

RULES AND REGULATIONS
OF
BACHELOR OF TECHNOLOGY (B.TECH.) PROGRAM

(With effect from 2017 - 2018)



NATIONAL INSTITUTE OF TECHNOLOGY
WARANGAL - 506 004, T.S.

Rules and Regulations of B.Tech Programs effective from 2017-18

1. **INTRODUCTION:** Provision of these regulations shall come into force with effect from the academic year 2017 - 2018 and shall be applicable to all B. Tech courses (unless otherwise stated) offered by the Institute

1.1 B.Tech Degree Programs are offered in the following specializations by the respective engineering departments.

S No	Department	B. Tech Programme Name
1	Civil Engineering	Civil Engineering
2	Electrical Engineering	Electrical and Electronics Engineering
3	Mechanical Engineering	Mechanical Engineering
4	Electronics and Communication Engineering	Electronics and Communication Engineering
5	Metallurgical and Materials Engineering	Metallurgical and Materials Engineering
6	Chemical Engineering	Chemical Engineering
7	Computer Science and Engineering	Computer Science and Engineering
8	Biotechnology	Biotechnology

1.2 The provisions of these regulations shall be applicable to any new discipline that may be introduced from time to time.

1.3 The sanction of stipend will be as per the guidelines prescribed by AICTE/MHRD from time to time

1.4 Prescribed service courses for all the programmes listed in 1.1 are supported by a) Mathematics b) Humanities and Social Sciences c) Physics d) Chemistry and e) School of Management, Physical Education.

2. ADMISSION:

2.1 Admission to National Institute of Technology Warangal will be made in accordance with the instructions received from the Ministry of Human Resource Development (MHRD), Government of India from time to time. Seats are reserved for candidates belonging to Scheduled Castes (SC), Schedules Tribes (ST), Other Backward Classes (OBC), Persons with Disability (PH/PWD) and other categories as per the guidelines issued by MHRD from time to time.

- 2.2 Admission to all courses will be made in the odd semester of each academic year at the first year level based on the relative performance in the Joint Entrance Examination (JEE – Mains) as per the guidelines issued by the MHRD, New Delhi from time to time. The candidates should have successfully passed the 12th class examination or equivalent with the combination of subjects prescribed by the Competent Authority.
- 2.3 A limited number of admissions are offered to Foreign Nationals and Indians living abroad in accordance with the rules applicable for such admission, from time to time, issued by MHRD.
- 2.4 If, any time after admission, it is found that a candidate had not in fact fulfilled all the requirements stipulated in the offer of admission, in any form what so ever, including possible misinformation etc., the Dean-Academic shall report the matter to the Senate recommending for cancelling the admission of the candidate.
- 2.5 The institute reserves the right to cancel the admission of any student and ask him/her to discontinue his/her studies at any stage of his/her career on the grounds of indiscipline or any misconduct.
- 2.6 The decision of the Senate, regarding sections 2.4 and 2.5 above, is final and binding.
- 2.7 Candidates must fulfil the medical standards required for admission as prescribed in the Institute Information Brochure or the Prospectus.
- 2.8 Every Under Graduate student of the Institute shall be associated with the parent department offering the degree program that the student undergoes, throughout his/her study period.

3. COURSE STRUCTURE:

- 3.1 The total course package for B.Tech Degree Program typically consists of the following components.
- a) Basic Science Core (BSC)
 - b) Engineering Science Core (ESC)
 - c) Humanities and Social Science Core (HSC)
 - d) Program Core Courses (PCC)
 - e) Departmental Elective Courses (DEC)
 - f) Open Elective Courses (OPC)
 - g) Program Major Project (PRC)
 - h) EAA: Games and Sports (MDC)

Note: (Open *Elective Courses can be any of the following areas: Basic Sciences, Engineering Science Courses, Humanities, Social Sciences and Management*)

- 3.2 Each student should have cleared, with P or better grade, at least 173 credits to be eligible for the award of the B. Tech. Degree.
- 3.3 The DAC - UG along with external members will discuss and finalize the exact credits offered for the program for the components (a) to (h) of 3.1, the semester-wise distribution among them, as well as the syllabi of all courses offered by the Department along with course outcomes of each course from time to time and recommend the same to the Senate for consideration and approval.

3.4 Curriculum in the first two semesters:

3.4.1 In the first two semesters, students of all the B.Tech programs will have the same curriculum.

3.4.2 Every student admitted in the first year is required to register and complete satisfactorily in Extra-Academic Activity (E.A.A. = Games & Sports) in the first two semesters, which is mandatory. However, the EAA does not carry any credits. Interested students can also enroll in NCC / NSS.

3.5 Major Project: The Major Project is a 6-credit course and is offered in the IV Year First and Second semesters. The method of evaluation may be as per the guidelines given under B.Tech Project evaluation. (See Section 10.6). Guidelines for preparation of Project Report are given in Appendix-V.

3.6 Minimum number of credits that a student can register in any given semester is 16. Maximum number of credits that can be registered in a semester is 30 inclusive of backlog subjects registered.

4. DEGREE REQUIREMENTS:

The requirements for a student of B.Tech degree program are as follows:

- (a) Credit Requirements: Minimum Earned Credit Requirements for the award of Degree is 173 with a CGPA of not less than 4.0.
- (b) The minimum duration for a student for complying with the Degree requirement is FOUR academic years from the date of first registration for his/her first semester.
- (c) The maximum duration for a student for complying with the Degree requirement is EIGHT academic years from the date of first registration for his/her first semester.

5. ACADEMIC CALENDAR:

The *academic year* is divided into two semesters.

The Senate shall approve the schedule of academic activities for an academic year including the dates of registration, Mid-semester and End-semester examinations. Each semester will normally be of 19 weeks, which includes End-semester examinations. It may *be* ensured that the number of *effective teaching days in a semester is 80*.

Academic calendar declared by the Senate in the beginning of each academic year shall also fix *Festival* dates during which the co-curricular and extra-curricular programs like Technical seminars /*Spring Spree*/Institute Fest etc., are to be organized.

6. RESIDENTIAL REQUIREMENT:

The Institute is essentially residential and unless otherwise exempted/permitted, every student shall be required to reside in and be a boarder of one of the Halls of Residence and mess to which he/she is assigned. The rules relating to the residential requirements are given in Appendix I.

7. ATTENDANCE:

Following are the rules relating to attendance requirements:

- 7.1 Every student is expected to have 100% attendance in each subject in which he/she has registered at the beginning of the semester. However, condonation for shortage of attendance up to 20% (i.e., not lower than 80% aggregate attendance in any course) may be granted by the Head of the concerned Department.
- 7.2 Students not having the mandatory requirement of minimum 80% attendance in any course, shall not be permitted to appear for the end semester examination in that subject and is awarded "R" Grade in that course. Such student has to register for the course in which he/she has shortage of attendance, as and when the course is offered next.
- 7.3 If the period of absence is for a short duration (of not more than two weeks), application for leave shall have to be submitted to the Head of the Department concerned stating fully the reasons for the leave requested for along with supporting document(s). The Head of the Department will grant such leave. During such leave period, the student will be marked as absent. Even with this leave applied, the student must satisfy at least 80% attendance requirement to appear for end semester examination.
- 7.4 If the period of absence exceeds two weeks, a prior application for grant of leave will have to be submitted through the Head of the Department to the Dean-Academic with supporting documents. The decision to grant such leave shall be taken by the Dean-Academic, after considering the recommendation of the Head of the Department, if the aggregate attendance is at least 80%.
- 7.5 A resident student must take prior permission from the corresponding warden before proceeding on leave. Failing to do so will be construed as breach of discipline and will be dealt with as per provisions.
- 7.6 A student representing the Institute in approved extracurricular activities such as Sports, Games, Cultural meets, Seminar, Workshop, Conference and Interview arranged through Training & Placement Department, NCC/ NSS Camps shall be considered as on-duty subject to a maximum of five working days in a semester. Prior permission from competent authority is required for availing on-duty permission. The period of absence can be counted as present for the computation of percentage of attendance at the end of semester.
- 7.7 Attendance for both theory and laboratory courses shall be entered before the end of each working week by the concerned faculty through faculty portal of the Institute website. Students are advised to monitor the status of their attendance through student portal of the Institute website.

8. REGISTRATION:

- 8.1 Every student is required to be present and register at the commencement of each semester on the day(s) fixed for and notified in the Academic Calendar.
- 8.2 Percentage attendance for all students will be counted from the date of commencement of the semester, irrespective of his/her date of registration. However, in case of I Year I Semester, attendance will be counted from date of admission into the Institute or date of commencement of class work, whichever is later.
- 8.3 Registration for all courses in the first two semesters is organized centrally.

8.4 From the third semester onwards, the registration will be organized at the respective Department under the supervision of the Head of the Department.

8.5 A student who does not register on the day announced for the purpose may be permitted, in consideration of any compelling reason, late registration within the next week on payment of additional late fee as prescribed by the Institute from time to time. Normally no late registration shall be permitted after one week from the scheduled date.

8.6 After registration in each semester, each student should collect a registration sheet, which indicates the courses registered by him/her in that semester, signed by the faculty advisor. The student should carry this registration sheet for all the examinations in that semester. This sheet serves the purpose of hall ticket for appearing for the examinations in that semester.

8.7 If a student finds his/her load heavy in any semester, or for any other valid reason, he/she can drop some courses within three weeks from the commencement of the class work in the semester with the written approval of his/her Faculty Advisor and Head of the Department, with an intimation to Dean-Academic.

8.8 Only those students will be permitted to register who have

- i. Cleared all the Institute and Hostel dues of the previous semesters,
- ii. Paid all required fees for the current semester, and
- iii. Not been debarred from registering for a specified period on disciplinary or any other ground.

8.9 A Student can register for a backlog subject whenever it is offered. His/her previous marks/grades are cancelled and will have to attend all classes and examinations as and when they are conducted. Major changes in the time table shall not be entertained to accommodate backlog students. Alternatively, a student can appear for make-up examination in the backlog subject as and when it is conducted. In such a case, the student shall be awarded only P grade, if he/she gets 35% or more marks in the makeup examination.

8.10 A student must register for the backlog courses first giving priority to the oldest backlogs. [The students will register by default for backlog courses being offered in a particular semester]. The maximum credits (including backlog courses) that a student can register in a semester is 30.

9. EVALUATION - Grading System:

9.1 As a measure of student's performance an 8-scale grading system using the following letter grades and corresponding grade points per credit shall be followed. Grading will be done based on the total marks obtained by the student in that subject.

Letter Grade	S	A	B	C	D	E	P	F
Grade Point	10	9	8	7	6	5	4	0

Relative grading scheme shall be followed for all the UG Programs.

The norms for the award of the letter grade are as follows:

- No student can be awarded P or better grade without securing at least **35%** aggregate marks in any course.
- It is also mandatory that the student should secure at least 35% marks in the End Semester examination in the course for award of P or better Grade.
- The class average is calculated by excluding the marks obtained by F grade students.
- Further, there shall be four transitional grading symbols, which can be used by the examiners to indicate the special position of a student in the subject.
 - **I:** for "Incomplete assessment", when the student misses the End-semester examination on Medical grounds (see rule 11.6).
 - **R:** for 'Insufficient attendance' in the course (see Rule 7.2).
 - **W:** for "Temporary withdrawal' from the Institute (see rule 14).
 - **X:** for "Debarred" on grounds of indiscipline/ malpractices in examinations (See rule 16).

9.2 A semester Grade Point Average (SGPA) will be computed for each semester. The SGPA will be calculated as follows:

$$SGPA = \frac{\sum_1^n C_i GP_i}{\sum_1^n C_i}$$

where C_i is Credits for the course, GP_i is the grade point obtained for the course and n is Number of subjects registered in the semester.

9.3 Starting from I Year II Semester a Cumulative Grade Point Average (CGPA) will be computed for every student at the end of every semester. The CGPA would give the Cumulative performance of the student from the first semester up to the end of the semester to which it refers and calculated as follows.

$$CGPA = \frac{\sum_1^n S_i C_i}{\sum_1^n C_i}$$

where n is the total number of Semesters under consideration, C_i is the total number of Credits Registered during a particular semester and S_i is the SGPA of the semester.

9.4 The CGPA, SGPA and the grades obtained in all the subjects in a semester will be communicated to every student at the end of every semester excepting IV year II semester through a grade sheet. In its place a consolidated grade sheet (with 173 credits) is issued for final semester. This consolidated grade sheet supersedes all the earlier grade sheets.

9.5 Both SGPA and CGPA will be rounded off to the second place of decimal and recorded as such. Whenever these grade point averages are to be used for the purpose of determining the inter-se merit ranking of a group of students, only the rounded off values will be used.

9.6 Transitional Grades:

(a) **Grade I:** When a student gets “I” Grade for any subject(s) during a semester, the SGPA of that semester and the CGPA at the end of that semester will be tentatively calculated ignoring this (these) subjects. After these transitional grades have been converted to appropriate grades, the SGPA for the semester and CGPA at the end of the semester will be recalculated after taking into account the new grades.

(b) **About grades R, W and X:** When a student gets any of these transitional grades in any subject(s) during a semester, the SGPA of that semester and the CGPA at the end of that semester will be tentatively calculated by taking ‘zero point’ for these subject(s). After these transitional grades have been converted to appropriate grades, the SGPA for the semester and CGPA at the end of the semester will be recalculated after taking into account the new grades.

(c) **About Grade F:** When a student gets the 'F' grade in any subject during a semester, the SGPA and the CGPA from that semester onwards will be tentatively calculated, taking only 'zero point' for each such 'F' grade. After the 'F' grade has been substituted by better grades during a subsequent semester, the SGPA and CGPA of all the semesters starting from the earliest semester in which the 'F' grade has been updated, will be recomputed and recorded to take this change of grade into account.

9.7 Students registering for makeup examination shall be awarded only P grade, if they get 35% or more marks in the makeup examination.

10. ASSESSMENT OF ACADEMIC PERFORMANCE:

10.1 There will be continuous assessment of a student's performance through class tests/ quizzes/ Assignments etc throughout the semester and grades will be awarded by the subject teacher/co-ordination committee formed for this purpose (see Academic Committees)

10.2 Each theory subject in a semester is evaluated for 100 marks, with the following weightages.

Sub-component	Weightage
Class tests/ Quizzes/ Assignment etc.	20 marks
Mid-semester Examination	30 marks
End-semester Examination	50 marks

10.3 The mid-semester examination will be conducted after 7 or 8 weeks of instruction.

10.4 The mode and nature of the evaluation and the corresponding weightages, for the subcomponent (a) shall be intimated to the students at the beginning of the semester along with the lecture schedule.

10.5 Each laboratory course in a semester is evaluated for 100 marks, with the following weightages:

Sub-component	Weightage
Continuous evaluation	60 marks
End Semester examination	40 marks

The marks for continuous evaluation may be distributed among various components like class work performance, Lab records, Quizzes, skill tests/ assignments/ mini projects. This is to be informed to students and supervisor before commencement of the dissertation work by the Faculty Advisor.

10.6 The B.Tech Project work will be evaluated for 100 marks, with the following weightages:

Sub-component	Weightage
Periodic evaluation by Guide	40 marks
Midterm review	20 marks
End Semester viva-voce examination	40 marks

The midterm review and the end semester viva-voce examination will be conducted by a committee constituted by the Head of the Department. If the performance of a student is not satisfactory, he/ she can be awarded 'F' grade. Such a student will be given a maximum time of three months to improve his/her performance. If the performance of such a student is not satisfactory even after the extended time period, he/ she will have to repeat the project work in the next academic year.

The Departments have to evolve rubrics for evaluation of Project work. The marks may be distributed among various components like selection of topic, problem statement, literature review, methodology, oral and written presentation of the work done and performance in viva-voce examination

The project work will commence in IV year I semester and will be for a duration of two semesters. The final evaluation of the project work will be done at the end of second semester and the grade for project will be given at the end of second semester.

11 MID-SEMESTER AND END-SEMESTER EXAMS:

- 11.1 The Mid-Semester and the End-semester examinations in respect of theory courses will be conducted centrally by the examination section as per the schedule.
- 11.2 Head of the Department sends the list of courses registered by each student for the semester along with percentage of attendance.

- 11.3 Class tests, surprise tests, assignments, quizzes, viva-voce, laboratory assignments etc. are the constituent components of continuous assessment process, and a student must undergo the continuous assessment process as prescribed by the teacher/co-ordination committee of the subject. If due to any compelling reason (such as his/her illness, calamity in the family etc.) a student fails to meet any of the requirements within/on the scheduled date and time, the teacher/coordination committee in consultation with the concerned Head of the Department may take such steps (including the conduct of compensatory tests/examinations) as are deemed fit.
- 11.4 If a student fails to appear for the mid semester examination in any subject(s) due to compelling reason like serious illness of himself/herself which necessitates hospitalization (with intimation to the medical officer) or a calamity in the family, he / she shall apply immediately to Dean-Academic, along with relevant certificates and duly recommended by the respective Head of the Department, within one week after completion of the examinations. All such cases will be scrutinized by a committee and approved list of candidates shall be permitted for a re-examination and the period of re-examination and syllabus shall be notified by the Dean- Academic.
- 11.5 Appearing in the end-semester examination in the theory and laboratory subjects is mandatory for a student. Unless exempted as stated below, if a student fails to appear for the end-semester examination, he/she shall be awarded 'F' grade in the subject. He/She can be permitted to appear for the makeup examinations to be conducted later, as announced in the academic calendar.
- 11.6 However, if a student misses the end-semester examinations due to a compelling reason like **serious illness of himself/herself which necessitates hospitalization or a calamity in the family**, he/she may appeal to the Dean-Academic before commencement of examination through his/her Head of the Department and Institute Medical Officer for permitting himself/herself to appear in the subsequent examination(s), when conducted next. A committee consisting of the following members may, after examining the documents and being convinced about the merit of the case, recommend permitting him/her to appear in the subsequent re-examination(s), when conducted next, condoning his / her absence. In such cases, transitory grade 'I' is temporarily awarded to the student in the subject.

Sub-committee:

Dean-Academic, Chairman.

Dean, Students Welfare

Concerned Head of the Department

The Institute Medical officer

Associate Dean, Examinations (Convener)

- 11.7 Students will be permitted to appear in the examinations in only those subjects for which they have registered at the beginning of the semester.

- 11.8 The final grades awarded to the students in a subject must be submitted by the teacher/Chairman, Coordination committee, within five working days from the date of the last examination to the concerned Head of the Department. The Head of the Department shall place the grades of students in all subjects before the DAC-UG for its consideration and recommendation. The grades recommended by the DAC-UG shall be sent to the Examination section.
- 11.9 Any change of grade of a student in a subject consequent upon detection of any genuine error of omission and/or commission on part of the concerned teacher must be recommended by the DAC-UG and shall be forwarded by the teacher/Chairman, Coordination Committee, through the Head of the concerned Department within 20 (twenty) days from the commencement of the next semester.
- 11.10 As a process of learning by students and also to ensure transparency, the answer scripts after correction of class tests, mid-semester examinations, assignments etc., will be shown to the students within two weeks from the date of test/examination. The teacher/ Chairman, Coordination Committee must submit the marks obtained in mid-semester examinations to the Head of the Department two weeks after the end of mid-semester examinations. The marks obtained in class tests/ minor tests held till that date also need to be submitted to the Head of the Department. The performance of the students in these examinations will be discussed in the Class Review Committee.
- 11.11 In order to ensure transparency in the evaluation of scripts of end-semester examination, those answer scripts also shall be shown to the students up to one day before the finalization of grades in the DAC-UG. Once the Grades are finalized by DAC-UG, the student will no longer have any right to verify his/her answer scripts.
- 11.12 The student can appeal to DAAC for any arbitration within 20 days from the date of official publication of results in the Institute Website .
- 11.13 A student of the B.Tech degree program must complete the prescribed course work with a minimum requirement of 173 credits within a maximum period of eight years starting from registration of I year I Sem.
- 11.14 A student who has passed all the courses without securing R, X, or F Grades during the period of study and with a **CGPA of 8.5 and above** is considered eligible for the award of First Division with Distinction.
- 11.15 A student failing to satisfy Rule 11.14, even if he/she gets a **CGPA of 8.5** or more will be eligible for the award of First Division only.
- 11.16 A student with a CGPA of 6.5 and above but less than 8.5 is considered eligible for the award of First Division.
- 11.17 A student with a CGPA of 5.0 and above but less than 6.5 is considered eligible for the award of Second Division.
- 11.18 A student with a CGPA of 4.0 and above but less than 5.0 is considered eligible for the award of Pass Division.
- 11.19 The valued answer scripts shall be preserved for a maximum period of 6 months after publication of results. The teachers are required to send the valued answer scripts of both mid semester and end semester examinations to the examination section to preserve them.
- 11.20 Examination record of all students shall be maintained in both soft and hard copy form in the academic section.

12 MAKEUP EXAMINATION:

Students appearing in Makeup examination shall be governed by the following rules:

- 12.1 Students with “R” Grade in any subject are not eligible for writing the makeup examination for that subject.
- 12.2 Students with “F” or “I” Grade only are eligible to write makeup examination. In the case of a student who has got “I” grade, the marks obtained by the student in continuous evaluation and mid-semester examination will be added to the marks obtained in makeup examination and will be graded as per the grading used for his/her class. In the case of a student who has obtained “F” grade in regular examination, he/ she will be awarded only “P” grade if he or she get 35% or more in the makeup examination. A student will be given only one chance to write the makeup examination. If he/ she gets “F” grade in the makeup examination, he/she has to repeat the course whenever it is offered.
- 12.3 Makeup examination is offered only once in an academic year.
- 12.4 A student who has obtained ‘F’ grade in makeup examination has to register for the course whenever it is offered.
- 12.5 The schedule for makeup examination is given in the Academic calendar.
- 12.6 A student can register for makeup examinations in any number of courses.

13 SUMMER QUARTER:

- 13.1 Students who have obtained ‘F’ grade in first year courses can register for summer quarter up to a maximum of 3 courses on payment of registration fees at prescribed rates. Students with ‘R’ grade are not eligible to register for Summer Quarter. A course will run during summer provided a faculty member is available for running the course and a minimum of 5 students are registered for the course. The Summer Quarter typically runs for 8 weeks, during May-July.
- 13.2 The total number of contact hours for the semester courses remains the same as that during the regular semesters, and therefore the courses run at accelerated pace. The evaluation and grading patterns also remain the same as during the regular semesters.

14 TEMPORARY WITHDRAWAL FROM THE INSTITUTE:

- 14.1 A student who has been admitted to an undergraduate degree course of the institute may be permitted to withdraw temporarily for a period of one semester or more from the Institute on grounds of prolonged illness or acute problem in the family, which compelled him/her to stay at home, provided that
 - He/she applies to the Institute within 15 days of the commencement of the semester or from the date he/she last attended his/her classes whichever is later, stating fully the reasons for such withdrawal together with supporting documents and endorsement of the parent/guardian.
 - The Institute is satisfied that, including the period of withdrawal, the student is likely to complete his/her requirements for the degree within the time limits specified in clause 11.13.

- There are no outstanding dues against him/her or demands from him/her in the Institute/Hostel/Department/Library/NCC etc.
- 14.2 A student, who has been granted temporary withdrawal from the Institute under the above provisions will be awarded 'W' grade. He will be required to pay the tuition fees and other essential fees/charges for the intervening period till such time as his/her name is borne on the Roll list.
- 14.3 A student will be granted only one such temporary withdrawal during his/her tenure as a student of the Institute.

15. CONDUCT AND DISCIPLINE:

Students shall conduct themselves within and outside the precincts of the institute in a manner befitting the students of an Institute of National importance. Detailed rules regarding conduct and discipline are given in Appendix-II.

16. MALPRACTICES:

Students are not allowed to leave the Examination Hall without submitting the answer script. They will not be permitted to enter the examination hall after 30 minutes of commencement of the examination and to leave the examination hall before 30 minutes of the closure of examination.

The nature of malpractice and the minimum punishment are indicated in the following table:

Sl. No	Nature of the Malpractice	Punishment
1	Taking out, used or unused answer booklets outside the examination room.	Fine of Rs. 1000/- per paper. In case of used answer booklets, in addition to the above, the candidate shall be awarded an F Grade in that subject.
2	Verbal or oral communication with neighbouring students after one warning.	Taking away the answer script and asking the student to leave the hall.
3	Possession of any incriminating material inside the examination hall (whether used or not) For Example: written or printed materials, bits, writings on scale, calculator, hand kerchief, dress, part of the body and hall ticket etc., Possession of cell phones, programmable calculator, recording apparatus or any unauthorized	In case of Mid/Sessional examination, award zero marks. In case of End semester examinations, award F Grade. The candidate may be allowed to write make-up examination.

	<p>electronic equipment.</p> <p>Copying from neighbour.</p> <p>Exchange of question papers and other materials with some answers.</p>	
4	<p>Possession of answer book of another candidate.</p> <p>Giving answer book to another candidate.</p>	The candidate shall be awarded zero marks in that examination and he/she shall be awarded F Grade in that particular subject.
5	<p>Misbehaviour in the examination hall (unruly conduct, threatening the invigilator, or any other examination officials).</p> <p>Repeated involvement in malpractices 2 to 4 above.</p>	Cancellation of all theory examinations registered in that semester and further debarring from continuing his/her studies for one year (two subsequent semesters). However such student may be permitted to appear for makeup examinations of the previous semesters.
6	Cases of impersonation	<p>Handing over the impersonator (outsider) to the police with a complaint to take appropriate action.</p> <p>Cancellation of all examinations (all papers registered) for the bonafide student for whom the impersonation was done and further the bonafide student will be debarred from continuing his/her studies and writing all examinations for two years.</p> <p>If a student of this institute is found to impersonate a bonafide student, the impersonating student will be debarred from continuing his/her studies and writing all examinations for two years.</p>
7	Physical assault causing injury to the invigilator or any examination officials.	Rustication from the Institute.

For any other type of malpractices reported, The Malpractice and Disciplinary Action Committee (Academic) may recommend appropriate punishment.

17. Certificate retention Fee:

Students will be charged with Certificate retention fees as per the details shown below:

All students –

- Who have passed in current and previous academic year - No charge.
- Who have passed in the last 2 to 10 academic years - Rs. 1,000
- Who have passed in the last 11 to 20 academic years - Rs. 5,000.
- Who have passed more than 20 academic years back - Rs. 10,000

18. STUDENT APPRAISAL:

It is mandatory for every student to submit the feedback on each and every course, he/she has undergone, at the end of every semester. Results will be withheld for those students who have not submitted the feedback. All such students have to a) pay a fine of Rs. 500/- , b) obtain permission from Dean(Academic) and c) fill the feedback for viewing the withheld result.

19. CHANGE OF REGULATIONS:

Not with standing all that has been stated above, the Senate, has the right to modify any of the above rules and regulations from time to time. All such modifications shall be documented and numbered sequentially and shall be made available in the Institute website.

Mathematics - I

[for I B.Tech. I Semester - all sections]

MA 101	Mathematics – I	BSC	3-0-0	3 Credits
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Pre-requisites: None

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

CO 1	solve the consistent system of linear equations
CO 2	apply orthogonal and congruent transformations to a quadratic form
CO 3	determine the power series expansion of a given function
CO 4	find the maxima and minima of multivariable functions
CO 5	solve arbitrary order linear differential equations with constant coefficients
CO 6	apply the concepts in solving physical problems arising in engineering

Detailed Syllabus

Matrix Theory: Linear dependence and independence of vectors; Rank of a matrix; Consistency of the system of linear equations; Eigenvalues and eigenvectors of a matrix; Caley-Hamilton theorem and its applications; Reduction to diagonal form; Reduction of a quadratic form to canonical form - orthogonal transformation and congruent transformation; Properties of complex matrices - Hermitian, skew-Hermitian and Unitary matrices.

(14)

Differential Calculus: Taylor's theorem with remainders; Taylor's and Maclaurin's expansions; Asymptotes; Curvature; Curve tracing; Functions of several variables - partial differentiation; total differentiation; Euler's theorem and generalization; Change of variables - Jacobians; maxima and minima of functions of several variables (2 and 3 variables) - Lagrange's method of multipliers.

(14)

Ordinary Differential Equations: Geometric interpretation of solutions of first order ODE $y' = f(x, y)$; Exact differential equations; integrating factors; orthogonal trajectories; Higher order linear differential equations with constant coefficients - homogeneous and non-homogeneous; Euler and Cauchy's differential equations; Method of variation of parameters; System of linear differential equations; applications in physical problems - forced oscillations, electric circuits, etc.

(14)

Reading:

1. R. K. Jain and S. R. K. Iyengar, "*Advanced Engineering Mathematics*", Fifth Edition, Narosa Publishing House, 2016
2. Erwin Kreyszig, "*Advanced Engineering Mathematics*", Eighth Edition, John Wiley and Sons, 2015
3. B. S. Grewal, "*Higher Engineering Mathematics*", Khanna Publications, 2015



NATIONAL INSTITUTE OF TECHNOLOGY

WARANGAL – 506 004

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

No. NITW/HSS/ 2017/

Date: 18.07.2017

DETAILED SYLLABUS

H.S.102	English for Technical Communication	L-T-P	2-0-2	3 Credits
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Detailed Syllabus:

1. Grammar Principles (Correction of sentences, Concord) and Vocabulary Building (synonyms and antonyms): Idioms and Phrasal verbs--patterns of use and suggestions for effective employment in varied contexts
2. Effective Sentence Construction - strategies for bringing variety and clarity in sentences- removing ambiguity - editing long sentences for brevity and clarity
3. Reported speech;- contexts for use of reported speech - its impact on audiences and readers- active and passive voice- reasons for preference for passive voice in scientific English-
4. Paragraph-writing: Definition of paragraph and types- features of a good paragraph - unity of theme- coherence- linking devices- direction- patterns of development.
5. Note-making - definition- the need for note-making - its benefits - various note formats- like tree diagram, block or list notes, tables, etc.
6. Letter-Writing: Its importance in the context of other channels of communication- qualities of effective letters-types -personal, official, letters for various purposes- emphasis on letter of application for jobs - cover letter and resume types -examples and exercises
7. Reading techniques: Definition- Skills and sub-skills of reading- Skimming and Scanning - their uses and purposes- examples and exercises.
8. Reading Comprehension - reading silently and with understanding- process of comprehension- types of comprehension questions.
9. Features of Technical English - description of technical objects and process- Report-Writing- definition- purpose -types- structure- formal and informal reports- stages in developing report- proposal, progress and final reports-examples and exercises
10. Book Reviews- Oral and written review of a chosen novel/play/movie- focus on appropriate vocabulary and structure - language items like special vocabulary and idioms used-

DELETED ELEMENTS FROM THE CURRICULUM

Mnemonics, Prefixes, Suffixes

Simple, compound and complex sentences

Language laboratory

1. English Sound System -vowels , consonants, Diphthongs, phonetic symbols- using dictionary to decode phonetic transcription-- Received Pronunciation, its value and relevance- transcription of exercises-
2. Stress and Intonation –word and sentence stress - their role and importance in spoken English-
Intonation in spoken English -definition, patterns of intonation- –falling, rising, etc.-use of intonation in daily life-exercises
- 3.Introducing oneself in formal and social contexts- Role plays.- their uses in developing fluency and communication in general.
4. Oral presentation - definition- occasions- structure- qualities of a good presentation with emphasis on body language and use of visual aids.
5. Listening Comprehension -Challenges in listening, good listening traits, some standard listening tests- practice and exercises.
6. Debate/ Group Discussions-concepts, types , Do's and don'ts- intensive practice.

Deleted items

Rhythm , JAM

Reading:

1. English for Engineers and Technologists (Combined edition , Vol. 1 and 2)
Orient Blackswan 2010.
2. Ashraf, M Rizvi. Effective Technical Communication. Tata McGraw-Hill, 2006
3. Meenakshi Raman and Sangeetha Sharma. Technical Communication: Principles and Practice 2nd Edition, Oxford University Press, 2011

Software:

- 1.Clear Pronunciation – Part-1 *Learn to Speak English.*
2. Clear Pronunciation – Part-2 *Speak Clearly with Confidence*
3. Study Skills
- 4.English Pronunciation

Course Outcomes: The student will be able to

- CO1: Solve engineering problems using the concepts of wave and particle nature of radiant energy.
- CO2 : Understand the use of lasers as light sources for low and high energy applications.
- CO3: Understand the nature and characteristics of new Materials for engineering applications.
- CO4: Apply the concepts of light propagation in optical fibers, light wave communication systems, holography and for sensing physical parameters.
- CO5: Apply the knowledge of Solar PV cells for choice of materials in efficient alternate energy generation.

Detailed Syllabus:

1. Quantum Mechanics:

Concepts and Experiments that led to the discovery of Quantum Nature. Heisenberg uncertainty principle; Schrodinger time independent and time dependent wave equations, The free particle problem - Particle in an infinite and finite potential well, Quantum mechanical tunneling. MB, BE and FD distributions. (5)

2. Wave and Quantum Optics:

Interference and Diffraction: Concept of interference and working of Fabry-perot Interferometer and its application as wavelength filter. Multiple beam diffraction and Working of diffraction Gratings, Application of Grating as wavelength splitter. **Polarization Devices:** Principles, Working and applications of Wave Plates, Half Shade Polarimeter, Polaroscope, Isolators and Liquid Crystal Displays. **Lasers:** Basic theory of Laser, Concept of population inversion and Construction and working of He-Ne, Nd-YAG, CO₂ Lasers, LED, White light LED, Semiconductor Laser, Holography and NDT. **Optical Fibers:** Structure, Types, Features, Light guiding mechanism and applications in Communications and Sensing. **Solar Cells:** Solar spectrum, photovoltaic effect, materials, structure and working principle, I-V characteristics, power conversion efficiency, quantum efficiency, emerging PV technologies, applications. (20)

3. Magnetic and Dielectric Materials:

Magnetic Materials and Superconductors: Introduction - Weiss Theory of Ferromagnetism – Properties – Domains – Curie Transition - Hard and soft magnetic materials – Spinel Ferrites – Structure – Classification – Applications - Meissner effect - Type-I and Type-II Superconductors – Applications.

Dielectric Materials:

Introduction to Dielectrics, Dielectric constant – Polarizability - Properties and types of insulating materials - Polarization mechanisms in dielectrics (Qualitative) – Frequency and temperature dependence of polarization – Dielectric loss Clausius-Mossotti Equation (Qualitative) – dielectric Breakdown - Applications. (10)

4. Functional and Nano Materials:

Functional Materials: Fiber reinforced plastics, fiber reinforced metals, surface acoustic wave materials,

Bio-materials, high temperature materials and smart materials - Properties and applications.

Nanomaterials: Introduction, classification, properties, different methods of preparation and applications.

(7)

Reading:

1. Halliday, Resnic and Walker, Fundamentals of Physics, 9th Ed., John Wiley, 2011.
2. Beiser A, Concepts of Modern Physics, 5th Ed., McGraw Hill International, 2003.
3. Ajoy Ghatak, Optics, 5th Ed., Tata McGraw Hill, 2012.
4. S.O.Pillai, Solid State Physics, New Age Publishers, 2015

EC101 - Basic Electronic Engineering

3-0-0 3-credits

Detailed Syllabus:

Electronics Systems: Introduction to electronics, review of p-n junction operation, diode applications, Zener diode as regulator.

Transistor and applications: Introduction to transistors, BJT Characteristics, biasing and applications, simple RC coupled amplifier and frequency response. FET and MOSFET characteristics and applications.

Feedback in Electronic Systems: open loop and closed loop systems, Negative and positive Feedback, merits and demerits, Principles of LC and RC oscillators.

Integrated Circuits: Operational amplifiers – characteristics and linear applications

Digital Circuits: Number systems and logic gates, Combinational Logic circuits, Flip-Flops, counters and shift registers, data converters, Analog to Digital and Digital to Analog converters (ADC/DAC's), Introduction to microprocessors and microcontrollers.

Laboratory measuring instruments: principles of digital multi-meters, Cathode ray oscilloscopes (CRO's).

Electronics Instrumentation: Measurement, Sensors, principles of LVDT, strain gauge and thermocouples. Introduction to data acquisition system.

Principles of Communication: Need for Modulation, Definitions of various Modulation and Demodulation techniques, AM radio transmitter and receiver, brief understanding of FM and mobile communications.

Text books:

1. Bhargava N. N., D C Kulshreshtha and S C Gupta, Basic Electronics & Linear Circuits, 2nd Edition, Tata McGraw Hill, 2013.
2. Malvino and Brown, "Digital Computer electronics" Mcgraw Hill, 3rd Edition.
3. Keneddy and Davis, "Electronic Communication Systems" Mcgraw Hill, 4th Edition.
4. Helfrick and Cooper, " Modern Electronic Instrumentation and Measurement Techniques" PHI, 2011

References:

1. Salivahanan, N Suresh Kumar Electronic Devices and circuits, 3rd Edition, McGraw Hill publications.
2. Neil Storey, Electronics A Systems Approach, 4th Edition, Pearson Education Publishing Company Pvt Ltd.

Environmental Science and Engineering

Syllabus

Unit 1: Introduction to Environmental Science: (2-0-0-2)

Environment and society, major environmental issues: Ozone layer depletion, Acid rains, global climate change etc, sustainable development, Environmental impact assessment, environmental management

Unit 2: Natural Resources Utilization and its Impacts:

Energy, minerals, water and land resources, Resource consumption, population dynamics, urbanization.

Unit 3: Ecology and Biodiversity:

Energy flow in ecosystem, food chain, nutrient cycles, eutrofication, value of biodiversity, biodiversity at global, national and local levels, threats for biodiversity, conservation of biodiversity

Unit 4: Water Pollution:

Sources, types of pollutants and their effects, water quality issues, contaminant transport, self purification capacity of streams and water bodies, water quality standards, principles of water and wastewater treatment.

Unit 5: Air Pollution:

Sources, classification and their effects, Air quality standards, dispersion of pollutants, control of air pollution, automobile pollution and its control.

Unit 6: Solid Waste Management:

Sources and characteristics of solid waste, effects, Collection and transfer system, disposal methods

Text Book:

G.B. Masters, Introduction to Environmental Engineering and Science, Pearson Education., 2013

Reference books:

- Gerard Kiely, Environmental Engineering, McGraw Hill Education Pvt Ltd, Special Indian Edition, 2007.
- W P Cunningham, M A Cunningham, Principles of Environmental Science, Inquiry and Applications, Tata McGraw Hill Publishing Company Ltd, New Delhi.
- M.Chandrasekhar, Environmental science, Hi Tech Publishers, 2009.

ME101	BASIC MECHANICAL ENGINEERING	ESC	3 - 0 - 0	3 Credits
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Pre-requisites: None.

Course Outcomes: At the end of the course, the student will be able to:

CO1	Identify Materials for Engineering Applications
CO2	Describe the functions and operations of Conventional, NC, CNC and 3D Printing methods of manufacturing.
CO3	Select a power transmission system for a given application.
CO4	Understand the concepts of thermodynamics and functions of components of a power plant.
CO5	Understand basics of heat transfer, refrigeration, internal combustion engines and Automobile Engineering.

DETAILED SYLLABUS:

Engineering Materials: Introduction to Engineering Materials, Classification and Properties

Manufacturing Processes: Castings – Patterns & Moulding, Hot Working and Cold Working, Metal Forming processes: Extrusion, Drawing, Rolling, Forging, Welding – Arc Welding & Gas Welding, Soldering, Brazing.

Machine Tools: Lathe – Types – Operations, Problems on Machining Time Calculations, Drilling M/c – Types – Operations, Milling M/c – Types – Operations – Up & Down Milling, Shaping M/c – Operations – Quick Return Mechanism, Planer M/c. – Operations – Shaper Vs Planer, Grinding M/c – Operations. Introduction to NC/CNC Machines, 3D Printing

Power Transmission: Transmission of Power, Belt Drives, Gears and Gear Trains – Simple Problems

Fasteners and Bearings: Fasteners – Types and Applications, Bearings – Types and Selection,

Thermodynamics: Energy Sources – Conventional/Renewable, Thermodynamics – System, State, Properties, Thermodynamic Equilibrium, Process & Cycle, Zeroth law of Thermodynamics, Work & Heat, First law – Cyclic process, Change of State, C_p , C_v , PMM1, Limitations of First law, Thermal Reservoirs, Heat Engine, Heat Pump/Refrigerator, Efficiency/CoP, Second law, PMM2, Carnot Cycle, Entropy – T-s and P-v diagrams.

Thermal Power Plant: Layout of Thermal Power Plant & Four circuits – Rankine cycle, T-s & P-v diagrams, Boilers – Babcock & Wilcox, Cochran Boilers, Comparison of Fire Tube & Water Tube Boilers, Steam Turbines – Impulse Vs. Reaction, Compounding – Pressure & Velocity Compounding, Condensers – Jet Condenser and Surface Condenser; Cooling Towers.

I.C. Engines: 2-Stroke & 4-Stroke Engines, P-v Diagram; S.I. Engine, C.I. Engine, Differences

Refrigeration: Vapor Compression Refrigeration Cycle – Refrigerants, Desirable Properties of Refrigerants

Heat Transfer: Modes of Heat Transfer, Thermal Resistance Concept, Composite Walls & Cylinders, and Overall Heat Transfer Coefficient – problems

Automobile Engineering: Layout of an Automobile, Transmission, Clutch, Differential, Internal Expanding Shoe Brake

Text Book:

M.L.Mathur, F.S.Mehta and R.P.Tiwari,R.S.Vaishwnar, “Elements of Mechanical Engineering”, Jain Brothers, New Delhi, 2008

Reference Books:

1. Praveen Kumar, “Basic Mechanical Engineering”, Pearson Education, India, 2013
2. P.N. Gupta, M.P. Poonia, “Elements of Mechanical Engineering”, Standard Publishers, 2004
3. C.P.Gupta,Rajendra Prakash, “Engineering Heat Transfer”,NemChand Brothers,New Delhi, 1994
4. B.S.Raghuvanshi, “Workshop Technology, Vol. 1&2”, Dhanpath Rai & Sons, New Delhi, 1989

CS101	PROBLEM SOLVING AND COMPUTER PROGRAMMING	ESC	3 – 0 – 0	3 Credits
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Pre-requisites: None.

Course Outcomes: At the end of the course, the student will be able to:

CO1	Design algorithms for solving simple mathematical problems including computing, searching and sorting
CO2	Compare and contrast algorithms in terms of space and time complexity to solve simple mathematical problems
CO3	Explore the internals of computing systems to suitably develop efficient algorithms
CO4	Examine the suitability of data types and structures to solve specific problems
CO5	Apply control structures to develop modular programs to solve mathematical problems
CO6	Apply object oriented features in developing programs to solve real world problems

Mapping of course outcomes with program outcomes

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3	3	3	3		2			2
CO2	3	3	2	2		2		2	2
CO3	3	3	2	2				2	2
CO4	2	3	2	1		2			2
CO5	2	3	2	2		2			2
CO6	2	3	2	2		2			2

Detailed Syllabus:

Theory:

Fundamentals of Computers, Historical perspective, Early computers, Components of a computers, Problems, Flowcharts, Memory, Variables, Values, Instructions, Programs.

Problem solving techniques – Algorithmic approach, characteristics of algorithm, Problem solving strategies: Top-down approach, Bottom-up approach, Time and space complexities of algorithms.

Number systems and data representation, Basics of C++, Basic data types.

Numbers, Digit separation, Reverse order, Writing in words, Development of Elementary School Arithmetic Testing System, Problems on Date and factorials, Solutions using flow of control constructs, Conditional statements - If-else, Switch-case constructs, Loops - while, do-while, for.

Functions – Modular approach for solving real time problems, user defined functions, library functions, parameter passing - call by value, call by reference, return values, Recursion, Introduction to pointers.

Sorting and searching algorithms, Large integer arithmetic, Single and Multi-Dimensional Arrays, passing arrays as parameters to functions

Magic square and matrix operations using Pointers and Dynamic Arrays, Multidimensional Dynamic Arrays

String processing, File operations.

Structures and Classes - Declaration, member variables, member functions, access modifiers, function overloading, Problems on Complex numbers, Date, Time, Large Numbers.

Reading:

1. Walter Savitch, Problem Solving with C++, Ninth Edition, Pearson, 2014.
2. Cay Horstmann, Timothy Budd, Big C++, Wiley, 2nd Edition, 2009.
3. R.G. Dromey, How to solve it by Computer, Pearson, 2008.

Mathematics - II

[for I B.Tech. II Semester - all sections]

MA 151	Mathematics - II	BSC	3-0-0	3 Credits
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Pre-requisites: Mathematics-I

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

CO 1	analyze improper integrals
CO 2	evaluate multiple integrals in various coordinate systems
CO 3	apply the concepts of gradient, divergence and curl to formulate engineering problems
CO 4	convert line integrals into surface integrals and surface integrals into volume integrals
CO 5	apply Laplace transforms to solve physical problems arising in engineering

Detailed Syllabus

Integral Calculus: Convergence of improper integrals; Beta and Gamma integrals; Differentiation under integral sign; Double and Triple integrals - computation of surface areas and volumes; change of variables in double and triple integrals. (14)

Vector Calculus: Scalar and vector fields; vector differentiation; level surfaces; directional derivative; gradient of a scalar field; divergence and curl of a vector field; Laplacian; Line and Surface integrals; Green's theorem in a plane; Stoke's theorem; Gauss Divergence theorem. (14)

Laplace Transforms: Laplace transforms; inverse Laplace transforms; Properties of Laplace transforms; Laplace transforms of unit step function, impulse function, periodic function; Convolution theorem; Applications of Laplace transforms - solving certain initial value problems, solving system of linear differential equations, finding responses of systems to various inputs viz. sinusoidal inputs acting over a time interval, rectangular waves, impulses etc. (14)

Reading:

1. R. K. Jain and S. R. K. Iyengar, "*Advanced Engineering Mathematics*", Fifth Edition, Narosa Publishing House, 2016
2. Erwin Kreyszig, "*Advanced Engineering Mathematics*", Eighth Edition, John Wiley and Sons, 2015
3. B. S. Grewal, "*Higher Engineering Mathematics*", Khanna Publications, 2015

SYLLABUS OF I/IV B.Tech. (FROM 2017-18)

CHEMISTRY

(All Branches)

Code CY101

Credits: 3

3-0-0-3 (L-T-P-CH)

Detailed Syllabus:

1: Quantum Chemistry and Chemical Bonding:

Emergence of Quantum Theory; Postulates of Quantum Mechanics, Operators and Observables, Schrodinger Equation, Particle in a One-Dimensional Box and Colour of Conjugate Molecules, Hetero-diatomic Molecule as Harmonic Oscillator and Rigid Rotor, Hydrogen Atom, LCAO-MO Theory (MO Diagram of CO and NO Molecules)

2: Chemical Thermodynamics:

Enthalpy and Free Energy Changes in Chemical Reactions; Relevance of C_p and C_v in Gas Phase Reactions, Chemical Potential; Heat Capacity of Solids, Absolute Entropy and Third Law of Thermodynamics

3: Electrochemistry:

Electrodes and Electrochemical Cells; Potentiometric and Amperometric Sensors; Li-Ion and Ni-Cd Rechargeable Batteries; Fuel Cells (Methanol-Oxygen); Electrochemical Theory of Corrosion; Factors Affecting Rate of Corrosion; Sacrificial Anodic and Impressed Current Cathodic Protection.

4: Coordination Chemistry and Organometallics:

Shapes of Inorganic Compounds; Crystal Field and Molecular Orbital Theories; MO-Diagram for an Octahedral Complex; Metal Ions in Biology; Organometallic Chemistry (Metal Carbonyls).

5: Basics of Organic Chemistry:

Classification of Organic reaction and their mechanisms. Reaction intermediates: formation, structure and properties. Named Reactions: Skraup's synthesis, Diels-Alder reaction, Click Reactions.

6: Engineering Materials and Application:

Inorganic and Organic polymers - Zeolites, resins, polymeric membranes, conducting polymers, Applications - optical fibres, OLED, water purification.

7: Instrumental Methods of Chemical Analysis:

Gas- and Liquid-Chromatographic Separation of Components of Mixtures; UV-Visible, FTIR, NMR and Mass Spectral Methods of Analysis of Structures of Organic Compounds, Radiometry.

Reading Books :

1. A Textbook of Engineering Chemistry, Shashi Chawla, Dhanpat Rai, 2017.
2. Elements of Physical Chemistry, P. Atkins and Julio de Paula, 7th Ed., Oxford UP, 2017.
3. Engineering Chemistry, Shikha Agarwal, Cambridge UP, 2015.
4. Concise Inorganic Chemistry, J.D. Lee, 5th edition, OUP, 2008.

Reference Books :

5. Organic Chemistry, Clayden, Greaves, Warren and Wothers, Oxford University, 2014.
6. Organic Chemistry, Paula Bruce, Pearson, 7th edition, 2013.

- End -

NATIONAL INSTITUTE OF TECHNOLOGY, WARANGAL – 506 004

Department of Electrical Engineering

Revised Syllabus for BASIC ELECTRICAL ENGINEERING of 3-Credits

I B.Tech. Code: EE101

Pre-requisites: None.

Course Outcomes: At the end of the course, the student will be able to:

CO1	Analyze and solve electric and magnetic circuits
CO2	Identify the type of electrical machines for a given application
CO3	Recognize the ratings of different electrical apparatus
CO4	Identify meters for measuring electrical quantities and requirements of illumination

Mapping of course outcomes with program outcomes

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	1	1	3	1	-	-	-	-	-	-
CO2	2	1	3	1	-	-	-	-	-	-
CO3	-	1	2	1	-	-	-	-	-	-
CO4	1	1	1	1	-	-	-	-	-	-

Detailed Syllabus:

DC Circuits: Kirchoff's Voltage and Current Laws, Superposition Theorem, Star-Delta Transformations

AC Circuits: Complex representation of Impedance, Phasor diagrams, Power & Power Factor, Solution of 1- ϕ Series & Parallel Circuits, Solution of 3- ϕ circuits and Measurement of Power in 3- ϕ circuits

Magnetic Circuits: Fundamentals and solution of Magnetic Circuits, Concepts of Self and Mutual Inductances, Coefficient of Coupling

Single Phase Transformers: Principle of Operation of a Single Phase Transformer, EMF Equation, Phasor Diagram, Equivalent Circuit of a 1- ϕ Transformer, Determination of Equivalent circuit parameters, calculation of Regulation & Efficiency of a Transformer

DC Machines: Principle of Operation, Classification, EMF and Torque Equations, Characteristics of Generators and Motors, Speed Control Methods and Applications

Three Phase Induction Motor: Principle of Rotating Magnetic Field, Principle of Operation of 3- ϕ Induction Motor, Torque – Speed Characteristics of 3- ϕ Induction Motor, Applications

Measuring Instruments: Moving Coil and Moving Iron Ammeters and Voltmeters

Illumination: Laws of illumination and luminance

TEXT BOOK:

1. Edward Hughes, Electrical & Electronic Technology – 12th Edition, Pearson, 2016.

REFERENCE BOOKS:

1. Vincent Del Toro, Electrical Engineering Fundamentals – 2nd Edition, Pearson, 2015.
2. V N Mittle & Arvind Mittal , Basic Electrical Engineering – 2nd Edition TMH 2005.
3. E. Openshaw Taylor, Utilization of Electrical Energy – Orient Longman, 2010

BT101	ENGINEERING BIOLOGY	EB	2 – 0 – 0	2 Credits
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Pre-requisites: None.

Course Outcomes: At the end of the course, the student will be able to:

CO1	Realize the significance of biomolecules for sustaining life
CO2	Identify the difference between unicellular to multi-cellular organisms
CO3	Understand heredity, variation and central dogma of life
CO4	Analyse and understand the concepts of biology for engineering the cell

Mapping of Course Outcomes (COs) and the Program Outcomes (POs)

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	2			1		1	2	3		1
CO2	2			1		1	2	3		1
CO3	2			1		1	2	3		1
CO4	2			1		1	2	3		1

Detailed Syllabus:

Molecules of life, water and carbon - chemical basis of life, protein structure and function, nucleic acids and the RNA world, carbohydrates, lipids, membranes and first cells.

Cell structure and function, inside the cell, cell–cell Interactions, cellular respiration and fermentation, photosynthesis, cell cycle, biological signal transduction.

Gene structure and expression, Mitosis, Meiosis, Mendel and the gene, DNA and the gene: synthesis and repair, how genes work, transcription, RNA processing, and translation, control of gene expression, analysing and engineering genes, genomics.

Engineering concepts in biology – genetic engineering, disease biology and biopharmaceuticals, stem cell engineering, metabolic engineering, synthetic biology, neuro transmission, biosafety and bioethics.

Reading:

1. Quillin, Allison Scott Freeman, Kim Quillin and Lizabeth Allison, Biological Science, Pearson Education India, 2016
2. Reinhard Renneberg, Viola Berkling and Vanya Loroch, Biotechnology for Beginners, Academic Press, 2017

CE101	ENGINEERING MECHANICS	ESC	3 – 0 – 0	3 Credits
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Pre-requisites: None.

Course Outcomes: At the end of the course, the student will be able to:

CO1	Determine the resultant force and moment for a given system of forces
CO2	Analyze planar and spatial systems to determine the forces in members of trusses, frames and problems related to friction
CO3	Calculate the motion characteristics of a body subjected to a given force system
CO4	Determine the deformation of a shaft and understand the relationship between different material constants
CO5	Determine the centroid and second moment of area

Mapping of course outcomes with program outcomes

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3	-	-	2	-	-	-	1
CO2	3	-	-	2	-	-	-	1
CO3	3	-	-	2	-	-	-	-
CO4	3	-	1	2	-	-	-	-
CO5	3	-	-	2	-	-	-	-

Detailed syllabus:

Introduction - Specification of force vector, Formation of Force Vectors, Moment of Force – Cross product – Problems, Resultant of a general force system in space, Degrees of freedom - Equilibrium Equations, Kinematics – Kinetics – De' Alemberts principle, Degree of Constraints – Freebody diagrams.

Spatial Force systems - Concurrent force systems - Equilibrium equations – Problems, Problems (Vector approach) – Tension Coefficient method, Problems (Tension Coefficient method), Parallel force systems - problems, Center of Parallel force system – Problems.

Coplanar Force Systems - Introduction – Equilibrium equations – All systems, Problems on Coplanar Concurrent force system, Coplanar Parallel force system, Coplanar General force system – Point of action, Method of joints, Method of sections, Method of sections, Method of members, Friction – Coulombs laws of dry friction – Limiting friction, Problems on Wedge friction, Belt Friction-problems.

Mechanics of Deformable Bodies - Stress & Strain at a point- Normal and shear stresses, Axial deformations – Problems on prismatic shaft, tapered shaft and deformation due to self-weight, Deformation of Stepped shaft due to axial loading, Poisson's Ratio – Bulk Modulus - Problems, change in dimensions and volume.

Centroid & Moment of Inertia - Centroid and M.I – Area – Radius of Gyration, Parallel axis– Perpendicular axis theorem – Simple Problems.

Dynamics of Particles - Rectilinear Motion – Kinematics Problems, Kinetics – Problems, Work & Energy – Impulse Moment, Curvilinear Motion – Normal and tangential components

Reading:

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

ME102	ENGINEERING GRAPHICS	ESC	2 - 0 - 4	4 Credits
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Pre-requisites:None.

Course Outcomes: At the end of the course, the student will be able to:

CO1	Recall BIS standards and conventions while drawing Lines, printing Letters and showing Dimensions.
CO2	Classify the systems of projection with respect to the observer, object and the reference planes.
CO3	Construct orthographic views of an object when its position with respect to the reference planes is defined.
CO4	Analyse the internal details of an object through sectional views.
CO5	Relate 2D orthographic views to develop 3D Isometric View.
CO6	Construct 2D (orthographic) and 3D (isometric) views in CAD environment.

DETAILED SYLLABUS:

Introduction: Overview of the course, Lines Lettering and Dimensioning: Types of lines, Lettering, Dimensioning, Geometrical Constructions, Polygons, Scales

Orthographic Projection:Principles of Orthographic projection, Four Systems of Orthographic Projection.

Projection of Points: Projections of points when they are situated in different quadrants.

Projections of Lines: Projections of a line parallel to one of the reference planes and inclined to the other, line inclined to both the reference planes, Traces.

Projections of Planes: Projections of a plane perpendicular to one of the reference planes and inclined to the other, Oblique planes.

Projections of Solids: Projections of solids whose axis is parallel to one of the reference planes and inclined to the other, axis inclined to both the planes.

Section of Solids: Sectional planes, Sectional views - Prism, pyramid, cylinder and cone, true shape of the section.

Isometric Views: Isometric axis, Isometric Planes, Isometric View, Isometric projection, Isometric views – simple objects.

Auto-CAD Practice:Introduction to Auto-CAD, DRAW tools, MODIFY tools, TEXT, DIMENSION, PROPERTIES

Text Book:

N.D. Bhat and V.M. Panchal, Engineering Graphics, Charotar Publishers, 2013

Reference Book:

Sham Tickoo, "AutoCAD 2017 for Engineers & Designers", 23ed, Dreamtech Press, 2016

PH102	PHYSICS LABORATORY	0 - 1 - 2	2 Credits
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Course Outcomes : At the end of the course, the student will be able to :

1. Use CRO, signal generator, spectrometer, polarimeter and GM counter for making measurements.
2. Test optical components using principles of interference and diffraction of light
3. Determine the selectivity parameters in electrical circuits
4. Determine the width of narrow slits, spacing between close rulings using lasers and appreciate the accuracy in measurements Mapping of course outcomes with program outcomes

Detailed Experiments :

1. Determination of Wavelength of Sodium light using Newton's Rings.
2. Determination of Wavelength of He-Ne laser-Metal Scale
3. Measurement of Width of a narrow slit using He-Ne Laser.
4. Determination of Specific rotation of Cane sugar by Laurent Half-shade Polarimeter.
5. Determination of capacitance by using R-C circuit.
6. Determination of resonating frequency and bandwidth by LCR circuit.
7. Measurement of half-life or radioactive source using GM Counter.
8. Diffraction grating by normal incidence method.
9. Characteristics of Photodiode.
10. Determination of Planck's Constant
11. Determination of Numerical Aperture of an optical Fiber.

Reading : 1. Physics Laboratory Manual.

CS102	PROBLEM SOLVING AND COMPUTER PROGRAMMING	0 - 1 - 2	2 Credits
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Laboratory:

1. Programs on conditional control constructs.
2. Programs on loops (while, do-while, for).
3. Programs using user defined functions and library functions.
4. Programs on arrays, matrices (single and multi-dimensional arrays).
5. Programs using pointers (int pointers, char pointers).
6. Programs on structures.
7. Programs on classes and objects.

ME103	WORKSHOP PRACTICE	ESC	0 - 1 - 2	2 Credits
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Pre-requisites: None.

Course Outcomes: At the end of the course, the student will be able to:

CO1	Study and practice on machine tools and their operations
CO2	Practice on manufacturing of components using workshop trades including fitting, carpentry, foundry and welding
CO3	Identify and apply suitable tools for machining processes including turning, facing, thread cutting and tapping
CO4	Apply basic electrical engineering knowledge for house wiring practice

DETAILED SYLLABUS:

Fitting Trade: Preparation of T-Shape Work piece as per the given specifications, Preparation of U-Shape Work piece which contains: Filing, Sawing, Drilling, Grinding, and Practice marking operations.

Plumbing: Practice of Internal threading, external threading, pipe bending, and pipe fitting, Pipes with coupling for same diameter and with reducer for different diameters and Practice of T-fitting, Y-fitting, Gate valves fitting.

Machine shop: Study of machine tools in particular Lathe machine (different parts, different operations, study of cutting tools), Demonstration of different operations on Lathe machine, Practice of Facing, Plane Turning, step turning, taper turning, knurling and parting and Study of Quick return mechanism of Shaper. Demonstration of the working of CNC and 3D Printing Machines.

Power Tools: Study of different hand operated power tools, uses and their demonstration and Practice of all available Bosch Power tools.

Carpentry: Study of Carpentry Tools, Equipment and different joints, Practice of Cross Half lap joint, Half lap Dovetail joint and Mortise Tenon Joint

DEPARTMENT OF CHEMISTRY
SYLLABUS OF I/IV B.Tech. (FROM 2017-18)
CHEMISTRY LABORATORY
(All Branches)

Code CY102

Credits: 2

0-1-2-2 (L-T-P-CH)

Detailed Syllabus:

Cycle-I

1. Standardization KMnO_4 solution: Understanding the redox process, electron transfer, importance of qualitative and quantitative analysis.
2. Estimation of Hematite: Understanding the importance on purity of a ore, % of metal content (for Fe).
3. Hardness of Water: Understanding the of metal complexes, multi dentate ligands, importance of purity of ground water, (EDTA method; complexometry).
4. Analysis of bleaching powder for available chlorine: Understanding the importance and purity of potable water, back titration (Iodometry).
5. Preparation of nanomaterials: Understanding the importance of nanomaterials, their preparation and characterization.

Cycle II

1. pH metry: Concept of pH, Instrumentation, calibration, determination of the concentrations by instrumental methods
2. Conductometry: Concept of conductivity, importance of conductivity
3. Potentiometry: Determination of the redox potential of the reaction
4. Colorimetry: Importance of Beers and Lamberts law,
5. Photochemical experiment: Importance of visible light and its application for a redox process, importance of coloring agent
6. Preparation of bakelite / polypyrrole: Concepts of organic reactions and application for the organic material preparation.
7. Corrosion experiment: Concept of corrosion, importance of corrosion agents
8. Adsorption experiment: Understanding phenomena of adsorption and absorption
9. Analysis of a drug: Importance of the purity, concentrations of a drug molecule.

Reading Books :

1. Introductory Chemistry laboratory manual: Concepts and Critical Thinking, Charles Corwin, Pearsons edn., 2012.
2. Investigating Chemistry: Laboratory Manual, David Collins, 1st Edn., Freeman & Co., 2006.

APPENDIX-I

RULES RELATING TO RESIDENTIAL REQUIREMENT

1. All the students are normally expected to stay in the hostels and be a boarder of one of the messes.
2. Under special circumstances, the Director/Dean-Academic may permit a student to reside with his parent(s) within a reasonable distance from the institute. However, this permission may be withdrawn at the discretion of the Institute at any time considered appropriate without assigning any reason.
3. Married accommodation shall not be provided to any student of the undergraduate courses.
4. No student shall come into or give up the assigned accommodation in any Hall of residence without prior permission of the Chief Warden.
5. A student shall reside in a room allotted to him/her and may shift to any other only under the direction/permission of the Chief Warden.
6. Students shall be required to make their rooms available whenever required for inspection, repairs, maintenance or disinfecting and shall vacate the rooms when leaving for the vacation/ holidays.
7. Students shall be responsible for the proper care of the furniture; fan and other fittings in the rooms allotted to them and shall generally assist the Warden in ensuring proper use, care and security of those provided in the Halls for common use of all students.
8. Students will be responsible for the safe keeping of their own property. In the event of loss of any personal property of a student due to theft, fire or any other cause the Institute shall accept no responsibility and shall not be liable for payment of any compensation.
9. Engaging personal attendants, keeping pets and use of appliances like electric heater, refrigerator, etc. by a student in Halls of Residence are prohibited.
10. All students must abide by the rules and regulations of the Halls of Residence as may be framed from time to time.
11. **It is mandatory for all ICCR students to stay in the Hostels.**

APPENDIX-II

STUDENTS' CONDUCT AND DISCIPLINARY CODE

It is the responsibility and duty of each and every student of the Institute to become acquainted with "Students Conduct and Disciplinary Code". It is presumed that every student from the date of his/her admission to the Institute has knowledge of this code. All students are required to strictly adhere to this code as a condition of their admission to the Institute and these rules would be binding on and enforceable against them or any one among them.

Section 1: Responsibilities of the Students

It shall be the responsibility of the students

- i) To behave and conduct themselves in the Institute campus, hostels and premises in a dignified and courteous manner and show due respect to the authorities, employees and elders.
- ii) To follow decent and formal dressing manners. Students should avoid clothing depicting illegal drugs, alcohol, profane language, racial, sexual and vulgar captions etc.
- iii) To access all educational opportunities and benefits available at the Institute and make good use of them to prosper academically and develop scientific temper.
- iv) To respect the laws of the country, human rights and to conduct in a responsible and dignified manner at all times.
- v) To report any violation of this Code to the functionaries under this Code.

Section 2: Behaviour of the Students

- i) Groupism of any kind that would distort the harmony is not permitted.
- ii) Students are expected to spend their free time in the Library. They shall not loiter along the verandas or crowd in front of the offices or the campus roads. Students should refrain from sitting on places such as parapets, stairs, footpaths etc.
- iii) Possession or consumption of narcotic drugs and other intoxicating substances are strictly prohibited in the campus and hostels.
- iv) Silence shall be maintained in the premises of the Institute.
- v) Students are not permitted to use mobile phones in the class room, library, computer centre, examination halls, etc.
- vi) **Students shall refrain from all activities considered as ragging which is a criminal offence.**
- vii) Students are prohibited from indulging in anti-institutional, anti-national, antisocial, communal, immoral or political expressions and activities within the campus and hostels.
- viii) Politically based students' and other organizations or outfits are not allowed in the campus. Students are strictly prohibited from organizing, attending or participating in any activity or agitation sponsored by politically based organizations.
- ix) Students shall not deface, disfigure, damage or destroy or cause any loss in any manner to all the public, private or Institute properties.
- x) Without specific permission of the authorities, students shall not bring outsiders to the Institute or hostels.

- xi) No one shall bring, distribute or circulate unauthorized notices, pamphlets, leaflets etc within the campus or hostels. The possession, distribution or exhibition of any item by any means which is *per se* obscene is prohibited within the campus or on any property owned/ managed by the Institute.
- xii) No student shall collect money either by request or by coercion from others within the campus or hostels.
- xiii) The Institute being a place of learning and an exclusive academic zone, nobody shall respond to any call for any form of strike, procession or agitation including slogan shouting, *dharna*, *gherao*, burning of effigy or indulge in anything which may harm the peaceful atmosphere of the Institution and shall eschew from violence in the campus and hostels and even outside.
- xiv) Possession or usage of weapons, explosives or anything that causes injury/ damage to the life and limb or body of any human being or property is prohibited.
- xv) **Use of motorized vehicles within the Institute premises is strictly prohibited.**
- xvi) Students shall only use the waste bins for dispensing waste materials within the campus including classrooms, hostels, offices, canteen and messes.
- xvii) Any conduct which leads to lowering of the esteem of the Institute is prohibited.
- xviii) **Any unauthorized tour/visit by individual or group of students shall be treated as a serious conduct violation and all such students will be imposed disciplinary penalties.**

Section 3: Disciplinary Sanctions

Any student exhibiting prohibited behaviour mentioned in this Code shall, depending upon the gravity of the misconduct or depending on its recurrence, be subjected to any of the following disciplinary sanctions. Any student who is persistently insubordinate, who is repeatedly or wilfully mischievous, who is guilty of fraud, in the opinion of the competent authority, is likely to have an unwholesome influence on his/ her fellow students, will be removed from the rolls.

I. Minor Sanctions

- i. Warning or Reprimand: This is the least sanction envisaged in this Code. The student engaged in any prohibited behaviour will be issued a warning letter.
- ii. Tendering Apology: The student engaged in any prohibited behaviour may be asked to tender an apology for his/her act and undertaking that he/she shall not indulge in such or any of the prohibited behaviour in future.

II. Major Sanctions

- i. Debarring from Examinations: A student/group of students may be debarred from writing all/any/some of the examinations, which forms part of the academic program for which he/she/they has/ have joined.
- ii. Suspension: A student may be suspended from the Institute for violation of any of the provisions of this Code. The period of suspension and conditions, if any, shall be clearly indicated in the communication addressed to the student. The student shall lose his/her attendance for the suspended period.

- iii. Restitution: Restitution implies reimbursement in terms of money and/or services to compensate for personal injury or loss, damage/disfiguration to property of the Institute or any property kept in the premises of the Institute in any manner. The students/group of students may be asked to compensate for the loss that has been caused to any person or property of the Institute or any property kept in the premises of the Institute due to the act of vandalism perpetrated by the students. The students/group of students shall also be liable to put in their service to restore any loss or damage caused to any property and thereby bringing it to its original form if it is possible.
- iv. Forfeiture: Caution deposit of any student engaged in any prohibited behaviour shall be forfeited.
- v. Expulsion: This is the extreme form of disciplinary action and shall be resorted to only in cases where stringent action is warranted. Expulsion is the permanent dismissal of a student from the Institute. Such a student will not be eligible for readmission to any of the courses of this Institute.

Section 4: Functionaries under the Code

i) Heads of the Departments/ Faculty Advisors/Chief Warden/ Wardens of Hostels: As the persons in charge of the Departments/Hostels, the respective functionaries of all Teaching Departments and Hostels shall have the power and duty to take immediate action to curb any prohibited behaviour as envisaged under this code. As these functionaries cannot single handedly manage all the issues, they can assign part of the work to the teachers and the teachers of all the departments/wardens have the responsibility to inform any incident of prohibited behaviour to the Heads of the Departments/ Chief Warden so that any serious issue can be settled before the same goes out of control. The Head of the Departments/ Chief Warden shall have the power to impose minor sanctions as envisaged under section 3(I) of this Code.

They can also recommend imposition of major sanctions as envisaged under Section 3(II) of this Code to the Director. The Head of the Departments/ Faculty Advisors/Chief Warden/ Wardens of Hostels while taking any action as envisaged in the code shall do so in an impartial manner and see to it that the sanction imposed/proposed is commensurate with the gravity of the prohibited behaviour. Any lapse on the part of a teacher/ Warden to report any instance of violence and misconduct on the part of the students shall be reported to the Director by the respective Head of the Departments/Chief Warden. The Wardens of Hostels shall be responsible for maintaining strict discipline and decorum in the hostel. He/she shall specifically see to it that the inmates of the hostel do not involve themselves in violation of any clause under Section 2 of this Code.

ii) Deans: Any authority of the Institute with delegated powers shall have the power to visit/inspect any premises, buildings or any property of the Institute when there is a genuine doubt that any act of prohibited behaviour is taking place and can take any lawful actions to curb such behaviour. The HODs/ Faculty Advisors/Chief Warden/ Wardens of Hostels shall report to the Dean (Students) any instances of prohibited behaviour, who in turn shall bring it to the notice of the Director. The Dean (Students) shall forward the recommendations from the HODs/ Chief Warden to impose a major sanction under Section 3(II) of this Code to the Director after noting his observations. The Dean (Student Welfare) can also *suo moto* recommend action against any student/students indulging in prohibited behaviour which is brought to his/ her notice.

iii) Director: The Director shall be the ultimate authority in imposing major sanctions as envisaged under Section 3(II) against the students for acts of prohibited behaviour. The Director can also entertain any appeal from any student/students aggrieved by the action of any authority of the Institute under or subordinate to the Director and decide the case on merit.

Section 5: Right to Appeal

The student/students aggrieved by the action of any authority of the Institute under or subordinate to the Director can appeal to the Director and any student aggrieved by the action of the Director can appeal to the Senate. The decision of the Senate shall be final and binding on the students.

Section 6: Assistance from Law Enforcement Agencies

The Deans/ HoDs/ Chief Warden shall have the power and duty to call the Police immediately with the concurrence of the Director when there is a threat of Law and Order situation in the Campus and also when there is a genuine apprehension that any incident of rioting, vandalism or any other act prohibited by law is likely to take place. The Deans/ HoDs/ Chief Warden shall in such a case give a detailed report to the Director. The Director/ Deans/ HoDs/ Chief Warden can also arrange for video recording of the entire situation and take requisite actions through police and other concerned authorities.

Section 7: Grievance Redressal Committee

The Institute will also set up “Grievance Redressal Committee” where the students can air their grievances. The Committee shall consist of the Deans/ HoDs/ Chief Warden and also members of the Parent-Teacher Association. Till these committees are constituted, *ad-hoc* committees shall be formed by the Director.

Section 8: Undertaking by the Students

The students joining any academic program of the Institute will have to give an undertaking to the effect that he/she will comply with the provisions envisaged in this Code in letter and spirit and even if it is not given them as well, will be bound by the provisions of this Code.

Section 9: Opportunity for Hearing

No order other than the order suspending or warning a student shall be passed without giving an opportunity of hearing to the Student/ Students.

Section 10: Ultimate Authority

For all disciplinary matters related to students, the Director shall be the ultimate authority as provided herein.

Section 11: Amendments to the Code

The Senate of the Institute shall have the power to amend any of the provisions in this Code. The amendments shall be brought to the notice of the students and faculty of the Institute through notice put on the Institute web site, notice boards of the Institute or through emails.

APPENDIX-III

PROJECT WORK EVALUATION

PROJECT WORK:

Project work is divided into two batches:

- a) Part A (IV Year I semester) --- 2 credits
- b) Part B (IV Year II Semester) --- 4 credits

1. A student has to select a topic for his project work, based on his/her interest and the available facilities, in the IV year I semester , which ,he/she will continue through IV Year II semester also. The guide will evaluate execution of the project periodically.
2. The project work shall be prepared following guidelines given in the Appendix-V
3. For the purpose of assessment, the performance of a student in the project work may be divided into the following sub components.
 - i. At the end IV Year I Semester (for 2 credits)
 - a) Assessment by the supervisor ...50%
 - b)Assessment by the project assessment committee of the Dept. ...50%
 - ii. At the end IV Year II Semester (for 4 credits)
 - a)Assessment by the supervisor ...50%
 - b)Assessment by the project assessment committee of the Dept. ...50%

APPENDIX-IV

RULES FOR CHANGE OF BRANCH

1. Student admitted to a particular branch of the B.Tech. course will normally studying in that branch till completion.
2. However, in special cases the Institute may permit a student, admitted through JEE (Main) to change from one branch to another after the first year. Such changes will be permitted, strictly in accordance with the provision laid down hereafter.
3. Only those students will be eligible for consideration for a change of branch after I year II semester, who have
 1. Completed all the credits prescribed in the I Year I semester and I Year II semesters
 2. Obtained a CGPA of not less than 8.5 at the end of the I Year II semester in single attempt only.
4. Students who are repeating I Year are not eligible.
5. Application for a change of branch must be made by intending eligible students in the form prescribed for this purpose. The Associate Dean – Academic will call for applications sometime in the second semester of each academic year and the completed forms must be submitted to him/her within the last date specified in the notification.
6. Students may enlist up to seven choices of branch, in order of preference to which they wish to change over. It will not be permissible to alter the choices after the application has been submitted.
7. Change of branch shall be made strictly on the basis of merit of the applications. For this purpose the CGPA obtained at the end of the I Year II semester shall be considered. Ties will be resolved by the JEE (Main) rank of the applicants.
8. The applicants may be allowed a change of branch, strictly in the order of merit, subject to the limitations that the present strength of students in any branch at most can be increased by THREE.
 - (a) Subject to the condition that the student strength in a particular branch from which transfer is made, does not fall below 85% of the existing strength.
 - (b) For any reason, if a student is denied change of branch, no other student with a lesser CGPA should be permitted for change into that branch.
9. All changes of branch made in accordance with the above rules will be effective from the II Year I semester of the applicants concerned. No change of branch shall be permitted thereafter.
10. All changes of branch will be final and binding on the applicants. No student will be permitted under any circumstances to refuse the change of branch offered.

APPENDIX-V

GUIDELINES FOR PREPERATION OF PROJECT WORK REPORT

Preamble

While utmost attention must be paid to the content of the dissertation report, which is being submitted in partial fulfilment of the requirements of the M.Tech degree, it is imperative that a standard format be prescribed. The same format shall also be followed in preparation of the final soft copies to be submitted to the Library in future.

1. Organisation of the Dissertation

The dissertation report shall be presented in a number of chapters, starting with Introduction and ending with Summary and Conclusions. Each of the other chapters will have a precise title reflecting the contents of the chapter. A chapter can be subdivided into sections, subsections and sub-subsection so as to present the content discretely and with due emphasis. When the work comprises two or more mutually independent investigations, the dissertation report may be divided into two or more parts, each with an appropriate title. However, the numbering of chapters will be continuous right through, for example Part 1 may comprise Chapters 2 - 5, Part 2, Chapters 6 - 9.

1.1 Introduction

The title of Chapter 1 shall be Introduction. It shall justify and highlight the problem posed, define the topic and explain the aim and scope of the work presented in the dissertation report. It may also highlight the significant contributions from the investigation.

1.2 Review of Literature

This shall normally form Chapter 2 and shall present a critical appraisal of the previous work published in the literature pertaining to the topic of the investigation. The extent and emphasis of the chapter shall depend on the nature of the investigation.

1.3 Report on the present investigation

The reporting on the investigation shall be presented in one or more chapters with appropriate chapter titles. Due importance shall be given to experimental setups, procedures adopted, techniques developed, methodologies developed and adopted. While important derivations/formulae should normally be presented in the text of these chapters, extensive and long treatments, copious details and tedious information, detailed results in tabular and graphical forms may be presented in Appendices. Representative data in table and figures may, however, be included in appropriate chapters. Figures and tables should be presented immediately following their first mention in the text. Short tables and figures (say, less than half the writing area of the page) should be presented within the text, while large table and figures may be presented on separate pages. Equations should form separate lines with appropriate paragraph separation above and below the equation line, with equation numbers flushed to the right.

1.4 Results and Discussion

This shall form the penultimate chapter of the dissertation report and shall include a thorough evaluation of the investigation carried out and bring out the contributions from the study. The discussion shall logically lead to inferences and conclusions as well as scope for possible further future work.

1.5 Summary and Conclusions

This will be the final chapter of the dissertation report. A brief report of the work carried out shall form the first part of the Chapter. Conclusions derived from the logical analysis presented in the Results and Discussions Chapter shall be presented and clearly enumerated, each point stated separately. Scope for future work should be stated lucidly in the last part of the chapter.

1.6 Appendix

Detailed information, lengthy derivations, raw experimental observations etc. are to be presented in separate appendices, which shall be numbered in Roman Capitals (e.g. “Appendix IV”). Since reference can be drawn to published/unpublished literature in the appendices these should precede the “Literature Cited” section.

1.7 Literature Cited

This should follow the Appendices, if any, otherwise the Summary and Conclusions chapter. The candidates shall follow the style of citation and style of listing in one of the standard journals in the subject area consistently throughout his/her report, for example, IEEE in the Department of Electrical Engineering, Materials Transactions in Department of Metallurgical Engineering and Materials Science. However, the names of all the authors along with their initials and the full title of the article/monogram/book etc. have to be given in addition to the journals/publishers, volume, number, pages(s) and year of publication. Citation from websites should include the names(s) of author(s) (including the initials), full title of the article, website reference and when last accessed. Reference to personal communications, similarly, shall include the author, title of the communication (if any) and date of receipt.

1.8 Publications by the candidate

Articles, technical notes etc. on the topic of the dissertation report published by the candidate may be separately listed after the literature cited. This may also be included in the contents. The candidates may also include reprints of his/her publications after the literature citation.

1.9 Acknowledgements

The acknowledgments by the candidate shall follow the citation of literature, signed by him/her, with date.

2. PROJECT WORK FORMAT

2.1 Paper

2.1.1 Quality: The dissertation report shall be printed / photo copied on white bond paper, whiteness 95% or above, weight 70 gram or more per square meter.

2.1.2 Size: The size of the paper shall be standard A4; height 297 mm, width 210 mm.

2.1.3 Type Setting, Text Processing and Printing: The text shall be printed on both sides employing LaserJet or Inkjet printer, the text having been processed using a standard text processor. The standard font shall be Times New Roman of 12 pts with 1.5-line spacing.

2.1.4 Page Format: The Printed Sheets shall have the following written area and margins:

Top Margin 15 mm

Head Height 3 mm

Head Separation 12 mm

Bottom Margin 22 mm

Footer 3 mm

Foot Separation 10 mm

Text Height 245 mm

Text Width 160 mm

When header is not used the top margin shall be 30 mm.

Left and Right Margins

Single sided

Left Margin 30mm

Right Margin 20 mm

2.1.5 Pagination: Page numbering in the text of the report shall be Hindu Arabic numerals at the centre of the footer. But when the candidate opts for header style the page number shall appear at the right and left top corner for the odd and even number pages, respectively. Page number “1” for the first page of the Introduction chapter shall not appear in print, only the second page will bear the number “2”. The subsequent chapters shall begin on a fresh page. When header style is chosen the first page of each chapter will not have the header and the page number shall be printed at the centre of the footer. Pagination for pages before the Introduction chapter shall be in lower case Roman numerals, e.g., “iv”.

2.1.6 Header: When the header style is chosen, the header can have the Chapter number and Section number (e.g., Chapter 2, Section 3) on even numbered page headers and Chapter title or Section title on the odd numbered page header.

2.1.7 Paragraph format: Vertical space between paragraphs shall be about 2.5-line spacing. The first line of each paragraph should normally be indented by five characters or 12mm. A candidate may, however, choose not to indent if he/she has provided sufficient paragraph separation. A paragraph should normally comprise more than one line. A single line of a paragraph shall not be left at the top or bottom of a page (that is, no windows or orphans should be left). The word at the right end of the first line of a page or paragraph should, as far as possible, not be hyphenated.

2.2 Chapter and Section Format

2.2.1 Chapter: Each chapter shall begin on a fresh page with an additional top margin of about 75mm. Chapter number (in Hindu-Arabic) and title shall be printed at the centre of the line in 6mm font size (18pt) in bold face using both upper and lower case (all capitals or small capitals shall not be used). A vertical gap of about 25mm shall be left between the Chapter number and Chapter title lines and between chapter title line and the first paragraph.

2.2.2 Sections and Subsections: A chapter can be divided into Sections, Subsections and Sub-sub Sections so as to present different concepts separately. Sections and subsections can be numbered using decimal points, e.g. 2.2 for the second section in Chapter 2 and 2.3.4 for the fourth Subsection in third Section of Chapter 2. Chapters, Sections and Subsections shall be included in the contents with page numbers flushed to the right. Further subsections need not be numbered or included in the contents. The Section and Sub-Section titles along with their numbers in 5 and 4mm (16 and 14 pt) fonts, respectively, in bold face shall be flushed to the left (not centred) with 15 mm space above and below these lines. In further subdivisions character size of 3 and 3.5 with bold face, small caps, all caps and italics may be used for the titles flushed left or centred. These shall not feature in the contents.

2.2.3 Table / Figure Format: As far as possible, tables and figures should be presented in portrait style. Small size table and figures (less than half of writing area of a page) should be incorporated within the text, while larger ones may be presented on separate pages. Table and figures shall be numbered chapter wise.

For example, the fourth figure in chapter 5 will bear the number Figure 5.4 or Fig 5.4 Table number and title will be placed above the table while the figure number and caption will be located below the figure. Reference for Table and Figures reproduced from elsewhere shall be cited in the last and separate line in the table and figure caption, e.g. (after McGregor[12]).

3 Auxiliary Format

3.1 Binding: The evaluation copies of the dissertation report may be spiral bound or soft bound. The final hard bound copies to be submitted after the viva-voce examination will be accepted during the submission of dissertation report with the following colour specification:

B.Tech. Project work Grey

3.2 Front Covers: The front covers shall contain the following details:

Full title of report in 6 mm 22 point's size font properly centred and positioned at the top. Full name of the candidate in 4.5 mm 15 point's size font properly centred at the middle of the page. A 40 mm diameter replica of the Institute emblem followed by the name of department, name of the Institute and the year of submission, each in a separate line and properly centred and located at the bottom of page.

3.2.1 Lettering: All lettering shall be embossed in gold.

3.2.2 Bound back: The degree, the name of the candidate and the year of submission shall also be embossed on the bound (side) in gold.

3.3 Blank Sheets: In addition to the white sheets (binding requirement) two white sheets shall be put at the beginning and the end of the report.

3.4 Title Sheet: This shall be the first printed page of the Dissertation and shall contain the submission statement: the Dissertation Report submitted in partial fulfilment of the requirements of the M.Tech Degree, the name and Roll No. of the candidate, name(s) of the Supervisor and Co-supervisor(s) (if any), Department, Institute and year of submission.

Sample copy of the 'Title Sheet' is appended (Specimen 'A').

3.5 Dedication Sheet: If the candidate so desires(s), he/she may dedicate his/her report, which statement shall follow the title page. If included, this shall form the page 1 of the auxiliary sheets but shall not have a page number.

3.6 Approval Sheet: In the absence of a dedication sheet this will form the first page and in that case shall not have a page number. Otherwise, this will bear the number two in Roman lower case “ii” at the centre of the footer. The top line shall be:

Dissertation Approval for M.Tech

A sample copy of the Approval Sheet is appended (Specimen `B')

3.7 Abstract: The 500-word abstract shall highlight the important features of the dissertation report and shall correspond to the electronic version to be submitted to the Library for inclusion in the website.

3.8 Contents: The contents shall follow the Abstract and shall enlist the titles of the chapters, section and subsection using decimal notation, as in the text, with corresponding page number against them, flushed to the right.

3.8.1 List of Figures and Tables: Two separate lists of Figure captions and Table titles along with their numbers and corresponding page numbers against them shall follow the Contents.

3.9 Abbreviation Notation and Nomenclature: A complete and comprehensive list of all abbreviations, notations and nomenclature including Greek alphabets with subscripts and superscripts shall be provided after the list of tables and figures. As far as possible, generally accepted symbols and notation should be used.

Auxiliary page from dedication (if any) to abbreviations shall be numbered using Roman numerals in lower case, while the text starting from the Introduction shall be in Hindu Arabic.

The first pages in the both the cases shall not bear a page number.

3.10 A Declaration of Academic Honesty and Integrity: A declaration of Academic honesty and integrity is required to be included along with every dissertation report after the approval sheet. The format of this declaration is given in Specimen 'C' attached.

Specimen 'A': Title Sheet

(Title)

Submitted in partial fulfilment of the requirements

of the degree of

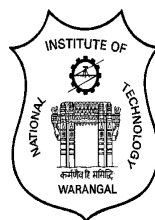
(Bachelor of Technology)

by

(Name of the Student(s))

(Roll No. _____)

Supervisor (s):



(Name of the Department)

NATIONAL INSTITUTE OF TECHNOLOGY WARANGAL

(Year)

Specimen `B': Approval Sheet

This Project Work entitled (Title) by (Author Name) is approved for the
degree of _____ (Degree details).

Examiners

Supervisor (s)

Chairman

Date : _____

Place : _____

Specimen `C' – Declaration

I declare that this written submission represents my ideas in my own words and where others' ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

(Signature)

(Name of the student)

(Roll No.)

Date: _____

Specimen `D' – Certificate

This is to certify that the dissertation work entitled “ *name of the project work* ” is a bonafide record of work carried out by “*Mr/Ms name of the student with Roll No.*“, submitted to the faculty of “*name of the department* “, in partial fulfilment of the requirements for the award of the degree of Bachelor of Technology in “*name of the program*” at National Institute of Technology, Warangal during the academic year -----.

Name of the HOD

Head of the Department

Department of -----

NIT Warangal

Name of the Guide

Designation

Department of -----

NIT Warangal

ACADEMIC COMMITTEES: FUNCTIONS AND RESPONSIBILITIES

S No	Name of the Committee		Constitution guidelines	Functions
1	DEPARTMENTAL ACADEMIC COMMITTEE –UG (DAC-UG)	<p>1. The Head of the Department will nominate one of the members as secretary.</p> <p>2. There shall be one DAC-UG for every department that is involved in the teaching for the B.Tech program.</p> <p>3. There shall be one DAC-UG for each of the basic science and Humanities and Social Science Departments.</p> <p>4. The Chairman may co-opt and/or invite more members including external experts while framing the curriculum/or revising the curriculum</p>	<p>Chairman: Head of the Department</p> <p>Members: All professors and Associate Professors having Ph.D., and Two Assistant professors having Ph.D on rotation basis for two years.</p>	<p>a) To monitor the conduct of all undergraduate courses offered by the Department and course work of undergraduate program.</p> <p>b) To ensure academic standards and excellence of the courses offered by the department.</p> <p>c) Review and Recommend the grades to senate for approval.</p> <p>d) To consolidate the registration of the students and communicate to the course instructor and Dean-Academic.</p> <p>e) To consider any matter related to the undergraduate program(s) of the Department.</p> <p>f) To take up any responsibility or function assigned by the Senate or the Chairman of the Senate or Chairman of DAC-UG.</p> <p>g) To report the cases of malpractices to the Malpractices and Disciplinary Action Committee.</p>
2	CLASS REVIEW COMMITTEE (CRC)	<p>Every Class (group of students registered for a course and taking the course together in a section/class) of the UG Program shall have a Class Review Committee, consisting of Faculty and Students.</p> <p>Tenue: One Semester</p>	<p>Chairman- Head of the Department / One Senior Faculty of the Department concerned, preferably not associated with teaching of the class, to be nominated by the Head of the Department concerned.</p>	<p>a) The Class Committees shall meet at least twice in a semester, once after four to six weeks after the commencement of class work and once after two weeks after the mid semester examinations.</p> <p>b) The basic responsibilities of the Class Review Committee are to review periodically the progress of the classes, to discuss problems concerning curriculum and syllabi and the conduct of the classes.</p>

			<p>Members: All teachers of the class, Six students, to be chosen by the students of the class from amongst themselves</p> <p>Convener/Secretary: Faculty advisor of the class.</p>	<p>c) The class review committee will do a mid-semester review of the performance of the class work two weeks after the mid-semester examinations. The committee will review the performance of the class in mid semester and other exams conducted till that date.</p> <p>d) Each Class Review Committee will communicate its recommendations to the Head of the Department / DAC-UG of the parent teaching department.</p> <p>e) The minutes of each Class Review. Committee meeting shall be recorded in a separate minutes register maintained in the parent/teaching department.</p> <p>f) Any appropriate responsibility or function assigned by the DAC-UG or the chairman of the DAC-UG.</p>
3	<p>DEPARTMENTAL ACADEMIC APPEALS COMMITTEE (DAAC)</p>	<ul style="list-style-type: none"> • There shall be one DAAC for every department. • The Chairman may co-opt and / or invite more members. • If the concerned instructor is a member of DAAC then he/she shall keep himself out of the Committee during deliberations. • The quorum for each meeting shall be a minimum of THREE (Professor from outside department is mandatory). 	<p>Chairman: Head of the Department</p> <p>Members: Three faculty members of the Department</p> <p>Consisting of 1 Professor, 1 Associate Professor and 1 Asst. Professor.</p> <p>Nominee: One Professor from outside the Department nominated by Dean-Academic</p>	<p>a) To receive grievance /complaints in writing from the students regarding anomaly in award of grades due to bias, victimization, erratic evaluation, etc. and redress the complaints.</p> <p>b) To interact with the concerned course instructor and the student separately before taking the decision.</p> <p>c) The decision of the DAAC will be based on simple majority</p> <p>d) The recommendations of the DAAC shall be communicated to the Dean-Academic for further appropriate action as required.</p>

4	COURSE COORDINATION COMMITTEE (CCC)	<p>CCC would be constituted for each subject taught by more than one teacher of one or more Departments/Centres.</p> <p>Validity : One semester</p> <p>Frequency of meetings: At least 4 times in semester.</p>	<p>Chairman: Nominated by the Head of the department from the constituted list of members</p> <p>Members: All the teachers who <i>are</i> involved with the teaching of the Subject during the semester.</p>	<p>a) To plan the lecture schedule for the subject</p> <p>b) To coordinate instruction and progress of teaching in the subject and to ensure that the full syllabus is covered.</p> <p>c) To set the question papers jointly.</p> <p>d) To review periodically the performance of students who have registered in the subject.</p> <p>e) To forward the results of the examinations and the final grades obtained by each student.</p>
4	DEPARTMENTAL BOARD OF STUDIES (UG)	<ul style="list-style-type: none"> All the members must possess Ph. D. The Chairman will nominate one of the members as secretary. The Chairman may co-opt and / or invite more members including external experts while framing / revising the curriculum. 	<p>Chairman: Head of the department</p> <p>Members: All professors and Associate Professors having Ph.D., One professor from allied department, one external expert each from Industry and Academia</p>	<p>a) To develop the curriculum for the postgraduate courses offered by the department and recommend the same to the Senate.</p> <p>b) The Board of studies is required to meet at least once in two years.</p>
5	Academic Audit Committee – Department (AACD)	<ul style="list-style-type: none"> The duration of the members of the committee will be two years 	<p>Chairman: Professor nominated by Director</p> <p>Members: One Department Nominee</p> <p>Convener: Head of the Department</p>	<p>a) To review the internal audit reports submitted by faculty</p> <p>b) To recommend corrective measures, if any.</p> <p>c) To send a consolidated report to Academic Audit Committee – Institute</p>
6	Academic Audit Committee – Institute (AACI)	<ul style="list-style-type: none"> The members of the duration of the committee is TWO years 	<p>Chairman: Director</p> <p>Members: Dean(Academic), Two professors nominated by Director</p>	<p>a) To review the recommendations of AACD of each department</p> <p>b) To initiate appropriate measures (counseling/ training etc.).</p>

7	Mentor (Faculty Advisor)	<ul style="list-style-type: none"> • Specific number of students will be assigned of the concerned department • The students will have the same faculty advisor throughout their duration of study 	Faculty Advisors will be appointed by the Head of the Department and.	<p>a) To help the Students in planning their courses and activities during study.</p> <p>b) To guide, advice and counsel the students on academic program.</p>
8	MALPRACTICE AND DISCIPLINARY ACTION COMMITTEE		<p>Chairman: Dean(Academic)</p> <p>Members: Dean(Student Welfare), Concerned Head of the Department, Invigilator(s), Associate Dean(Examinations)</p> <p>Convener: Associate Dean (Examinations)</p>	a). To recommend appropriate punishment.