SANJAY GHODAWAT UNIVERSITY KOLHAPUR

Sanjay Ghodawat University (SGU) is established in the Academic Year 2017-18, as a State Private University under Govt. of Maharashtra Act No. XL of 2017 dated 3rd May 2017, with the approval of the UGC and the state Government. "For the true measure of giving is giving without measure." Spread across 150 Acres, Sou. Sushila Danchand Ghodawat Charitable Trust's Sanjay Ghodawat University (SGU) is situated in serene atmosphere amidst idyllic hills and lush green meadows to study in harmony with Nature. The Institution aspires to run along the lines of best-in- the-world education and become a world-class institution where teaching-learning process gets a far deeper meaning. SGU always stands as the guiding star of brilliance, quality and deliverance beyond expectations. Innovativeness and Creativity are the hallmarks of a genius enterprise and SGU stands to be a stage where these qualities would be nurtured, encouraged and blossomed. The genius is incomplete without the sense of social responsibility and SGU's ultimate goal remains the development of an attitude of gratitude that freely gives back without expectations.

The Sanjay Ghodawat University stands as a beacon of light to guide the younger generation of the day on the right path to fulfilment in career and life. The USP of the University is its research based curriculum and academically oriented teaching staff. The world class ambience and infrastructure helps the students to easily accommodate themselves in an environment that is conducive to the teaching- learning process. Hands on experience, challenge based case studies, maximum participation of students in the classroom, use of modern digital technology, smart classrooms, solution oriented thinking promotion, stress on research and innovation, international tie ups, choice based credit system for flexibility in choosing areas of interest etc. are some of the features of the University.

The university will help students develop as a unique individual-to be educated as a whole person, intellectually, emotionally, socially, ethically, and spiritually. The educational program designs are worked out meticulously in line with best in class universities with special focus on:

- Flexible Choice Based Credit System
- OBE - Outcome Based Education System
- Experiential Learning
- Project Based Learning
- Case Based Learning
- Training need analysis based on Performance Appraisal System

- Active Learning tools for effective delivery
- Mentoring / Proctorship
- On line learning /Self learning platforms
- Flipped Classroom concept
- Effective Student Feedback Mechanism

VISION

Internationally recognized university of excellence in creating and disseminating knowledge through value-based quality education leading to betterment of mankind.

MISSION

- To prepare students for life-long learning and leadership in a global academic culture
- To create intellectual manpower relevant to the industry and society at large
- To collaborate with institutions of international repute for academic excellence
- To promote research and development through conducive environment
- To encourage entrepreneurship and skill development programs

CORE VALUES

- Integrity
- Transparency
- Accountability
- Equality
- Empathy
- Stewardship

QUALITY POLICY

Sanjay Ghodawat University is committed to establish high standards in value-based quality education to enhance and nurture young minds to excel in their chosen profession and develop into socially responsible citizens through resourceful collaboration, innovation and research

CHOICE BASED CREDIT SYSTEM (CBCS)

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.

University Grants Commission has come up with the Choice Based Credit System (CBCS) programme in which the students have a choice to choose from the prescribed courses, which are referred as core, elective or minor or soft skill courses and they can learn at their own pace and the entire assessment is graded-based on a credit system. The basic idea is to look into the needs of the students so as to keep up-to-date with development of higher education in India and abroad. CBCS aims to redefine the curriculum keeping pace with the liberalization and globalization in education. CBCS allows students an easy mode of mobility to various educational institutions spread across the world along with the facility of transfer of credits earned by students.

Where the students can choose the prescribed courses, as the core, and elective or soft skill courses, from a range of options, rather than to simply consume what the curriculum offers. They can learn at their own pace and the assessments are graded based on a credit system. It provides an opportunity for students to have a choice of courses or subjects within a programmed resembling a buffet, against the mostly fixed set of subjects now being offered (except for the limited choice of electives in professional degrees and postgraduate programmers) with the flexibility to complete the programmed by earning the required number of credits at a pace decided by the students.

The UGC has always initiated measures to bring efficiency and excellence in the Higher Education System of India. The basic motive is to expand academic quality in all aspects, right from the curriculum to the learning-teaching process to examination and evaluation systems. However, so far multiple methods are followed by different universities across the country towards examination, evaluation and grading system. Considering this diversity, the implementation of the choice based credit system seems to be a good system in assessing the overall performance of a student in a universal way of a single grading system.

OUTCOME BASED EDUCATION (OBE) MODEL

Sanjay Ghodawat University (SGU) has implemented OBE model of education, which is a learner centered approach. SGU has witnessed a sea change in the entire academic systems with implementation of all three components of OBE – Design, Delivery and Assessment. The SGU model of autonomy focuses on experiential learning which believes in learning by doing. This is achieved through hands on experience, industrial assignments, mini projects and live problem solving and collaboration with industries.

SGU is set in to dynamics of transformation and witnessing a shift in focus from teaching to learning and entire academic system of SGU is designed to provide multiple learning opportunities for students to acquire and demonstrate the Knowledge, Skills and Attitudes (KSA) for rewarding career.

The Vision and Mission of the Management, contribution from eminent BOG members and knowledgeable members of Academic Council and Board of Studies, the motivation and drive of the Director, the relentless efforts of the fellow Deans and Head of Departments and all teaching and non-teaching staff along with commitment to learning of students made it possible to successfully transform the institute and stand out to carve a niche for itself as an Institute of repute.

OBE is an approach of curriculum design and teaching that focuses on what students should be able to do (attained) at the end of course/ program. Outcome based education (OBE) is student-centered instruction model that focuses on measuring student performance through outcomes. Outcomes include knowledge, skills and attitudes (KSA). Its focus remains on evaluation of outcomes of the program by stating the knowledge, skill and behavior a graduate is expected to attain upon completion of a program and after 4 – 5 years of graduation. In the OBE model, the required knowledge and skill sets for a particular degree is predetermined and the students are evaluated for all the required parameters (Outcomes) during the course of the program.

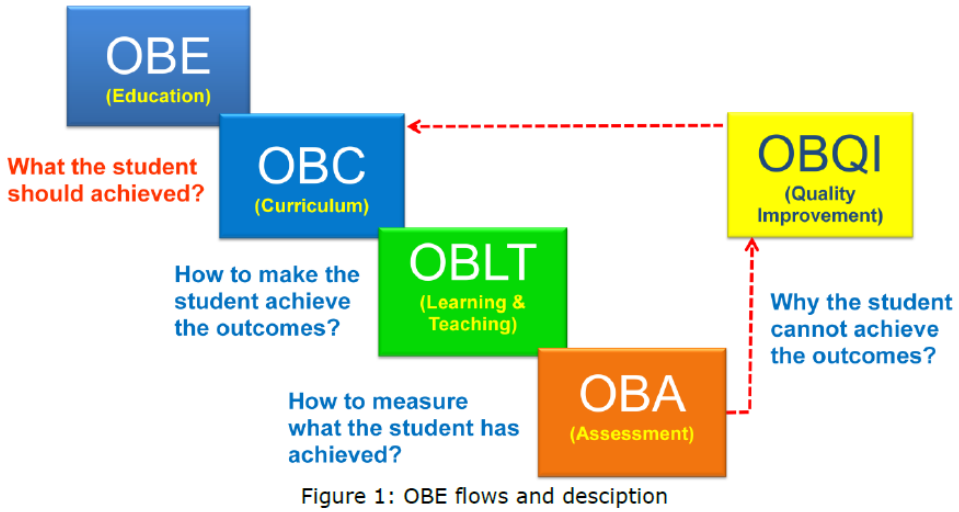
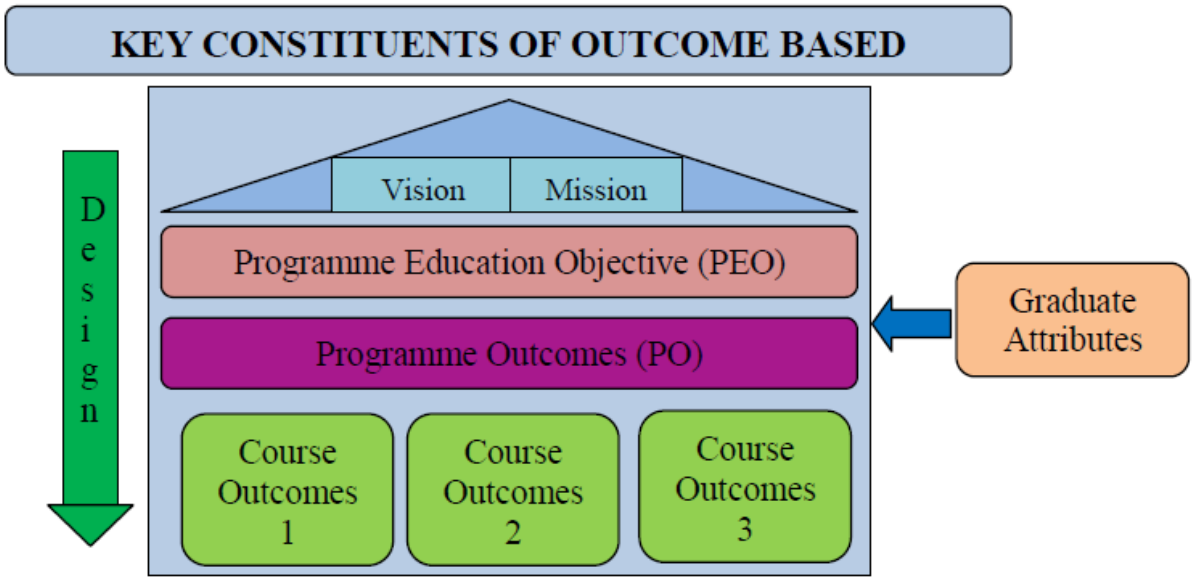


Figure 1: OBE flows and desciption

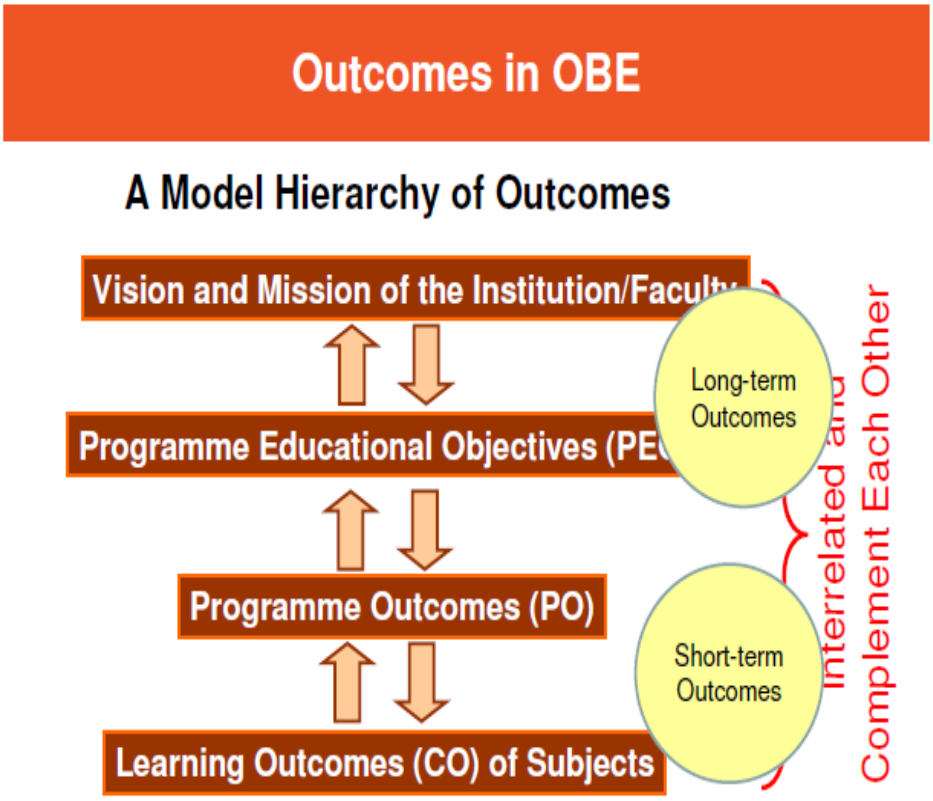


The OBE model measures the progress of the graduate in three parameters, which are

- Program Educational Objectives (PEO)
- Program Outcomes (PO)
- Course Outcomes (CO)

Program Educational Objectives (PEO) are broad statements that describe the career and professional accomplishments that the program is preparing the graduates to achieve. PEO's are measured 4-5 years after graduation. Program outcomes are narrower statements that describe what students are expected to know and be able to do by the time of graduation. They must reflect the Graduate attributes. Course outcomes are the measurable parameters which evaluates each students performance for each course that the student undertakes in every semester.

The various assessment tools for measuring Course Outcomes include Tests and End Semester Examinations, Tutorials, Assignments, Project work, Labs, Presentations, Employer/Alumni Feedback etc., These course outcomes are mapped to Graduate attributes and Program outcomes based on relevance. This evaluation pattern helps Institutions to measure the Program Outcome. The Program Educational Objective is measure through Employer satisfaction survey (Yearly), Alumni survey (Yearly), Placement records and higher education records.



Special Features of OBE

- OBE is an educational process that focuses on what students **can do** or the **qualities** they should develop after they are taught.
- OBE involves the restructuring of curriculum, assessment and reporting practices in education to reflect the achievement of high order learning and mastery rather than accumulation of course credits.
- Both structures and curricula are designed to achieve those **capabilities** or **qualities**.
- Discourages traditional education approaches based on direct instruction of facts and standard methods.
- It requires that the students demonstrate that they have learnt the required skills and content.

Sanjay Ghodawat University Kolhapur

(Established as a State University under Government of Maharashtra Act No XL dated 3rd May 2017)

Academic and Examination Rules and Regulations

Approved in the third Academic Council Meeting held on 14th June, 2019 and to be implemented from academic year 2019-20. [Version R0]

Sanjay Ghodawat University Kolhapur

Kolhapur - Sangli Highway, A/p Atigre - 416 118, Tal. - Hatkanangale, Dist. Kolhapur, Maharashtra, India

(Implemented from Academic year 2019-20)

Academic and Examination Rules and Regulations

1.0 Preamble

The Sanjay Ghodawat University (SGU) stands for quality and excellence. It aims at nurturing the young talent and gromming them into responsible citizen and a value added human resource. Outcome Based Education (OBE) model is adopted to enhance the effectiveness of teaching learning process and Credit Based semester system is implemented.

The focus of the University is its research based curriculum and academically oriented teaching staff. The world class ambience and infrastructure helps the students to easily accommodate themselves in an environment that is conducive to the teaching- learning process. Hands on experience, challenge based case studies, maximum participation of students in the classroom, use of modern digital technology, smart classrooms, solution oriented thinking promotion, stress on research and innovation, international tie ups, choice based credit system for flexibility in choosing areas of interest etc. are some of the features of the University.

Vision of SGU is internationally recognized university of excellence in creating and disseminating knowledge through value-based quality education leading to betterment of mankind. To achieve the vision SGU has developed state-of-the-art infrastructure that promotes conducive ambience promoting innovation and research. Create intellectual manpower relevant to the industry and society at large. Foster mutually beneficial partnership with alumni, industry and academia. Inculcate ethics and values to develop socially responsible citizens and promote entrepreneurship.

SGU is offering various programs through schools such as School of Technology, School of Commerce and Management, School of Sciences and School of Arts.

SGU has implemented the outcome-based Education (OBE) system and Credit based Evaluation System in all the schools.

The rules and regulations mentioned in this document are applicable to all the Under Graduate (UG) and Post Graduate programs offered by the Sanjay Ghodawat University from the academic year 2018-19. The rules and regulations stated under here are subject to revisions / refinements, updates and modifications and amendments by Academic Council (AC) from time to time and applicable to all batches including those already undergoing programs in different year and are binding on all stakeholders including students, faculty, parents and University authorities.

The academic programs of the University shall be governed by rules and regulations approved by the Academic Council from time to time. Academic council is the supreme and statutory academic body that governs all academic matters of the university and the decisions of the academic council are final and binding in the matters related to academics.

2.0 Definition of Terms

1. University: University means Sanjay Ghodawat University, Kolhapur
2. Academic Year: The period of the year during which students attend university for all academic activities, usually it starts from first of July and ends on 30th of June next year.
3. **Semester:** Academic Year is divided in to 2 parts called Semester, Odd Semester which starts from July and Even Semester which starts from January.
4. **Duration of Semester**: Total duration of semester is usually 20weeks per semester including instructions, examination and evaluation. Total instructional days are 90 per semester.

5. **Course:** It is a Subject that is in a semester. The course may consist of Theory/ Practical/ Project/Seminar during semester. Usually taught by instructor in a class. e.g. Physics, Chemistry, Engineering Mechanics, Workshop etc.
6. **Program:** Collection of Courses is called Program. B Tech in Mechanical Engineering,
7. M Tech in Civil Engineering, Bachelor of Business Administration. Bachelor of Science etc.
8. **Department:** Department is a unit of the school which offers one or more programs.
9. **Contact Hours:** Time of students in class/laboratory with instructor. Usually in the range of 26-30 Hrs./Week. For the purpose of uniformity one contact hour is measured as 60 minutes
10. **Academic Council (AC):** Means apex academic body governing the academic programs responsible for framing policy, rules and regulations.
11. **Board of Examination (BOE):** Central body responsible for framing policy, rules and regulations for Examination.
12. **Board of Studies (BOS):** Departmental academic body to govern the academics of programs (BOS)offered by department.

3.0 Curriculum:

3.1. Curriculum:

Every program has a prescribed structure which, in general, is known as Curriculum. It prescribes courses to be studied in each semester. The booklet containing courses structure along with detail syllabus for each course of each program is updated periodically and made available on the website.

3.2. Semesters:

SGU implements a credit based semester system. The academic year is divided into two regular semesters. The semesters that begin in July are known as Odd semester and the semester that begin in January are known as Even semesters. Total duration of each semester is generally of 20 weeks including the period of examination, evaluation and grade declaration.

3.3. Course Credit System/Structure:

In general, a certain quantum of work measured in terms of credits is laid down as the requirement for a particular program. Calculation of number of credits for a course in any semester is as per Table 3.1

Table 3.1: Calculation of number of credits for a course

Sr. No.	Course	Credits
1	Lecture of 1 hour/week	**1**
2	Tutorial of 1 hour/week	**1**
3	Practical / Laboratory / Drawing/mini-project of two hours/ week	**1**
4	Seminar (1 hour per week)	**1**

There are mainly two types of courses- viz. Theory courses and Laboratory courses. Generally a theory course consists of Lecture hours (L) and Tutorial hours (T). Tutorial hours may not be assigned to a particular theory course if it has a separate laboratory course. Laboratory course consists of practical hours (P) for which a student works in a Laboratory/Drawing Hall/Workshop. The other courses required to be taken by a

student include seminar, mini project, and project at various levels of the program.

A student shall earn credits for a particular course by fulfilling the minimum academic requirements for attendance and evaluation. No credits shall be awarded if a student satisfies the minimum attendance requirements but fails to meet minimum evaluation requirements.

The total number of credits required for completing a program shall be mentioned in the course structure. The total number of credits in a semester which a student registers shall generally be 20--25. The maximum number of credits per semester shall not exceed 30

3.4 Audit Course:

3.4.1 A student may have to register for an audit course in a semester which could be institute requirement or department requirement.

3.4.2 An audit course may include either a) a regular course required to be done as per structure or required as pre-requisite of any higher level course or b) the programmes like practical training, industry visits, societal activities etc.

3.4.3 Audit course shall not carry any credits but shall be reflected in Grade Card as "PP"/"NP" depending upon the satisfactory performance in the semester evaluation as per the course curriculum structure.

4.0 Course Registration:

4.1 Every student must register for the courses that he/she wants to study for earning credits at the beginning of each semester on the prescribed dates announced from time to time and shall be mandatory for every student till he/she completes the program. Only after registration his/her name shall appear in the roll list of each of such courses.

4.2 Students shall be required to fill up a Course Registration Form which shall be made available to them by the Student section of Administration office after payment of required fees.

4.3 Registration, according to rules, should be carried out as per the schedule given in academic calendar. Late registration may be permitted only for valid reasons and on payment of late registration fees. In any case, registration must be completed before the prescribed last date for registration, failing which his/her studentship shall be liable to be cancelled. Students having dues outstanding towards the institute or hostel shall be permitted to register only after clearing such dues.

4.4 In-absentia registration may be allowed only in rare cases at the discretion of the Dean Academics and with prior permission.

4.5 For registration in an odd semester, the student must have earned all the credits of the pre-previous year and at least 75% credits of the previous year. For example, for registration of the 5^{th} semester courses (i.e. 3^{rd} year of program), a student must have earned all the credits of the first year and 75% credits of the second year. Similarly, for registration of the 7^{th} semester courses (i.e. 4^{th} year of program), a student must have earned all the credits of the second year and 75% credits of the third year. However, if 75% calculation turns out to be a mixed number (integer + fraction) then only the integer part of that number shall be considered for taking decision related with this clause.

4.6 A student registered in odd semester shall be eligible to register for the courses offered in the even semester of that year irrespective of his/her SGPI or the number of credits earned by him/her in that odd semester.

5 .0 Lateral Entry for B Tech Programs

Post diploma students in engineering and B.Sc. Graduates can have lateral entry at third semester of the program. Such admissions are governed by the rules of regulatory bodies like AICTE New Delhi and Directorate of Technical Education Maharashtra state and Sanjay Ghodawat University for Admission criteria and shall undergo all academic requirements as specified by the Academic council.

For such students there shall not be First Year Performance Index (FYPI). Semester Performance Index (SGPI) and Cumulative Performance Index (CGPI) shall be calculated from the third semester onwards taking into consideration the courses undergone by them at Sanjay Ghodawat University Kolhapur.

Registration of the students not covered by the cases mentioned above shall be decided by the Academic Council. Such students shall undergo the academic program as specified by the Academic Council. Such odd entry students shall not be eligible for any medals or awards instituted by the institute.

6.0 Change of Program:

This is applicable to B Tech Program only. Students shall be eligible to apply for Change of Program after completing the first two semesters. The following rules/ guidelines shall be used for considering their applications for change:

6.1 The change of program shall be permitted strictly on merit basis subject to the rules of admissions prevailing at the time of such change.

6.2 Students without fail grades and/or backlogs shall be eligible to apply for change of program and can give their choices in the order of preference.

6.3 The request for change of program by a student from program A to program B shall be considered if number of students of program B does not exceed the sanctioned capacity of program B and also the minimum strength required to run the program as decided by Academic Council.

6.4 All such transfers can be effected only once at the beginning of the second academic year of the 4-year UG program. No application for change of program during subsequent academic years shall be entertained.

7. Facilitation to Students:

7.1 Faculty Advisor:

On joining the institute, a student or a group of students shall be assigned to a faculty advisor who shall be mentor for a student throughout his/her tenure in the institute. A student shall be expected to consult the faculty advisor on any matter relating to his/her academic performance and the courses he/she may take in various semesters / summer term. A Faculty advisor shall be the person to whom the parents/guardians should contact for performance related issues of their ward. The role of a faculty advisor is as outlined below:

The role of the Faculty Adviser is outlined below:

a. Guide the students about the rules and regulations governing the courses of study for a particular degree.
b. Advise the students for registering courses as per curriculum given. For this purpose the Faculty Adviser has to discuss with the student his/her academic performance during the previous semester and then decide the number and nature of the courses for which s/he can register during the semester as per the curriculum.
c. Approve the registration of the students.
d. Advice students to overload/ drop one or more courses/activities based on her/his academic performance as per the prescribed rules.
e. At the end of the first semester/year, the Faculty Adviser may even advise a reduced load program for a poorly performing student.
f. Pay special attention to weak students and carefully monitor performance of students recommended for slow track option.
g. Advice students for Course Adjustment / Dropping of courses during the Semester within the stipulated time frame given in the Academic calendar.
h. Advice students seeking semester drop either during the ongoing semester or before the commencement of the semester. FA has to ensure strict compliance of rules and regulations laid down for this purpose. Recommend the cases to the appropriate authorities for consideration.
i. Make revised plan of study for weak/bright students based on their semester wise performance.
j. Suggest modalities for course/credit requirements for the students recommended for exchange program.
k. Guidance and liaison with parents of students for their performance.
l. To ensure that students are not permitted to re-register for courses, which they have already passed.
m. Inform students that any academic activity (course / Lab. / seminar / project / noncredit requirement etc.) undergone without proper registration will not be counted towards the requirements of his/her degree.
n. Strictly warn students that if she/he fails to register during any semester without prior approval, his/her studentship is liable to be cancelled.

- Keep the students updated about the Academic Administration of the University.

7 .2. Helping Weaker Students:

A student with backlog/s should continuously seek help from his/her faculty advisor, Head of the Department and the Dean of respective schools. Additionally, he/she must also be in constant touch with his/her parents/local guardians for keeping them informed about academic performance. The university also shall communicate to the parents/guardians of such student at least once during each semester regarding his/her performance in in-in various tests and examination and also about his/her attendance. It shall be expected that the parents/guardians too keep constant touch with the concerned faculty advisor or Head of the Department, and if necessary - the Dean of the respective school.

8. 0 Discipline And Conduct:

8.1 Every student shall be required to observe discipline and decorous behavior both inside and outside the campus and not to indulge in any activity, which shall tend to bring down the prestige of the university.

8.2 Any act of indiscipline of a student reported to the Dean, Student Development, shall be discussed in a Disciplinary Action Committee of the institute. The Committee shall enquire into the charges and recommend suitable punishment if the charges are substantiated.

8.3 If a student while studying in the university is found indulging in anti-national activities contrary to the provisions of acts and laws enforced by Government, he/she shall be liable to be expelled from the institute without any notice.

8.4 If a student is involved in any kind of ragging, the student shall be liable for strict action as per provisions in the Maharashtra anti-ragging act.

8.5 If any statement/information supplied by the student in connection with his/her admission is found to be false/ incorrect at any time, his/ her admission shall be cancelled and he/she shall be expelled from the university and fees paid shall be forfeited.

8.6 If a student is found guilty of malpractice in examinations then he/she shall be punished as per the recommendations of the Grievance Redressed Committee (CRC) constituted by Board of Examinations.

8.7 Every admitted student shall be issued photo identification (ID) card which must be retained by the student while he/she is registered at Sanjay Ghodawat University Kolhapur. The student must have valid ID card with him/her while in the University Campus.

8.8 Any student who alters or intentionally mutilates an ID card or who uses the ID card of another student or allows his/her ID card to be used by another, student shall be subjected to disciplinary action.

8.9 The valid ID card must be presented for identification purpose as and when demanded by authorities. Any student refusing to provide an ID card shall be subjected to disciplinary action.

8.10 Students should switch off the Mobiles during the Instructional hours and in the academic areas of university Building, Library, Reading room etc. Strict action will be taken if students do not adhere to this.

8 .11 during the conduct of any Tests and Examination students must not bring their mobiles. A student in possession of the mobile whether in use or switched off condition will face disciplinary action and will be debarred from appearing for the Test / Examination.

9.0 Academic Calendar

The academic activities of the institute are regulated by Academic Calendar and is made available to the students/ faculty members and all other concerned in electronic form or hard copy. It shall be mandatory for students / faculty to strictly adhere to the academic calendar for completion of academic activities

10. Attendance:

10.1 Regular 100% attendance is expected from all students for every registered course in lectures, tutorial, laboratory, projects, mini-projects and other courses mentioned in program curriculum. Hence, attendance is compulsory and shall be monitored during the semester rigorously. Students shall be informed at the end of every month if they are failing short of attendance requirements.

10.2 A Maximum of 25% absence for the attendance may be permitted only on valid grounds such as illness, death in family of blood relations (Father, Mother, Sister, and Brother) and any other emergency reason which is beyond the control of the student and shall be approved by the authorities in respective departments.

10.3 If a student fails to put up 75% attendance individually in each course, the student will be put under X grade category and student will be debarred form attending the End Semester Examination (ESE) and Re-Exam for that semester in that course. However, student has an option to re-register for the course whenever it is offered next time or he can appear for 100% examination for which he will be awarded two grade penalties. Student's FET, CAT1 and CAT2 marks are treated as null and void.

10.4 The maximum number of days of absence for students participating in Co-curricular activities /Sports/ Cultural events during a semester shall not exceed 10. Any waiver in this context shall be on the approval of the Academic council only after the recommendation by Dean Academics of the university.

The HOD and Dean of the respective school shall report and recommend to Academic Academic council the cases of students not having 75% attendance as per the records of course instructor. After rigorously analyzing these cases AC may take a decision to debar such student from End-Semester Examination (ESE) for that course. Such a student shall re-register for that course as and when it is offered next. ISE and MSE evaluations of such a student for this course during regular semester shall be treated as null & void.

10.5 A student remaining absent during ESE of a course either on medical ground (Accident and/or hospitalization of a student) or any other emergency circumstances (death of immediate close relative i.e. father, mother, brother and sister) or due to representing University at university/state level in sports/co-curricular activities shall be treated as per the rules of Sec 12.6.2 and 11.1.2

The critical cases of absenteeism which are not covered by any of the above clauses shall be reported by concerned Head of Department to Academic dean and all such cases the decision of Academic council is final.

11.0 Modes of Assessment:

11.1 Assessment of Theory Courses:

11.1.1 A student shall be evaluated for his/her academic performance in a theory course through Faculty Evaluation Theory (FET), Continuous Assessment Tests (CAT1 and CAT2) and End Semester Examination (ESE).

11.1.2 The relative weightage for the theory courses having ESE shall be generally as shown in the Table 10.1.2.

Table 10.1.2: Weightage for the theory courses in %

FET	CAT1	CAT2	ESE
20	15	15	50

The details of the weightage of each course shall be listed in the structures of each program.

11.1.3 FET shall be based on student's performance in assignments, quizzes, seminars, Course projects and field assignments, term papers, etc. The mode of FET shall be decided and announced by the Course Instructor at the beginning of the course.

11.1.4 CAT1 shall generally be of one hour duration for each course and shall be held as per the schedule declared in the Academic calendar for that Semester. The test will be based on first two units of the course.

11.1.5 CAT2 shall generally be of one hour duration for each course and shall be held as per the schedule declared in the Academic calendar for that semester based on unit 3 and unit 4 of the syllabus.

10.1.6 ESE is of three hours comprehensive examination having the weightage of 60% for unit 5 and 6 and 40% to unit 1 to unit 4. It is of 100 marks

11.1.6 All examinations and evaluations shall be compulsory. Credits for a course shall be awarded only if a student satisfies evaluation criteria and acquires the necessary minimum grade.

11.1.7 There shall be no re-examination for CAT1 and CAT2 of the courses having all the three components of evaluation viz. FET, CAT1 CAT2 and ESE. However, a student remaining absent for CAT1 and CAT2 for representing the institute in state level or university level sports/co-curricular activities (on prior recommendation and approval from) or on valid grounds such as illness, death in family or other emergency reason which is beyond control of a student (on approval by the head of department and dean of respective school shall be considered for Make- up examinations.

11.1.8 A student remaining absent for ESE of a course either due to medical reason (Accident and/or hospitalization of a student) or other emergency circumstances (death of immediate close relative i.e. father, mother, brother and sister) or due to representing college at university/state level in sports/co-curricular activities shall be awarded with grade "I". Such a student shall be allowed to appear for make-up examination scheduled along with re-examinations of other courses. The student shall apply to COE with proper documentary evidence to appear for make-up examination. After make-up examination, a student shall be entitled to an appropriate grade as per Table I of Sec. 10.1.2 based on his/her performance during the regular semester and in make-up examination.

11.2 Assessment of Laboratory Courses:

11.2.1 The assessment of laboratory course shall be continuous and based on turn-by-turn supervision of the student's work and the quality of his/her work as prescribed through laboratory journals and his/her performance in viva-voce examinations uniformly distributed throughout the semester. Where ESE for the laboratory course is specified ESE shall be based on performing an experiment followed by an oral examination. The relative weightage for FEP and ESE for assessment of laboratory courses shall be 50% each for FEP and ESE and a minimum performance of 40% in both ISE and ESE separately shall be required to get the passing grade.

11.2.2 ESE for laboratory course shall normally be held before the ESE for theory courses and shall be conducted by a panel of examiners appointed by COE from the panel of experts approved by BOS. This activity shall be coordinated by Department Examination Coordinator (DEC) in consultation with HOD of the respective department.

11.2.3 Student failed in ESE of a laboratory course in a regular semester shall be eligible to appear for 100% examination conducted alongwith ESEs of laboratory courses of the subsequent semester. Such examination shall be fairly comprehensive (generally of 3 hours similar to POE i.e. Practical-Oral-Examinations) to properly judge his/her practical skill and theoretical knowledge for that laboratory course. He/She shall suffer one grade penalty.

12.0 The Grading System:

Absolute Grading System (AGS) is adopted based on absolute numerical marks obtained by the student during all stages of evaluation for a course.

12.1. Award of Grade (Regular Semester):

12.1.1 For every course registered by a student in a semester, he/she shall be assigned a grade based on his/her combined performance in all components of evaluation scheme of a course as per the structure. The grade indicates an assessment of the student's performance and shall be associated with equivalent number called a grade point.

12.1.2 The academic performance of a student shall be graded on a ten point scale. The Absolute Grading System is followed. Letter grades, the guidelines for conversion of marks to letter grades and their equivalent grade points are as given in Table 11.1.2

Table 11.1.2: Grade Table for Regular Semester

Marks Obtained	Grade Letter GL	Grade Point GP	Performance Description
90-100	**O**	**10**	Outstanding
80-89	**A+**	**09**	Excellent
70-79	**A**	**08**	Very Good
60-69	**B+**	**07**	Good
50-59	**B**	**06**	Above Average
45-49	**C**	**05**	Average
40-44	**P**	**04**	Pass
00-39	**F**	**00**	Fail
-	**Ab**	**00**	Absent
-	**X**	**00**	Detained (Failed)
-	**Satisfactory**	**-**	Pass in Non Credit Courses
-	**Un Satisfactory**	**-**	Failed in Non Credit Courses

12.1.3 A student shall pass the course if he/she gets any grade in the range "O" to "P".

12.1.4"FF" grade shall be awarded to a student in a course if he/she gets less than 40% marks jointly in the FET, CAT1, and CAT2 & ESE for a theory course and in PET & ESE for a laboratory course. A course shall then be eligible to apply for re-examination. A student failed in laboratory course shall be eligible to apply only for 100% examination conducted with the laboratory examinations of the subsequent semester. In both cases, a student has to suffer one grade penalty.

13.0 Assignment of X Grade

Grade "X" in a regular course shall be given to a student if he/she falls in any of the following categories.

13.1 A student does not maintain the minimum 75% attendance in any of the theory or laboratory courses.

13.2 A student has not completed most of the Evaluations like FET, CAT1 and CAT2 due to non-medical reasons (for example when a student has missed all or most of the components of internal evaluation conducted by the instructor in that semester).

13. 3 The performance of a student is less than 40% in FET, CAT1 and CAT2 Combined.

13.4 A student is guilty of any academic malpractice during semester (Such cases shall be dealt by Grievance Redressed and Discipline Committee).

In above four cases grade "X" shall be declared one week before ESE and intimated to the Academic Office and COE immediately thereafter. Such a student shall not be permitted to take the ESE of that course.

13.5 Grade "X" may be given to a student if

13.5.1 A student eligible for ESE remains absent for ESE of a course with no written intimation to Exam Cell within four days after the respective ESE is over.

13.5.2 A student is guilty of any academic malpractice during examination. (Such cases shall be dealt by Grievance Redressal Committee).

In 12.5.2 grade "X" in that course shall be declared after Grievance Redressed Committee confirms the academic malpractice.

In above two cases when a student gets "X " grade in a course, then this shall be treated as "FF" for the purpose of calculation of Semester Performance Index (SGPI) and First Year Performance Index (FYPI) or Cumulative Performance Index (CGPI).

13.6 Following rules apply to the student who has obtained grade "X" in a regular semester:

13.6.1 A student obtaining grade "X" in a course in a regular semester or during examination shall be not be allowed to appear for End semester examination and also Re ESE conducted before the beginning of the next semester. His/her FET, CAT1 and CAT2 evaluations for all courses shall be treated as null and void. He/She needs to re-register for courses of that semester in the next academic year whenever they are offered and undergo all evaluations along with fresh regular students for which he will get one grade penalty.

13.6.2 Grade "I" shall be declared in a theory/laboratory course if a student has satisfactory performance FET, CAT1, CAT2 and has fulfilled the 75% attendance requirement, but has not appeared for ESE due to genuine reasons. Such students shall be eligible for the make-up examination of ESE only on medical grounds/valid reasons and on production of authentic medical certificate or other supporting document/s (as required by the University) to the COE within ten days after the respective examination is over. The application form with requisite amount of fees must be submitted to the Exam Cell before the last date of filling such application forms for make-up examinations. These examinations shall be based on 100% syllabus and shall be scheduled before the commencement of the subsequent semester for theory courses and along with ESEs of laboratory courses of the subsequent semester. A student with "I" grade when appears for the make-up examination shall be eligible to obtain a regular performance grade ("O" to "F") as per Table 11.1.2 depending on his/her overall performance in FET, CAT1 ,CAT2 and make-up examination. If a student fails to appear for make-up examination too, a grade "XX" shall be awarded to him/her. Thus "I" is only a temporary grade and shall be replaced by a valid grade only after make-up examination.

13.6.3 There shall be a few audit courses as per the policies of the institute or as decided by DPC of respective program. The grade "PP" (Passed)/ "NP" (Not Passed) shall be awarded for such courses depending upon the performance of a student evaluated by the faculty in-

charge. No grade points shall be associated with these grades and performance in these courses shall be not taken into account in the calculation of the performance indices (SGPI, CGPI). However, the award of the degree shall be subject to obtaining a "PP" grade in all such courses.

14.0 Award of Grades for Re-Examination:

14.1 A student who has obtained grade "F" in regular semester shall be eligible to appear for re-examination conducted before the commencement of the next regular semester. In such cases FET, CAT1 and CAT2 marks are carried forward and a student has to suffer one grade penalty

14.2 A student shall apply for re-examination before the last date of such application and shall appear for re-examination.

14.3 50% weightage similar to ESE shall be given to re-examination and there is one grade penalty.

14.4 student who has obtained "F" grade in ESE of a regular semester and has not availed re-examination option or a student who has obtained "F" grade in both ESE and re-examination shall be eligible to choose one of the two options below to clear his/her backlog:

- Re-registration for the next regular semester course whenever that course is offered.
- Appearing for ESE of the course when conducted...
  A student detained in a regular semester due to either a) by obtaining "X" grade or b) by involvement in academic malpractice or c) by breaking the institute code of conduct and discipline can re-register for the course when offered next

Following rules apply for these cases:

14.5 In first case i.e. Re- registration the earlier performance of a student in all the evaluations of that course shall be treated as null and void. The student has to undergo all the evaluations after re-registration.

15.0 Grades for Third and Subsequent attempts:

If A student opts for ESE or Re ESE who previously had obtained grade "F" in a course in two attempts, his/her FET, CAT1 and CAT2 performance of the regular semester shall be considered for evaluation and He/She has to suffer two grade penalty for the third attempt and for 4^{th} and subsequent attempts shall be awarded a grade "P" or "F" or "X" based on his/her performance.. However, if a student takes more than three chances (regular examination being the first chance, re-examination being the second chance, to clear a course, then the maximum passing grade that he/she can get shall be only "P". Thus a student has to suffer a grade penalty by accepting a lower grade than that obtained in the regular examination, re-examination, or examination for a re-registered course.

16.0 Calculation of Performance Indices:

16.1 Semester Grade Point Average (SGPA)

The performance of a student in a one specific semester is indicated by SGPA. SGPA is a weighted average of the grade points obtained in all courses registered by the students during the semester. SGPA can be calculated by following equation.

$$SGPA = S_i = \frac{\sum_{i=1}^{n} C_i P_i}{\sum_{i=1}^{n} C_i}$$

Where, i = 1,2,3…….n are number of courses during semesters. C = No of credits associated with that course and P = Grade point earned in that course. SGPA will be rounded off to two decimal places.

16.2 Cumulative Grade Point Average (CGPA)

The total cumulative performance of a student at the end of specific semester is indicated by CGPA. An up-to-date assessment of the overall performance of a student for the courses from the first semester onwards till completion of the program shall be obtained by calculating Cumulative Grade Point Average (CGPA).

CGPA is a weighted average of the SGPA obtained in all semesters by the students during the semesters. CGPA can be calculated by following equation.

$$CGPA = \frac{\sum_{j=1}^{n} C_j S_j}{\sum_{j=1}^{n} C_j}$$

Where, j = 1,2,3…….n are number of semester during program. C = Total No of credits in the semester for which CGPA is to be calculated.

CGPA will be rounded off to two decimal places.

Conversion of CGPA to percentage marks for CGPA $\geq$ 4.5 can be obtained using equations. Percentage marks = (CGPA x 10) – 7.5.

16.3 For the students acquiring "I" grade (which is only a temporary grade) in any of the courses, SGPA, CGPA shall be calculated only after make-up examination.

17.0 First Year Performance Index (FYPI): **(Applicable For B. Tech Programs Only)**

17.1 For a student registered in Sanjay Ghodawat University Kolhapur right from the First semester, First-Year-Performance-Index (FYPI) shall be calculated as weighted average of the grade points obtained in all the courses registered by him/her in semesters I and II only.

$$\text{FYPI} = \frac{\sum_{1} C_i g_i}{\sum_{1} C_i}$$

Where summation is for all the courses registered by a student in first two semesters. FYPI shall be calculated when SPI for the second semester is calculated. FYPI shall be rounded off to two decimal places.

17.2 FYPI shall reflect all the courses undergone by a student in the first year including the courses in which he/she has failed. FYPI may get modified in the subsequent semesters whenever a student clears his/her first year backlog courses.

17.3 If a student has been awarded "I" grade in the regular semester course of the first year then, FYPI shall be calculated after the make-up examination on the basis of the grade obtained by that student in a make-up examination.

17.4 If a student has obtained grade "F" or "X" at any time in any of the courses registered by him, then zero grade points corresponding to these grades shall be taken into consideration for calculation of FYPI.

18.0 Maximum Duration for Completing the Program

Maximum duration for completing any program UG/PG offered by Sanjay Ghodawat University is respective program duration plus two additional years.
Maximum duration for getting the B. Tech degree for students admitted in the first semester of UG program is, program duration plus two additional years (i.e. 12 Semesters and 6 academic years) For lateral entry student academic admitted in the third semester shall be (10 Semester and 5 Years).
The maximum duration of the program includes the period of withdrawal, absence and different kind of leaves permission to student but excludes the period of rustication of the student from the university however genuine case an confidential of valid reason may be referred to academic council for extending this limit by additional criteria

19.0 NFTE (Not Fit For Technical Education) **(Applicable to B Tech program only)**

It is mandatory for the student to earn all credits of first year specified for semester I & II or eligible for ATKT as per the rules to seek admission to semester III of second year in three years from the date of admission to avoid NFTE. If a student fails to become eligible for admission to Semester III in three year form the date of his admission, he shall be declared as "Not Fit for Technical Education" leading to discontinuation of his/her registration with the university. Such cases should be put up in the academic council.

20.0 Academic Progress Rules (ATKT Rules):

20.1 A student shall be allowed to register for the courses of the next year's odd semester only if he/she has earned all the credits of the previous year and has earned at least 75% credits of the current year. If 75% calculation turns out to be a mixed number (integer + fraction) then only the integer part of that number shall be considered for

deciding the eligibility for ATKT.

At the end of 1st year a student shall be allowed to keep terms (ATKT) to 2nd year of study provided he/she attends course work prescribed for 1st year with prescribed attendance and successfully earned at least 75% of the total credits specified for 1st year program.

For Example: Total credits for B. Tech first year 2017-18, are 45 (Total of Semester I and II). A Student should earn mininum75% of the 45 Credits i.e. 33.15 (Rounded to 33 Credits). A student can go to next higher class with a maximum backlog of 12 credits of semester I & II of the first year.

Student, who fails to earn those credits, cannot register for next semester, either it can re-registrar for the course and credits or can use the next opportunity to earn the credits when exams are conducted.

(a) At the end of 2nd year a candidate shall be allowed to keep terms to 3rd year of study provided he/she attends course work prescribed for 2nd year with prescribed attendance, and successfully cleared 1st year program and at least 75% of total credits prescribed for 2nd year program.

(b) At the end of 3rd year a candidate shall be allowed to keep terms to final year of study provided he/she attendants course work prescribed for 3rd year with prescribed attendance, and should have completed 2nd year program and 75% of total credits prescribed for 3rd year program.

All such candidates fulfilling the above criteria shall be declared as FAILED, ATKT.

A student shall be allowed to take admission for odd semester of next academic year only if he/ she have earned all the credits of the previous year and 75% happens to be a decimal, it is rounded to only integer part.

21.0 Semester Grade Report:

21.1 Semester grade report reflects the performance of a student in that semester (SGPI) and also his/her cumulative performance for the first year (FYPI) and also the cumulative performance since the third semester of his/her study (CGPA).

21.2 The semester grade card issued at the end of each semester/ summer term to each student shall contain the following.

- The credits for each course registered for that semester.
- Any audit course/s undertaken by a student in a Semester.
- The letter grade obtained in each course.
- The total number of credits earned by a student for the first year separately.
- The total number of credits earned by a student since the 3rd semester onwards.
- SGPI, FYPI, CGPI.
- A list of backlog courses, if any.
- Remarks regarding eligibility of registration for the next semester.

21.3 Semester grade card shall not indicate class or division or rank however a conversion from grade point index to percentage based on CGPI shall be indicated on the final grade card of the program.

22.0 Award of Degree:

Following rules prevail for the award of degree.

- A student has registered and passed all the prescribed courses under the general institutional and departmental requirements.
- A student has obtained CGPI $\geq$ 4.75.
- A student has paid all the institute dues and satisfied all the requirements prescribed.
- A student has no case of indiscipline pending against him/her.
- Academic Council shall recommend the award of degree to a student who is declared to be eligible and qualified for above norms.

23.0 Grace Marks

- Maximum total grace marks will be 1 % of the total theory credit courses x 100 subjected
- To maximum 6 marks in that semester.
- Grace marks will be given candidate for change in grades for theory credit courses, i.e. from
- Fail to pass grade only and will be reflected in final ESE marks.
- The grace marks are applicable only for maximum 1/3rd courses (rounded to higher
- Integer part i.e. if there are 4 theory courses then 4/3 = 1.33 = 2 courses).
- Maximum grace marks will be distributed in maximum courses
- Benefit of grace marks is not applicable for any medal/award.
- Applicable to theory and (Theory + Practical Courses). If is not applicable for Practical courses.
- Scheme for grace marks only can be used when the student will pass in all courses of that semester.

24.0 CGPA Improvement Policy for Award of Degree:

An opportunity shall be given to a student who has earned all the credits required by the respective program with CGPA greater than or equal to 4.00 but less than 4.75 to improve his/her grade by allowing him/her to appear for ESE examinations of maximum two theory courses of seventh semester. Such examinations shall be scheduled along with re-examinations/make-up examinations. However, CGPA shall be limited to 4.75 even though the performance of a student as calculated through modified CGPA becomes greater than 4.75.

Conclusions:

The academic policies regarding conduct of programs in Sanjay Ghodawat University Kolhapur are published in this document. The Academic Council shall reserve the right to modify these policies as and when required from the point of view of achieving academic excellence. In special and abnormal cases (i.e. the cases not covered through above rules) the decision of the (Chairman, Academic Council shall be final and shall be binding on all concerned.

Chairman
Academic Council

Structure for First Year B. Tech. All Engineering Programs (2020-21) R2

AME/P/82/00

Group A - Semester I

Course Code	Course Title	L	T	P	C	Evaluation Scheme				
						Component	Exam	Wt.	Min Pass (%)	Pass (%)
FYT101R2 (BS | SS) Version 1.2	Engineering Mathematics - I	3	1	-	4	Theory	FET	20	40	40
							CAT I	15		
							CAT II	15		
							ESE	50	40	
FYT102 (BS | SS) Version 1.1	Applied Physics	3	-	-	3	Theory	FET	20	40	40
							CAT I	15		
							CAT II	15		
							ESE	50	40	
FYT108R1 (ES | ST) Version 1.1	Engineering Mechanics	3	-	-	3	Theory	FET	20	40	40
							CAT I	15		
							CAT II	15		
							ESE	50	40	
FYT131 (ES | ST) Version 1.0	Programming for Problem Solving	2	-	-	2	Theory	FET	50	40	40
FYT137 (ES | ST) Version 1.0	Elective - II	2	-	-	2	Theory	FET	20	40	40
							CAT	30		
							ESE	50	40	
FYT110R1 (ES | ST) Version 1.1	Engineering Mechanics Laboratory	-	-	2	1	Practical	FEP	100	40	40
FYT112R2 (HS | SA) Version 1.2	Professional Communication - I	-	-	2	1	Practical	FEP	100	40	40
FYT113 (HS | SA) Version 1.1	Applied Physics Laboratory	-	-	2	1	Practical	FEP	50	40	40
							POE	50	40	
FYT129 (ES | ST) Version 1.0	Engineering Practice-I	-	-	2	1	Practical	FEP	100	40	40
FYT130 (ES | ST) Version 1.0	Design Thinking - I	-	-	2	1	Practical	FEP	100	40	40
FYT132 (BS | SS) Version 1.0	Programming for Problem Solving Laboratory	-	-	2	1	Practical	FEP	50	40	40
							POE	50	40	
FYT121 (HS | SA) Version 1.0	Constitution of India	-	-	-	NC	Theory	ESE	100	40	40
	Total	**13**	**01**	**12**	**20**	**Total Hrs.: 26, Total Credits: 20**				

Group A: I. Mechanical Engineering, II. Civil Engineering, III. Aeronautical Engineering Programs

L: Lecture, T: Tutorial, P: Practical, C: Credits, NC: Non-Credit Course (Pass/Fail).

FET: Faculty Evaluation Theory, FEP: Faculty Evaluation Practical, CAT I: Continuous Assessment Test I CAT II: Continuous Assessment Test II, ESE: End Semester Examination, POE: Practical Oral Examination.

ST: School of Technology, SS: School of Sciences, SC: School of Commerce and Management, SA: School of Arts.

Structure for First Year B. Tech. All Engineering Programs (2020-21) R2

Group A - Semester II

Course Code	Course Title	L	T	P	C	Evaluation Scheme				
						Component	Exam	Wt	Min Pass (%)	Pass (%)
FYT122R2 (BS | SS) Version 1.2	Engineering Mathematics - II	3	1	-	4	Theory	FET	20	40	40
							CAT I	15		
							CAT II	15		
							ESE	50	40	
FYT103R1 (BS | SS) Version 1.1	Applied Chemistry	3	-	-	3	Theory	FET	20	40	40
							CAT I	15		
							CAT II	15		
							ESE	50	40	
FYT107R1 (ES | ST) Version 1.1	Elements of Electrical Engineering	2	-	-	2	Theory	FET	20	40	40
							CAT I	15		
							CAT II	15		
							ESE	50	40	
FYT123R1 (BS | SS) Version 1.1	Biology for Engineers	2	-	-	2	Theory	FET	20	40	40
							CAT	30		
							ESE	50	40	
FYT135 (ES | ST) Version 1.0	Elective – I	2	-	-	2	Theory	FET	20	40	40
							CAT I	15		
							CAT II	15		
							ESE	50	40	
FYT111R1 (ES | ST) Version 1.2	Engineering Graphics Laboratory	-	-	2	1	Practical	FEP	100	40	40
FYT114 (BS | SS) Version 1.1	Applied Chemistry Laboratory	-	-	2	1	Practical	FEP	50	40	40
							POE	50	40	
FYT118 (ES | ST) Version 1.1	Elements of Electrical Engineering Laboratory	-	-	2	1	Practical	FEP	100	40	40
FYT124R2 (HS | SA) Version 1.2	Professional Communication-II		-	2	1	Practical	FEP	100	40	40
FYT133 (ES | ST) Version 1.0	Engineering Practice-II	-	-	2	1	Practical	FEP	100	40	40
FYT134 (ES | ST) Version 1.0	Design Thinking - II	-	-	2	1	Practical	FEP	50	40	40
							POE	50	40	
FYT136 (ES | ST) Version 1.0	Elective – I Lab	-	-	2	1	Practical	FEP	100	40	40
Total		**12**	**01**	**14**	**20**	**Total Hrs.: 27 Total Credits: 20**				

Structure for First Year B. Tech. All Engineering Programs (2020-21) R2

AME/P/82/00

Group B - Semester I

Course Code	Course Title	L	T	P	C	Evaluation Scheme				
						Component	Exam	Wt	Min Pass (%)	Pass (%)
FYT101R2 (BS | SS) Version 1.2	Engineering Mathematics - I	3	1	-	4	Theory	FET	20	40	40
							CAT I	15		
							CAT II	15		
							ESE	50	40	
FYT103R1 (BS | SS) Version 1.1	Applied Chemistry	3	-	-	3	Theory	FET	20	40	40
							CAT I	15		
							CAT II	15		
							ESE	50	40	
FYT107R1 (ES | ST) Version 1.1	Elements of Electrical Engineering	2	-	-	2	Theory	FET	20	40	40
							CAT I	15		
							CAT II	15		
							ESE	50	40	
FYT123R1 (BS | SS) Version 1.1	Biology for Engineers	2	-	-	2	Theory	FET	20	40	40
							CAT	30		
							ESE	50	40	
FYT135 (ES | ST) Version 1.0	Elective – I	2	-	-	2	Theory	FET	20	40	40
							CAT I	15		
							CAT II	15		
							ESE	50	40	
FYT111R1 (ES | ST) Version 1.2	Engineering Graphics Laboratory	-	-	2	1	Practical	FEP	50	40	40
FYT114 (BS | SS) Version 1.1	Applied Chemistry Laboratory	-	-	2	1	Practical	FEP	50	40	40
							POE	50	40	
FYT118 (ES | ST) Version 1.1	Elements of Electrical Engineering Laboratory	-	-	2	1	Practical	FEP	100	40	40
FYT112R2 (HS | SA) Version 1.2	Professional Communication - I	-	-	2	1	Practical	FEP	100	40	40
FYT129 (ES | ST) Version 1.0	Engineering Practice-I	-	-	2	1	Practical	FEP	100	40	40
FYT130 (ES | ST) Version 1.0	Design Thinking - I	-	-	2	1	Practical	FEP	100	40	40
FYT136 (ES | ST) Version 1.0	Elective – I Lab	-	-	2	1	Practical	FEP	100	40	40
FYT121 (HS | SA) Version 1.0	Constitution of India	-	-	-	NC	Theory	ESE	100	40	40
Total		**12**	**01**	**14**	**20**	**Total Hrs.: 27 Total Credits: 20**				

Group B: I. Electrical Engineering, II. Electronics and Communication Engineering, III. Electrical and Electronics Engineering, IV. Computer Science & Engineering.

L: Lecture, T: Tutorial, P: Practical, C: Credits, NC: Non-Credit Course (Pass/Fail).

FET: Faculty Evaluation Theory, FEP: Faculty Evaluation Practical, CAT I: Continuous Assessment Test I CAT II: Continuous Assessment Test II, ESE: End Semester Examination, POE: Practical Oral Examination.

Group B - Semester II

Course Code	Course Title	L	T	P	C	Evaluation Scheme				
						Component	Exam	Wt.	Min Pass (%)	Pass (%)
FYT122R2 (BS | SS) Version 1.2	Engineering Mathematics - II	3	1	-	4	Theory	FET	20	40	40
							CAT I	15		
							CAT II	15		
							ESE	50	40	
FYT102 (BS | SS) Version 1.1	Applied Physics	3	-	-	3	Theory	FET	20	40	40
							CAT I	15		
							CAT II	15		
							ESE	50	40	
FYT108R1 (ES | ST) Version 1.1	Engineering Mechanics	3	-	-	3	Theory	FET	20	40	40
							CAT I	15		
							CAT II	15		
							ESE	50	40	
FYT131 (ES | ST) Version 1.0	Programming for Problem Solving	2	-	-	2	Theory	FET	50	40	40
FYT137 (ES | ST) Version 1.0	Elective - II	2	-	-	2	Theory	FET	20	40	40
							CAT	30		
							ESE	50	40	
FYT110R1 (ES | ST) Version 1.1	Engineering Mechanics Laboratory	-	-	2	1	Practical	FEP	100	40	40
FYT112R2 (HS | SA) Version 1.2	Professional Communication-II	-	-	2	1	Practical	FEP	100	40	40
FYT113 (HS | SA) Version 1.1	Applied Physics Laboratory	-	-	2	1	Practical	FEP	50	40	40
							POE	50	40	
FYT133 (ES | ST) Version 1.0	Engineering Practice-II	-	-	2	1	Practical	FEP	100	40	40
FYT134 (ES | ST) Version 1.0	Design Thinking - II	-	-	2	1	Practical	FEP	50	40	40
							POE	50	40	
FYT132 (BS | SS) Version 1.0	Programming for Problem Solving Laboratory	-	-	2	1	Practical	FEP	50	40	40
							POE	50	40	
Total		**13**	**01**	**12**	**20**	**Total Hrs.: 26, Total Credits: 20**				

ST: School of Technology, SS: School of Sciences, SC: School of Commerce and Management, SA: School of Arts.

Professional Communication			
Sr. No.	**Course Code**	**Component**	**Course Title**
1.	**FYT 112R11 (ES | SA) Version 1.2**	**Laboratory**	Professional Communication-I: English Language.
2.	**FYT 112R12 (ES | SA) Version 1.2**		Professional Communication-I: German Language.
3.	**FYT 124R21 (HS | SA) Version 1.1**	**Laboratory**	Professional Communication-II: English Language.
4.	**FYT 124R22 (HS | SA) Version 1.1**		Professional Communication-II: German Language.

Elective – I (Technical Domain)			
Sr. No.	**Course Code**	**Component**	**Course Title**
1.	**FYT 1351 (ES | ST) Version 1.2**	Theory	Elements of Mechanical Engineering
2.	**FYT 1361 (ES | ST) Version 1.2**	Laboratory	Elements of Mechanical Engineering Laboratory
3.	**FYT 1352 (ES | ST) Version 1.2**	Theory	Elements of Civil Engineering
4.	**FYT 1362 (ES | ST) Version 1.2**	Laboratory	Elements of Civil Engineering Laboratory
5.	**FYT 1353 (ES | ST) Version 1.2**	Theory	Elements of Electronics Engineering
6.	**FYT 1363 (ES | ST) Version 1.2**	Laboratory	Elements of Electronics Engineering Laboratory
7.	**FYT 1354 (ES | ST) Version 1.0**	Theory	Engineering Materials
8.	**FYT 1364 (ES | ST) Version 1.0**	Laboratory	Engineering Materials Laboratory
9.	**FYT 1355 (ES | ST) Version 1.0**	Theory	Elements of Aeronautical Engineering
10.	**FYT 1365 (ES | ST) Version 1.0**	Laboratory	Elements of Aeronautical Engineering Laboratory

Elective – II (Open Elective)			
Sr. No.	**Course Code**	**Component**	**Course Title**
1.	**FYT 1371 (ES | ST) Version 1.0**	Theory	Electric Vehicles
2.	**FYT 1372 (ES | ST) Version 1.0**	Theory	Information Systems for Engineers
3.	**FYT 1373 (ES | ST) Version 1.0**	Theory	Energy Auditing
4.	**FYT 1374 (ES | ST) Version 1.0**	Theory	Global Warming and Climate Change
5.	**FYT 1375 (ES | ST) Version 1.0**	Theory	Information Security
6.	**FYT 1356 (ES | ST) Version 1.0**	Theory	Renewable Energy Resources

FYT101R2 : Engineering Mathematics - I

(Ver 1.2, Program Core, School of Sciences)

Lect.	Tut.	Practical	Credits	Evaluation Scheme				
				Component	Exam	WT	Min Pass (%)	Pass (%)
3	1	-	4	Theory	FET	20	40	40
					CAT-I	15		
					CAT-II	15		
					ESE	50	40	

Course Outcomes: At the end of this course students will able to

CO1 **Solve**[3] simultaneous linear equations using matrix.

CO2 **Find**[3] eigen values and eigen vectors.

CO3 **Find**[3] nth order derivative using Leibnitz's theorem.

CO4 **Construct**[3] the function in powers of x and (x-a).

CO5 **Find**[3] partial derivatives.

CO6 **Apply**[3] partial derivative to find maxima, minima, errors and approximations.

Syllabus (Theory)

Units	Description	Hours
I	**Matrices I:** Rank of matrix, Elementary Transformation on matrix, normal form (canonical form), echelon form, and consistency of linear system of equations, solution of system of linear homogeneous and non-homogeneous equations.	07
II	**Matrices II:** Vectors, Linear dependence and independence of vectors, Characteristic equation, Eigen value, properties of Eigen value, Eigen vectors, properties of Eigen vectors, Cayley Hamilton's theorem (Without proof), Power and inverse of matrix by Cayley Hamilton theorem.	07
III	**Successive Differentiation:** The nth derivatives of standard functions, Leibnitz's theorem (without proof), nth order derivative of the product of two functions by Leibnitz's theorem.	07
IV	**Expansion of functions:** Expansion of function by Maclaurians series, standard expansions, expansion by integration & derivative and substitution method, Taylor's series, indeterminate forms	07
V	**Partial Differentiation:** Partial derivatives, Partial derivatives of higher order, partial derivatives of Implicit functions, Euler's theorem on	07

	homogeneous function (Without Proof), Total derivative, Change of variables, Jacobians, properties of Jacobians.	
VI	**Application of Partial Differentiation:** Error and approximation, Maxima and minima for function of two variables, Differentiation under the integral sign with constant limits.	07

Tutorial

One hour per week per batch tutorial is to be utilized for problem solving to ensure that students have properly learnt the topics covered in the lectures. To strengthen fundamental concepts of this course, tutorial session shall include group discussions on problems other than class and any academic activity.

List of Tutorials

Tutorial No.	Details
1	Find rank of Matrix and Solution Homogeneous and Non homogeneous equation
2	Linear Dependence and Independence of vectors
3	Eigen Vectors and Cayley Hamilton's theorem
4	nth derivatives of some functions
5	Leibnitz's theorem
6	Expansion of function by Macaurians Theorem
7	Expansion of function by Taylors function
8	Partial derivatives and chain rule
9	Euler's theorem on Homogeneous function
10	Find Maxima and Minima of functions of two variables
11	Differentiation under integral sign

References

Text Book

1. Grewal. B. S, "Higher Engineering Mathematics", Khanna Publications, 41st Edition, Delhi, (2011).

Reference Book

1. Bali N. P and Manish Goyal, "A Text book of Engineering Mathematics", 8th Edition,Laxmi Publications Pvt Ltd., (2011)
2. Dass, H.K., and Er. RajnishVerma," Higher Engineering Mathematics", S. Chand Private Ltd., (2011).

FYT102 : Applied Physics

(Ver 1.1 Program Core, School of Sciences)

Lect.	Tut.	Practical	Credits	Evaluation Scheme				
				Component	Exam	WT	Min Pass (%)	Pass (%)
3	-	-	3	Theory	FET	20	40	40
					CAT I	15		
					CAT II	15		
					ESE	50	40	

Course Outcomes: After the end of this course students will able to

CO1 **Discuss**[2] Ultrasonic and Acoustics

CO2 **Apply**[3] knowledge of Electromagnetic waves in Engineering Applications

CO3 **Use**[3] Laser and Fiber Optics

CO4 **Understand**[2] the concepts of Quantum Mechanics.

CO5 **Apply**[3] knowledge of Magnetic Materials in Engineering Applications

CO6 **Explain**[2] Crystal Physics

Syllabus (Theory)

Units	Description	Hours
I	**Ultrasonic and Acoustics:** Introduction, production of ultrasonic waves by Piezoelectric and Magnetostriction method (Using transistor circuit), properties of ultrasonic waves, determination of wavelength and velocity of ultrasonic waves, application of ultrasonic waves, Numerical. Acoustics: Introduction, Basic requirements for acoustically good hall, reverberation, time of reverberation, Sabine's formula (No derivation), absorption coefficient, factors affecting architectural acoustics and their remedies, Numerical.	07
II	**Properties and Applications of Electromagnetic Waves:** Properties of Electromagnetic Waves: Interference, diffraction and polarization. Applications of Electromagnetic Waves: Applications of microwave and radio waves, Infrared rays, Ultraviolet rays, X-rays and gamma rays.	07
III	**Laser and Fiber Optics:** Laser Basic process and Lasing action (metastable state, population inversion), Applications communication in space, medical and industry. Fiber optics: Structure and principle, types of optical fibers, Applications- medical applications / communication	07

IV	**Quantum Mechanics:** Development of Quantum theory, wave-particle duality, de-Broglie hypothesis, Heisenberg's Uncertainty principle, Photoelectric and Compton effect.	07
V	**Magnetic Materials for Engineering Applications:** Origin of magnetic moment, magnetic properties of materials, Magnetic susceptibility, Classification of diamagnetic, paramagnetic and ferromagnetic materials, Ferromagnetic domains, Hysteresis in ferromagnetic materials, Soft and Hard magnetic materials, Applications: transformer, Motors, Electrical bell, Magnetic levitation train.	07
VI	**Crystal Physics:** Introduction to basic concepts, Bravais Lattices, Properties of Crystal symmetry elements of a cubic crystal, Miller indices, X-ray diffraction: Bragg's law and powder method.	07

References

1. A Textbook of Applied Physics, Volume 1, A. K. Jha, I. K. International Pvt Ltd,2009

2. Applied Physics for Engineers, Mehta Neeraj, PHI Learning Pvt. Ltd.,2011

3. Applied physics, Paul E. Tippens, Gregg Division, McGraw-Hill Book Co.,1985

FYT103R1 : Applied Chemistry

(Ver 1.1, Program Core, School of Sciences)

Lect.	Tut.	Practical	Credits	Evaluation Scheme				
				Component	Exam	WT	Min Pass (%)	Pass (%)
3	-	-	3	Theory	FET	20	40	40
					CAT I	15		
					CAT II	15		
					ESE	50	40	

Course Outcomes: At the end of this course students will able to

CO1 **Explain**[2] water quality parameters for applications in water purification.

CO2 **Explain**[1] the mechanism of corrosion to prevent corrosion.

CO3 **Describe**[2] the significance of advanced material, process of metallurgy and alloy

CO4 **Evaluate**[3] the quality of fuels based on quality parameters.

CO5 **Demonstrate**[3] the conceptual understanding of green chemistry components.

Syllabus (Theory)

Units	Description	Hours
I	**Water:** Introduction, impurities in natural water, water quality parameters total solids, acidity, alkalinity, chlorides, and dissolved oxygen (definition, causes, significance), hardness of water (Causes, types, units of hardness), ill effects of hard water in steam generation in boilers (Scale, Sludge & caustic embrittlement), numerical on hardness, treatment of hard water (ion exchange and reverse osmosis).	07
II	**Corrosion and its Prevention:** Introduction, basic concepts (electrochemistry), causes, classification, atmospheric corrosion (oxidation corrosion), Electrochemical corrosion (hydrogen evolution and oxygen absorption mechanism), factors affecting rate of corrosion. Prevention of corrosion by proper design and material selection, hot dipping (galvanizing and tinning), Cathodic protection, metal spraying and electroplating. Coating types and functions.	07
III	**Engineering Materials**: *Polymers*: Introduction, thermo softening and thermosetting plastics, industrially Important plastics like phenol formaldehyde, urea formaldehyde and epoxy resins, conducting Polymers	07

	(doping, conjugation, conductivity), examples and applications, biodegradable plastics. *Cement*: Classification, Composition and manufacturing of Portland cement. Refractories: Classification and properties.	
IV	**Metallurgy and Alloys:** Introduction, concepts of metals and nonmetals in periodic table, basic terms in metallurgy (mineral, ore, metallurgy). Process of extraction of metal: Concentration of ore, Ore to metaloxide, Metaloxide to metal, purification of metal. *Alloys***:** Definition, purposes of making alloys with examples. Classification of Alloys- Ferrous and nonferrous alloys (copper, aluminium, nickel and tin) with examples.	07
V	**Fuels:** Introduction, classification, calorific value, definition, units (calorie, kcal, joules, kilojoules), characteristics of good fuels, comparison between solid, liquid and gaseous fuels, types of calorific Value (higher and lower), Bomb calorimeter and Boy's calorimeter. Numerical on Bomb and Boy's calorimeter. *Introduction to advanced fuels*: Bioethanol, Hydrogen & Fuel cells, Batteries, Dry reforming.	07
VI	**Chemical analysis & Green Chemistry:** Qualitative and Quantitative analysis, titrimetry , gravimetry, instrumental methods of analysis : an overview, pH metry, Absorption spectrometry (UV-vis), AAS. *Green Chemistry*: Introduction, Need and Historical Background of Green Chemistry, Concept of Systems Thinking, Circular economy and Sustainability, Twelve principles of Green Chemistry.	07

References

1. Engineering Chemistry by Jain and Jain, Dhanpat Rai Publishing Company Ltd., New Delhi.
2. Engineering Chemistry, Pendse M H, Joshi S S, Bhavsar C M, Kulkarni S D, Nirali Prakashan
3. A Textbook of Engineering Chemistry by S. S. Dara and S. S. Umare, S. Chand & Company Ltd., New Delhi.
4. Green Chemistry: Environmentally benign Reaction by V. K. Ahluwalia; Ane Books Pvt Ltd.
5. E-resource for Green chemistry: www.beyondbenign.com

FYT107R1 : Elements of Electrical Engineering

(Ver 1.1, Program Core, School of Technology)

Lect.	Tut.	Practical	Credits	Evaluation Scheme				
				Component	Exam	WT	Min Pass (%)	Pass (%)
2	-	-	2	Theory	FET	20	40	40
					CAT I	15		
					CAT II	15		
					ESE	50	40	

Course Outcomes: At the end of this course students will able to

CO1 **State**[1] basic circuit laws and magnetic circuits.

CO2 **Describe**[1] the fundamentals of single and three phase AC circuits.

CO3 **Discuss**[2] electrical system and various protective devices**.**

CO4 **Explain**[2] construction and working of single-phase transformer.

Syllabus (Theory)

Units	Description	Hrs.
I	**D.C. Circuits and Magnetic Circuits:** **DC Circuits:** Ohm's Law, Simple DC circuit analysis-Series & Parallel reduction, Kirchhoff's law- KVL & KCL. (Numerical based on KVL and KCL laws.) **Magnetic Circuits:** Electromagnetism-Fundamental definition, B-H Curve, Magnetic leakage and fringing, Comparison between electrical and magnetic circuit.	07
II	**Single Phase AC Circuits**: Laws of electromagnetic induction, Concept of self and mutual induction, Generation of single phase sinusoidal voltage, R.M.S. & Average value, Form factor & Peak factor, Concept of impedance & admittance, Analysis of single phase AC circuits- R,L,C,R-L,R-C,R-L-C circuit (Numerical based on analysis of single phase AC circuits)	07
III	**Three Phase AC Circuits and Electrical Safety:** **Three Phase AC Circuits:** Need of 3 phase AC circuits, Phasor representation of three phase quantities, Balanced & unbalanced conditions, Definition-Line value, Phase value and Phase sequence, Star and Delta Connection.	07

	Electrical Safety: Basic protective devices-Fuse, Earthing for electrica installation, Electric hazards & preventive measures, Single line diagran (SLD) of electrical system.	
IV	**Single Phase Transformer:** Construction, Operating principle, Classification, Types, EMF equation, Transformer Ratios, Power losses, Efficiency and Voltage regulation, All day efficiency, OC and SC test on transformer, Applications. (Numerical based on EMF equation, Efficiency & Voltage regulation)	07

References

Text Books

1. Nagrath I.J. and D. P. Kothari, "Basic Electrical Engineering", TMH Publication, 3rd Edition, 2010.

2. Ashfaq Husain, "Fundamentals of Electrical Engineering" Dhanpat Rai & Company, 4th Edition, 2011.

Reference Books

1.B.L & A.K. Theraja, "Electrical Technology", Vol-II, S. Chand McGraw Hill Publication, 4th Edition, 2011.

2. Edward Hughes, "Electrical Technology", Longman Sc & Tech; 7th Edition, 2007

FYT108R1 : Engineering Mechanics

(Ver 1.1, Program Core, School of Technology)

Lect.	Tut.	Practical	Credits	Evaluation Scheme				
				Component	Exam	WT	Min Pass (%)	Pass (%)
3	-	-	3	Theory	FET	20	40	40
					CAT-I	15		
					CAT-II	15		
					ESE	50	40	

Course Outcomes: After the end of this course students will able to

CO1 **Determine**[2] the Resultant of Concurrent and Non-Concurrent Force System.

CO2 **Analysis**[3] of Structures for a given force system to determine Moment of Inertia.

CO3 **Understand**[1] the concept of Kinetics and Kinematics of a particle.

CO4 **Understand**[1] Principle of Work and Energy and Principle of Impulse and Momentum.

Syllabus (Theory)

Unit No.	Description	Hrs.
I	**Fundamental Concepts and Principles of Mechanics**: Newton's Laws of Motion, Forces on Particle, Systems of 2D forces, Resolution, Composition and Resultant of Concurrent Forces, Law of Parallelogram of Forces, Equilibrium of a Particle. Lami's Theorem, Free-Body Diagrams,	07
II	**Moment of a Force:** Moment, Couple, Equilibrium of 2D Rigid Bodies, Resultant of Non-Concurrent Force System. Types of Beams, Types of Loading and Support reactions, Analysis of determinate Beams, The Principle of Virtual Work to determinate beams.	07
III	**Analysis of Structures**: Analysis of Trusses by the Method of Joint and Method of Section, Friction: Laws of Dry Friction, Coefficients of Friction, Angles of Friction, Problems Involving Dry Friction, Wedges.	07
IV	**Centroids and Moment of Inertia**: Centre of Gravity of a 2D Body, Centroids of Areas and Lines, Composite Plates, Moment of Inertia, of an Areas, Polar Moment of Inertia, Radius of Gyration of an Area, Parallel-Axis Theorem, Perpendicular Axis Theorem, Moments of Inertia of Composite Areas.	07

V	**Kinematics of Particles**: Rectilinear Motion of Particles. Dependent Motion of Particles. Curvilinear Motion of Particles: Relative Motion, Projectile Motion. **Kinetics of Particles**: Linear Momentum of a Particle. Dynamic Equilibrium, Equations of Motion in Terms of Radial and Transverse Components, Kepler's Laws of Planetary Motion. Work of a Force, Kinetic Energy of a Particle.	07
VI	**Principle of Work and Energy**, Applications of the Principle of Work and Energy, Power and Efficiency, Potential Energy, Conservative Forces, Conservation of Energy, Motion under a Conservative Central Force. **Principle of Impulse and Momentum**, Impulsive Motion, Impact, Direct Central Impact, Oblique Central Impact.	07

References

Text Book

1. Engineering Mechanics by Beer &Johnston, Tata McGraw Hill

Reference Book

1. J.L.Meriam and L.G. Kraige, Engineering Mechanics, 7thEd, John Wiley & Sons, 2012.
2. Timoshenko and Young, Engineering Mechanics, 3rdEd, McGraw Hill Publishers, 2006.
3. Gere and Timoshenko, Mechanics of Materials, 2ndEd, CBS Publishers, 2011.

FYT110R1 : Engineering Mechanics Laboratory

(Ver 1.1, Program Core, School of Technology)

Lect.	Tut.	Practical	Credits	Evaluation Scheme			
				Component	Exam	WT	Pass (%)
-	-	2	1	Practical	FET	100	40

Course Outcomes: After the end of this course students will able to

CO1 **Understand**[1] different Laws and Principle of Mechanics.

CO2 **Calculate**[2] Support Reaction of Beams, Coefficient of Friction and Coefficient of Restitution.

No	Description
1	Verification Law of Polygon of Forces.
2	Verification Law of Moment of Forces.
3	Verification Law of Triangle of Forces.
4	Determination reactions of Simply Supported Beam.
5	Determination of Coefficient of Friction.
6	Determination of Coefficient of Restitution.
7	Determination of Curvilinear Motion

References

Text Book

1. Engineering Mechanics by Beer &Johnston, Tata McGraw Hill

Reference Book

2. J.L.Meriam and L.G. Kraige, Engineering Mechanics, 7th Ed, John Wiley & Sons, 2012.
3. Timoshenko and Young, Engineering Mechanics, 3rd Ed, McGraw Hill Publishers, 2006.
4. Gere and Timoshenko, Mechanics of Materials, 2nd Ed, CBS Publishers, 2011

FYT111R1 : Engineering Graphics Laboratory

(Ver 1.2, Program Core, School of Technology)

Lect.	Tut.	Practical	Credits	Evaluation Scheme			
				Component	Exam	WT	Pass (%)
-	-	2	1	Practical	FEP	100	40

Course Outcomes: After the end of this course students will able to

CO1 **Explain[2]** the basic concepts involved in technical drawing skills and computer graphics.

CO2 **Develop[3]** the ability of conveying the Engineering Information through drawings.

CO3 **Use[3]** 3D modeling software to draw solid object.

Syllabus (Practical)

Units	Description	Hours
I	**Fundamentals of Engineering Graphics:** Different types of lines and material conventions used in drawing practice, Dimensioning system as per BIS (Theoretical treatment only) **Projections of Lines, Planes & Solids:** Introduction to First angle and third angle methods of projection, Projection of points, Projections of lines on regular, horizontal and frontal planes. Projection of oblique lines. Projections of plane figures inclined to HP or VP. (Circle and regular polygon). Projections of Prisms, Pyramids, Cylinder and Cones inclined to HP or VP. **Orthographic Projections:** Orthographic views: lines used, Selection of views, spacing of views, dimensioning. Drawing required views from given pictorial objects.	06
II	**Isometric Projections:** Isometric drawings, Circles in isometric view. Isometric views of simple objects **Development of Lateral surfaces:** Prisms, Pyramids, Cylinders and Cones (simple position) **Basic Commands by using 3D CAD Software I:** Units, Limits, Point, Line, Circle, Arc, Ellipse, Polygon, Polyline, Spline,	06

Edit/Modify Commands, Erase, Trim, Extend, Scale, Break, Fillet, Chamfer, Offset, Copy, Move, Mirror, Array, Hatch etc.

III **Basic Commands by using 3D CAD Software I:** 06
Units, Limits, Point, Line, Circle, Arc, Ellipse, Polygon, Polyline, Spline, Edit/Modify Commands, Erase, Trim, Extend, Scale, Break, Fillet, Chamfer, Offset, Copy, Move, Mirror, Array, Hatch etc.

IV **Basic Commands by using 3D CAD Software II:** 06
Zoom, Pan, Rotate etc. Other Commands: Line type, Text, Text style, Dimensioning, Dimension style, Leader, Layers etc. Development of 3D objects.

Practical

No	Description	Nature of Description	Marks Out of 30
1	Drawing Sheet.	1.Projection of Lines & Planes 2.Projection of solids 3.Orthographics 4.Isometrics 5. Development of lateral surfaces.	25
2	Problems on 3D CAD software.	Students will submit 2 hardcopies of 3D models	25

References

1. Engineering Drawing by N. D. Bhatt, Charotor Publication House, Bombay
2. Fundamentals of Engineering by W. J. Luzadder, Drawing, Prentice Hall of India.
3. Engineering Design and Visualization by Jon M.Duff, William A. Ross, CENGAGE Learning
4. Machine Drawing by N. D. Bhatt, Charotor Publication House, Bombay.
5. Graphic Science by French and Vierck, Mc-Graw Hill International.
6. Engineering Drawing and Graphics by K. Venugopal, New Age Publication
7. A text book of Engineering Drawing by R. K. Dhawan, S. Chand and Co.
8. “Auto cad 2014 for Engineers and Designers”, Sham Tickoo, Dream tech press
9. “Auto Cad 2014”, Ellen Finkelsten, Wiley India

FYT112R21 : Professional Communication – I - English Language

(Ver 1.2, Program Core, School of Arts)

Lect.	Tut.	Practical	Credits	Evaluation Scheme			
				Component	Exam	WT	Pass (%)
-	-	2	1	Practical	FEP	100	40

Course Description: English is an international language. Whether you are looking for a new job or planning to travel the world, studying English can help you progress in life both personally and professionally. You can compete in the global job market, increase your career skills and start to meet people around the world.

German is the most widely spoken native **language i**n Europe. For centuries the language served as a lingua franca (a common **l**anguage which unifies different peoples) in large parts of the European continent. It continues to serve this purpose as an important second language in central and eastern Europe.

So, students who are taking admission for FY B.Tech. will have to select **any one** of these two languages.

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

CO1 **Form**[2] different words using Affixes.

CO2 **Use**[3] vocabulary to form sentences.

CO3 **Construct**[5] grammatically correct and meaningful sentences.

CO4 **Correct**[3] common errors in given sentences

CO5 **Use**[3] techniques and strategies of effective Listening and speaking

Syllabus (Theory): English Language

Units	Description	Hrs.
I	**Vocabulary Building**: The concept of Word Formation, prefixes and suffixes, Synonyms, antonyms, Homophones, Homonyms, Eponyms, One-word substitute, Phrasal Words, Idioms, Spellings-British, American and standard abbreviations.	06

II	**Basic Grammar-I:** Parts of speech, Sentence Pattern, Types of Sentences, Tenses, Common **Errors:** Subject-verb agreement, Noun-pronoun agreement, Misplaced modifiers, Articles, Prepositions.	06
III	**Listening & Speaking Skills:** **Listening Skills**: Hearing and Listening, listening as an active skill; Types of Listeners; Listening for general content; Listening to fill up information; Intensive Listening; Listening for specific information; Developing effective listening skills; Barriers to effective listening skills. **Speaking Skills:** Effective Speaking, forms and styles of speaking: 1. Public Speaking 2. Group Discussion 3. Mock Meetings	04

Practical

Sr. No	Name of the Session	Description	Hrs.
1	Morphological Analysis of Words	Affixes-Inflectional and derivational	02
2	Vocabulary Building	Synonyms, antonyms, Homophones, Homonyms, Eponyms, One-word substitute, Phrasal Words, Idioms (Vocabulary Games, Quizzes and activities (Writing 25 examples)	02
3	Basic Grammar	Exercise on Parts of Speech, Sentence structure, and types of sentences (Games, online /offline quizzes and other activities).	04
4	Basic Grammar	Identifying and correcting common errors in English: subject-verb agreement, Noun-pronoun agreement, Misplaced modifiers, Articles, Prepositions.	04
5	Listening Comprehension	Listening Comprehension activities: Comprehension of Audio/Video tapes (Quizzes, Summary)	02
6	Speaking Skills	Public Speaking-extempore, prepared Group Discussion Mock Meetings	10

References

1.Raymond Murphy, Essential English Grammar: A Self-Study Reference and Practice Book for Elementary Students of English with Answers, Cambridge University Press

2. Green, David. Contemporary English Grammar –Structures and Composition. MacMillan India. 2014 (Print)

3.Ajmani, J. C. Good English: Getting it Right. New Delhi: Rupa Pubications, 2012.

4.Fitikides, T. J. Common Mistakes in English. London: Orient Longman, 1984.

5.Meenakshi Raman &Sangeeta Sharma, Communication Skills Oxford University Press.

6.Business Correspondence & Report-writing by R.C. Sharma& Krishna Mohan, Tata McGraw Hill Education.

7. Effective Technical Communication by Ashraf Rizvi, Tata McGraw-Hill.

8.Technical Writing & Professional Communication for non-native speakers of English by Thomas N. Huckin& Leslie A. Olsen, McGraw –Hill.

9.Mastering Communication by Nicky Stanton, Palgrave Master Series

10. Meenakshi Raman & Sangita Sharma, Technical Communication; Principles and Practice, Oxford University Press.

11. M Ashraf Rizvi, Effective Technical Communication, Tata McGraw-Hill Education

Websites

http://esl.about.com/od/englishtestsandquizzes/

https://learnenglish.britishcouncil.org/en/content

https://www.englishclub.com/grammar/quizzes.htm

https://englishdost.com/blog/language-learning-perfect-solution/

https://englishdost.com/blog/category/english-for-beginners/

http://www.selfgrowth.com/comm.html

FYT112R22 : Professional Communication – I - Introduction to Foreign Language: German

(Ver 1.0, Program Core, School of Arts)

Lect.	Tut.	Practical	Credits	Evaluation Scheme			
				Component	Exam	WT	Pass (%)
-	-	2	1	Practical	FEP	100	40

Prerequisite: Nil

CO2 **Identify[2]** different alphabets.

CO3 **Use[3]** words in sentences.

CO4 **Write[5] grammatically** correct sentences.

Syllabus (Theory) : German Language

Units	Description	Hrs.
1	**Greetings:** **Theory** - Introduce yourself and others, Numbers 1to 10, Describe phone number and email addresses, Talk about countries and languages. **Grammar** - Alphabets, German Nouns, Personal pronoun I, Verbkonjugation {Regular verbs}, Frage worter.	10 + 05
2	**Theory** - Talk about hobbies, Arrange meet, Days of the week, Months of the year, Talk about work, occupation and working hours, Numbers 20 onwards, Seasons **Grammar** - Yes no type questions, Artikels, Negations, Irregular verbs, Verbs haben and sein	10 + 05

References

1. Netzwerk Deutsch als Fremdsprache, Stefanie Dengler,Paul Rusch,Heelen Schmitz,Tanja Sieber, Goyal Publishers & distribution Pvt.Ltd.
2. Deutsch fur alle1, Marine Derval Quinn,Derval Mcgrath, Folens
3. Wortschatz Grammatik A1, Marion Techmer,Anneli Billina,Lilli Marlen Brill, Hueber

FYT113 : Applied Physics Laboratory

(Ver 1.1, Program Core, School of Sciences)

Lect.	Tut.	Practical	Credits	Evaluation Scheme			
				Component	Exam	WT	Pass (%)
-	-	2	1	Practical	FEP	50	40
					POE	50	40

Course Outcomes: At the end of this course students will able to

CO1 **Develop**[1] practical skills with proper handling and choosing of instruments.

CO2 **Apply**[3] basic theoretical concepts and properties of light, grating, crystals structures to calculate different physical quantities.

No	Laboratory Description
1	Introduction to Laser
	Applications of Laser light
	Study of Properties of Light
	Determination of Crystal Structure
	Synthesis of nanomaterial using chemical synthesis technique
	Study of Magnetic Properties
	Determination of band gap of semiconductor
	Photoelectric Effect
2	Assignments per Unit
3	Quiz

FYT114 : Applied Chemistry Laboratory

(Ver 1.1, Program Core, School of Sciences)

Lect.	Tut.	Practical	Credits	Evaluation Scheme			
				Component	Exam	WT	Pass (%)
-	-	2	1	Practical	FEP	50	40
					POE	50	40

Course Outcomes: At the end of this course students will able to

CO1 **Demonstrate**[3] ability of working safely in chemistry laboratory.

CO2 **Apply**[3] knowledge of basic concepts in chemistry to measure values.

No	Laboratory Description
1	Good laboratory Practices: Safety First.
2	Determination of acidity of water.
3	Determination of alkalinity of water.
4	Determination of chloride content of water by Mohr's method.
5	Determination of total hardness of water by EDTA method.
6	Preparation of urea-formaldehyde resin.
7	Preparation of phenol-formaldehyde resin.
8	Determination of percentage of copper in brass.
9	Determination of rate of corrosion of aluminum in acidic and basic medium.
10	Demonstration of pH meter.
11	Open ended experiment (relation between color, wavelength, absorbance & concentration).

References

1. Engineering Chemistry by Jain and Jain, Dhanpat Rai Publishing Company Ltd., New Delhi.
2. A Textbook of Engineering Chemistry by C. P. Murthy, C. V. Agarwal and A. Naidu, BS Publications, Hyderabad.
3. Engineering Chemistry by Dr. A. K. Pahari and Dr. B. S. Chauhan, Laxmi Publications (P) Ltd, New Delhi.
4. Industrial Chemistry (Including Chemical Engineering) by B. K. Sharma, GOEL Publishing House.
5. Instrumental Methods of Chemical analysis by W. Dean, Merittee, Tata MacGrow Hills Ltd.

FYT118 : Elements of Electrical Engineering Laboratory

(Ver 1.1, Program Core, School of Technology)

Lect.	Tut.	Practical	Credits	Evaluation Scheme			
				Component	Exam	WT	Pass (%)
-	-	2	1	Practical	FEP	100	40

Course Outcomes: At the end of this course students will able to

CO1 **Study**[1] of basic symbols of electrical engineering laboratory.

CO2 **Verify**[2] ohm's law & Kirchhoff's law.

CO3 **Study**[1] of different luminaries & basic earthing method.

CO4 **Analyze**[4] series R-L-C circuit and performances of single-phase transformer.

No.	Laboratory Description
1	Study of basic symbols of electrical engineering laboratory.
2	Verification of ohm's Law.
3	Verification of Kirchhoff's Voltage Law and Kirchhoff's Current Law.
4	Study of series R-L-C circuit.
5	Study of different luminaries including Incandescent lamp, Mercury vapor lamps, fluorescent tube, CFL, LED lamps.
6	Study of basic earthing system- Plate and Pipe earthing.
7	Find efficiency and regulation of single phase transformer by direct load test.
8	Measurement of power by using two wattmeter methods.
9	Introduction to wiring methods and fuse.
10	Study of protective devices-Fuse & MCB.

FYT129 : Engineering Practice I

(Ver. 1.0, Program Core, School of Technology)

Lect.	Tut.	Practical	Credits	Evaluation Scheme			
				Component	Exam	WT	Pass (%)
-	-	2	1	Practical	FEP	100	40

Course Description:

Workshop practice imparts basic knowledge of various tools and their uses in different sections of manufacturing such as fitting, Tin smithy, House wiring, Carpentry etc. It is true that engineers are not going to become carpenters or blacksmiths or skilled workers on the shop floor, but by exposing themselves to all working trades, they get a bird eye view of the basic practical activities associated with all sections of manufacturing. It helps them, when they occupy managerial positions, in understanding the activities and practical difficulties, so they can make appropriate decisions.

Prerequisite: Nil.

Course Outcomes: At the end of this course students will able to

CO1 **Acquire**[2] skills in basic engineering practice

CO2 **Use**[2] of hand tools and power tools

CO3 **Develop**[3] sheet metal and carpentry model for specific applications

CO4 **Perform**[2] different joining operations

CO5 **Practice**[2] fitting operation and able to produce assembly of two work pieces

CO6 **Perform**[2] pipe fitting operations

Laboratory Description		
Experiment No.	**Description**	**Hrs.**
1.	Demonstration of different carpentry operations useful for making wood pattern, furniture items etc. with the help of hand tools and power tools	02
2.	To make small jobs like dovetail joint, butt joint or T-joint using carpentry tools	02
3.	Demonstration of different sheet metal operations useful for sheet metal objects like CPU cabinet, Enclosures of inverters, Tray etc. by performing operations like cutting, bending and folding.	02

4.	To make small jobs like electric meter cover, transformer clamping.	02
5.	Demonstration of different joining process for metal rods, plates and sheet metal.	02
6.	To make lap joint, but joint or T-joint using metal joining techniques.	02
7.	Demonstration of different operations performed in fitting like Marking, cutting, drilling, tapping, filing and make one simple job on above operations	02
8.	Demonstration of different operation performed in smithy to make model like Hook, peg, square headed bolt.	02
9.	Demonstration of different piping connections, plumbing techniques, in G.I, PVC, UPVC, CPVC fittings	02
10.	Demonstration of household wiring connections, wiring for experiments and assembly and disassembly of various electrical appliances.	02
11.	Demonstration of soldering and testing of electronic components	02
12.	Demonstration of use of electronic circuit	02

References

1. A Course in Workshop Technology, Vol – I by B. S. Raghuvanshi, Dhanapat Rai and Sons.
2. Elements of Workshop Technology, Vol –I by Hajara Chaudhari, Media Promoters.
3. Workshop Technology, Vol – I by Gupta and Kaushik, New Heights.
4. Workshop Technology, Vol – I by Chapman, The English Language Book Society.
5. Workshop Technology, Vol.-I by H.S. Bawa, TMH Publications, New Delhi.

FYT130 : Design Thinking - I

(Ver 1.0, Program Core, School of Technology)

Lect.	Tut.	Practical	Credits	Evaluation Scheme			
				Component	Exam	WT	Pass (%)
-	-	2	1	Practical	FEP	100	40

Course Outcomes: After the end of this course students will able to

CO1 **Explain**[2] the role of an Engineer as a problem solver.

CO2 **Design**[3] solutions to simple problems utilizing multi-disciplinary systems approach.

CO3 **Examine**[4] a given problem using process of problem analysis.

Practical

Week #	Experiment Title	Hrs.
Week 1	Overview of the Design Thinking Process	02
Week 2	How Engineering Design is different from Conventional Design	02
Week 3	Steps in Design Process	02
Week 4	Customer need identification, gathering customer needs	02
Week 5	Identification of need for new products	02
Week 6	Organizing and prioritizing needs, Product mission statement, Voice of the customer	02
Week 7	Creativity & Innovation for generation of new ideas	02
Week 8	Product Specifications: Design Metrics, Bench marking	02
Week 9	Concept generation process and methods	02
Week 10	Concept selection mechanism and techniques	02
Week 11	Concept screening &Testing – Purpose, process and methods	02
Week 12	Product Architecture – types; conceptual architecture for selected product	02

References

1. C. Starkey, "Basic Engineering Design", Butterworth-Heinemann Publisher 1988
2. Yousef Haik, SangarappillaiSivaloganathan, Tamer M. Shahin, "Engineering Design Process", Cengage learning, 2011

3. Hugh Jack, "Engineering Design, Planning, and Management", Academic press 2013.
4. Rattan, S.S. "Theory of Machines", 3rdEdition, Tata McGraw-Hill, 2009
5. Khurmi, R.S. "Theory of Machines", 14thEdition, S Chand Publications, 2005.
6. Kenneth Ayala, "The 8051 Microcontroller, Architecture, Programming, and Applications", West publishing Company
7. Boylsted, "Electronic Devices and Circuits", Person publication, 2013
8. R. P. Jain, "Modern Digital Electronics" 2/e, TMH publication.
9. Jeremy Blum, "Exploring Arduino: Tools and Techniques for Engineering Edition, Wiley publication, 2015.
10. Simon Monk, "Programming Arduino Next Steps: Going Further with Sketches", McGraw-Hill / Tab Electronics.
11. Massimo Banzi, "Make: Getting Started with Arduino, 3rd Edition", ShroffPublications, 2014
12. Stuart Yarnold, "Arduino in Easy Steps", In Easy Steps Publications, 2015
13. Blum, "Arduino Programming in 24 Hours, Sams Teach Yourself', I st Edition, Pearson Publications, 2015.

FYT121 : Constitution of India

(Ver 1.0, Program Core, School of Sciences)

Lect.	Tut.	Practical	Credits	Evaluation Scheme			
				Component	Exam	WT	Pass (%)
-	-	-	NC	Theory	ESE	100	40

Course Outcomes: After the end of this course students will able to

CO1 **Understand**[2] state and central policies, fundamental duties, Union and State Executives.

CO2 **Explain**[3] special provisions, emergency provisions, Human rights, Panchayat Raj.

CO3 **Apply**[3] Ethics and Responsibility of an Engineer in practice.

CO4 **Understand**[2] code of ethics for an Engineer.

Syllabus (Theory)

Units	Description
I	Historical Background and The Making of the Indian Constitution Salient Features of the Indian Constitution, Fundamental Rights, Fundamental Duties, Directive Principles of State Policy & Relevance of Directive Principles State Policy. Fundamental Duties. Union Executives: President, Prime Minister Parliament Supreme Court of India. State Executives: Governor Chief Minister, State Legislature High Court of State. Electoral Process in India, Amendment Procedures, 42nd, 44th, 74th, 76th, 86th & 91st Amendments. The Indian Judiciary System.
II	Special Provision for SC & ST Special Provision for Women, Children & Backward Classes. Emergency Provisions. Human Rights –Meaning and Definitions, Legislation Specific Themes in Human Rights- Working of National Human Rights Commission in India. Powers and functions of Municipalities, Panchyats and Co - Operative Societies.
III	Scope & Aims of Engineering Ethics, Responsibility of Engineers Impediments to Responsibility. Risks, Safety and liability of Engineers, Honesty, Integrity & Reliability in Engineering.
IV	Case Studies, Code of Ethics for Engineers

References

1. G B Reddy and Mohd Suhaib, Constitution of India and Professional Ethics, I. K. International Publishing House Pvt. Limited, 2010

2. M. V. Pylee, "An Introduction to Constitution of India", Vikas Publishing, 2002.

3. M. Govindarajan, S. Natarajan, V. S. Senthilkumar, "Engineering Ethics", Prentice – Hall of India Pvt. Ltd. New Delhi,2004

FYT122R2 : Engineering Mathematics - II

(Ver 1.2, Program Core, School of Sciences)

Lect.	Tut.	Practical	Credits	Evaluation Scheme				
				Component	Exam	WT	Min Pass (%)	Pass (%)
3	1	-	4	Theory	FET	20	40	40
					CAT-I	15		
					CAT-II	15		
					ESE	50	40	

Course Outcomes: At the end of this course students will able to

CO1 **Find**[3] roots, and relation between circular and hyperbolic function.

CO2 **Find**[3] real and imaginary parts of complex number.

CO3 **Solve**[3] differential equation of first order and first degree.

CO4 **Evaluate**[4] improper integral by Gamma and Beta function.

CO5 **Evaluate**[4] double integral.

CO6 **Apply**[3] the knowledge of multiple integral to find area, volume etc.

Syllabus (Theory)

Units	Description	Hours
I	**Complex Number** Introduction, Modules and arguments, Types of complex number, DeMoiver's theorem (Without proof), Roots of complex number, Expansion of sin (nθ), cos (nθ) in powers of sin θ and/or cos θ, Expansion of sin $^n\theta$ and cos $^n\theta$ in terms of sines and cosines of multiple of θ	7
II	**Hyperbolic function** Hyperbolic functions, Relation between circular and hyperbolic functions, Formulae of hyperbolic functions (Without proof), inverse hyperbolic function, Separation of real and imaginary parts of complex number, Logarithmic function of a complex variable	7
III	**Differential equation of first order and first degree** Definition, order and degree of differential equation, solution of differential equation of first order and first degree by linear equations, equation reducible to linear, exact differential equations, equation reducible to exact, application to orthogonal trajectories.	7

IV	**Special function** Gamma function, properties of gamma function, beta function, properties of beta function, relation between beta and gamma function	7
V	**Multiple Integral** Double integral, Evaluation of double integration in Cartesian and polar form, change of order of integration, change to polar, Double integration over the region.	7
VI	**Application of Multiple Integral** Area enclosed by plane curves, Volume of solid by rotation of an area (by Double integral), Mass of plane lamina, Moment of inertia.	7

Tutorial

One hour per week per batch tutorial is to be utilized for problem solving to ensure that students have properly learnt the topics covered in the lectures. This shall include group discussions on problems other than class and any academic activity to strengthen fundamental concepts of the subject.

Tutorial No.	Details
1	Simplify complex number by Demovere's theorem
2	Find roots of complex number and ecpand sin nθ and cosnθ
3	Relation between circular and hyperbolic function.
4	Separation of real and imaginary parts of complex number.
5	Exact and non-exact differential equations
6	Linear and nonlinear differential equations
7	Gamma function and its properties
8	Beta function and its properties
9	Evaluation of double integral
10	Change of order and double integration over the region
11	Application of double integral

Text Book

1. Grewal. B. S "Higher Engineering Mathematics", 41st Edition, Khanna Publications, Delhi, (2011).

References

1. Bali N. P and Manish Goyal, A Text book of Engineering Mathematics, Eighth Edition,Laxmi Publications Pvt Ltd., (2011)
2. Dass, H.K., and Er. RajnishVerma, Higher Engineering Mathematics, S. Chand Private Ltd., (2011).
3. Glyn James, Advanced Modern Engineering Mathematics, 3rd Edition, Pearson Education, (2012).
4. Peter V and O'Neil, Advanced Engineering Mathematics, 7th Edition, Cengage learning, (2012).
5. Ramana, B.V, Higher Engineering Mathematics, Tata McGraw Hill Publishing Company, New Delhi, (2008).

FYT123R1 : Biology for Engineers

(Ver 1.1, Program Core, School of Sciences)

Lect.	Tut.	Practical	Credits	Evaluation Scheme				
				Component	Exam	WT	Min Pass (%)	Pass (%)
2	-	-	2	Theory	FET	20	40	40
					CAT	30		
					ESE	50	40	

Course Outcomes: At the end of this course students will able to

CO1 **Discuss2** fundamentals of biology**.**

CO2 **Demonstrate3** biological mechanisms and metabolism.

CO3 **Discuss2 about** genetics, human immune system and disorders

CO4 **Apply3** knowledge of engineering to try and solve problems related to biology..

Syllabus (Theory)

Units	Description	Hrs.
I	**Introduction to Biology:** Cells and living organisms, Structure, function and classification of cells, Cell theory, Nucleus as an information centre, introduction to biomolecules (nucleic acids, proteins, carbohydrates and lipids), Cell metabolism- cell growth, reproduction and differentiation.	07
II	**Biochemistry of Life:** Biological diversity, biological catalysts, plant system basics, Human biology, Growth and nutrition, Stem cell technology, Microbial systems (types, economic importance of microbes)	07
III	**Genetics and Immunobiology**: Theories of evolution, Components of Immune system, Cell signalling, Immune response, Human diseases (diabetes, bacterial and viral infections, cancers, genetic discorders), Vaccines and recombinant DNA technology.	07
IV	**Applications of Biology**: Transgenic technologies in plants and animals, bioreactors, bioremediation (bio control elements- bio fertilizers and bio pesticides) biosensors, sustainable energy and green technology, biological neural networks.	07
	Mini Project	

References

1. Principles of Biochemistry, 5th edition by U. Satyanarayana, Elsevier
2. Biology for Engineers by G. Sureishkumar, Oxford University Press.
3. Principles of Industrial Biotechnology by P. Stanbury, A. Whitaker and Hall, 2nd edition, Elsevier
4. Life- The science of Biology by Sadava and Hillis, 10th edition, Freeman and Co.
5. Immunology (Kuby), by Osborne and Goldsby, 6th edition, Freeman and Co.
6. Principles of Genetics by P. Snustad and E. Gardner 6th edition, Wiley.

FYT124R21 : Professional Communication – II - English Language

(Ver 1.2, Program Core, School of Arts)

Lect.	Tut.	Practical	Credits	Evaluation Scheme				
				Component	Exam	WT	Min Pass (%)	Pass (%)
-	-	2	1	Practical	FEP	100	40	40

Course Description: English is an international language. Whether you are looking for a new job or planning to travel the world, studying English can help you progress in life both personally and professionally. You can compete in the global job market, increase your career skills and start to meet people around the world.

German is the most widely spoken native **language i**n Europe. For centuries the language served as a lingua franca (a common **l**anguage which unifies different peoples) in large parts of the European continent. It continues to serve this purpose as an important second language in central and eastern Europe.

So, students who are taking admission for FY B.Tech. will have to select **any one** of these two languages.

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

CO1 **Change**[2] the given sentences as per the instructions.

CO2 **Correct**[3] common errors in given sentences.

CO3 **Define**[1] communication theory.

CO4 **Use**[3] verbal and non-verbal communication.

CO5 **Explain**[2] barriers to communication.

CO6 **Exhibit**[3] various techniques and strategies of effective Reading and Writing.

Syllabus (Theory)

Units	Description	Hrs.
I	**Basic Grammar-II**: Change the Voice, Direct Indirect Speech/Reported Speech, Degree, Subject -Verb Agreement, Modal Auxiliaries, **Common Errors:** Redundancies, Clichés.	06

II	**Communication Skills:** Need for Effective Communication, The Process of Communication, Levels of communication, Flow of communication, Communication networks, English for Technocrats **Verbal & Non-verbal Communication:** Forms of Verbal & non-verbal communication, Interpreting body-language cues; Kinesics; Proxemics; Chronemics. Use of technology in communication. **Barriers to Communication**: Types of barriers; Miscommunication; Noise; Overcoming measures.	04
III	**Reading & Writing Skills:** **Reading Skills**: Previewing techniques; Skimming; Scanning; Understanding the gist of an argument; Identifying the topic sentence; Inferring lexical and contextual meaning; recognizing coherence and sequencing of sentences; Improving comprehension skills. Techniques of Rapid Reading. **Writing Skills**: Effective technical writing, Different types of writing styles: Technical Paragraph Writing 1. Report 2. Letter Writing- Enquiry, Reply, Order, Complaint and Adjustment Letter 3. Notice, Minutes, Agenda 4. E mail	04

Practical

Sr. No	Name of the Session	Description	Hrs.
1	**Grammar Exercises**	Transformation of given sentences (Change the Voice, Reported Speech, Degree, and Modals.)	06
2	**Communication Theory**	Enacting a skit to explain the process of communication. Role plays to demonstrate Non-Verbal Communication. Identifying communication barriers and suggesting remedies to overcome them.	06
3	**Writing Skills**	1. Technical Paragraph Writing 2. Project report writing 3. Letter Writing-Enquiry, Reply, Order, Complaint Adjustment 4. Notice, Minutes, Agenda	14

References

1. Raymond Murphy, Essential English Grammar: A Self-Study Reference and Practice Book for Elementary Students of English with Answers, Cambridge University Press
2. Green, David. Contemporary English Grammar – Structures and Composition. MacMillan India. 2014 (Print)
3. Ajmani, J. C. Good English: Getting it Right. New Delhi: Rupa Publications, 2012.
4. Fitikides, T. J. Common Mistakes in English. London: Orient Longman, 1984.
5. Meenakshi Raman & Sangita Sharma, Technical Communication; Principles and Practice, Oxford University Press.
6. M Ashraf Rizvi, Effective Technical Communication, Tata McGraw-Hill Education
7. Andrea J. Rutherford, Basic Communication Skills for Technology, Person Education Asia
8. Pease, Allan. Body Language. Delhi: Sudha Publications, 1998.
9. Adair, John. Effective Communication. London: Pan Macmillan Ltd., 2003.
10. Moore, Ninja-Jo, et al. Nonverbal Communication: Studies and Applications. New York: Oxford University Press, 2010.
11. Rutherford, Andrea J. Basic Communication Skills for Technology: Second Edition. Delhi: Pearson Education, 2007.

Websites

http://esl.about.com/od/englishtestsandquizzes/

https://learnenglish.britishcouncil.org/en/content

https://www.englishclub.com/grammar/quizzes.htm

https://englishdost.com/blog/language-learning-perfect-solution/

https://englishdost.com/blog/category/english-for-beginners/

http://www.selfgrowth.com/comm.html

FYT124R22 : Professional Communication – II - Introduction to Foreign Language: German

(Ver 1.0, Program Core, School of Arts)

Lect.	Tut.	Practical	Credits	Evaluation Scheme				
				Component	Exam	WT	Min Pass (%)	Pass (%)
-	-	2	1	Practical	FEP	100	40	40

Prerequisite: Nil

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

CO1 **Use**[2] Simple expressions in confrontations.

CO2 **Communicate**[4] in simple sentences.

CO3 **Write**[3] short and simple conversations

Syllabus (Theory)

Units	Description		Hrs.
I	**Theory** Call places and buildings Ask questions about places Ask for things Designate the means of transport Ask for Way	**Grammar** Akkusative pronomen WH type questions Sentence structure Imperayive with Sie	09
II	Talk about food Purchase plan Make a purchase conversations Talk while eating Meals, favorite food, Beverages	Irregular Artikel Akkusative regular and irregular verbs	09
III	Understand and tell the time Talk about family Make an appointment on phone Daily routine, Time of the day	Prepositions with time Possessive artikel with akkusative Modal verb	13

References

1. Netzwerk Deutsch als Fremdsprache, Stefanie Dengler,Paul Rusch,Heelen Schmitz,Tanja Sieber, Goyal Publishers & distribution Pvt.Ltd.
2. Deutsch fur alle1, Marine Derval Quinn,Derval Mcgrath, Folens
3. Wortschatz Grammatik A1, Marion Techmer,Anneli Billina,Lilli Marlen Brill, Hueber

FYT131 : Programming for Problem Solving

(Ver 1.0, Program Core, School of Technology)

Lect.	Tut.	Practical	Credits	Evaluation Scheme			
				Component	Exam	WT	Pass (%)
2	-	-	2	Theory	FET	50	40

Course Outcomes: At the end of this course students will able to

CO1 **Understand[2]** programming environment.

CO2 **Describe[1]** basics of programming language.

CO3 **Write[1] and** execute programs in C / Python programming language.

CO4 **Implement[3]** the algorithms for solving Mathematical problems.

Course Description: During learning of this course, Group A - students will learn the solving of the real-life problem by means of programming using the Python language and Group B -students will use the C programming language. First unit is common to both Group A and Group B students. The learning is expected through the discussion of the real-life problems and their programming solutions.

Syllabus of C Programming Language (Theory)

Units	Description	Hours
I	**Fundamentals of C Programming:** Language Translators, Compilers, Interpreters, Definition & Characteristics of algorithm and Flow charts, History of C language, Features of C, Structure of C Program, Character set, Identifiers: variables, constants, symbolic constants, keywords, Data types, Operators: Arithmetic, binary, bitwise, unary (increment, decrement), Shift operators, Input and Output statement: printf, scanf, getchar, putchar, getch functions, Escape sequence characters and Format specifiers .	05
II	**Control Statements:** Control Structures – Conditional and Unconditional Branching Using "if", if-else, nested if, nested if-else, if-else ladder, switch, Loop Structures – Creating Pretest Loops using "for" and "while" Statements; Creating Posttest Loops using "do while" statement, "break", "continue", "go to" and "return" Statements.	10

III	**Functions:** Introduction to Functions, Writing and calling function, Function with parameters, returning value from function, Passing and returning value to and from function, Function call within function. Arrays and Strings, Declaration and Initialization of Arrays, use of single dimensional and multi-dimensional arrays to handle numerical and string data.	**06**
IV	**Array and Strings:** Meaning and definition, Declaration, Initialization of arrays, One and Two-Dimensional Arrays, Operations on arrays, passing array to the function, String Meaning and definition, Declaration, **Strings**: Handling of character array, Initialization of character array, Use of standard Library String Function: strlen (), strrev(), strlwr(), strupr(), strcat(), strcmp(), strcpy().	**05**
V	**Structures:** Meaning, Definition and Declaration, Array within structure, Array of structure, Nested Structure, Union: Definition and Declaration	**05**
VI	**Pointers and File Handling** **Pointer**: Meaning, Definition and Declaration, pointer to array, pointer to structure. **File Handling:** Creating a Sequential Access File, Reading Data from a Sequential Access File, Writing Data to a Sequential Access File.	**05**

Syllabus - Python Programming Language (Theory)

Units	Description	Hours
I.	**Overview and Environment of Python:** An Overview of Python, What is Python?, Interpreted languages, Advantages and disadvantages, Downloading and installing, Which version of Python, Where to find documentation, The Python Environment, Structure of a Python script, Using the interpreter interactively as calculator, Math operators and expressions.	**6**
II	**Getting Started with Pyton** Using List, Tuple, Set, Dictionary and Operations on them, String and String operations, Reading different types of data from the keyboard, Writing simple code using editor like pycharm, jupyter.	**8**
III	**Control Statements** if, if-else statement, significance of Indenting, if - elif statements, for loop, while loops, for each loop for list, tuple, set, dictionary, The range() function in loop.	**8**

IV	**Functions** About function, passing value to the function, Returning value from function, Default, keyword, Arbitrary parameters, Multiple functions, Function call within function.	**6**
V	**Array** What is numpy?, 1D and 2D Array using numpy, Operations on array, Array slicing, list, tuple, string slicing	**6**
VI	**File handling** open , close, read , write and append data using file, Error handling	**6**

References

Text Books

1. Programming with C by Bryon Gottfried, Schaum's Outlines.
2. Let Us C by Yashwant Kanetkar 14th Edition BPB Publication
3. E. Balaguruswamy, "Programming In ANSI C", TMH Publications

References Books

4. How to Program, Harvey M. Deitel , Paul J. Deitel, Abbey Deitel, Pearson Publications.
5. The C Programming language – Kernighan and Ritchie

FYT132 : Programming for Problem Solving Lab

(Ver 1.0, Program Core, School of Technology)

Lect.	Tut.	Practical	Credits	Evaluation Scheme			
				Component	Exam	WT	Pass (%)
-	-	2	1	Practical	FEP	50	40
					POE	50	

Course Outcomes: At the end of this course students will able to

CO1 **Apply**[3] knowledge of C / Python programming to solve problems

CO2 **Implement**[3] the algorithms for solving Mathematical problems

Students will submit 10 - 12 programs executed using C programming languages / Python with understanding.

No	Laboratory Description
1	**Learning of Basic Programming Skills** Program to illustrate Primitive Data types, variables, constants and expressions. Program to illustrate String functions Program to illustrate Control Structures Program to illustrate to arrays / sequence
2	**Specific Programming Skills :** Write a program to find whether a given number is Odd or Even. Write a program to test whether a string is a Palindrome. Write a program to design an arithmetic calculator using Switch-Case. Write a program to find the number of vowels, consonants, digits in a string. Write a program to find largest and smallest elements in an array. Write a program to calculate length of a String. Write a program to find the frequency of characters in a string. Write a program to declare a structure 'Student' with name, age and marks of three subjects as parameters. Compute the average of marks of 10 students. Write a program to perform addition of two numbers using command line arguments. Write a program to find a factorial of a number using functions. Write a Program to perform different Matrix Operations by using arrays. Write a Program to pass the arrays and structure to the function. Write a Program to calculate the factorial value by using recursion. Write a Program to capitalize first letter of every word in a file.

	Write a program to input the student data and perform the following operations by using structure and file handling concepts: Read from File, Write Data to File, Update the input data and Delete the any asked student record.
3	Apply programming skills to provide solution to real life problems: Student has to choose the problem statement with respective of their program like: Group A students will choose real life problems from Mechanical / Aeronautical / Civil domains and will need to provide the solution. (in a group) Group B students has to choose real life problem statement in their respective domain areas and need to provide the solution. (in a group)

References

1. Herbert Schildt, C the Complete Reference, Tata McGraw Hills, 6th Edition.
2. Yashavant Kanetkar, Let Us C, BPB Publications, 2007, – 7th Edition.
3. Python Crash Course: A Hands-On, Project-Based Introduction to Programming (2nd Edition)

FYT133 : Engineering Practice II

(Ver. 1.0, Program Core, School of Technology)

Lect.	Tut.	Practical	Credits	Evaluation Scheme				
				Component	Exam	WT	Min Pass (%)	Pass (%)
-	-	2	1	Practical	FEP	100	40	40

Course Description:

To familiarize with the basic manufacturing processes and to study the various tools and equipment used, hands-on training is given different sections. Essentially student should know the labour involved, machinery or equipment necessary, time required fabricate and also should be able to estimate the cost of the product or job.

Prerequisite: Based on skills acquired by students in **Semester I**, they will choose any two jobs of their interest and make them with the help of these skills individually.

Course Outcomes: At the end of this course students will able to

CO1 Produce a wooden job with different carpentry operations.

CO2 Make sheet metal jobs with cutting and non-cutting operations.

CO3 Make a job by smithy, fitting and Joining operations.

Laboratory Description		
Expt. No.	**Description**	**Hrs.**
01.	Perform different carpentry operations to make job like pen stand, Mobile stand, gift articles etc. with the help of hand tools and power tools	06
02.	Perform different sheet metal operations to make sheet metal jobs like, Enclosures of inverters, Tray, electric meter cover, transformer clamping etc.	06
03.	Perform different joining process for the jobs like Coconut Husk Peele, Hand fork, fabrication work etc.	04
04.	Perform different operation to make jobs by smithy and fitting operations like Coconut Husk Peeler, Hand cultivator, Hand fork, etc.	06

References

1. A Course in Workshop Technology, Vol – I by B. S. Raghuvanshi, Dhanapat Rai and Sons.
2. Elements of Workshop Technology, Vol –I by Hajara Chaudhari, Media Promoters.
3. Workshop Technology, Vol – I by Gupta and Kaushik, New Heights.
4. Workshop Technology, Vol – I by Chapman, The English Language Book Society.
5. Workshop Technology, Vol.-I by H.S. Bawa, TMH Publications, New Delhi.

FYT134 : Design Thinking - II

(Ver 1.0, Program Core, School of Technology)

Lect.	Tut.	Practical	Credits	Evaluation Scheme			
				Component	Exam	WT	Pass (%)
-	-	2	1	Practical	FEP	50	40
					POE	50	40

Course Outcomes: After the end of this course students will able to

CO1 **Build**[3] simple systems/prototypes using design and development process.

CO2 **Analyze**[3] engineering solutions from ethical and sustainability perspectives.

CO3 **Make**[4] a product using various manufacturing processes.

Practical

Week #	Experiment Title	Hrs.
Week 1	Basic protocols of design	02
Week 2	Establishing Product Architecture, Brainstorming	02
Week 3	Modular Design with Consideration of design for manufacturing and assembly (DFMA). Selection of material, Design for Sustainability, Aesthetic & Ergonomics	02
Week 4	Prototyping	02
Week 5	Prototyping	02
Week 6	Detail Drawing and Specification	02
Week 7	Selections of Methods of manufacturing	02
Week 8	Manufacturing of the Product	02
Week 9	Manufacturing of the Product	02
Week 10	Manufacturing of the Product	02
Week 11	Manufacturing of the Product	02
Week 12	Preparation of report and presentation	02

References

1. C. Starkey, "Basic Engineering Design", Butterworth-Heinemann Publisher 1988
2. Yousef Haik, SangarappillaiSivaloganathan, Tamer M. Shahin, "Engineering Design Process", Cengage learning, 2011

3. Hugh Jack, "Engineering Design, Planning, and Management", Academic press 2013.
4. Rattan, S.S. "Theory of Machines", 3rdEdition, Tata McGraw-Hill, 2009
5. Khurmi, R.S. "Theory of Machines", 14thEdition, S Chand Publications, 2005.
6. Kenneth Ayala, "The 8051 Microcontroller, Architecture, Programming, and Applications", West publishing Company
7. Boylsted, "Electronic Devices and Circuits", Person publication, 2013
8. R. P. Jain, "Modern Digital Electronics" 2/e, TMH publication.
9. Jeremy Blum, "Exploring Arduino: Tools and Techniques for Engineering Edition, Wiley publication, 2015.
10. Simon Monk, "Programming Arduino Next Steps: Going Further with Sketches", McGraw-Hill / Tab Electronics.
11. Massimo Banzi, "Make: Getting Started with Arduino, 3rd Edition", ShroffPublications, 2014
12. Stuart Yarnold, "Arduino in Easy Steps", In Easy Steps Publications, 2015
13. Blum, "Arduino Programming in 24 Hours, Sams Teach Yourself', I st Edition, Pearson Publications, 2015.

FYT135 : Elective – I (Theory)

Course Information: This is a technical elective course and student will have choice to choose any one of the courses from the following list based on their area of interest to explore their knowledge in different technical domains. For Group A students, this course is provided in Semester - II and for Group B students, this is provided in Semester - I. List of courses is as follows:

Semester – I / II
Elective – I
✓ Elements of Mechanical Engineering. ✓ Elements of Civil Engineering. ✓ Elements of Electronics Engineering. ✓ Engineering Materials. ✓ Elements of Aeronautical Engineering

FYT1351: Elements of Mechanical Engineering

(Ver 1.0, Program Core, School of Technology)

Lect.	Tut.	Practical	Credits	Evaluation Scheme				
				Component	Exam	WT	Min Pass (%)	Pass (%)
2	-	-	2	Theory	FET	20	40	40
					CAT I	15		
					CAT II	15	40	
					ESE	50		

Course Outcomes: At the end of this course students will able to

CO1 **Explain**[2] concept of thermodynamics and Refrigeration systems.

CO2 **Differentiate**[2] IC Engines, Electric and Hybrid Vehicle systems.

CO3 **Classify**[2] Energy Sources and Mechanical Power Transmission devices.

CO4 **Explain**[2] types of manufacturing processes.

Syllabus (Theory)

Units	Description	Hours
I	**Thermodynamics:** Thermodynamic State, Process, Cycle, Thermodynamic System, Heat, work, Internal Energy, First Law of Thermodynamics, Application of First Law to	07

	steady Flow and Non-Flow processes, heat engine, heat pump, refrigerator, Statements of Second Law of Thermodynamics (Numerical treatment on SFEE), Introduction to Refrigeration Systems.	
II	**Internal Combustion Engines:** Introduction to Engine components and its working: Study of engine specifications, Carnot Cycle, Otto Cycle, Diesel Cycle comparison of specifications of vehicles, Two stroke and Four stroke engines (Petrol, Diesel and CNG engines). Introduction to Electric and Hybrid Vehicle systems.	05
III	**Introduction to Energy Sources & its conversion** Energy sources: Renewable and Non-renewable Energy Sources, Hydropower energy, Nuclear energy, Steam Power Plant, Solar energy, Geothermal energy, Wind energy, Tidal energy, Biodiesel, Energy conversion devices: Introduction of pump, compressor, turbines, etc. Power Transmission Devices: Gears, Belt-Pulley, Rope Drives, Chain-Sprocket. (Derivation & Simple Numerical on Belt Drives)	06
IV	**Introduction to Manufacturing Processes:** Types of manufacturing Processes, Casting, Metal forming (Rolling, Drawing, Extrusion, Forging, etc.), Sheet metal working, Metal Joining (Introduction to Soldering, Arc Welding, Oxy-Acetylene Welding, TIG Welding, MIG Welding), etc. Material Removal Processes. Introduction to Automation & Robotics in industry (Terminology, Working & Applications)	06

References

1. Engineering Thermodynamics by P K Nag, Tata Mc-Graw Hill Publication
2. Thermal Engineering by R.K. Rajput, Laxmi Publication, Delhi.
3. Internal Combustion Engines by V Ganesan, Tata Mc-Graw Hill Publication
4. Refrigeration and Air Conditioning by C P Arora, Tata Mc-Graw Hill Publication
5. Theory of Machines by S SRatan, Tata Mc-Graw Hill Publication
6. Solar Energy by Dr.S.P. Sukathame, TataMc-Graw Hill Publication
7. Non-Conventional Sources of Energy by G.D. Rai, Khanna Publication
8. Manufacturing Technology Volume I and II by P. N. Rao, Tata Mc-GrawHill
9. Elements of Workshop Technology, Vol.I and II by Hajara Choudhari, Media Promoters.

FYT1352 : Elements of Civil Engineering

(Ver 1.0, Program Core, School of Technology)

Lect.	Tut.	Practical	Credits	Evaluation Scheme				
				Component	Exam	WT	Min Pass (%)	Pass (%)
2	-	-	2	Theory	FET	20	40	40
					CAT-I	15		
					CAT-II	15		
					ESE	50	40	

Course Outcomes: After the end of this course student will able to

CO1 **Describe**[2] Principals of Planning and Bye Laws.

CO2 **Describe**[3] concepts of building components in practice.

CO3 **Discuss**[2] Principles of Surveying and leveling.

CO4 **Discuss**[2] various aspects of transportation and environmental engineering.

Syllabus (Theory)

Units	Description	Hrs.
I	**Relevance of Civil Engineering and Building Planning:** Introduction, branches of civil engineering, application of civil engineering in other allied fields. Load bearing and framed structure, Types of loads, Principles of planning, Necessity of bye Laws, Bye-Laws such as building line, height of building, open space requirements, F.S.I., ventilation, Sanitation as per municipal corporation area requirement.	07
II	**Components of Building:** Sub-structure: Elements of sub-structures and their functions. Super-structure**:** Elements of super-structures and their functions. Concept of bearing capacity, types of foundations i.e. shallow and deep and their suitability.	07
III	**Surveying and Leveling:** Principles of surveying, Numerical on chaining. Meridian, bearing and its types, system of bearing, Calculation of included angles, Numerical on correction for local attraction. Terms used in leveling, types of leveling, Contours, characteristics of contours, use of contour maps.	07
IV	**Introduction to Transportation, Environmental and Irrigation Engineering**: Components of rigid and flexible pavement, components of railway track (Broad Gauge). Components of water supply scheme (flow diagram). Types of Dams, detailed explanation of earthen and gravity Dam.	07

References

Text Book

1. Shanmugam, G, and Palanichamy, M.S., Basic Civil and Mechanical Engineering, Tata McGraw Hill Publishing Co., New Delhi, 1996.

Reference Book

1. Arora S.P. and Bindra S.P., Building Construction, Planning Techniques and Method of Construction, Dhanpat Rai and Sons, New Delhi 1997.

FYT1353 : Elements of Electronics Engineering

(Ver 1.0, Program Core, School of Technology)

Lect.	Tut.	Practical	Credits	Evaluation Scheme				
				Component	Exam	WT	Min Pass (%)	Pass (%)
2	-	-	2	Theory	FET	20	40	40
					CAT I	15		
					CAT II	15		
					ESE	50	40	

Course Outcomes: After the end of this course students will able to

CO1 **Describe**[2] the operation and applications of diodes, transistors viz switch, rectifier and voltage regulator.

CO2 **Illustrate**[2] the working of basic electronic instruments.

CO3 **Explain**[2] the working of op-amp and its application.

CO4 **Identify**[3] types of analog communication and basic digital circuits using logic gates.

Syllabus (Theory)

Units	Description	Hrs.
I	**Semiconductor diodes, Transistors & Applications:** PN junction diode theory, working principle of forward and reverse bias, characteristics applications, Zener diode working principle and characteristics, PN junction diode as rectifier (Half & full wave), Zener diode as voltage regulator, commercial applications of diodes. Types of transistor (NPN, PNP), working principle, CE & CB configuration with input-output characteristics, Transistor as a switch and amplifier. Working principle and characteristics of FET Comparison between BJT & FET.	07
II	**Electronics Instruments & Transducers:** Definition of measurement & instrument. Block diagram and operation of Digital multi-meter, cathode ray oscilloscope, DC power supply. Applications of transducers: -Temperature measurement is using RTD & LM35, Displacement measurement using LVDT.	07
III	**Introduction to Operational Amplifiers (Op-Amps):**Significance of Op - Amps, Pin description of Op-Amp (IC 741), Configuration modes: Inverting, Non- Inverting and unity gain, Op-amp applications: adder, subtractor, integrator, and Differentiator.	07

IV	**Analog Communication & Digital Design Circuits:** Block diagram of basic communication system, Classification of communication system:- Analog & Digital, Wired & Wireless, Simplex, Duplex communication: - Half duplex & full duplex, Need of modulation, Types of Analog communication:- AM, FM, PM (Definition, waveform & applications), Importance and classification of number systems- binary, decimal, octal and hexadecimal, conversion methods, Concept of logic gates: basic logic gates and derived gates.	07

References

1. Electronic devices & circuit by Allen Mottershed, Prentice- Hall India Publication
2. Electronic Devices and Circuits by David A. Bell, Oxford University Press, 5thEdition.
3. Electronic devices & circuits by N Salivanan & Sureshkumar, Tata Mc-GrawHill
4. Digital Design by Morris Mano, PHI Learning, fourth edition,2008.
5. OP-AMP and Linear ICs by Ramakant A. Gayakwad, Prentice Hall / Pearson Education
6. Electronic Instrumentation by H Kalsi, Tata McGraw Hill Education.
7. Principles of Electronic Communication Systems by Louis E. Frenzel, McGraw Hill

FYT1354 : Engineering Materials

(Ver 1.0, Program Core, School of Technology)

Lect.	Tut.	Practical	Credits	Evaluation Scheme				
				Component	Exam	WT	Min Pass (%)	Pass (%)
2	-	-	2	Theory	FET	20	40	40
					CAT I	15		
					CAT II	15		
					ESE	50	40	

Course Outcomes: After the end of this course students will able to

CO1 **Demonstrate[2]** different properties of ferrous and nonferrous metals

CO2 **Explain[2]** applications of various modern engineering materials

CO3 **Explain[2]** different manufacturing processes of plastics and composites

CO4 **Select[4]** a suitable material for specific application

Syllabus (Theory)

Units	Description	Hrs.
I	**Engineering Materials** Metals, alloys- ferrous & non-ferrous, plastics & polymers, ceramics and composites. Dual phase steels, micro alloyed steels, High strength low alloy steels, transformation inducted plasticity (TRIP) steels, Maraging steels. Selection of a suitable material for specific application	**07**
II	**Modern materials** Compositions, properties & applications of: Inter-metallics, Ni & Ti aluminides, smart materials, shape memory alloys, Metallic glass-quassi crystals, Dielectrics, semiconductors, conductors & super conducting materials. Magnetic & photoelectric materials, optical materials, Bio materials, micro electronic materials & nano-materials. Selection of a suitable modern material for specific application	**07**
III	**Plastics** Classification, Manufacturing Processes – Molding, Casting, Extruding, Laminating. Physical Properties, Working Properties, Uses, Transparent materials, Rubber and synthetic rubber. Applications of plastics	**07**

IV	**Composites** Fibers-glass, boron, carbon, organic, ceramic and metallic fibers-matrix materials polymers, metals and ceramics. Processing of polymer matrix composites: open mould process, bag molding, compression molding with BMC and SM- filament winding, pultrussion- centrifugal casting, injection molding, applications of PMC's. Composite material for specific application	**07**

References

Text Books

1. Callister W. D., "Materials Science and Engineering" Wiley India (P) Ltd.ISBN:978-81-265-21-43-2, 2010
2. Materials & Processes in Manufacturing, E. Paul DeGarmo, J. T. Black & Ronald A. Kohser, (PHI)

Reference Books

1. V. D. Kodgire and S.V. Kodgire, "Material Science and Metallurgy for Engineers, Everts publishing house, Pune, 20082. Raghavan V., "Materials science and Engineering- A first course," 5th edition, ISBN: 978-81-203-2445-8, 2011.
2. Van Vlack. L. H., Materials Science for Engineers, Addison Wesley, 1985.
3. Manufacturing Processes for Engineering Materials, S. Kalpaljian & Steven R. Schmidt, (Pearson Education)

FYT1355 : Elements of Aeronautical Engineering

(Ver 1.0, Program Core, School of Technology)

Lect.	Tut.	Practical	Credits	Evaluation Scheme				
				Component	Exam	WT	Min Pass (%)	Pass (%)
2	-	-	2	Theory	FET	20	40	40
					CAT I	15		
					CAT II	15		
					ESE	50	40	

Course Outcomes: After the end of this course students will able to

CO1 **Explain[2]** various types of aircraft and spacecraft components based on its configurations.

CO2 **Explain[2]** the principles of flight dynamics and aerodynamics.

CO3 **Write[2]** the working principles of jet and rocket propulsion

CO4 **Discuss[2]** the significance of various materials used in an aircraft

Syllabus (Theory)

Units	Description	Hrs.
I	**Introduction to Aircraft Anatomy & Configurations** Brief Review of Historical Developments in Aeronautical & Aerospace Engineering, Basic Parts & Their Functions of Single Engine & Multi Engine Aircraft, Helicopter, Rocket & Missiles, & Satellite, Classification of Flying Vehicles, Current Market Opportunities in Aeronautical Engineering. Primary & Secondary Flight Controls & Their Functions	07
II	**Aerodynamics of Fixed Wing Aircraft** Forces acting of the Aircraft, Introduction to Aerofoils, Classification of Aerofoils, Centre of Pressure & Aerodynamic Centre, Pressure Distribution over Aerofoils, Aerofoil Lift characteristics, Coefficient of Lift &Drag, Aspect Ratio, Taper Ratio, Lift – Drag Ratio	07
III	**Aircraft & Rocket Propulsion** Introduction to Propeller & Jet Propulsion, Basic Components & Their Functions of Gas Turbine Engine, Variants of the Gas Turbine Engines – Turbojet, Turbofan, Turbo shaft, Turboprop, Ramjet & Scramjet Engines, Thrust Equation of Jet Propulsion, Principles of Rocket Propulsion, Classification of Rocket Motors, Thrust Equation of Rocket Propulsion.	07

IV	**Aircraft Structures** Introduction to Aircraft Structural Members of Wing, Fuselage & Empennage, & their functions (Ribs, Spars, Longerons, Keel, Stringers & Skin), Semi-monocoque & Monocoque Construction of Aircraft, Structural Detail of the Landing Gear, Air & Ground Loads acting on the Aircraft.	**07**

References

Text Books

1. Anderson, J.D., "Introduction to Flight", McGraw-Hill, 7th Edition, 2011
2. Anderson, J.D. Jr., "Fundamentals of Aerodynamics", McGraw-Hill, 5th Edition, 2013.

Reference Book

1. Kermode, A.C., "Mechanics of Flight", Himalayan Books, New Delhi, 2004.

FYT136 : Elective – I (Laboratory)

Course Information: With respective to the preferred theory course from the technical domain, the following laboratory courses has to be registered by the students.

Elective – II: Semester – I / II
✓ Elements of Mechanical Engineering Laboratory.
✓ Elements of Civil Engineering Laboratory.
✓ Elements of Electronics Engineering Laboratory.
✓ Engineering Materials Laboratory.

FYT1361: Elements of Mechanical Engineering Laboratory

(Ver 1.0, Program Core, School of Technology)

Lect.	Tut.	Practical	Credits	Evaluation Scheme			
				Component	Exam	WT	Pass (%)
-	-	2	1	Practical	FEP	100	40

Course Outcomes: At the end of this course students will able to

CO1 **Identify**[1] different components of IC Engines and Refrigeration system.

CO2 **Explain**[2] different renewable and non-renewable energy sources like solar and Steam.

CO3 **Discuss**[2] basic concept of energy conversion devices like gear drives, belt drives, chain drives, pumps and compressor.

CO4 **Explain**[2] different manufacturing process like turning, drilling, grinding etc. And metal joining process like arc and spot welding.

No.	Laboratory Description	Hrs.
1	Demonstrate domestic refrigerator (Vapor Compression Refrigeration Cycle)	2
2	Refrigeration Applications: Water cooler, Window A/C, Split AC unit	2
3	Study of Two stroke and Four stroke engines.	2
4	Identify different components of vehicle (Visit to CAR Lab)	2
5	Demonstration of Solar Water Heating System	2
6	Steam generators (Boilers), types, working and applications.	2
7	Demonstration of Pumps, Compressors & Turbines	2

8	Demonstration of Mechanical Power Transmission Systems	2
9	Demonstration of Metal Joining Processes.	2
10	Demonstration of operations of Centre lathe and drilling machines.	2
11	Industrial visit to study various primary manufacturing processes and power plants	2

References

1. Engineering Thermodynamics by P K Nag, Tata Mc-Graw Hill Publication
2. Thermal Engineering by R.K. Rajput, Laxmi Publication, Delhi.
3. Internal Combustion Engines by V Ganesan, Tata Mc-Graw Hill Publication
4. Refrigeration and Air Conditioning by C P Arora, Tata Mc-Graw Hill Publication
5. Theory of Machines by S S Ratan, Tata Mc-Graw Hill Publication
6. Solar Energy by Dr. S. P. Sukathame, Tata Mc-Graw Hill Publication
7. Non-Conventional Sources of Energy by G.D. Rai, Khanna Publication
8. Manufacturing Technology Volume I and II by P. N. Rao, Tata Mc-Graw Hill
9. Elements of Workshop Technology, Vol. I and II by Hajara Choudhari, Media Promoters.

FYT1362 : Elements of Civil Engineering Laboratory

(Ver 1.0, Program Core, School of Technology)

Lect.	Tut.	Practical	Credits	Evaluation Scheme			
				Component	Exam	WT	Pass (%)
-	-	2	1	Practical	FEP	100	40

Course Outcomes: At the end of this course students will able to

CO1 **Plotting**[4] the outlines of building

CO2 **Calculate**[3] reduced levels of slopping ground

CO3 **Measure**[3] area and volume of topo sheet by using planimeter

CO4 **Use**[3] knowledge of Surveying in construction of roads and projects

CO5 **Carried out** [2] traversing by using compass surveying

No	Laboratory Description
1	Plotting the outlines of building by chaining, ranging and offsetting.
	Plotting of closed traverse by prismatic compass.
	Reduction of levels by rise and fall method
	Reduction of levels by collimation plane method.
	Measurement of area by mechanical planimeter.
	Measurement of area by digital planimeter.
	To study various models of building elements.
	To study various construction materials.
	Site visit to study various components of building structure.
	Plotting the outlines of building by chaining, ranging and offsetting.
2	Assignments
3	Quiz

FYT1363 : Elements of Electronics Engineering Laboratory

(Ver 1.0, Program Core, School of Technology)

Lect.	Tut.	Practical	Credits	Evaluation Scheme			
				Component	Exam	WT	Pass (%)
-	-	2	1	Practical	FEP	100	40

Course Outcomes: At the end of this course students will able to

CO1: **Illustrate**[2] the working of CRO & DMM.

CO2: **Explain**[2] the applications of semiconductor devices.

CO3: **Describe**[2] the working of Logic gates & Operational Amplifier.

No	Laboratory Description
1	To study basic electronics instruments CRO & DMM
2	To study the IV characteristics of PN junction diode
3	To study IV characteristics of Zener diode
4	Diode as Rectifier (Half wave & Full wave)
5	To study op-amp as Summing Amplifier
6	To study op-amp as Differentiator and Integrator
7	To study modulation techniques of AM, FM and PM
8	To study & verify truth table of Logic Gates.
9	Construct basic gates using Universal Gates

FYT1364 : Engineering Materials Laboratory

(Ver 1.0, Program Core, School of Technology)

Lect.	Tut.	Practical	Credits	Evaluation Scheme			
				Component	Exam	WT	Pass (%)
-	-	2	1	Practical	FEP	100	40

Course Outcomes: At the end of this course students will able to

CO1 **Illustrate** stress strain diagram for different materials.

CO2 **Measure** impact strength of the metals.

CO3 **Determine** flaws in the component using destructive and nondestructive testing methods.

CO4 **Conduct** tensile, compression test and fatigue on CFRP/GFRP.

No	Laboratory Description
1	Tensile test on metals
2	Brinell hardness test on metals
3	Rockwell Hardness test on metals.
4	Charpy impact test on metals
5	Izod impact test and Fatigue on metals
6	Dye penetrant testing of metals
7	Magnetic particle inspection of the parts.
8	Demonstration of ultrasonic testing
9	Demonstration of Spectrometer.

FYT1366 : Elements of Aeronautical Engineering Laboratory

(Ver 1.0, Program Core, School of Technology)

Lect.	Tut.	Practical	Credits	Evaluation Scheme			
				Component	Exam	WT	Pass (%)
-	-	2	1	Practical	FEP	100	40

Course Outcomes: At the end of this course students will able to

CO1 **Explain**[2] Aircraft Anatomy

CO2 **Discuss**[2] the working principle of Aircraft & Rocket Propulsion

CO3 **Conduct**[3] experiment on Aircraft Structures

CO4 **Perform**[3] test on Aircraft Materials and Flight Control

No	Laboratory Description
1	Study of Aircraft Anatomy & Configurations
2	Study on Aerodynamics of Fixed Wing Aircraft
3	Perform test on Wind tunnel
4	Study on Propulsion lab equipment's
5	Demonstration of Turbojet Engine
6	Study on Aircraft Structures lab equipment's
7	Perform test on cantilever beam
8	Study on Aircraft Materials lab equipment's
9	Demonstration of Primary controls in Aircraft

FYT137: Elective – II (Open Elective)

Course Information: This is an open elective course and student will have choice to choose any one of the courses from the following list based on their area of interest to explore their knowledge in required open domains. For Group A students, this course is provided in semester - I and for Group B students, this is provided in semester - II. List of courses is as follows:

Elective – II - Semester – I / II
✓ Electric Vehicles ✓ Information Systems for Engineers ✓ Energy Auditing ✓ Global Warming and Climate Change ✓ Information Security ✓ Renewable Energy Resources

FYT1351 : Electrical Vehicles

(Ver 1.0, Program Core, School of Technology)

Lect.	Tut.	Practical	Credits	Evaluation Scheme				
				Component	Exam	WT	Min Pass (%)	Pass (%)
2	-	-	2	Theory	FET	20	40	40
					CAT	30		
					ESE	50	40	

Purpose: This course introduces the fundamental concepts, principles, analysis and design of hybrid, electric and fuel cell vehicles.

Instructional Objectives

1. To understand working of different configurations of electric vehicles, and its components, hybrid vehicle configuration and performance analysis.

Syllabus (Theory)

Units	Description	Hrs.
I	**ELECTRIC VEHICLES** Introduction, Components, vehicle mechanics – Roadway fundamentals, vehicle kinetics, Dynamics of vehicle motion - Propulsion System Design.	**07**

II	**BATTERY** Basics – Types, Parameters – Capacity, Discharge rate, State of charge, state of Discharge, Depth of Discharge, Technical characteristics, Battery pack Design, Properties of Batteries.	**07**
III	**DC & AC ELECTRICAL MACHINES** Motor and Engine rating, Requirements, DC machines, Three phase A/c machines, Induction machines, permanent magnet machines, switched reluctance machines.	**07**
IV	**ELECTRIC VEHICLE DRIVE TRAIN** Transmission configuration, Components – gears, differential, clutch, brakes regenerative braking, motor sizing.	**07**

References

1. Iqbal Hussain, "Electric & Hybrid Vechicles – Design Fundamentals", Second Edition, CRC Press, 2011.

2. James Larminie, "Electric Vehicle Technology Explained", John Wiley & Sons, 2003.

3. Mehrdad Ehsani, Yimin Gao, Ali Emadi, "Modern Electric, Hybrid Electric, and Fuel Cell Vehicles: Fundamentals", CRC Press, 2010.

4. Sandeep Dhameja, "Electric Vehicle Battery Systems", Newnes, 2001

FYT1372 : Information Systems for Engineers

(Ver 1.0, Program Core, School of Technology)

Lect.	Tut.	Practical	Credits	Evaluation Scheme				
				Component	Exam	WT	Min Pass (%)	Pass (%)
2	-	-	2	Theory	FET	20	40	40
					CAT	30		
					ESE	50	40	

Purpose: This course is intended to give a basic idea about Information Systems and the need to study the same from the engineering perspective. The different units are intended to expose the students to the various aspects like the transformation of today's businesses with the advent and use of Information Systems, need for security of Information Systems, and the ethical and social issues involved in the use of Information Systems.

Instructional Objectives:

1. To understand the basic concepts of Information Systems applicable to Engineers
2. To study the design, development and security of Information Systems
3. To learn about the various modules in ethical and social issues using Information Systems.

Syllabus (Theory)

Units	Description	Hrs.
I	**Introduction** Introduction to Information Technology - Need for Information Technology; Information Technology Firms - what they are and how they do things; Opportunities in the IT industries.	07
II	**Systems Design** Information Systems: Concepts and overview of information systems; A systematic framework for information systems; Components of information systems; information systems design, analysis and management, types of Information Systems.	07
III	**Database Management Systems and Data Security** Database Management Systems for Information Systems: Data resources, structure and functional aspects: Graphic Database, Data Storage and Hypermedia. Information Systems Security – System Vulnerability and abuse – improve Business value of security & control using various technologies –	07

	framework for security and control – recent technologies and tools for protecting information resources.	
IV	**Ethics in Information Systems** Ethical and Social Issues in Information Systems – ethics in an information society – moral dimensions of Information Systems – role of Government in information technology	07

References

Text Books

1. Kenneth C. Laudon & Jane P.Laudon, "Management Information Systems"Managing the Digital Firm-Twelfth Edition, Pearson

2. Gerald V.Post David L. Anderson, "Management Information System-Solving Business Problems with Information Technology" Tata McGraw Hill Publishing Co. ltd, New Delhi

Reference Books :

1. Alexis Leon, "Enterprise Resource Planning" Tata McGraw Hill Publishing Co. Ltd., New Delhi – 2005

2. Raymond Meleod, JR "Information Systems" Mac Millan Publishing Co. ltd – 4th Edition

3. Gordan B.Davis Margrette H.Olsan, "Management Information System", Conceptual Foundations, Structure & Development – Second Edition – Tata McGraw Hill Co. Ltd, New Delhi

FYT1373 : Energy Auditing

(Ver 1.0, Program Core, School of Technology)

Lect.	Tut.	Practical	Credits	Evaluation Scheme				
				Component	Exam	WT	Min Pass (%)	Pass (%)
2	-	-	2	Theory	FET	20	40	40
					CAT	30		
					ESE	50	40	

Purpose: To familiarize the students about energy management and energy audit.

Instructional Objectives:

1. To familiarize about forms of energy
2. To understand energy management concepts
3. To learn the methods of energy audit and usage of instruments
4. To analyse and report the outcome of energy audit

Syllabus (Theory)

Units	Description	Hrs.
I	**Fundamentals of Energy** Basics of energy and its various forms: Conventional and non -conventional sources. Different fuels and its energy contents. Renewable energy - solar energy, wind energy, bio energy, hydro energy, geothermal energy, wave energy, tidal energy and OTEC.	07
II	**Energy Management** Energy management- various approaches, cost effectiveness, bench marking, optimization of energy requirement and maximization of system efficiencies. Fuels and energy substitution.	07
III	**Energy Audit** Energy audit – need, preliminary audit, detailed audit, methodology and approach. Instruments for audit, monitoring energy and energy savings.	07
IV	**Assessment and Reporting** Evaluation of saving opportunities – determining the savings in INR, non-economic factors, conservation opportunities, estimating cost of implementation. Energy audit reporting - the plant energy study report, importance, effective organization, report writing and presentation.	07

References

Text Books

1. Paul. O. Callaghan., "Energy Management", McGraw-Hill Professional Publishing, 2003.

2. Albert Thumann, "Handbook of energy audits", 6th edition, The Fairmount Press, 2003.

Reference Books

1. Murphy.W.R and McKay.G, "Energy Management", Butterworths, London, 2007.

2. Steve Doty, Wayne C.Turner, "Energy Management Handbook", Fairmont Press, 7th edition, 2009.

3. Barney L. Capehart, Wayne C.Turner, William J.Kennedy, "A Guide to Energy Management", The Fairmont Press, 6th edition, 2008

FYT1374 : Global Warming and Climate Change

(Ver 1.0, Program Core, School of Technology)

Lect.	Tut.	Practical	Credits	Evaluation Scheme				
				Component	Exam	WT	Min Pass (%)	Pass (%)
2	-	-	2	Theory	FET	20	40	40
					CAT	30		
					ESE	50	40	

Purpose: To learn about the global warming and climate change.

Instructional Objectives:

1. To know the basics, importance of global warming
2. To know the concept of mitigation measures against global warming.

Syllabus (Theory)

Units	Description	Hrs.
I	**Earth's Climate System** Role of ozone in environment-ozone layer-ozone depleting gases-Green House Effect, Radiative Effects of Greenhouse Gases-The Hydrological Cycle-Green House Gases and Global Warming – Carbon Cycle.	07
II	**Atmosphere and Its Components** Importance of Atmosphere - Physical Chemical Characteristics of Atmosphere - Vertical structure of the atmosphere Composition of the atmosphere-Atmospheric Stability-Temperature profile of the atmosphere-Lapse Rates-Temperature inversion-effects of inversion on pollution dispersion.	07
III	**Impacts of Climate Change** Causes of Climate change: Change of Temperature in the environment - Melting of ice Pole-sea level rise - Impacts of Climate Change on various sectors – Agriculture, Forestry and Ecosystem – Water Resources – Human Health – Industry, Settlement and Society, Projected Impacts for Different Regions.	07
IV	**Climate Change and Mitigation Measures** Clean Development Mechanism – Carbon Trading- examples of future Clean Technology – Biodiesel – Natural Compost – Eco- Friendly Plastic – Alternate Energy – Hydrogen – Bio-fuels – Solar Energy – Wind –	07

Hydroelectric Power
Mitigation Efforts in India and Adaptation funding, Key Mitigation Technologies and Practices.

References

Text Books

1. Dash Sushil Kumar, "Climate Change – An Indian Perspective", Cambridge University Press India Pvt. Ltd, 2007.

Reference Books

1. Adaptation and mitigation of climate change-Scientific Technical Analysis. Cambridge University Press, Cambridge, 2006.

2. Atmospheric Science, J.M. Wallace and P.V. Hobbs, Elsevier / Academic Press 2006.

3. Jan C. van Dam, Impacts of "Climate Change and Climate Variability on Hydrological Regimes", Cambridge University Press, 2003.

FYT1375 : Information Security

(Ver 1.0, Program Core, School of Technology)

Lect.	Tut.	Practical	Credits	Evaluation Scheme				
				Component	Exam	WT	Min Pass (%)	Pass (%)
2	-	-	2	Theory	FET	20	40	40
					CAT	30		
					ESE	50	40	

Purpose: To provide impeccable knowledge on various technical aspects of Information Security & Computer Security principles

Instructional Objectives:

1. To provide foundation for understanding the key issues associated with protecting Computer Systems & Information Assets.
2. To provide competency in designing consistent & reasonable Information security system.

Syllabus (Theory)

Units	Description	Hrs.
I	**Introduction to Information Security** Introduction to Information Security, Need for Security - Threats to security & Attacks, Computer System Security and Access Controls - System access and data access.	07
II	**Network and Communication Security** Introduction to Network Security, Email Security, IP Security, Web Security. Introduction to cryptography, cryptosystems, Encryption & Decryption Techniques - classical encryption techniques, communication channel used in cryptographic system.	07
III	**Scanning & Enumeration Technology** Malicious software's, Firewalls, Honey pots, Intrusion Detection system, Intrusion Prevention system	07
IV	**Ethics in Information Security** Implementing Information Security, Legal Ethical & Professional issues in Information Security.	07

References

Text Books

1. Matt Bishop, "Computer Security: Art and Science", Addison-Wesley Professional, First Edition, 2003. ISBN: 0201440997.

2. William Stallings, “Cryptography and Network Security”, Pearson Education, Fourth Edition, 2006. ISBN: 8177587749

Reference Books

1. Michael E. Whitman, Herbert J. Mattord ,“Principles of Information Security” Cengage Learning, Fourth Edition, 2010, ISBN: 1111138214

2. Charlie Kaufman, Radia Perlman, Mike Speciner, “Network security: private communication in a public world”, Second Edition, ISBN: 0130460192.

3. Dieter Gollmann ,”Computer Security “, Third Edition, ISBN: 0470741155.

FYT1376 : Renewable Energy Resources

(Ver 1.0, Program Core, School of Technology)

Lect.	Tut.	Practical	Credits	Evaluation Scheme				
				Component	Exam	WT	Min Pass (%)	Pass (%)
2	-	-	2	Theory	FET	20	40	40
					CAT	30		
					ESE	50	40	

Purpose: To acquire knowledge on different types renewable energy resources.

Instructional Objectives:

1. To educate the students scientifically the new developments in renewable energy studies.
2. To educate scientifically the new developments in non-conventional and renewable energy studies
3. To emphasize the significance of Green Energy Technologies.

Syllabus (Theory)

Units	Description	Hrs.
I	**Solar Energy** Solar radiation its measurements and prediction - Solar thermal collectors - Flat plate collectors, Concentrating collectors – Applications - Heating, Cooling, Desalination, Drying, Cooking, etc - Principle of photovoltaic conversion of solar energy - Types of solar cells and fabrication - Photovoltaic applications - Battery charging, Domestic lighting, Street lighting and water pumping.	07
II	**Wind Energy** Wind energy - Energy chains - Application - Historical background, Merits and limitations - Nature of wind - Planetary and local day / night winds - Wind energy quantum - Power in wind- Turbine efficiency - Torque Thrust calculations - Velocity at different heights - Site selection - Components of Wind Energy Conversion System (WECS).	07
III	**Biomass Energy** Energy from Biomass - Biomass as Renewable Energy Source - Types of Bio mass Fuels - Solid, Liquid and Gas - Biomass Conversion Techniques - Wet Process, Dry Process -Photosynthesis - Biogas Generation - Factors affecting Bio - digestion - Classification of bio gas plant - Continuous, Batch and Fixed Dome types - Advantages and Disadvantages.	07

IV	**New Energy Sources** Hydrogen as a renewable energy source - Sources of Hydrogen - Fuel for Vehicles - Hydrogen Production - Direct electrolysis of water, thermal decomposition of water, biological and biochemical methods of hydrogen production – Stor age of Hydrogen - Gaseous, Cryogenic and Metal hydride - Fuel Cell – Principle of working, construction and applications.	**07**

References

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1. Matt Bishop, “Computer Security: Art and Science”, Addison-Wesley Professional, First Edition, 2003. ISBN: 0201440997.

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