



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

(Approved by AICTE | NAAC Accreditation with 'A' Grade | Accredited by NBA | Affiliated to JNTUH)

Dundigal, Hyderabad - 500 043, Telangana

**OUTCOME BASED EDUCATION
WITH
CHOICE BASED CREDIT SYSTEM**

**MASTER OF TECHNOLOGY
STRUCTURAL ENGINEERING**

**ACADEMIC REGULATIONS, COURSE STRUCTURE AND SYLLABI
(Based on AICTE Model Curriculum)**

IARE - R18

**M.Tech Regular Two Year Degree Program
(for the batches admitted from the academic year 2018 - 2019)**

**FAILURE TO READ AND UNDERSTAND THE REGULATIONS
IS NOT AN EXCUSE**

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“Take up one idea.

Make that one idea you’re life-think of it, dream of it, and live on that idea.

**Let the brain muscles, nerves, every part of your body be full of that idea
and just leave every other idea alone.**

This is the way to success” Swami Vivekananda

PRELIMINARY DEFINITIONS AND NOMENCLATURES

Academic Council: The Academic Council is the highest academic body of the institute and is responsible for the maintenance of standards of instruction, education and examination within the institute. Academic Council is an authority as per UGC regulations and it has the right to take decisions on all academic matters including academic research.

Academic Autonomy: Means freedom to an institute in all aspects of conducting its academic programs, granted by UGC for Promoting Excellence.

Academic Year: It is the period necessary to complete an actual course of study within a year. It comprises two consecutive semesters i.e., Even and Odd semester.

AICTE: Means All India Council for Technical Education, New Delhi.

Autonomous Institute: Means an institute designated as autonomous by University Grants Commission (UGC), New Delhi in concurrence with affiliating University (Jawaharlal Nehru Technological University, Hyderabad) and State Government.

Backlog Course: A course is considered to be a backlog course if the student has obtained a failure grade (F) in that course.

Basic Sciences: The courses offered in the areas of Mathematics, Physics, Chemistry, Biology etc., are considered to be foundational in nature.

Betterment: Betterment is a way that contributes towards improvement of the students' grade in any course(s). It can be done by either (a) re-appearing or (b) re-registering for the course.

Board of Studies (BOS): BOS is an authority as defined in UGC regulations, constituted by Head of the Organization for each of the departments separately. They are responsible for curriculum design and updation in respect of all the programs offered by a department.

Certificate course: It is a course that makes a student gain hands-on experience and skill required for holistic development in a specific area/field.

Choice Based Credit System: The credit based semester system is one which provides flexibility in designing curriculum and assigning credits based on the course content and hours of teaching along with provision of choice for the student in the course selection.

Compulsory course: Course required to be undertaken for the award of the degree as per the program.

Commission: Means University Grants Commission (UGC), New Delhi.

Continuous Internal Examination: It is an examination conducted towards internal assessment.

Course: A course is a subject offered by the University for learning in a particular semester.

Course Outcomes: The essential skills that need to be acquired by every student through a course.

Credit: A credit is a unit that gives weight to the value, level or time requirements of an academic course. The number of 'Contact Hours' in a week of a particular course determines its credit value. One credit is equivalent to one lecture hour per week.

Credit point: It is the product of grade point and number of credits for a course.

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

Curriculum: Curriculum incorporates the planned interaction of students with instructional content, materials, resources and processes for evaluating the attainment of Program Educational Objectives.

Degree with Specialization: A student who fulfills all the program requirements of her/his discipline and successfully completes a specified set of professional elective courses in a specialized area is eligible to receive a degree with specialization like Structural Engineering, Embedded Systems, CSE, etc.

Department: An academic entity that conducts relevant curricular and co-curricular activities, involving both teaching and non-teaching staff and other resources in the process of study for a degree.

Detention in a course: Student who does not obtain minimum prescribed attendance in a course shall be detained in that particular course.

Dropping from the Semester: A student who doesn't want to register for any semester can apply in writing in prescribed format before commencement of that semester.

Elective Course: A course that can be chosen from a set of courses. An elective can be Professional Elective and/or Open Elective.

Evaluation: Evaluation is the process of judging the academic performance of the student in her/his courses. It is done through a combination of continuous internal assessment and semester end examinations.

Grade: It is an index of the performance of the students in a said course. Grades are indicated by alphabets.

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

Institute: Means Institute of Aeronautical Engineering, Hyderabad unless indicated otherwise by the context.

MassiveOpenOnlineCourse (MOOC): MOOC courses inculcate the habit of self learning. MOOC courses would be additional choices in all the elective group courses.

Pre-requisite: A course, the knowledge of which is required for registration into higher level course.

Core: The courses that are essential constituents of each engineering discipline are categorized as professional core courses for that discipline.

Professional Elective: A course that is discipline centric. An appropriate choice of minimum number of such electives as specified in the program will lead to a degree with specialization.

Program: Means, Master of Technology (M.Tech) degree program / UG degree program: B.Tech.

Program Educational Objectives: The broad career, professional and personal goals that every student will achieve through a strategic and sequential action plan.

Project work: It is a design or research based work to be taken up by a student during his/her second year to achieve a particular aim. It is a credit based course and is to be planned carefully by the student.

Re-Appearing: A student can reappear only in the semester end examination for the theory component of a course, subject to the regulations contained herein.

Registration: Process of enrolling into a set of courses in a semester of a Program.

Regulations: The regulations, common to all M.Tech programs offered by Institute are designated as "IARE-R18" and are binding on all the stakeholders.

Semester: It is a period of study consisting of 15 to 18 weeks of academic work equivalent to normally 90 working days. The odd semester starts usually in July and even semester in December.

Semester End Examinations: It is an examination conducted for all courses offered in a semester at the end of the semester.

S/he: Means "she" and "he" both.

Student Outcomes: The essential skill sets that need to be acquired by every student during her/his program of study. These skill sets are in the areas of employability, entrepreneurial, social and behavioral.

University: Means the Jawaharlal Nehru Technological University Hyderabad, Hyderabad.

Withdraw from a Course: Withdrawing from a course means that a student can drop from a course within the first two weeks of the odd or even semester (deadlines are different for summer sessions). However s/he can choose a substitute course in place of it by exercising the option within 5 working days from the date of withdrawal.

Words 'he', 'him', 'his', occur, they imply 'she', 'her', 'hers' also.

FOREWORD

The autonomy is conferred to Institute of Aeronautical Engineering (IARE), Hyderabad by University Grants Commission (UGC), New Delhi based on its performance as well as future commitment and competency to impart quality education. It is a mark of its ability to function independently in accordance with the set norms of the monitoring bodies like J N T University Hyderabad (JNTUH), Hyderabad and AICTE. It reflects the confidence of the affiliating University in the autonomous institution to uphold and maintain standards it expects to deliver on its own behalf and thus awards degrees on behalf of the college. Thus, an autonomous institution is given the freedom to have its own **curriculum, examination system and monitoring mechanism**, independent of the affiliating University but under its observance.

IARE is proud to win the credence of all the above bodies monitoring the quality in education and has gladly accepted the responsibility of sustaining, if not improving upon the standards and ethics for which it has been striving for more than a decade in reaching its present standing in the arena of contemporary technical education. As a follow up, statutory bodies like Academic Council and Boards of Studies are constituted with the guidance of the Governing Body of the institute and recommendations of the JNTUH to frame the regulations, course structure and syllabi under autonomous status.

The autonomous regulations, course structure and syllabi have been prepared after prolonged and detailed interaction with several expertise solicited from academics, industry and research, in accordance with the vision and mission of the institute to order to produce a quality engineering graduate to the society.

All the faculty, parents and students are requested to go through all the rules and regulations carefully. Any clarifications needed are to be sought at appropriate time and with principal of the college, without presumptions, to avoid unwanted subsequent inconveniences and embarrassments. The Cooperation of all the stake holders is sought for the successful implementation of the autonomous system in the larger interests of the college and brighter prospects of engineering graduates.

PRINCIPAL



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

ACADEMIC REGULATIONS

M.Tech. Regular Two Year Degree Program (for the batches admitted from the academic year 2018 - 20)

For pursuing two year postgraduate Master Degree program of study in Engineering (M.Tech) offered by Institute of Aeronautical Engineering under Autonomous status and herein after referred to as IARE.

1.0 CHOICE BASED CREDIT SYSTEM

The Indian Higher Education Institutions (HEI's) are changing from the conventional course structure to Choice Based Credit System (CBCS) along with introduction to semester system at first year itself. The semester system helps in accelerating the teaching learning process and enables vertical and horizontal mobility in learning.

The credit based semester system provides flexibility in designing curriculum and assigning credits based on the course content and hours of teaching. The choice based credit system provides a 'cafeteria' type approach in which the students can take courses of their choice, learn at their own pace, undergo additional courses and acquire more than the required credits and adopt an interdisciplinary approach to learning.

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

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

The CBCS permits students to:

1. Choose electives from a wide range of elective courses offered by the departments of the Institute.
2. Undergo additional courses of interest.
3. Adopt an inter-disciplinary approach in learning.
4. Make the best use of expertise of the available faculty.

2.0 MEDIUM OF INSTRUCTION

The medium of instruction shall be English for all courses, examinations, seminar presentations and project work. The curriculum will comprise courses of study as given in course curriculum in accordance with the prescribed syllabi.

3.0 ELIGIBILITY FOR ADMISSION

The admissions for category A and B seats shall be as per the guidelines of Telangana State Council for Higher Education (TSCHE) in consonance with government reservation policy.

- a) Under Category A: 70% of the seats are filled based on GATE/PGECET ranks.
- b) Under Category B: 30% seats are filled on merit basis as per guidelines of TSCHE.

4.0 UNIQUE COURSE IDENTIFICATION CODE

Every specialization of the M.Tech programme will be placed in one of the groups as listed in the Table 1.

Table 1: Group of Courses

S. No	Specialization	Offering Department	Code
1	Structural Engineering	Civil Engineering	ST
2	Electrical Power Systems	Electrical and Electronics Engineering	EPS
3	CAD / CAM	Mechanical Engineering	CC
4	Embedded Systems	Electronics and Communication Engineering	ES
5	Computer Science and Engineering	Computer Science and Engineering	CS
6	Aerospace Engineering	Aeronautical Engineering	AE

5.0 TYPES OF COURSES

Courses in a programme may be of four kinds: **Core, Elective, Open and Audit.**

5.1 Core Course:

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

5.2 Elective Course:

Electives provide breadth of experience in respective branch and applications areas. Elective course is a course which can be chosen from a pool of courses. It may be:

- Supportive to the discipline of study
- Providing an expanded scope
- Enabling an exposure to some other discipline/domain
- Nurturing student's proficiency/skill.

There shall be five professional core elective groups out of which students can choose not more than two courses from each group. Overall, students can opt for four professional elective courses which suit their project work in consultation with the faculty advisor/mentor. In addition, one course from each of the two open electives has to be selected. A student may also opt for more elective courses in his/her area of interest.

5.3 Open Elective Course:

An elective may be discipline centric focusing on those courses which add generic proficiency to the students or may be chosen from supportive/general discipline called as "Open Elective".

5.4 Audit Course:

The value added courses are audit courses offered through joint ventures with various organizations providing ample Scope for the students as well as faculty to keep pace with the latest technologies pertaining to their chosen fields of study. A plenty of value added programs will be proposed by the departments one week before the commencement of class work. The students are given the option to choose the courses according to their desires and inclinations as they choose the desired items in a cafeteria. The expertise gained through the value added programs should enable them to face the formidable challenges of the future and also assist them in exploring new opportunities. Its result shall be declared with "Satisfactory" or "Not Satisfactory" performance.

6.0 SEMESTER STRUCTURE

The institute shall follow semester pattern. An academic year shall consist of a first semester and a second semester and the summer term. Each semester shall be of 23 weeks (Table 2) duration and this period includes time for course work, examination preparation and conduct of examinations. Each main semester shall have a minimum of 90 working days; out of which number of contact days for teaching / practical shall be 75 and 15 days shall be for examination preparation. The duration for each semester shall be a minimum of 17 weeks of instruction. The Academic Calendar is declared at the beginning of the academic year as given in Table2.

Table 2: Academic Calendar

FIRST SEMESTER (23 weeks)	I Spell Instruction Period	9 weeks	21 weeks
	I Mid Examinations	1 week	
	II Spell Instruction Period	8 weeks	
	II Mid Examinations	1 week	
	Preparation and Practical Examinations	2 weeks	
	Semester End Examinations		2 weeks
Semester Break and Supplementary Exams			2 weeks
SECOND SEMESTER (23 weeks)	I Spell Instruction Period	9 weeks	21 weeks
	I Mid Examinations	1 week	
	II Spell Instruction Period	8 weeks	
	II Mid Examinations	1 Week	
	Preparation & Practical Examinations	2 weeks	
	Semester End Examinations		2 weeks
Summer Vacation and Supplementary Exams			4 weeks
THIRD SEMESTER	I Spell Instruction Period	9 weeks	18 weeks
	I Mid Examinations	1 week	
	II Spell Instruction Period	8 weeks	
	II Mid Examinations	1 week	
	Project Work Phase – I		
	Semester End Examinations		1 week
FOURTH SEMESTER	Project Work Phase – II		18 weeks

7.0 PROGRAM DURATION

A student shall be declared eligible for the award of M.Tech degree, if he/she pursues a course of study and completes it successfully in not less than two academic years and not more than four academic years. A student, who fails to fulfill all the academic requirements for the award of the degree within four academic years from the year of his/her admission, shall forfeit his/her seat in M.Tech course.

- A student will be eligible for the award of M.Tech degree on securing a minimum of 5.0/10.0 CGPA.
- In the event of non-completion of project work and/or non-submission of the project report by the end of the fourth semester, the candidate shall re-register by paying the semester fee for the project. In such a case, the candidate will not be permitted to submit the report earlier than three months and not later than six months from the date of registration.

8.0 CURRICULUM AND COURSE STRUCTURE

The curriculum shall comprise Core Courses, Elective Core Courses, Laboratory Course, Mini Project with Seminar, Internship, Project Work-1 and Project Work-2.

Each Theory and Laboratory course carries credits based on the number of hours/week as follows:

- **Lecture Hours (Theory):** 1 credit per lecture hour per week.
- **Laboratory Hours (Practical):** 1 credit for 2 practical hours, 2 credits for 3 or 4 practical hours per week.
- **Project Work:** 1 credit for 2 hours of project work per week.

8.1 Credit distribution for courses offered is shown in Table 3.

Table 3: Credit distribution

S. No	Course	Hours	Credits
1	Core Courses	3	3
2	Professional Core Elective Courses	3	3
3	Audit Courses	2	0
4	Laboratory Courses	4	2
5	Open Elective Courses	3	3
6	Mini Project with Seminar	2	2
7	Project Work-1 Dissertation	20	10
8	Project Work-2 Dissertation	32	16

8.2 Coursewise break-up for the total credits:

Total Theory Courses (12) Core Courses (04) + Professional Core Electives (05) + Open Electives (01)	04 @ 3 credits + 05 @ 3 credits + 01 @ 3 credits	30
Total Laboratory Courses (03)	04 @ 2 credits	08
Mini Project with Seminar (01)	1 @ 2 credit	02
Research Methodology and IPR	1 @ 2 credit	02
Project Work-1	1 @ 10 credit	10
Project Work-2	1 @ 16 credits	16
TOTAL CREDITS		68

9.0 EVALUATION METHODOLOGY

9.1 Theory Course:

Each theory course will be evaluated for a total of 100 marks, with 30 marks for Continuous Internal Assessment (CIA) and 70 marks for Semester End Examination (SEE). Out of 30 marks allotted for CIE during the semester, marks are awarded by taking average of two sessional examinations.

9.1.1 Semester End Examination (SEE):

The SEE shall be conducted for 70 marks of 3 hours duration. The syllabus for the theory courses shall be divided into FIVE units and each unit carries equal weightage in terms of marks distribution. The question paper pattern shall be as defined below. Two full questions with 'either' 'or' choice will be drawn from each unit. Each question carries 14 marks. There could be a maximum of three sub divisions in a question.

The emphasis on the questions is broadly based on the following criteria:

50 %	To test the objectiveness of the concept
30 %	To test the analytical skill of the concept
20 %	To test the application skill of the concept

9.1.2 Continuous Internal Assessment (CIA):

For each theory course the CIA shall be conducted by the faculty/teacher handling the course as given in Table 4. CIA is conducted for a total of 30 marks, with 25 marks for Continuous Internal Examination (CIE) and 05 marks for Technical Seminar and Term Paper.

Table 4: Assessment pattern for Theory Courses

COMPONENT	THEORY		TOTAL MARKS
	CIE Exam (Sessional)	Technical Seminar and Term Paper	
Type of Assessment			
Max. CIA	25	5	30

Continuous Internal Examination (CIE):

Two CIE exams shall be conducted at the end of the 9th and 17th week of the semester respectively. The CIE exam is conducted for 25 marks of 2 hours duration, consisting of 5 one mark compulsory questions in part-A and 4 questions in part-B. The student has to answer any 4 questions out of five questions, each carrying 5 marks. Marks are awarded by taking average of marks scored in two CIE exams.

Technical Seminar and Term Paper:

Two seminar presentations are conducted during I year I semester and II semester. For seminar, a student under the supervision of a concerned faculty member, shall identify a topic in each course and prepare the term paper with overview of topic. The evaluation of Technical seminar and term paper is for maximum of 5 marks. Marks are awarded by taking average of marks scored in two Seminar Evaluations.

9.2 Laboratory Course:

- 9.2.1 Each lab will be evaluated for a total of 100 marks consisting of 30 marks for internal assessment and 70 marks for semester end lab examination. Out of 30 marks of internal assessment, continuous lab assessment will be done for 20 marks for the day to day performance and 10 marks for the final internal lab assessment. The semester end lab examination for 70 marks shall be conducted by two examiners, one of them being an internal examiner and another is external examiner, both nominated by the Principal from the panel of experts recommended by Chairman, BOS.

- 9.2.2 All the drawing related courses are evaluated in line with lab courses. The distribution shall be 30 marks for internal evaluation (20 marks for day-to-day work, and 10 marks for internal tests) and 70 marks for semester end lab examination. There shall be ONE internal test for 10 marks each in a semester.

9.3 Projectwork

Normally, the project work should be carried out at Host Institute (Institute of Aeronautical Engineering). However, it can also be carried out in any of the recognized Educational Institutions, National Laboratories, Research Institutions, Industrial Organizations, Service Organizations or Government Organizations with the prior permission from the guide and concerned Head of the Department. A student shall submit the outcome of the project work in the form of a dissertation.

- 9.3.1 The student shall submit the project work synopsis at the end of III semester for Phase-I of project evaluation. The Phase-I of project work shall be evaluated by Project Review Committee (PRC) at the end of the third semester for a maximum of 100 marks. Head of the Department (HOD) shall constitute a PRC comprising of senior faculty of the specialization, Guide and Head of the Department.
- 9.3.2 The first phase of project work is to be carried out in IV semester for Phase –II of Project work. The student will be allowed to appear for final viva voce examination at the end of IV semester only if s/he has submitted s/he project work in the form of paper for presentation/ publication in a conference/journal and produce the proof of acceptance of the paper from the organizers/publishers.
- 9.3.3 The student shall submit the project work in the form of dissertation at least four weeks ahead of the completion of the program. Head of the Department shall constitute an Internal Evaluation Committee (IEC) comprising of the Chairman BOS (PG), HOD and Guide. As per convenes of all meeting for open pre-submission seminar evaluation of the student. If the open pre-submission seminar by a student is not satisfactory, another seminar shall be scheduled within two weeks.

The evaluation of the project work and the marks allotted are as under:

S.No	Project Phases	Mode	Evaluation Committee	Marks
1	Phase - I	Continuous evaluation at the end of III Semester	Guide	30
2		Evaluation at the end of III Semester	Project Review Committee (PRC) comprising of senior faculty of the specialization, guide and HOD.	70
Total(Phase – I)				100
3	Phase - II	An open pre-submission seminar by the student	The Internal Evaluation Committee (IEC) comprising of the Chairman, BOS (PG), HOD and guide wherein the HOD convenes its meeting.	30
4		End Semester Examination (An open seminar followed by viva-voce)	The External Evaluation Committee (EEC) comprising of External Examiner, HOD and guide wherein the HOD shall be the chairman of the committee.	70
Total(Phase-II)				100

- 9.3.4 As soon as a student submits his project work, Principal shall appoint the External Examiner among the panel of examiners recommended by the Chairman, BOS (PG).
- 9.3.5 The Principal shall schedule the End Semester Examination in project work soon after the completion of the study of program and a student can appear for the same provided s/he has earned successfully all the requisite credits. The student shall produce the dissertation duly certified by the guide and HOD during the Examination.
- 9.3.6 The project reports of M.Tech students who have not completed their course work successfully will be evaluated in that semester itself and the result sent confidentially to the Controller of Examinations. The results of the project work evaluation will be declared by the Controller of Examinations only after the successful completion of the courses by those students.

10.0 ATTENDANCE REQUIREMENTS AND DETENTION POLICY

- 10.1 It is desirable for a candidate to put on 100% attendance in each course. In every course (theory/laboratory), student has to maintain a minimum of 80% attendance including the days of attendance in sports, games, NCC and NSS activities to be eligible for appearing in Semester End Examination of the course.
- 10.2 For cases of medical issues, deficiency of attendance in each course to the extent of 15% may be condoned by the College Academic Committee (CAC) on the recommendation of Head of the Department if his/her attendance is between 80% to 65% in every course, subjected to submission of medical certificate and other needful documents to the concerned department.
- 10.3 The basis for the calculation of the attendance shall be the period prescribed by the institute by its calendar of events. For late admission, attendance is reckoned from the date of admission to the program.
- 10.3 However, in case of a student having less than 65% attendance in any course, s/he shall be detained in the course and in no case such process will be relaxed.
- 10.4 Students whose shortage of attendance is not condoned in any subject are not eligible to write their semester end examination of that courses and their registration shall stand cancelled.
- 10.5 A prescribed fee shall be payable towards Condonation of shortage of attendance.
- 10.6 A candidate shall put in a minimum required attendance at least in three (3) theory courses for getting promoted to next higher class / semester. Otherwise, s/he shall be declared detained and has to repeat semester.
- 10.7 A student shall not be promoted to the next semester unless he satisfies the attendance requirement of the present semester, as applicable. They may seek readmission into that semester when offered next. If any candidate fulfills the attendance requirement in the present semester, s/he shall not be eligible for readmission into the same class.

11.0 CONDUCT OF SEMESTER END EXAMINATIONS AND EVALUATION

- 11.1 Semester end examination shall be conducted by the Controller of Examinations (COE) by inviting Question Papers from the External Examiners.
- 11.2 Question papers may be moderated for the coverage of syllabus, pattern of questions by Semester End Examination Committee chaired by Head of the Department one day before the commencement of semester end examinations.
- 11.3 Internal Examiners shall prepare a detailed scheme of valuation.

- 11.4 The answer papers of semester end examination should be evaluated by the internal examiner immediately after the completion of exam and the award sheet should be submitted to COE in a sealed cover before the same papers are kept for second evaluation by external examiner.
- 11.5 In case of difference is more than 15% of marks, the answer paper shall be re-evaluated by a third examiner appointed by the Examination Committee and marks awarded by him shall be taken as final.
- 11.6 HOD shall invite 3-9 external examiners to evaluate all the endsemester answer scripts on a prescribed date(s). Practical laboratory exams are conducted involving external examiners.
- 11.7 Examination Control Committee shall consolidate the marks awarded by internal and external examiners to award grades.

12.0 SCHEMEOFORTHEAWARDOFGRADE

- 12.1 A student shall be deemed to have satisfied the minimum academic requirements and earn the credits for each theory course, if s/he secures:
 - i. Not less than 40% marks for each theory course in the semester end examination, and
 - ii. A minimum of 50% marks for each theory course considering both CIA and SEE
- 12.2 A student shall be deemed to have satisfied the minimum academic requirements and earn the credits for each Laboratory / Seminar and Technical Writing / Project, if s/he secures
 - i. Not less than 40% marks for each Laboratory / Seminar / Project course in the semester end examination,
 - ii. A minimum of 50% marks for each Laboratory / Mini project with Seminar / Project course considering both internal and semester end examination.
- 12.3 If a candidate fails to secure a pass in a particular course, it is mandatory that s/he shall register and reappear for the examination in that course during the next semester when examination is conducted in that course. It is mandatory that s/he should continue to register and reappear for the examination till s/he secures a pass.

13.0 LETTER GRADES AND GRADE POINTS

- 13.1 Performances of students in each course are expressed in terms of marks as well as in Letter Grades based on absolute grading system. The UGC recommends a 10 point grading system with the following letter grades as given below:

Range of Marks	Grade Point	Letter Grade
100 - 80	10	S (Superior)
70 – 79	9	A+ (Excellent)
60 – 69	8	A (Very Good)
55 – 59	7	B+ (Good)
50 – 54	6	B (Average)
Below 50	0	F (Fail)
Absent	0	Ab (Absent)
Authorized Break of Study	0	ABS

- 13.2 A student is deemed to have passed and acquired to correspondent credits in particular course if s/he obtains any one of the following grades: “S”, “A+”, “A”, “B+”, “B”.
- 13.3 A student obtaining Grade “F” shall be considered Failed and will be required to reappear in the examination.

- 13.4 “SA” denotes shortage of attendance (as per item 10) and hence prevention from writing Semester End Examination.
- 13.5 At the end of each semester, the institute issues grade sheet indicating the SGPA and CGPA of the student. However, grade sheet will not be issued to the student if s/he has any outstanding dues.

14.0 COMPUTATION OF SGPA AND CGPA

The UGC recommends to compute the Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA). The credit points earned by a student are used for calculating the Semester Grade Point Average (SGPA) and the Cumulative Grade Point Average (CGPA), both of which are important performance indices of the student. SGPA is equal to the sum of all the total points earned by the student in a given semester divided by the number of credits registered by the student in that semester. CGPA gives the sum of all the total points earned in all the previous semesters and the current semester divided by the number of credits registered in all these semesters. Thus,

$$SGPA = \sum_{i=1}^n (C_i G_i) / \sum_{i=1}^n C_i$$

Where, C_i is the number of credits of the i^{th} course and G_i is the grade point scored by the student in the i^{th} course and n represent the number of courses in which a student's is registered in the concerned semester.

$$CGPA = \sum_{j=1}^m (C_j S_j) / \sum_{j=1}^m C_j$$

Where, S_j is the SGPA of the j^{th} semester and C_j is the total number of credits upto the semester and m represent the number of semesters completed in which a student registered upto the semester.

The SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.

15.0 ILLUSTRATION OF COMPUTATION OF SGPA AND CGPA

15.1 Illustration for SGPA

Course Name	Course Credits	Grade letter	Grade point	Credit Point (Credit x Grade)
Course 1	3	A	8	3 x 8 = 24
Course 2	4	B+	7	4 x 7 = 28
Course 3	3	B	6	3 x 6 = 18
Course 4	3	S	10	3 x 10 = 30
Course 5	3	C	5	3 x 5 = 15
Course 6	4	B	6	4 x 6 = 24
	20			139

$$\text{Thus, } SGPA = 139 / 20 = 6.95$$

15.2 Illustration for CGPA

Semester 1	Semester 2	Semester 3	Semester 4
Credit: 20 SGPA: 6.9	Credit: 22 SGPA: 7.8	Credit: 25 SGPA: 5.6	Credit: 26 SGPA: 6.0

$$\text{Thus, } CGPA = \frac{20 \times 6.9 + 22 \times 7.8 + 25 \times 5.6 + 26 \times 6.0}{93} = 6.51$$

16.0 PHOTOCOPY / REVALUATION

A student, who seeks the revaluation of the answer script, is directed to apply for the photocopy of his/her semester examination answer paper(s) in the theory course(s) within 2 working days from the declaration of results in the prescribed format to the Controller of Examinations through the Head of the Department. On receiving the photocopy, the student can consult with a competent member of faculty and seek the opinion for revaluation. Based on the recommendations, the student can register for the revaluation with prescribed fee. The Controller of Examinations shall arrange for the revaluation and declare the results. Revaluation is not permitted to the courses other than theory courses.

17.0 GRADUATION REQUIREMENTS

The following academic requirements shall be met for the award of M.Tech degree.

- 17.1 Student shall register and acquire minimum attendance in all courses and secure 68 credits.
- 17.2 A student who fails to earn 68 credits within four consecutive academic years from the year of his/her admission with a minimum CGPA of 5.0, shall forfeit his/her degree and his/her admission stands cancelled.

18.0 AWARD OF DEGREE

Classification of degree will be as follows:

CGPA ≥ 7.5	CGPA ≥ 6.5 and < 7.5	CGPA ≥ 5.5 and < 6.5	CGPA ≥ 5.0 and < 5.5	CGPA < 5.0
First Class with Distinction	First Class	Second Class	Pass Class	Fail

- a) In case a student takes more than one attempt in clearing a course, the final marks secured shall be indicated by * mark in the marks memo.
- b) All the candidates who register for the semester end examination will be issued grade sheet by the Institute. Apart from the semester wise marks memos, the institute will issue the provisional certificate subject to the fulfillment of all the academic requirements.

19.0 IMPROVEMENT OF GRADE:

A candidate, after becoming eligible for the award of the degree, may reappear for the final examination in any of the theory courses as and when conducted for the purpose of improving the aggregate and the grade. But this reappearance shall be within a period of two academic years after becoming eligible for the award of the degree.

However, this facility shall not be availed of by a candidate who has taken the Original Degree Certificate. Candidates shall not be permitted to reappear either for CIE in any course or for Semester End Examination (SEE) in laboratory courses (including Project Viva-voce) for the purpose of improvement.

20.0 TERMINATION FROM THE PROGRAM

The admission of a student to the program may be terminated and the student may be asked to leave the institute in the following circumstances:

- a) The student fails to satisfy the requirements of the program within the maximum period stipulated for that program.
- b) The student fails to satisfy the norms of discipline specified by the institute from time to time.

21.0 WITH-HOLDING OF RESULTS

If the candidate has not paid any dues to the college / if any case of indiscipline / malpractice is pending against him/her, the results of the candidate will be withheld. The issue of the degree is liable to be withheld in such cases.

22.0 GRADUATION DAY

The institute shall have its own annual Graduation Day for the award of Degrees to students completing the prescribed academic requirements in each case, in consultation with the University and by following the provisions in the Statute.

The college shall institute prizes and medals to meritorious students annually on Graduation Day. This will greatly encourage the students to strive for excellence in their academic work.

23.0 DISCIPLINE

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

24.0 GRIEVANCE REDRESSAL COMMITTEE

The institute shall form a Grievance Redressal Committee for each course in each department with the Course Teacher and the HOD as the members. This Committee shall solve all grievances related to the course under consideration.

25.0 TRANSITORY REGULATIONS

25.1 A student who has been detained in any semester of previous regulations for not satisfying the attendance requirements shall be permitted to join in the corresponding semester of this regulation.

25.2 Semester End Examination in each course under the regulations that precede immediately these regulations shall be conducted three times after the conduct of last regular examination under those regulations. Thereafter, the failed students, if any, shall take examination in the equivalent papers of these regulations as suggested by the Chairman, BOS concerned.

26.0 REVISION OF REGULATIONS AND CURRICULUM

The Institute from time to time may revise, amend or change the regulations, scheme of examinations and syllabi if found necessary and on approval by the Academic Council and the Governing Body shall come into force and shall be binding on the students, faculty, staff, all authorities of the Institute and others concerned.

**FAILURE TO READ AND UNDERSTAND
THE REGULATIONS IS NOT AN EXCUSE**



INSTITUTE OF AERONAUTICAL ENGINEERING

(AUTONOMOUS)

CIVIL ENGINEERING

COURSE STRUCTURE

I SEMESTER

Course Code	Course Name	Subject Area	Category	Periods per week			Credits	Scheme of Examination Max. Marks		
				L	T	P		CIA	SEE	Total
THEORY										
BSTB01	Advanced Structural Analysis	PCC	Core	3	0	0	3	30	70	100
BSTB02	Advanced Solid Mechanics	PCC	Core	3	0	0	3	30	70	100
	Professional Core Elective-I	PEC	Elective	3	0	0	3	30	70	100
	Professional Core Elective-II	PEC	Elective	3	0	0	3	30	70	100
	Audit Course – I	Audit - I	Perspective	2	0	0	0	30	70	100
PRACTICAL										
BSTB09	Structural Design Laboratory	PCC	Core	0	0	4	2	30	70	100
BSTB10	Advanced Concrete Laboratory	PCC	Core	0	0	4	2	30	70	100
TOTAL				14	00	08	16	210	490	700

II SEMESTER

Course Code	Course Name	Subject Area	Category	Periods per week			Credits	Scheme of Examination Max. Marks		
				L	T	P		CIA	SEE	Total
THEORY										
BSTB11	FEM in Structural Engineering	PCC	Core	3	0	0	3	30	70	100
BSTB12	Structural Dynamics	PCC	Core	3	0	0	3	30	70	100
	Professional Core Elective-III	PEC	Elective	3	0	0	3	30	70	100
	Professional Core Elective-IV	PEC	Elective	3	0	0	3	30	70	100
	Audit Course - II	Audit - II	Perspective	2	0	0	0	30	70	100
BSTB19	Research and Content Development	PCC	Skill	2	0	0	2	30	70	100
PRACTICAL										
BSTB20	Numerical Analysis Laboratory	PCC	Core	0	0	4	2	30	70	100
BSTB21	Mini Project with Seminar	PCC	Core	2	0	0	2	30	70	100
TOTAL				18	00	04	18	240	560	800

III SEMESTER

Course Code	Course Name	Subject Area	Category	Periods per week			Credits	Scheme of Examination Max. Marks		
				L	T	P		CIA	SEE	Total
THEORY										
BCSB31	Research Methodology and IPR	PCC	Core	2	0	0	2	30	70	100
	Professional Core Elective – V	PEC	Elective	3	0	0	3	30	70	100
	Open Elective	OE	Elective	3	0	0	3	30	70	100
PRACTICAL										
BSTB40	Phase-I Dissertation	Major Project	Core	0	0	4	10	30	70	100
TOTAL				08	00	04	18	120	280	400

IV SEMESTER

Course Code	Course Name	Subject Area	Category	Periods per week			Credits	Scheme of Examination Max. Marks		
				L	T	P		CIA	SEE	Total
BSTB41	Phase - II Dissertation	Major Project	Core	0	0	32	16	30	70	100
TOTAL				00	00	32	16	30	70	100

PROFESSIONAL CORE ELECTIVE COURSES

PROFESSIONAL CORE ELECTIVE – I

Course Code	Course Title
BSTB03	Theory of Thin Plates and Shells
BSTB04	Theory and Applications of Cement Composites
BSTB05	Theory of Structural Stability

PROFESSIONAL CORE ELECTIVE – II

Course Code	Course Title
BSTB06	Analytical and Numerical Methods for Structural Engineering
BSTB07	Structural Health Monitoring
BSTB08	Structural Optimization

PROFESSIONAL CORE ELECTIVE – III

Course Code	Course Title
BSTB13	Advanced Steel Design
BSTB14	Design of High Rise Structures
BSTB15	Design of Masonry Structures

PROFESSIONAL CORE ELECTIVE – IV

Course Code	Course Title
BSTB16	Design of Advanced Concrete Structures
BSTB17	Advanced Design of Foundations
BSTB18	Design of Industrial Structure

PROFESSIONAL CORE ELECTIVE – V

Course Code	Course Title
BSTB22	Design of Pre stressed Concrete Structures
BSTB23	Analysis of Laminated Composite Plates
BSTB24	Fracture Mechanics of Concrete Structures

OPEN ELECTIVE COURSES

Course Code	Course Title
BCSB25	Business Analytics
BCSB26	Industrial Safety
BCSB27	Operations Research
BCSB28	Cost Management of Engineering Projects
BCSB29	Composite Materials
BCSB30	Waste to Energy

AUDIT COURSES

Course Code	Course Title
BCSB32	English for Research Paper Writing
BCSB33	Disaster Management
BCSB34	Sanskrit for Technical Knowledge
BCSB35	Value Education
BCSB36	Constitution of India
BCSB37	Pedagogy Studies
BCSB38	Stress Management by Yoga
BCSB39	Personality Development through Life Enlightenment Skills

SYLLABUS

(I – IV SEM)

ADVANCED STRUCTURAL ANALYSIS

I Semester: ST								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
BSTB01	Core	L	T	P	C	CIA	SEE	Total
		3	0	0	3	30	70	100
Contact Classes: 45	Total Tutorials: Nil	Total Practical Classes: Nil			Total Classes: 45			
OBJECTIVES: The course should enable the students to: I. Analyze the skeleton structures using stiffness analysis code. II. Use direct stiffness method understanding its limitations.								
UNIT –I	INFLUENCE COEFFICIENTS						Classes: 09	
Physical Significance, Effects of Settlements, Temperature Change and Lack of Fit, Member Approach and Structure Approach.								
UNIT-II	STIFFNESS METHOD APPLIED TO LARGE FRAMES						Classes: 09	
Force method and displacement method, Degree of Freedom, Local Coordinates and Global Coordinates.								
UNIT-III	STIFFNESS MATRIX ASSEMBLY OF STRUCTURES AND APPLICATIONS TO SIMPLE PROBLEMS						Classes: 09	
Stiffness Matrix in Global Coordinates, Boundary Conditions, Solution of Stiffness Matrix Equations, Calculation of Reactions and Member Forces.								
Beams, Plane Trusses, Plane Rigid Jointed Frames and Grids by Structure Approach and Member Approach.								
UNIT-IV	BOUNDARY VALUE PROBLEMS (BVP)						Classes: 09	
Boundary Value Problems: Approximate Solution of Boundary Value Problems, Modified Galerkin Method for One-Dimensional BVP, Matrix Formulation of the Modified Galerkin Method.								
UNIT-V	LINEAR ELEMENT						Classes: 09	
Linear Element: Shape Functions, Solution for Poisson’s Equation, General One Dimensional Equilibrium Problem.								
Text Books: 1. C.S. Reddy, “Basic Structural Analysis”. 2. Ashok.K., “Advanced Structural Analysis”, Jain, New Channel Brothers. 3. J. Meek, “Matrix Methods of Structural Analysis”. 4. S S Bhavikatti, “Matrix Methods of Structural Analysis”								
Reference Books: 1. Todd, J.D., “structural theory and analysis”, the mac million press ltd., New York. 2. Menon,D., “advanced structural analysis”, narosa publishing house, new delhi. 3. Mc Carmac, J. And Elling, R. E., “structural analysis: a classical and matrix a approach” , harper and row publishers.								

Web References:

1. nptel.ac.in/courses/Webcourse-contents/.../Structural%20Analysis/pdf/m2l7.pdf.
2. https://nptel.ac.in/reviewed_pdfs/105106050/lec1.pdf
3. <http://web.iitd.ac.in/~sbhalla/rc717.pdf>

E-Text Books:

1. https://phindia.com/.../matrix_methods_of_structural_analysis_theory_and_problems
2. <http://www.uomisan.edu.iq/library/admin/book/91314849583.pdf>
3. http://priodeep.weebly.com/uploads/6/5/4/9/65495087/w._j._spencer__auth._-

ADVANCED SOLID MECHANICS

I Semester: ST								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
BSTB02	Core	L	T	P	C	CIA	SEE	Total
		3	0	0	3	30	70	100
Contact Classes: 45	Total Tutorials: Nil		Total Practical Classes: Nil			Total Classes: 45		
OBJECTIVES:								
The course should enable the students to:								
I. Solve simple problems of elasticity and plasticity for understanding the basic concepts.								
II. Apply numerical methods to solve continuum problems.								
UNIT-I	INTRODUCTION TO ELASTICITY						Classes: 09	
Displacement, Strain and Stress Fields, Constitutive Relations, Cartesian Tensors and Equations of Elasticity.								
UNIT-II	STRAIN AND STRESS FIELD						Classes: 09	
Elementary Concept of Strain, Strain at a Point, Principal Strains and Principal Axes, Compatibility Conditions, Stress at a Point, Stress Components on an Arbitrary Plane, Differential Equations of Equilibrium, Hydrostatic and Deviatoric Components.								
UNIT-III	EQUATIONS OF ELASTICITY AND TWO-DIMENSIONAL PROBLEMS OF ELASTICITY						Classes: 09	
Equations of Equilibrium, Stress-Strain relations, Strain Displacement and Compatibility Relations, Boundary Value Problems, Co-axiality of the Principal Directions.								
Plane Stress and Plane Strain Problems, Airy's stress Function, Two-Dimensional Problems in Polar Coordinates.								
UNIT-IV	TORSION OF PRISMATIC BARS						Classes: 09	
Torsion of Prismatic Bars: Saint Venant's Method, Prandtl's Membrane Analogy, Torsion of Rectangular Bar, Torsion of Thin Tubes.								
UNIT-V	PLASTIC DEFORMATION						Classes: 09	
Plastic Deformation:								
Strain Hardening, Idealized Stress- Strain curve, Yield Criteria, von Mises Yield Criterion, Tresca Yield Criterion, Plastic Stress-Strain Relations, Principle of Normality and Plastic Potential, Isotropic Hardening.								
Text Books:								
1. Timoshenko and Goodier , "Theory of Elasticity" , McGraw Hill Publishing Company, 1970.								
2. RagabA.R.,BayoumiS.E , "Engineering Solid Mechanics"., CRC Press,1999.								
3. Kazimi S. M. A, "Solid Mechanics"., Tata McGraw Hill,1994.								
Reference Books:								
1. SaddM.H , "Elasticity",Elsevier,2005.								
2. Ameen.M, "Computational Elasticity", Narosa,2005.								
3. KazimiS. M. A, "Solid Mechanics", Tata McGraw Hill,1994.								
4. SrinathL.S "Advanced Mechanics of Solids", Tata McGraw Hill,2000.								

Web References:
1. http://nptel.ac.in/courses/105106049/77
2. https://lecturenotes.in/subject/162/advanced-mechanics-of-solids-amos
E-Text Books:
1. http://nptel.ac.in/courses/105106049/pdf-assignments/main.pdf

THEORY OF THIN PLATES AND SHELLS

I Semester : ST								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
BSTB03	Elective	L	T	P	C	CIA	SEE	Total
		3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: 0	Practical Classes: Nil			Total Classes: 45			
OBJECTIVES: The course should enable the students to: I. Use analytical methods for the solution of thin plates and shells. II. Use analytical methods for the solution of shells. III. Apply the numerical techniques and tools for the complex problems in thin plates. IV. Apply the numerical techniques and tools for the complex problems in shells.								
UNIT-I	INTRODUCTION						Classes: 09	
Space Curves, Surfaces, Shell Co-ordinates, Strain Displacement Relations, Assumptions in Shell Theory, Displacement Field Approximations, Stress Resultants, Equation of Equilibrium using Principle of Virtual Work, Boundary Conditions								
UNIT-II	STATIC ANALYSIS OF PLATES						Classes: 09	
Governing Equation for a Rectangular Plate, Navier Solution for Simply Supported Rectangular Plate under Various Loadings, Levy solution for Rectangular Plate with other Boundary Conditions.								
UNIT-III	CIRCULAR PLATES						Classes: 09	
Introduction, basic relations in polar coordinates, Analysis under Axi-Symmetric Loading, Governing Differential Equation in Polar Co-ordinates. Approximate Methods of Analysis:Asymmetrical Bending of Circular Plates, Rayleigh-Ritz approach for Simple Cases in Rectangular Plates.								
UNIT-IV	STATIC ANALYSIS OF SHELLS: MEMBRANE THEORY OF SHELLS						Classes: 09	
Introduction, Membrane Theory, Membrane Stresses, Cylindrical shells under general load and buckling, Conical shells and Spherical Shells.								
UNIT-V	SHELLS OF REVOLUTION: WITH BENDINGRESISTANCE						Classes: 09	
Cylindrical and Conical Shells, Application to Pipes and Pressure Vessels, Thermal Stresses in Plate/Shell, stress-strain and displacement relations, the governing differential equation.								
Text Books: 1. Timoshenko S. and Krieger, “Theory of Plates and Shells”, McGraw Hill. 2. Chandra shekhara. K, “Theory of Plates”, Universities Press. 3. Timoshenko ,”Theory of Plates and Shells” , Tata McGraw Hill.								
Reference Books: 1. UguralAnsel C,”Stresses in Plates and Shells”, McGraw Hill. 2. Kraus.H, “Thin Elastic Shells”, John Wiley and Sons.								

Web References:
1. https://pdfs.semanticscholar.org/presentation/ce6d/b61238325d60d3f6dc0f1fbe7af33e3972c1.pdf
E-Text Books:
1. https://ocw.mit.edu/courses/mechanical-engineering/2-081j-plates-and-shells-spring-2007/readings/lecturenote.pdf
2. http://community.wvu.edu/~bpbettig/MAE456/Lecture_10_Shell_Elements_b.pdf

THEORY AND APPLICATIONS OF CEMENT COMPOSITES

I Semester: ST								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
BSTB04	Elective	L	T	P	C	CIA	SEE	Total
		3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: 0	Practical Classes: Nil			Total Classes: 45			
OBJECTIVES: The course should enable the students to: I. Formulate constitutive behaviour of composite materials:Ferro cement, SIFCON and Fibre Reinforced Concrete by understanding their strain- stress behaviour. II. Classify the materials as per orthotropic and anisotropic behaviour. III. Estimate strain constants using theories applicable to composite materials. IV. Analyse and design structural elements made of cement composites.								
UNIT-I	INTRODUCTION						Classes: 09	
Classification and Characteristics of Composite Materials: Basic Terminology, Advantages. Stress-Strain Relations, Orthotropic and Anisotropic Materials, Engineering Constants for Orthotropic Materials, Restrictions on Elastic Constants, Plane Stress Problem, Biaxial Strength, Theories for an Orthotropic Lamina.								
UNIT-II	MECHANICAL BEHAVIOUR						Classes: 09	
Mechanics of Materials Approach to Stiffness- Determination of Relations between Elastic Constants, Elasticity Approach to Stiffness, Bounding Techniques of Elasticity, Exact Solutions, Elasticity Solutions with Continuity, Halpin, Tsai Equations, Comparison of approaches to Stiffness.								
UNIT-III	CEMENT COMPOSITES						Classes: 09	
Types of Cement Composites, Terminology, Constituent Materials and their Properties, Composite Materials- Orthotropic and Anisotropic behavior. Construction Techniques for Fibre Reinforced Concrete: Ferrocement, SIFCON, Polymer Concretes, Preparation of Reinforcement, Casting and Curing								
UNIT-IV	MECHANICAL PROPERTIES OF CEMENT COMPOSITES						Classes: 09	
Behavior of Ferrocement, Fiber Reinforced Concrete in Tension, Compression, Flexure, Shear, Fatigue and Impact, Durability and Corrosion								
UNIT-V	APPLICATION OF CEMENT COMPOSITES						Classes: 09	
FRC and Ferrocement- Housing, Water Storage, Boats and Miscellaneous Structures. Composite Materials- Orthotropic and Anisotropic behaviour, Constitutive relationship, Elastic Constants. Analysis and Design of Cement Composite Structural Elements:Ferrocement, SIFCON and Fibre Reinforced Concrete								
Text Books: 1. Jones R. M , “Mechanics of Composite Materials”, Taylor and Francis,BSP Books, 2 nd Edition, 1998. 2. Pama R. P, “Ferrocement – Theory and Applications”, IFIC, 1980.								
Reference Books: 1. Pama R. P ,”Ferrocement – Theory and Applications”, IFIC, 1980.								

2. Swamy R.N ,”New Concrete Materials”, Blackie, Academic and Professional, Chapman & Hall. 1 st Edition, 2019.
Web References:
1. http://nptel.ac.in/courses/101104010/
E-Text Books:
2. http://nptel.ac.in/courses/105108124/pdf/Lecture_Notes/LNm11.pdf

THEORY OF STRUCTURAL STABILITY

I Semester :ST								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
BSTB05	Elective	L	T	P	C	CIA	SEE	Total
		3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: 0	Practical Classes: Nil			Total Classes: 45			
OBJECTIVES: The course should enable the students to: I. Determine stability of columns and frames II. Determine stability of beams and plates III. Use stability criteria and concepts for analyzing discrete and continuous systems								
UNIT-I	CRITERIA FOR DESIGN OF STRUCTURES						Classes: 09	
Stability, Strength, and Stiffness, Classical Concept of Stability of Discrete and Continuous Systems, Linear and nonlinear behaviour.								
UNIT-II	STABILITY OF COLUMNS						Classes: 09	
Axial and Flexural Buckling, Lateral Bracing of Columns, Combined Axial, Flexural and Torsion Buckling.								
UNIT-III	STABILITY OF FRAMES						Classes: 09	
Introduction, modes of buckling, Member Buckling versus Global Buckling, critical load using various methods Differential equation buckling, Relative slenderness, Slenderness Ratio of Frame Members.								
UNIT-IV	STABILITY OF BEAMS						Classes: 09	
Lateral torsion buckling, Stability of Plates: axial flexural buckling, shear flexural buckling, buckling under combined loads.								
UNIT-V	STABILITY OF PLATES						Classes: 09	
Axial flexural buckling, shear flexural buckling, buckling under combined Loads. Introduction to Inelastic Buckling and Dynamic Stability.								
Text Books: 1. Timoshenko and Gere , “Theory of elastic stability”, Tata McGraw Hill, 1981. 2. Alexander Chajes , “Principles of Structural Stability Theory”, Prentice Hall, New Jersey.								
Reference Books: 1. Iyengar, N. G. R, “Structural Stability of columns and plates” , Eastern west press Pvt. Ltd. 2. Bleich F. Bucking, “Strength of Metal Structures”, Tata McGraw Hill, New York.								
Web References: 1. http://nptel.ac.in/courses/105106116/10								
E-Text Books: 1. https://www.colorado.edu/engineering/CAS/courses.d/Structures.d/IAST.Lect23.d/IAST.Lect23.Slides.pdf								

ANALYTICAL AND NUMERICAL METHODS FOR STRUCTURAL ENGINEERING

I Semester: ST								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
BSTB06	Elective	L	T	P	C	CIA	SEE	Total
		3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: 0	Practical Classes: Nil			Total Classes: 45			
OBJECTIVES:								
The course should enable the students to:								
I. Solve ordinary and partial differential equations in structural mechanics using numerical methods.								
II. Write a program to solve a mathematical problem.								
UNIT-I	FUNDAMENTALS OF NUMERICAL METHODS						Classes: 09	
Error Analysis, Polynomial Approximations and Interpolations, Curve Fitting; Interpolation and extrapolation Solution of Nonlinear Algebraic and Transcendental Equations								
UNIT-II	ELEMENTS OF MATRIX ALGEBRA:						Classes: 09	
Solution of Systems of Linear Equations, Eigen Value Problems								
UNIT-III	NUMERICAL DIFFERENTIATION & INTEGRATION						Classes: 09	
Numerical integration (Trapezoidal and Simpson’s rule) for determining shear, moment and deflection in beams Gauss Quadrature formula for Numerical integration (Trapezoidal and Simpson’s rule), Solution of ordinary and Partial Differential Equations.								
UNIT-IV	FINITE DIFFERENCE SCHEME						Classes: 09	
Implicit & Explicit scheme, solution using Explicit method, Stability analysis of Explicit and Implicit scheme								
UNIT-V	COMPUTER ALGORITHMS						Classes: 09	
Numerical Solutions for Different Structural Problems, Fuzzy Logic and Neural Network.								
Text Books:								
1. AtkinsonK. E., “An Introduction to Numerical Analysis”, J. Wiley and Sons, 1989. 2. Stevan C.Chopra, Raymond P.Canal, “Numerical Methods for Engineers” McGraw HillBook Company. April 2009.								
Reference Books:								
1. Scheid F, “Theory and Problems of Numerical Analysis”, McGraw Hill Book Company, (ShaumSeries), 1988. 2. Sastry S. S, “Introductory Methods of Numerical Analysis”, Prentice Hall of India, 1998								
Web References:								
1. http://nptel.ac.in/courses/105105043/ 2. https://www.class-central.com/course/nptel-numerical-methods-finite-difference-approach-10003								
E-Text Books:								
1. http://nptel.ac.in/courses/103101111/downloads/Lecture-notes/Unit_6_Solving_ODE-IVPs.pdf								

STRUCTURAL HEALTH MONITORING

I Semester: ST								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
BSTB07	Elective	L	T	P	C	CIA	SEE	Total
		3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: 0	Practical Classes: Nil			Total Classes: 45			
OBJECTIVES: The course should enable the students to: I. Diagnosis the distress in the structure understanding the causes and factors. II. Assess the health of structure using static field methods. III. Assess the health of structure using dynamic field tests. IV. Suggest repairs and rehabilitation measures of the structure.								
UNIT-I	STRUCTURAL HEALTH						Classes: 09	
Definition, Principles, significance of SHM, Factors affecting Health of Structures, Causes of Distress, Regular Maintenance.								
UNIT-II	STRUCTURAL HEALTH MONITORING						Classes: 09	
Concepts, Use of Sensors, Building Instrumentation, Various Measures, Structural Safety in Alteration.								
UNIT-III	STRUCTURAL AUDIT AND STATIC FIELD TESTING						Classes: 09	
Assessment of Health of Structure, Collapse and Investigation, Investigation Management, SHM Procedures. State-of-Art damage identification and pattern reorganization methods. Types of Static Tests, Simulation and Loading Methods, sensor systems and hardware requirements, Static Response Measurement.								
UNIT-IV	DYNAMIC FIELD TESTING						Classes: 09	
Types of Dynamic Field Test, Stress History Data, Dynamic Response Methods, Hardware for Remote Data Acquisition Systems, Remote Structural Health Monitoring.								
UNIT-V	INTRODUCTION TO REPAIRS AND REHABILITATIONS OF STRUCTURES						Classes: 09	
Case Studies (Site Visits), piezo-electric materials and other smart materials, electro–mechanical impedance (EMI) technique, Adaptations of EMI technique.								
Text Books: 1. Daniel Balageas, Claus_Peter Fritzen, Alfredo Güemes , “Structural Health Monitoring” , John Wiley and Sons, 2006. 2. Douglas E Adams, “Health Monitoring of Structural Materials and Components_Methods with Applications”, John Wiley and Sons, 200								
Reference Books: 1. J. P. Ou, H. Li and Z. D. Duan , “Structural Health Monitoring and Intelligent Infrastructure”, Voll, Taylor and Francis Group, London, UK, 2006. 2. Victor Giurglitui, “Structural Health Monitoring with Wafer Active Sensors”, Academic Press Inc, 2007.								

Web References:
1. http://nptel.ac.in/courses/112104160/3
2. http://nptel.ac.in/downloads/112104160/
E-Text Books:
1. https://books.google.co.in/books?id=DXOsGoqtiggC&printsec=frontcover#v=onepage&q&f=false .
2. https://www.researchgate.net/publication/273059503_Introduction_to_Structural_Health_Monitoring .

STRUCTURAL OPTIMIZATION

I Semester: ST								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
BSTB08	Elective	L	T	P	C	CIA	SEE	Total
		3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil			Total Classes: 45			
OBJECTIVES: The course should enable the students to: I. Use Variational principle for optimization II. Apply optimization techniques to structural steel and concrete members. III. Design using frequency constraint.								
UNIT-I	INTRODUCTION						Classes: 09	
Definition, Variables, Objective Function, Constraints, Simultaneous Failure Mode and Design, Classical External Problems								
UNIT-II	CALCULUS OF VARIATION						Classes: 09	
Differential calculus, Optimality criteria, Variational Principles with Constraints, Single variable optimization Multivariable optimization								
UNIT-III	LINEAR PROGRAMMING						Classes: 09	
Integer Programming, Nonlinear Programming, Dynamic Programming, Geometric Programming and Stochastic Programming. Problem formulation, Graphical solution, Analytical method, Standard form, Slack, surplus and artificial variables								
UNIT-IV	APPLICATIONS						Classes: 09	
Structural Steel and Concrete Members, Trusses and Frames, Methods for optimal design of structural elements, continuous beams and single storied frames using plastic theory.								
UNIT-V	DESIGN						Classes: 09	
Frequency Constraint, Design of Layouts, Minimum weight design for truss members, Fully stressed design- Optimization principles to design of R.C. structures such as multi-storey buildings.								
Text Books: 1. Spillers, William R, Keith M. MacBain, “Structural Optimization”, Springer, 2009. 2. M. P. Bendsoe, O. Signmund, “Topology Optimization: Theory, methods and Applications” Springer.								
Reference Books: 1. Haftka, Raphael T., Gürdal, Zafer, “Elements of Structural Optimization”, Third Revised and Expanded Edition, kluver academic publishers. 2. Andrej Cherkhaev, “Variational methods for Structural optimization”, Springer.								
Web References: 1. http://nptel.ac.in/courses/112108211/25								
E-Text Books: 1. http://eprints-phd.biblio.unitn.it/1343/1/PhD.pdf								

STRUCTURAL DESIGN LABORATORY

I Semester: ST								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
BSTB09	Core	L	T	P	C	CIA	SEE	Total
		0	0	4	2	30	70	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 40			Total Classes:40			
OBJECTIVES:								
The course should enable the students to:								
I. Design and Detail all the Structural Components of Frame Buildings.								
II. Design and Detail complete Multi-Storey Frame Buildings.								
LIST OF EXPERIMENTS								
Design and detailed drawing of complete G+ 3 structures by individual student using latest relevant IS codes.								
Week-I	INTRODUCTION TO STAAD SOFTWARE							
Introductionto STAAD Software								
Week-II	STRUCTURAL SYSTEMS							
General Description-Type of structure, Unit systems, structure geometry and Co-ordinate systems								
Week-III	COMMAND INPUTS							
STAAD III –Commands- Using Edit Input-Command Formats-Text Input.								
Week-IV	DEVELOPING GEOMETRY AND DIMENSIONING							
STAAD PRE- Graphical Input Generation-Library- Geometry Generation – Dimensioning								
Week-V	3D MODEL DEVELOPMENT							
STAAD POST – Graphical Post Processing – Animation – Icons – Isometric View – Zooming-Results of Analysis & Design – Query reports.								
Week-VI	ASSIGNING DIFFERENT LOAD PARAMETERS							
LOAD – Member Load, Element Load, Joint Load, Floor Load, Self weight Command, Load case no, Load Combination								
Week-VII	ANALYSIS OF BEAM AND TRUSS							
Analysis of 2D Truss using STAAD-III Analysis of continuous Beams using STAAD-III								
Week-VIII	ANALYSIS OF RIGID FRAMES							
Analysis of 2D and 3D Rigid Frames using STAAD-III								
Week-IX	DESIGN OF RC STRUCTURAL ELEMENTS							
Design of RC framed structures (Beams, columns, slabs, footings)using STAAD III Design of circular water tanks using STAAD-III								
Week-X	ANALYSIS AND DESIGN OF STEEL STRUCTURES							
Analysis and Design of steel structures (Beams, columns)								

Text Books:
<ol style="list-style-type: none"> 1. T.S.Sarma, “Staad .Pro v8i for Beginners” Notion press, 2014. 2. Sivakumar Naganathan, “Learn Yourself Staad Pro V8i”, Lap Lambert Academic Publishing GmbH KG, 2012.
Reference Books:
<ol style="list-style-type: none"> 1. Design of Steel Structures: Dr. Subramanian Narayanan - Oxford Publication
Web References:
<ol style="list-style-type: none"> 1. https://onlinecourses.nptel.ac.in/noc17_ce21/preview.
E-Text Books:
<ol style="list-style-type: none"> 1. https://civildigital.com/staad-pro-v8i-video-tutorials/.

ADVANCED CONCRETE LABORATORY

I Semester: ST								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
BSTB10	Core	L	T	P	C	CIA	SEE	Total
		0	0	4	2	30	70	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 40			Total Classes:40			
OBJECTIVES:								
The course should enable the students to:								
I. Design high grade concrete and study the parameters affecting its performance.								
II. Conduct Non Destructive Tests on existing concrete structures.								
III. Apply engineering principles to understand behavior of structural/ elements.								
LIST OF EXPERIMENTS								
Week-I	STRESS STRAIN CURVE FOR CONCRETE							
Study of stress-strain curve of high strength concrete.								
Week-II	CORRELATION BETWEEN CUBE STRENGTH AND CYLINDER STRENGTH							
Correlation between cube strength and cylinder strength.								
Week-III	DETERMINION OF SPLIT TENSILE CONCRETE							
Split tensile strength.								
Week-IV	DETERMINION OF MODULUS OF RUPTURE CONCRETE							
Modulus of rupture.								
Week-V	RELATION BETWEEN COMPRESSIVE STRENGTH AND SPLIT STRENGTH							
Correlation between compressive strength and cylinder strength.								
Week-VI	RELATION BETWEEN COMPRESSIVE AND MODLUS OF RUPTURE							
Effect of cyclic loading on steel.								
Week-VII	NON – DESTRUCTIVE TEST (NDT)							
Non-Destructive testing of existing concrete members.								
Week-VIII	FLEXURE STRENGTH TEST							
Behavior of Beams under flexure.								
Week-IX	SHEAR STRENGTH TEST							
Behavior of Beams under Shear.								
Week-X	TORSION STRENGTH TEST							
Behavior of Beams under Torsion.								
Text Books:								
1. Concrete Technology, Shetty M. S., S. Chand and Co., 2006.								
Reference Books:								
1. Properties of Concrete, Neville A. M., Prentice Hall, 5 th Edition, 2012.								

Web References:
1. http://kec.edu.np/wp-content/uploads/2017/06/Advanced-Concrete-Technology.pdf .
E-Text Books:
1. http://alphace.ac.in/downloads/notes/cv/10cv81.pdf .

FINITE ELEMENT METHOD IN STRUCTURAL ENGINEERING

II Semester: ST								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
BSTB11	Core	L	T	P	C	CIA	SEE	Total
		3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil			Total Classes: 45			
OBJECTIVES: The course should enable the students to: I. Use Finite Element Method for structural analysis. II. Execute the Finite Element Program/ Software. III. Solve continuum problems using finite element analysis.								
UNIT-I	INTRODUCTION						Classes: 09	
History and Applications. Spring and Bar Elements, Minimum Potential Energy Principle, Direct Stiffness Method, Nodal Equilibrium equations, Assembly of Global Stiffness Matrix, Element Strain and Stress.								
UNIT-II	BEAM ELEMENTS						Classes: 09	
Flexure Element, Element Stiffness Matrix, Element Load Vector.								
UNIT-III	METHOD OF WEIGHTED RESIDUALS						Classes: 09	
Galerkin Finite Element Method, Application to Structural Elements, Interpolation Functions, Compatibility and Completeness Requirements, Polynomial Forms, Applications.								
UNIT-IV	TYPES						Classes: 09	
Triangular Elements, Rectangular Elements, Three-Dimensional Elements, Isoparametric Formulation, Axi-Symmetric Elements, Numerical Integration, Gaussian Quadrature.								
UNIT-V	APPLICATION TO SOLID MECHANICS & COMPUTER IMPLEMENTATION						Classes: 09	
Application to Solid Mechanics: Plane Stress, CST Element, Plane Strain Rectangular Element, Isoparametric Formulation of the Plane Quadrilateral Element, Axi- Symmetric Stress Analysis, Strain and Stress Computations. Computer Implementation of FEM procedure, Pre-Processing, Solution, Post-Processing, Use of Commercial FEA Software.								
Text Books:								
1. Seshu P, “Finite Element Analysis”, Prentice-Hall of India, 2005. 2. Cook R. D, “Concepts and Applications of Finite Element Analysis”, Wiley J., New York, 1995. 3. Krishnamoorthy C.S, "Finite Elements Analysis - Theory and Programming", Tata McGraw Hill publishing company limited, New Delhi, 2008.								
Reference Books:								
1. Hutton David, “Fundamentals of Finite Element Analysis”, McGraw Hill, 2004. 2. Buchanan G.R, “Finite Element Analysis, McGraw Hill Publications, New York, 1995. 3. Zienkiewicz O.C. & Taylor R.L , “Finite Element Method”,. Vol. I, II & III, Elsevier, 2000 4. Belegundu A.D., Chandrupatla, “Finite Element Methods in Engineering”, T.R., Prentice Hall, India, 1991.								

Web References:
1. http:// nptel.ac.in/courses/105106051/
2. http:// nptel.ac.in/courses/1051050
E-Text Books:
1. http://web.mit.edu/16.810/www/16.810_L4_CAE.pdf

STRUCTURAL DYNAMICS

II Semester: ST								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
BSTB12	Core	L	T	P	C	CIA	SEE	Total
		3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil			Total Classes: 45			
OBJECTIVES: The course should enable the students to: I. Analyze and study dynamics response of single degree freedom system using fundamental theory and equation of motion. II. Analyze and study dynamics response of Multi degree freedom system using fundamental theory and equation of motion. III. Use the available software for dynamic analysis.								
UNIT -I	INTRODUCTION						Classes: 09	
Objectives, Importance of Vibration Analysis, Nature of Exciting Forces, Mathematical Modeling of Dynamic Systems.								
UNIT -II	SINGLE DEGREE OF FREEDOM SYSTEM						Classes: 09	
Free and Forced Vibration with and without Damping, Response to Harmonic Loading, Response to General Dynamic Loading using Duhamel’s Integral, Fourier Analysis for Periodic Loading, State Space Solution for Response.								
UNIT -III	NUMERICAL SOLUTION						Classes: 09	
Introduction, accuracy and stability, Solution to Response using New mark Method and Wilson Method, State Space solution for response Numerical Solution for State Space Response using Direct Integration.								
UNIT -IV	MULTIPLE DEGREE OF FREEDOM SYSTEM (LUMPED PARAMETER)						Classes: 09	
Two Degree of Freedom System, Multiple Degree of Freedom System, Inverse Iteration Method for Determination of Natural Frequencies and Mode Shapes, Dynamic Response by Modal Superposition Method, Direct Integration of Equation of Motion.								
UNIT -V	MULTIPLE DEGREE OF FREEDOM SYSTEM & SPECIAL TOPICS IN STRUCTURAL DYNAMICS						Classes: 09	
Multiple Degree of Freedom System (Distributed Mass and Load): Single Span Beams, Free and Forced Vibration, Generalized Single Degree of Freedom System. Special Topics in Structural Dynamics(Concepts only): Dynamic Effects of Wind Loading, Moving Loads, Vibrations caused by Traffic, Blasting and Pile Driving, Foundations for Industrial Machinery, Base Isolation.								
Text Books:								
1. Clough R. W. and Penzien J, “Dynamics of Structures”, McGraw Hill. 2. Chopra A. K, “Structural Dynamics and Introduction to Earthquake Engineering”, illustrated, Prentice Hall, 4 th Edition, 2012. 3. Smith J. W, “Vibration of Structures - Application in Civil Engineering Design”, Chapman and Hall.								

Reference Books:
<ol style="list-style-type: none">1. Humar J. L., “Dynamics of Structures”, Prentice Hall.2. Paz Mario, “Structural Dynamics Theory and Computation”, CBS Publication.3. Hart and Wong, “Dynamics of Structures”
Web References:
<ol style="list-style-type: none">1. http://nptel.ac.in/courses/105101006/
E-Text Books:
<ol style="list-style-type: none">1. http://scmero.ulb.ac.be/Teaching/Courses/MECA-H-303/MECA-H-303-Lectures.pdf

ADVANCED STEEL DESIGN

II Semester: ST								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
BSTB13	Elective	L	T	P	C	CIA	SEE	Total
		3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil			Total Classes: 45			
OBJECTIVES: The course should enable the students to: I. Design steel structures/ components by different design processes. II. Analyze and design beams and columns for stability and strength, and drift. III. Design welded and bolted connections.								
UNIT -I	PROPERTIES OF STEEL						Classes: 09	
Mechanical Properties, Hysteresis, Ductility, Hot Rolled Sections: compactness and non-compactness, slenderness, residual stresses								
UNIT -II	DESIGN OF STEEL STRUCTURES						Classes: 09	
Inelastic Bending Curvature, Plastic Moments, Design Criteria Stability, Strength, Drift. Stability of Beams: Local Buckling of Compression Flange & Web, Lateral Torsional Buckling								
UNIT -III	STABILITY OF COLUMNS AND METHOD OF DESIGNS						Classes: 09	
Slenderness Ratio, Local Buckling of Flanges and Web, Bracing of Column about Weak Axis Allowable Stress								
Design, Plastic Design, Load and Resistance Factor Design								
UNIT -IV	STRENGTH CRITERIA						Classes: 09	
Beams -Flexure, Shear, Torsion, Columns - Moment Magnification Factor, Effective Length, PM Interaction, Biaxial Bending, Joint Panel Zones.								
UNIT -V	DRIFT CRITERIA AND CONNECTIONS						Classes: 09	
Drift Criteria: P Effect, Deformation Based Design								
Connections: Welded, Bolted, Location Beam Column, Column Foundation, Splices								
Text Books:								
1. P. Dayaratnam, “Design of Steel Structures”, S. Chand (2012). 2. Dr. Ramachandra & Vivendra, “Design Steel Structures” Volume – II, Gehlot Scientitic Publishes Journals Department. 3. S.K. Duggal, “Limit State Design of Steel Structures”, McGraw Hill Education Private Ltd. New Delhi.								
Reference Books:								
1. Galyord & Gaylord, “Design of Steel Structures”, Tata McGraw Hill, Education (2012). 2. Indian Standard Code – IS:800 (2007). 3. B.O. Kuzamanovic and N.Willems, “Steel Design for Structural Engineers”, Prentice Hall (1997).								
Web References:								
1. http://nptel.ac.in/courses/105106113/								
E-Text Books:								
1. https://www.iare.ac.in/sites/default/files/lecture_notes/lec%20notes%20ASD.pdf								

DESIGN OF HIGH RISE STRUCTURES

II Semester: ST								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
BSTB14	Elective	L	T	P	C	CIA	SEE	Total
		3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil			Total Classes: 45			
OBJECTIVES: The course should enable the students to: I. Analyze, design and detail Transmission/ TV tower, Mast and Trestles with different loading conditions. II. Analyze, design and detail the RC and Steel Chimney. III. Analyze, design and detail the tall buildings subjected to different loading conditions using relevant codes.								
UNIT-I	DESIGN OF TRANSMISSION/ TV TOWER						Classes: 09	
Mast and trestles: Configuration, bracing system, analysis and design for vertical transverse and longitudinal loads								
UNIT-II	ANALYSIS AND DESIGN OF RC AND STEEL CHIMNEY						Classes: 09	
Foundation design for varied soil strata.								
UNIT-III	TALL BUILDINGS						Classes: 09	
Structural Concept, Configurations, various systems, factors affecting growth, height and structural form, Gravity load, dead load, live load, live load reduction technique, impact load, Wind and Seismic loads, combination of load.								
UNIT-IV	FIREFIGHTING PROVISION OF TALL BUILDINGS						Classes: 09	
Dynamic approach, structural design considerations and IS code provisions. Firefighting design provisions.								
UNIT-V	APPLICATION						Classes: 09	
Application of software in analysis and design.								
Text Books: 1. Varyani U. H, “Structural Design of Multi-storeyed Buildings”, South Asian Publishers, New Delhi, 2 nd Ed., 2002. 2. Taranath B. S, “Structural Analysis and Design of Tall Building”, McGraw Hill, 1988. 3. Shah V. L. & Karve S. R., “Illustrated Design of Reinforced Concrete Buildings (GF+3storeyed)”, Structures Publications, Pune, 2013								
Reference Books: 1. Smith Byran S. and Coull Alex , “Tall Building Structures” , Wiley India. 1991. 2. Wolfgang Schueller, “High Rise Building Structures”, Wiley, 1971.								
Web References: 1. http://nptel.ac.in/courses/105106113/13								
E-Text Books: 1. http://www.byggmek.lth.se/fileadmin/byggnadsmekanik/publications/tvsm5000/web5213.pdf								

DESIGN OF MASONRY STRUCTURES

II Semester: ST								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
BSTB15	Elective	L	T	P	C	CIA	SEE	Total
		3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil			Total Classes: 45			
OBJECTIVES: The course should enable the students to: I. Understand the masonry design approaches. II. Analyze Reinforced Masonry Members. III. Determine interactions between members. IV. Determine shear strength and ductility of Reinforced Masonry members.								
UNIT -I	INTRODUCTION						Classes: 09	
Historical Perspective, Masonry Materials, Masonry Design Approaches, Overview of Load Conditions, Compression Behaviour of Masonry, Masonry Wall Configurations, Distribution of Lateral Forces								
UNIT -II	FLEXURAL STRENGTH						Classes: 09	
Flexural Strength of Reinforced Masonry Members: In plane and Out-of-plane Loading. Shear Strength and Ductility of Reinforced Masonry Members								
UNIT -III	INTERACTIONS						Classes: 09	
Structural Wall, Columns and Pilasters, behavior of axially loaded columns, axial strength of reinforced masonry columns. Retaining Wall, principal types of retaining walls, lateral pressures on retaining walls, external stability of a retaining wall, Pier and Foundation								
UNIT -IV	PRESTRESSED MASONRY						Classes: 09	
Stability of Walls, Coupling of Masonry Walls, Openings, Columns, Beams.								
UNIT -V	ELASTIC AND INELASTIC ANALYSIS						Classes: 09	
Modeling Techniques, Static Push Over Analysis and use of Capacity Design Spectra.								
Text Books: 1. NarendraTaly, “Design of Reinforced Masonry Structures”, ICC, 2 nd Edition, 2010. 2. Hamid Ahmad A. and Drysdale Robert G, “Masonry Structures: Behavior and Design”, 1994. 3. Mechanics of Masonry Structures, Editor: Maurizio Angelillo, 2014.								
Reference Books: 1. Earthquake-resistant Design of Masonry Buildings, Toma_evi_Miha, Imperial College Press, 1999.								
Web References: 1. http://nptel.ac.in/courses/105102088/28								
E-Text Books: 1. http://civil.iisc.ac.in/ksnseminar.pdf								

DESIGN OF ADVANCED CONCRETE STRUCTURES

II Semester: ST								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
BSTB16	Elective	L	T	P	C	CIA	SEE	Total
		3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil			Total Classes: 45			
OBJECTIVES: The course should enable the students to: I. Analyze the special structures by understanding their behaviour. II. Design and prepare detail structural drawings for execution citing relevant IS codes.								
UNIT-I	DESIGN PHILOSOPHY						Classes: 09	
Modeling of Loads, Material Characteristics								
UNIT-II	REINFORCED CONCRETE						Classes: 09	
P-M, M-phi Relationships, Strut-and- Tie Method, Design of Deep Beam and Corbel.								
UNIT-III	ANALYSIS AND DESIGNING OF SHEAR WALLS						Classes: 09	
Introduction, fundamental concepts, types of shear walls, rigidity and relative rigidity of a shear wall.								
Design considerations for shear walls, Design of Shear Walls as per IS code & ACI code,								
UNIT-IV	DESIGN OF SHEAR AND TORSION						Classes: 09	
Compression Field Theory for Shear Design, Design against Torsion; IS, ACI and Euro code.								
UNIT-V	STEEL STRUCTURES						Classes: 09	
Stability Design, Torsional Buckling - Pure, Flexural and Lateral, Design Of Beam-Columns, Fatigue Resistant Design, IS code, AISC Standards and Euro code								
Text Books:								
1. Pillai S. U. and Menon D, ‘Reinforced Concrete Design’, Tata McGraw-Hill, 3 rd Edition, 1999. 2. Subramaniam N, “Design of Steel Structures”, Oxford University Press, 2008. 3. Park R. and Paulay T, “Reinforced Concrete Structures”, John Wiley & Sons, 1995								
Reference Books:								
1. Varghese P. C, “Advanced Reinforced Concrete Design”, Prentice Hall of India, New Delhi. 2. Hsu T. T. C. and Mo Y. L, “Unified Theory of Concrete Structures”, John Wiley & Sons, 2010. 3. Salmon C. G., Johnson J. E. and Malhas F. A. “Steel Structures Design and Behavior Emphasizing Load and Resistance Factor Design”, Pearson Education, 5th Ed, 2009. 4. Ramchandra, “Design of Steel Structures”, Vol. II., Standard Book House, Delhi. 5. Neal B.G, “Plastic Methods of Structural Analysis”, Chapman and Hall London.								
Web References:								
1. https://lecturenotes.in/subject/179/design-of-advanced-concrete-structures-dacs								
E-Text Books:								
1. http://nptel.ac.in/downloads/105105104/								

ADVANCED DESIGN OF FOUNDATIONS

II Semester: ST								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
BSTB17	Elective	L	T	P	C	CIA	SEE	Total
		3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil			Total Classes: 45			
OBJECTIVES: The course should enable the students to: I. Decide the suitability of soil strata for different projects. II. Design shallow foundations deciding the bearing capacity of soil. III. Analyze and design the pile foundation. IV. Understand analysis methods for well foundation.								
UNIT -I	PLANNING OF SOIL EXPLORATION						Classes: 09	
Planning of Soil Exploration for Different Projects, Methods of Subsurface Exploration, Methods of Borings along with Various Penetration Tests.								
UNIT -II	SHALLOW FOUNDATIONS						Classes: 09	
Requirements for Satisfactory Performance of Foundations, Methods of Estimating Bearing Capacity, Settlements of Footings and Rafts, Proportioning of Foundations using Field Test Data, Pressure - Settlement Characteristics from Constitutive Laws.								
UNIT -III	PILE FOUNDATIONS						Classes: 09	
Methods of Estimating Load Transfer of Piles, Settlements of Pile Foundations, Pile Group Capacity and Settlement. Laterally Loaded Piles, Pile Load Tests, Analytical Estimation of Load- Settlement Behavior of Piles, Proportioning of Pile Foundations, Lateral and Uplift Capacity of Piles.								
UNIT -IV	WELL FOUNDATION						Classes: 09	
IS and IRC Code Provisions, Elastic Theory and Ultimate Resistance Methods. Tunnels and Arching in Soils, Pressure Computations around Tunnels								
UNIT -V	OPEN CUTS,COFFER DAMS						Classes: 09	
Sheeting and Bracing Systems in Shallow and Deep Open Cuts in Different Soil Types. Cofferdams, Various Types, Analysis and Design, Foundations under uplifting loads, Soil-structure Interaction.								
Text Books: 1. N.P. Kurian, “Design of foundation system”, Narosa Publishing House. 2. J. E. Bowles, “Foundation Analysis and Design” , Tata McGraw Hill New York.								
Reference Books: 1. Analysis and Design of Substructures, Swami Saran, Oxford and IBH Publishing Co. Pvt. Ltd, New Delhi.								
Web References: 1. http://nptel.ac.in/courses/105105039/								
E-Text Books: 1. https://lecturenotes.in/subject/244/advanced-foundation-engineering-afe								

DESIGN OF INDUSTRIAL STRUCTURES

II Semester: ST								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
BSTB18	Elective	L	T	P	C	CIA	SEE	Total
		3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil			Total Classes: 45			
OBJECTIVES: The course should enable the students to: I. Design Steel Gantry Girders. II. Design Steel Portal, Gable Frames. III. Design Steel Bunkers and Silos. IV. Design Chimneys and Water Tanks								
UNIT-I	STEEL GANTRY GIRDERS						Classes: 09	
Introduction, loads acting on gantry girder, permissible stress, types of gantry girders and crane rails, crane data, maximum moments and shears, construction detail, design procedure.								
UNIT-II	PORTAL FRAMES						Classes: 09	
Design of portal frame with hinge base, design of portal frame with fixed base -Gable Structures – Lightweight Structures								
UNIT-III	STEEL BUNKERS AND SILOS						Classes: 09	
Design of square bunker, Jansen’s and Airy’s theories, IS Code provisions – Design of side plates. Stiffeners, Hooper, Longitudinal beams Design of cylindrical silo, Side plates, ring girder, stiffeners.								
UNIT-IV	CHIMNEYS						Classes: 09	
Introduction, dimensions of steel stacks, chimney lining, breech openings and access ladder, loading and load combinations, design considerations, stability consideration, design of base plate, design of foundation bolts, design of foundation								
UNIT-V	WATER TANKS, DESIGN OF PRESSED STEEL WATER TANK						Classes: 09	
Design of stays :Joints , Design of hemispherical bottom water tank , side plates , Bottom plates, joints, Ring girder :Design of staging and foundation.								
Text Books:								
1. Punmia B. C., Jain Ashok Kr., Jain Arun Kr, “Design of Steel Structure”, Lakshmi Publishers, 2 nd Edition, 1998.								
Reference Books:								
1. Ram Chandra, “Design of Steel Structures”, Standard Publishers, 12 th Edition, 2009. 2. Subramaniam., “Design of Steel Structures,								
Web References:								
1. http://nptel.ac.in/courses/105106113/3								
E-Text Books:								
1. http://nptel.ac.in/downloads/105106113/								

NUMERICAL ANALYSIS LABORATORY

II Semester: ST								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
BSTB20	Core	L	T	P	C	CIA	SEE	Total
		0	0	4	2	30	70	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 40			Total Classes:40			
OBJECTIVES: The course should enable the students to: I. Find Roots of non-linear equations by Bisection method and Newton’s method. II. Do curve fitting by least square approximations III. Solve the system of Linear Equations using Gauss - Elimination/ Gauss - Seidal Iteration/ Gauss - Jorden Method IV. Integrate Numerically Using Trapezoidal and Simpson’s Rules To Integrate Numerically Using Trapezoidal and Simpson’s Rules								
LIST OF EXPERIMENTS								
Week-I	BISECTION METHOD							
Find the Roots of Non-Linear Equation Using Bisection Method								
Week-II	NEWTON’S METHOD							
Find the Roots of Non-Linear Equation Using Newton’s Method.								
Week-III	CURVE FITTING							
Curve Fitting by Least Square Approximations.								
Week-IV	GAUSS ELIMINATION METHOD							
Solve the System of Linear Equations Using Gauss - Elimination Method.								
Week-V	GAUSS SEIDAL ITERATION METHOD							
Solve the System of Linear Equations Using Gauss - Seidal Iteration Method.								
Week-VI	GAUSS JORDEN METHOD							
Solve the System of Linear Equations Using Gauss - Jorden Method.								
Week-VII	TRAPEZIODIAL RULE							
Integrate numerically using Trapezoidal Rule.								
Week-VIII	SIMPSON’S RULE							
Integrate numerically using Simpson’s Rules.								
Week-IX	EULER’S METHOD							
Numerical Solution of Ordinary Differential Equations By Euler’s Method.								
Week-X	RUNGE KUTTA METHOD							
Numerical Solution of Ordinary Differential Equations By Runge- Kutta Method.								

Text Books:
1. D.A. Bini, M. Capovani, O. Menchi, "Method of Numerical Algebra Linear", Zanichelli, 1988.
Reference Books:
1. R. Bevilacqua, D.A. Bini, M. Capovani, O. Menchi, Metodi Numerici, Zanichelli, 1992
Web References:
1. http://www.iitg.ac.in/physics/fac/charu/courses/ph508/lab5.pdf
E-Text Books:
1. https://www.researchgate.net/publication/275014975_A_Numerical_Analysis_Lab_Solving_System_of_Linear_Equations

RESEARCH AND CONTENT DEVELOPMENT

II Semester: ST								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
BSTB19	Core	L	T	P	C	CIA	SEE	Total
		0	0	4	2	30	70	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 48			Total Classes:48			
OBJECTIVES:								
The course should enable the students to:								
I. Understand the fundamental concepts of computer networking.								
II. Use the preamble of LaTeX file to define document class and layout options.								
III. Use latex and various templates acquired from the course to compose mathematical documents								
IV. Understand web design concepts								
LIST OF EXPERIMENTS								
Week – I	LaTeX FORMATTING							
Introduction of LaTeX and LaTeX document formatting: Create a LaTeX document with following formatting: All margins with 1.5, headings with bold, text with normal, chapter name with blue color, line space with 1.5.								
Week – II	TECHNICAL PAPER PREPARATION IN LaTeX							
Essential steps in writing the technical report: Create a technical report according to IEEE format includes title of the paper, authors name and affiliations,abstract and keywords, introduction section, background section, and other sections, references.								
Week – III	FORMATTING MATHEMATICAL EQUATIONS IN LaTeX							
Create a LaTeX document with following mathematical equations along with equation numbers in Italicformat: summation (represent in sigma symbol), integration, integral of summation, average of summation trigonometric equations, polynomial and non-polynomial equations.								
Week – IV	GRAPHICS AND TABLES IN LaTeX							
Create a LaTeX documents with images and image caption at centre alignment, table with thick border and table caption with centre alignment, row height, content with cell centre alignment.								
Week – V	VARIOUS FORMATTING STYLES IN LaTeX							
Using LaTeX to create project certificate. Features to be covered:- Formatting Fonts in word, Drop Cap in word. Applying Text effects. Using Character Spacing, Borders and Colors, Inserting Header and Footer, using Date and Time option in both LaTeX.								
Week – VI	EXCEL SPREAD SHEETS							
Spreadsheet Orientation: Accessing, overview of toolbars, saving spreadsheet files. Using help and resources. Creating a Scheduler: Gridlines, Format Cells, Summation, auto fill, Formatting Text Calculating GPA-Features to be covered:- Cell Referencing, Formulae in spreadsheet - average std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, Sorting, Conditional formatting								
Week – VII	PREPARATION OF POWERPOINT PRESENTATION IN LaTeX							
Student should work on basic power point utilities and tools in Latex which help them create basic power point presentation. PPT Orientation, Slide Layouts, Inserting Text, Formatting Text, Bullets and Numbering. Auto Shapes. Lines and Arrows								
Week – VIII	WEB PAGES CREATION AND DESIGNING							
HTML, creating simple web pages, images and links, design of web pages Develop home page: Student should learn to develop his/her home page using HTML consisting of his/her photo, name, address and education details as a table and his/her skill set as a list.								

Week – IX	WEB DESIGN FOR SAMPLE PROJECT
<p>Create a webpage with HTML describing your department. Use paragraph and list tags.</p> <p>Apply various colors to suitably distinguish key words. Also apply font styling like italics, underline and two other fonts to words you find appropriate. Also use header tags.</p> <p>Create links on the words e.g. "Wi-Fi" and "LAN" to link them to Wikipedia pages.</p> <p>Insert an image and create a link such that clicking on image takes user to other page.</p> <p>Change the background color of the page.</p> <p>At the bottom create a link to take user to the top of the page.</p>	
Week – X	NETWORK CONNECTIVITY
<p>Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. . Finally students should demonstrate how to access the websites and email.</p>	
Week – XI	SURFING THE WEB
<p>Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers.</p>	
Week – XII	ROUTER CONFIGURATION
<p>Cabling a network using CCNA, basic and challenge router configuration, subnetting, practical test router connections and settings, troubleshooting challenges.</p>	
Reference Books:	
<ol style="list-style-type: none"> 1. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education India, 2005 2. DavrdAnfimion and KenQuamme, “IT Essentials: PC Hardware and Software Companion Guide,Third Edition, Cisco Press, 2008 	
Web References:	
<ol style="list-style-type: none"> 1. https://www.latex-tutorial.com/tutorials/ 2. https://tutorial.techaltum.com/webdesigning.html 	

MINI PROJECT

II Semester: ST								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
BSTB21	Core	L	T	P	C	CIA	SEE	Total
		0	0	4	2	30	70	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 45				Total Classes:45		
OBJECTIVES: The course should enable the students to: I. Identify structural engineering problems reviewing available literature. II. Study different techniques used to analyze complex structural systems. III. Work on the solutions given and present solution by using his/her technique applying engineering principles.								
Guidelines to be followed Mini Project will have mid semester presentation and end semester presentation. Mid semesterpresentation will include identification of the problem based on the literature review on the topicreferring to latest literature available. End semester presentation should be done along with the report on identification of topic for thework and the methodology adopted involving scientific research, collection and analysis of data,determining solutions highlighting individuals’ contribution. Continuous assessment of Mini Project at Mid Sem and End Sem will be monitored by theDepartmental committee.								

RESEARCH METHODOLOGY AND IPR

III Semester: CSE, ES, CAD/CAM, AE, EPS, ST								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
BCSB31	Core	L	T	P	C	CIA	SEE	Total
		2	-	-	2	30	70	100
Contact Classes: 30	Tutorial Classes: Nil	Practical Classes: Nil			Total Classes: 30			
OBJECTIVES: The course should enable the students to: I. Understand research problem formulation. II. Analyze research related information III. Follow research ethics IV. Understand that today’s world is controlled by Computer, Information Technology; but tomorrow world will be ruled by ideas, concept, and creativity.								
UNIT-I	INTRODUCTION						Classes: 07	
Meaning of research problem, Sources of research problem, Criteria Characteristics of a good research problem, Errors in selecting a research problem, Scope and objectives of research problem. Approaches of investigation of solutions for research problem, data collection, analysis, interpretation, Necessary instrumentations.								
UNIT-II	RESEARCH ETHICS						Classes: 05	
Effective literature studies approaches, analysis Plagiarism, Research ethics.								
UNIT-III	RESEARCH PROPOSAL						Classes: 06	
Effective technical writing, how to write report, Paper Developing a Research Proposal. Format of research proposal, a presentation and assessment by a review committee.								
UNIT-IV	PATENTING						Classes: 06	
Nature of Intellectual Property: Patents, Designs, Trade and Copyright. Process of Patenting and Development: technological research, innovation, patenting, development. International Scenario: International cooperation on Intellectual Property. Procedure for grants of patents, Patenting under PCT.								
UNIT-V	PATENT RIGHTS						Classes: 06	
Patent Rights: Scope of Patent Rights. Licensing and transfer of technology. Patent information and databases. Geographical Indications. New Developments in IPR: Administration of Patent System. New developments in IPR; IPR of Biological Systems, Computer Software etc. Traditional knowledge Case Studies, IPR and IITs.								
Text Books:								
1. Stuart Melville and Wayne Goddard, “Research methodology: an introduction forscience & engineering students” 2. Wayne Goddard and Stuart Melville, “Research Methodology: An Introduction” 3. Ranjit Kumar, 2nd Edition, “Research Methodology: A Step by Step Guide forbeginners”.								

Reference Books:

1. Halbert, “Resisting Intellectual Property”, Taylor & Francis Ltd ,2007.
2. Mayall, “Industrial Design”, McGraw Hill, 1992.
3. Niebel, “Product Design”, McGraw Hill, 1974.
4. Asimov, “Introduction to Design”, Prentice Hall, 1962.

Web References:

1. Robert P. Merges, Peter S. Menell, Mark A. Lemley, “ Intellectual Property in NewTechnological Age”, 2016
2. T. Ramappa, “Intellectual Property Rights Under WTO”, S. Chand, 2008

E-Text Books:

1. <http://nptel.ac.in/courses/107108011/>

DESIGN OF PRESTRESSED CONCRETE STRUCTURES

III Semester: ST								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
BSTB22	Elective	L	T	P	C	CIA	SEE	Total
		3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil			Total Classes: 45			
OBJECTIVES:								
The course should enable the students to:								
I. Find out losses in the prestressed concrete.								
II. Understand the basic aspects of prestressed concrete fundamentals, including pre and post-tensioning processes.								
III. Analyze prestressed concrete deck slab and beam/ girders.								
IV. Design prestressed concrete deck slab and beam/ girders.								
UNIT-I	INTRODUCTION TO PRESTRESSED CONCRETE						Classes: 09	
Types of prestressing, systems and devices, materials, losses in prestress. Analysis of PSC flexural members: basic concepts, stresses at transfer and service loads, ultimate strength in flexure, code provisions.								
UNIT-II	STATICALLY DETERMINATE PSC BEAMS						Classes: 09	
Design for ultimate and serviceability limit states for flexure, analysis and design for shear and torsion, code provisions.								
Transmission of prestressing, pretensioned members; Anchorage zone stresses for post tensioned members.								
UNIT-III	STATICALLY INDETERMINATE STRUCTURES						Classes: 09	
Plane Truss – Determinacy and Analysis method, Structural Analysis – Plane truss and Space truss.								
Analysis and design - continuous beams and frames, choice of cable profile, linear transformation and concordancy								
UNIT-IV	COMPOSITE CONSTRUCTION						Classes: 09	
Composite construction with precast PSC beams and cast in-situ RC slab - Analysis and design, creep and shrinkage effects. Partial prestressing - principles, analysis and design concepts, crack width calculations.								
UNIT-V	ANALYSIS AND DESIGN						Classes: 09	
Analysis and design of prestressed concrete pipes, columns with moments								
Text Books:								
1. Lin T.Y, “Design of Prestressed Concrete Structures”, Asia Publishing House, 1955.								
2. Krishnaraju N, “Prestressed Concrete”, Tata McGraw Hill, New Delhi, 1981.								
Reference Books:								
1. GuyanY, “Limited State Design of Prestressed Concrete”, Applied Science Publishers, 1972.								
2. IS: 1343- Code of Practice for Prestressed Concrete								
3. IRC: 112- code for concrete road bridges.								
Web References:								
1. http://nptel.ac.in/courses/105106117/								
E-Text Books:								
1. http://textofvideo.nptel.ac.in/105106118/lec17.pdf								

ANALYSIS OF LAMINATED COMPOSITE PLATES

III Semester: ST								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
BSTB23	Elective	L	T	P	C	CIA	SEE	Total
		3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil			Total Classes: 45			
OBJECTIVES: The course should enable the students to: I. Analyze the rectangular composite plates using the analytical methods. II. Analyze the composite plates using advanced finite element method. III. Develop the computer programs for the analysis of composite plates.								
UNIT-I	INTRODUCTION						Classes: 09	
Displacement Field Approximations for Classical Laminated Plate Theory (CLPT) and First Order Shear Deformation Theory (FSDT), Analytical Solutions for Bending of Rectangular Laminated Plates using CLPT.								
UNIT-II	GOVERNING EQUATIONS.						Classes: 09	
Navier Solutions of Cross-Ply and Angle-Ply Laminated Simply-Supported Plates, Determination of Stresses. Levy Solutions for Plates with Other Boundary Conditions, Analytical Solutions for Bending of Rectangular Laminated Plates Using FSDT.								
UNIT-III	FINITE ELEMENT SOLUTIONS						Classes: 09	
Finite Element Solutions for Bending of Rectangular Laminated Plates using CLPT. Stiffness Matrix and Truss element, truss element stiffness matrix, truss element bending function and Beam element								
UNIT-IV	INTRODUCTION TO FINITE ELEMENT METHOD						Classes: 09	
Introduction to Finite Element Method, Rectangular Elements, Formation of Stiffness Matrix, Formation of Load Vector, Numerical Integration, Post Computation of Stresses								
UNIT-V	FEM MODELLING OF LAMINATED PLATES						Classes: 09	
Finite Element Solutions for Bending of Rectangular Laminated Plates using FSDT. Finite Element Model, C0 Element Formulation, Post Computation of Stresses. Analysis of Rectangular Composite Plates using Analytical Methods.								
Text Books: 1. J. N. Reddy , “Mechanics of Laminated Composite Plates and Shells”.								
Reference Books: 1. Reddy J. N., CRC Press, “Mechanics of Laminated Composites Plates and Shells”.								
Web References: 1. http://ethesis.nitrkl.ac.in/5685/1/110ME0327-3.pdf								
E-Text Books: 1. http://ethesis.nitrkl.ac.in/5878/1/110ME0335-6.pdf								

FRACTURE MECHANICS OF CONCRETE STRUCTURES

III Semester: ST								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
BSTB24	Elective	L	T	P	C	CIA	SEE	Total
		3	0	0	3	30	70	100
Contact Classes: 45	Tutorial Classes: 0	Practical Classes: Nil			Total Classes: 45			
OBJECTIVES: The course should enable the students to: I. Identify and classify cracking of concrete structures based on fracture mechanics. II. Implement stress intensity factor for notched members III. Apply fracture mechanics models to high strength concrete and FRC structures. IV. Compute J-integral for various sections understanding the concepts of LEFM.								
UNIT-I	INTRODUCTION						Classes: 09	
Fracture Mechanics, Crack in a Structure, Mechanisms ofFractureandCrackGrowth, Cleavage Fracture,								
UNIT-II	CRACKING MECHANISM						Classes: 09	
Ductile Fracture, Fatigue Cracking, Environment assisted Cracking,Service Failure Analysis.								
UNIT-III	STRESS AT CRACK TIP						Classes: 09	
Stress at Crack Tip, Linear Elastic Fracture Mechanics, Griffith’s Criteria,Stress Intensity Factors. Crack Tip Plastic Zone, Erwin’s Plastic Zone Correction, R curves,Compliance, J Integral, Concept of CTOD and CMD.								
UNIT-IV	MATERIAL MODELS						Classes: 09	
General Concepts, Crack Models, Band Models, Models based on ContinuumDamage Mechanics,.								
UNIT-V	APPLICATIONS TO CONCRETE STRUCTURES						Classes: 09	
Applications to High Strength Concrete, Fibre Reinforced Concrete, CrackConcepts and Numerical Modeling								
Text Books: 1. Suri C. T. and Jin Z.H., “Fracture Mechanics”, 1st Edition, Elsevier Academic Press, 2012. 2. BroekDavid, “Elementary Engineering Fracture Mechanics”, 3rd Rev. Ed. Springer, 1982. Elfgreen L, “Fracture Mechanics of Concrete Structures – Theory and Applications”, RILEMReport, Chapman and Hall, 1989.								
Reference Books: 1. Victor, Li C., Bazant Z. P, “Fracture Mechanics – Applications to Concrete”, ACI SP 118, ACIDetroit, 1989.								
Web References: 1. http://www.nptel.ac.in/courses/112106065/#								
E-Text Books: 1. http://www.civil.northwestern.edu/people/bazant/PDFs/Papers/P90.pdf								

BUSINESS ANALYTICS

Course Code	Category	Hours / Week			Credits	Maximum Marks		
BCSB25	Open Elective	L	T	P	C	CIA	SEE	Total
		3	-	-	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil			Total Classes: 45			
OBJECTIVES: The course should enable the students to: I. Understand the role of business analytics within an organization. II. Analyze data using statistical and data mining techniques and understand relationships between the underlying business processes of an organization. III. To gain an understanding of how managers use business analytics to formulate and solve business problems and to support managerial decision making. IV. To become familiar with processes needed to develop, report, and analyze business data. V. Use decision-making tools/Operations research techniques. VI. Mange business process using analytical and management tools. VII. Analyze and solve problems from different industries such as manufacturing, service, retail, software, banking and finance, sports, pharmaceutical, aerospace etc.								
UNIT-I	BUSINESS ANALYTICS						Classes: 09	
Business analytics: Overview of Business analytics, Scope of Business analytics, Business Analytics Process, Relationship of Business Analytics Process and organization, competitive advantages of Business Analytics. Statistical Tools: Statistical Notation, Descriptive Statistical methods, Review of probability distribution and data modeling, sampling and estimation methods overview.								
UNIT-II	REGRESSION ANALYSIS						Classes: 09	
Trendiness and Regression Analysis: Modeling Relationships and Trends in Data, simple Linear Regression. Important Resources, Business Analytics Personnel, Data and models for Business analytics, problem solving, Visualizing and Exploring Data, Business Analytics Technology.								
UNIT-III	ORGANIZATION STRUCTURES						Classes: 09	
Organization Structures of Business analytics, Team management, Management Issues, Designing Information Policy, Outsourcing, Ensuring Data Quality, Measuring contribution of Business analytics, Managing Changes. Descriptive Analytics, predictive analytics, predicative Modeling, Predictive analytics analysis, Data Mining, Data Mining Methodologies, Prescriptive analytics and its step in the business analytics Process, Prescriptive Modeling, nonlinear Optimization.								
UNIT-IV	FORECASTING TECHNIQUES						Classes: 09	
Forecasting Techniques: Qualitative and Judgmental Forecasting, Statistical Forecasting Models, Forecasting Models for Stationary Time Series, Forecasting Models for Time Series with a Linear Trend, Forecasting Time Series with Seasonality, Regression Forecasting with Casual Variables, Selecting Appropriate Forecasting Models. Monte Carlo Simulation and Risk Analysis: Monte Carle Simulation Using Analytic Solver Platform, New-Product Development Model, Newsvendor Model, Overbooking Model, Cash Budget Model.								
UNIT-V	DECISION ANALYSIS						Classes: 09	
Decision Analysis: Formulating Decision Problems, Decision Strategies with the without Outcome Probabilities, Decision Trees, The Value of Information, Utility and Decision Making. Recent Trends in:								

Embedded and collaborative business intelligence, Visual data recovery, Data Storytelling and Data journalism.
Text Books
1. James Evans, “Business Analytics”, Persons Education.
Reference Books
1. Marc J. Schniederjans, Dara G. Schniederjans, Christopher M. Starkey, “Business analytics Principles, Concepts, and Applications”, Pearson FT Press.
Web References
1. http://nptel.ac.in/courses/110107092/
E-Text Books
1. http://nptel.ac.in/downloads/110107092/

INDUSTRIAL SAFETY

Course Code	Category	Hours / Week			Credits	Maximum Marks		
BCSB26	Open Elective	L	T	P	C	CIA	SEE	Total
		3	-	-	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil			Total Classes: 45			
OBJECTIVES: The course should enable the students to: I. Ensuring duty holders apply inherent safety principles in managing risks. II. Prioritizing interventions based on the inherent hazards of the site and/or pipeline, performance of duty holders in controlling risks and other defined operational intelligence. III. Identifying the underlying, as well as the immediate, causes of any deficiencies in duty holders arrangements for managing risks. IV. Taking action to ensure immediate and underlying causes of failures of risk management are addressed.								
UNIT-I	INDUSTRIAL SAFTEY						Classes: 09	
Industrial safety: Accident, causes, types, results and control, mechanical and electrical hazards, types, causes and preventive steps/procedure, describe salient points of factories act 1948 for health and safety, wash rooms, drinking water layouts, light, cleanliness, fire, guarding, pressure vessels, etc, Safety color codes. Fire prevention and firefighting, equipment and methods.								
UNIT-II	MAINTENANCE ENGINEERING						Classes: 09	
Fundamentals of maintenance engineering: Definition and aim of maintenance engineering, Primary and secondary functions and responsibility of maintenance department, Types of maintenance, Types and applications of tools used for maintenance, Maintenance cost & its relation with replacement economy, Service life of equipment.								
UNIT-III	CORROSION AND PREVENTION TECHNIQUES						Classes: 09	
Wear and Corrosion and their prevention: Wear- types, causes, effects, wear reduction methods, lubricants- types and applications, Lubrication methods, general sketch, working and applications, i.e. Screw down grease cup, ii. Pressure grease gun, iii. Splash lubrication, iv. Gravity lubrication, v. Wick feed lubrication vi. Side feed lubrication, vii. Ring lubrication. Definition, principle and factors affecting the corrosion. Types of corrosion, corrosion prevention methods.								
UNIT-IV	FAULT TRACING						Classes: 09	
Fault tracing: Fault tracing-concept and importance, decision tree concept, need and applications, sequence of fault finding activities, show as decision tree, draw decision tree for problems in machine tools, hydraulic, pneumatic, automotive, thermal and electrical equipment's like, I. Any one machine tool, ii. Pump iii. Air compressor, iv. Internal combustion engine, v. Boiler, vi. Electrical motors, Types of faults in machine tools and their general causes.								
UNIT-V	PERODIC AND PREVENTIVE MAINTENANCE						Classes: 09	
Periodic and preventive maintenance: Periodic inspection-concept and need, degreasing, cleaning and repairing schemes, overhauling of mechanical components, overhauling of electrical motor, common troubles and remedies of electric motor, repair complexities and its use, definition, need, steps and advantages of preventive maintenance. Steps/procedure for periodic and preventive maintenance of: I. Machine tools, ii. Pumps, iii. Air compressors, iv. Diesel generating (DG) sets, Program and schedule of preventive maintenance of mechanical and electrical equipment, advantages of preventive maintenance. Repair cycle concept and importance.								

Text Books
<ol style="list-style-type: none"> 1. Higgins & Morrow, “Maintenance Engineering Handbook”, Da Information Services. 2. H. P. Garg, “Maintenance Engineering”, S. Chand and Company.
Reference Books
<ol style="list-style-type: none"> 1. Audels, “Pump-hydraulic Compressors”, Mcgraw Hill Publication. 2. Winterkorn, Hans, “Foundation Engineering Handbook”, Chapman & Hall London.
Web References
<ol style="list-style-type: none"> 1. https://onlinecourses.nptel.ac.in/noc18_mg42/preview
E-Text Books
<ol style="list-style-type: none"> 1. http://portal.unimap.edu.my/portal/page/portal30/Lecturer%20Notes/KEJURUTERAAN_KOMPUTER/Semester%201%20Sidang%20Akademik%2020142015/DPT333%20Industrial%20safety%20and%20health/Chapter%201%20-%20Introduction%20-Zaizu_0.pdf

OPERATIONS RESEARCH

Course Code	Category	Hours / Week			Credits	Maximum Marks		
BCSB27	Open Elective	L	T	P	C	CIA	SEE	Total
		3	-	-	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil			Total Classes: 45			
OBJECTIVES: The student should enable the students to: I. Apply the dynamic programming to solve problems of discrete and continuous variables. II. Understand the concept of nonlinear programming. III. Describe the sensitivity analysis.								
UNIT-I	INTRODUCTION							Classes: 09
Optimization Techniques, Model Formulation, models, General L.R Formulation, Simplex Techniques, Sensitivity Analysis, Inventory Control Models								
UNIT-II	FORMULATION TECHNIQUES							Classes: 09
Formulation of a LPP - Graphical solution revised simplex method - duality theory - dual simplex method - sensitivity analysis - parametric programming.								
UNIT-III	NON LINEAR METHODS							Classes: 09
Nonlinear programming problem - Kuhn-Tucker conditions min cost flow problem. max flowproblem - CPM/PERT.								
UNIT-IV	SCHEDULING MODELS							Classes: 09
Scheduling and sequencing - single server and multiple server models - deterministic inventory models - Probabilistic inventory control models - Geometric Programming.								
UNIT-V	DYNAMIC PROGRAMMING AND GAME THEORY							Classes: 09
Competitive Models, Single and Multi-channel Problems, Sequencing Models, Dynamic Programming, Flow in Networks, Elementary Graph Theory, Game Theory Simulation								
Text Books								
1. H.A. Taha, “Operations Research - An Introduction”, PHI, 2008 2. H.M. Wagner, “Principles of Operations Research”, PHI, Delhi, 1982. 3. J.C. Pant, “Introduction to Optimisation: Operations Research”, Jain Brothers, Delhi, 2008								
Reference Books								
1. Hitler Libermann,“Operations Research” McGraw Hill Publications, 2009. 2. Pannerselvam, “Operations Research” Prentice Hall of India, 2010. 3. Harvey M Wagner, “Principles of Operations Research” Prentice Hall of India, 2010.								
Web References								
1. https://onlinecourses.nptel.ac.in/noc17_mg10/preview								
E-Text Books								
1. http://nptel.ac.in/courses/112106134/								

COST MANAGEMENT OF ENGINEERING PROJECTS

Course Code	Category	Hours / Week			Credits	Maximum Marks		
BCSB28	Open Elective	L	T	P	C	CIA	SEE	Total
		3	-	-	3	30	70	100
Contact Classes: 48	Tutorial Classes: Nil	Practical Classes: Nil			Total Classes: 48			
OBJECTIVES: The course should enable the students to: I. Establish systems to help streamline the transactions between corporate support departments and the operating units. II. Devise transfer pricing systems to coordinate the buyer-supplier interactions between decentralized organizational operating units III. Use pseudo profit centers to create profit maximizing behavior in what were formerly cost centers.								
UNIT-I	INTRODUCTION						Classes: 09	
Introduction and Overview of the Strategic Cost Management Process								
UNIT-II	COST CONCEPTS						Classes: 09	
Cost concepts in decision-making; Relevant cost, Differential cost, Incremental cost and Opportunity cost. Objectives of a Costing System; Inventory valuation; Creation of a Database for operational control; Provision of data for Decision-Making.								
UNIT-III	PROJECT MANAGEMENT						Classes: 09	
Project: meaning, Different types, why to manage, cost overruns centers, various stages of project execution: conception to commissioning. Project execution as conglomeration of technical and nontechnical activities. Detailed Engineering activities. Pre project execution main clearances and documents. Project team: Role of each member. Importance Project site: Data required with significance. Project contracts. Types and contents. Project execution Project cost control. Bar charts and Network diagram. Project commissioning: mechanical and process.								
UNIT-IV	COST BEHAVIOR AND PROFIT PLANNING						Classes: 09	
Cost Behavior and Profit Planning Marginal Costing; Distinction between Marginal Costing and Absorption Costing; Break-even Analysis, Cost-Volume-Profit Analysis. Various decision-making problems. Standard Costing and Variance Analysis. Pricing strategies: Pareto Analysis. Target costing, Life Cycle Costing. Costing of service sector. Just-in-time approach, Material Requirement, Planning, Enterprise Resource Planning, Total Quality Management and Theory of constraints. Activity-Based Cost Management, Bench Marking; Balanced Score Card and Value-Chain Analysis. Budgetary Control; Flexible Budgets; Performance budgets; Zero-based budgets. Measurement of Divisional profitability pricing decisions including transfer pricing.								
UNIT-V	QUANTITATIVE TECHNIQUES						Classes: 09	
Quantitative techniques for cost management, Linear Programming, PERT/CPM, Transportation Problems, Assignment problems, Simulation, Learning Curve Theory.								
Text Books								
1. Robert S Kaplan Anthony A. Alkinson, Management & Cost Accounting. 2. N.D. Vohra, Quantitative Techniques in Management, Tata McGraw Hill Book Co. Ltd.								
Reference Books								
1. Cost Accounting A Managerial Emphasis, Prentice Hall of India, New Delhi. 2. Charles T. Horngren and George Foster, Advanced Management Accounting. 3. Ashish K. Bhattacharya, Principles & Practices of Cost Accounting A. H. Wheeler publisher.								

Web References
1. https://onlinecourses.nptel.ac.in/noc16_ce02/preview
E-Text Books
1. http://nptel.ac.in/downloads/110101003/

COMPOSITE MATERIALS

Course Code	Category	Hours / Week			Credits	Maximum Marks		
BCSB29	Open Elective	L	T	P	C	CIA	SEE	Total
		3	-	-	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil			Total Classes: 45			
OBJECTIVES: The course should enable the students to: I. Understand the manufacturing processes of reinforcement fibers and matrices for composites. II. Understand the concept of tailored design philosophy.								
UNIT-I	INTRODUCTION							Classes: 09
Definition – Classification and characteristics of Composite materials. Advantages and application of composites. Functional requirements of reinforcement and matrix. Effect of reinforcement (size, shape, distribution, volume fraction) on overall composite performance.								
UNIT-II	REINFORCEMENTS							Classes: 09
Preparation-layup, curing, properties and applications of glass fibers, carbon fibers, Kevlar fibers and Boron fibers. Properties and applications of whiskers, particle reinforcements. Mechanical Behavior of composites: Rule of mixtures, Inverse rule of mixtures. Isostrain and Isostress conditions.								
UNIT-III	MANUFACTURING OF METAL MATRIX COMPOSITES							Classes: 09
Casting, Solid State diffusion technique, Cladding, Hot isostatic pressing. Properties and applications. Manufacturing of Ceramic Matrix Composites.								
Liquid Metal Infiltration, Liquid phase sintering. Manufacturing of Carbon, Carbon composites: Knitting, Braiding, Weaving. Properties and applications.								
UNIT-IV	MANUFACTURING OF POLYMER MATRIX COMPOSITES							Classes: 09
Preparation of Moulding compounds and preregs, hand layup method, Autoclave method, Filament winding method, Compression moulding, Reaction injection moulding. Properties and applications.								
UNIT-V	STRENGTH							Classes: 09
Laminar Failure Criteria-strength ratio, maximum stress criteria, maximum strain criteria, interacting failure criteria, hygrothermal failure. Laminate first ply failure-insight strength; Laminate strength-ply discount truncated maximum strain criterion; strength design using caplet plots; stress concentrations.								
Text Books: 1. R.W.Cahn, “Material Science and Technology” VCH, West Germany. 2. WD Callister, Jr., Adapted by R. Balasubramaniam, “Materials Science and Engineering, An introduction”, John Wiley & Sons, NY, Indian edition, 2007.								
Reference Books: 1. ed-Lubin, “Hand Book of Composite Materials” 2. Deborah D.L. Chung, “Composite Materials Science and Applications” 3. Danial Gay, Suong V. Hoa, and Stephen W. Tasi, “Composite Materials Design and Applications”								
Web References: 1. https://freevideolectures.com/course/3479/processing-of-non-metals/5								
E-Text Books: 1. https://www.asminternational.org/documents/10192/1849770/05287G_Sample_Chapter.pdf								

WASTE TO ENERGY

Course Code	Category	Hours / Week			Credits	Maximum Marks		
BCSB30	Open Elective	L	T	P	C	CIA	SEE	Total
		3	-	-	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil			Total Classes: 45			
OBJECTIVES: The course should enable the students to: I. Understand the principles associated with effective energy management and to apply these principles in the day to day life. II. Develop insight into the collection, transfer and transport of municipal solid waste. III. Explain the design and operation of a municipal solid wasteland fill. IV. Device key processes involved in recovering energy from wastes, systematically evaluate the main operational challenges in operating thermal and biochemical energy from waste facilities.								
UNIT-I	INTRODUCTION TO ENERGY FROM WASTE						Classes: 09	
Introduction to Energy from Waste: Classification of waste as fuel, Agro based, Forest residue, Industrial waste. MSW, Conversion devices. Incinerators, gasifiers, digestors								
UNIT-II	BIOMASS PYROLYSIS						Classes: 09	
Biomass Pyrolysis: Pyrolysis, Types, slow fast , Manufacture of charcoal, Methods, Yields and application, Manufacture of pyrolytic oils and gases, yields and applications.								
UNIT-III	BIOMASS GASIFICATION						Classes: 09	
Gasifiers, Fixed bed system, Downdraft and updraft gasifiers, Fluidized bed gasifiers, Design, construction and operation. Gasifier burner arrangement for thermal heating. Gasifier engine arrangement and electrical power, Equilibrium and kinetic consideration in gasifier operation.								
UNIT-IV	BIOMASS COMBUSTION						Classes: 09	
Biomass stoves, Improved chullahs, types, some exotic designs, Fixed bed combustors, Types, inclined grate combustors, Fluidized bed combustors, Design, construction and operation - Operation of all the above biomass combustors.								
UNIT-V	BIOGAS						Classes: 09	
Properties of biogas (Calorific value and composition), Biogas plant technology and status, Bio energy system. Design and constructional features, Biomass resources and their classification, Biomass conversion processes, Thermo chemical conversion, Direct combustion, biomass gasification, pyrolysis and liquefaction, biochemical conversion, anaerobic digestion. Types of biogas Plants, Applications. Alcohol production from biomass, Bio diesel production. Urban waste to energy conversion, Biomass energy programme in India.								
Text Books:								
1. Desai, Ashok V, “Non Conventional Energy”, Wiley Eastern Ltd., 1990.								
Reference Books:								
1. Khandelwal, K. C. and Mahdi, S. S, “Biogas Technology - A Practical Hand Book”, Vol. I & II Tata McGraw Hill Publishing Co. Ltd., 1983.								
2. Challal, D. S, “Food, Feed and Fuel from Biomass”, IBH Publishing Co. Pvt. Ltd., 1991.								
Web References:								
1. http://nptel.ac.in/courses/103107125/								
E-Text Books:								
1. Biomass Conversion and Technology, C. Y. WereKo-Brobby and E. B. Hagan, John Wiley & Sons, 1996..								

ENGLISH FOR RESEARCH PAPER WRITING

Course Code	Category	Hours / Week			Credits	Maximum Marks		
BCSB32	Audit	L	T	P	C	CIA	SEE	Total
		2	-	-	0	30	70	100
Contact Classes: 24	Tutorial Classes: Nil	Practical Classes: Nil			Total Classes: 24			
OBJECTIVES: The course should enable the students to: I. Understand that how to improve your writing skills and level of readability II. Learn about what to write in each section III. Understand the skills needed when writing a Title Ensure the good quality of paper at very first-time submission								
UNIT-I	PLANNING AND PREPARATION						Classes: 04	
Planning and Preparation, Word Order, Breaking up long sentences, Structuring Paragraphs and Sentences, Being Concise and Removing Redundancy, Avoiding Ambiguity and Vagueness								
UNIT-II	ABSTRACT						Classes: 05	
Clarifying Who Did What, Highlighting Your Findings, Hedging and Criticizing, Paraphrasing and Plagiarism, Sections of a Paper, Abstracts. Introduction								
UNIT-III	DISCUSSION AND CONCLUSIONS						Classes: 05	
Review of the Literature, Methods, Results, Discussion, Conclusions, The Final Check. key skills are needed when writing a Title, key skills are needed when writing an Abstract, key skills are needed when writing an Introduction, skills needed when writing a Review of the Literature.								
UNIT-IV	WRITING SKILLS						Classes: 05	
Skills are needed when writing the Methods, skills needed when writing the Results, skills are needed when writing the Discussion, skills are needed when writing the Conclusions								
UNIT-V	QUALITY AND TIME MAINTENANCE						Classes: 05	
Useful phrases, how to ensure paper is as good as it could possibly be the first- time submission								
Text Books:								
1. Goldbort R, “Writing for Science”, Yale University Press. 2011. 2. Adrian Wallwork, “English for Writing Research Papers”, Springer New York Dordrecht Heidelberg London, 2011.								
Reference Books:								
1. Highman N, “Handbook of Writing for the Mathematical Sciences”, SIAM Highman’s book.								
Web References:								
1. http://saba.kntu.ac.ir/eecd/ecourses/Seminar90/2011%20English%20for%20Writing%20Research%20Papers.pdf								
E-Text Books:								
1. Day R (2006) How to Write and Publish a Scientific Paper, Cambridge University Press.								

DISASTER MANAGEMENT

Course Code	Category	Hours / Week			Credits	Maximum Marks		
BCSB33	Audit	L	T	P	C	CIA	SEE	Total
		2	-	-	0	30	70	100
Contact Classes: 24	Tutorial Classes: Nil	Practical Classes: Nil			Total Classes: 24			
OBJECTIVES: The course should enable the students to: I. Learn to demonstrate a critical understanding of key concepts in disaster risk reduction and humanitarian response. II. Critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives. III. Develop an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations. IV. Critically understand the strengths and weaknesses of disaster management approaches, planning and programming in different countries, particularly their home country or the countries they work in								
UNIT-I	INTRODUCTION						Classes: 04	
Disaster: Definition, Factors And Significance; Difference Between Hazard And Disaster; Natural And Manmade Disasters: Difference, Nature, Types And Magnitude.								
UNIT-II	REPERCUSSIONS OF DISASTERS AND HAZARDS						Classes: 05	
Economic Damage, Loss Of Human And Animal Life, Destruction Of Ecosystem. Natural Disasters: Earthquakes, Volcanisms, Cyclones, Tsunamis, Floods, Droughts And Famines, Landslides And Avalanches, Man-made disaster: Nuclear Reactor Meltdown, Industrial Accidents, Oil Slicks And Spills, Outbreaks Of Disease And Epidemics, War And Conflicts.								
UNIT-III	DISASTER PRONE AREAS IN INDIA						Classes: 05	
Study Of Seismic Zones; Areas Prone To Floods And Droughts, Landslides And Avalanches; Areas Prone To Cyclonic And Coastal Hazards With Special Reference To Tsunami; Post-Disaster Diseases And Epidemics								
UNIT-IV	DISASTER PREPAREDNESS AND MANAGEMENT						Classes: 05	
Preparedness: Monitoring of Phenomena Triggering A Disaster Or Hazard; Evaluation Of Risk: Application Of Remote Sensing, Data From Meteorological And Other Agencies, Media Reports: Governmental And Community Preparedness.								
UNIT-V	RISK ASSESSMENT & DISASTER MITIGATION						Classes: 05	
Disaster Risk: Concept And Elements, Disaster Risk Reduction, Global And National Disaster Risk Situation. Techniques Of Risk Assessment, Global Co-Operation In Risk Assessment And Warning, People's Participation In Risk Assessment. Strategies for Survival. Disaster Mitigation:Meaning, Concept And Strategies Of Disaster Mitigation, Emerging Trends In Mitigation. Structural Mitigation And Non-Structural Mitigation, Programs Of Disaster Mitigation In India.								

Text Books:
1. R. Nishith, Singh AK, “Disaster Management in India: Perspectives, issues and strategies”, New Royal book Company.
Reference Books:
1. Sahni, PardeepEt.Al, “Disaster Mitigation Experiences and Reflections”, Prentice Hall Of India, New Delhi.
2. Goel S. L. “Disaster Administration and Management Text and Case Studies”,Deep &Deep Publication Pvt. Ltd., New Delhi.
Web References:
1. http://nptel.ac.in/courses/105101010/downloads/Lecture37.pdf
E-Text Books:
1. Disaster management by Vinod k. Sharma

SANSKRIT FOR TECHNICAL KNOWLEDGE

Course Code	Category	Hours / Week			Credits	Maximum Marks		
BCSB34	Audit	L	T	P	C	CIA	SEE	Total
		2	-	-	0	30	70	100
Contact Classes: 24	Tutorial Classes: Nil	Practical Classes: Nil			Total Classes: 24			
OBJECTIVES: The course should enable the students to: I. Get a working knowledge in illustrious Sanskrit, the scientific language in the world II. Learning of Sanskrit to improve brain functioning III. Learning of Sanskrit to develop the logic in mathematics, science & other subjects enhancing the memory power IV. The engineering scholars equipped with Sanskrit will be able to explore the huge knowledge from ancient literature								
UNIT-I	INTRODUCTION						Classes: 04	
Alphabets in Sanskrit, Past/Present/Future Tense								
UNIT-II	SENTENCES						Classes: 04	
Simple Sentences								
UNIT-III	ROOTS						Classes: 04	
Order, Introduction of roots								
UNIT-IV	SANSKRIT LITERATURE						Classes: 04	
Technical information about Sanskrit Literature								
UNIT-V	TECHNICAL CONCEPTS						Classes: 08	
Technical concepts of Engineering-Electrical, Mechanical, Architecture, Mathematics								
Text Books:								
1. Suresh Soni, “India’s Glorious Scientific Tradition”, Ocean books (P) Ltd., New Delhi..								
Reference Books:								
1. Dr.Vishwas, “Abhyaspustakam”, Samskrita-Bharti Publication, New Delhi								
Web References:								
1. http://learnsanskritonline.com/								
E-Text Books:								
1. Prathama Deeksha-VempatiKutumbShastri, “Teach Yourself Sanskrit”, RashtriyaSanskriSansthanam, New Delhi Publication.								

VALUE EDUCATION

Course Code	Category	Hours / Week			Credits	Maximum Marks		
BCSB35	Audit	L	T	P	C	CIA	SEE	Total
		2	-	-	0	30	70	100
Contact Classes: 24	Tutorial Classes: Nil	Practical Classes: Nil			Total Classes: 24			
OBJECTIVES: The course should enable the students to: I. Understand value of education and self- development II. Imbibe good values in students III. Let the should know about the importance of character								
UNIT-I	VALUES AND SELF-DEVELOPMENT						Classes: 04	
Values and self-development. Social values and individual attitudes. Work ethics, Indian vision of humanism. Moral and non- moral valuation. Standards and principles. Value judgments.								
UNIT-II	CULTIVATION OF VALUES						Classes: 06	
Importance of cultivation of values. Sense of duty. Devotion, Self-reliance. Confidence, Concentration. Truthfulness, Cleanliness. Honesty, Humanity. Power of faith, National Unity. Patriotism. Love for nature,Discipline.								
UNIT-III	PERSONALITY AND BEHAVIOR DEVELOPMENT						Classes: 06	
Personality and Behavior Development - Soul and Scientific attitude. Positive Thinking. Integrity and discipline. Punctuality, Love and Kindness. Avoid fault Thinking. Free from anger, Dignity of labor. Universal brotherhood and religious tolerance.True friendship. Happiness Vs suffering, love for truth. Aware of self-destructive habits. Association and Cooperation. Doing best for saving nature.								
UNIT-IV	CHARACTER AND COMPETENCE						Classes: 03	
Character and Competence –Holy books vs Blind faith. Self-management and Good health.Science of reincarnation. Equality, Nonviolence, Humility, Role of Women.								
UNIT-V	SELF CONTROL						Classes: 03	
All religions and same message. Mind your Mind, Self-control. Honesty, Studying effectively.								
Text Books:								
1. Chakroborty, S.K. “Values and Ethics for organizations Theory and practice”, Oxford University Press, New Delhi.								
Web References:								
1. http://www.best-personal-development-books.com/personal-value-development.html 2. http://nptel.ac.in/courses/109104068/								
E-Text Books:								
1. R.P. Shukla, “Value education and human rights”.								

CONSTITUTION OF INDIA

Course Code	Category	Hours / Week			Credits	Maximum Marks		
BCSB36	Audit	L	T	P	C	CIA	SEE	Total
		2	-	-	0	30	70	100
Contact Classes: 24	Tutorial Classes: Nil	Practical Classes: Nil			Total Classes: 24			
OBJECTIVES: The course should enable the students to: I. Understand the premises informing the twin themes of liberty and freedom from a civil right perspective. II. Address the growth of Indian opinion regarding modern Indian intellectuals' constitutional role and entitlement to civil and economic rights as well as the emergence of nationhood in the early years of Indian nationalism. III. Address the role of socialism in India after the commencement of the Bolshevik Revolution in 1917 and its impact on the initial drafting of the Indian Constitution.								
UNIT-I	HISTORY OF MAKING OF THE INDIAN CONSTITUTION & PHILOSOPHY OF THE INDIAN CONSTITUTION						Classes: 08	
History of Making of the Indian Constitution: History, Drafting Committee, (Composition & Working) Philosophy of the Indian Constitution: Preamble, Salient Features								
UNIT-II	CONTOURS OF CONSTITUTIONAL RIGHTS & DUTIES						Classes: 04	
Fundamental Rights, Right to Equality, Right to Freedom, Right against Exploitation, Right to Freedom of Religion, Cultural and Educational Rights, Right to Constitutional Remedies, Directive Principles of State Policy, Fundamental Duties.								
UNIT-III	ORGANS OF GOVERNANCE						Classes: 04	
Parliament, Composition, Qualifications and Disqualifications, Powers and Functions, ExecutivePresident,Governor, Council of Minister. Judiciary, Appointment and Transfer of Judges, Qualifications, Powers and Functions								
UNIT-IV	LOCAL ADMINISTRATION						Classes: 04	
District's Administration head: Role and Importance,Municipalities: Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation. Pachayati raj: Introduction, PRI: ZilaPachayat. Elected officials and their roles, CEO ZilaPachayat: Position and role. Block level: Organizational Hierarchy (Different departments),Village level: Role of Elected and Appointed officials, Importance of grass root democracy								
UNIT-V	ELECTION COMMISSION						Classes: 04	
Election Commission: Role and Functioning.Chief Election Commissioner and Election Commissioners. State Election Commission: Role and Functioning. Institute and Bodies for the welfare of SC/ST/OBC and women.								
Text Books: 1. Dr. S. N. Busi, "Dr. B. R. Ambedkar framing of Indian Constitution", 1 st Edition, 2015. 2. M. P. Jain, "Indian Constitution Law", Lexis Nexis, 7 th Edition, 2014.								
Reference Books: 1. The Constitution of India, 1950 (Bare Act), Government Publication. 2. D.D. Basu, "Introduction to the Constitution of India", Lexis Nexis, 2015.								

Web References:
1. http://www.constitution.org/cons/india/p18.html
E-Text Books:
1. https://www.india.gov.in/my-government/constitution-india/constitution-india-full-text

PEDAGOGY STUDIES

Course Code	Category	Hours / Week			Credits	Maximum Marks		
BCSB37	Audit	L	T	P	C	CIA	SEE	Total
		2	-	-	0	30	70	100
Contact Classes: 24	Tutorial Classes: Nil	Practical Classes: Nil			Total Classes: 24			
OBJECTIVES: The course should enable the students to: I. Review existing evidence on the review topic to inform programme design and policy making undertaken by the DFID, other agencies and researchers. II. Identify critical evidence gaps to guide the development.								
UNIT-I	INTRODUCTION						Classes: 04	
Introduction And Methodology: Aims and rationale, Policy background, Conceptual framework and terminology. Theories of learning, Curriculum, Teacher education. Conceptual framework, Research questions. Overview of methodology and Searching.								
UNIT-II	THEMATIC OVERVIEW						Classes: 02	
Thematic overview: Pedagogical practices are being used by teachers in formal and informal classrooms in developing countries. Curriculum, Teacher education.								
UNIT-III	PEDAGOGICAL PRACTICES						Classes: 04	
Evidence on the effectiveness of pedagogical practices. Methodology for the in depth stage: quality assessment of included studies. How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy? Theory of change. Strength and nature of the body of evidence for effective pedagogical practices. Pedagogic theory and pedagogical approaches. Teachers’ attitudes and beliefs and Pedagogic strategies.								
UNIT-IV	PROFESSIONAL DEVELOPMENT						Classes: 04	
Professional Development: alignment with classroom practices and follows up Support. Peer support. Support from the head teacher and the community. Curriculum and assessment Barriers to learning: limited resources and large class sizes.								
UNIT-V	RESEARCH GAPS						Classes: 02	
Research gaps and future directions, Research design, Contexts, Pedagogy. Teacher education. Curriculum and assessment. Dissemination and research impact.								
Text Books:								
1. Ackers J, Hardman F, “Classroom interaction in Kenyan primary schools”, Compare, 31 (2), 245-261. 2. Agrawal M, “Curricular reform in schools: The importance of evaluation”, Journal of Curriculum Studies, 36 (3): 361-379.								
Reference Books:								
1. AkyeampongK, “Teacher training in Ghana - does it count?” Multi-site teacher education research project (MUSTER) country report 1. London: DFID. 2. Akyeampong K, Lussier K, Pryor J, Westbrook J, “Improving Teaching and Learning of Basic Maths and Rreading in Africa: Does teacher preparation count?” International Journal Educational Development, 33 (3): 272–282.								

Web References:

1. www.pratham.org/images/resource%20working%20paper%202.pdf.
2. Alexander RJ (2001) Culture and pedagogy: International comparisons in primary education Oxford and Boston: Blackwell

E-Text Books:

1. www.pratham.org/images/resource%20working%20paper%202.pdf.

STRESS MANAGEMENT BY YOGA

Course Code	Category	Hours / Week			Credits	Maximum Marks		
BCSB38	Audit	L	T	P	C	CIA	SEE	Total
		2	-	-	0	30	70	100
Contact Classes: 24	Tutorial Classes: Nil	Practical Classes: Nil			Total Classes: 24			
OBJECTIVES: The course should enable the students to: I. To achieve overall health of body and mind. II. To overcome stress.								
UNIT-I	INTRODUCTION						Classes: 08	
Definitions of Eight parts of yog. (Ashtanga)								
UNIT-II	YAM AND NIYAM						Classes: 04	
Yam and Niyam. Do`s and Don`t`s in life. Ahinsa, satya, astheya, bramhacharya and aparigraha								
UNIT-III	SHAUCHA						Classes: 04	
Shaucha, santosh, tapa, swadhyay, ishwarpranidhan								
UNIT-IV	ASAN AND PRANAYAM						Classes: 04	
Asan and Pranayam. Various yog poses and their benefits for mind & body								
UNIT-V	BREATHING TECHNIQUES						Classes: 04	
Regularization of breathing techniques and its effects-Types of pranayam								
Text Books:								
1. Swami Vivekananda, “Rajayoga or conquering the Internal Nature”, AdvaitaAshrama (Publication Department), Kolkata								
Reference Books:								
1. Janardan Swami, “Yogic Asanas for Group Tarining-Part-I”, Yogabhyasi Mandal, Nagpur								
Web References:								
1. https://americanyoga.school/course/anatomy-for-asana/								
2. https://www.yogaasanasonline.com/								
E-Text Books:								
1. “Stress Management By Yoga” by Todd A. Hoover, M. D. D., Ht.								

PERSONALITY DEVELOPMENT THROUGH LIFE ENLIGHTENMENT SKILLS

Course Code	Category	Hours / Week			Credits	Maximum Marks		
BCSB39	Audit	L	T	P	C	CIA	SEE	Total
		2	-	-	0	30	70	100
Contact Classes: 24	Tutorial Classes: Nil	Practical Classes: Nil			Total Classes: 24			
OBJECTIVES: The course should enable the students to: I. To learn to achieve the highest goal happily II. To become a person with stable mind, pleasing personality and determination III. To awaken wisdom in students								
UNIT-I	HOLISTIC DEVELOPMENT						Classes: 08	
Neetisatakam-Holistic development of personality, Verses- 19,20,21,22 (wisdom), Verses- 29,31,32 (pride & heroism), Verses- 26,28,63,65 (virtue),Verses- 52,53,59 (dont's),Verses- 71,73,75,78 (do's)								
UNIT-II	BHAGWAD GEETA						Classes: 04	
Approach to day to day work and duties. Shrimad BhagwadGeeta: Chapter 2-Verses 41, 47,48. Chapter 3-Verses 13, 21, 27, 35.								
UNIT-III	BHAGWAD GEETA						Classes: 04	
Shrimad BhagwadGeeta: Chapter 6-Verses 5, 13, 17, 23, 35, Chapter 18-Verses 45, 46, 48.								
UNIT-IV	BASIC KNOWLEDGE						Classes: 04	
Statements of basic knowledge. Shrimad BhagwadGeeta: Chapter2-Verses 56, 62, 68. Chapter 12 -Verses 13, 14, 15, 16,17, 18								
UNIT-V	ROLE MODEL						Classes: 04	
Personality of Role model. Shrimad BhagwadGeeta: Chapter2-Verses 17, Chapter 3-Verses 36,37,42, Chapter 4-Verses 18, 38,39. Chapter18 – Verses 37,38,63								
Text Books:								
1. P.Gopinath, “Bhartrihari’s Three Satakam (Niti-sringar-vairagya)”, Rashtriya Sanskrit Sansthanam, New Delhi.								
Reference Books:								
1. Swami Swarupananda, “Srimad Bhagavad Gita”,Advaita Ashram (Publication Department), Kolkata.								
Web References:								
1. http://openlearningworld.com/section_personality_development.html								
E-Text Books:								
1. http://persmin.gov.in/otraining/UNDPPProject/undp_UNITS/Personality%20Dev%20N%20DLM.pdf								

VISION AND MISSION OF THE INSTITUTE

VISION

To bring forth professionally competent and socially sensitive engineers, capable of working across cultures meeting the global standards ethically.

MISSION

To provide students with an extensive and exceptional education that prepares them to excel in their profession, guided by dynamic intellectual community and be able to face the technically complex world with creative leadership qualities.

Further, be instrumental in emanating new knowledge through innovative research that emboldens entrepreneurship and economic development for the benefit of wide spread community.

M.TECH - PROGRAM OUTCOMES (POS)

- PO-1:** Independently carry out research / investigation and development work to solve practical problems.
- PO-2:** Write and present a substantial technical report / document.
- PO-3:** Capable to apply the core, multidisciplinary knowledge for understanding the problems in structural engineering and allied fields.
- PO-4:** Apply appropriate techniques, resources, modern engineering and Information Technology (IT) tools including predictions, modeling of complex structural engineering activities.
- PO-5:** Able to identify and analyze the impact of Structural Engineering in development projects and find a suitable solution from number of alternatives.
- PO-6:** Conceptualize and design civil engineering structures considering various socio-economic factors.
- PO-7:** Ability to demonstrate in-depth knowledge of Structural Engineering and build capability to apply that knowledge to real problems.

OBJECTIVES OF THE DEPARTMENT

DEPARTMENT OF CIVIL ENGINEERING

Program Educational Objectives (PEO's)

The students of M.Tech Structural Engineering are prepared to:

- PEO – I:** Develop the skills for development of new materials, design and construction of structures that are sustainable.
- PEO – II:** Expose the students to the latest innovations and trends with a view to inculcate research orientation in structural engineering as well as in multidisciplinary streams.
- PEO – III:** Adopt to the technological advancements for professional development to cater for the changing needs of the society through critical thinking.
- PEO –IV:** Become as Professional Engineers, teaching experts and engage in Research and Development works both with ethically and societal responsibility.

FREQUENTLY ASKED QUESTIONS AND ANSWERS ABOUT AUTONOMY

1. Who grants Autonomy? UGC, Govt., AICTE or University

In case of Colleges affiliated to a university and where statutes for grant of autonomy are ready, it is the respective University that finally grants autonomy but only after concurrence from the respective state Government as well as UGC. The State Government has its own powers to grant autonomy directly to Govt. and Govt. aided Colleges.

2. Shall IARE award its own Degrees?

No. Degree will be awarded by Jawaharlal Nehru Technological University, Hyderabad with a mention of the name IARE on the Degree Certificate.

3. What is the difference between a Deemed University and an Autonomy College?

A Deemed University is fully autonomous to the extent of awarding its own Degree. A Deemed University is usually a Non-Affiliating version of a University and has similar responsibilities like any University. An Autonomous College enjoys Academic Autonomy alone. The University to which an autonomous college is affiliated will have checks on the performance of the autonomous college.

4. How will the Foreign Universities or other stake – holders know that we are an Autonomous College?

Autonomous status, once declared, shall be accepted by all the stake holders. The Govt. of Telangana mentions autonomous status during the First Year admission procedure. Foreign Universities and Indian Industries will know our status through our website.

5. What is the change of Status for Students and Teachers if we become Autonomous?

An autonomous college carries a prestigious image. Autonomy is actually earned out of our continued past efforts on academic performances, our capability of self- governance and the kind of quality education we offer.

6. Who will check whether the academic standard is maintained / improved after Autonomy? How will it be checked?

There is a built in mechanism in the autonomous working for this purpose. An Internal Committee called Academic Programme Evaluation Committee, which will keep a watch on the academics and keep its reports and recommendations every year. In addition the highest academic council also supervises the academic matters. The standards of our question papers, the regularity of academic calendar, attendance of students, speed and transparency of result declaration and such other parameters are involved in this process.

7. Will the students of IARE as an Autonomous College qualify for University Medals and Prizes for academic excellence?

No. IARE has instituted its own awards, medals, etc. for the academic performance of the students. However for all other events like sports, cultural on co-curricular organized by the University the students shall qualify.

8. Can IARE have its own Convocation?

No. Since the University awards the Degree the Convocation will be that of the University, but there will be Graduation Day at IARE.

9. Can IARE give a provisional degree certificate?

Since the examinations are conducted by IARE and the results are also declared by IARE, the college sends a list of successful candidates with their final Grades and Grade Point Averages including CGPA to the University. Therefore with the prior permission of the University the college will be entitled to give the provisional certificate.

10. Will Academic Autonomy make a positive impact on the Placements or Employability?

Certainly. The number of students qualifying for placement interviews is expected to improve, due to rigorous and repetitive classroom teaching and continuous assessment. Also the autonomous status is more responsive to the needs of the industry. As a result therefore, there will be a lot of scope for industry oriented skill development built-in into the system. The graduates from an autonomous college will therefore represent better employability.

11. What is the proportion of Internal and External Assessment as an Autonomous College?

Presently, it is 70 % external and 30% internal. As the autonomy matures the internal assessment component shall be increased at the cost of external assessment.

12. Is it possible to have complete Internal Assessment for Theory or Practicals?

Yes indeed. We define our own system. We have the freedom to keep the proportion of external and internal assessment component to choose.

13. Why Credit based Grade System?

The credit based grade system is an accepted standard of academic performance the world over in all Universities. The acceptability of our graduates in the world market shall improve.

14. What exactly is a Credit based Grade System?

The credit based grade system defines a much better statistical way of judging the academic performance. One Lecture Hour per week of Teaching Learning process is assigned One Credit. One hour of laboratory work is assigned half credit. Letter Grades like A, B,C,D, etc. are assigned for a Range of Marks. (e.g. 91% and above is A+, 80 to 90 % could be A etc.) in Absolute Grading System while grades are awarded by statistical analysis in relative grading system. We thus dispense with sharp numerical boundaries. Secondly, the grades are associated with defined Grade Points in the scale of 1 to 10. Weighted Average of Grade Points is also defined Grade Points are weighted by Credits and averaged over total credits in a Semester. This process is repeated for all Semesters and a CGPA defines the Final Academic Performance

15. What are the norms for the number of Credits per Semester and total number of Credits for UG/PG programme?

These norms are usually defined by UGC or AICTE. Usually around 25 Credits per semester is the accepted norm.

16. What is a Semester Grade Point Average (SGPA)?

The performance of a student in a semester is indicated by a number called SGPA. The SGPA is the weighted average of the grade points obtained in all the courses registered by the student during the semester.

$$SGPA = \sum_{i=1}^n (C_i G_i) / \sum_{i=1}^n C_i$$

Where, C_i is the number of credits of the i^{th} course and G_i is the grade point scored by the student in the i^{th} course and i represent the number of courses in which a student registered in the concerned semester. SGPA is rounded to two decimal places.

17. What is a Cumulative Grade Point Average (CGPA)?

An up-to-date assessment of overall performance of a student from the time of his first registration is obtained by calculating a number called CGPA, which is weighted average of the grade points obtained in all the courses registered by the students since he entered the Institute.

$$CGPA = \sum_{j=1}^n (C_i S_i) / \sum_{j=1}^n C_i$$

Where, S_i is the SGPA of the i^{th} semester and C_i is the total number of credits in that semester and j represent the number of courses in which a student's is registered upto the semester. CGPA is rounded to two decimal places.

18. Is there any Software available for calculating Grade point averages and converting the same into Grades?

Yes, The institute has its own MIS software for calculation of SGPA, CGPA, etc.

19. Will the teacher be required to do the job of calculating SGPAs etc. and convert the same into Grades?

No. The teacher has to give marks obtained out of whatever maximum marks as it is. Rest is all done by the computer.

20. Will there be any Revaluation or Re-Examination System?

No. There will double valuation of answer scripts. There will be a make up Examination after a reasonable preparation time after the End Semester Examination for specific cases mentioned in the Rules and Regulations. In addition to this, there shall be a 'summer term' (compressed term) followed by the End Semester Exam, to save the precious time of students.

21. How fast Syllabi can be and should be changed?

Autonomy allows us the freedom to change the syllabi as often as we need.

22. Will the Degree be awarded on the basis of only final year performance?

No. The CGPA will reflect the average performance of all the semester taken together.

23. What are Statutory Academic Bodies?

Governing Body, Academic Council, Examination Committee and Board of Studies are the different statutory bodies. The participation of external members in everybody is compulsory. The institute has nominated professors from IIT, NIT, University (the officers of the rank of Pro-vice Chancellor, Deans and Controller of Examinations) and also the reputed industrialist and industry experts on these bodies.

24. Who takes Decisions on Academic matters?

The Governing Body of institute is the top academic body and is responsible for all the academic decisions. Many decisions are also taken at the lower level like Boards of Studies. Decisions taken at the Board of Studies level are to be ratified at the Academic Council and Governing Body.

25. What is the role of Examination committee?

The Examinations Committee is responsible for the smooth conduct of internal, End Semester and make up Examinations. All matters involving the conduct of examinations, spot valuations, tabulations and preparation of Grade Cards etc fall within the duties of the Examination Committee.

26. Is there any mechanism for Grievance Redressal?

The institute has grievance redressal committee, headed by Dean - Student affairs and Dean - IQAC.

27. How many attempts are permitted for obtaining a Degree?

All such matters are defined in Rules & Regulation

28. Who declares the result?

The result declaration process is also defined. After tabulation work wherein the SGPA, CGPA and final Grades are ready, the entire result is reviewed by the Moderation Committee. Any unusual

deviations or gross level discrepancies are deliberated and removed. The entire result is discussed in the Examinations and Result Committee for its approval. The result is then declared on the institute notice boards as well put on the web site and Students Corner. It is eventually sent to the University.

29. Who will keep the Student Academic Records, University or IARE?

It is the responsibility of the Dean, Academics of the Autonomous College to keep and preserve all the records.

30. What is our relationship with the JNT University?

We remain an affiliated college of the JNT University. The University has the right to nominate its members on the academic bodies of the college.

31. Shall we require University approval if we want to start any New Courses?

Yes, It is expected that approvals or such other matters from an autonomous college will receive priority.

32. Shall we get autonomy for PG and Doctoral Programmes also?

Yes, presently our PG programs also enjoying autonomous status.

MALPRACTICES RULES

DISCIPLINARY ACTION FOR / IMPROPER CONDUCT IN EXAMINATIONS

S.No	Nature of Malpractices/Improper conduct	Punishment
	<i>If the candidate:</i>	
1. (a)	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the candidate which 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)	Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell 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.	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 examination (theory or practical) in which the candidate is appearing.	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 to appear for the remaining examinations of the subjects of that Semester/year. The Hall Ticket of the candidate is to be cancelled and sent to the Controller of Examinations.
3.	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 semester end 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.	Smuggles in the 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 semester end examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
5.	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.	Refuses to obey the orders of the Controller of Examinations /Additional Controller of Examinations/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 COE or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the COE 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 result in damage to or destruction of property in the examination hall or any part of the Institute premises 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.	In case of students of the college, 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.
7.	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 semester end examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
8.	Possess 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 college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	<p>Student of the colleges 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.</p> <p>Person(s) who do not belong to the College will be handed over to police and, a police case will be registered against them.</p>
10.	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 and 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 examinations and project work of that semester/year examinations.
12.	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the University for further action to award suitable punishment.	



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad - 500 043

UNDERTAKING BY STUDENT/PARENT

“To make the students attend the classes regularly from the first day of starting of classes and be aware of the College regulations, the following Undertaking Form is introduced which should be signed by both student and parent. The same should be submitted to the Dean, Academic”.

I, Mr./Ms. ----- joining I Semester for the academic year 2018-2019 in Institute of Aeronautical Engineering, Hyderabad, do hereby undertake and abide by the following terms, and I will bring the ACKNOWLEDGEMENT duly signed by me and my parent and submit it to the Dean, Academic.

1. I will attend all the classes as per the timetable from the starting day of the semester specified in the institute Academic Calendar. In case, I do not turn up even after two weeks of starting of classes, I shall be ineligible to continue for the current academic year.
2. I will be regular and punctual to all the classes (theory/practical/drawing) and secure attendance of not less than 80% in every course as stipulated by Institute. I am fully aware that an attendance of less than 70% in more than three courses will make me lose one year.
3. I will compulsorily follow the dress code prescribed by the college.
4. I will conduct myself in a highly disciplined and decent manner both inside the classroom and on campus, failing which suitable action may be taken against me as per the rules and regulations of the institute.
5. I will concentrate on my studies without wasting time in the Campus/Hostel/Residence and attend all the tests to secure more than the minimum prescribed Class/Sessional Marks in each course. I will submit the assignments given in time to improve my performance.
6. I will not use Mobile Phone in the institute premises and also, I will not involve in any form of ragging inside or outside the campus. I am fully aware that using mobile phone to the institute premises is not permissible and involving in Ragging is an offence and punishable as per JNTUH/UGC rules and the law.
7. I declare that I shall not indulge in ragging, eve-teasing, smoking, consuming alcohol drug abuse or any other anti-social activity in the college premises, hostel, on educational tours, industrial visits or elsewhere.
8. I will pay tuition fees, examination fees and any other dues within the stipulated time as required by the Institution / authorities, failing which I will not be permitted to attend the classes.
9. I will not cause or involve in any sort of violence or disturbance both within and outside the college campus.
10. If I absent myself continuously for 3 days, my parents will have to meet the HOD concerned/ Principal.
11. I hereby acknowledge that I have received a copy of IARE - R18 Academic Rules and Regulations, Syllabus copy and hence, I shall abide by all the rules specified in it.

ACKNOWLEDGEMENT

I have carefully gone through the terms of the undertaking mentioned above and I understand that following these are for my/his/her own benefit and improvement. I also understand that if I/he/she fail to comply with these terms, shall be liable for suitable action as per Institute/JNTUH/AICTE/UGC rules and the law. I undertake that I/he/she will strictly follow the above terms.

Signature of Student with Date

Signature of Parent with Date

Name & Address with Phone Number