



2011-2012  
**First Year Engineering  
Common to all Branches**

# **HANDBOOK**



K.E.Society's  
**RajarambapuInstitute of Technology, Rajaramnagar**  
(AnAutonomousInstitute AffiliatedtoShivajiUniversity,Kolhapur)

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## Foreword from the Director

Hearty Congratulations!

We experience immense pleasure to welcome you on many notable counts. You are the first batch under the autonomous structure this institute is implementing for the first time, you will be the indicators of our curricular and extra-curricular efforts being taken, you will be the students to be experimented upon in the context of this academic autonomy, you will be the foundations of our future success.

When you aspired to become Engineers you started collecting information about the various facets of this discipline from your elders and the people who are related with the practices prevalent in a typical technical institute. Very few of them would be familiar with the academic and administrative procedures being established in the autonomous technical institutes like ours.

The orientation programme is meant to make you aware of the fundamental procedures and needed know-how to have first hand knowledge of the practices of the First Year Engineering (Common to all Branches) course. This handbook offers a ready reference of the things needed for you throughout your course. It is a prerequisite of a pupil entering such the educational system which is more complex than the traditional one in many aspects. We are offering hereby very useful document that will help you to become the informed student of this system.

Feel yourself blessed to have entry in this institute having 28 years of glorious academic past and a new history of its success starts from your batch. You have to make yourselves wide open intellectually to gain the facilities we provide. You have to create opportunities from every event here because the seeds of chances are invisibly scattered.

It is my kind appeal to you to learn the things essential from this handbook and become a part of this corridor of technical knowledge.

WITH BEST WISHES

**Dr. Mrs S.S. Kulkarni**

## From the desk of Dean Academic

Greetings and congratulations for taking admission to first batch of autonomous RIT..

Exponential growth of engineering institutions in India, although provide opportunity for young aspirants to opt for engineering career, at the same time pose enormous challenges to develop competent engineering graduates with knowledge, skills and ethical standards for global careers.

RIT, proactively initiated steps to transform teaching-learning process to make learning a joyful experience for students. We firmly believe in IUCEE Mantra **"I am teaching, are they (students) learning. Say What You Do, Do What You Say. Prove it and improve it."** This shift of focus from teaching to learning and outcome based teaching has started yielding good results. The new and innovative practices like Academic Audit, Faculty Competency Mapping and Development Project, academic monitoring are helping to overcome obstacles in learning process. Faculty competency Development map the level of competency and Quality Circles have imbibe a new spirit in academics of the institute. Academic Audit captures the class dynamics in terms of students learning styles, teaching strategies, learning outcomes and obstacles in learning. Faculty competency development maps the current competency gives a clear plan to acquire competency required for the future. Understanding of learning styles of students is a prior-step in devising appropriate teaching strategies.

RIT is conferred the status of Academic Autonomy by University Grant Commission and Shivaji University Kolhapur, which we look towards as great opportunity to design and implement curriculum sensitive to needs of Business and Industries, introduce innovative evaluation system to make students learn what they are expected to learn (learning outcomes). The RIT model of Autonomy focuses on "Experiential learning model which believes in learning by doing. This is achieved through hands on experience, industrial assignment, mini-projects and live problem solving.

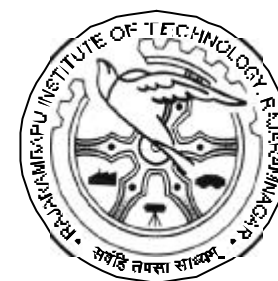
Our efforts are always in the direction to develop an overall personality of students to make them a competent technical manpower for employment and self employment. We always hope and look forward for joyful learning experience for students and RIT should be the first choice for both students who value learning as an experience and also faculty who have a passion to create a great learning environment.

Autonomy has given us an opportunity to prepare graduates to meet the expectations of stake holders and create a better academic ambience. We are optimistic about RIT carving a niche for itself as a "First choice of engineering aspirants."

**Prof. Martand T. Telsang**

## Ordinances, Rules and Regulations for Undergraduate Degree Programmes

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Kasegaon Education Society's  
**Rajarambapu Institute of Technology, Rajaramnagar**  
Sakharale, Islampur, Tal. Walwa, Dist. Sangli, Pin 415414.

(An Autonomous Institute Affiliated to Shivaji University, Kolhapur)

**K.E.Society's  
Rajarambapu Institute of Technology, Rajaramnagar,**  
(An Autonomous Institute Affiliated to Shivaji University Kolhapur)

Academic Rules and Regulations for Undergraduate Programmes

**Preface**

Kasegaon Education Society's "Rajarambapu Institute of Technology" Rajaramnagar, Sakharale Tal. Walwa, Dist. Sangli was established as a self-financed Engineering College in 1983. It is affiliated to the Shivaji University, Kolhapur, recognized by Government of Maharashtra and approved by All India Council for Technical Education, New Delhi. The objective is to provide excellent technical education for producing high quality engineering manpower for industry and promote academic excellence through research & development.

The Institute has envisaged a long term goal to attain complete Academic Autonomy. This allows the institute to prescribe its Academic Calendar, design its own structure and syllabi, conduct examination, carry out Assessment/Evaluation and declare results. Under autonomy the degree, however, shall be awarded by Shivaji University on completion of the program. The institute proposes to implement an experiential learning model (ELM) under Autonomous structure. It is always perceived in the context of engineering education that institutes produce engineers with a strong theoretical and conceptual background with limited focus on hands-on experience. There exists a gap between what students learn and what the industry demands.

RIT in its autonomy model looks forward to adopt an experiential learning model (ELM) which focuses on learning by doing. Experiential learning provides opportunity for the students to experiment and learn better by doing. The curriculum will be designed keeping in mind the hands on experience through extensive experimentation through lab work, plant visits, in-plant training, mini projects and projects in industries.

A judicious mix of theory and practice will make the RIT students as preferred prospective employees.

RIT as an autonomous Institute that functions with the objectives of promoting academic freedom and scholarship on the part of teachers and students which are essential for fostering and developing of intellectual climate conducive to the pursuit of scholarship and excellence.

The focus of the Institute is always student centric and the endeavor shall be to ensure that students get the best of what is required to create outstanding Engineers.

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**GLOSSARY:**

Institute	Rajarambapu Institute of Technology, Rajaramnagar
BOG	Board of Governors
BOS	Board of Studies
AC	Academic Council
Government	Government of Maharashtra.
AICTE	All India Council for Technical Education, New Delhi
UGC	University Grants Commission, New Delhi
SUK	Shivaji University, Kolhapur
Act	Maharashtra Universities Act
CPI	Cumulative Performance Index
SPI	Semester Performance Index
Programme	Programme of study leading towards award of Degree.
UG	Under Graduate Programme
PG	Post Graduate Programme
Dean	Dean of respective functions.
HOD	Head of Academic Departments

**TERMINOLOGY :**

Semester	The academic year shall be divided into two regular semesters of approximately 20 weeks duration each. Typically the odd semester shall be from the second week of July till the last week of November and the even semester from the first week of January till the second week of May. (Refer Sec. 2.2 for more details). This includes the period of academic delivery (14 weeks), Mid-semester examination (MSE), End-semester examination (ESE), assessment and declaration of results.
Course Credit	Weighted sum of the number of Lecture hours (L), Tutorial hours (T), and Practical hours (P) associated with the course.
Credits Earned	The sum of course credits for credit courses in which a student has passed.
Grade	Assessment of the student's performance in a course indicated by the letters, "AA", "AB", "BB", "BC", "CC", "CD", "DD", "FF", "II", "XX", "AU", "DR" Grade. (Refer Sec. 9 of this document for details.)
Grade point	Number equivalent of the letter grades given by 10, 9, 8, 7, 6, 5, 4 corresponding to grades "AA", "AB", "BB", "BC", "CC", "CD", "DD" respectively. Fail grades "FF" and "XX" carry zero grade points. (Refer Sec. 9 of this document for details of grading system.)
Semester Grade Points	The sum of the products of credits and Grade Points for each course registered by a student in a semester.
Cumulative Credits	Sum of the semester credits for all semesters, undergone by a student till the time of calculation of cumulative credits.
DPC	Departmental Program Committee (Common for UG and PG)
Instructor	Member of faculty who shall be assigned to teach a specific course.
Cumulative Grade Points	Sum of the semester grade points for all semesters, undergone by a student till the time of calculation of cumulative grade points
SPI	Semester Performance Index
CPI	Cumulative Performance Index
ATKT	Allowed to Keep Term.

## 1. INTRODUCTION :

RIT has been offering undergraduate (U.G.) program leading to Bachelor's degree in Engineering (B.E.) since last 27 years.

The programs offered and degrees obtained are listed as shown in Table 1.8A. The admission to U.G. program which shall be of eight academic semesters as per the norms set by the competent Authority of the Government of Maharashtra / Directorate of Technical Education, Mumbai / Shivaji University, Kolhapur and which shall be prevailing at the time of admission.

**Table 1.8A: Programs offered and Degrees Awarded**

Program	*B.Tech Degree in
Automobile Engineering	Automobile Engineering
Civil Engineering	Civil Engineering
Computer Science & Engineering	Computer Science & Engineering
Electrical Engineering	Electrical Engineering
Electronics & Telecomm. Engineering	Electronics & Telecomm. Engineering
Information Technology	Information Technology
Mechanical Engineering	Mechanical Engineering

\*B.Tech degree will be awarded subject to final approval from Shivaji University Kolhapur

U. G. Program consists of courses in Sciences, Humanities and Social Sciences, Engineering and Technology and other related areas. These sequence of studies consists of broadly four stages.

The first stage involves introduction to courses in sciences, humanities and technical skills. This shall be common to all UG programs.

The second stage involves the study of engineering courses that emphasize a broad base knowledge in interdisciplinary areas which enables a student to appreciate the links between science, engineering, technology and humanities.

In the third stage, a student is exposed to courses in the chosen branch of Engineering which dwell on the principles governing design and which develop in them the ability for physical and analytical modeling, design and development.

During the final stage, a student studies problems of integrated design with an awareness of size, performance, optimization and cost. The student works for his/her final year project in a small group under the supervision of the faculty member/instructor assigned to the group.

A student is also introduced to the social and economic objectives of the era and to the interaction between man, machine and nature. This is achieved through courses in humanities & social sciences, through practical training, fieldwork, industrial visits, seminars, co-curricular and extra-curricular activities etc.

## 2. CURRICULUM:

### 2.1. Curriculum:

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

### 2.2. Semesters:

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

There shall be one additional session during summer vacation known as summer term. The institutes shall run this semester for both theory and laboratory courses subject to sufficient number of students registering for the course and the availability & consent of the concerned faculty member. The purpose of the summer term is to provide an opportunity to the student to clear his/her backlog, if any. Total duration of summer courses shall be of eight weeks. The examinations for the courses taught in summer term shall be conducted thereafter.

### 2.3. Course Credit System/Structure:

In general, a certain quantum of work measured in terms of credits is laid down as the requirement for a particular program. Calculation of number of credits for a course in any semester is as per Table 2.3A.

**Table 2.3A: Calculation of number of credits for a course**

Sr.No.	Course	Credits
1	Lecture of 1 hour/week	1
2	Tutorial of 1 hour/week	1
3	Practical/Laboratory/Drawing/mini-project of two hours/week	1
4	Seminar (1 hour per week)	1
5	Final Year Project (Semester VII: 4 credits; 4 hours/week Semester VIII: 8 credits; 8 hours/week)	12

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

includes seminar, mini project, and project at various levels of the program. Special courses like industrial training, NSS, NCC etc. shall be treated as audit courses and shall be reflected in the grade card.

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

The total number of credits required for completing a program is 192-200 (the exact number for a program shall be mentioned in the course structure). The total number of credits in a semester which a student registers shall generally be 23-25. The maximum number of credits per semester shall not exceed 30 subject to the approval by Department Program Committee (DPC).

#### **Audit Course:**

- \* A student may have to register for an audit course in a semester which could be institute's requirement or department requirement.
- \* An audit course may include either a) a regular course required to be done as per structure or required as pre-requisite of any higher level course or b) the programmes like practical training, industry visits, societal activities etc.
- \* Audit courses shall not carry any credits but shall be reflected in Grade Card as "PP"/"NP" (refer Table 1) depending upon the satisfactory performance in the in-semester evaluation and any other evaluation as decided by DPC of respective department.

#### **2.4. Seminar:**

Seminar is a course requirement, wherein under the guidance of an Instructor, a student is expected to do in-depth study in a specialized area by carrying out a literature survey, understanding different aspects related to that area, preparing a status report based on the topic chosen. For a seminar course, a student is expected to learn investigation methodologies, study relevant research papers, correlate work of various authors/researchers critically, study the concepts, techniques & prevailing results, analyze them, prepare a seminar report on all these aspects. It shall be mandatory to give a seminar presentation before a panel constituted for this purpose. The gradings shall be done on the basis of the depth of the work done, understanding of the problem, technical quality of the report prepared and presentation given by the student.

#### **2.5. Project:**

Project is a course requirement, wherein under the guidance of an Instructor, a final year student is required to do some innovative/contributory/developmental work with application of knowledge earned while undergoing various theory and laboratory courses in his/her course of study. A student has to exhibit both analytical and practical skills through the project work.

A student has to carry out project under the guidance of a faculty from the same discipline unless specifically permitted by the Department Program Committee (DPC) of

the concerned departments in case of interdisciplinary projects or DPC of the parent department in case of industry sponsored projects.

The B.Tech. projects shall be done in the final year and is divided into two stages. Normally the first stage shall be carried out in Semester-VII while the second stage shall be carried out in Semester-VIII. The quantum of work expected to be carried out by a student in each stage shall be in accordance with the division of credits given in Sec. 2.3.

### **3. REGISTRATION:**

#### **3.1. Regular Entry:**

- 3.1.1. Every student must register for the courses that he/she wants to study for earning credits at the beginning of each semester on the prescribed dates announced from time to time and shall be mandatory for every student till he/she completes the program. Only after registration his/her names shall appear in the roll list of each of such courses.
- 3.1.2. Students shall be required to fill up a Course Registration Form which shall be made available to them by the Academic office after payment of required fees.
- 3.1.3. Registration, according to rules, should be carried out as per the schedule given in academic calendar. Late registration may be permitted only for valid reasons and on payment of late registration fees. In any case, registration must be completed before the prescribed last date for registration, failing which his/her student ship shall be liable to be cancelled. Students having dues outstanding towards the institute or hostel shall be permitted to register only after clearing such dues.
- 3.1.4. In-absentia registration may be allowed only in rare cases at the discretion of the Dean Academics and with prior permission.
- 3.1.5. For registration in an odd semester, the student must have earned all the credits of the pre-previous year and at least 75% credits of the previous year. For example, for registration of the 5th semester courses (i.e. 3rd year of program), a student must have earned all the credits of the first year and 75% credits of the second year. Similarly for registration of the 7th semester courses (i.e. 4th year of program), a student must have earned all the credits of the second year and 75% credits of the third year. However, if 75% calculation turns out to be a mixed number (integer + fraction) then only the integer part of that number shall be considered for taking decision related with this clause.
- 3.1.6. A student registered in odd semesters shall be eligible to register for the courses offered in the even semester of that year irrespective of his/her SPI or the number of credits earned by him/her in that odd semester.

#### **3.2. Second Year Lateral Entry:**

- 3.2.1. Post diploma students can have lateral entry at third semester of the program. Such admissions are governed by the rules of DTE, Mumbai. Such students shall undergo all academic requirements as specified by the Academic council.

For such students there shall not be First Year Performance Index (FYPI). Semester

Performance Index (SPI) and Cumulative Performance Index (CPI) shall be calculated from the third semester onward taking into consideration the courses undergone by them at RIT, Rajaramnagar. (Refer Sec. 10 for definitions and calculations of these performance indices).

### 3.3. Entry of Students from University Pattern to Autonomous Pattern:

A student of RIT, Rajaramnagar admitted in pre-autonomous status can become eligible for admission in autonomous status only in odd semester (i.e. in Semester I or III or V or VII) when he/she clears the backlog or fulfills the prevailing ATKT norms of Shivaji University, Kolhapur. After taking admission in autonomous RIT, Rajaramnagar, such students shall clear backlog subjects (courses) of Shivaji University curriculum, if any, by appearing for the respective examinations of Shivaji University, Kolhapur. Further they shall undergo additional academic requirements (bridge courses) as specified by the Department Program Committee (DPC) of the respective departments so as to have tuning with RIT, Rajaramnagar autonomous curriculum. The students who have obtained a condone in any of the subjects of university curriculum by Shivaji University, Kolhapur shall be considered to have cleared that subject. All such students shall not be eligible for any medals or awards instituted by the institute.

### 3.4. Odd Entry:

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

## 4. CHANGE OF PROGRAM:

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

- 4.1 The change of program shall be permitted strictly on merit basis subject to the rules of admissions prevailing at the time of such change.
- 4.2 Students without fail grades and/or backlog shall be eligible to apply for change of program and can give their choices in the order of preference.
- 4.3 The request for change of program by a student from program A to program B shall be considered if number of students of program B does not exceed the sanctioned capacity of program B.
- 4.4 All such transfers can be effected only once at the beginning of the second academic year of the 4-year UG program. No application for change of program during subsequent academic years shall be entertained.

## 5. FACILITATION TO STUDENTS:

### 5.1. Faculty Advisor:

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

- \* Guidance about the rules and regulations governing the courses of study for a particular degree.
- \* Paying special attention to weak students.
- \* Guidance and liaison with parents of students for their performances.

### 5.2. Helping Weaker Students:

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

## 6. DISCIPLINE AND CONDUCT:

- 6.1 Every student shall be required to observe discipline and decorous behavior both inside and outside the campus and not to indulge in any activity, which shall tend to bring down the prestige of the institute.
- 6.3 Any act of indiscipline of a student reported to the Dean, Student Development, shall be discussed in a Disciplinary Action Committee of the institute. The Committee shall enquire into the charges and recommend suitable punishment if the charges are substantiated.
- 6.4 If a student while studying in the institute is found indulging in anti-national activities contrary to the provision of facts and laws enforced by Government he/she shall be liable to be expelled from the institute without any notice.
- 6.5 If a student is involved in any kind of ragging, the student shall be liable for strict action as per Maharashtra anti-ragging act 1999, which is in effect from 15th May 1999.
- 6.6 If any statement/information supplied by the student in connection with his/her

admission is found to be false/incorrect at any time, his/her admissions shall be cancelled and he/she shall be expelled from the institute and fees paid shall be forfeited.

- 6.7 Student once admitted in the institute shall follow instructions issued from time to time.
- 6.8 If a student is found guilty of malpractice in examination then he/she shall be punished as per the recommendations of the Complaint Redressal Committee (CRC) constituted by Board of Examinations. The maximum punishment may be expulsion from the institute.
- 6.9 Every admitted student shall be issued photo identification (ID) card which must be retained by the student while he/she is registered at RIT, Rajaramnagar. The student must have a valid ID card with him/her while in the institute.  
 Any student who alters or intentionally mutilates an ID card or whose ID card of another student or allows his/her ID card to be used by another, students shall be subjected to disciplinary action.  
 The valid ID card must be presented for identification purpose as and when demanded by authorities. Any student refusing to provide an ID card shall be subjected to disciplinary action.
- 6.10 Students should switch off the Mobiles during the Instructional hours and in the Institute Building, Library, Reading room etc. Strict action will be taken if students do not adhere to this.
- 6.11 During the conduct of any Tests and Examination students must not bring their mobiles. A student in possession of the mobile whether in use or switched off condition will face disciplinary action and will be debarred from appearing for the Test/Examination.

**7. ATTENDANCE:**

- 7.1 Academic Calendar : The academic activities of the institute are regulated by Academic Calendar and is made available to the students/faculty members and all other concerned in electronic form or hard copy. It shall be mandatory for students/faculty to strictly adhere to the academic calendar for completion of academic activities.
- 7.2 Regular 100% attendance is expected of all students for every registered course in lectures, tutorials, laboratory, seminar, mini-project and project etc.. Hence attendance is compulsory and shall be monitored in the semester rigorously. Students shall be informed at the end of every month if they are falling short of attendance requirement.
- 7.3 A maximum of 25% absence for the attendance may be permitted only on valid grounds such as illness, death in family or other emergency reason which is beyond control of student and shall be approved by the DPC of respective department. Sanction for such absenteeism shall be taken from the DPC Chairman of the respective department (in case of S.Y., T.Y. and final year students) while from F.Y.

coordinator (in case of F.Y. students) within a period of maximum one week after availing such leave. First year academic coordinators shall report such cases of first year students to respective DPC Chairman.

- 7.4 The maximum number of days of absence for students participating in Co-curricular activities /Sports/ Cultural events during a semester shall not exceed 10. Any waiver in this context shall be on the approval of the Academic Development Committee only after the recommendation by Dean Student Development.
- 7.5 ADPC Chairman shall report and recommend to Academic Development Committee (ADC) the cases of students not having 75% attendance as per the records of course instructor. After rigorously analyzing these cases ADC may take a decision to debar such student from End-Semester Examination (ESE) for that course. Such student shall re-register for that course as and when it is offered next. ISE and MSE evaluations of such student for this course during regular semesters shall be treated as null & void.
- 7.6 A student remaining absent during ESE of a course either on medical ground (Accident and/or hospitalization of a student) or any other emergency circumstances (death of immediate closer relative i.e. father, mother, brother and sister) or due to representing college at university/state level in sports/co-curricular activities shall be treated as per the rules of Sec 8.1.8 and Sec. 9.1.7.
- 7.7 If a student eligible for ESE remains absent for ESE of a course with no written intimation to Exam Cell within four days after the respective ESE is over, then he/she shall be awarded grade "XX".
- 7.8 A student who is eligible for re-examination, but remains absent for the same, shall be treated as per the rules given in Sec. 9.2.5.
- 7.9 The critical cases of absenteeism which are not covered by any of the above clauses shall be reported by concerned DPC Chairman to Academic Development Committee for final decision.

**8. MODES OF ASSESSMENT:**

**8.1. Assessment of Theory Courses:**

- 8.1.1. A student shall be evaluated for his/her academic performance in a theory course through In-Semester Evaluation (ISE), Mid Semester Examination (MSE) and End Semester Examination (ESE).
- 8.1.2. The relative weightage for the theory courses having ESE and not having ESE shall be generally as shown in the Table 8.1.2A.

**Table 8.1.2A: weightage for the theory courses**

Theory with ESE			Theory without ESE	
ISE	MSE	ESE	ISE	MSE
20	30	50	60	40

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

- 8.1.3. ISE shall be based on student's performance in assignments, viva-voce, quizzes, seminars, test set etc. The mode of ISE shall be decided and announced by the Course Instructor at the beginning of the course.
- 8.1.4. MSE shall generally be of 2 hours duration for each course and shall be held as per the schedule declared in the Academic calendar for that Semester. The detailed time-tables for this shall be declared one week in advance of the commencement of MSE.
- 8.1.5. ESE shall generally be of three hours duration for each course and shall be held as per the schedule declared in the Academic calendar for that semester. The detailed time-tables for this shall be declared one week in advance of the commencement of ESE. The ESE shall be a reasonably comprehensive examination based on entire syllabus.
- 8.1.6. All examinations and evaluations shall be compulsory. Credits for courses shall be awarded only if a student satisfies evaluation criteria and acquires the necessary minimum grade.
- 8.1.7. There shall be no re-examination for MSE of the courses having all the three components of evaluation viz. ISE, MSE and ESE. However, a student remaining absent for MSE for representing the institute in state level or university level sports/co-curricular activities (on prior recommendation and approval from Dean Student Development) or on valid grounds such as illness, death in family or other emergency reason which is beyond control of a student (on approval by the DPC Chairman of respective department within one week after availing such leave) shall be considered for re-examinations.
- 8.1.8. A student remaining absent for ESE of a course either due to medical reason (Accident and/or hospitalization of a student) or other emergency circumstances (death of immediate close relative i.e. father, mother, brother and sister) or due to representing college at university/state level in sports/co-curricular activities shall be awarded with grade "II". Such a student shall be allowed to appear for make-up examinations scheduled along with re-examinations of other courses. The student shall apply to Exam Cell with proper documentary evidence to appear for make-up examination. After make-up examination, a student shall be entitled to an appropriate grade as per Table of Sec. 9.1 based on his/her performance during the regular semester and in make-up examination.
- 8.1.9. A student remaining absent for MSE of non-ESE courses on medical grounds or other emergency reasons as given above, shall be awarded with grade "II". Such a student shall be eligible for make-up examinations scheduled along with re-examinations of other courses. The make-up examinations shall be based on 100% syllabus and the student shall not suffer any grade penalty. If the student remains absent even for make-up examination, he/she shall be awarded a grade "FF".

### 8.2. Assessment of Laboratory Courses:

- 8.2.1. The assessment of laboratory course for First year shall be continuous and based on

turn-by-turn supervision of the student's work and the quality of his/her work as prescribed through laboratory journals and his/her performance in viva-voce examinations uniformly distributed throughout the semester. There shall be no ESE for laboratory courses of First Year. The entire reassessment of a student shall be based on ISE.

- 8.2.2. The assessment of laboratory course from the 3rd semester onwards shall be carried out in two parts.
  - \* ISE shall be based on turn-by-turn supervision of the student's work and the quality of his/her work as prescribed through laboratory journals and his/her performance in oral or Practical-oral examinations uniformly distributed throughout the semester.
  - \* ESE shall be based on performing an experiment followed by an oral examination or a written examination.
  - \* The relative weightage for ISE and ESE for assessment of laboratory courses shall be 60% and 40% from second year onwards and a minimum performance of 40% in both ISE and ESE separately shall be required to get the passing grade.
- 8.2.3. ESE for laboratory courses shall normally be held one week before the ESE for theory courses and shall be conducted by a panel of examiners consisting of external and internal examiner. This activity shall be coordinated by Department Examination Coordinator (DEC) in consultation with HOD of the respective department.
- 8.2.4. A student failed in ESE of a laboratory course in a regular semester shall be eligible to appear for 100% examination conducted along with ESE of laboratory courses of the subsequent semester. Such examinations shall be fairly comprehensive (generally of 3 hours similar to POE i.e. Practical-Oral-Examinations) to properly judge his/her practical skill and theoretical knowledge for that laboratory course. ISE performance of regular semester of such a student shall be considered as null and void. He/She shall suffer a grade penalty as per Table of Sec. 9.2.

### 8.3. Assessment of Seminar, Mini-project, Project etc.:

- 8.3.1. Every student has to undertake seminar, mini-project, project of professional nature and interest at various levels of study. The topic of seminar or work related with mini-project/project may be related to theoretical analysis, an experimental investigation, a prototype design, new concept, analysis of data, fabrication and setup of new equipment etc. The students shall be evaluated for his/her seminar or mini-project/project through the quality of work carried out, the novelty in the concept, the report submitted and presentation(s) etc.
- 8.3.2. The Seminar/Project report must be submitted by the prescribed date usually two weeks before the end of academic session of the semester. It is desirable that the topics for seminar/project be assigned by the end of previous semester.
- 8.3.3. The seminar report and the presentation of seminar shall be evaluated by three departmental faculty members (decided by DPC).
- 8.3.4. The mini-project shall be evaluated jointly by External Examiner and Internal Examiner.

8.3.5. The assessment of B.Tech project work shall be carried out in two phases as shown below:

Sr.No.	Details	Evaluation By	Evaluation Type	Schedule	Credits
1	I-phase ISE (Synopsis submission seminar)	Departmental Program Committee	ISE	August last week	1
2	Termwork assessment	Guide	ISE	Continuous	1
3	I-phase ESE Progress Seminar & presentation	Panel of Examiners	ESE	November 2nd week	2
4	II-phase ISE (Progress seminar)	Departmental Program Committee	ISE	February 2nd week	1
5	Report submission	—	—	April 2nd week	—
6	Termwork assessment	Guide	ISE	Continuous	3
7	II-phase ESE (Final orals & presentations)	Panel of Examiners	ESE	April 4th week	4

A panel of examiners consists of three members viz. Chairman, Guide/Co-guide and External examiner.

#### 8.4. Assessment during summer term:

The evaluation of a fast student undergoing summer courses shall be done in exactly the same way as the assessment of theory or laboratory courses as explained above. The only difference shall be that the pace of teaching and evaluation shall be twice that for even or odd semester course.

### 9. THE GRADING SYSTEM:

#### 9.1. Award of Grade (Regular Semester):

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

9.1.2. The academic performance of a student shall be graded on a ten-point scale. The letter grades, the guidelines for conversion of marks to letter grades and their equivalent grade points are as given in Table.

**Table: Grade Table for Regular Semester**

Letter Grade	Marks Grade	Grade Point	Description of Performance
AA	>=90	10	Outstanding
AB	80-89	9	Excellent

BB	70-79	8	Very Good
BC	60-69	7	Good
CC	50-59	6	Above Average
CD	45-49	5	Average
DD	40-44	4	Below Average
FF	<40	0	Fail
XX	—	0	Detained, Re-register for course
II	—	—	Incomplete, eligible for make-up examination
PP	—	—	Passed (Audit Course)
NP	—	—	Not Passed (Audit Course)
DR	—	—	Dropped Out

9.1.3. The combined performance mentioned in Sec. 9.1.1 generally refers to performance in (as per the structure of the respective course).

\* ISE, MSE and ESE in theory courses.

\* ISE and ESE for laboratory courses.

\* ISE and MSE in the courses having no ESE.

In the last case MSE shall be considered as ESE and all rules related with ESE of theory courses shall be applicable to MSE of these non-ESE courses.

9.1.4. A student shall pass the course if he/she gets any grade in the range "AA" to "DD".

9.1.5. "FF" grade shall be awarded to a student in a course if he/she gets less than 40% marks jointly in the ISE, MSE & ESE for a theory course and in ISE & ESE for a laboratory course and non-ESE theory course. A student failed in theory courses shall then be eligible to apply for re-examination or register for summer term or opt for 100% examination. A student failed in laboratory courses shall be eligible to apply only for 100% examination conducted with the laboratory examination of the subsequent semester. In both cases, a student has to suffer a grade penalty.

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

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

\* A student has not completed most of the ISE due to non-medical reasons (for example when a student has missed all or most of the components of internal evaluation conducted by the instructor in that semester).

\* The performance of a student is less than 40% in ISE & MSE jointly.

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

In above four cases grade "XX" shall be declared one week before ESE and intimated to the Academic Office and Exam Cell immediately thereafter. Such students shall not be permitted to take the ESE of that course.

**Grade "XX" may be given to a student if**

- \* A student eligible for ESE remains absent for ESE of a course with no written intimation to Exam Cell within four days after the respective ESE is over.
- \* A student is guilty of any academic malpractice during examination. (Such cases shall be dealt by Complaint Redressal Committee).  
In second case grade "XX" in that course shall be declared after Complaint Redressal Committee confirms the academic malpractice.  
In above two cases when a student gets "XX" grade in a course, then this shall be treated as "FF" for the purpose of calculation of Semester Performance Index (SPI) and First Year Performance Index (FYPI) or Cumulative Performance Index (CPI). Refer Sec. 10 for calculation of Performance Indices.

**Grade "XX" shall be declared in all courses of a semester if**

- \* A student has any disciplinary action against him/her.  
In this case Academic Development Committee after confirming the level of seriousness of the case from Grievance Redressal and Discipline Committee shall punish him/her by debarment for a minimum period of six months to the extreme level of expelling him/her from the institute.  
Following rules are applicable to the student who has obtained grade "XX" in a regular semester:
  - \* A student obtaining grade "XX" in only one course in a regular semester or during examinations shall be allowed to appear for 100% examination conducted before the beginning of the next semester. Such students shall be eligible to obtain only "DD" as passing grade or "FF" or "XX" as fail grade.
  - \* A student obtaining grade "XX" in two or more than two courses in a regular semester shall be detained for that semester and shall not be allowed to appear for any of the ESEs of that semester. His/her ISE and MSE evaluations for all courses shall be treated as null and void. He/She needs to re-register for all courses of that semester in the next academic year and undergo all evaluations along with fresh regular students.
  - \* A student obtaining "XX" in two or more than two courses during examination (either due to absenteeism for ESE without intimation or within a valid reason or due to use of unfair means during examination) shall be awarded grade "XX" in all courses of that semester. His/her ISE and MSE evaluations for all courses shall be treated as null and void. He/She needs to re-register for all courses of that semester in the next academic year and undergo all evaluations along with fresh regular students.

9.1.7. Grade "II" shall be declared in a theory/laboratory course if a student has satisfactory

in-semester performance and has fulfilled the 75% attendance requirement, but has not appeared for ESE due to genuine reasons mentioned in Sec. 7.6. Such students shall be eligible for the make-up examination of ESE only on medical grounds/valid reasons AND on production of authentic medical certificate or other supporting document/s (as required by the institute) to the Exam Cell within ten days after the respective examination is over. The application form with requisite amount of fees must be submitted to the Exam Cell before the last date of filling such application forms for make-up examinations. These examinations shall be based on 100% syllabus and shall be scheduled before the commencement of the subsequent semester for theory courses and along with ESEs of laboratory courses of the subsequent semester.

A student with "II" grade when appears for the make-up examination shall be eligible to obtain a regular performance grade ("AA" to "FF") as per Table I depending on his/her overall performance in ISE, MSE and make-up examination. If a student fails to appear for make-up examination too, a grade "XX" shall be awarded to him/her. Thus "II" is only a temporary grade and shall be replaced by a valid grade only after make-up examination.

As mentioned in Sec. 2.3, there shall be a few audit courses as per the policies of the institute or as decided by DPC of respective program. The grade "PP" (Passed)/"NP" (Not Passed) shall be awarded for such courses depending upon the performance of a student evaluated by the faculty in-charge. No grade point shall be associated with these grades and performance in these courses shall not be taken into account in the calculation of the performance indices (SPI, CPI). However, the award of the degree shall be subject to obtaining a "PP" grade in all such courses.

**9.2. Award of Grades for Re-Examination:**

- 9.2.1. A student who has obtained grade "FF" in regular semesters shall be eligible to appear for re-examination conducted before the commencement of the next regular semester.
- 9.2.2. In such cases In-semester and Mid-semester performance of a student shall not be wiped out.
- 9.2.3. A student shall apply for re-examination before the last date of such application and shall appear for re-examination.
- 9.2.4. 50% weightages similar to ESE shall be given to re-examination.
- 9.2.5. A student who is eligible for re-examination, but remains absent for re-examination shall be given grade "FF".
- 9.2.6. A student shall be awarded a grade between "AB" to "DD", or "FF" or "XX" as given in Table II depending upon the cumulative marks obtained by him/her in ISE, MSE and Re-examination of ESE. Here a student has to suffer a grade penalty by accepting one grade lower as compared with the regular grades.

**Table II: Grade Table for Re-examination/Summer Term/Re-registration**

Letter Grade	Marks Obtained %	Grade Point
AB	> = 90	9
BB	80-89	8
BC	70-79	7
CC	60-69	6
CD	50-59	5
DD	40-49	4
FF	< 40	0
XX	—	0

**9.3. Award of Grade (Summer Term or 100% Examination):**

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

\* Registration for summer course or re-registration for the next regular semester course whenever that course is offered.

\* Application for 100% examination.

A student detained in a regular semester due to either a) by obtaining "XX" grade or b) by involvement in academic malpractice or c) by breaking the institute code of conduct and discipline cannot apply for summer, but can appear for 100% examination to clear the backlog.

Following rules apply for these cases:

9.3.1. In both cases the earlier performance of a student in all the evaluations of that course shall be treated as null and void.

**Grades for Summer Term:**

9.3.2. A student registering for the summer courses shall undergo all evaluations as per the structure of that course such as ISE, MSE and ESE and shall be eligible to acquire any grade between "AB" to "DD" or "FF" or "XX" as per Table II.

9.3.3. A student getting grade "FF" in summer course has to re-register and repeat the course whenever it is offered next or appear for 100% examination whenever it is held next. In both cases, a student has to suffer a grade penalty and accept the grades as per Table II and Table III respectively.

9.3.4. A grade "XX" shall be awarded to a student if he/she is found to be guilty of any disciplinary action during summer term, examination or assessment. Such cases shall be dealt by Grievance Redressal Committee or Complaint Redressal Committee as and when required.

**Grades for 100% Examination:**

If 100% examination is offered by the institute and is opted by a student who previously had obtained grade "FF" in a course, then his/her ISE and MSE performance of the regular semesters shall be considered as null and void. He/She shall be awarded a grade between "BB" to "DD" or "FF" or "XX" as given in Table III based on his/her performance only in 100% examination conducted on entire syllabus. However, if a student takes more than three chances (regular examination being the first chance, re-examination being the second chance, 100% examination being the third chance) to clear a course, then the maximum passing grade that he/she can get shall be only "DD". Thus a student has to pay a grade penalty by accepting a lower grade than that obtained in the regular examination, re-examination, or examination for a re-registered course. If 100% examination is taken by a student who previously had obtained grade "II" in a laboratory course, then he/she shall be awarded a grade as per Table I without any grade penalty.

**Table III: Grade Table for 100% Examination**

Letter Grade	Marks Obtained %	Grade Point
BB	> = 90	8
BC	80-89	7
CC	70-79	6
CC	55-69	5
DD	40-54	4
FF	< 40	0
XX	—	0

9.3.5. A student who had obtained grade "XX" in only one course in a regular semester and has appeared for 100% examination shall be eligible to get only "DD" as pass-grade (irrespective of his performance) or "FF" or "XX" as fail-grade.

9.3.6. A student appearing for 100% examination shall get grade "XX" if he/she is found guilty of any disciplinary action during the examination period.

**9.4. Award of Grade (Re-Registration):**

Following rules apply for the course re-registered in any semester.

9.4.1. ISE and MSE performance of a student of a regular or summer term for a re-registered course in which he/she had obtained "FF" or "XX" grade during regular semester or summer term shall be treated as null and void.

9.4.2. A student shall undergo all evaluations consisting of ISE, MSE and ESE applicable as per the structure of the respective course.

9.4.3. A student with "FF" grade when re-registers for that course in a regular semester or summer term has to suffer a grade penalty and shall be eligible to acquire grades as per Table II.

- 9.4.4. Are-registered student eligible for ESE remains absent for ESE due to valid genuine reason as mentioned in Sec. 7, then he/she shall be treated in a similar way as "II" cases in regular semester by giving a chance to appear for re-examination held before the commencement of the next semester with grade Table III being applicable to him/her.
- 9.4.5. A student with "XX" grade when re-registers for that course in a regular semester has to suffer a grade penalty and shall be eligible to acquire grade as per Table III.

## 10. CALCULATION OF PERFORMANCE INDICES:

The performance indices viz. Semester Performance Index (SPI), First Year Performance Index (FYPI), Cumulative Performance Index (CPI) represent the performance of a student in a semester (SPI), cumulated for two semesters of first year (FYPI) and cumulated over all semesters from the third semester onward still current semester (CPI) on a scale of 10.

### 10.1. Semester Performance Index (SPI):

- 10.1.1. The performance of a student in a semester shall be indicated by a number called SPI.
- 10.1.2. SPI shall be the weighted average of the grade points obtained in all the courses registered by the student during a semester.
- 10.1.3. If a student has a grade with numerical equivalent as  $g_i$  obtained by a student for the course with credits  $C_i$  then, SPI for that semester is calculated using formula.

$$SPI = \frac{\sum C_i g_i}{\sum C_i}$$

Where summation is for all the courses registered by a student in that semester. SPI shall be calculated and is rounded off to two decimal places.

- 10.1.4. SPI shall get affected because of the grades "XX" and "FF" obtained by the student in any of the courses.
- 10.1.5. For the students acquiring "II" grade (which is only a temporary grade) in any of the courses, SPI, CPI shall be calculated only after make-up examination.
- 10.1.6. SPI once calculated shall never be modified.

### 10.2. First Year Performance Index (FYPI):

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

$$FYPI = \frac{\sum C_i g_i}{\sum C_i}$$

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

- 10.2.2. FYPI shall reflect all the courses undergone by a student in the first year including the courses in which he/she has failed. FYPI may get modified in the subsequent semesters whenever a student clears his/her first year backlog courses.
- 10.2.3. If a student has been awarded "II" grade in the regular semester course of the first year then, FYPI shall be calculated after the make-up examination on the basis of the grade obtained by that student in a make-up examination.
- 10.2.4. If a student has obtained grade "FF" or "XX" at any time in any of the courses registered by him, then zero grade points corresponding to these grades shall be taken into consideration for calculation of FYPI.
- 10.2.5. If a student has a backlog of first year, then his/her FYPI shall be recalculated only after he/she clears his/her backlog.

### 10.3. Cumulative Performance Index (CPI):

- 10.3.1. An up-to-date assessment of the overall performance of a student for the courses from the third semester onward still completion of the program shall be obtained by calculating an index called Cumulative Performance Index (CPI).
- 10.3.2. CPI is the weighted average of the grade points obtained in all the courses registered by a student since the beginning of the third semester of the program.

$$CPI = \frac{\sum C_i g_i}{\sum C_i}$$

where summation is for all the courses registered by a student from third semester till that semester. CPI shall also be calculated at the end of every semester from the third semester onward and shall be rounded off to two decimal places.

- 10.3.3. CPI shall reflect all courses undergone by a student including courses in which he/she has failed. Thus, similar to SPI, "FF" and "XX" grades shall affect the CPI of a student.
- 10.3.4. If a student is awarded with a pass-grade for a course in which he/she was awarded previously "FF" or "XX" grade then, CPI shall be calculated by replacing corresponding  $C_i$  and  $g_i$  in both numerator and denominator of the above formula. Thus a course shall be included only once in CPI calculation. The latest performance of a student in a course shall be considered for CPI.

## 11. SUPPLYING PHOTOCOPY OF THE EVALUATED END SEMESTER ANSWER PAPER, RE-EVALUATION, AND PERIOD OF RETENTION:

- 11.1. A student having doubt regarding the grade declared in a course can apply for getting the photocopy of his/her evaluated ESE answer book by remitting the prescribed fee and submitting an undertaking. The undertaking shall mention that

the photocopy issued shall not be used for any kind of legal matters and no external faculty shall be involved for sorting out the discrepancies (if any) observed in the assessed answer book. A student can also apply for re-evaluation of his/her ESE answer book.

- 11.2. Evaluated answer papers should be preserved by the Exam Cell for a period of minimum two semesters.

### 12. ACADEMIC PROGRESS RULES (ATKTRULES):

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

- 12.2. The opportunities for clearing backlogs shall become available through summer courses or extra courses offered by the institute during the regular semesters after regular office hours. The department programme committee may advise such student to register for his/her backlog courses.

- 12.3. The maximum duration for getting B.Tech. degree for students admitted in the first semester of U.G. program shall be 12 semesters (six academic years) while for lateral entry students admitted in the third semesters shall be 10 semesters (five academic years) from their date of admission. The maximum duration of the program includes the period of withdrawal, absence and different kinds of leaves permissible to a student but excludes the period of rustication of a student from the institute. However, genuine cases on confirmation of valid reasons may be referred to Academic Council for extending this limit by additional one year.

If a student is unable to gain all credits of first year in three years from the date of his/her admission, then he/she shall be declared as "Not Fit for Engineering" leading to discontinuation of his/her registration with the institute.

Depending upon the academic progress of a student, Academic Council may take a decision regarding continuation or discontinuation of his/her registration with the institute.

### 13. SEMESTER GRADER REPORT:

- 13.1. Semester grader report reflects the performance of a student in that semester (SPI) and also his/her cumulative performance for the first year (FYPI) and also the cumulative performance since the third semester of his/her study (CPI).

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

- \* The credits for each course registered for that semester.
- \* Any audit course/s undertaken by a student in a Semester.
- \* The letter grade obtained in each course.
- \* The total number of credits earned by a student for the first year separately.
- \* The total number of credits earned by a student since the 3rd semester onwards.

- \* SPI, FYPI, CPI.
- \* A list of backlog courses, if any.
- \* Remarks regarding eligibility of registration for the next semester.

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

### 14. AWARD OF DEGREE:

Following rules prevail for the award of degree.

- 14.1. A student has registered and passed all the prescribed courses under the general institutional and departmental requirements.

- 14.2. A student has obtained CPI = 4.5.

- 14.3. A student has paid all the institute dues and satisfied all the requirements prescribed.

- 14.4. A student has no case of indiscipline pending against him/her.

- 14.5. Institute authorities shall recommend the award of B.Tech degree to a student who is declared to be eligible and qualified for above norms. However, the final degree shall be conferred by Shivaji University, Kolhapur.

### 15. CPI IMPROVEMENT POLICY FOR AWARD OF DEGREE:

An opportunity shall be given to a student who has earned all the credits required by the respective program with CPI greater than or equal to 4.00 but less than 4.50 (Refer Section 14.2), to improve his/her grade by allowing him/herto appear for 100% examinations of maximum two theory courses of seventh and eighth semester. Such examinations shall be scheduled along with re-examinations/make-up examinations of eighth semester. However, CPI shall be limited to 4.5 even though the performance of a student as calculated through modified CPI becomes greater than 4.5.

### 16. CONCLUSIONS:

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

For the latest updated version, stake holders are requested to visit [www.ritindia.edu](http://www.ritindia.edu) and to refer the academic section therein.

Teaching & Evaluation Scheme for  
First Year Engineering Common to all Branches

**SEMESTER: I (Group A)**  
(For Mechanical, Civil and Automobile)

Subject Code	Subject	Teaching Scheme				Evaluation Scheme				
		L	T	P	Credits	Scheme	Theory (Marks%)		Practical (Marks%)	
							Max.	Min. for Passing \$	Max.	Min. for Passing
SH101	Engineering Physics	3	-	-	3	ISE	20	40	--	--
						MSE	30		--	--
						ESE	50		--	--
SH105	Engineering Mathematics-I	4	1	-	5	ISE	20	40	--	--
						MSE	30		--	--
						ESE	50		--	--
SH107	Communication Skills	3	0	-	3	ISE	20	40	--	--
						MSE	30		--	--
						ESE	50		--	--
SH111	Engineering Mechanics	3	1	-	4	ISE	20	40	--	--
						MSE	30		--	--
						ESE	50		--	--
SH115	Introduction to Computer Programming	3	-	-	3	ISE	20	40	--	--
						MSE	30		--	--
						ESE	50		--	--
SH151	Engineering Physics	-	-	2	1	ISE	--	--	100	40
SH157	Introduction to Computer Programming	-	-	2	1	ISE	--	--	100	40
SH159	Communication Skills	-	-	2	1	ISE	--	--	100	40
SH161	W/S Practice-I	-	-	2	1	ISE	--	--	100	40
<b>Total</b>		<b>16</b>	<b>2</b>	<b>8</b>	<b>22</b>	<b>Total Contact Hours/Week : 26 hrs.</b>				

**Note:**

\$: Minimum 40% marks required combined in ISE and MSE to become eligible for ESE.

\*Tutorials and practical shall be conducted in batches with batch strength not exceeding 20 students.

ISE: In Semester Evaluation    MSE: Mid Semester Evaluation    ESE: End Semester Examination

**SEMESTER: I (Group B)**

(For Electrical, Electronics & Telecommunication,  
Computer Science and Information Technology)

Subject Code	Subject	Teaching Scheme				Evaluation Scheme				
		L	T	P	Credits	Scheme	Theory (Marks%)		Practical (Marks%)	
							Max.	Min. for Passing \$	Max.	Min. for Passing
SH103	Engineering Chemistry	3	-	-	3	ISE	20	40	--	--
						MSE	30		--	--
						ESE	50		--	--
SH105	Engineering Mathematics-I	4	1	-	5	ISE	20	40	--	--
						MSE	30		--	--
						ESE	50		--	--
SH109	Basic Electrical & Eln. Engg.	4	1	-	5	ISE	20	40	--	--
						MSE	30		--	--
						ESE	50		--	--
SH111	Engineering Mechanics	3	1	-	4	ISE	20	40	--	--
						MSE	30		--	--
						ESE	50		--	--
SH113	Engineering Graphics	2	-	-	2	ISE	20	40	--	--
						MSE	30		--	--
						ESE	50		--	--
SH153	Engineering Chemistry	-	-	2	1	ISE	--	--	100	40
SH155	Engineering Graphics	-	-	4	2	ISE	--	--	100	40
SH161	W/S Practice-I	-	-	2	1	ISE	--	--	100	40
<b>Total</b>		<b>16</b>	<b>3</b>	<b>8</b>	<b>23</b>	<b>Total Contact Hours/Week : 27 hrs.</b>				

**Note:**

\$: Minimum 40% marks required combined in ISE and MSE to become eligible for ESE.

\*Tutorials and practical shall be conducted in batches with batch strength not exceeding 20 students.

ISE: In Semester Evaluation    MSE: Mid Semester Evaluation    ESE: End Semester Examination

Teaching & Evaluation Scheme for  
First Year Engineering Common to all Branches

**SEMESTER: II (Group A)**  
(For Mechanical, Civil and Automobile)

Subject Code	Subject	Teaching Scheme				Evaluation Scheme				
		L	T	P	Credits	Scheme	Theory (Marks%)		Practical (Marks%)	
							Max.	Min. for Passing \$	Max.	Min. for Passing
SH103	Engineering Chemistry	3	-	-	3	ISE	20	40	-	-
						MSE	30		-	-
						ESE	50		-	-
SH102	Engineering Mathematics-II	4	1	-	5	ISE	20	40	-	-
						MSE	30		-	-
						ESE	50		-	-
SH109	Basic Electrical & Eln. Engg.	4	1	-	5	ISE	20	40	-	-
						MSE	30		-	-
						ESE	50		-	-
SH104	Basic Civil & Mechanical Engg.	4	1	-	5	ISE	20	40	-	-
						MSE	30		-	-
						ESE	50		-	-
SH113	Engineering Graphics	2	-	-	2	ISE	20	40	-	-
						MSE	30		-	-
						ESE	50		-	-
SH153	Engineering Chemistry	-	-	2	1	ISE	-	-	100	40
SH155	Engineering Graphics	-	-	4	2	ISE	-	-	100	40
SH152	W/S Practice-II	-	-	2	1	ISE	-	-	100	40
SH154	Mini Project	-	-	-	1	ESE	Project submission followed by presentation and oral			
<b>Total</b>		<b>17</b>	<b>3</b>	<b>8</b>	<b>25</b>	Total Contact Hours/Week: <b>28</b> hrs.				

**Note:**

\$: Minimum 40% marks required combined in ISE and MSE to become eligible for ESE.

\*Tutorials and practical shall be conducted in batches with batch strength not exceeding 20 students.

ISE: In Semester Evaluation    MSE: Mid Semester Evaluation    ESE: End Semester Examination

**SEMESTER: II (Group B)**  
(For Electrical, Electronics & Telecommunication,  
Computer Science and Information Technology)

Subject Code	Subject	Teaching Scheme				Evaluation Scheme				
		L	T	P	Credits	Scheme	Theory (Marks%)		Practical (Marks%)	
							Max.	Min. for Passing \$	Max.	Min. for Passing
SH101	Engineering Physics	3	-	-	3	ISE	20	40	-	-
						MSE	30		-	-
						ESE	50		-	-
SH102	Engineering Mathematics-II	4	1	-	5	ISE	20	40	-	-
						MSE	30		-	-
						ESE	50		-	-
SH107	Communication Skills	3	0	-	3	ISE	20	40	-	-
						MSE	30		-	-
						ESE	50		-	-
SH104	Basic Civil & Mechanical Engg.	4	1	-	5	ISE	20	40	-	-
						MSE	30		-	-
						ESE	50		-	-
SH115	Introduction to Computer Programming	3	-	-	3	ISE	20	40	-	-
						MSE	30		-	-
						ESE	50		-	-
SH151	Engineering Physics	-	-	2	1	ISE	-	-	100	40
SH157	Introduction to Computer Programming	-	-	2	1	ISE	-	-	100	40
SH159	Communication Skills	-	-	2	1	ISE	-	-	100	40
SH152	W/S Practice-II	-	-	2	1	ISE	-	-	100	40
SH154	Mini Project	-	-	-	1	ESE	Project submission followed by presentation and oral			
<b>Total</b>		<b>17</b>	<b>2</b>	<b>8</b>	<b>24</b>	Total Contact Hours/Week: <b>27</b> hrs.				

**Note:**

\$: Minimum 40% marks required combined in ISE and MSE to become eligible for ESE.

\*Tutorials and practical shall be conducted in batches with batch strength not exceeding 20 students.

ISE: In Semester Evaluation    MSE: Mid Semester Evaluation    ESE: End Semester Examination

**Syllabus:****SH101 Engineering Physics (Theory)****Teaching Scheme: Lectures- 03****Credits: 3****Evaluation Scheme: ISE-20% MSE-30% ESE-50%**

	<b>Hrs</b>
<b>1 Acoustics &amp; Ultrasonics:</b>	<b>6</b>
Basic requirements for the acoustically good hall, reverberation and time of reverberation, Sabine's formula (no derivation), absorption coefficient, factors affecting the architectural acoustics and their remedy.	
Production of ultrasonic waves by Piezo-electric method & Magnetostriction method, properties of ultrasonic waves, determination of wavelength and velocity of ultrasonic waves, applications of ultrasonic waves.	
<b>2 Diffraction &amp; Polarization:</b>	<b>6</b>
Diffraction, types, difference, resolving power, Rayleigh's criterion of resolution, diffraction grating – construction, theory, determination of wavelength & R. P. of diffraction grating.	
Polarisation, presentation of various types of light, plane of polarisation, double refraction, Huygens' theory of double refraction, optical activity, specific rotation, Laurent's half shade polarimeter.	
<b>3 LASER:</b>	<b>6</b>
Introduction – spontaneous emission, stimulated emission, absorption, population inversion, pumping, characteristics of laser, types of LASER – Ruby laser, semiconductor laser, applications of laser, Holography – principle, construction, reconstruction, applications.	
<b>4 Nuclear Energy:</b>	<b>6</b>
Discovery of fission, energy released by 1 Kg. of U235, chain reaction, explosive chain reaction and critical size, nuclear reactor and their classification, essentials of nuclear reactor.	
<b>5 Crystallography:</b>	<b>6</b>
Crystal structure, unit cell, these seven crystal systems and Bravais space lattice, no. of atoms per unit cell, atomic radius, coordination no., packing factor, the symmetry elements in cubic crystals – centre, plane, axis of symmetry, X-ray diffraction, Bragg's law, Bragg's X-ray spectrometer, Bragg's law and crystal structure.	
<b>6 Superconductivity &amp; Nanotechnology:</b>	<b>6</b>
Introduction to superconductivity, discovery, zero electrical resistance, persistent current, effect of temperature and external magnetic field, Meissner effect, applications.	
Introduction to nanotechnology, definition, nanomaterials, variation of properties of nanomaterials (physical & chemical), production of nanomaterials, applications.	

**List of reference books:**

1. Engineering Physics - Gaur R. K. & Gupta S. L. Dhanpat Rai Publication.
2. A Text Book of Engineering Physics - Avadhanulu M. N. & Kshirsagar P. G. S. Chand Pub.
3. Modern Physics - Theraja B. L. - S. Chand & Company Ltd. Delhi. Pub.
4. A Text Book of Optics - Subramanyam & Brij Lal - S. Chand & Company (Pvt.) Ltd. Pub.
5. Engineering Physics - P. K. Palanisamy.

**SH151 Engineering Physics (Practical)****Teaching Scheme:****Practical-2****Credits: 1****Evaluation Scheme: ISE-100%**

1. **Band gap energy:**  
Determination of band gap energy of semiconductor
2. **Diffraction grating:**  
Determination of wavelengths of various colours of visible spectrum.
3. **Resolving power of telescope:**  
Determination of resolving power of telescope using auxiliary slit.
4. **Polarimeter:**  
Determination of specific rotation of optically active solution using Laurent's half shade polarimeter.
5. **Cylindrical obstacle:**  
Determination of diameter of cylindrical obstacle using different methods.
6. **Study of crystal structure:**  
A detail study of seven crystal systems.
7. **Biprism:**  
Determination of wavelength of sodium source using Biprism.
8. **Symmetry elements of cube:**  
A detail study of thirteen symmetry elements of cube.

**SH103 Engineering Chemistry (Theory)****Teaching Scheme: Lectures- 03****Credits: 03****Evaluation Scheme: ISE-20% MSE-30% ESE-50%**

	<b>Hrs</b>
<b>1 Volumetric analysis:</b>	<b>6</b>
Chemical analysis, classification, volumetric analysis, standards – Primary and Secondary, concentration of solution (Molarity, Molality, and Normality), requirements of chemical reactions in volumetry, types of volumetric analysis – Acid-base, Iodometric, precipitation and complexometric.	
<b>2 Chemistry of Water:</b>	<b>6</b>
Introduction, impurities in natural water, Hardness of water – estimation and calculation, scale and sludge formation in boilers, acidity, alkalinity, chlorides, industrial treatment of water by Ion Exchange Process and domestic treatment by chlorination.	

- 3 Lubricants:** 6  
Introduction, mechanism of lubrication (fluid film, boundary and extreme pressure), classification of lubricants (solid, semisolid and liquid), properties of lubricants (Viscosity and viscosity index, flash and fire points, cloud and pour point), criteria for selection of lubricants.
- 4 Fuels** 6  
Introduction, classification, characteristics of good fuel, comparison between solid, liquid and gaseous fuels, calorific value and their types, theoretical calculation of calorific value, Bomb calorimeter, Boy's calorimeter, Numerical problems on calorific value, fuel cells.
- 5 Engineering Materials**  
**Polymers:** 6  
Introduction, addition and condensation polymerization, plastics, types, important thermoplastic resins (Polythene, Polyvinyl chloride), important thermosetting resins (Phenol formaldehyde, Urea formaldehyde), Epoxy resin.  
**Metallic materials:**  
Introduction, purposes of making alloys, classification, ferrous alloys – plain carbon steel, non-ferrous alloys – brass, duralumin, nichrome.
- 6 Corrosion and its Control** 6  
Introduction, classification, dry or atmospheric corrosion, wet or electrochemical corrosion, types and mechanism of wet corrosion, factors influencing corrosion, corrosion control by material selection and proper design, cathodic protection, hot dipping (galvanizing and tinning), metal spraying.

**Recommended books:**

1. Engineering Chemistry by Jain and Jain, Dhanpat Rai Publishing Company (P) Ltd, New Delhi.
2. A text book of Engineering Chemistry by S.S. Dara, S. Chand & Company Ltd., New Delhi.
3. Engineering Chemistry by Dr. A.K. Pahari and Dr. B.S. Chauhan, Laxmi Publications (P) Ltd, New Delhi.
4. Essentials of Physical Chemistry - Bahl, Tuli and Bahl.

**SH153 Engineering Chemistry (Practical)**

**Teaching Scheme:** Practical-02 **Credits: 01**  
**Evaluation Scheme:** ISE-100%

1. **Hardness:**  
Estimation of total hardness of a given sample of water by EDTA method.
2. **Acidity:**  
Estimation of acidity of a water sample.

3. **Alkalinity:**  
Estimation of alkalinity of a water sample.
4. **Chlorides:**  
To determine chloride content of water by Mohr's method.
5. **Phenol-formaldehyde:**  
Preparation of phenol formaldehyde resin.
6. **Urea-formaldehyde:**  
Preparation of urea-formaldehyde resin.
7. **Viscosity:**  
Determination of coefficient of viscosity by Ostwald's Viscometer.
8. **Analysis of coal:**  
Estimation of moisture and ash content in a given sample of coal.
9. **Corrosion:**  
Estimation of rate of corrosion of aluminium in acidic and basic medium.
10. **Alloy:**  
Estimation of copper from brass by using standard sodium thiosulphate solution.
11. **pH Meter:**  
Demonstration of pH meter.
12. **Potentiometer:**  
Demonstration of potentiometer.
13. **Photocalorimeter:**  
Demonstration of photo-colorimeter/spectrophotometer.

**Recommended books:**

1. Laboratory manual on Engineering Chemistry by Dr. Sudha Rani, Dhanpat Rai Publishing Company (P) Ltd, New Delhi.
2. Instrumental Methods of Chemical Analysis by Chatwal and Anand.

**SH105 Engineering Mathematics-I (Theory)**

**Teaching Scheme:** Lectures- 04 **Tutorial-01** **Credits: 5**

**Evaluation Scheme:** ISE-20% MSE-30% ESE-50%

- |   | <b>Hrs</b> |
|---|------------|
| <b>1 Complex Numbers</b>  | <b>8</b>   |
| Demoiver, stheorem, Rootsof complex numbers, expansion of $\sin^{\theta}$ and $\cos^{\theta}$ in terms of sine and cosine of multiples of $\theta$ , exponential functions of complex variable, circular functions of complex variable, logarithms of complex numbers, the general exponential function |            |
| <b>2 Partial differentiation and applications</b>   | <b>8</b>   |
| Definition, functions of two or more variables, Differentiations of composite function, Euler's theorem on homogeneous function. Jacobians, partial derivatives by using Jacobians, maxima and minima   |            |

3	<b>Integral calculus</b>	8
	Reduction formulae, Beta and Gamma functions, properties of Beta and Gamma functions, differentiation under integral sign	
4	<b>Differential equations of first order and first degree</b>	8
	Exact differential equations, Non-exact differential equation, Rules for solving non-exact differential equations, Linear differential equations, Non-linear differential equations	
5	<b>Applications of Ordinary differential equations</b>	8
	To orthogonal trajectories and engineering problems.	
6	<b>Numerical solutions of differential equations of first order and first degree</b>	8
	Picard's method, Taylor's series method, Euler's method, Euler's modified method, Runge-kutta Method.	

**Tutorials to be conducted batchwise. The no. of students per batch should be 20. Minimum number of Tutorials should be 8 covering all topics.**

#### List of tutorials

**Tutorial no: 1) and 2)** Revision of basic Notions and mathematical formulae to be used in Engineering Mathematics-I

**Tutorial no: 3)** Complex Numbers

**Tutorial no: 4)** Partial differentiation and applications

**Tutorial no: 5)** Integral calculus

**Tutorial no: 6)** Differential equations of first order and first degree

**Tutorial no: 7)** Applications of Ordinary differential equations

**Tutorial no: 8)** Numerical solutions of Ordinary differential equations of first order and first degree

#### Text Books

1. B. S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 39th edition: 2005
2. N.P. Bali, Ashok Saxena and N.Ch. S. N. Iyengar, A Text Book of Engineering Mathematics, Laxmi Publications, New Delhi, sixth edition, 2004

#### Reference Books

1. P.N. Wartikar and J.N. Wartikar, A Text Book of Applied Mathematics, Vol. I, Vol. II, Vidhyarthi Griha Prakashan, Pune, Ninth Revised Edition, October 1984, Reprints: September 2005
2. Ch.V. Raman Murthy and N.C. Srinivas, Applied Mathematics, S. Chand and company Ltd. First edition, 2001
3. Kreyszig E., Advanced Engineering Mathematics, Wiley Eastern 8th edition, 2007

4. Sastry, S. S., Engineering Mathematics, Vol. I and II, Prentice Hall of India, 4th edition, 2009
5. Peter V. O'Neil, Advanced Engineering Mathematics, / Cole Publishing House, 4th Edition 2002

#### SH107 Communication Skills (Theory)

Teaching Scheme: Lectures - 03

Credits: 3

Evaluation Scheme: ISE-20% MSE-30% ESE-50%

		Hrs
1	<b>Effective Reading Writing Comprehension</b>	07
	Selected Essays, Speeches and Technical Articles. Skimming and scanning; Factual and inferential comprehension; Prediction; Guessing meaning of words from context; Word reference based on these selective topics	
2	<b>Communicative Grammar</b>	07
	Forms of tenses, Use of articles & parts of speech, Concord, Idioms and phrases, One word substitution, Spotting common errors	
3	<b>Technical Paragraph Development</b>	05
	Introduction, Topic sentence and supporting sentences. Attributes of a good paragraph, Types of paragraphs	
4	<b>Writing Business Letter</b>	06
	Business Letters, Structure and types of a business letter, Student Correspondence, Letter of Inquiry, Letters of complaint, regret and adjustment.	
5	<b>Technical Reports</b>	06
	Introduction, Types of reports, Structure of reports, Objectives and characteristics of reports.	
6	<b>Information Transfer</b>	05
	Introduction, Definition of an object or a process. Guidelines for writing good description-organization, content, structure. Basics of visual literacy.	

#### Text Books:

1. Yadava Raju & Muralikrishna (ed.); Inspiring Speeches and Lives, Maruthi Publications, Guntur (2009) [Unit: I, II, IV, VII, VIII]
2. Dixon Robert J.: Complete Course in English, Prentice-Hall of India Private Limited, New Delhi (2004) [Unit: I, II, VII, XIII, XV]

**References:**

Books:

1. The Oxford Guide to writing and speaking by John Seely; Oxford University Press, New Delhi (2004)
2. A Handbook of Pronunciation of English Words by Sethi J. & Jinda I. V.; Prentice-Hall of India Private Limited, New Delhi (2004)
3. Advanced English Communication Skills by R. K. Lakshminarayan; Scitech Publications India Pvt. Ltd., Pune (2009)
4. Soft Skills by S. Hariharan, et al; MJ Publishers, Chennai (2010)

**SH159 Communication Skills (Practical)**

**Teaching Scheme: Practical- 02**

**Credits: 01**

**Evaluation Scheme: ISE-100%**

**1 Receptions skills: Listening**

Listening and typing – Filling in the blanks – Listening and answering the questions  
Making students listen to an audio or watch a video and asking them to explain the situation, temperament of the speakers, moods and attitudes of the speakers through their body language, intonation, pitch variation, pauses, pace of speech etc.

**2 Grammar**

Testing students' understanding of the application of tenses in the practice and explaining the rules where necessary. To make the students write and speak on everyday issues and finding out the general errors they commit unconsciously and correct them. Making them translate the sentences from their mother tongue into English and commenting on errors and correcting at the very moment.

**3 Speaking**

**Phonetics:** Intonation – Ear Training – Correct Pronunciation – Sound recognition exercises – Common Errors in English

**Conversations:** Face to Face Conversation – Telephone conversation – Role play activities (Students take on roles and engage in conversation)

**4 Writing Skills**

Student correspondence (day-to-day communication with administration through letters); Writing C.V. and job application; inquiry and complaint letter.

**5 Group Discussion**

Why is GD part of selection process? – Structure of a GD – Strategies in GD – Body Language – Mock GD – Video Samples

Conducting formal Group Discussions on given topics and assessing performances of the individual group members with the help of a well-defined set of rules.

**6 Presentation Skills**

Elements of an effective presentation – Presentation tools – Body Language – Video Samples

Students will make formal presentations on the previously allotted or selected issues. The A.V. aids (esp. electronic devices) will be made available to them. Either individual or group presentation will be allowed. The students will be well acquainted with the parameters of assessment.

**7 Interview Skills**

Kind of Interviews – Required Key Skills – Mock Interviews – Video Samples

On the line of available video versions of different phases of the normal job interviews conducting mock interview of an individual student. The panel of interviewers may have some students assessing minor aspects along with the teacher.

**8 Soft Skills**

Time Management – Articulatness – Assertiveness – Psychometrics – Innovation and Creativity – Stress Management & Poise – Video Samples

**SH109 Basic Electrical & Electronics Engg (Theory)**

**Teaching Scheme: Lectures- 4 Tutorial-01**

**Credits: 05**

**Evaluation Scheme: ISE-20% MSE-30% ESE-50%**

**Hrs**

**1 Magnetic Circuits**

6

Concept of magnetic circuit, MMF, reluctance, magnetic flux, flux density.

Magnetic field strength (Numerical treatment), Comparison between electrical & magnetic circuits.

**2 A.C. Fundamentals & single phase A.C. Circuits**

6

Faraday's law of electromagnetic induction. Lenz's law, dynamically induced EMF, Fleming's right hand rule, statically induced EMF – self and mutual induced EMF, Concept of self and mutual inductance, Generation of single phase alternating EMF, Cycle, frequency, time period, amplitude, Average value, RMS value, form and peak factor, Phase, Phase Difference, Phasor representation.

**3 D.C. Machines**

8

Principle of working, construction, types, circuit diagram of DC machine as generator & motor, Characteristics and applications of D.C. Motor. Operating principle, EMF equation, types of transformer, Construction, transformation ratio. Working of transformer at no load and with load. Losses in transformer, efficiency and voltage regulation (numerical treatment), Direct loading method for efficiency and regulation. Introduction to 3ph Transformers.

4	<b>Measurement and Error</b> Definitions, Accuracy and Precision, Significant Figures, Types of Error, Statistical Analysis, Probability of Errors, Limiting Errors	6
5	<b>Sensors &amp; Transducers</b> Classification of Transducers, Selecting a Transducer, Strain Gages, Displacement Transducers, Temperature Measurements, Photosensitive Devices.	8
6	<b>Electronic Measuring Devices</b> AC Voltmeter using Rectifiers, Electronic Multimeter, Digital Voltmeters, Q Meter, Oscilloscope & its applications	6

**List of Tutorials:**

1. Numerical based on magnetic flux density
2. Objective test on magnetic circuits
3. Numerical based on self and mutual inductance
4. Objective test on AC fundamentals and AC circuits
5. Numerical based on efficiency and voltage regulation
6. Objective test on DC machines.
7. Study of different error types & calculation of % error
8. Study of Statistical analysis of errors & Different error limiting Techniques
9. Study of Strain gauge
10. Study of LVDT
11. Study of front panel control of oscilloscope & measurement of frequency & voltage
12. Study of Electronic Multimeter

**Text Books:**

1. Electrical Technology Volume II By B.L. Theraja
2. Electrical Technology By H. Cotton
3. Principles of Power Systems By V.K. Mehta
4. Modern Electronic Instrumentation and Measurement Techniques, PHI publication, by Albert D. Helfrick & William D. Cooper. (Chapter 01, 06, 07 & 11)

**Reference Books:**

1. V. Detero, Principles of Electrical Engineering, PHI publication
2. E. Hughes, electrical and electronic technology, Pearson education
3. Instrumentation Devices & Systems, Second Edition, Tata McGrawhill publication by C.S. Rangan, G.R. Sarma, V.S.V. Mani

**SH111 Engineering Mechanics (Theory)**  
**Teaching Scheme: Lectures- 03 Tutorial-01 Credits: 04**  
**Evaluation Scheme: ISE-20% MSE-30% ESE-50%**

	<b>Hrs</b>
1	<b>Fundamentals of Mechanics and force systems:</b> 8 Introduction, Scope of the subject, Fundamental principles of Mechanics: Force and classification of force systems. Law of forces, resolution of forces, resultant of concurrent forces. Moment of a force, couple and its properties, Varignon's theorem, principle of transmissibility of force. Resultant of force system - parallel, concurrent and non-concurrent coplanar forces.
2	<b>Equilibrium of force system:</b> 6 Free body diagram, condition of equilibrium, types of loads, types of beams, types of supports and reactions. Equilibrium of concurrent, parallel and general force system in a plane, Lami's theorem, analysis of simple and compound beams. Concept of friction.
3	<b>Centre of Gravity &amp; Moment of Inertia:</b> 5 Centre of gravity of plane and composite figures, parallel axis & perpendicular axis theorems, radius of gyration, polar MI, Moment of Inertia of plane & composite figures.
4	<b>Rectilinear motion of particle:</b> 6 Kinematics: Introduction to dynamics and basic concepts, types of motion, rectilinear motion, equations for rectilinear motion for constant velocity, constant acceleration, equations of motion under gravity, variable acceleration, motion curves, concept of relative motion.
5	<b>Kinetics:</b> 6 Kinetics: Newton's second law of motion, D'Alembert's Principle and concept of dynamic equilibrium, application to problems on horizontal plane, inclined plane, circular motion (flywheel), normal and tangential components. Concept of centripetal and centrifugal force.
6	<b>Kinetics of particle and rigid body:</b> 9 Energy and Momentum Methods for particle: Work, Energy, Power, conservation of energy, work-energy principle, concepts of impulse, linear momentum, conservation of momentum, impulse-momentum principle, direct central impact, coefficient of restitution.

**Tutorials**

1. Law of polygon of forces
2. Jib Crane
3. Bell crank lever
4. Support reactions of beams
5. Fletcher's trolley

## 6. Centrifugal force

Minimum one assignment consisting of at least two problems on each unit. The students should utilize this time for solving of problems using the concepts learnt during lectures.

**Text Books**

1. Engineering Mechanics by Bhavikatti S.S. and Rajashekarappa; New age International publication (India) Pvt. Ltd. New Delhi (2008) 3rd Edition.
2. Engineering Mechanics by R.K. Bansal; Laxmi Publications (India) Pvt. Ltd. New Delhi (2005) 2th Edition.

**Reference Books**

1. Elements of Applied Mechanics by Junnerkar S.B.; Charotar Publishing House (India) Pvt. Ltd., Anand (Gujarat) (2001) 12th Edition.
2. Vector Mechanics for Engineers (Statics and Dynamics) by Ferdinand P. Beer and E. Russell Johnson; The McGraw Hill Publication, New York (2004) 8th Edition.
3. Engineering Mechanics (Statics and Dynamics) by Ferdinand L. Singer; Harper and Collins Publications (India) Pvt. Ltd. Noida (2005) 3rd Edition.
4. Engineering Mechanics (Statics and Dynamics) by J.L. Meriam and Craig; John Wiley and Sons Publications Singapore (2006) 5th Edition.

**SH115 Introduction to Computer Programming (Theory)**

Teaching Scheme: Lectures - 3

Credits: 3

Evaluation Scheme: ISE-20% MSE-30% ESE-50%

	Hrs.
1 <b>Computer Hardware &amp; Software</b> Classification of computers—Mini, Desktop, Micro, Mainframe, Super Computers, Computer System Components—CPU, Input devices (keyboard, mouse, joystick, scanner), Output devices (monitor, printer, plotter), Storage devices (RAM, HDD, CDROM), Applications of Computers, Study of Windows XP operating system (Installation, Basic system administration utilities)	6
2 <b>Introduction to 'C' Language</b> Importance of 'C' Language, Sample 'C' Program, Structure of 'C' Program, Constants, variables and data types. Operators and expressions. Managing input/output operations. Decision and Control statements.	6
3 <b>Functions</b> Basic of functions function definition, declaration and calling of function, Function prototype, storage classes, scope and lifetime of variables, Methods of parameter passing-call by value.	6

4 <b>Arrays</b> Basic of arrays, array initialization, one and two dimensional arrays, Character arrays, strings, passing array to user defined function.	6
5 <b>Pointers</b> Basic of pointers, pointer & addresses, passing array to function using pointers, returning a pointer from function, Pointer to arrays, Array of pointers, Methods of parameter passing-call by address and call by reference.	6
6 <b>Structures</b> Basic of structure, structure declaration and initialization of structures, passing structure variable to function, pointer to structure variable.	6

**Text Books:**

1. Fundamentals of Computers 4th Edition By Rajaraman, PHI Publication
2. Programming in ANSIC By K. Balaguruswamy, TGMH Publication
3. Windows XP Home Edition 3rd Edition By Hart Davis, John Wiley and Sons Publication.

**Reference Books:**

1. The 'C' Programming Language, By B.W. Kernighan and D.M. Ritchie, Pearson Education
2. C Language Interview Q&A, By Sandeep A. Thorat, Shroff Publishers.

**SH157 Introduction to Computer Programming (Practical)**

Teaching Scheme: Practical - 2

Credits: 1

Evaluation Scheme: ISE-100%

1 <b>Computer Hardware</b> Computer disassembly to show different hardware components (e.g. RAM, Hard disk, Processor, CDROM etc.) and study of each component.
2 <b>Computer Software</b> Installation of Windows XP on given machine and to install application software (e.g. Microsoft office, Turbo C etc.) on given machine.
3 <b>Introduction to C Language</b> Implement a C language program to display any miscellaneous output using different types of control statements.
4 <b>Control Statements</b> Implement a C program that demonstrates different types of control statement used in the C.

- 5 **Functions**  
Implement a C program that demonstrates functions in the C language.
- 6 **Arrays**  
Implement a C program that demonstrates 1-Dimensional and 2-Dimensional arrays in the C language.
- 7 **Pointers**  
Implement a C program that demonstrates pointers in the C language.
- 8 **Methods of parameter passing**  
Implement a C program that demonstrates parameter passing methods in the C language.
- 9 **Strings**  
Implement a C program that demonstrates strings in the C language; also demonstrates string handling using pointers in user-defined functions.
- 10 **Structures**  
Implement a C program to demonstrate student information system using structures. The program should have following mechanisms: - add student, update student information and display student information.

**Text Books:**

1. Programming in ANSI C By K. Balaguruswamy, TGMH Publication
2. The 'C' Programming Language, By B.W. Kernighan and D.M. Ritchie, Pearson Education
3. C Language Interview Q&A, By Sandeep A. Thorat, Shroff Publishers.

**SH113 Engineering Graphics (Theory)****Teaching Scheme: Lectures-2****Credits: 02****Evaluation Scheme: ISE-20% MSE-30% ESE-50%**

- |   | <b>Hrs</b> |
|---|------------|
| 1 <b>Introduction to computer Aided sketching</b><br>Introduction to Engineering Graphics, BIS conventions, Lettering and dimensioning methods used in drawing. Layout of the AutoCAD software, standard tool bar/menus. Co-ordinate system and reference planes. Creation of 2D environment. Selection of drawing size and drawing units. Commands and creation of Lines, coordinate points, axes, polylines, polygons, splines, circles, hatch, text, move, copy, offset, mirror, rotate, trim, extend, break, match properties | 3          |
| 2 <b>Projection of Point, Lines and Planes</b><br>Projection of oblique line by rotation or auxiliary plane method. Projection of parallel, perpendicular, intersecting and skew lines. True shape and angle between planes   | 4          |

- |   |   |
|---|---|
| 3 <b>Projection of Solids</b><br>Projection of prism, pyramid, cone, cylinder and cylinder by rotation method.  | 4 |
| 4 <b>Section of solids and Development of Surfaces</b><br>Projections of regular solids cut by section plane and Development of lateral surfaces for simple positions only. True shape of section.  | 4 |
| 5 <b>Orthographic Projection</b><br>Basic principles of orthographic projection (First and Third angle method), projection of point and line. Orthographic projection of objects by first angle projection method. Missing views, procedure for preparing scaled drawing, sectional views and types of cutting planes and their representation, hatching of sections. | 5 |
| 6 <b>Isometric Projection</b><br>Isometric axes, line and planes, isometric projection and isometric view. Drawing isometric view of solids and objects.  | 4 |

**Text Books:**

1. Engineering Drawing by Dhanjay A. Jolhe, Tata-McGraw Hill (2008).
2. Elementary Engineering Drawing by N.D. Bhatt, Charotar Publishing House, Anand (India)

**Reference Book:**

1. Fundamentals of Engineering Drawing by Warren Luzzader, Prentice Hall of India, New Delhi.
2. Engineering Graphics by P.S. Gills. K. Kataria and sons New Delhi (2009).
3. Engineering Graphics with AutoCAD by D.M. Kulkarni, A.P. Rastogi, A.K. Sarkar, PHI Publication (2010).
4. Text Book on Engineering Drawing by K.L. Narayana & P. Kannaiah, Scitech Publications (India) Pvt. Ltd., Chennai.

**SH155 Engineering Graphics (Practical)****Teaching Scheme: Practical - 4****Credits: 2****Evaluation Scheme: ISE-100%**

- |  |
|--|
| 1 Orientation of AutoCAD software with basic draw and modify commands and simple practice sketches |
| 2 Advanced AutoCAD commands, dimensioning, text, linetype properties etc. and practice sketches    |
| 3 Projection of lines (Minimum four problems)  |
| 4 Projection of Planes (Minimum two problems)  |
| 5 Projection of Solids (Minimum two problems)  |
| 6 Section of Solids and Development of Surfaces (Minimum two problems)                             |

- 7 Orthographic views of simple objects and regular solids (Minimum four problems with all three views)
- 8 Problems on missing views and simple object with sectional views (Minimum two problems each with all three views)
- 9 Orthographic projection with sectional view (Minimum two problems each with all three views)
- 10 Isometric projection (Minimum two problems)

**SH161 WORKSHOP PRACTICE I (Practical)**

**Teaching Scheme: Practical-02**

**Credits: 1**

**Evaluation Scheme: ISE-100%**

- 1 **Carpentry Shop:**
  - a) Importance of carpentry & pattern making in engg.
  - b) Introduction to different carpentry & pattern making tool.
  - c) Job Demo.
- 2 **Carpentry Shop:**

One composite job such as dovetail/ butt joint, tray, photo frame etc. with commercial aspects.
- 3 **Carpentry Shop:**

One composite job such as dovetail/ butt joint, tray, photo frame etc with commercial aspects.  
(Jobing group of two students)
- 4 **Carpentry Shop:**
  - a) Demonstration of power tools.
  - b) Costing of wooden/ Furniture article.
- 5 **Fitting Shop:**
  - a) Introduction to Engg. Materials such as flat/ I Section/ C section/ Bar-diff. sections/ pipe costing of material
  - b) Job Demo.
- 6 **Fitting Shop:**

One job- Male-Female fitting with operations – Marking, cutting, drilling, tapping, filing, etc. (Jobing group of two students)
- 7 **Fitting Shop:**

One job- Male-Female fitting with operations – Marking, cutting, drilling, tapping, filing, etc.
- 8 **Fitting Shop:**

One job- Male-Female fitting with operations – Marking, cutting, drilling, tapping, filing, etc.

- 9 **Fitting Shop:**

One job- Male-Female fitting with operations – Marking, cutting, drilling, tapping, filing, etc.
- 10 **Machine Shop:**
  - a) Importance of machining, elements of machining, works & tool relative motion.
  - b) Basic structure of any machine- Drive, mechanism.
  - c) Demonstration of lathe.
- 11 **Machine Shop:**
  - a) Demonstration of shaping machine, milling machine, grinder, turret, automat.
  - b) Demonstration of CNC lathe, milling, EDM.
- 12 **Automobile:**

General Automobile care & Maintenance.

  - a) 4 Wheeler
  - b) 2 Wheeler

**SH102 Engineering Mathematics-II (Theory)**

**Teaching Scheme: Lecture- 04 Tutorial-01**

**Credits: 5**

**Evaluation Scheme: ISE-20% MSE-30% ESE-50%**

- 1 **Curve tracing and Rectification** 8
 

Introduction to basic notions, Tracing of curve in Cartesian form, Tracing of curve in polar form, rectification of plane curves (Cartesian and polar form)
- 2 **Multiple integrals** 8
 

Introduction to double integrals, Evaluation of double integrals, change of order of integration, change in polar coordinates, Evaluation of triple integrations with given limits
- 3 **Applications of Multiple integrals** 8
 

Area under the curves using double integrals, mass of lamina, moment of inertia of a plane lamina, Volume of solids of revolutions
- 4 **Vector Differentiation** 8
 

Differentiation of vectors, gradient of scalar point function, directional derivative, divergence of vector point function, curl of vector point function, irrotational and solenoid vector field
- 5 **Matrices-I** 8
 

Rank of a matrix, Reduction to normal form, Echelon form, System of homogeneous and non-homogeneous Equations, Their consistency and solution.
- 6 **Matrices-II** 8
 

Linear Dependence and Independence, Orthogonality of matrix, Eigen values and Eigen vector of a square matrix, Cayley-Hamilton Theorem.

**Tutorials to be conducted batchwise. The no. of students per batch should be 20. Minimum number of Tutorials should be 8 covering all topics.**

**List of tutorials:**

**Tutorial no: 1) and 2)** Revision of basic Notions and mathematical formulae to be used in Engineering Mathematics-II

**Tutorial no: 3)** Curve tracing and Rectification

**Tutorial no: 4)** Multiple integrals

**Tutorial no: 5)** Applications of Multiple integrals

**Tutorial no: 6)** Vector Differentiation

**Tutorial no: 7)** Matrices-I

**Tutorial no: 8)** Matrices-II

**Text Books:**

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers 39th edition: 2005.
2. N.P. Bali, Ashok Saxena and N.Ch. S. N. Iyengar, A Text Book of Engineering Mathematics, Laxmi Publications, New Delhi, sixth edition, 2004

**Reference Books:**

1. P.N. Wartikar and J.N. Wartikar, A Text Book of Applied Mathematics, Vol. I, Vol. II, Vidhyarthi Griha Prakashan, Pune. Ninth Revised Edition, October 1984, Reprints: September 2005
2. Ch.V. Raman Murty, N.C. Srinivas, Applied Mathematics, S. Chand and Company Ltd. Ramnagar, New Delhi, First edition, 2001
3. Kreyszig E., Advanced Engineering Mathematics, Wiley Eastern, 8th edition, 2007
4. Sastry, S. S., Engineering Mathematics, Vol. I and II, Prentice Hall of India, 4th edition, 2009
5. Peter V. O'neil, Advanced Engineering Mathematics, / Cole Publishing House 4th Edition 2002

**SH104 Basic Civil & Mechanical Engineering (Theory)**

**Teaching Scheme: Lectures-04 Tutorial-01 Credits: 05**

**Evaluation Scheme: ISE-20% MSE-30% ESE-50%**

	SECTION	Hrs
1	<b>Introduction to Civil Engineering:</b> Significance and applications of Civil Engineering, different streams of Civil Engineering, Building materials - cement, stone, tiles, aggregates, bricks, admixtures, roofing materials, steel their uses and engineering properties.	6

2	<b>Building components and Planning Principles:</b> Components of building, functions, Principles of building planning, general building bye-laws - building line, control line, height of building, open space requirements and FSI, General safety requirements, repairs and maintenance of building - routine and special maintenance works.	9
3	<b>Surveying:</b> Classification of surveys, Principles of surveying, introduction to leveling & contour survey, modern surveying instruments - digital planimeters, total station (Demonstration).	9
<b>SECTION: II</b>		
1	<b>Energy Sources and Fluid Power:</b> Renewable and non-renewable, solar, Wind, Geothermal, Nuclear, Wave, Tidal, Hydro-power, Steam power plant, Bio-gas. Study of Pumps, Compressor, Hydraulic Turbines: Types, Construction, working and applications.	8
2	<b>Thermodynamics:</b> Scope, Microscopic and macroscopic views, Thermodynamic System and its types, properties, State, Process, Cycle, working substance, Thermodynamic equilibrium, Zeroth law of thermodynamics, Work and Heat, Different forms, First Law of Thermodynamics, Application of First Law to steady Flow processes, Limitations of First Law, PMM-I, Path and Point functions, Second Law of Thermodynamics. I.C. Engine - two strokes, four stroke, SI, CI engines.	8
3	<b>Mechanical Power Transmission:</b> Type of Belt and belt drives, chain drive, Types of gears and gear trains, Types of Coupling.	8

**List of Tutorials:**

**SECTION I**

1	<b>Data Collection:</b> Collection of samples of different building materials with rates, collection of data of recent civil engineering projects through internet, civil engineering journals and magazines and preparation of its report.
2	<b>Measurement of distances:</b> Measurement of horizontal and vertical dimensions of any small building and preparation of dimensioned sketch of the building from the measurements taken.
3	<b>Leveling:</b> Reduction of levels by Height of Instrument and Rise-Fall method using dumpy level.

- 4 **Area Measurement:**  
Measurement of an irregular area using (mechanical/digital) planimeters.
- 5 **Demonstration of Advanced surveying instruments:**  
Measurement of an area using Total Station.
- 6 **Site Visit:**  
Visit to an nearby construction site and preparation of the report based on the above site visit and its presentation in the form of power point presentation

### SECTION II

- 1 **I.C.Engine:**  
Demonstration of Two stroke and four stroke engine with the help of cut section models.
- 2 **Refrigeration:**  
Demonstration of refrigeration system.
- 3 **Solar Energy:**  
Demonstration of solar water heating system.
- 4 **Power Transmission:**  
Estimation of velocity ratio and Gear ratio.
- 5 **Fluid Power:**  
Demonstration of pumps and compressors.
- 6 **Industrial Visit:**  
Industrial visit to steam power plant

#### References:

#### Text Books:

1. Basic Civil Engineering by G.K.Hiraskar; Dhanpat Rai Publications (India) Pvt. Ltd. New Delhi (2008)
2. Basic Civil Engineering by Dr.P.D.Despande, by Nirali Publication, Pune (2000).
3. Non Conventional Sources of Energy by G.D.Rai,, Khanna Publication New Delhi (2000)
4. Engineering Thermodynamics by A.Achyutan,, Prentice Hall of India, New Delhi (2010)
5. Elements of Mechanical Engineering by K.P.Roy & S.K Hazarachoudari, Media Promoters and Publisher Pvt Ltd, Mumbai (2000).

#### Reference books:

1. Surveying by Basak N. Tata Mc-Graw Hill Publication, New Delhi (2004)

2. Surveying, Vol.-I, Vol.-II, Vol.-III by B.C.Punmia Laxmi Publication, New Delhi (2004)
3. Engineering Materials by R.K.Rajput S.Chand and co. Ltd., New Delhi 2004
4. Solar Energy by Dr.S.P.Sukathame,, Tata Mc-Graw Hill Publication, Delhi (2008)
5. Thermal Engineering by R.K.Rajput, Laxmi Publication, New Delhi. (2004)
6. Thermodynamics an Engineering approach by A.Yunus cengle Tata Mc-Graw Hill Publication, Delhi (2006).
7. Arora and Domkunwar, Power Plant Engineering, Dhanpat Rai and Sons. Pvt Ltd (2010)

### SH152 WORKSHOP PRACTICE II (Practical)

Teaching Scheme: Practical-02 Credits: 1

Evaluation Scheme: ISE-100%

- 1 **Smithy Shop:**  
One job in smithy-operations-Drawing, Bending, Upsetting, (jobs such as Chisel, Peg, Hook, Lathetool etc.)
- 2 **Smithy Shop:**  
One job in smithy-operations-Drawing, Bending, Upsetting.
- 3 **Smithy Shop:**  
One job in smithy-operations-Drawing, Bending, Upsetting.
- 4 **Smithy Shop:**  
One job in smithy-operations-Drawing, Bending, Upsetting.
- 5 **Sheet Metal Shop:**  
Introduction with M.S. Sheet/ G.I. Sheet / CRC Sheet Applications & gauge measurement. One Job-Commercial items such as dustbin, funnel, tray, motor cover etc.  
(Jobing group of two students)
- 6 **Sheet Metal Shop:**  
One Job-Commercial items such as dustbin, funnel, tray, motor cover etc.
- 7 **Sheet Metal Shop:**  
One Job-Commercial items such as dustbin, funnel, tray, motor cover etc.
- 8 **Welding Shop:**  
One job on Arc welding. Lap/Butt Joint.
- 9 **Welding Shop:**  
One job on Arc welding. Lap/Butt Joint.
- 10 **Welding Shop:**  
Demonstration of TIG, MIG, Submerged Arc, Plasma Arc Welding Machine.
- 11 **Welding Shop:**  
Costing of Fabrication work-Soldering/Brazing Demonstration  
Practical, Demonstration-Angel Grinder, cutter Drill etc.

12 **Electrical Workshop:**

Single phase, 3 Ø supply, checking supply, replacing fuse, simple electric connections, fuse fitting motor short circuit test, earthing, neutral, Safety measures.

**SH154 Mini Project**

**Teaching Scheme:** Lecture:0 Tutorial:0 Practical:0 Credits: 01

**Evaluation Scheme:** ESE-100%

**Course description:**

Mini projects have been incorporated in the curriculum in order to enhance and utilize the high potential of the students and build positive attitude, which will help them in their social and technical life ahead. The mini project is designed to help students develop practical ability and knowledge about practical tools/techniques in order to solve real life problems related to the industry, academic institutions and community. The course Mini Project is one that involves practical work for understanding and solving problems in the field of technology and will have one credit.

**Guidelines for Mini Project:**

1. Each division will have separate project co-ordinator with 2Hrs Load. (He/She should be senior faculty from respective branch)
2. Mini project will be teamwork, consisting min. 3 to max. 5 students
3. Topic selection should have applicability, social or technical, selection and finalization will be through project guide
4. Preparation of small project report as per guidelines.
5. Project group must provide complete solution to the selected problem with conceptual clarity.
6. The project will be evaluated by respective branch HOD and project guide and senior faculty.
7. The mini project should be presented before the committee, which shall evaluate for 100 marks.

**Duties of Project Co-ordinator:**

1. Project coordinator should form appropriate groups.
2. He should provide suitable guides.
3. Project co-ordinator should do the registration of groups with title and project objectives.
4. Follow up of work should be taken regularly from project guides and students and maintain record.
5. He is responsible for arrangement of presentation and evaluation of the mini projects.

**Useful Resources at a Glance:**

Library	48000 Volumes, 225 National & International journals
e-Library	Online access to Science Direct, IEEE Journals and other learning resources
ISTE Students' Chapter	The activities of Indian Society for Technical Education through students' chapter RIT motivate the students in direction of technical excellence.
CESA, ESSA, MESA, AESSA, ASCI (Students Associations of Various Departments)	Provides platform to the students for their overall development
Central Computing Center	Specially designed for computing services and like internet, RFID System, Wi-Fi, hardware and software services
Workshop	RIT has a full-fledged workshop for hands-on training to the next generation engineers.
Gymkhana	In-campus gymnasium and indoor games, open sports complex adjacent to the Institute
Cultural Cell	Cultural activities and youth programmes provide opportunities for the latent potentialities of the students to find an outlet in joyous and constructive ways.
Girl Students' Development Cell	Despite the programs like Health Counselling, Lectures on Social Justice to Women the cell has presenting some beautiful performance through its popular feature "SHARDANAYAS"
Grahak Bhandar	The RIT Students Consumers' Cooperative Store cater the needs right from stationary and cutlery items to cosmetics and dress materials for uniform.
Student Counseling Cell	It focuses on chronic failures as well as chances of getting converted in habitual failures among students.

