The perceptron, ADALINE and MADLINE Models, Winner-Takes-All Learning Algorithm, Back Propagation Algorithm, Hopfield Model.	CO1 CO2							
v	Concepts of Fuzzy Logic and Fuzzy Neural Networks : Propositional Logic, The Membership Function, Fuzzy Logic, Deffuzification of fuzzy logic, Time- Dependent Fuzzy Logic, Fuzzy Artificial Neural Nework(FANN), Fuzzy Neural Example, Neuro-Fuzzy control,Some Applications.	CO1 CO3							

Text Books

1. Understanding Neural Networks and Fuzzy Logic, Stamatios V. Kartalopoulos, PHI. References

Neural networks and Fuzzy Systems, Bart Kosko, PHI.
 Neural Networks and Fuzzy Logic, Vinoth Kumar K, Saravana

Kumar R, SkKataria&sons,2010

EXPLORATORY DATAANALYSIS

Course Code	19IT4704F	Year	IV	Semester	Ι
Course Category	PE	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	Data Mining
Continuous Internal Evaluation :	30	Semester End Evaluation:	70	Total Marks:	100

	Course Outcomes									
U	Upon successful completion of the course, the student will be able to									
CO1	Understand the basic concepts of EDA	L2								
CO2	Determine various graphical techniques of EDA	L3								
CO3	Determine various quantitative techniques of EDA	L3								

Co	Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (H:High, M: Medium, L:Low)													
	PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12 PS01 PS02										PSO2			
CO1	3												1	
CO2	2	3		2									1	
CO3	2	3		2									1	

	Syllabus	
Unit No	Contents	Mapped CO
I	EDA Introduction : What is EDA? How Does Exploratory Data Analysis differ from Classical Data Analysis? How Does Exploratory Data Analysis Differ from Summary Analysis? What are the EDA Goals? The Role of Graphics, An EDA/Graphics Example and General Problem Categories	CO1
п	EDA Techniques - I : Introduction, Analysis Questions, Graphical Techniques: Alphabetic- Autocorrelation Plot, Bihistogram, Block Plot, Bootstrap Plot, Box-Cox Linearity Plot, Box- Cox Normality Plot, Box Plot, Complex Demodulation Amplitude Plot, Complex Demodulation Phase Plot, Contour Plot, DOE Scatter Plot, DOE Mean Plot and DOE Standard Deviation Plot.	CO1 CO2
III	EDA Techniques – II : Histogram, Lag Plot, Linear Correlation Plot, Linear Intercept Plot, Linear Slope Plot, Linear Residual Standard Deviation Plot, Mean Plot, Normal Probability Plot, Probability Plot, Probability Plot Correlation Coefficient Plot, Quantile-Quantile Plot, Run- Sequence Plot	CO1 CO2
IV	EDA Techniques – III : Scatter Plot, Spectral Plot, Standard Deviation Plot, Star Plot, Weibull Plot, Youden Plot, 4-Plot, 6-Plot. Graphical Techniques: By Problem Category	CO1 CO2
V	Quantitative Techniques: Measures of Location, Confidence Limits for the Mean, Two- Sample t-Test for Equal Means, One-Factor ANOVA, Multi-factor Analysis of Variance, Measures of Scale, Bartlett's Test, Chi- Square Test for the Standard Deviation, F-Test for Equality of Two Standard Deviations, Levene Test for Equality of Variances, Measures of Skewness and Kurtosis, Autocorrelation, Runs Test for Detecting Non- randomness, Anderson-Darling Test, Chi-Square Goodness-of-Fit Test, Kolmogorov-Smirnov Goodness- of-Fit Test, Grubbs' Test for Outliers and Yates Analysis	CO1 CO3

Text Books

1. Exploratory Data Analysis Handbook

References

1. Exploratory Data Analysis with Python by Suresh kumar Mukhiya, Usman Ahmed

Project Phase-I

Course Code	19IT3761	Year	IV	Semester	Ι
Course Category	PC	Branch	IT	Course Type	Practical
Credits	2	L-T-P	0-0-4	Prerequisites	-
Continuous Internal Evaluation :	100	Semester End Evaluation:	-	Total Marks:	100

	Course Outcomes	Blooms Taxonomy Level
Upon su		
CO1	Analyze a real world problem and identify its requirements.	L4
CO2	Design and document technical ideas, strategies and methodologies.	L6
CO3	Use tools, algorithms and/or techniques that contribute to the development of the project.	L3
CO4	Role-Play as a member and/or leader of a team to present the project.	L6

C	Contribution of Course Outcomes towards achievement of Program Outcomes &													
	Strength of correlations (3:High, 2: Medium, 1:Low)													
	Р	Р	Р	Р	Р	Р	Р	Р	Р	Р	Р	Р	PS	PS
	0	0	0	0	0	0	0	0	0	0	Ο	0	0	Ο
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
С														
0														
1	2	2	2	2		2	2						2	2
С														
0														
2		2	2	2				2		2			2	2
С														
0														
3					3								3	3
С											2	2	2	2
0														
4									2					

19IT3771 Industrial Training/Internship/ResearchProjects in National Laboratories/Academic Institutions

VIII SEMESTER

CYBER SECURITY AND ETHICAL HACKING

Course Code	19IT4801A	Year	IV	Semester	II
Course Category	PE	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	CNS
Continuous Internal		Semester End			
Evaluation :	30	Evaluation:	70	Total Marks:	100

Course Outcomes					
Upon Successful completion of course, the student will be able to					
CO1	erstand the basics of cyber security and Ethical Hacking				
CO2	trate diverse cyber offences				
CO3	tify various methods and tools used in Cyber Crime.				
CO4	tify different issues and techniques in hacking				

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:High, 2: Medium, 1:Low)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3												2	2
CO2	3												2	2
CO3		3											2	2
CO4	3					3		3					2	2

Syllabus								
Unit No	Contents	Mapped CO						
I	Introduction to Cybercrime : Introduction, Cybercrime, and Information Security, Who are Cybercriminals, Classifications of Cybercrimes, The legal Perspectives and Indian Perspective, Cybercrime and the Indian ITA 2000, A Global Perspective on Cybercrimes.	CO1						
II	Cyber Offenses: How Criminals Plan Them: Introduction, How Criminals plan the Attacks Social Engineering Cyber stalking Cyber	CO1,CO2						

	cafe and Cybercrimes, Botnets(The Fuel for Cybercrime), Attack								
	Vector, and Cloud Computing.								
III	Tools and Methods Used in Cybercrime : Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Key loggers and Spywares, Virus and Worms, Trojan Horse and Backdoors, Steganography, DoS and DDoS attacks, SQL Injection, Buffer Overflow	CO1,CO3							
IV	Introduction to Ethical Hacking, Ethics, and Legality : Defining Ethical Hacking, How to Be Ethical, Keeping It Legal, Reconnaissance, Information-Gathering Methodology	CO1,CO4							
V	System Hacking : The Simplest Way to Get a Password, Types of Passwords, Cracking a Password, Understanding Key loggers and Other Spyware Technologies Trojans and Backdoors: Overt and Covert Channels, Types of Trojans, Viruses and Worms : Types of Viruses, Virus Detection Methods	CO1,CO4							

Text Books

 Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Prespectives, Nina God bole and Sunil Belapure, First edition, 2011, Wiley INDIA
 Certified ethical hacker study guide by Kimberly Graves, First Edition

References

1. James Graham, Richard Howard and Ryan Otson, Cyber Security Essentials, First edition, 2011, CRC Press.

2. Chwan-Hwa(John) Wu,J.David Irwin, Introduction to Cyber Security, First edition, 2013, CRC Press T&F Group.

E-Recourses and other Digital Material

- 1. <u>https://onlinecourses.nptel.ac.in/noc22_cs13/preview</u>
- 2. http://eprints.binadarma.ac.id/1000/1/KEAMANAN%20SISTEM%20INFOR MASI%20MATERI%201.pdf

CLOUD INFRASTRUCTURE MANAGEMENT

Course Code	19IT4801B	Year	IV	Semester	II
Course Category	PE	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	DCCN,
					OS
Continuous Internal		Semester End			
Evaluation :	30	Evaluation:	70	Total Marks:	100

	Blooms Taxonomy Level	
Upon s		
CO1	Understand the concept of virtualization and how this has enabled the development of Cloud Computing, scaling, cloud security and disaster management	L1
CO2	Know the fundamentals of cloud, cloud Architectures and types of services in cloud	L1
CO3	Demonstrate different Applications in cloud	L2
CO4	Make Use Of some important cloud computing driven commercial systems	L3

Contr (3:Sul	Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:Substantial, 2: Moderate, 1:Slight)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1		2	2								1	1
CO2	2	1		2	2								1	1
CO3	2	1		2	2								1	1
CO4	2	1		2	2								1	1

	Syllabus	
Unit No	Contents	Mapped CO
Ι	Introduction to Cloud : Cloud Computing at a Glance, The Vision of Cloud Computing, Defining a Cloud, A Closer Look, Cloud Computing Reference Model. Characteristics and Benefits, Challenges Ahead, Historical Developments. Virtualization: Introduction, Characteristics of Virtualized Environment, Taxonomy of Virtualization Techniques, Virtualization and Cloud computing, Pros and Cons of Virtualization, Technology Examples- VMware and Microsoft Hyper-V. Before the Move into the Cloud: Know Your Software Licenses, The Shift to a Cloud Cost Model, Service Levels for Cloud Applications.	CO1
П	Cloud Computing Architecture : Introduction, Cloud Reference Model, Architecture, Infrastructure / Hardware as a Service, Platform as a Service, Software as a Service, Types of Clouds, Public Clouds, Private Clouds, Hybrid Clouds, Community Clouds, Economics of the Cloud, Open Challenges, Cloud Interoperability and Standards, Scalability and Fault Tolerance. Ready for the Cloud: Web Application Design, Machine Image Design, Privacy Design, Database Management, Data Security, Network Security, Host Security, Compromise Response	CO2
ш	Defining the Clouds for Enterprise : Storage as a service, Database as a service, Process as a service, Information as a service, Integration as a service and Testing as a service. Scaling a cloud infrastructure - Capacity Planning, Cloud Scale. Disaster Recovery: Disaster Recovery Planning, Disasters in the Cloud, Disaster Management.	CO3
IV	Aneka: Cloud Application Platform Framework Overview, Anatomy of the Aneka Container, From the Ground Up: Platform Abstraction Layer, Fabric Services, Foundation Services, Application Services, Building Aneka Clouds, Infrastructure Organization, Logical Organization, Private Cloud Deployment Mode, Public Cloud Deployment Mode, Hybrid Cloud Deployment Mode, Cloud Programming and Management, Aneka SDK, Management Tools.	CO4
V	Cloud Applications : Scientific Applications – Health care, Geoscience and Biology. Business and Consumer Applications- CRM and ERP, Social Networking, Media Applications and Multiplayer Online Gaming. Cloud Platforms in Industry: Amazon Web Services- Compute Services, Storage Services, Communication Services and Additional Services. Google AppEngine-Architecture and Core Concepts, Application Life-Cycle, cost model. Microsoft Azure- Azure Core Concepts, SQL Azure	CO4

Text books

- 1. Mastering Cloud Computing by Rajkumar Buyya, Christian Vecchiola, S.Thamarai Selvi from TMH 2013.
- 2. George Reese Cloud Application Architectures, First Edition, O"Reilly Media 2009.

References

- 1. Cloud Computing and SOA Convergence in Your Enterprise A Step-by-Step Guide by David S. Linthicum from Pearson 2010.
- 2. Cloud Computing 2nd Edition by Dr. Kumar Saurabh from Wiley India 2012.
- 3. Cloud Computing web based Applications that change the way you work and collaboration Online Micheal Miller.Pearson Education.

e-Resources and other Digital Material

1. https://www.redhat.com/en/topics/cloud-computing/what-is-cloud-infrastructure 2. https://www.youtube.com/watch?v=2LaAJq11B1Q

GAME PROGRAMMING

Course Code	19IT4801C	Year	III	Semester	Ι
Course Category	PE	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	GRAPHICS
Continuous Internal Evaluation :	30	Semester En Evaluation:	70	Total Marks:	100

	Blooms Taxonomy Level	
Upon s		
CO1	Examine 3D Graphics For Game Programming	L4
CO2	List the Game Design Principles	L4
CO3	Build Gaming Engine Design	L3
CO4	Relate Gaming platforms and frameworks Game development	L2

Contro corre	Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:Substantial, 2: Moderate, 1:Slight)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2			1								2	
CO2	2	2			1								2	
CO3	2	2			1								2	
CO4	2	2			1								2	

	Syllabus					
Unit No	Contents	Mapped CO				
	3d Graphics For Game Programming: Coordinate Systems, Ray Tracing,					
I	Modeling in Game Production, Vertex Processing, Rasterization, Fragment	~ ~ ~				
	Processing and Output Merging, Illumination and Shaders, Parametric Curves	CO1				
	and Surfaces, Shader Models, Image Texturing, Bump Mapping, Advanced					
	Texturing, Character Animation, Physics-based Simulation.					
	Game Design Principles: Character development, Story Telling, Narration,					
II	Game Balancing, Core mechanics, Principles of level design, Genres of Games,					
II	Collision Detection, Game Logic, Game AI, Path Finding.					
	Gaming Engine Design: Renderers, Software Rendering, Hardware Rendering,					
III	and Controller based animation, Spatial Sorting, Level of detail, collision	CO3				
	detection, standard objects, and physics					
	Gaming Platforms and Frameworks: Flash, DirectX, OpenGL, Java, Python,					
IV	XNA with Visual Studio, Mobile Gaming for the Android, iOS, Game engines-	CO4				
	Adventure Game Studio, DXStudio, Unity					
	Game Development: Developing 2D and 3D interactive games using OpenGL,					
V	DirectX – Isometric and Tile Based Games, Puzzle games, Single Player games,					
	Multi-Player games.					

1. DavidH.Eberly, "3DGameEngineDesign,SecondEdition:APracticalApproachtoReal-TimeComputerGraphics"Morgan Kaufmann,2Edition, 2006.

- 2. JungHyunHan,"3DGraphicsforGameProgramming", ChapmanandHall/CRC,1stedition ,2011.
- 3. MikeMcShaffrfy, "GameCodingComplete", ThirdEdition, CharlesRiverMedia, 2009.
- 4. JonathanS.Harbour, "BeginningGameProgramming", CourseTechnologyPTR, 3edition, 2009.

References

Text books

- 1. Ernest Adams and Andrew Rollings, "Fundamentals of Game Design", Prentice Hall 1stedition,2006.
- 2. RogerE.Pedersen, "GameDesignFoundations", Edition2, Jones & BartlettLearning, 2009.
- 3. ScottRogers, "LevelUp!: TheGuidetoGreatVideoGameDesign", Wiley, 1stedition, 2010.
- 4. AndyHarris, "BeginningFlashGameProgrammingForDummies", ForDummies; Updated edition, 2005.

SOFTWARE RELIABILITY TECHNIQUES

Course Code	19IT4801D	Year	IV	Semester	II
Course Category	PE	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	SE
Continuous Internal		Semester End			
Evaluation :	30	Evaluation:	70	Total Marks:	100

	Course Outcomes	Blooms Taxonomy Level					
Upon s	Upon successful completion of the course, the student will be able to						
CO1	Develop reliable software systems.	L3					
CO2	Understand the fault handling and failure forecasting techniques in software systems	L1					
CO3	Understand different time dependent and time independent software reliability models.	L1					
CO4	Examine reliability models for software systems.	L4					

Contr correl	Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:Substantial, 2: Moderate, 1:Slight)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2		2	2								1	2	1
CO2	2		2	2								1	2	1
CO3	2		2	2								1	2	1
CO4	2		2	2								1	2	1

	Syllabus	
Unit No	Contents	Mapped CO
I	Basic Ideas of Software Reliability: Hardware reliability vs. Software reliability, Reliability metrics, Failure and Faults – Prevention, Removal, Tolerance, Forecast, Dependability Concept – Failure Behaviour, Characteristics, Maintenance Policy, Reliability and Availability Modeling.	CO1
п	Reliability Evaluation Testing methods, Limits, Starvation, Coverage, Filtering, Microscopic Model of Software Risk. Computation of software reliability, Functional and Operational Profile, Operational Profiles Difficulties, Customer Type, User Type, System Mode	CO2
III	TestSelection:SelectingOperations,RegressionTest.ClassesofsoftwarereliabilityModels,TimeDependentSoftwareReliabilityModels:TimebetweenfailurereliabilityModels,FaultCountingReliabilityModels.TimeIndependentSoftware	CO3
IV	Reliability Models : Fault injection model of Software Reliability, Input Domain Reliability Model, Orthogonal defect classification, Software availability Models. Software Reliability Modelling: A general procedure for reliability modelling.	CO3
V	Short and Long Term Prediction : Model Accuracy, Analysing Predictive Accuracy – Outcomes, PLR, U and Y Plot, Errors and Inaccuracy, Recalibration – Detecting Bias, Different Techniques, Power of Recalibration, Limitations in Present Techniques, Improvements.	CO4

Learning Resources
Text books
1. J.D. Musa, Software Reliability Engineering, McGraw Hill, New York, 2004
2. H. Pham, Software Reliability, Springer Verlag, New York, 2000
References
1. Patric D. T.O Connor, Practical Reliability Engineering, 4th Edition, John Wesley &
Sons, 2003
2. D. Reled, Software Reliability Methods, Springer Verlag, New York, 2001
e-Resources and other Digital Material

https://users.ece.cmu.edu/~koopman/des_s99/sw_reliability/

DEEP LEARNING

Course Code	19IT4801E	Year	IV	Semester	II
Course Category	PE	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	ML
Continuous Internal		Semester End			
Evaluation :	30	Evaluation:	70	Total Marks:	100

	Course Outcomes	Blooms Taxonomy Level					
Upon s	Upon successful completion of the course, the student will be able to						
CO1	Demonstrate the mathematical foundation of neural network	L2					
CO2	Assess the machine learning basics	L5					
CO3	Compare the different architectures of deep neural network	L2					
CO4	Choose a convolutional neural network and train RNN and LSTMs	L5					

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:Substantial, 2: Moderate, 1:Slight)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1		2	2								1	1
CO2	2	1		2	2								1	1
CO3	2	1		2	2								1	1
CO4	2	1		2	2								1	1

	Syllabus	
Unit No	Contents	Mapped CO
I	Linear Algebra: Scalars, Vectors, Matrices and Tensors, Matrix operations, types of matrices, Norms, Eigen decomposition, Singular Value Decomposition, Principal Components Analysis. Probability and Information Theory: Random Variables, Probability Distributions, Marginal Probability, Conditional Probability, Expectation, Variance and Covariance, Bayes' Rule, Information Theory. Numerical Computation: Overflow and Underflow, Gradient-Based Optimization, Constrained Optimization, Linear Least Squares.	CO1
Π	Machine Learning : Basics and Under fitting, Hyper parameters and Validation Sets, Estimators, Bias and Variance, Maximum Likelihood, Bayesian Statistics, Supervised and Unsupervised Learning, Stochastic Gradient Descent, Challenges Motivating Deep Learning. Deep Feed forward Networks: Learning XOR, Gradient- Based Learning, Hidden Units, Architecture Design, Back-Propagation and other Differentiation Algorithms.	CO2
III	Regularization for Deep Learning : Parameter Norm Penalties, Norm Penalties as Constrained Optimization, Regularization and Under-Constrained Problems, Dataset Augmentation, Noise Robustness, Semi-Supervised Learning, Multi-Task Learning, Early Stopping, Parameter Tying and Parameter Sharing, Sparse Representations, Bagging and Other Ensemble Methods, Dropout, Adversarial Training, Tangent Distance, Tangent Prop and Manifold Tangent Classifier. Optimization for Training Deep Models : Pure Optimization, Challenges, Basic Algorithms, Parameter Initialization Strategies, Algorithms with Adaptive Learning Rates, Approximate Second-Order Methods, Optimization Strategies and Meta-Algorithms.	CO3
IV	Convolutional Networks : The Convolution Operation, Pooling, Convolution, Basic Convolution Functions, Structured Outputs, Data Types, Efficient Convolution Algorithms, Random or Unsupervised Features, Basis for Convolutional Networks.	CO4
V	Sequence Modelling : Recurrent and Recursive Nets: Unfolding Computational Graphs, Recurrent Neural Networks, Bidirectional RNNs, Encoder-Decoder Sequence-to-Sequence Architectures, Deep Recurrent Networks, Recursive Neural Networks, Echo State Networks, LSTM, Gated RNNs, Optimization for Long-Term Dependencies, Auto encoders, Deep Generative Models.	CO4

 Ian Goodfellow, Yoshua Bengio, Aaron Courville, "Deep Learning", MIT Press, 2016.
 Josh Patterson and Adam Gibson, "Deep learning: A practitioner's approach", O'Reilly Media, First Edition, 2017.

References

Text books

1) Fundamentals of Deep Learning, Designing next-generation machine intelligence algorithms, Nikhil Buduma, O'Reilly, Shroff Publishers, 2019.

2) Deep learning Cook Book, Practical recipes to get started Quickly, Douwe Osinga,

O'Reilly, Shroff Publishers, 2019.

e-Resources and other Digital Material

1) https://keras.io/datasets/

- 2) http://deeplearning.net/tutorial/deeplearning.pdf
- 3) https://arxiv.org/pdf/1404.7828v4.pdf
- 4) <u>https://github.com/lisa-lab/DeepLearningTutorials</u>

WEB ANALYTICS

Course Code	19IT4801F	Year	IV	Semester	II
Course Category	PE	Branch	IT	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	WT, DA
Continuous Internal		Semester End			
Evaluation :	30	Evaluation:	70	Total Marks:	100

	Course Outcomes	Blooms Taxonomy Level
Upon s	uccessful completion of the course, the student will be able to	
CO1	Recall the Web analytics	L1
CO2	Identify Different Data Collection and Web Analytics Strategies	L3
CO3	Apply Different Web Analytics Tools	L3
CO4	Summarize Various Google Analytics	L2

Contr (3:Sub	Intribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (Substantial, 2: Moderate, 1:Slight)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2		2		2							1	2	1
CO2	2		2		2							1	2	1
CO3	2		2		2							1	2	1
CO4	2		2		2							1	2	1

	Syllabus	
Unit No	Contents	Mapped CO
I	Introduction : Understanding web analytics – The foundations of Web analytics: Techniques and Technologies – Present and Future of Web analytics.	C01
II	Data Collection : Importance and Options –Web server log files: Click stream data – User submitted information – Web server performance data – Page tags –First and third party tracking.	CO2
III	Web Analytics Strategy: Key performance indicators – Web analytics process – Heuristics evaluations – Site visits – Surveys – Measuring reach – Measuring acquisition – Measuring conversion – Measuring retention – Security and privacy implications of Web analytics	CO3
IV	Web Analytics Tools: Content organization tools – Process measurement tools – Visitor segmentation tools – Campaign analysis tools – Commerce measurement tools – Google analytics – Omniture – Web trends – Yahoo! Web analytics.	CO3
V	Google Analytics : Key features and capabilities – Quantitative and qualitative data - Working of Google analytics – Privacy - Tracking visitor clicks, Outbound links and Non HTML files.	CO4

Text books 1. Bernard J. Jansen, "Understanding User-Web Interactions via Web analytics", Morgan and Claypool, 2009.

2. Avinash Kaushik, "Web Analytics2.0", John Wiley and Sons, 2010.

References

Brian Clifton, "Advanced web metrics with Google analytics", John Wiley and Sons, 2012.
 Justin Cutroni, "Google Analytics", O"Reilly, 2015.

3. Jerri L. Ledford, Joe Teixeira and Mary E. Tyler, "Google Analytics", John Wiley and Sons, 2013

e-Resources and other Digital Material

1.https://www.youtube.com/watch?v=zEUrfmpHXLg

 $2.https://www.youtube.com/watch?v=BuEYkI2_b5I\&list=PLEiEAq2VkUULPk73XBrYk_eJu9S3MGKcU$

Project Phase-II

Course Code	19IT3861	Year	IV	Semester	II
Course Category	PC	Branch	IT	Course Type	Practical
Credits	7	L-T-P	0-0-14	Prerequisites	-
Continuous Internal Evaluation :	100	Semester End Evaluation:	100	Total Marks:	200

	Course Outcomes	Blooms Taxonomy Level
Upon su	accessful completion of the course, the student will be able to	
CO1	Analyze a real world problem and identify its requirements.	L4
CO2	Design and document technical ideas, strategies and methodologies.	L6
CO3	Use tools, algorithms and/or techniques that contribute to the development of the project.	L3
CO4	Role-Play as a member and/or leader of a team to present the project.	L6

	Contr	ibutio	on of (Course	e Outo	comes	towar	ds ac	hieven	nent of	Progr	am Ou	tcomes	&
			Str	rength	of co	rrelati	ions (3	8:High	n, 2: M	ledium	, 1:Lov	w)		
	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO1	PO1	PO1	PSO	PSO
	I	2	3	4	5	6	1	8	9	0	1	2	1	2
CO 1	2	2	2	2		2	2						2	2
CO 2		2	2	2				2		2			2	2
CO 3					3								3	3
CO 4									2		2	2	2	2

Open Electives and

Inter Disciplinary Electives

Cou	rse C	ategory	<i>'</i> :	Open I	Electiv	e -1					Credit	s:		3
0		<u> </u>			_					Le	cture-Tu	torial-	2	0.0
	ourse	I ype:		Ineory	/						Practic	al:	3-	0-0
											Continu	ous		20
				NGI							Evaluat	ion:		50
Pr	erequ	isites:		1 1 1 1						S	Semester	End	7	70
											Evaluat	ion:	,	0
	-									,	Fotal Ma	arks:	1	00
Course	e Out	comes	1.1	<u> </u>		.1	. 1			1 .				
Upon successful completion of the course, the student will be able to:														
CO1	Ui bi	ndersta otechno	anding ology	the	basic	conc	epts	of ac	lvance	d and	emergi	ng issi	ues in	K2
CO2	Analyze, and evaluate social and ethical issues in the conduct of biological K^2													K4
02	research and application of biological knowledge													
CO3	Apply knowledge and analytical approaches in several major domains of the biological sciences that reflects a breadth and don'th of understanding K3													K3
	the biological sciences that reflects a breadth and depth of understanding													
COA	A	nalyze	the so	then t	c met	to rec	by for	mulati	ng hy	potnese	s, prop	osing te	stable	V4
C04	pr		is and e	unen t	and a	to rea	ta tha i	portau	ne con	modern	biology	to societ	11	Λ4
	pr	Apply responsibilities to promote societal health and safety upholding the trust												
CO5	gi	given to the profession by the society K.												
	Co	Contribution of Course Outcomes towards achievement of Program Outcomes												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011	PO12	PSO1	PSO2
CO1	3													
CO2	3					3		3						
CO3	3					3								
CO4						3								
CO5						3	3							
Avg.	3					3	3	3						
	1	- Low					2-Me	dium				3-Hi	gh	
						Cou	rse (Cont	tent					
	I	IISTO	RY (OF B	IOTE	CHNO	DLOG	Y . C	Jenes	(basic	concep	ts). Ge	enetic	
	, e	ngineer	ing, T	ools fo	or man	ipulati	on of	genes	(intro	duction	to recon	nbinant	DNA	
UNII-	te	echnolo	ogy), V	<i>'ectors</i>	and ex	pressi	on syst	tems (i	introdu	ction)				
														CO1
	Ι	NTELI	LECT	UAL I	PROP	ERTY	RIGI	HTS (d	concep	ts relate	d to dru	gs, gene	s and	
UNIT.	2 g	enomes	s) Rec	ombin	ant Dl	NA D	ebates,	Biote	echnolo	ogy and	Busine	ss, Pate	enting	
01111	- L	life, Ge	netical	lly Mo	dified	Foods:	Risk,	Regula	ation, a	and Our	Food			CO2
		·	<u>ר</u>		•	. F	,	T1. TT		7	D	C		
TINIT	- F	reezing	g, Bank	ang, C	rossing	g, Eug	enics,	I ne Hu	uman (Jenome	Project,	Genetic)):11 + -	CO^{2}
UNIT	• 3 1 T	esung, VF Cle	Disab	nny, a Stem C	110 D18 'elle	crimin	ation,	DIOGU	nes an		me, Fro	m me P	ш ю	CUS
	<u>г</u>		nd Do	signar	Rodia	e Rio	techno		and D	ace Ric	nrosneo	ting and	l Bio	
UNIT		oloniali	ism	SIGNEL	Douit	љ, DIO	n ann (nogy i	unu Ka	ace, Dit	prospec	ing and	1 010	
UNIT-4 colonialism										CO4				
Vaccines Gene therapy Clinical trials Synthetic Biology and Bioterrorism Use														
UNIT-5 of biofertilizers and biopesticides for organic farming														
										CO5				
					L	earn	ing]	Reso	nrce	es				
	<u>р</u> ,						8							
Text	Book	s 1.	Biote	chnolo	gy an	d Soci	ety: A	n intr	oducti	on. Hal	lam Ste	vens. U	Iniversi	ty of

19ES5501A – BIOTECHNOLOGY AND SOCIETY

	Chicago Press. 2016. ISBN 022604615X, 9780226046150
Reference Books	 W. Godbey, An Introduction to Biotechnology, The Science, Technology and Medical Applications, 1/e, Woodhead Publishing, 2014. J.M. Walker and R. Rapley, Molecular Biology and Biotechnology, 5/e, Royal society of chemistry, 2009. B.R.Glick, J.J.Pasternak, C.L.Patten. Molecular Biotechnology.ASM Press. 2009. ISBN-10:1555814980, ISBN-13: 978-1555814984s

Cou	irse C	ategory	<i>'</i> :	Open I	Electiv	e -1					Credit	s:		3
C	ourse	Type:		Theory	7					Le	cture-Tu	torial-	3-	0-0
		71		5							Practic Continu	al:		
											Evaluati	ous on:	3	30
P	rerequ	isites:		Nil						S	emester	End	_	70
	•										Evaluati	on:		/0
										-	Fotal Ma	ırks:	1	00
Cours	e Out	comes												
Upon successful completion of the course, the student will be able to:											1			
CO1	Und in re	erstan sidenti	d the I al, con	ndian j imercia	power al, agri	sector	organı e, haza	zation rdous	and El areas a	ectricity and use of	f fire ex	lectrical tinguish	ers.	K2
CO2	Und	Jnderstand the Indian power sector organization and Electricity rules, electrical safety												к2
02	in re	residential, commercial, agriculture, hazardous areas and use of fire extinguishers.												112
CO3	Und	nderstand the Indian power sector organization and Electricity rules, electrical safety												K2
	in re	derstand the Indian power sector organization and Electricity rules electrical safety												-
CO4	in re	sidential, commercial, agriculture, hazardous areas and use of fire extinguishers.												K2
	Co	Contribution of Course Outcomes towards achievement of Program Outcomes												
	PO1	PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12 PS01 P												PSO2
CO1	3		2		1	2		2			1		2	1
CO2	3		2		1	2		2			1		2	1
CO3	3	2 1 2 2 1 2								1				
<u>CO4</u>	3		2		1	2		2			1		2	1
Avg.	3	Low	2		I	2	2 Mo	<u> </u>			1	2 Ui	 zh	1
1- Low 2-Medium 3-High														
		NIKU hocks	and T	ION I heir P	l O EL reventi	ECTE	erms g	and de	LIY:	ns ohie	ectives o	of safets	and	
	s	ecurity	measu	ires. H	azards	assoc	iated v	with e	lectric	current	and vol	tage. w	ho is	
TINITT	1 e	xposed	, princ	iples o	f elect	rical sa	afety, a	approa	ches to	preven	t Accide	ents, sco	pe of	CO1
UNIT	-1 SI	ubject e	electric	cal safe	ety. Pr	imary	and se	conda	ry elec	trical sł	ocks, p	ossibiliti	es of	
	g	etting e	electric	al sho	ck and	its sev	verity,	medica	al anal	ysis of e	electric s	hocks a	nd its	
	e	meets, s	SNOCKS	due to	flash/	Spark	over's	s, preve	ention	of shock	ks, satety	/ precau	tions	
	a F	LECT	RICA	L SI	FET	Y in	Resid	lential	Cor	nmercia	$\frac{1}{1}$ and	Aoricu	ltura1	
	I	nstallati	ions: V	Viring	and fi	tting –	Dome	stic ap	pliance	es –wate	er tap gi	ving sho	ock –	
UNIT	-2 sl	hock f	rom v	vet wa	ull —fa	n firiı	ng sho	ock –	nulti-s	toried h	ouilding	-Temp	orary	CO1
	ir	nstallati	ions –	Agricu	ıltural	pump	install	ation	-Do's	and Do	n'ts for	safety i	n the	
	<u>u</u>	se of do	omesti	$\frac{c}{1} \frac{c}{c}$	rical ap	oplianc	es.			TT A TOT			1	
		LECT	KICA	LS.	AFET	Y D	UKIN Maint	G L	NSTA.	LLATI	UN, 1	esting	and	CO^{2}
UNIT	.3 9	Commissioning, Operation and Maintenance: Preliminary preparations –safe CC												002
UNII	safety -personal protective equipment –safety clearance notice –safety precautions													
-safeguards for operators -safety.														
	E	LECT	RICA	L S.	AFET	Y D	URIN	G I	NSTA	LLATI	0 <mark>N,</mark> 1	esting	and	
	C	Commis	sionin	g, Op	eration	and	Maint	enance	e: Pre	liminary	prepar	ations	-safe	001
UNIT	-4 se	equence	e –risk	t of pla	ant and	1 equip	oment	-satet	y docu	mentati	on –tiele	d quality	y and	CO1
		alety -p safeous	ersona for	u prote r onera	tors –	equipit safety	ient –s	alety C	hearan	ce notic	e –saiety	y precau	uons	COS
UNIT	-5 E		RICA	L S	AFET	Y D	URIN	GI	NSTA	LLATI	ON, 7	esting	and	
	-										· , -	0		

19ES5501B- ELECTRICAL SAFETY

Commissioning, Operation and Maintenance: Preliminary preparations –safe sequence –risk of plant and equipment –safety documentation –field quality and safety -personal protective equipment –safety clearance notice –safety precautions –safeguards for operators –safety.									
	Learning Resources								
Text Books 1. Rao, S. and Saluja, H.L., "Electrical Safety, Fire Safety Engineering a Safety Management", Khanna Publishers, 1988.									
Referen Books	 Cooper.W.F, "Electrical safety Engineering", Newnes-Butterworth Company, 1978. 2. John Codick, "Electrical safety hand book", McGraw Hill Inc., New Delhi, 2000. 3. Nagrath, I.J. and Kothari, D.P., "Power System Engineering", Tata McGraw Hill, 1998. 4. Wadhwa C.L. "Electric Power Systems" New Age International 2004 								

Cou	rrse Category: Open Elective -1 Credits: 3												3		
C	011750	Tune	,	Theory	7					Le	cture-Tu	torial-	3	0.0	
	Juise	i ype.		Theory							Practic	al:	5-	0-0	
											Continu	ous	3	30	
De	~~~~~	:		Nil							Evaluat	ION:			
	erequ	isites.									Evaluation.			70	
										-	Fotal Ma	arks:	1	00	
Course	e Out	comes													
Upon successful completion of the course, the student will be able to:															
CO1	Und	erstan	d the b	asic co	oncept	s of Se	ection 8	30 of I	T Act	2000, C	yber Cr	ime, Co	mputer	K2	
Crime, Internet Thett/Fraud, Goods and Services.															
CO2	Hacl	king T	leenage	- Weh	Vand	als Pr	evalen	ce and	l Victi	nology	Consu	mer Pro	tection	К3	
002	Act.												110		
	Ar	nalyze	the cor	ncepts	of Arre	est for	"Abou	t to C	ommit	' an Off	ence Un	der the l	T Act,		
CO3	A tribute to Draco, Cyber Fraud, Computer as Commodities, Consumer Complaint												K4		
	Cons	onsumer Complaint.													
CO4	Exp. Intel	xplain the concepts of Arrest, But No Punishment, Cyber Cheating, Theft of tallectual Property. Pestrictive and Unfair Trade practices												K4	
	Co	ntribu	tion of	Cours	se Out	comes	towar	ds acl	hieven	nent of l	Progran	1 Outco	mes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011	PO12	PSO1	PSO2	
CO1						2	2	3					2	2	
CO2						2	2	3					2	2	
CO3						2	2	3					2	2	
						2	2	3					2	$\frac{2}{2}$	
Avg.	1	- Low				4	2-Me	dium				3-Hi	 ⊽h	2	
		2011				Соп	rse	Cont	ent				5		
	Т	HE IT		2000.	A CR			Com							
	Ċ	rimes	in Mil	lenniu	m, Se	ction 8	80 of	the IT	Act,	2000-A	Weapon	or a F	arce?		
UNIT-	- 1 F	orgettii	ng the	Line b	etweer	n Cogr	nizable	and N	on-Co	gnizable	e Offenc	es, Arre	st for		
	"	About	to Con	nmit" נ	n Offe	ence U	nder t	he IT	Act, A	tribute	to Drace	o, Arrest	, But		
		vbor	Crimo	and	Crimi	nol I	uctico	Dong	ltiog	Adjudi	cotion (nd An	naale		
		under t	he IT	Act, 2	000: C	oncept	t of Cy	ber Cr	ime ar	nd the IT	C Act, 20	000, Hac	king,		
UNIT-	⁻² T	eenage	Web	Vandal	ls, Cyb	er Fra	ud and	Cyber	Cheat	ting.			U.		
	T	raditi	onal C	Compu	ter C	rime:	Early	Hac	ker a	nd The	eft of (Compon	ents:		
UNIT-	$3 \begin{vmatrix} 1 \\ V \end{vmatrix}$	raditio Vesterda	nai Pr	oblems	, Kec Hack	ognizi ing C	ng and	1 Den	ning (Comm	Compute odities	Theft o	e, Phrea f Intelle	akers:		
	Property.														
INIT-4 Identity Theft and Identity Fraud: Typologies of Internet Theft/Fraud,															
UNIT-4 Prevalence and Victimology, Physical Methods of Identity Theft.															
Protection of Cyber consumers in India: Are Cyber consumers Covered under															
UNII-	• 5 11 R	estricti	ve and	Unfai	1011 AC r Trade	e pract	ous and	u Serv	ices, C	onsume	r Compi	aint,			
I contente and omain Trade produces															
1 Vivek Sood "Cyber Law Simplified" Tata McGraw Hill															
Text	Book	s	2.	Mariie	T. Bri	tz, "Co	ompute	er Fore	nsics a	and Cvb	er Crime	e", Perso	n.		
L						,	т					,			

19ES5501C- FUNDAMENTALS OF CYBER LAW

	3. Ferrera, "Cyber Laws Texts and Cases", Cengage.
Reference Books	 Vakul Sharma, "Handbook Of Cyber Laws" Macmillan India Ltd, 2 nd Edition,PHI,2003. Justice Yatindra Singh, " Cyber Laws", Universal Law Publishing, 1 st Edition,New Delhi, 2003. Sharma, S.R., "Dimensions Of Cyber Crime", Annual Publications Pvt. Ltd., 1st Edition, 2004. Augastine, Paul T.," Cyber Crimes And Legal Issues", Crecent Publishing Corporation, 2007

Course Category:			: (Open Elective -1							Credits:			3	
Course Type			,	Theory							Lecture-Tutorial-			3-0-0	
Course Type.											Practical:				
Prerequisites:				19MC1301 - Environmental Science							Continuous			30	
											Evaluation:				
											Semester End			70	
				Evaluation:								1	00		
C	- 04			<u> </u>							I otal Marks:			00	
Lunan	e Out	comes		on of t					h a a h 1	a 4 a 1					
Upon s	Trates	siui coi	mpleti	on of t	ne cou	rse, the		nt will	be abl		-:	4.0		K2	
$\frac{CO1}{CO2}$	Ana	negrate information related to structure and functions of ecological units.												K3 K4	
C02	Ana	naryze and communicate the concepts of environmental.												K4 K4	
0.05	Ana	Analyze and evaluate policies and frame works for welfare of environment & social													
CO4	Susta	sustainability.													
CO5	Ann	pply system concepts for bio-monitoring environmental issues													
	Contribution of Course Outcomes towards achievement of Program Outcomes														
<u> </u>	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	
CO1	3						2					2		2	
CO2	3					2	2	3						2	
CO3	3						2	3						2	
CO4	3						2							2	
CO5	3					2	2							2	
Avg.	3					2	2	3				2		2	
	1- Low2-Medium3-High														
						Cou	rse	Cont	tent						
	E	ECOLOGY:													
	Ir	Introduction - Biosphere, scope, organization and significance. Ecosystem													
UNIT	-1 co	concept- structure &function, Factors affecting ecosystem. Evolution: Natural													
	S	Selection and its ecological significance. Population parameters- growth													
	re	regulation, relationships between organisms.													
UNIT-			AL K	ESUU inition	KCES		ANAG	and a	NI: corcity	of reso	urca Ec	practs &	wild		
	li	kesource- Definition, category, concept and scarcity of resource. Forests & wild life. Global productivity & human activities (Explaination). Land Decourse, wea													
	$-2 \mid_{n}^{n}$	pattern in India, soil & soil Conservation. Water resource- potentials and use with													
	St	becial r	eferen	ce to 1	India,	Conce	pt of]	Integra	ted W	ater Re	sources	Manage	ement		
	(I	WRM)	. Rem	ote Ser	nsing a	nd GIS	S: App	licatio	ns in c	onservir	ng resour	ces.			
	E	NVIR	ONMI	ENTA	L GE	OSCI	ENCE	S &	COM	PUTER	APPL	ICATI	ONS:		
UNIT	.3 S	tructure	e and c	ompos	sition o	of atmo	osphere	e, hydr	rospher	e, lithos	phere ar	nd biosp	here.	CO3	
	S	cale of	mete	orolog	y, pre	essure,	tempe	erature	, atmo	ospheric	stability	y. Grap	hical		
	re	presen	tation	of Data	a, creat	ing Da	atabase	tables	5. 	D D/P/P	LOC				
UNIT	E	EINVIKUNIVIENTAL FULICY, EDUCATION AND ETHICS: Important National policies: National environmental policy 2006 & National													
		agricultural policy etc. Legislation: Environment Protection Act													
	_A 10	agricultural policy etc. Legislation: Environment Protection Act, 1986 Environmental education: Goals and objectives of environmental education													
		Environment awareness and action: Role of NGOs in environmental awareness.													
	Ē	Environmental movements in India- silent valley movement, Chipko movement,													
	N	Narmada Bachao Andolan, Environmental movements in the West- Green Peace.													
	E	ENVIRONMENTAL MONITORING AND MANAGEMENT:													
UNIT	-5 E	nvironi	nental	imp	act a	nalysi	s and	I EM	IP; A	analytica	al appr	oaches	and	CO4	
	in	instrumentation in environmental monitoring; Bio-monitoring of air pollution -												CO5	

19ES5501D – ENVIRONMENT AND ECOLOGY
r												
plant	s as bio monitors; Bio monitoring of running water pollution.											
(Soft	ware's)Organic Farming and its ecological significance.											
	Learning Resources											
Text Books	 Singh, J.S; Singh, S.P. and Gupta S.R. (2014) Ecology, Environmental Science and Conservation. S. Chand & Company Pvt. Ltd. New Delhi. Sharma, P.D. (2011) Ecology and Environment (11th edition) Rastogi Publication, Meerut. 											
3) Bharucha, E. (2013) Text Book of Environmental Studies (2nd edition Universities Press, Hyderabad.												
Reference Books	 Nobel, B.J. and Wright, R.T. (1995) Environmental Science. Prentice Hall. Agarwal, S.K. (1991) Pollution Ecology. Himanshu Publication, Udaipur. S.V.S.Rana, Essentials of Ecology and Environmental Science, Prentice Hall India, New Delhi, 2011. 											
E-Resources & other digital material	es <u>http://nptel.ac.in</u>											

Cou	rse Ca	ategor	y:	Open I	Electiv	e -1					Credit	s:		3		
C	ourse	Type:		Theory	7					Le	cture-Tu	torial-	3-	3-0-0		
		• •		-							Continu					
											Evaluati	on: 30		30		
Pr	erequ	isites:		Nil						S	Semester	End	End 70			
											Evaluat	ion:	on: 70			
										r	Total Ma	arks:	1	00		
Course	Course Outcomes Upon successful completion of the course, the student will be able to:															
Upon s	Upon successful completion of the course, the student will be able to:															
C01		alon a	deen in	unders	$\frac{1}{1}$	g or va	irious .	indian	epics	te natior	al conse	viousnes	c	K2 K3		
CO2 CO3	Ann	lv the	knowle	edge ga	ined to	$\frac{1}{2}$ vario	us real	-life si	tuation	ie natioi is		lousnes	3	K3		
CO4	Ana	lvze th	e conte	empora	rv rele	vance	of Ind	ian epi	cs	10				K4		
CO5	Inte	rpret :	and cor	relate t	he ide	als to c	one's o	wn life	e.					K4		
	Co	ntribu	tion of	Cours	se Out	comes	towar	ds acl	hieven	nent of l	Program	1 Outco	mes			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2		
CO1						-	2	3								
CO2						2	2	3			2					
CO3																
C04																
Avg.						2	2	3				2				
Avg. 2 2 3 2 1- Low 2-Medium 3-High																
Course Content																
		DEFIN	ITION	OF T	не те	ERM E	PIC F	eatures	of epi	c. Introd	uction to	,				
UNIT-	UNIT-1 Indian epics, Characteristics of classical Indian epics, Importance of Indian CO1,CO4															
	0	epics				DANG	X7 A N T	- F ·	1.	·						
		ALIE leals to	be imb	ibed fro	om the	KANIA first Ind	a r A NA dian en	ic Mor	al esse	nce in R	amayana, amayana	,	1 000	005		
UNIT-		npact o	of Rama	yana on	Indian	societ	y.	10, 10101	ui 0550		annayana	, cc	Л,CO2,	,005		
	N	- 14HA1	RHARA		nic au	alities	of Mal	habbara	nta Set	of valu	es to be					
UNIT	3 a	cquired	from the	he large	est epic	z, Impa	ct of N	Iahabh	arata o	n our cu	lture and			05		
	so	ociety.		0	•								201, 0	05		
UNIT	4 R	ELEV	ANCE	OF IN	DIAN	Epics the cont	to the c	contemp	porary (of Indian	i society,	(CO1,CC	03,		
	E	SSEN	CE OF	BHAG	AVAD	GITA	, justif	ication	of the	triumph	of virtue	CC	01,CO2.	CO5		
UNIT	5 0	ver vice	e, Impor	rtance of	f truth	and Sel	lf-sacri	fice.		I			,,	-		
					.		• •	<u> </u>								
		,			L	earn	ing l	keso	urce	es						
. .	л .		. Rama	yana b	y R. K	. Nara	yan (P	enguin)							
Text Books2. Mahabharata by K. K. Narayan (Penguin)3. Geetha darshan by Rama krisha mission																
		1	The nal-	ace of i	llusion.	. Chitra	Baner	iee Div	akaruni							
		2.	My Gita	a- Devd	utt Pat	tankaik	. Danci		anu ull							
Dafa	ronce	3.	Asura:ta	ale of V	anquis	hed- Aı	hand N	eelakan	ıtan							
Bo	oks	4.	Prince of	of Ayod	hya:Bo	ok one	-Ashok	k.Ban	ker							
		5.	The Hin	idus: A	n Alter	native I	History	- Wend	ly Doni	ger						
		6. N	Myth a	nd Real	lity: Stu Villiam	idies in Buck	the Fo	rmation	n of Ind	lian Cult	ure-D.D.	Kosamb	1			
	Mahabharath- William Buck															

19HS5501A – CONTEMPORARY RELEVANCE OF INDIAN EPICS

Cou	rse Ca	ategory	r:	Open I	Electiv	e -1					Credit	s:		3
C	ourse.'	Type	,	Theory	7					Le	cture-Tu	torial-	3-	0-0
	ourse	rype.									Practic	al:	5	00
				NT:1							Continu	ous		30
D	oroqui	icitos	-	N1I							Evaluati	End		
	erequ	isites.									Evaluati	ion:	,	70
										r.	Fotal Ma	arks:	1	00
Cours	e Out	comes											l	
Upon s	succes	sful co	mpleti	on of t	he cou	rse, the	e stude	nt will	be abl	e to:				
CO1	Und	lerstar	id poli	tical, s	ocial a	nd eco	nomic	backg	round	of freed	om strug	ggle (L2))	K2
CO2	Spe	cify ma	ajor sta	iges of	freedo	om stru	iggle ai	nd thei	r ideol	ogical d	istinctio	ns (L5)		K5
CO3	Ana	lyze th	e role	of nati	onalist	move	ment i	n the n	naking	of mod	ern India	u(L4)		K4
CO4	Dev	elop ai	n attitu	de of r	ationa	lism cu	utting a	cross	limited	l bounda	aries of r	eligion	in	K5
COF	order	der to resist communal forces(L5)												V.A
05	Intel	rpret a	tion of	Course 1		als to c	towar	wn life	e. (L4)	ont of I	Duaguan	Outoo	mod	K 4
	PO1			PO4		PO6	PO7	US aci	POO		PO11	PO12	IIIes PSO1	PSO2
CO1	101	102	02 r03 r04 r05 r06 r07 r08 r09 r010 r011 r012 r801											1502
CO2														
CO3														
CO4														
Avg.														
1- Low 2-Medium 3-High														
Course Content														
	N	lodule	-I											
]	Back g	round:	Early	Britis	h Colo	nialisr	n in In	ndia, ea	arly reb	ellions –	Pazhass	i raja	
TINIT	1 ((the c	otiote	war	-Kera	la, 18	h th	centur	y), V	eerapan	diyan H	Kattabor	nman	
UNII	·	Tamin	adu/M	adras	Presed	ency-1	8 th c	entury), Paik	rebelli	on (Kali	nga/ Oc	lisha,	CO1
	e	early 1	9 th ce	ntury)	, Vello	ore mut	tiny (e	arly 19	th ce	ntury);	The Sep	oy Muti	ny of	
		185/a1	nd its c	onsequ	lences	•								
		ontribu	-11 itory F	actors	Socio	nolitic	eal con	scious	ness a	rowth o	f Wester	n educa	tion	
UNIT	$-2 \mid_{at}^{\circ}$	nd its in	npact s	socio -	religio	us mov	vement	Britis	sh Eco	nomic P	olicies a	ind their	tion	CO1
	in	npact.	I		0			,						
	Ν	lodule	-III											
	R	ise of	Orgai	nized	Mover	nents:	Emer	gence	of In	dian Na	ational (Congres	s, its	
UNIT	-3 po	olicies	and pr	ogram	mes, p	artitio	n of Be	engal,	rise of	radical	national	ists, Bal	l-Lal-	GO2
	Pa	al, torr	nation	of Mu	islim le	eague;	Minto	-More	ly reto	orms, th	e nation	al move	ment	CO2
		u ilig ti Iodule	-IV	world	war.									
		louule Jatheri	-1 v nσ Μο	mentuu	n· Nor	າ-ດວດກ	eration	and ci	ivil dis	obedien	ce emer	gence o	f	
	, G	andhi.	some i	oromin	ent rev	volutio	naries	- Khu	diram l	Bose. Pr	afulla C	haki.	1	CO3
UNIT	-4 B	hupenc	ira Nat	h Dutt	,V.D.	Savark	ar, Sar	dar Aj	it sing	h, Lala	Hardaya	l, Sardaı	•	
	B	Bhagat Singh, Raj Garu, Sukh Deo, Chandra Shekhar Azad, development of												
	so	ocialist	ideas,	comm	unal di	ivide.					_			
	Μ	Module -V												
		owards	Indep	penden	ice: Co	onstitu	tional	develo	opment	ts, prov	incial e	lections,	quit	
UNIT	- 5 In	idia mo	ovemei	nt and	atter,	partici	pation	OI WO	men n	ational i	moveme	nt durin	g the	CO4
		artition	imna	war, 1	nuiaii ne wor	nation Id	ai arin	y, nav	ai iiiu	uny of	1940, 1	recuoin	anu	04
	P P	partition, impact on the world.												

19HS5501B- INDIAN NATIONAL MOVEMENT

	Learning Resources										
Text Books	 K. Majumdar, Advent of Indepedence, Bhartiya Vidya Bhavan, Bombay 1969. R. Desai, Social Background of Indian Nationalism, 5th ed., Popular Prakashan, Mumbai, 1976. Bandyopadhyay, Sekhar, Nationalist Movement in India. A reader, Oxford university press, 2008. Chandra, Bipin, National and colonialism in modern India, Orient Longman Limited NewDelhi, 1979. 										

Cou	rse Ca	ategory	:	Open I	Electiv	e -1					Credit	s:		3
C	ourse	Type		Theory	I					Le	cture-Tu	torial-	3-0-0	
	04150	rype.		111001							Practic	al:		
											Continu Evoluati	ous		30
P	rereau	isites [.]		Nil							emester	End		
1	lerequ	151105.									Evaluati	ion:	70	
										r	Fotal Ma	arks:	100	
Cours	e Out	comes												
Upon s	Upon successful completion of the course, the student will be able to:													
<u>CO1</u>	Und	erstan	d the 1	ntricac	ies of e	engine	ering p	profess	10n.	C		C	1. 1114	<u>K2</u>
CO2	Exa deve	lopme	ne role nt.	that e	nginee	ring m	iight p	lay in	the dif	terent a	spects of	t sustair	ability	К3
CO3	Solv	Solve basic analytical and design problems using engineering tools, and be profic and efficient in the use of these tools										oficient	K3	
CO4	Exp	Explore various awareness methods about safety, risk & risk benefit analysis.										lysis.		K4
CO5	Ana	lyze w	hat cor	nstitute	es socia	al justi	ce in d	lifferer	nt areas	s of soci	al life ai	nd the re	ole that	K/
	engi	neering	g migh	t play i	n these	e.								174
	Co	ntribu	tion of	of Course Outcomes towards achievement of Program Outcomes										D CO.
<u>C01</u>	POI	PO2	PO3	PO4	PO5	PO6	P07	P08	PO9	POI0	POII	PO12	PS01 2	PSO2
CO1													2	
CO3												2		
CO4						3	3	3				2	2	
CO5						3	3	3				2		
Avg.						3	3	3				2	2	
	1	- Low					2-Me	dium				3-Hi	gh	
						Cou	rse	Cont	tent					
	Т	'he Eng	gineeri	ing Pr	ofessio	n								
	On	being	a Prof	essiona	1 1	1.01							CC)1,
UNIT	- 1 Te	chnical	l Expei	tise an	d Ethi	cal Ob	ligatio	ns)2,)5
	1	Enging	orina (Orga	nizatic	on of Pi	roressi	onal E	nginee	ring			C	J 5
	F	ngine	ring (nd Su	stainal	us ble Co	mmur	nity De	velon	nent				
	Un	dersta	nding (Comm	unity		mmun	nty Dt	Ciopi	nent			C)1
UNIT	- 2 En	gineers	s' Beli	efs abo	ut Cor	nmuni	ty Dev	elopm	ent				C)2,
		-		Meas	suring	Sustair	nability	/					CC)4
	E	nginee	rs as P	roblen	n Solve	ers								
	Ε	nginee	ers and	Deve	lopme	nt							C	21
	En	gineeri	ng Dis	asters:	Lesso	ns to b	e Lear	med)],)3
UNIT	-3 Te	Technology for Community Development)3,)4	
	Re	newab	le Soui	ces of	Energ	У							-	
	Gr	een and	a Smar	t Citie	S									
	S Etl	afety o	ilemm	'ublic										
	Ca	lculati	no the	us Value	of I ife								~	21
UNIT	-4 \mathbf{w}	histle h	lowing	, and ,		,								л,)3
	Tri	listing f	he Ev	perts									C)4
	Ca	se Stuc	lies.	50110									50	
	Ca	Case Studies:												

19HS5501C – ENGINEERING FOR COMMUNITY SERVICE

1		1							
	a. Sinking of the Titanic								
	b. Bhopal Gas Tragedy								
UNIT-5	UNIT-5 Engineering and Social Justice Social Justice in Engineering Sciences Humanities and Social Sciences in Engineering Education Transforming Engineering Education and Practice Making Social Justice Visible and Valued								
	Learning Resources								
	1. Deborah G. Johnson. (2020) Engineering Ethics: Contemporary and Enduring Debates. Yale University Press.								
D - f	2. Vesilind, P. Aarne., Gunn, Alastair S. (2010) <i>Hold Paramous</i> Engineer's Responsibility to Society. Cengage Learning.	nt: The							
Bool	Reference Books3. Luegenbiehl, Heinz., Clancy, Rockwell. (2017) Global Engineering Ethics. Butterworth-Heinemann, UK.								
	4. Traer, Robert. (2018) Doing Environmental Ethics. New Yor	k: Routledge.							
	5. Leydens, Jon., Lucena, Juan. (2017) <i>Engineering Justice: Tra</i> <i>Engineering Education and Practice.</i> Wiley: IEEE Press.	ansforming							

Cours	se Cat	Category: Open Elective -1 Credits: 3												3
Co	reo T	<u>'uno</u>	,	Theory	,					Le	cture-Tu	torial-	2	0.0
	Irse I	ype:		Theory	/						Practic	al:	5-	-0-0
											Continu	ous	,	30
			1	Nil							Evaluat	ion:	•	50
Pre	requis	sites:								S	Semester	End	,	70
											Evaluat	ion:	1	00
C	04-										Fotal Ma	arks:		.00
Linon au		ful co	mnlati	on of t	ha aqu	rea th	o studo	nt mill	bash	la to:				
	Undo	rstan	d the fi	undam	antale	of vari		nects (of perso	onality t	raite			K)
CO1	Annly	v vario	u ine n	vinuam	f soft s	kills a	nd ners	sonality	v devel	lonment				K2 K3
CO2 1	<u>Anals</u>	vario	vario	us tech	niques	s of str	ess ma	nagem	y ue ve	iopment	•			K4
CO4	Acau	ire the	- signi	ficant f	factors	of affe	ecting a	attitud	es					K3
CO5 Develop Interpersonal communication.											K6			
	Con	tribut	tion of	Cours	se Out	comes	towar	ds acl	hieven	nent of l	Progran	1 Outco	mes	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1														
CO2														
CO3									3	3		3		
CO4														
CO5														
Avg. 3 3 3														
1- Low 2-Medium 3-High														
						Cou	rse	Cont	tent					
	Per	sonali	ity: Gr	oomin	g one's	s perso	nality,							
	Pe	rsonal	lity trai	its,										
UNIT-1	Inf	luence	e of hei	redity	and en	vironn	nent on	perso	nality,					CO1
	Eff	ective	habits	. 11 :										CO4
	Con	fliot r	nai inte	emgen	ce.									
		nici n ertive	nature	on										CO1
UNIT-2	Dec	ision 1	naking	, skills	_									CO2
				,	•									CO5
	Te	chniqu	ues of t	time m	anage	ment								
LINIT 2	Te	amwo	rk		-									CO1
0111-3	Se	lf cont	fidence	e										CO5
	Str	ess m	anager	nent										~~
	At	titude-	-conce	pt	***	_								CO1
UNIT-4	PO No	suive	aunua	e-auva	intages									003
		galition		ue -uis	auvani 1 lood	ages								
UNIT-5 Interpersonal relationship														
	Good manners & etiquette.													
	Learning Resources													
							<u>6</u> 1-1				Found			
Text B	ooks	P _c	ersonal	ity dev	<i>ielonm</i>	ient Xza	SULL GIVE	ille Rai	riink n	/111 n t 1v i	ora			
Text B	ooks	Pe	ersonal ps://ww	ity dev	elopm english	ent &s	mpreher	IIIs Bai	ttps://w	ww.englis	shclub.con	n/reading/	short-	
Text B Refer	Books ence	Pe htt sto	ersonal ps://ww pries.htn	ity dev w.using n; ht	english tps://wv	com/con/con/con/con/con/con/con/con/con/con	mpreher sh-onlir	nsion/; h ne.at/	ttps://w	ww.englis	shclub.con	n/reading/	short-	
Text B Refer Boo	Books ence oks	Pe htt sto Al	ersonal ps://ww pries.htn l Skills:	ity dev w.using n; ht	/elopm genglish tps://wv	ient &s .com/con vw.engli	soft ski mpreher ish-onlir	ills Bai nsion/; h ne.at/	ttps://w	ww.englis	shclub.con	n/reading/	short-	cilora

19HS5501D – PERSONALITY DEVELOPMENT

19HS5501E – INTRODUCTION TO INTERNATIONAL BUSINESS

Cou	rse Ca	ategory	:	Open I	Electiv	e -1					Credit	s:		3
C	ourse	Type:		Theory	7					Le	cture-Tu	torial-	3-(0-0
		71		5							Practic	al:		
											Evaluati	ion:	3	0
Pr	erequ	isites:		Nil						S	Semester	End	_	0
	•										Evaluati	ion:	/	0
										,	Fotal Ma	arks:	10	00
Course	Upon successful completion of the course, the student will be able to:													
Upon s	Apply the concepts of global dynamics which affect businesses and multinational firms												Т	
CO1	in le	iy the c veragin	g thei	ts of gl	obal d	and co	mpeter	ch affe ncies.	ct busi	inesses a	and mult	inationa	li firms	K3
CO3	Com	pare a	and co	ntrast	culture	es and	societ	ies glo	obally	using s	ocioecor	omic, c	cultural	W2
02	and e	ethical	frame	works				U		U				К3
CO3	Rela	elate business expansion concepts abroad to key issues related to their operations in											К3	
	other		ries.		• /	.1	1 .	1		• .1		<u> </u>	•	
CO4	Deve	evelop entry strategies into other markets by recognizing the nature of institutions										K6		
CO5	Use	the concepts in international business with respect to foreign trade											К3	
000	Col	ontribution of Course Outcomes towards achievement of Program Outcomes											11.5	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011	PO12	PSO1	PSO2
CO1			3	2							3	3		
CO2			3	2							3	3		
CO3			3	2							3	3		
CO4			3	2							3	3		
			3	2							3	3		
Avg.	1	- Low	3	4			2-Me	dium			5	3.Hi	և Ծh	
		1011				Con	rse	Cont	ent			<u> </u>	511	
	1	INTRO		ΤΙΟΝ	•	Cou		com						
		History	v and H	Feature	• s of In	ternati	onal B	usines	S.					
	. (Globali	zation	– For	es and	dange	ers Firr	ns' fac	e duri	ng Inter	national	Busines	s.	CO1
UNIT-	1	Internat	ional	Busine	ss Env	ironme	ent - G	eograp	hical,	Econon	nic, Soci	o-cultur	al,	CO4
	1	politica	l and l	egal er	nvironr	nent								
	(Culture	and I	nternat	ional E	susines	SS .	F /	• 7					
		oncep	tual fr	amewo	ork of I	viultina	ational	Enter	prise (I	VINE)				CO1
UNIT	2	Internat	tondin	rade a	ind Fo	reign I Aorleot	Jirect I	nvesti	nent	nomio I	ataoratio	n		CO^{2}
	Fu	ndamer	tals o	g Enter f Interr	ationa	1 Mone	s and r etary S	vstem			negratio	11		CO2
	1	Internat	ional	econor	nic inst	titutior	is and a	agreen	nents					
TATE		WTO,	UNCA	D, IM	F, Wo	rld Bai	ık;	0						CO1
UNIT	.3 (Genera	lized s	ystem	of pref	erence	s- GS	ГР						CO5
	Ir	International commodity agreements												
	1	Modes	of Ope	eration	s in Int	ernatio	onal Bu	isiness	•					CO1
UNIT	.4	Exporti	ng, In	portin	g, and	Global	Sourc	ring						CO3
01122		Differe	nces b	etween	Dome	estic ar	nd Inter	rnation	al Bus	iness				
		E-Busii	ness	a.1.114	1 0	7+1a	n Test -	mati -	al D	inora C		ada		
TINITT	5 1	SOCIAL I	xespoi Intern	ISIDIIIT	y and E	LUNICS 1	in inter	nation	ai Bus	mess Co	Junier tra	ade		
UNII	· · · · · · · · · · · · · · · · · · ·	Foreion	merna Trada	Policy	Dusiii v/Trad	ess Polic	v fram	ework	in Ind	ia				
		Foreign Trade Policy/Trade Policy framework in India												

Exp	ort Promotion: Export Facilities & Incentives and Status holders and Export											
Zon	Zones.											
Learning Resources												
	1. Aswathappa," International Business", Tata Mc Graw Hill publications, New Delhi											
Text Books	2. Black and Sundaram, "International Business Environment", Prentice Hall of India, New Delhi.											
	3. Cherunilam Francis, "International Business", PHI Learning Pvt. Ltd., 2020											
Reference	1. Adhikary, Manab, "Global Business Management", Macmillan, New Delhi.											
Books	2. Sumati Varma, "International Business", Pearson											

Cou	irse	Categ	orv	: (Open H	Electiv	e -1					Credit	s:		3
C	011			,	Theory	•	-				Le	cture-Tu	torial-	2	0.0
C	our	se Typ	e:		Ineory	/						Practic	al:	3-	0-0
												Continu	ous		30
]	Nil							Evaluat	ion:		50
Pı	rere	quisite	es:								S	Semester	End	,	70
												Evaluat	ion:		/0
G												Fotal Ma	arks:	1	00
Cours	e O	utcon	ies		on of t	<u>.</u>				he chi	1				
Upon s	succ				on of t	ne cou	rse, the	e stude	nt Will	be ab.	le to:				K2
$\frac{CO1}{CO2}$				1 the so	ocio-ec	conom	1c-cult	ural co	to Ind	ns of a	Ituro	nala			K2 K2
C02	r F	now u vomin	le co		sion of	f diffor	ont for	raign r	ulore o	nd thai	nure r offoot	on India	n oultur	0	K2 K2
005	A nolves the impact of British colonial rule on industrialisation and introduction of											2			
CO4	AI We	western education in India												K4	
CO5	D	escribe the national movements against British rule.												K2	
	(Contribution of Course Outcomes towards achievement of Program Outcomes													
	PC	01 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12 PS01										PSO2			
CO1							2						2		1
CO2							2						2		1
CO3															1
CO4							2						2		1
CO5							1						1		1
Avg.							2						2		1
1- Low 2-Medium 3-High															
Course Content															
		And	ien	t Indi	an Hi	story a	and C	ulture	–Indu	us Val	ley Civi	lization:	Salient		
UNIT.	1	Feat	tures	s, Ved	lic and	l Later	·Vedi	c cultu	ire, Do	octrine	s of Jai	nism an	d Buddl	nism,	CO1
01111	-	Mau	ırya	.ns – A	Admini	stratio	n, Ash	ioka 's	5 Dhan	nma, S	atavaha	nas , Gi	ıptas –S	ocio-	
		Eco	nom	<u>iic-Cu</u>	ltural (<u>Condit</u>	ions.	<u> </u>				~		, ,	
		Medie	val	India	n Hist	tory a	nd Cu	ilture	– Del	hi Sult	tanate, (Great M	ughals S	South	COD
UNIT	-2	Supre	emac Cor	cy and	1 Coni	IICTS F	'allava	s, Cn	olas,	Кака	utiyas, v	/ijayanag	gara En	ipires	02
		then		lillouti		Indian	Cultur	e.							
		Mod	ern	India	n Hist	ory ar	ıd Cul	ture –	Europ	pean pe	enetratic	on In to 1	India, A	nglo-	COA
UNIT	-3	Frenc	ch F	(ivalry	i tor Σ	Supren	nacy,	The ba	attle of	f Plass	sey esta	blishme	nt of Br	itish	CO3
		Powe	r, C	_onsol	idation	i and e	expans	10n too	dis, Su	losiaiai	ry Allia	nce, Do	ctrine of		
		Imr	<u>z.</u> Nact	of Br	itich (<u>'oloni</u>	ոլ թութ	-Con	merci	alizati	on of A	ricultur	e de		
UNIT.	_4	indu	istri	alizati	on- de	cline o	f cotta	ge Indi	ustries	famir	es and o	condition	of Peas	sants	CO4
UI	•	Intro	oduc	ction c	of West	tern Ed	lucatio	on in In	dia, th	e great	t Revolt	t of 1857	7.	, and	001
		The	Ris	se of I	ndian	Natio	nal Mo	veme	$\frac{1}{nt - Sc}$	ocio- R	Religious	s Moven	nents the	<u>,</u>	
	Genesis of Freedom Movement –Birth of Indian National Congress, -Freedom														
UNIT	-5	Stru	iggle	e (188	5-1920)) Mod	lerate F	Phase F	Partitio	n of B	engal-E	mergenc	e of Mil	itant	CO4
		Nat	iona	lism-S	Swades	shi & F	Boycot	t Move	ement	-Home	e Rule N	/lovemen	nt Freed	om	
		Stru	ggle	e (1920	0-1947	') Gan	dhi's ro	ole in I	ndian	Nation	al Move	ement.			
						Le	earn	ing]	Reso	urce	es				
Text	Boo	oks	Kr	rishna	Reddv	, India	an Hist	tory, N	IcGrav	w Hill I	Educatio	on; Seco	nd editio	on, 201	7
e- Reso	ourc ital m	es & aterial	htt	tps://or	nlineco	ourses.	swaya	m2.ac.	in/cec2	20_hs0	04/previe	ew			

19HS5501G – INDIAN HISTORY

Cou	irse Ca	ategory	/:	Open I	Electiv	e - II					Credit	s:		3	
C	ourse	Type:	1	Theory	7					Le	cture-Tu	torial-	3-	0-0	
	ourse	rype.		111001)							Practic	al:		0 0	
				19BS1	103- 0	Chemis	try of I	Materi	als		Continu Evaluati	ious		30	
P	rereau	isites									Semester	End			
	lerequ	151105.									Evaluati	ion:	,	70	
											Fotal Ma	arks:	1	00	
Cours	e Out	comes													
Upon successful completion of the course, the student will be able to:															
<u>CO1</u>	Ana	lyze th	e sourc	es and	comp	osition	$\frac{1}{1}$ of M	inicipa	<u>l Solic</u>	Waste	1 .1.			K4	
CO2	Asse	ess the	1mport	ance of	t the g	green te	chnolo	ogies t	owards	s sustain	ability.			K5	
C03	Dete	troto i	differe	ent typ	ELA of F	lazardo	ous wa	stes ar	nd then	safe dis	sposal m	ethods		K3	
C04 C05	Asse		acts of	air an	d wate	r and t	heir sig	nent n	nce	Jiogies				K2 K5	
005	Co	ntribu	tion of	Cours	se Out		towa	ds ac	hieven	nent of l	Program	1 Outco	mes	III.	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	
CO1	3	2	1		1		2					1		2	
CO2	3		1		2 2 1 1										
CO3	3		2												
CO4	3														
CO5	3	-	1		1		2	1				1		2	
Avg.	3	3 2 1 1 2 1 1 1 1- Low 2-Medium 3-High													
1- Low 2-Medium 3-High															
						Cou	rse	Cont	tent						
		INTRO	ODUC	TION	:										
		Source	s and	types	of m	unicip	al sol	id wa	stes-wa	aste gei	neration	rates-fa	actors	COI	
UNIT	-1	affectir	ng gen	eration	, char	acteris	tics-m	ethods	of sa	mpling	and cha	tracterization	ation,		
		nrocess	sing e	lement	s of s	olid w	aste m	anage	ment -	– munic	inal and	l bio me	edical		
		solid w	vaste ru	les – p	ublic 1	cole in	solid v	vaste r	nanage	ment.	ipui une	. 010 110	Juicui		
	Ι	NTRO	DUC	ΓΙΟΝ΄	TO G	REEN	TECI	INOL	OGY						
	τ	Jse of t	techno	logy to	wards	sustai	nabilit	y. IGB	C ratii	ng syste	ms, Und	lerstandi	ng of	CO2	
UNIT	-2 gi	een bu	uilding	meas	ures i	n the	areas	of Sit	e Pres	ervation	, Energ	y Effici	ency,		
	M	laterial	s, Wat	er Con	servat	ion, So	olar En	ergy-	Wind e	energy-	Basic C	oncepts-			
			and us				CEN	-							
	n S		and ty	5 WA	F hazaı	TANA rdous	GENII waste i	un I : charac	teristic	s of ha	zardous	wastes		CO3	
UNIT	-3 ⁵	ollectio	on-hand	iling-n	rocess	ing t	echnia	ues-di	sposal	metho	ds: ho	spital	waste	005	
	n	anagei	ment -	proces	sing te	chniqu	ies - di	sposal			,	~ P			
		CONC	EPTU	AL F	ACTS	OF E	IA:								
	Introduction, definition and scope of EIA objectives in EIA, basic EIA											CO4			
UNIT	-4	principles, classification of EIA, strategic EIA (SEIA), regional EIA, sectoral													
01111		EIA, project level EIA and life cycle assessment, project cycle, Environmental													
		baselin	e moni	toring	(EBM Matha), preli	minar	y study	to det	ermine	impact s	ignificat	nce,		
	-		Asses			uoiogi				D).					
	·	Air and	IUIIO	on UF	IIVIP A		(AIK A	MND V Lhasic	vAIE inform	KJ:	n wator c	and air			
UNIT	-5	nn anc Concep	i water tual an	proach	for ac	l, source Idressi	no air	and we	nnunn iter en	vironme	nt impag	niu all sts		CO4	
		assessn	nent of	impac	ts air.	water.	noise.	soil, b	iologia	cal and s	ocioeco	nomic			
	1	mpacts	s, asses	sment	of im	oact sig	gnifica	nce.	0			-			

19ES5601A – ENVIRONMENTAL MANAGEMENT

Learning Resources									
Text Books	1. Integrated Solid waste management by Goerge Tchobanolous, Hilary Theisen & Samuel A. Vigil. McGraw Hill International Editions								
	2. Y. Anjaneyulu, Environmental Impact Assessment, B.S. Publications, 2003.								
	1. CPCB Manual on solid waste Management								
Reference	2. Technological guidance manuals of EIA, MoEF								
Books	3. M. Anjireddy, Textbook of Environmental Science and Technology, BS								
	Publications, 2010.								
e- Resources	1. www.nptel.ac.in/courses/120108005								
& other	2. nptel.ac.in/courses/10510605								
digital	3. https://www.coursera.org/learn/solid-waste-management								
material									

Course Type: Theory												
Course rype. Theory		Lecture-T	utorial-	3	0.0							
		Practio	cal:	5-	0-0							
		Continu	ious		30							
Nil	-	Credits:3Lecture-Tutorial- Practical: $3-0-0$ Practical: $3-0-0$ Evaluation: 30 Evaluation: 30 Semester End Evaluation: 70 Total Marks: 100 eto:Total Marks:, regulation and standards ofWi-Fi and DTH operators and siness on Bandwidth.ss technologies to understandand sub-systems in advancedent of Program OutcomesP010P011P012P010P011P012P010P011P012I1<										
Prerequisites:		Semeste	r End	7	70							
	-	Evaluat Total M	ion:	1	00							
Course Outcomes		I Otal M	arks:	1	00							
Upon successful completion of the course, the student will be	e able to).										
Infer the basic knowledge of telecommunication sy	vstem r	,. equilation a	nd stand	ards of								
CO1 telecom regulatory bodies.	ystenn, 1	egulation a	ila standa	4103 01	K2							
Able to deduce cost of different devices such as mol	bile, Wi	-Fi and DT	H operate	ors and	W2							
corry out investigation of Frequency Management an	arry out investigation of Frequency Management and Business on Bandwidth.											
Make use of revolutionary changes in mobile and w	Take use of revolutionary changes in mobile and wireless technologies to understand											
recent developments.	ecent developments.											
CO4 Examine different optical communication componer	Examine different optical communication components.											
CO5 Justify the use of satellite orbits, different compon	Justify the use of satellite orbits, different components and sub-systems in advanced											
Communication systems.	Contribution of Course Outcomes towards achievement of Program Outcomes											
PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 I				nes	DEO2							
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CO4 3 3 2 2 1 2			1		2							
CO5 3 3 2 2 1 2 1			1		2							
Avg. 3 3 2 2 1 2 1			2	2	2							
1- Low 2-Medium		·	3-Hi	gh								
Course Conte	ent											
TELECOMMUNICATION SYSTEMS:												
Telephones, Telephone System, Facs	simile,	Internet	Telep	hony.	CO1							
UNIT-1 Telecommunication Standards and R	Regulatio	ons -	Interna	tional								
telecommunication union (ITU) - TRAI and its	s role – l	Frequency r	nanagem	ient –								
Cost computations – Mobile and DTH operations (WPC) for tologommunications in L	10NS – K India	cole of wire	eless plai	nning								
TELECOM BUSINESS MANACEMENT.	muid.											
Automated teller machines – Teleconferencing – '	Telecon	nmuting –C	ustomer		CO2							
UNIT-2 oriented communication aspects – Telecom bill	ling - C	oncepts of	data rate	e and								
bandwidth requirements – Digital subscriber line	- Broad	band techno	ologies –									
Digital home – Voice enabled DSL.			-									
CELL PHONE TECHNOLOGIES:	-		~									
Cellular Telephone Systems, A Cellular Industry	Overvie	2 w, 2G and 3	3G		CO3							
UNIT-3 Digital Cell Phone Systems, Long Term Evolution	on and 4C	S Cellular S	ystems									
WIRELESS IECHNOLOGIES: Wireless I AN PANs and Bluetooth ZigBee and	d Mech V	Wiroloss No	tworks									
Wildess EAN, TANS and Didetooth, Zigbee and WiMAX and Wireless Metropolitan-Area Networ	orks	W II CICSS INC	tworks,									
OPTICAL COMMUNICATION:	/1 N.O											
UNIT-4 Optical Principles. Optical Communication Syste	tems. Fil	ber-Optic Ca	ables. Or	otical	CO4							
Transmitters and Receivers.	.,	T T	, - 1									
LINUT 5 SATELLITE COMMUNICATION:												
Satellite Orbits, Satellite Communication System	ms, Satel	lite Subsyst	ems, Gro	ound								

19ES5601B – TELECOMMUNICATION FOR SOCIETY

Sta	tions, Satellite Applications, Global Navigation Satellite Systems.	CO4									
	Learning Resources										
Text Books	1. Louis E. Frenzel Jr., Principles of Electronic Communication Systems, 4 Graw Hill Publications, McGraw-Hill Education, 2016.	/e, Mc									
I CAT DOORS	2. Willium C. Y. Lee, "Wireless & Cellular Telecommunications", McGra Companies Inc, Third Edition, 2006.	w-Hill									
Reference Books	 Wayne Tomasi, Electronic Communication Systems, 5/e, Pearson Education 2009. Wayne Tomasi, Advanced Electronic Communication Systems, 4/e, Pearson Education, 2013. Dennis Roddy, Electronic Communications, 4/e, Pearson Education, 2003. 	n, n									

Cou	Irse Category: Open Elective -II Credits: 3 Investor Tampet Theorem Lecture-Tutorial- 2.0											3				
C	ourse	е Тур	e:	,	Theory	/					Le	cture-Tu Practic	itorial- al:	3-	·0-0	
					Nil							Continu Evaluat	ous ion:		30	
P	rerequ	uisite	es:								S	Semester	End	,	70	
											,	Evaluat Total Ma	arks [.]	1	00	
Cours	e Ou	tcom	es									1 0141 111		-	00	
Upon s	succe	ssful	con	mpleti	on of t	he cou	rse, the	e stude	nt will	be abl	le to:					
CO1	Lea bac	i rn b kgroi	asic und	es of C of the	Germar langu	n Lang age.	uage a	nd dev	elop a	consci	iousness	s for the	cultural		K5	
CO2	Une	derst	and	d auth	entic te	exts/ ar	nnounc	ement	s in Ge	erman					K2	
CO3	Exp	Express themselves according to the situations and to give/seek information in German												K2		
CO4	Read and respond to an extract from a story, an e-mail message or song or simple text												K1			
CO5	Write the spellings correctly and sentences in a grammatically correct form												K2			
	Contribution of Course Outcomes towards achievement of Program Outcomes															
<u> </u>	PO1	PO	02	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	
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CO_2											1					
C03											1					
C04											1					
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Avg.		1. La	w					2-Me	dium		1		3.Hi	σh	L	
			,,,				Соп	rso	Cont	ont			0 111	511		
							Cou	130	COIII	CIII						
UNIT	-1	INT Alpl	' RC hab	DUC ets, Ni	TION umbers	: s, Basio	c Voca	bulary	, Gern	nan Sta	ites & It	s Culture	e		CO1	
UNIT	-2	Mod /erb	al V Coi	/erbs, njugati	Separa ion,	able an	d Insej	parable	e Verb	s, Tran	sitive a	nd Intrar	isitive V	'erbs,	CO2	
UNIT	-3	Adve	rbs	, Prepo	osition	s, Pers	onal Pi	onoun	is, Adje	ectives					CO3	
UNIT	-4	Pres	ent	Tense	, Past	Tense,	Future	e Tense	e						CO4	
UNIT	-5	The Imp	No erat	minati tive	ve Cas	se, Acc	cusativ	e Case	, Dativ	e Case	e, Geniti	ve Case,	The		CO4	
						L	earn	ing l	Reso	urce	es					
Text	Bool	KS	Ne	etzwer	k A1 I	Deutsc	h als F	remdsp	orache	by Go	yal Pub	lications	, New D	elhi		
e- Re & d dig ma	e- Resources and other digital material. & other digital material															

19HS5601A – GERMAN FOR BEGINNERS

0.00	irse C	Category	: (Open I	Electiv	e-II					Credit	s:		3
C	ourse	e Type:	,	Theory	/					Le	cture-Tu	torial-	3-	0-0
		71									Practic	al:		
											Evaluati	ion:	3	30
P	rerequ	uisites:		Nil						S	Semester	End	_	10
	-										Evaluati	on:	,	0
G	0										Fotal Ma	urks:	1	00
Lipon		tcomes	mnleti	on of t	he cou	rea the	a studa	nt will	be abl	e to:				
opon	Un	derstan	d the r	neanin	g of a	nalvsis	and h	$\frac{10}{0}$ w to a	analyze	$\frac{1}{2}$ the co	ntent of	essavs		
CO1	para	agraphs,	review	vs, boo	oks, ar	ticles e	etc.	011 201	unuiyz			c 55 u J5,		K2
CO2	Classify various types of analytical topics according to context and make reports.												К3	
	Organize the topic and prepare hypothesis.												113	
CO3	Construct meaningful arguments by following thematic information and suitable language.												K3	
CO4	4 Analyze thesis statement, topic sentences, evidence, and supporting ideas.												K4	
CO5	Distinguish the general essays from analytical essays and reorganize the content.												K4	
	Co	ontribu	tion of	Cours	se Out	comes	towar	ds acl	nievem	ent of I	Program	Outco	mes	
<u>CO1</u>	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C01										3		2		
CO2 CO3										3		2		
CO4										3		1		
CO5										3		3		
Avg.										3		2		
1- Low 2-Medium 3-High														
						Cou	rse	Cont	tent					
UNIT	Identifying the topic sentences – meaning of analysis – History of essay writing – Different types of essays – Role of analytical essays											CO1		
		Differe	пі туре	Fundamental prose skills – explore the content – discover various approaches in										
	F	Fundame	ental pr	rose sk	tills – e	explore	e the co	ontent	- disco	over var	ious app	roaches	in	CO2
UNIT	-2 V	Fundame vriting e	ental pressays -	rose sk – Hypo	tills – e othesis	explore of the	e the co topic o	ontent or rese	– disco arch	over var	ious app	roaches	in	CO2
UNIT UNIT	-2 ^H -3 ^I _s	Fundame vriting e Discussi	ental pressays - ng and cated w	rose sk – Hypo l emula /ay to j	cills – contraction of the contr	explore of the ifferen	e the co topic o t topic pics	ontent or rese s – tra	– discc arch ditiona	over var	ious app	roaches say writ	in ing –	CO2 CO3
UNIT UNIT UNIT	-2 V -3 I s -4	Fundame vriting e Discussi sophistic Analyz context	ental pressays - ng and cated w e the exist $s - Co$	rose sk – Hypo l emula /ay to j ssays – mpetit	cills – e othesis ating d present - antho ive exa	explore of the ifferen the to ology o	e the co topic o t topic pics f essay ientatio	ontent or rese s - tra $vs - Uson -C^{0}$	- disco arch ditiona	over var l metho alytical nensive	ious app ods of es- essays in question	roaches say writ n differe	in ing – nt	CO2 CO3 CO4
UNIT UNIT UNIT	-2 V -3 I s -4	Fundame Fundame vriting e Discussi sophistic Analyz context Types o	ental pressays - ng and cated w e the ers s - Co f essay	rose sk – Hypo l emula /ay to j ssays – mpetit //s – di	cills – contrast of the contra	explore of the ifferen t the to logy o ams ori iation	e the co topic of t topic pics f essay ientatio of essa	$rac{1}{2}$ pontent or rese $rac{1}{2}$ s - tra $rac{1}{2}$ s - Us $rac{1}{2}$ s - Us r	- disco arch ditiona sing ana ompreh	l metho alytical porary	ious app ods of es essays in question essayists	roaches say writ n differe s like Ha	in ing – nt azlitt,	CO2 CO3 CO4
UNIT UNIT UNIT	-2 V -3 I s -4 J I	Fundame Fundame vriting e Discussi sophistic Analyz context Fypes o David F	ental p essays - ng and cated w e the es s - Co f essay oster V	rose sk – Hypo l emula /ay to j ssays – mpetit /s – di Wallac	tills – contrast of the contra	explore of the ifferen t the to logy o ams ori iation ntaigne	e the co topic of t topic pics f essay ientatio of essa c, Jawa	$rac{1}{2}$ prime	- disco arch ditiona .ing ana ompreh contem Nehru	l metho alytical nensive porary	ious app ods of est essays in question essayists Krishna	roaches say writ n differe s like Ha Murthy	in ing – nt azlitt, , Iris	CO2 CO3 CO4
UNIT UNIT UNIT	-2 V -3 I s -4 7 I I -5 M	Fundame vriting e Discussi sophistic Analyz context Types o David F Murdocl Baldwin	ental pressays - ng and cated w e the ex- f essay oster V n, Woo	rose sk – Hypo l emula /ay to j ssays – mpetit //ay – di Wallac olf Bao ha Chr	tills – contrasting d ating d present - antho ive exa fferent e, Mon con, R istie, J	explore of the ifferen t the to logy o ams ori iation ntaigne W Em ane Au	e the co topic of t topic pics f essay ientatio of essay e, Jawa herson,	$rac{1}{2}$ rac	- disco arch ditiona ing ana ompreh contem Nehru el John	l metho alytical porary , Jiddu nson, G	ious app ods of es essays in question essayists Krishna eorge O	roaches say writ n differe s like Ha Murthy prwell, J	in ing – nt azlitt, , Iris fames	CO2 CO3 CO4 CO4
UNIT UNIT UNIT UNIT	-2 V -3 I -3 S -4 J I I H	Fundame vriting e Discussi sophistic Analyz context Types o David F Murdocl Baldwin	ental pressays - ng and cated w e the end s - Co f essay oster V n, Woo , Agati	rose sk – Hypo l emula /ay to j ssays – mpetit /s – di Wallac olf Bao ha Chr	tills – contrast ting d present - antho ive exa fferent e, Mor con, R istie, J	explore of the ifferen the to logy o ams ori iation ntaigne W Em ane Au	e the co topic of t topic pics f essay ientatio of essa e, Jawa ierson, isten e	s - tra s - tra s - Us s	- disco arch ditiona ing ana ompreh contem Nehru el John	l metho alytical nensive porary , Jiddu nson, G	ious app ods of est essays in question essayists Krishna eorge C	roaches say writ n differe s like Ha Murthy rwell, J	in ing – nt azlitt, 7, Iris fames	CO2 CO3 CO4 CO4
UNIT UNIT UNIT	-2 V -3 I s -4 I -5 M H	Fundame vriting e Discussi sophistic Analyz context Types o David F Murdocl Baldwin	ental presental pressays - ng and cated we e the essay oster Vo n, Woo , Agath	rose sk – Hypo l emula /ay to j ssays – mpetit /s – di Wallac olf Bao ha Chr	tills – e othesis ating d present - antho ive exa fferent e, Mor con, R istie, J	explore of the ifferen the to logy o ams ori iation ntaigne W Em ane Au	e the co topic of t topic pics f essay ientatio of essa e, Jawa herson, usten e	s - tra s - tra s - us s	- disco arch ditiona sing ana ompreh contem Nehru el John	l metho alytical nensive porary , Jiddu nson, G	ious app ods of est essays in question essayists Krishna eorge C	roaches say writ n differe s like Ha Murthy brwell, J	in ing – nt azlitt, 7, Iris fames	CO2 CO3 CO4 CO4
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UNIT UNIT UNIT UNIT	-2 V -3 I s -4 -4 I -5 N H erenc poks	Fundame vriting e Discussi sophistic Analyz context Types o David F Murdocl Baldwin	ental pressays - ng and cated w e the exist - Co f essay oster V n, Woo , Agatl 1. 2. 3. 4. 5.	rose sk – Hypo l emula /ay to j ssays – mpetit /s – di Wallac olf Bao ha Chr Ariel I Philip David Books, Revisi 100 wa	tills – contrasting d present - antho ive exa fferent e, Mon con, R istie, J Levy, e Lopate Foster , 2007 ng Pro ays to i	explore of the ifferen t the to logy o ams ori iation ntaigne W Em ane Au earn d., The e, ed., T Walla se by F	e the co topic of t topic f essay ientatio of essay ientatio essay i ientatio essay i ientatio essay i i i essay i i i i i i i i i i i i i i i i i i i	pontent pontent pontent pontent $s - tra \sqrt{s} - Uspon - Coays - $	- disco arch ditiona ditiona ditiona ditiona ompreh contem Nehru el John UTCE can Esse e Perso the Lol am	over var l metho alytical pensive porary , Jiddu nson, G S says 201 nal Essa bster an ary Pro	ious app ods of es essays in question essayists Krishna deorge O	roaches say writ n differe s like Ha Murthy prwell, J chton Mi or Book Essays,	in ing – nt azlitt, 7, Iris fames ifflin, 2 cs 1997 Back B	CO2 CO3 CO4 CO4

19ES5601C - ANALYTICAL ESSAY WRITING

	 Bird by Bird by Anne Lamott The Sense of Style by Steven Pinker
e- Resources & other digital material	https://canvas.harvard.edu/courses/8124 https://boomessays.com/blog/how-write-analytical-essay#definition https://www.ranker.com/list/best-essayists/ranker-books

19ES5601D- INDIAN ECONOMY

Cou	rse Category: Open Elective-II Credits: 3										3			
C	ourse '	Tunor	,	Theory	7					Le	cture-Tu	torial-	2	0.0
C	ourse	i ype.		Theory	/						Practic	al:	5-	0-0
											Continu	ous	3	80
				Nil							Evaluati	ion:		0
P	rerequi	isites:								S	Semester	End	7	0
											Evaluati	ion:		
0	0 (l'otal Ma	arks:	10	00
Cours	e Outo	comes		f (1				1 1. 1					
Upon s	succes	stul co	mpleti	$\frac{\text{on of t}}{\frac{1}{2}}$	$\frac{1}{1}$	rse, the	e stude	ent Will	be ab	le to:	1.1		1	
CO1	Und back	erstan	aing o	of the f	undan	iental	concep	ots of I	ndian	econom	ly and tr	leoretica	11	K2
	Apply knowledge to evaluate the impact of the population, unemployment and poverty													-
CO2	on the economic development.													K3
CO3	Und	lerstar	ding ($\frac{1000}{100}$	ole of	nublic	and nr	ivate s	ector i	n the Ind	lian eco	nomy		К2
005	Awareness on structure and growth of capital market in India industrial growth, how												112	
CO4	to align the management of a supply chain with corporate goals and strategies.												K5	
CO5	Analysing Public expenditure trends, issues and Assessment of Indian planning.												K4	
	Coi	ntribut	tion of	Cours	se Out	comes	towar	rds acl	hieven	ent of l	Program	1 Outco	mes	1
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3		2								3	3	
CO2	3	3		2								3	3	
CO3	3	3		2								3	3	
CO4	3	3		2								3	3	
CO5	3	3		2								3	3	
Avg.	3	3		2								3	3	
1- Low 2-Medium 3-High														
						Cou	rse (Cont	tent					
	1	ECON	OMIC	DEV	ELOF	MEN'	T:							
		A theor	etical	back s	ground	: Econ	omic :	growth	, deve	lopment	and un	der		CO1
UNIT	-1 0	levelor	oment	charac	teristic	s of u	nder de	evelop	ed and	develop	ing cour	ntries. N	ature	
	(of the 1	Indian	econo	my, ro	le of r	natural	resou	rces in	econon	nic deve	lopment		
	I	Enviroi	nmenta	al prote	ection a	and sus	stainab	le dev	elopme	ent.				
	P	OPUL	ATIO	N AN	DHU	MAN	DEVE	LOPN	MENT	:				_
	Iı	ndian p	populat	tion siz	ze and	growt	th tren	ds, rea	isons c	of the ra	pid grov	wth of		CO2
UNIT	-2 pc	pulatio	on, p	opulat	10n	and	econor	mic	develo	pment.	Emplo	oyment	and	
	ur	iemplo	yment	in Inc	na, the	e conc	ept of	pover	ty and	rural p	overty, 1	ncome		
		stributi	ION IN		тор		FDVI	CECT	N INT	MAN E	CONON	AV .		
		arious	induct	rial no	icies	role of	nubliz	ces I	un IINL rivate	sector in	the Ind	ian ecor	omv	CO3
UNIT	-3 v	aliev 10	991 Ir	ndustri	al sick	ness in	India	foreig	n trade	and for	eign car	ital Ra	lance	COJ
	of	² navm	ents. T	O and	India.	iiess iii	mana.	101015	, ii ti uu	und for	eign eur	nui. Du	lance	
	M	IONE	Y ANT) BAN	KING	:								
		haracte	ristics	of the	Indiar	n mone	y marl	ket, pri	ice trer	ids and i	nflation	, comme	ercial	CO4
UNIT	-4 ba	inking	in Indi	ia. Cap	oital ma	arket in	n India	, struc	ture an	d growt	h of capi	ital marl	ket in	
	In	dia inc	lustrial	l growt	h, RB	I, Evol	utiona	l of ins	stitutio	nal finaı	ncing in	India.		
	P	UBLIC	C FIN	ANCE	, EC	ONON	AIC I	PLAN	NING	AND	POLIC	Y: FIS	CAL	
	po	olicy a	nd mor	netary	policy,	India	n tax s	tructur	e. Publ	lic expe	nditure t	rends an	d	
UNIT	-5 is	sues.			-					_				CO4
	Ε	CONC	OMIC	PLAN	INING	AND	POLI	ICY: E	Evaluat	ion of th	ne object	tives of		
	ec	conomi	c plan	ning, i	mporta	int feat	ures of	f India	n plans	, Assess	sment of	Indian		

plan	ning.
	Les star Dense service
	Learning Kesources
	1. Misra and Puri Indian economy Himalaya Publishing House twenty eight revised and updated edition 2010.
Text Books	2. T. Dyson, 2008, —India's Demographic Transition and its Consequences for Development in Uma Kapila, editor, Indian Economy Since Independence, 19 th edition, Academic Foundation.
	3. Dr. S.K. Singh/Prof. T.N. Jha/Dr. vinita Singh Economic Development 21st Century Edition.
	4A. Musgrave and P.B. Musgrave, Public Finance in Theory & Practice,Mc Graw Hill Publications, 5 th edition, 1989.

Cou	irse (Category	/:	Open I	Electiv	e-II					Credit	s:		3
C	ours	e Type [.]		Theory	I					Le	cture-Tu	itorial-	3-	0-0
	ours	e rype.		Theory							Practic	al:	5	00
											Continu Evoluot	ious		30
D	roroc	nicitor		Nil							Evaluat	IOII:		
L L		luisites.								,	Evaluat	ion.		70
											Total Ma	arks:	1	00
Cours	e Oı	itcomes												
Upon	succ	essful co	mpleti	on of t	he cou	rse, the	e stude	nt will	l be ab	le to:				
CO1	De	scribe tl	he scop	e and s	signific	cance of	of publ	ic adn	ninistra	ition				L2
CO2	Ex	plain di	fferent	admin	istrativ	e thou	ghts.							L2
CO3	O3 Illustrate accountability and control over administration by different groups in society													L2
CO4 Explain the concepts of union and state government administration												L2		
CO5 Summarize the administration process in civil services													L2	
	C	ontribu	tion of	Cours	se Out	comes	towar	ds ac	hieven	nent of	Progran	n Outco	mes	
<u>CO1</u>	PO	1 PO2	PO3	PO4	PO5	PO6	PO7	P08	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-					2		3	3		1			2
C02						2		3	3		1			$\frac{2}{2}$
CO4						2		3	3		1			2
CO5						2		3	3		1			2
Avg.						2		3	3		1			2
1- Low 2-Medium 3-High														
Course Content														
INTRODUCTION;														
		Meanii	ng, sco	pe and	, l signif	icance	of pu	blic ad	lminist	ration.	evolutio	n of the		CO1
UNIT	-1	discipl	ine and	i its p	resent	status	, chall	enges	of lib	eralizati	on, priv	atizatior	and	
		globali	zation,	good	govern	ance,	electro	nic go	vernan	ce conc	epts and	applicat	tions,	
		New P	ublic N	Ianage	ment ((NPM)								
			NISTI	RATIN	E TH	OUGI	HT:	.1.4	1			1		CO 2
UNIT	-2	Scient	theory	inagem	ient th	eory, c	classica	al theo	ry, bu	reaucrat	ic theory	y, humai	1	CO2
				, syste		лу.		~ -						
		ACCC	DUNTA	ABILI	IY AI		ONTRO	OL:		1		1	. 1'.	002
UNIT	-3	Legisia	anve, e	NGC	ve and	1 judic 1 socie	ty Ric	ntrol C	over au Inform	ation A	ation, re	social a	leola,	COS
		citizen c	hapter	, 100 S.	<i>i</i> , <i>c</i> ₁ , <i>i</i>	1 30010	<i>ty</i> , R		morm			, 500141 1	iuun,	
		UNIO	N ANI) STA'	TE GO	OVER	NME	NTS A	DMIN	NISTR A	TION:			
TINIT		Preside	ent, Pri	me mii	nister,	counci	l of mi	nisters	s, cabir	net, cent	ral and s	tate		CO4
UNII	-4	secreta	riats, b	oards a	and con	mmissi	ions, g	overno	or, chie	f minist	er and co	ouncil of	2	
		ministe	ers, cen	tral sta	te rela	tions, t	finance	e comn	nission	, Neeti	ayog.			
		CIVIL	SERV	ICES:										
UNIT	-5	Recruit	nent, t	raining	and o	ther co	onditio	n of s	ervices	, distric	t admin	istration	, role	a a i
01,111	-	of collec	ctor, lo	cal self	f-gove	rning i	nstitut	es - 72	^{3^{iu} and}	$74^{\rm m}$ cor	stitution	nal		CO4
		amenan	ients a	st.	т		· 1	D a = -						
						earn	ing l	keso	ource	25				_
			1.	Avasti	, Mahe	eswari,	Public	c Admi	inistrat	tion, $31/$	e. Laksh	mi Naria	an Aga	rwal
Text	Boo	ks	r	BIE	, india	, 2014 Juldoor	- Eadia	India	n Ada	niniatrat	ion $\frac{9}{2}$	Sabitro	Rhome	n
			۷.	D.L. F India	aula, N 2014	undeel		i, maia	ui Aufi	minstral	1011, o/e,	Samya	DHawa	.11,
	India, 2014.													

19ES5601E – PUBLIC ADMINISTRATION

	1. Nicholas Henry, Public Administration and Public Affairs, 21/e. Prentice
	Hall of India, 2012.
	2. D.Ravindra Prasad, V.Sivalinga, P.Satyanarayana, Administrative Thinkers,
Reference	2/e. Sterling Publishers, 1991.
Books	3. D.D.Basu, Introduction to the Indian Constitution, 21/e, Lexis Nexis
	Butterworths, Wadhwa, Nagpur, 2013.
	4. Ramesh K, Arora, Rajini Goyal, Indian Public Administration, 3/e, New
	Age International Publishers, India, 1995.

Cou	irse	Category	:	Open I	Electiv	e –II					Credit	s:		3	
C	ours	e Type:	,	Theory	/					Le	cture-Tu	torial-	3-	-0-0	
		51									Practic	al:			
											Evaluati	ion:		30	
P	rerec	quisites:		N1l						S	Semester	End	,	70	
											Evaluati	ion:		100	
Cours		iteomos								,	Fotal Ma	arks:		00	
Upon		essful co	mpleti	on of t	he cou	rse, th	e stude	nt will	be ab	le to:					
CO1	Ur	derstan	d the c	ommu	nity in	which	they v	vork a	nd thei	r relatio	n.			K2	
CO2	Id	e ntify th	e need	ls and	probl	ems o	f the o	commu	unity a	and invo	olve ther	n in pr	oblem-	K3	
CO3	De	Develop capacity to meet emergencies and natural disasters.												K3	
CO4	Та	Take part in national integration and social harmony.												K4	
CO5	Apply their knowledge in finding practical solutions to individual and community											K4			
	pro	problems.													
			PO3	PO4	PO5	PO6	towar	POS	PO9	PO10	Program	PO12	mes PSO1	PSO2	
CO1	10	1 102	105	104	105	3	2	100	107	1010	1011	1012	1	1502	
CO2						3	2					1	1		
CO3						3	2					1	1		
CO4						3	2					1	1		
						3	2					1	1		
Avg.		1- Low				5	2-Me	dium					gh 1		
Course Content															
		NATIO	DNAL	SERV	VICE S	SCHE	ME								
		A) 1	History	y and it	ts Obje	ectives								CO1	
	1	B)	Organi	zation	al stru	cture c	of N.S.	S. at I	Vationa	al, State	, Univer	sity and			
UNII	-1	Adviso	coneg	e Leve	and t	their f	unction	ns witt	h sneci	ial refer	ence to	college			
		princip	al, Pro	gramn	ne offi	cer, N	.S.S. g	group 1	leader	and N.S	S.S. volu	nteers i	n the		
		implem	entatio	on											
		Nationa	l Integ	gration	1 									CON	
UNIT	-2	A) T Various d	bstacl	es in fl	he way	egrand	ntional	Integr	ation	such as	caste rel	ligion		02	
		language	e and p	rovisic	onal pro	oblems	s etc.	megr	<i>u</i> tion, 1	such as	caste, rei	iigioii,			
		N.S.S. R	EGÛ	LAR A	CTIV	TTIES	5								
		A) '	Traffic	regula	ation									CO3	
		B)	Worki	ng with	n Polic	e Com	missio	ner's C	Office						
		C)	Worki	ng with	n Muni	cipal (Corpor	ation c	of Vijay	yawada					
UNIT	-3	D)	Worki	ng with	n Healt	h Dep	artmen	t							
		E) .	Blind a	issistai	ice										
		F) G)	Non-fe	rmal e	ducati	ı on									
		H)	'Enviro	nment	al Edu	cation	. Awar	eness	and Tr	aining (EEAT)'	Blood			
		,	donatio	on		2	, ui	2.200			,				
		SPECIA	L CA	MPIN	G PR	OGRA	MMF	C							
UNIT	-4	A) N	Vature	and its	object	ives								CO4	

19ES5601F – NATIONAL SERVICE SCHEME

	B)	Selection of camp site and physical arrangement								
	C)	Organization of N.S.S. camp through various committees and discipline in								
		the camp.								
	D)	Activities to be undertaken during the N.S.S. camp.								
	Use o	f the mass media in the N.S.S. activities.								
	SPEC	IAL PROGRAMME								
	A)	Legal awareness								
	B)	B) Health awareness								
UNIT-5	C) First-aid									
	D) Career guidance									
	E) Leadership training - cum - Cultural Program									
	Globalization and its Economic Social Political and Cultural impacts.									
		Learning Resources								
Text Bo	oks	1. National Service Scheme Manual, Government of India.								
		1. Training Programme on National Programme scheme, TISS.								
Refere	nce	2. Orientation Courses for N.S.S. Programme officers, TISS.								
Reference	ince is	3. Case material as Training Aid for field workers, Gurmeet Hans.								
DUUK	6	4. Social service opportunities in Hospitals, Kapil K.Krishan, TISS.								
		5. Social Problems in India, Ram Ahuja.								

Cot	ırse	rse Category: Open Elective – II Credits: 3										3			
C	ours	e Tvp	e:	,	Theory	7					Le	cture-Tu	torial-	3-	0-0
	0	• - JP			1 110 01)							Practic	al:		0 0
												Continu Evaluati	ous	3	30
P	rerea	misite	·C•]	Nil						<u> </u>	L'valuat.	End		
1		Juisite										Evaluati	ion:	7	70
											, ,	Fotal Ma	arks:	1	00
Cours	e Oi	utcom	es	•										•	
Upon	succ	essful	con	npleti	on of t	he cou	rse, the	e stude	nt will	be abl	e to:				
CO1	Co	ommu	nica	ate pr	oficien	tly in i	ntervie	ews an	d all so	ocial si	tuations			•11	K2
CO2	De	mons	frat	te an a	ability	to use	effecti	ve vert	Sal and	l non-v	erbal co	mmunic	cation sk	1118.	K3
CO3	DS Dla	c the formats, strategies and possible content of business continumcation at work .ce.												K3	
CO4	Pr	epare	epare professional documents including web related (On-line) communication.												K3
005	Ar	nalyze	alyze texts, diagrams and improve both reading and writing skills which would help											IZ A	
05	in	academics as well as professional career.												K 4	
	0	ontri	buti	on of	Cours	se Out	comes	towar	ds acl	nievem	ent of l	Program	n Outco	mes	
<u>CO1</u>	PO	1 PC	02	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
$\frac{COI}{CO2}$										3	3		3		
CO2										3	3		3		
CO4										3	3		3		
CO5										3	3		3		
Avg.										3	3		3		
		1- Lo) W					2-Me	dium				3-Hi	gh	
Course Content															
		VER	BAI	L CO	MMU	NICA	TION								
UNIT	-1	Conci	isen	ess, c	larity,	corre	ctness,	Non-	verbal	comm	nunicatio	on – bo	dy lang	uage,	CO1
01.111	-	Barrie	ers t	to co	mmuni	cation	, Read	ling S	hort P	assage	s, New	s Article	es, Tech	nical	
		Paper	s an	d Sho	ort Stor	ies - N	lote ma	aking a	and no	te takir	ng.				
TINIT	2	PKU.	res No	Style	NAL L	EIIE ormot	E m	oil f	Cormot	and a	tiquatta	Drosor	tation a	1-i11c	CO^{2}
UNII	-2	Grow	n dis	scussi	on and I	or mat,	L- m	an – 1	ormat		ilquette.	, 110501	nation s	KIIIS,	002
		TEC				ORT V	VRITI	NG –							
		Types	s: Bi	usines	ss/Tech	nnical,	Comp	onents	, Style	and F	ormats -	– Writin	g a Tecł	nnical	CO3
UNIT	-3	Propo	osal,	Adm	inistra	tive dr	afting	and co	rrespo	ndence	e - Mem	os, Min	utes and	Web	
		notes.	•												
UNIT	-4	Inform	mati	on tra	nsfer,	Meetir	ng skill	s, Tea	m dyn	amics					<i>a</i> a i
01111	•	IOD	4.751												CO4
		JOR	AP	PLIC.	ATIO.	N of D-				a 1-4		ting CO	Do Int-		
TINIT	5	Kesu Skille	me • tv	-Sur	ucture	of Ke	sume/C	v = 0	torvio	ig ielle	erview	ung SO	PS. Inter	code	CO5
UNII	-5	body language telephone/online interviews, one to one interview & panel											000		
	interview. FAOs related to job interviews, answering strategies.														
I parning Resources															
				1 R	asu R	N Tec	hnical	Writin	o 201	1 Kind	lle editio	on			
Text	Boo	oks		2. C	Mural	ikrishı	na & S	unitha	Mishr	a, Com	munica	tion Skil	ls for Ei	ngineer	s, 2
		-		nd e	dition,	NY: F	Pearson	n, 2011						<u> </u>	-

19ES5601G – PROFESSIONAL COMMUNICATION

	 Bailey, Stephen. Academic writing: A handbook for international students. Routledge, 2014. Skillful Level 2 Reading & Writing Student's Book Pack (B1) Macmillan Educational.
Reference Books	 http://www.britishcouncil.org/english http://www.5minuteenglish.com/ http://www.bbc.co.uk/learningenglish/ http://www.bbc.co.uk/learningenglish/ http://www.better-english.com/ http://www.nonstopenglish.com/ http://www.usingenglish.com/comprehension/ https://www.englishclub.com/reading/short-stories.htm https://www.english-online.at/ https://www.englishclub.com/ https://www.englishclub.com/ https://www.englishclub.com/ https://www.englishclub.com/

Open elective-II Course Category: Credits: 3 Lecture-Tutorial-3-0-0 Course Type: Theory Practical: Continuous 30 **Evaluation**: Prerequisites: Nil Semester End 70 **Evaluation**: Total Marks: 100 **Course Outcomes** Upon successful completion of the course, the student will be able to: Understanding of the basics of finance and objective of finical management K2 **CO1** K2 CO2 Acquire knowledge in financial planning and implementation of financial plans **CO3** Understanding problems of over-capitalisation and under-capitalisation K2 **CO4** Know about time value of money and financial forecast K2 **Capability** to **analyse** various sources of loans and identify the best source of loan for **CO5** K4 finance. **Contribution of Course Outcomes towards achievement of Program Outcomes** PO1 PO2 PO3 **PO4** PO5 PO6 **PO7 PO8 PO9** PO10 PO11 PO12 PSO1 PSO2 **CO1** 3 2 3 3 3 CO₂ 3 3 2 3 3 2 **CO3** 3 3 3 3 **CO4** 3 3 2 3 3 **CO5** 3 3 2 3 3 3 2 3 3 3 Avg. 2-Medium 1-Low 3-High **Course** Content **INTRODUCTION:** Business Finance Defined-Traditional and Modern Views; Scope and Functions of CO1 UNIT-1 Finance; Finance Function vs. Accounting Function; Objectives of Financial Management-Profit Maximization vs. Wealth Maximization. FINANCIAL PLANNING: CO2 Concept of Financial Planning; Process of Financial Planning; Characteristics of UNIT-2 Sound Financial Plans; Factors Affecting Financial Plan. CAPITALISATION AND CAPITAL STRUCTURE: CO3 Concept, Nature and Scope of Capitalisation; Earnings Theory and Cost Theory of **UNIT-3** Capitalisation; Over-Capitalisation; Under-Capitalisation; Capital Structure Theories and Factors Determining Capital Structure FINANCIAL FORECASTING AND TIME VALUE OF MONEY: CO4 Concept of Financial Forecasting; Sales Forecast; Income Forecast; Financial **UNIT-4** Position Forecast; Forecasting for Growth and External Funds Requirements; Time Value of Money-Discounting and Compounding. PATTERN OF CAPITAL REQUIREMENTS: CO5 Long-Term and Medium-Term Financing – Purpose, Sources and Instruments; UNIT-5 Short-Term Financing-Purpose, Sources and Instruments. **Learning Resources** Brealey, Richard A and Steward C. Myers: Corporate Finance, McGraw Hill, 1. Int.Ed., New York. **Text Books** Chandra, Prasanna : Financial management, Tata Mc Graw Hill, Delhi. 2. Hampton, John: Financial Decision Making, Prentice Hall, Delhi. 3. Pandey, I.M.: Financial Management, Vikas Publishing House, Delhi. 4

19ES5601H – BASICS OF FINANCE

	Van Horne, J.C. and J.M. Wachowicz Jr. : Fundamentals of Financial
	Management, Prentice-Hall, Delhi.
Reference Books	 Vanagement, Frentice-Hait, Denn. Van Horne, James C Financial Management ; Harper and Row, New York. Pinches, George E : Essentials of Financial Management ; Harper and Row, New York. Khan MY, Jain PK : Financial Management ; Tata McGraw Hill, New Delhi. Archer, Stephen, H., Chate G Marc, Racette, George; Financial management ; John Wiley, New York. Block, Stapley B, Geoffrey A Hilt : Foundations of Financial Management :
	Richard D. Irwin, Homewood.

Cou	irse (Categor	y:	Open e	elective	e-II					Credit	s:		3	
C	ours	- Type		Theory	7					Le	cture-Tu	torial-	3-	0-0	
C	ours	e rype.		Theory							Practic	al:			
											Continu	ous	3	80	
D				NI:1							Evaluat	ion:			
	rerec	uisites:		INII							Fvaluat	ion.	7	70	
										,	Total Ma	arks:	1	00	
Course Outcomes												00			
Upon successful completion of the course, the student will be able to:															
CO1	Understand issues of marketing with an emphasis on learning to develop responsive												onsive	K)	
	ma	rketing	strategi	ies that	meet	custon	ner nee	eds		_				K2	
CO2	Us	i ng of t	the key	/ analy	rtical f	framew	vorks a	and to	ols use	ed in m	arketing	in rela	tion to	K2	
001	seg	menting	g and ta	rgeting	g of pr	oducts									
CO3	Ge	t acqua	inted v	with the	e comp	ponents	s of ma	rketin	g mix,	stages i	n new p	roduct		K2	
	dev	elopme	nt	otivos	and	matha	da for	prioi	na pro	duata	nd colo	oting	honnol		
CO4	me	alyse u mbers	ie obje	cuves	anu	metho	18 101	prici	ng pro	Juucts a	illa sele	cting c	lanner	K4	
CO5	Ev	aluate t	he tech	niques	of pro	motio	ı mix							K5	
	C	ontribu	tion of	Cours	se Out	comes	towar	ds ac	hieven	nent of]	Progran	1 Outco	mes		
	PO	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	
CO1							3	3	2			3		3	
CO2							3	3	2			3		3	
CO3							3	3	2			3		3	
CO4							3	3	2			3		3	
CO5							3	3	2			3		3	
Avg.							3	3	2			3	Ļ	3	
1- Low 2-Medium 3-High															
						Cou	rse (Cont	tent						
		INTRO	DUCT	TION	TO M	ARKE	TING	:		a a		6) ()		001	
UNIT	-1	Definiti	on, Na	ture, S	cope, I	Importa	ance of	t Mark	teting,	Core Co	oncepts of	of Marke	eting,	COI	
		Philoso	phies o	f Mark	eting.										
	•		ET SE	GME	NIAI	ION	:/: T	· 1 .						CO^{2}	
UNIT	-2	Targetti Soomon	ig and	POSIU	Oning: Morl:	t Delin	ition, I	_evels	of Seg	gmentati	ion, Base	es of		02	
	-+	MADU	TTINA		• •	ci, FUS	niomi	g sua	legies.						
LINIT	_2	4P'e C	ascific	ation o	f Prod	ucte D	roduct	Life(vele	PI (ר)-פי	ages N	w Prod	uct	CO3	
	-5	Develor	ment (NPD)-	Tvne	s. Proc	ess			. LC/-0	ugos, 190		uci		
		PRICI	NG:		1 7 10	., 1100	-00								
UNIT	-4	Definiti	on. Or	ojective	es. Prie	cing S	trategia	es- Ch	annels	s of Dis	tributior	1: Defin	ition.	CO4	
		Functio	ns, Lev	vels	·,							- 5111	· · ·,		
		PROM	OTIO	N MIX											
UNIT	-5	Definiti	on,	Object	ives,	Impo	ortance	, E	lement	s, In	egrated	Marl	teting	CO5	
		Commu	nicatio	n (IMO	C).			-			U		U		
					L	earn	ing l	Reso	urce	es					
			1.	Philip l	Kotler,	Gary A	rmstron	ng and	Prafull	a Agniho	otri, Princ	iples of I	Marketir	ıg,	
Toyt	Ree	ke		Pearson	n India,	17th E	dition.	New D	elhi: 20	018		-		-	
ICAL	D00	172	Raja	an Saxe	ena. M	arketir	ig Man	ageme	ent, Ta	ta-McG	raw Hill	, Fifth E	dition N	New	
			ייֿ ת	1.001			C	U	,						
D C			Dell	ni :201	5 Voll	Ct.			<u>(Л.Г.</u> 1	ation C			• T - 4		

19ES5601I – BASICS OF MARKETING

Books	McGraw Hill, New Delhi.
	 Govindarajan M., "Marketing Management, Concepts, Cases, Challenges and Trends", PHI Private Limited, New Delhi, 2007.
	7. Karunakaran, "Marketing Management", Himalaya Publishing House,
	Mumbai.
	Charles W. Lamb, Joseph F. Hair, Carl McDaniel, Harish Kapoor, Henry
	Klaise "MKTG", Cengage Learning, New Delhi, 2012.
e- Resources	8. <u>https://nptel.ac.in/courses/110/104/110104068/</u>
& other	9. <u>https://nptel.ac.in/courses/110/107/110107147/</u>
digital	10. https://nptel.ac.in/courses/110/104/110104070/
material	

Cou	irse C	ategory	r:]]	Inter d	iscipli	nary El	lective	-1			Credit	s:		3
C	ourse	Type	,	Theory	,					Le	cture-Tu	torial-	3-	0-0
	ourse	rype.		Incory							Practic	al:		00
											Continu	ous	30	
D		icitor]	Nil							Evaluat	IOII:		
r Pi	rerequ	insites:									Semester End			
										,	Total Ma	arks [.]	1	00
Cours	e Ou	tcomes									1011111	uno.		00
Upon s	Upon successful completion of the course, the student will be able to:													
CO1	Unc	Understand the basic concepts of database management systems												
CO2	Unc	nderstand normalization techniques with simple examples.												K2
CO3	Ар	pply SQL commands to create tables for a given database application												K3
CO4	App mak	Apply ER Model concepts to draw ER Diagrams for a given database application and nake an effective report.												K3
CO5	Unc	Inderstand the basic concepts of database management systems												K2
	Co	ontribut	tion of	Cours	e Out	comes	towa	rds acl	hieven	ient of]	Progran	1 Outco	mes	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3													
<u>CO2</u>	3													
<u>CO3</u>	3													
CO4 CO5	3								2	2				
	3								3	3				
Avg.	J	I-Low					2-Me	dium	5	5		3-Hi	gh	
Course Content														
		INTR		TION	ΤΟΙ		BASE	<u>S:</u>						. <u></u>
		Charao	cteristi	cs of th	ne Dat	tabase	Appro	ach. A	dvanta	iges of i	using the	DBMS		l
		Appro	ach. A	Brief	Histor	v of Da	atabase	e Appli	ication	s.	0			l
UNIT	-1 (OVERVIEW OF DATABASE LANGUAGES AND ARCHITECTURES:												
	Ι	Data Models, Schemas and Instances, Three-Schema Architecture and Data											CO1	
	Ι	ndepen	dence,	Databa	ase La	nguage	es and	Interfa	ces, D	atabase	System	environi	nent,	001
	(Centraliz	zed and	d Clien	t-Serv	er Arc	hitectu	re for	DBMS					
		RELA	TION	AL M	IODE	L: The	e Relat	ional]	Model	Concep	ots, Rela	tional N	1odel	I
UNIT	-2	Constr	aints a	nd Rel	ationa	I Datal	base So	chemas	S.		. –	·· ·		I
		SQL: D	Data D	efinitic	on, Co	nstrain	nts, Ba	sic Qu	ieries	and Up	dates, V	iews(V	irtual	CO2
			III SQL TFPTI			MOD	FI IN(- .						
		High	evel (ra.∎A atual Γ)ata M	odele	J. for Do	tahase	Design	A Sam	nle Dot	ahase	I
		Applic	ation	Entity	Types	Entit	v Sete	Δttrik	uites ai	nd Keys	, A Dain Relatio	nshin T	wnee	l
UNIT	-3	Relatio	anoli,	Setc F	r ypes Poles	and Str	y Seis, ructura	1 Cone	trainte	Weak	Fntity T	vnes	ypes,	CO3
	T			MG. D	ofinin	anu Su a tha E		aion E	I anto	orams	Namina	ypes. Conver	tions	005
	a la	ind Desi	ign Issi	ues	cinni	s uie I		ngii, E		grams,	ranning	CONVEL	110115	I
	I	DATAB	BASE 1	DESIC	SN T	HEOR	Y : Fi	unctior	nal De	penden	cies, No	ormal fo	orms	 I
UNIT	- 4 t	based of	n Prim	ary Ke	eys, Se	econd	and Th	nird N	ormal	Forms,	Boyce-C	Codd No	ormal	I
	F	Form.												CO4
LINIT	-5	TRAN	ISACT	TION	PRO	CESSI	NG:	Introdu	uction,	Trans	action a	and Sy	stem	I
	-5	Conce	pts, De	esirable	e Prope	erties o	of Tran	saction	ns.					

19CS2501A – DATA BASE MANAGEMENT SYSTEMS

Introduction to Protocols for Concurrency Control in Databases: Two-PhaseCO5Locking Techniques for Concurrency Control - Types of Locks and System LockTables.										
1401	Learning Resources									
Text Books	1. DATABASE SYSTEMS Models, Languages, Design and Application Programming, Ramez Elmasri, Shamkant B.Navathe, 6th Edition, Pea	ı ırson.								
Reference Books	 Data base Management Systems, Raghurama Krishnan, Johar Gehrke, 3rd Edition, TMH. Data base System Concepts, Abraham Silberschatz, Henry F Kort S.Sudarshan, 5th Edition, Mc Graw Hill. 	nnes h,								

Cou	irse C	Category	/:	Inter d	iscipli	nary El	lective	-1			Credit	s:		3
C	ourse	e Type:		Theory	/					Le	cture-Tu Practic	torial-	3-	0-0
											Continu	0115		
				NT:1							Evaluation:			30
Pı	rereq	uisites:		IN11						S	Semester	End	7	70
										,	Total Ma	arks:	1	00
Course Outcomes														
Upon successful completion of the course, the student will be able to:														
CO1	Un	Jnderstand the basic concepts for solutions to business problems.												K2
CO2	App effe	p ly the ctive bu	analyt 1siness	ical te decisi	chniqu ons	es in l	busine	ss tran	saction	ns that	would h	elp in 1	naking	K3
CO3	Ana bus	a lyze pi iness.	roblem	s in t	ousines	s tran	saction	ns tha	t wou	ld help	in mal	king ef	fective	K4
CO4	Ap	ply the l	least sc	uare te	echniqu	ue to fi	nd the	equati	on of	the curv	e.			K3
CO5	Det	ermine	the eq	uation	of the	curve	from t	he give	en data					K3
	Co	ontribu	tion of	Cours	se Out	comes	towar	rds acl	hieven	nent of	Progran	1 Outco	mes	N 20-
CO1	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C01	3												$\frac{2}{2}$	
CO2	5	3											$\frac{2}{2}$	
CO4	3												2	
CO5		3							2	2			2	
Avg.	3	3							2	2			2	
1- Low 2-Medium 3-High														
						Cou	rse	Cont	tent					
]	INTRO	DUCI	TION	FO ST	ATIS	FICS:							
UNIT	-1	Meaning of Driver	g, Defi	nition,	Funct	ions, I	mport	ance, I	Limita	tions of	Statistic	s, Colle	ection	
	1	MEASI	IPFS	OF CE	IDATY L	$\frac{1}{1}$	NDF	VCV.						
UNIT	-2	Definitio	on, Ob	jective	s, Cha	racteri	stics a	nd Tec	hnique	es: Mea	n Media	n, Mode		
	- (Geomet	ric Me	an and	Harmo	onic M	lean.		1			,	,	
	I	MEASU	URES	OF DI	SPER	SION								er -
UNIT	-3	Definition	on, obj	ectives	, Char	acteris	tics an	d Tech	nnique	s: Rang	e, Quarti	ile Devia	ation,	CO1,
	1	VIEAN D	eviatio	n, Star	Idard L	Jeviati	on and	TOST	1000000000000000000000000000000000000	of Varia	ution.			CO2,
		Definitio	on. tvr	or sn bes of	skew	ness. 1	types	of kur	tosis.	Karl-Pe	earson's	Co-effi	cient.	005
UNIT	-4	Bowley	's Co-	efficie	nt, Ke	elly Co	o-effic	ient, (Calcula	tion of	Raw N	Aoments	s and	
	(Central	Mome	nts		-								
	_ •	CURVE	E FITT	TING:		• • •								CO1
UNIT	-5	Method	of leas	st squa	res, sti	aight l	ine, pa	irabola	, expo	nential c	curve, po	ower cur	ve	CO4 CO5
					Le	earn	ing]	Reso	urce	es				
			1.	S.C. G 11/e, S	upta a Sultan (nd V.K Chand	K. Kapo & Son	oor, Fu is Publ	indame icatior	entals of is, 2012	Mathen	natical S	Statistic	s,
Text	Bool	ks	2.	Dr.T.K Prasad	X.V. Iy	engar, babilit	Dr.B.l ty &	Krishn Statist	a Gano tics",	dhi, S. F Publicat	Ranganat tions: S	ham, Di .Chand,	r. M.V. 4 th R	S.S.N. evised
Dofe	rona		1 4		1, 2012	$\frac{2}{2}$	roo in T	Probab	ility D	Dagroon I	Iducatio	n India	2002	
Kele	renc	rence 1. S. Ross, a First Course in Probability, Pearson Education India, 2002.												

19HS2501A – QUANTITATIVE TECHNIQUES FOR MANAGEMENT

Books	3. Miller and Freunds, Probability and Statistics for Engineers,7/e, Pearson, 2008.
Е-	1. <u>www.nptel</u> videos.com/mathematics/(Math Lectures from
Resources &	Mit,Stanford,IIT'S
other digital	2. nptel.ac.in/courses/111/106/111106150/
material	3. nptel.ac.in/courses/111105035

					19 Ľ	Г2501	$\mathbf{C} - \mathbf{C}$	OP V	VITH	C++				
Cou	irse Ca	ategory	<i>'</i> :	Inter d	iscipli	nary El	lective	-1			Credit	s:		3
C	ourse	Type:		Theory	1					Le	ecture-Tu Practic	torial- al:	3-	0-0
				19ES1	102-Pı	oblem	S	olving	aı	nd	Continu Evaluati	ous ion:		30
Pı	rerequ	isites:		Programming Semester End Evaluation:									70	
9	0.1										Total Ma	arks:	1	00
Upon successful completion of the course, the student will be able to:														
	Illus	ustrate the fundamental programming concepts in C++												К2
CO1	Den	onstra	ate the	concer	$\frac{d}{dts}$ of (biect-	Orient	ed Pro	gramm	ning.				K2
CO3	Out	line the	e conce	epts of	polym	orphisi	m and	Except	tion ha	ndling	in C++			K2
CO4	Mak	e use c	of OOF	, conce	pts to	develo	p C++	progra	ams (L	3)				K3
	Co	ntribu	tion of	Cours	se Out	comes	towar	ds acl	nievem	ent of	Program	n Outco	mes	1
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2					1	1				2	2
CO2	2	2	2					1	1				2	2
CO3	2	2	2					1	1				2	2
<u>CO4</u>	2	2	2					1	1				2	2
Avg.	2		2				2 Mo	l	I			2 Ц;	2 ah	2
	1	- LUW				Con	2-1110	Cont	ont			5-111	gn	
						Cou	rse	Con	ent					-
UNIT	 INTRODUCTION TO C++: Difference between C and C++, Evaluation of C++, Programming Paradigms, Key concepts of OOP, Advantages of OOP. DECLARATIONS: TOKENS, Variable declaration and initialization, Data types in C++, Operators in C++, Scope access operator, Name Space, Memory management operators, Comments. DECISION STATEMENTS: Introduction, The if statement, Multiple ifs, Nested if-else, else-if ladder, unconditional control transfer statements, the switch (CO1, CO2,		
UNIT	Statement CONTROL LOOP STRUCTURES: Introduction, what is loop, The for loop, the while loop, The do-while loop CONTROL LOOP STRUCTURES: UNIT-2 Introduction, Parts of a function, Passing arguments, Inline functions, Function overloading INPUT AND OUTPUT IN C++: Streams in C++ and Stream Classes, Pre-defined streams.											CO3		
UNIT	-3 C I an C V V C I I I I I I I I I I I I I I I I	LASS ntroduc and their outside ariable, CONST ntroduc arametro onstruc OPERA ntroduc inary o	ES AN ction, S r scope memb , static TRUC ttion, C erized ctors, C TOR ttion, t perator	Structu Structu e, Defin per fur memb FORS Constru Constru Constru OVEF he key r.	JECT re in (ning m action er fund actors ructors ructor, ctors v RLOA	S: c, Clas eember as inli ctions, DEST I and de Over vith de DING : operat	ses in functi ine, R friend RUCT estructo loadin fault a or, ov	C++, c lons, C ules fc functi 'ORS : ors, Cc g con rgume erload	declarin haracte or inlir ons. onstruc structo nts ing un	ng Obje eristics ne func tors wi rs, Arr ary op	ects, Acc of memb ctions, St ith defau ray of c erators,	ess spec per funct tatic me lt argun objects Overloa	ifiers tions, mber nents, using ding	

	INHERITANCE:										
	Introduction, Reusability, Access Specifies and Simple inheritance, Types of										
	inheritance, Single, Multiple, Hierarchical, Hybrid, Multipath inheritances, Virtual										
UNIT-4	base classes, program on simple inheritance										
	POINTERS:										
	Introduction, Features of pointers, Pointer Declaration, void pointer, wild pointer,										
	this pointer. Pointers to derived class and base class										
	BINDING AND POLYMORPHISM AND VIRTUAL FUNCTIONS: C	CO1									
	Introduction, Binding in C++, Pointer to base class and derived class objects.	CO4									
	Virtual functions, pure virtual functions. Abstract classes.	205									
UNIT-5	EXCEPTION HANDLING:										
	Introduction. Principles of exception handling, the keywords try, throw and catch										
	Multiple catch statements, Re-throwing an exception.										
	Learning Resources										
	Leai ning Kesources										
Toyt Bo	1. Programming in C++, Second Edition, by Ashok N Kamthane, Pears	on									
I CAL DU	Education										
Refere	nce 1. C++ How To Program, Dietel and Dietel, Prentice Hal.										
Book	2. C++ The Complete Reference, 5th Edition, by Herbert Schildt, TMH.										
Е-	4. http://www.cplusplus.com										
Resourc	ces& 5. https://www.w3schools.com/cpp/										
other di	gital										
mater	ial										

Course	e Categor	y:	Inter d	isciplii	nary El	lective	-1			Credit	s:		3	
Con			Theory						Le	cture-Tu	torial-	2	0.0	
Cou	rse Type:		Theory	/						Practic	al:	5-	0-0	
										Continu	ous		30	
			Nil							Evaluati	on:	•	50	
Prer	equisites:		1911						S	Semester	End		70	
										Evaluati	on:		/0	
									, r	Fotal Ma	urks:	1	.00	
Course Outcomes														
Upon successful completion of the course, the student will be able to:														
CO1 S	olve Syst	em of e	quatio	ns usin	ig dire	t and i	iterativ	ve meth	nods				K3	
CO2 S	olve Bou	ndary a	nd cha	racteri	stic Va	ulue Pro	oblems	<u>.</u>					K3	
CO3 L	Vetermin	e appro	ximate	Innear	and no	onlinea	r curv	e using	regress	10n anar	ysis		K3	
CO4 F	Ina a nui	nerical	SOLUTIO	on to pa	artial d	towar	tial eq		s ont of I	Duaguan	Outoo	mod	K3	
п					DO(lowal		neven.		PO11	PO12	IIIes IIIes	DSO2	
CO1		P03	P04	P05	PU6	P07	PUð	P09	P010	POII	2	2	PS02	
CO1											2	2		
CO2		+									2	2		
CO4		+									2	2		
CO5											2	2		
Avg.											2	2		
	1- Low	7		1	1	2-Me	dium				3-Hi	gh		
					Сон	rse (Cont	ent				0		
	Tan tan a da		40.00					Led .	40.000					
	Exampl		ιο Π lving		of e	ulation	s app ng M	latriv	notatio	n_Deter	, prop minants	and		
UNIT-1	inversio	version– Iterative methods–Relaxation methods–Systems of non-linear												
	equatio	ns.						, as 2 j	Stellis S					
	Bound	ary val	ue pro	blems	and c	haract	eristic	value	proble	ms: Sho	oting			
UNIT-2	method	– Solut	ion thr	ough a	set of	equati	ons –I	Derivat	ive bou	ndary co	nditions	-		
	Charact	teristic	value p	roblen	ns.	-								
	Curve	fitting	and ap	proxi	matior	n of fu	nction	s:					CO1,	
UNIT-3	Least s	quare a	pproxi	mation	fitting	g of no	on- line	ear cur	ves by l	least squ	ares –		CO2,	
	regressi	regression analysis- multiple linear regression, non-linear regression.												
	Numer	ical so	lutions	s of pa	artial	differ	ential	equat	ions: L	aplace's	equation	ons –		
UNIT-4	Represe	Representations as a difference equation – Iterative methods for Laplace's												
	equatio	ns - P	oisson	equati	10n - 1	Examp	oles –	Deriva	ative bo	oundary	conditio	ons –		
	Irregula Doroho	u and n	on – ře rtiol	iffore	nar gri	u.	onge	Evolia	it moth	od Cr	ank Nia	alson	CO1	
	method	– Deri	vative	houn	darv	condit	ion_St	ahility	and a	iou- Ch converge	ank-ivic	iteria	CO_{1}	
UNIT-5	Hyperl	olic n	artial	differ	ential	ean	ations	: Sol	lving	wave e	equation	hv hv	C07	
01111 5	finite d	ifferenc	es- sta	bility	of nur	nerical	meth	od-me	thod of	charact	eristics-	wave	005	
	equatio	n in two	o space	e dimei	nsions.									
			-	L	earn	ing I	Reso	urce	S					
			a.			8		1 (01			<u> </u>		T .	
		1.	Steven	C.Cha	pra,Ka	ymond	r.Can	ale"Nu	imerical	wiethods	storEngi	neers"	1 ata	
Text Bo	ooks		WIC- U	iawiiii	ı,,r11tfi	euno	11.							
		2.	2. Ci	urtis	F.Gera	ald, p	artick.	O.Wh	eatley,"	Applied	numeric	al an	alysis"	
			Pearso	n Educ	cation -	-Sixth	Editio	n.2002	2					
Refere	nce	1	Ward	chene	y&Day	vid Ki	ncaid	"Num	erical m	athemati	icsand			
Books computing"Brooks/colepublishingcompany1999,fourthedition.														

19IME2501A- COMPUTATIONAL METHODS
	2. RileyK.F.M.P.Hobson&BenceS.J," mathematical methods for physics and engineering" Cambridgeuniversitypress, 1999.
E-	1. <u>https://www.nptel.ac.in/courses/111/107/111107105/</u>
Resources&	2. <u>https://www.nptel.ac.in/courses/111/105/111105041/</u>
other digital	3. <u>https://www.nptel.ac.in/courses/111/106/111106112/</u>
material	4. <u>https://www.nptel.ac.in/courses/111/105/111105090/</u>

Cou	irse Ca	ategory		Inter d	iscipli	nary E	lective	-1I			Credit	s:		3
C	ourse	Type:	,	Theory	1					Le	cture-Tu	itorial-	3-	0-0
	04150	1) p 0.		111001)							Practic	al:		0 0
											Continu Evoluot	ous	3	80
D	rereau	icitec		Nil							Evaluat	End		
1	lerequ	isites.									Evaluat	7	70	
										,	Fotal Ma	arks:	1	00
Cours	e Out	comes												
Upon s	succes	cessful completion of the course, the student will be able to:												
CO1	Und	erstan	d the	basics	of sol	ar ene	rgy, w	vind er	nergy,	bio ma	ss, geotł	nermal e	energy,	К2
	Ocea	Concern energy and principles of energy conversion												
CO2	Exp	Explain and classify instruments for measuring solar radiation solar collectors, solar nergy storages, wind turbines, geothermal, MHD and fuel call											K4	
	Eve	nergy storages, wind turbines, geothermal, MHD and fuel cell.												
CO3	ener	xpiain and classify instruments for measuring solar radiation solar collectors, solar here y storages wind turbines geothermal MHD and fuel cell											K4	
	Out	utline about solar radiation, power from solar module, performance characteristics of												
CO4	wind	ind mill, potential and conversion techniques of tidal and wave energy, mini-hydel											K2	
	pow	ower plants and their economics.												
	Co	ntribut	tion of	Cours	se Out	comes	towar	rds acl	hieven	nent of l	Program	1 Outco	mes	
<u>CO1</u>	PO1 2	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
$\frac{CO1}{CO2}$	3	2		3 1		3	2	$\frac{2}{2}$	1			2	2	<u> </u>
C02	3	3		3		5	2	2	1			1	$\frac{3}{2}$	2
CO4	3	2		1			1					1	3	3
Avg.	3	2		2		3	2	2	1			1	3	3
	1	- Low				L	2-Me	dium	L			3-Hi	gh	
						Cou	rse	Cont	tent					
	Р	rinciple	es of S	Solar R	adiati	on and	Solar	Energ	y Col	lection	Role and	1 potent	ial of	
	n	ew and	renew	able s	ource,	the so	lar ene	rgy op	otion, e	nvironn	nental in	npact of	solar	CO1,
	p	ower, p	ohysics	s of the	e sun,	the sol	lar con	istant,	extra-t	errestria	and te	rrestrial	solar	CO2,
UNIT	-1 ra	diatior	n, sola	r radi	ation	on tit	led su	ırface,	instru	iments	for mea	asuring	solar	CO3
	ra	diation	and	sun s	shine,	solar	radiat	ion da	ata. Fl	lat plate	e and	concenti	rating	CO4
	CO	ollector	s, cla	ssifica	tion c	of con	centrat	ting c	ollecto	ors, orie	entation	and the	ermal	
	a	latysis,	auvai		mector	IS IS								
<u> </u>	S	olar En	ergy S	torage	, Appl	ication	s and l	Photov	oltaic	Energy	Convers	ion Diff	erent	CO1.
	m	ethods	, sensi	ble, lat	ent he	at and	stratifi	ed stor	age, so	olar pon	ds. Solar	r applica	tions	CO2,
UNIT	-2 so	olar hea	ting/c	ooling	techni	que, so	olar dis	stillatio	on and	drying.	Solar ce	11		CO3
	fu	ındame	entals,	solar c	ell clas	ssificat	ion, pe	erform	ance of	f solar c	ell- pow	er from	solar	CO4
	m	odule	. 1		-1 1	·	4 - 1	1	. 1	·	. 1., '11			
		ources	and j	Potenti Botz	ais, h	orizon	iai an	u vert	ucal a	XIS WII	iamills,	perforn robio/oc	nance	
UNIT	$-3 \begin{vmatrix} c_1 \\ d_2 \end{vmatrix}$	gestion	i istics,	s of hi		la. Ell	merpre	s vield	comb	ustion (ll, Allac	vistics of	f bio-	
	g	as, utili	zation	for co	oking	urgest	15, ga	s yield	, come		maracter	131103 01	010-	
	G	Geothermal Energy and Ocean Energy Resources, types of wells, methods of												
LINIT	-1 h	arnessi	ng the	energy	y, pote	ential in	n India	a. OTE	EC, pri	nciples	of utiliza	ation, s	etting	
	o	OTE	C plan	its, the	rmody	mamic	cycle	s. Tida	al and	wave e	energy: 1	Potential	and	
	co	onversi	on tecl	nnique	s.		_	P			C 11	.1	1 0	001
UNIT	-5 G	eotheri	mal Ei	energy	and O	cean l	Energy	CTEC	urces,	types of	or wells,	method	us of	CO1
1	116	111CSSI	ng ule	energy	, poter	mai III	mula.	OTEC	, princ	rhies of	uunzati	on, setti	ing UI	004

19EE2701C- RENEWABLE ENERGY RESOURCES

OTE	C plants, thermodynamic cycles. Tidal and wave energy: Potential and C	05
conv	ersion techniques.	
	Learning Resources	
Text Books	 Non-Conventional Energy Sources by G.D. Rai, Khanna publishers, edition,2014. 2. Renewable Energy Sources and Emerging Technologies by D.P Koth K.C Singal, Rakesh Ranjan, PHI learning Pvt Ltd, 2nd edition ,2012 	5th ari,
Reference Books	 Renewable Energy resources byTiwari and Ghosal, publisher Narosa,200 Renewable Energy Resources by John Twidell and Tony Weit, publisher Taylor and Francis, 2nd editin 2006. Solar Photo Voltaics Fundamentals, Technology and application by Cheta Singh Solanki, publisher PHI learning Pvt Ltd, 3rd edition, 2019 Wind Energy Theory and Practice by Siraj Ahmed publisher PHI learning Pvt Ltd, 3rd edition 2016)5 an g

Cou	irse Ca	ategory	:	Inter d	iscipli	nary El	lective	-1I			Credit	s:		3
C	ourse	Туре:	,	Theory	7					Le	cture-Tu Practic	itorial- al:	3-	0-0
											Continu	ous		30
D	roroau	icitac		Nil							Evaluati	ion:		
1	lerequ	151105.									Evaluati	ion:		70
										,	Fotal Ma	arks:	1	00
Cours	e Out	comes												
Upon	succes	Increase the student will be able to:												
CO1	Und and 3	erstan JSP	d the 1	basic c	concep	ts of H	ITML	, CSS,	XML	, JDBC	connect	tivity, S	ervlets	K2
CO2	Use	Use Java script for validation of web pages.												
CO3	Ana	Analyze the concepts of DOM, JDBC Architecture and life cycles of Servlets and JSP.												K4
CO4	Con	Compare the concepts of HTML and XML, Servlets and JSP.												K4
CO5	Deve	Develop simple web applications using JDBC, servelet and JSP.											K6	
		Contribution of Course Outcomes towards achievement of Program Outcomes												DGOO
<u>CO1</u>	POI	PO2	P03	PO4	2	PO6	P07	PO8	P09	POI0	POII	PO12	2	PS02
CO1			$\frac{2}{2}$		$\frac{2}{2}$								$\frac{2}{2}$	2
CO2			2		2								2	2
CO4			2		2									
CO5			2	2	2			-						
Avg.			2	2	2								2	2
	1	- Low					2-Me	dium				3-Hi	gh	
						Cou	rse (Cont	tent					
	I	NTRO	DUCT	TION	ro wi	EB TE	CHN	OLOG	IES:					
	Н	listory	of the	web,	Overv	view of	f HTT	P, HT	ML Ir	ntroduci	ng HTM	IL docu	iment	CO1
UNIT	-1 st	ructure	e, Crea	ting H	eading	gs, link	is, para	igraph	, imag	es, table	es, frame	es, form	s and	
	ht	tml con	trols o	on a we	b page	e								
			DUCT				C/TX/T	E CIU	ND/DQ.					
	II Ir	nine E	vterna	NG CA 1 Inter	ASCA. nal St	vle cla	SI IL	Itiple	EE IS: styles	Introdu	ring Jav	Script		
UNIT	-2 U	sing V	ariable	es. Usir	ng Ope	rators.	Work	ing wi	th Con	trol Flo	w statem	inents.		CO2
01,111	w	orking	with f	unction	ns, Hai	ndling	Events	, Usin	g Arra	ys, Crea	ting obje	ects in Ja	ava	
	S	cript 0												
	V	VORK	ING V	VITH	XML:									CO1
UNIT	-3 Ir	ntroduc	tion to) XML	, XMI	L Basi	cs, XN	IL Te	chnolo	gies, Ex	tensible	HTML	,	CO3
	(2	XHIM.	L), Jav		IOT XN	DACE	cessin	g, Doc	ument	Object	Model (DOM)		CO1
		etting	UNG V started	with	DA I A IDRC	Defin	u: inσ ∩⊺	DRC 1	Introdu	ction to	IDRC	Compos	nente	CO3
UNIT	-4 of	f JDBC	L JDB	C Arch	nitectu	re. Tvr	nes of	Driver	s. Wor	king wi	th JDBC,	Compos	licitis	CO4
01111	. ci	reating	a Sim	ple Ap	plicati	on, W	orking	with I	Prepare	ed State	ment, U	sing Cal	lable	CO5
	S	tatemer	nt		1	,	U		1			U		
	V	VORK	ING V	VITH	SERV	LETS	:							
	Ι	ntroduc	cing th	e MV	C arch	itectur	e, Des	cribin	g Serv	lets, Ur	derstand	ling Ser	vlets,	CO1
UNIT	-5 ^W	nat are	e servl	ets, in	troduc	ing the	e Serv	iet AP	I, Serv	viet Lif	e Cycle	, Devel	oping	CO4
		NUDK.	viet Aj	ррпсат угтн	1011 ISP• 1	ntrodu	ction t	م ا۲۵	Under	erstanding ISP Describing the				COS
	Is	SP Life	Cvcle	Creat	ing a S	Simple	JSP n	ages	ondel	stanum	5 J.J. , L		is inc	
			2,010	, creat	T.4	arn [°]	ing 1	Recn	lirce	S				
						.ai II	ing i	11030	uiu	N N				

19IT2701C- WEB TECHNOLOGIES

	1. Web Technologies, Black Book, Kogent Learning Solutions Inc,
	Dreamtech Press.
I ext Books	2. JDBC, Servlets, and JSP, New Edition, Santhosh Kumar K, Kogent
	Learning Solutions Inc, Dreamtech Press.
	1. Web Technologies ,Uttam K. Roy, Volume 2 , Oxford University
	2. Core Servlets and Java Server Pages Volume 1 CORE TECHNOLOGIES,
	Marty Hall and Larry Brown Pearson
	3. Internet and World Wide Web – How to program, Dietel and Nieto
Reference	4. An Introduction to Web Design and Programming – Wang-Thomson
Books	5. Professional Java Server Programming S.AllamRaju and
	othersApres(dreamtech)
	6. Java Server Programming , IvanBayross and others, The X Team, SPD
	7. Beginning Web Programming-Jon Duckett WROX.
	8. Java Server Pages, Pekowsky, Pearson.
E-	1. http://nptel.ac.in/courses/106105084/13
Resources&	2. <u>http://www.w3schools.com/</u>
other digital	3. https://www.javatpoint.com/html-tutorial
material	

Course	Categor	ry:	Inter d	isciplir	nary El	lective	-II			Credit	s:		3
Cour	se Type:	:	Theory	/					Le	cture-Tu Practic	torial- al:	3-	0-0
Duran			Nil							Continu Evaluati	ous on:		30
Prere	quisites:	:								Semester Evaluati	End on:	,	70
									۲	Fotal Ma	arks:	1	00
Course O	utcome	s											
Upon succ	cessful completion of the course, the student will be able to:												IZ 2
$\begin{array}{c c} CO1 & A \\ \hline CO2 & Sc \\ \end{array}$	Apply various Classical optimization techniques											K3	
CO2 SC	elect suitable Numerical method for optimization of Engineering Problems.											K4 K4	
CO3 A	naryze mutu stage decision making process infough dynamic programming											K4 K2	
<u> </u>	Contribution of Course Outcomes towards achievement of Program Outcomes												112
PO	'O1PO2PO3PO4PO5PO6PO7PO8PO9PO10PO11PO12PS01												PSO2
CO1 2	2 3	3	2		2		2		2		2	2	2
CO2 2	2 3	3	2		2		2		2		2	2	2
CO3 2	2 3	3	2		2		2		2		2	2	2
CO4 2	2 2	3	2		2		2		2		2	2	2
Avg. 2	$\frac{2}{2}$	3	2		2		2		2		2	2	2
	I-Lov	V			<u> </u>	2-Me					3-Hi	gh	
					Cou	rse (Cont	tent					
UNIT-1	Introdu optimiz objecti techniq CLAS Introdu constra multipl	uction, zation ve fun jues. SICAL action, s unts, n lier met	engin proble ction, OPTI single nulti nod.	eering m-desi class MIZA variably variably	appl gn ve ificatio TION le opti e opti	ication ector, on of TECH imizati imizati	s of desigr optim HNIQI on, m on w	optin cons mizatio UES: ulti va ith ec	nization straints, on pro- riable o quality	, stater constra blems, optimiza constrai	nent of aint sur optimiz tion wit nts-Lag	f an rface, ation th no range	CO1
UNIT-2	NON-I One Di elimina method	LINEA imension ation me 1, Fibon	R PRC nal Mi ethods- acci me	OGRA nimiza unrest ethod,	MMIN tion M ricted golden	NG, I: lethods search, sectio	: Intro exhau n meth	duction stive s	n, unimo earch, i terpolati	odal fund nterval h ion meth	ction, alving od,		CO2
UNIT-3	NON-I Direct steepes	LINEA Search st descer	R PRC Metho nt meth	DGRAI d- Nel lod (Ca	MMIN der- M tuchy's	IG II: Iead Si s metho	implex od), No	t methewton	od, Indi Method	rect sear , Marqua	rch metl ardt Met	hods- hod	CO3
UNIT-4	DYNA Multist tabular	MIC P tage dec method	ROGF ision p ls, Line	rocess ear pro	IING: es, Co gramn	ncepts	of sub a case	optim of D.I	ization-	calculus	s metho	d and	CO3
UNIT-5	INTEGER PROGRAMMING:Introduction, Graphical Representation, Gomory's cutting plane method, BalasT-5algorithm for zero-one programming, Branch-and- bound method, PenaltyFunction method; Basic approaches of Interior and Exterior penalty functionmethods.											CO4	
Learning Resources													
Text Bo	oks	1. S	.S.Rac age int	, Enginernatio	neering mal,20	g optin 07.	nizatio	on theo	ry and p	practice,	, 3rd E	dition,	New

19ME2701B-OPTIMIZATION TECHNIQUES

	2. Van Wylen, Fundamentals of Classical Thermodynamics, .John Wylie.
Reference	1. H.A.Taha, Operations Research, , 9th Edition, Prentice Hall of India, 2010.
Books	2. F.S.Hillier, and G.J.Lieberman, Introduction to Operations Research, , 7th Edition, TMH, 2009.
E-	1. https://nptel.ac.in/courses/111/105/111105039/
Resources&	2. https://nptel.ac.in/courses/106/108/106108056/
other digital material	 https://nptel.ac.in/courses/111/104/111104071/ https://nptel.ac.in/courses/112/105/112105235/

Cou	irse (Category	:	Inter d	iscipli	nary El	ective	-II			Credit	s:		3
C	ourse	e Type:	,	Theory	7					Le	cture-Tu	torial-	3-	0-0
		• •		-							Continu			
											Evaluat	ion.		30
Pı	rerea	uisites:		Nil						S	Semester	End		
	ereq									~	Evaluati	ion:	, í	70
										r	Fotal Ma	arks:	1	00
Course	e Ou	tcomes											•	
Upon s	succe	ssful co	mpleti	on of th	he cou	rse, the	e stude	nt will	be abl	le to:				
CO1	Ex	plain bas	sics of	projec	t mana	igemer	nt							K2
CO2	An	alyze ac	tivities	involv	ved in	project	•							K4
CO3	Des	scribe va	arious	project	cost r	nanage	ement t	echnic	ques					K2
CO4	Ap	ply vario	ous Lir	near pr	ogram	ming to	echniq	ues an	d sequ	encing r	nethods	0		K3
	C	ontribut	tion of	Cours	se Out	comes	towar	ds acl	hieven	nent of I	Program	1 Outco	mes	
<u>CO1</u>	PO1	11 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12 PS01 2 2 3 2 2 2 3 2 2 3 2 2 3 <td< th=""><th>PSO2</th></td<>												PSO2
	2	2	3	2	2	2		2	2		3	2	2	3
C02	2	$\begin{array}{c c c c c c c c c c c c c c c c c c c $											3	
C03	$\frac{2}{2}$	$\begin{array}{c c c c c c c c c c c c c c c c c c c $											3	
	2	$\begin{array}{c c c c c c c c c c c c c c c c c c c $											3	
1115	-	<u>2 2 3 2 2 2 2 1 2 2 2 1 1 2 2 2 1 1 2 2 2 1 2 1 2 2 1 1 2 1 2 1 2 1 2 1 2 1 2 1 1 1 2 1 1 2 1 1 2 1</u>										5		
						Сон	rse	Cont	ent				9	
	1	Meaning	r defin	JF FK	ojec and ch	aracte	ristics	ofar	roject	technic	al and	socio-cu	ltural	
		limensio	ons: pr	oiect 1	ife cv	cle pha	ises. n	roiect	nojeci, planni	ng and	graphic	present	ation:	CO1
UNIT	-1	work bro	eakdov	vn stru	icture,	manag	geable	tasks;	size o	of netwo	ork; blov	v down	NW;	
	i	dentity	and log	gic dur	nmy a	ctivity	, Fulke	erson r	ule for	number	ring NW	; time-s	caled	
]	NW		-	-						-			
]	NW AN	ALYS	SIS:										
]	Network	mode	lling, I	Probab	ilistic 1	model-	variou	is types	s of				G Q Q
UNIT	-2	activity	times	estima	tion, p	rogran	nme e	valuati	on rev	new tec	hniques	(PERT)	,	CO ₂
		lotormir	ity of C	ompre vodel	ung m	e proje I nath i	Cl, nothod		(1) criti	ical nath	calcula	tion		
		rashing	of sim	nple of	netwo	rks	nethot		1), cin	icai pati	l'calcula	uon,		
		PROJE	CT DI	JRAT	ION A	ND C	ONTF	ROL:						
]	mportai	nce and	d optio	ns to a	cceler	ate pro	ject co	omplet	ion; tim	e cost tr	ade off;	fixed	CO2
		variable	and to	otal cos	sts; us	e of fl	oats [°] ar	nd cost	t optin	nization;	project	perform	nance	
UNIT	-3 1	neasure	s; proj	ect mo	nitorir	ng info	and re	eports;	projec	ct contro	ol proces	ss; Gant	chart	
		and con	trol ch	art; co	ost-sch	edule	S-grap	oh; pla	nned o	cost of	work sc	hedule	(PV),	
	1	oudgeted	1/ earn	ed cost	t of wo	ork cor	nplete	d (EV)	and a	ctual co	st of wo	rk comp	leted	
		AC); sc	nedule	and co	ost var	ances	(SV, C	V) to	recasti	ng tinal	project o	costs.		
	1	LINEA		JGKA nmina	Drob1	NG: om Eo	rmulet	ion C	tranhia	ما وماينه	ion Sim	nlev ma	thad	CO^{3}
		untificial	varie	ables	techni	T	'wo_nł	ion, O iase i	method	ai solut Rig_]	M meti	hod D	uality	005
UNIT	-4	Principle	y un n	10105		ques-1	wo pi	lase i	inctiloc	i, Dig-i	ivi meti	liou, D	uanty	
		SEQUE	NCIN	G: Intr	oducti	on, see	quenci	ng of r	n jobs t	through	two mad	chines, n	i jobs	
	t	hrough	three n	nachin	es –tw	o jobs	throug	h 'm'	machi	nes			5	
	'	FRANS	PORT	CATIO	N PR	OBLE	M:							
UNIT	-5	Formula	tion, C	Optimal	l soluti	ion, U-	V met	hod, u	ınbalar	nced trai	nsportati	on prob	lems,	CO4
]	Degener	acy.											

19ME2701C- PROJECT MANAGEMENT & OPTIMIZATION

rr	1
ASSI	GNMENT PROBLEM: Formulation, Optimal solution, Variants of
Assig	nment Problem-Traveling Salesman problem.
	Learning Resources
	1. Prasanna Chandra, Projects Planning, Implementation and Control,
Tort Doolra	Tata McGraw Hill Publishing Company Limited, New Delhi, 1995.
Text Dooks	2. Operations Research, by S.D.Sharma, Kedarnath & Ramnath
	publications (15 th edition),2013
	1. Project Management Institute (PMI), A Guide to the Project Management
	of Knowledge Newton Square, PA, 1996
	2. J.R. Meredith and S.J. Mantel, Project Management: A Managerial
Reference	Approach. John Wiley and Sons, New York, 1995.
Books	3. L.S. Srinath, PERT & CPM Principles & Applications, 3rd edition, East
	west Press,2001.
	4. Operations Research, (2nd edition) by R.Pannerselvam, 2009, PHI
	Publications, Noida
E-	1. https://nptel.ac.in/courses/105/106/105106149/
Resources&	2. https://nptel.ac.in/courses/110/104/110104073/
other digital	3. https://nptel.ac.in/noc/courses/noc16/SEM2/noc16-ce06/
material	4. https://nptel.ac.in/courses/112/106/112106134/

Cou	rse C	ategory	/:	Inter d	iscipli	nary E	lective	-III			Credit	s:		3
C	ourse	Type:	,	Theory	7					Le	cture-Tu	torial-	3-	0-0
	04150	1) p 0.		1 11001)							Practic	al:		0 0
											Continu	ous	3	30
D.		:.:]	Nil							Evaluat	IOII:		
PI	rerequ	isites:									Evolution	End	1	70
										,	Evaluat Total Me	arke	1	00
Cours	e Out	comes										u K5.	1	00
Upon s	succes	sful co	mpleti	on of t	he cou	rse, the	e stude	nt will	be ab	le to:				
CO1	Und	erstan	d the b	asic co	onstruc	ts of P	ython	Progra	mming	g.				K2
CO2	Арр	ly Pyth	non Pro	gramn	ning co	onstruc	ts to s	olve pr	oblem	s and m	ake an e	ffective	report.	K3
CO3	Арр	ly pyth	non pac	kages	to writ	e prog	rams f	or a gi	ven ap	plication	n.			K3
CO4	Ana	lyze an	nd choo	se app	ropria	te data	structu	are for	solvin	g proble	ems			K4
	Co	Contribution of Course Outcomes towards achievement of Program Outcomes												
	PO1	1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12 PS01												PSO2
CO1	3													
CO2	3	3 3 3												
CO3	3	3												
CO4														
Avg.	3	3 3 3												
	1	- LOW				<u> </u>	2-Me					3-Hi	gn	
Course Content														
	INTRODUCTION TO PYTHON													
	F	eatures	of F	ython	, Writ	ting a	nd Ex	ecutin	ig Firs	st Pyth	on Prog	gram, L	iteral	
UNIT-	$1 \begin{bmatrix} 0 \\ 0 \end{bmatrix}$	onstan	ts, Va	riables	s and	Ident	ifiers,	Rese	rved	Words,	Data 7	Гуреs,	Input	CO1
01.11		peratio	on, Op	erators	and H	Expres	sions,	Operat	tions o	on String	gs, Type	e Conve	rsion,	
	C	onditio	onal sta	temen	ts and	iterativ	ve state	ements	•					
		FUNC	TION	S IN I	рутн	ON								
	- F	unction	is: Intr	oductio	on. Bu	ilt-in N	/lath Fi	unction	ns. Use	r Defin	ed Funct	ions:		
UNIT	-2 F	unctior	n Call,	Variab	le Sco	pe and	Lifeti	me, Th	ne retur	n staten	nent, La	mbda		CO2
	F	unctior	ns, Rec	ursive	functi	ons Pa	ckages	in pyt	hon.		,			
		STRI	NGS A	ND F	ILE H	ANDI	LING	IN PY	THON	N				
UNIT.	3	String	s: Intr	oducti	on, Bi	uilt-in	String	Func	tions,	Slice O	peration	, Comp	aring	CO2
01111	5	String	s, Itera	ting St	ring, F	Regular	r Expre	essions	s.					
	F	ILE H		JING:	open,	close,	, read	and w	rite op	erations	3.			
			A STR	UCTU		IN PY	THO Noot	N ad t in	to Dec	ia List	Onarati			CO^{2}
	, r	Lists: Funlos	Acces	sing v ing Tu	$n \log \Lambda$	in fists	, INESU	ed Lis	is, Das	Bosic T	Operatio	JIIS.		COS
UNIT	4	nerati	ons	ing ru	pie, A	LCCSSII	ig valu		i tupic,	Dasic I	upie			
		Diction	aries [.]	Creatii	nσ and	1 Acce	ssino I	Diction	aries	Ruilt-in	Diction	arv		
	fi	inction	s. List	Vs Tu	ple Vs	Dicti	onarv.	2101101	lui ies,	Dunt III	Dietion	iui y		
		PACK	XAGES	5:	<u> </u>	_ 1001	·							
	1	Numpy	Crea	ate, res	shape,	slicing	, opera	ations s	such as	s min, m	ax, sum	, search,	sort,	CO4
TINIT	5 1	nath fu	nctions	s etc.	- '	C	-							
UNII	·	Pandas Read/write from csv, excel, json files, add/ drop columns/rows,												
	8	aggrega	ations,	applyii	ng funo	ctions								
	Ν	latplot	lib V	'isualiz	zing da	ta with	n differ	ent plo	ots, use	e of subp	olots.			
					Le	earn	ing l	Reso	urce	es				

19CS2801D- INTRODUCTION TO PYTHON PROGRAMMING

	1. Python Programming using Problem Solving Approach, Reema Thareja,
Text Books	2017, OXFORD University Press
	2. Python for Data Analysis, Wes McKinney, 2012, O.Reilly.
Reference	1. Core Python Programming, R. Nageswara Rao, 2018, Dreamtech press.
Books	2. Programming with python, T R Padmanabhan, 2017, Springer.
E-	1. http://www.ict.ru.ac.za/Resources/cspw/thinkcspy3/thinkcspy3.pdf
Resources&	2. https://zhanxw.com/blog/wp-content/uploads/2013/03/BeautifulCode_2.pdf
other digital	
material	

19EC2801B- INSTRUMENTATION AND SENSOR TECHNOLOGIES OF CIVIL

ENGINEERING APPLICATIONS

Cou	rse Ca	ategory	:	Inter d	iscipli	nary El	lective	-III			Credit	s:		3
C	ource	Type		Theory	,					Le	cture-Tu	ıtorial-	3_	0_0
C	ourse	Type.		Theory							Practic	al:	5-	0-0
											Continu	ous		30
				Nil							Evaluat	ion:		
P1	rerequ	isites:		1 111						S	Semester	End	7	70
										-	Evaluat	ion. orke	1	00
Cours	e Out	comes								-		u K5.	1	00
Upons		sful co	mpleti	on of t	he cou	rse the	e stude	nt will	be ab	le to				
oponi	Sum	marize	vario	is perf	formar	nce ch	aracter	istics	of ins	strument	s and t	he qual	ity of	
CO1	meas	sureme	nt	as per	orman		urueter	150105	01 111	, ci unioni	o una t	ne quui	<i>ity</i> 01	K2
CO2	Inter	pret th	e type	of tran	sducer	based	on the	transc	luction	princip	les.			K2
CO3	Iden	dentify the relevant transducer for measurement of physical quantities.												K2
COA	Disc	Discover the additional attributes in advanced sensors and their role in Civil												K4
004	Engi	ngineering.												
	Co	Contribution of Course Outcomes towards achievement of Program Outcomes												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
<u>CO1</u>	2	1	2	1										2
CO2	2	1	2	1										2
<u>CO3</u>	2	1	2	1										2
<u>CO4</u>	2		2											2
Avg.	2	<u> </u>	2	1			2 M.	12				2 11:	- 1-	2
	1	- LOW				0	Z-Ivie					3-HI	gn	
						Cou	rse	Cont	tent					
		Introd	uction	:										
		Definit	ion o	f sens	or/trai	nsduce	r-Bloc	k Dia	igram-	element	s of n	neasuren	nent	~ ~ <i>i</i>
		system	-class1	fication	1 of	senso	ors/tran	sducer	s-stati	c chara		cs-accura	acy,	COI
UNIT	1	time d	on, res	olution	, nnea	rity, se	ensitivi	ity, ran	ige, 102	ading en	lect, thre	esnoid, d	lead	
		ERRO	RS IN	IIC, SPA	n. SURF	MEN	т∙							
	Т	rue val	ue. sta	atic err	or. sta	tic cor	rection	n. scale	e range	e and sc	ale span	error		
	ca	alibrati	on cur	ve, read	labilit	y, repe	atabili	ty & re	eprodu	cibility,	drift and	d noise		
		RESIS	TIVE	TRAN	SDU	CERS	:	•		•				
		Potenti	ometer	rs-Line	ar PO	T, Rota	ary PO	T, cha	racteri	stics of]	POT.			
		Thermi	istors-	Constr	uction	and its	s Resis	tance-	Temp	erature c	character	ristics.		CO2
UNIT	-2	Thermo	ocoupl	es- Co	nstruct	ion an	d its R	esistar	nce-em	f charac	teristics			
	-			S TRA		CERS	S :	р	1 0	1	C (1		
		Princip		hange	of self	-induci	tance,	Princip	$\frac{1}{2}$	vnange c	of mutua	1	ahla	
	ll d	ifferent	ice, Lli ial tra	neform	riable er (RV		intial ti	ansion	mer (L	.vD1),	Kotary	varia	able	
	u			$\overline{\mathbf{F} \mathbf{T} \mathbf{R}}$	ANSD	UCEF	2S·							
		Introdu	iction-	Variab	le area	tvpe-	variabi	le air s	ean tvr	oe- diffe	rential a	arrangen	nent	CO2
		in capa	acitive	transd	ucers,	variat	ion of	dielec	tric co	onstant f	for meas	suremen	t of	
TINIT	2	liquid	level,	variatio	on of c	lielecti	ric con	istant f	for me	asureme	nt of di	splacem	ent,	
UNIT	-3	advanta	ages &	disadv	antag	es of C	Capacit	ive tra	nsduce	ers.				
		PIEZC)ELE(CTRIC	CTRA	NSDU	UCERS	S :						
		Measu	rement	of For	ce, M	odes o	f opera	ation o	f Pie	zoelectr	ic crysta	ils, prop	erties	
	0	f Piezo	electri	c crysta	als, use	e of Pie	ezoeleo	ctric T	ransdu	cers.				
UNIT	-4	HALL	, EFFF	CT T	KANS	DUCE	ERS:							

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	OPTICAL TRANSDUCERS.										
	UTIICAL INANSDUCERS: Vacuum meata amigaing call and its characteristics, comissingly star relate sleptic										
	vacuum photo emissive cell and its characteristics, semiconductor photo electric										
	transducer- Photo conductive cell and its characteristics, photo diode and its										
	characteristics, photo voltaic cell and its characteristics.										
	DIC	GITAL AND SMART SENSORS:									
LINIT 5	Intro	duction to digital encoding transducer- digital displacement transducers- shaft C	04								
0111-5	enco	der-optical encoder, Introduction to Smart Sensors, Overview in Applications									
	of sei	nsors in Civil Engineering.									
		Learning Resources									
-		1. A.K.Ghosh, "Introduction to Measurements & Instrumentation", IIIrd									
		ed, PHI									
Text Bo	ooks	2. A.K.Sawhney & Puneet Sawhney, "A Course in Mechnanical									
		Measuremnets & Instrumentation". Dhanapat Rai & Co.									
		3. D.V.S.Murty, "Transducers & Instrumentation", PHI.									
Reference		3. Core Python Programming, R. Nageswara Rao, 2018, Dreamtech press.									
Books		4. Programming with python, T R Padmanabhan, 2017, Springer.									
Б		1. Raman Pallas-Arney & John G.Webster, "Sensors & Signal									
E-	0	Conditioning",2012.									
Kesourc		2. D.Patranabis, "Sensors and Transducers" 2nd edition., PHI, 2013.									
other di	3 . BC Nakra, KK Chaudhry "Instrumentation, Measurement and Analysis", 2nd										
mater	al	Edition,TMH									

Cou	irse Ca	ategory	r : []	Inter disciplinary Elective –III							Credits:			3
Course Type:				Theory						Le	Lecture-Tutorial-		3-0-0	
											Continuous		<u> </u>	
											Evaluation:		30	
Prerequisites:				Nil							Semester End			
r rerequisites.											Evaluation:			70
											Total Marks: 1			00
Course Outcomes														
Upon successful completion of the course, the student will be able to:														
<u>CO1</u>	Und	iderstanding the fundamental logistics and supply chain management concepts.										K2		
02	App	iy knov	knowledge to evaluate and measuring logistics costs and performance.										K.3	
CO3	trans	sportati	ung i on.	ne rou	indatio	onal r	ole of	logis	stics a	is it re	lates to	Source	e and	K2
~~ (Crea	ate awa	arenes	s on h	ow to	align t	he ma	nagem	ent of	a suppl	v chain	with co	rporate	
CO4	goal	s and st	trategie	es.							<i>j</i>		- F	K6
	Co	ntribut	tion of	Cours	se Out	comes	towar	rds acl	hieven	nent of l	Program	1 Outco	mes	1
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1	2	1										2
CO2	2	1	2	1										2
CO3	2		2	1										$\frac{2}{2}$
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	-	Lon				Сон	rco	Cont	ont			0 111	511	
UNIT	INTRODUCTION TO LOGISTICS MANAGEMENT:Introduction, Objectives, Concept of Logistics, Objectives of logistics, Types of logistics, Concept of Logistics Management, Evolution of Logistics, Role of Logistics in an Economy, Difference between Logistics and Supply Chain Management.										CO1			
UNIT	MEASURING LOGISTICS COSTS AND PERFORMANCE: T-2 The concept of Total Cost analysis – Principles of logistics costing – Logistics and the bottom-line – Impact of Logistics on shareholder value.										CO2			
UNIT	-3 LOGISTICS AND SUPPLY CHAIN RELATIONSHIPS: Benchmarking the logistics process and SCM operations –Mapping the supply chain processes – Supplier and distributor benchmarking–identifying logistics performance indicators – Channel structure.										CO2			
UNIT	-4	Sourcing and Transporting:4Sourcing decisions and transportation in supply chain – infrastructure suppliersCoof transport services – transportation economics.									CO3			
TINIT		RICIN	ICING PRODUCT AND DOCUMENTATION:											CO4
UNIT	-5 P I+	Pricing - Revenue Management Lack of coordination and Bullwhip Effect -											CO4	
I earning Resources														
			1.	Donald	1 J.Bo	wersox	and I	David	J.Closs	s: "Logi	stical M	anagem	ent" TI	ne
Text	Text Books Integrated Supply Chain Process, TMH, 2011. 2. Edward J Bradi, John J Coyle: " A Logistics Approch to Suppl Management, Cengage Learning, New Delhi, 2012.								Supply	Chain				
Reference			1. D.K.Agrawal: "Distribution and Logistics Management", MacMillan											

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Books	Publishers, 2011
	2. Sunil Chopra and Peter Meindl: "Supply chain Management: Strategy,
	Planning and Operation", Pearson Education, New Delhi 2013
	3. Rahul V Altekar: Supply Chain Management, PHI Learning Ltd, New
	Delhi, 2009

000	Course Category:				Inter disciplinary Elective –III						Credits:			3	
C	ourse	Type:	,	Theory						Le	Lecture-Tutorial- Practical:			3-0-0	
											Continuous Evaluation:			30	
Prerequisites:				Nil							Semester End			70	
											Total Marks:			100	
Cours	Course Outcomes														
Upon s	pon successful completion of the course, the student will be able to:														
CO1	Dev	elop an	under	standir	ng on q	uality	manag	ement	philos	ophies a	and fram	eworks		K5	
CO2	Acq	uire kn	owled	ge of q	uality	costs a	ind lea	dership	2					K2	
CO3	Illus parti	s trate o nership	concep	ts of c	ustom	er focu	us, cor	ntinuou	ıs qual	ity imp	rovemen	it and su	upplier	K2	
CO4	Exp	lain T(QM too	ls to ir	nprove	e mana	gemen	t proce	esses.					K2	
CO5	Dete	ermine	the set	t of ind	icators	s to eva	aluate	perform	nance	exceller	ice of an	organiz	ation	K3	
	Co	ntribut	tion of	Cours	e Out	comes	towar	ds act	nievem	ent of I	rogram	Outco	mes		
<u>CO1</u>	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	
$\frac{CO1}{CO2}$	2				2	2		2	2	1	2	1	3 2	$\frac{2}{2}$	
C02	$\frac{2}{2}$				2	3		3	3	1	$\frac{2}{2}$	1	3	$\frac{2}{2}$	
C03	2				2	3		3	3	1	2	1	3	$\frac{2}{2}$	
C04	2				$\frac{2}{2}$	3		3	3	1	2	1	3	2	
Avg.	2				2	3		3	3	1	2	1	3	2	
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		NTRO.	DUCT	ION:											
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		NTRO. Definitic Dimensi	DUCT on of ons, fo	' ION: Quality our pha	y, Fac ses of	tors e quality	ffectin 7, Tota	g qual l Quali	lity, Q ity, Sal	uality r ient feat	nanagen tures of '	nent, Qu Fotal Qu	uality uality	CO1	
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UNIT	-1 M P C B -2 In Q Ie	NTRO Definitic Dimensi Aanager illars o CHARA Carriers DUALI DUALI eadersh	DUCT on of ons, fo ment (' f TQM CTEI to TQI TY CO nce of f TY LE ip for 7	TON: Quality our pha TQM) (, Tradi RISTI <u>M Imp</u> OSTS: quality CADEI FQM,	y, Fac ses of defini- itional CS OF lement Cost cost. RSHII Demin	tors e quality tion of Appro TQM ation classif P: Qual g Philo	ffectin, 7, Tota TQM ach an I: TQM ication lity of osophy	g qual l Quali l, Elen d TQM / Enat , Basi leaders	lity, Q ity, Sal nents c A Approblers, A c cost c cost ship, Q ributio	uality r lient feat of TQM coach. Approach of quality o ns of G	nanagen tures of ' , Princip hes, rele ty. App f success urus of T	nent, Qu Fotal Qu les of T vance, lications sful lead	uality uality CQM, s and er,	CO1 CO2	
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19ME2801B- TOTAL QUALITY MANAGEMENT

UNIT-4	TQM TOOLS:Benchmarking - Reasons to Benchmark, Benchmarking Process, Quality FunctionDeployment (QFD) - House of Quality, QFD Process, Benefits.TaguchiQualityLossFunction.Total Productive Maintenance (TPM) - Concept, Improvement Needs, FMEA - Stages of FMEA, the seven tools of quality, Process Capability-Concept, Methods of calculating process capability, Process capability index, Concept of six sigma.							
UNIT-5	NEED FOR ISO 9000 - ISO 9001-2008 QUALITY SYSTEMElements, documentation, Quality Auditing – QS 9000 - ISO 14000 - Concepts, Requirements and Benefits – TQM, Implementation in manufacturing and service sectors.CO)4						
Learning Resources								
Text Bo	 Dale H.Besterfiled, "Total Quality Management", Pearson Education, Delhi, 2006. K. C. Arora, "Total Quality Management", Kataria & sons., New Delh 2005. 	ni,						
Refere Book	 Subburaj Ramasamy, "Total Quality Management", Tata McGraw Hill Publishing Company Ltd., New Delhi, 2005. Narayana V and Sreenivasan N.S., Quality Management - Concepts and Tasks, New Age International, Delhi, 1996. 							
E-	1. https://nptel.ac.in/courses/110/105/110105039/							
Resourc	2. https://nptel.ac.in/courses/110/104/110104085/							
other di	gital3. https://nptel.ac.in/courses/110/104/110104080/#ial4. https://nptel.ac.in/noc/courses/noc17/SEM2/noc17-mg18/							

