



Pondicherry Engineering College, Puducherry – 605 014
(An Autonomous Institution of Government of Puducherry affiliated to Pondicherry University)

Regulations for Bachelor of Technology (B.Tech.) Degree Programmes

(With amendments approved in the third meeting of the Academic Council held on 23rd March 2016)

(Applicable for the candidates admitted from the Academic year 2014-15)

1. INTRODUCTION

- 1.1 The Regulations presented here are common to all the B.Tech. Degree Programmes of Pondicherry Engineering College (PEC) and binding on all parties concerned, including the Students, Faculty, Staff and Departments.
- 1.2 This set of Regulations contains the course structure, curriculum and the provisions governing the policies and procedures of imparting instructions of courses, conducting of examinations, evaluation and certification of students' performance, leading to the said Degree Programme(s).
- 1.3 The set of Regulations, on approval by the Academic Council of PEC, may supersede all the corresponding earlier sets of Regulations of the College, along with all the amendments thereto, and shall be binding on all students undergoing the said Degree Programme(s).
- 1.4 This set of Regulations may evolve and get revised/refined or updated or modified or changed through appropriate approvals from the Academic Council, from time to time.
- 1.5 The effect of periodic refinements in the Academic Regulations & Curriculum, on the students *admitted in earlier years*, shall be dealt with appropriately and carefully, so as to ensure that those students are not subjected to any unfair situation whatsoever, although they are required to conform to these revised set of Regulations & Curriculum, without any undue favour or considerations.
- 1.6 All disputes arising from this set of Regulations must be addressed to the Academic Council. The decision of the Academic Council is final and binding on all the parties concerned.
- 1.7 Any legal dispute that may arise from this set of Regulations shall be limited to the legal jurisdiction determined by the location of the college and not that of any other parties.

2. DEFINITIONS

In these regulations, unless the context otherwise requires:

- a) **“University”** means Pondicherry University
- b) **“College”/“PEC”/“Institute”** means ,Pondicherry Engineering College
- c) **“Principal”** means the Principal of Pondicherry Engineering College
- d) **“Programme”/“Degree”** means, UG Degree Programme, (B.Tech. degree programme)
- e) **“Lateral Entry”** means, admission of students directly into the second year of B.Tech. Degree programme after completion of Diploma Course in Engineering
- f) **“Branch”/“Discipline”** means, specialization or discipline of B.Tech. degree programme like Civil Engineering, Information Technology, etc.,
- g) **“Parent Department”** means, the department that offers the degree programme
- h) **“BoS”** means, the Board of Studies for the programmes offered by a department
- i) **“HoD”** means, Head of the Academic Department
- j) **“Course Instructor”** means, a Faculty teaching a theory/laboratory subject
- k) **“Course”/“Subject”** means, a theory subject or practical subject offered in a semester
- l) **“Core Subject”** means, a compulsory subject in the curriculum
- m) **“Elective Subject”** means, an optional subject in the curriculum
- n) **“Co-curricular activities”** means, specific activities that will help the student gain mileage in his professional career
- o) **“Odd Semester”** means, the Semester that is typically from Mid-June to October
- p) **“Even Semester”** means, the Semester that is typically from December to Mid-April
- q) **“Summer Vacation”** means, the inter semester vacation between Even Semester and Odd Semester
- r) **“Period”** means, Duration of one unit of a theory/practical class (*shown in the time table*) which is normally 50 minutes
- s) **“Enrollment”** means, Enlistment of a student in the rolls of a class in an academic year
- t) **“Arrear”** means, a subject in which a student has failed (*has not fulfilled the examination passing criteria*)
- u) **“Regular Examination”** means, an examination conducted in a semester for a subject which is prescribed in the curriculum of that semester
- v) **“Arrear Examination”** means, a semester examination conducted exclusively for the students who have failed in previous attempts
- w) **“First Attempt”** means, appearance in the semester examination of a subject in a semester in which the student has registered for the subject. If a student has registered for a subject in a semester and ‘Absent’ for the semester examination conducted in that semester, it is also treated as the *First Attempt*.
- x) **“Higher Learning Institutions”** means, any State or Central University or Institutes of National importance such as IISc/IITs/IIMs/NITs/IISERs
- y) **“MoU”** means, Memorandum of Understanding
- z) **“He”** includes both genders he and she; Similarly “him” includes “her” as well

3. BRANCHES OF STUDY

College offers B.Tech. programmes in **eight** branches listed below:

- 1) Civil Engineering (CE)
- 2) Mechanical Engineering (ME)
- 3) Electronics and Communication Engineering (EC)
- 4) Computer Science and Engineering (CS)
- 5) Electrical and Electronics Engineering (EE)
- 6) Electronics and Instrumentation Engineering (EI)
- 7) Chemical Engineering (CH)
- 8) Information Technology (IT)

4. ELIGIBILITY FOR ADMISSION

All candidates seeking admission to the **First year of B.Tech. Degree** and direct admission to the **Second year of B.Tech. Degree** under the **Lateral Entry scheme** shall be required to satisfy the eligibility rules prescribed by the Pondicherry University and Government of Puducherry, as notified from time to time. The list of Diploma programmes approved for admission for each of the B. Tech. Degree programme under the Lateral Entry scheme is given in **Annexure I**

5. DURATION OF THE PROGRAMME

Duration of the B.Tech. programme shall be Eight Semesters [Four years] /Six semesters [Three years] for lateral entry students, with 16 instruction weeks per semester. The maximum period to complete the programme shall be 14 consecutive semesters [Seven years] /12 consecutive semesters [Six years] for lateral entry students.

6. PROGRAMME STRUCTURE

6.1 The curriculum of every programme will have courses that are categorized as follows :

- a) Basic Science Courses (BS)
- b) Basic Engineering Courses (BE)
- c) Humanities & Management Courses (HM)
- d) Programme Core Courses (PC)
- e) Programme Electives Courses (PE)
- f) General Elective Courses (Inter-disciplinary) (GE)
- g) Professional Development Courses (PD)
- h) Mandatory Certificate Courses (MC)

6.2 **Highlights of the Curriculum:**

The medium of instruction is **English**.

- i) **Curriculum for First Year:** The curriculum in the first year shall have six theory courses and three laboratory courses in the first and second semesters and shall be common for all the B.Tech. programmes. Although, all the B.Tech. programmes have a common curriculum in the first year, some of the courses offered in the first semester to one group of branches are offered in the second semester to the other group and vice versa. This arrangement is essentially to share the laboratory resources among a larger number of students in the first year and to balance the faculty work load between odd and even semesters. Thus, in the first year, the eight B.Tech. programmes offered in PEC are divided into two Groups, Group-I and Group-II. Civil Engineering, Mechanical Engineering, Computer Science and Engineering, and Information Technology branches are placed in Group-I and the Group II comprises of the remaining four branches namely Electronics and Communication Engineering, Electrical and Electronics Engineering, Electronics and Instrumentation Engineering, and Chemical Engineering.
- ii) **Curriculum for Higher Semesters:** The curriculum from Third Semester through Seventh semester, in general, constitutes five theory courses and three laboratory courses. Eighth Semester would have three theory courses (Elective Courses), one *Project Work* and a *Comprehensive test cum Viva-Voce*. In addition to the above, the curriculum would include one course on *Soft skill Development* in sixth semester, one course on *Professional Ethics and Practice* in seventh semester, *Professional Development Courses* and *Mandatory Certificate Courses*. Curriculum of certain disciplines may have subjects that have both theory and practice components. These courses are grouped into two categories namely '*Practice Oriented Design Courses*' and '*Theory Combined with Practice Courses*' depending upon the weightage given to the theory component and the practice component of each course. The curriculum shall have both Core courses (compulsory courses) and Elective courses. Elective courses are offered from fourth semester through eighth semester. Two types of elective courses are offered namely *Programme Electives* (offered by the parent department) and *General Electives* (offered by departments other than the parent department).

6.3 Credits:

- i) Each course is assigned credits as detailed below:
- 4 credits for all theory courses
 - 2 credits for Laboratory (*denoted as LB*) courses
 - 4 credits for *Practice Oriented Design* (*denoted as POD*) courses
 - 4 credits for *Theory Combined with Practical* (*denoted as TCP*) courses

- e) 8 credits for Project work
 - f) 1 credit for Comprehensive test cum viva-voce
 - g) 1 credit for Professional ethics and practice
 - h) 1 credit for Soft skill development
 - i) 1 credit for *Professional Development Courses*
 - j) 0 credits for *Mandatory Certificate Courses*
- ii) Total number of credits of all the courses in the curriculum of any programme shall be between **214 and 220**.
- iii) The number of periods per week shall be *four* for theory subjects (both core and elective) and *three* for laboratory courses.

6.4 **Practice Oriented Design Courses:** Some design oriented courses may have both theory and practice components. Such courses are termed as *Practice Oriented Design (POD)* courses and shall have *two* periods of theory and *three* periods of practice per week.

6.5 **Theory Combined with Practical Courses:** Some courses may have a major theory part combined with a minor practice part. These courses are called *Theory Combined with Practical (TCP)* courses. These courses will have *three* periods of theory and *two* periods of practice per week.

6.6 **Elective Courses:**

i) **Programme Elective:** *Programme Electives* are the elective courses offered by the parent department. An elective is offered only if fifteen or more number of students register for the course. Maximum number of students that can register for an elective is limited to seventy five. However, depending upon the demand for a course and the resource availability, The Dean (Academics), in consultation with the concerned HoD, can fix the maximum number of students that can be allowed to register for an elective course.

ii) **General Elective:** The Interdisciplinary elective courses are called *General Electives*. Under this scheme, a student from a particular branch of study shall register for general elective courses offered only by departments other than the parent department. *Academic Courses Committee (vide Regulation 21.4)* shall prepare a list of General electives offered by various departments in a semester. These courses shall not have any prerequisites. A student can register for only one general elective course per semester, from fourth to eighth semesters and has to earn a minimum of eight credits during the entire course. A student cannot do more than five general electives in the entire course. Based on the necessity, a department may offer some of the core

- subjects/Programme Electives of their department as general electives with the approval of Dean (Academics).
- iii) Curriculum of all the B.Tech. programmes shall have three elective courses and a project work in the eighth semester. A student can opt for completion of the three elective courses (*shown in the eighth semester curriculum*) before the eighth semester itself by registering one additional elective course each from fourth to seventh semesters. This option enables the student to spend extra time for the project work in the industry/research organization/higher learning institutions. A student shall be permitted to register for such additional electives only if he does not have any arrear on the date of registration of courses for the concerned semester and should have a CGPA of 7.5 and above till the previous semester.
- iv) A student in the eighth semester is given the option of choosing one or more elective courses from the list of electives offered in the second semester M.Tech. curriculum, in partial or total fulfillment of the three elective courses required to be taken in the eighth semester. However, this provision of opting for an M.Tech. elective course in the eighth semester is restricted to only those students who do not have any arrear when they register for eighth semester courses.
- v) A student who has failed to secure a pass grade in an elective course may reappear for the examination in the following semester or drop the elective course and subsequently register for another elective course in the following semester in place of the dropped elective course.
- vi) **Auditing of Elective Courses:** Students, by auditing a course, are permitted to attend classes but are not required to take examinations and earn credits. Auditing is permitted only for elective courses (*Programme or General electives*) offered in sixth, seventh and eighth semesters. Only students having a CGPA of 8.5 and above are allowed to audit courses. A student will be permitted to audit a course only on submission of a '*Letter of Purpose*' to Dean (Academics) justifying the need for attending the course and this letter shall be duly forwarded with a recommendation by the Faculty Advisor through the Head of the Department. The student is required to maintain an attendance of 90% and above in the audited course. The attendance earned by a student in an audited course is accounted for in the calculation of overall attendance in a semester. The courses successfully audited by a student in a particular semester will appear with a Letter Grade 'X' in the Grade Card (*vide Regulation 9.3*).

6.7 Professional Development Courses :

i) Students shall earn a minimum of three credits under *Professional Development Course* category through some specific co-curricular activities that will help the student gain mileage in his professional career. Each of these activities carries one credit. Students should necessarily fulfill the requirement of one credit courses before the end of Seventh Semester. The grades obtained in these three one-credit courses will be included in the eighth semester grade sheet. A representative list of *Professional Development Courses* is given below. However this list may be modified as and when required by the *Academic Courses Committee*.

- a) Industrial Training (*Limited to a maximum of one credit*)
- b) Specific Field Knowledge Training - Lecture/Practice of 15 periods duration conducted by expert faculty from industry/higher learning institutions/R&D establishments/in-house faculty from the college (*No limit on maximum number of credits*)
- c) Seminar related to directed study (*Limited to a maximum of one credit*)
- d) Paper Publication in SCI Journals (*Limited to a maximum of one credit*)
- e) Working Model Development (*Limited to a maximum of one credit – Group of not more than four students*)
- f) Foreign Language Learning Certificate - offered by the college or by a recognized agency duly approved by the college (*No limit on maximum number of credits*)

ii) **Industrial Training:** Industrial Training is considered for one credit only if a student undergoes training in an industry for a minimum period of thirty days (or four weeks) during the vacation. After completion of the training, the student is required to submit a training report and certificate to the Head of the Department.

iii) **Specific Field Knowledge Training:** Students can opt for *Specific Field Knowledge Training* of 15 periods duration under Professional Development Courses approved by the *Academic Courses Committee*. *Specific Field Knowledge Training* is generally offered by experts from industry/research organizations/higher learning institutions. However departments can also offer this training in some specialized topics. A student is also permitted to register for training offered by other departments, provided the student fulfills the necessary pre-requisites.

iv) If a student who has registered for a Professional Development Course fails to complete it successfully, it will be automatically treated as withdrawn. The student can re-register for the same course and successfully complete it as and when it is offered or may register for some other course and complete the requirement.

v) Four successfully completed *Professional Development Courses* may be treated as equivalent to one General elective subject. This option can be exercised (*before the registration of eighth semester courses*) by a student who wishes to seek exemption of one general elective course by earning four extra credits through four additional *Professional Development Courses*.

6.8 Mandatory Certificate Courses: A student shall compulsorily undergo any three of the activities designated as *Mandatory Certificate Courses* listed below for completion of the programme. There is no assessment for these courses, however successful completion of these courses is mandatory and is to be substantiated by producing completion certificate from competent authority. The list of activities given below is only a representative list and may be modified as and when required by *Academic Courses Committee*. The consolidated list of Mandatory Certificate Courses completed by a student will appear in the 8th semester Grade Card.

S.No.	Mandatory Certificate Courses	Restrictions on the maximum number
1	Industrial Visit	Maximum of One certificate
2	Club Activities	Maximum of two certificates
3	Youth Red Cross (YRC)	Maximum of one certificate – Should be completed in First two years
4	National Cadet Corps (NCC)	Maximum of one certificate – Should be completed in First two years
5	National Service Scheme (NSS)	Maximum of one certificate – Should be completed in First two years
6	National Sports Organization (NSO)	Maximum of one certificate – Should be completed in First two years
7	Sports Activities	Maximum of one certificate – Should be completed in First two years
8	Winning prizes in the students symposiums	Maximum of two certificates
9	Presenting papers in the students symposiums	Maximum of two certificates
10	General Aptitude	Maximum of one certificate
11	General communications	Maximum of one certificate

7. ASSESSMENT PROCEDURE - TESTS AND EXAMINATIONS

7.1 Theory Courses:

i) All theory courses shall be assessed as follows:

Assessment Method	Marks
Continuous Assessment	40
Semester Examination (Duration: 3 Hours)	60
Total	100

- ii) Continuous Assessment shall be based on attendance, cycle tests and assignments. Attendance carries 5 marks (5 marks for 100% to 95% attendance, 4 marks for 94% to 90% attendance, 3 marks for 89% to 85% attendance, 2 marks for 84% to 80% attendance and 1 mark for 79% to 75% attendance), cycle test carries 25 marks. Performance in the best two of the three tests will be taken for assessment. Assignments carrying 10 marks, shall be in the form of problems, small projects, quizzes, design problems etc., depending upon the subject content.
- iii) Theory courses are grouped under the following **three** categories and the pattern of *Semester Examination* question papers will be different for different categories of courses. The curriculum shall clearly state the category of theory courses.
- a) **Category A** - Conventional courses which is a combination of theory and problems (*denoted as TA*)
 - b) **Category B** - Courses that are fully oriented to Mathematical analysis or problem solving (*denoted as TB*)
 - c) **Category C** - Courses that are jointly offered by two departments (*denoted as TC*). The syllabus of these courses will have two parts (*Part I and II*), each part covering topics pertaining to one department. The syllabus is grouped into six units, 3 units per part.
- iv) The pattern of *Semester Examination* question paper for the **Category A Courses** is as follows:
- a) The duration shall be 3 hours with a maximum of 60 marks.
 - b) Section-A contains 5 compulsory questions each carrying 2 marks. Only one question shall be selected from each unit. This section carries 10 marks in total.
 - c) Section-B contains five questions, one question from each unit with '*either*' '*or*' choice. Each question carries eight marks. Based on necessity, each question may contain sub divisions. This section carries 40 marks in total.
 - d) Section-C contains one question of problem solving/design problem/case study type (application of theoretical concepts) with '*either*' '*or*' choice. This question may be from any one unit or combination of units. Based on necessity, each question may contain sub divisions. This section carries 10 marks.
- v) The pattern of *Semester Examination* question papers for the **Category B Courses** is as follows:
- a) The duration shall be 3 hours with a maximum of 60 marks.

- b) The question paper shall contain Five either or type of problems, one problem from each unit. Each question carries 12 marks. Based on necessity, each question may contain sub divisions.
- vi) The pattern of *Semester Examination* question papers for the **Category C** Courses is as follows:
- a) The duration shall be 3 hours with a maximum of 60 marks.
- b) The question paper shall contain two parts (*Part I and II*) each part carrying 30 marks. The questions in Part I and Part II will be from the syllabus prescribed in the respective parts.
- c) Each part (*Part I and Part II*) shall have two sections (*Section A and Section B*). Section-A contains 3 compulsory questions each carrying 2 marks. One question is selected from each of the three units. Section A carries 6 marks in total. Section-B contains three questions, one question from each unit with '*either*' '*or*' *choice*. Each question carries eight marks. Based on necessity, each question may contain sub divisions. Section B carries 24 marks in total.

7.2 Laboratory Courses:

- i) All laboratory courses (*denoted as LB*) shall be assessed as follows:

Assessment Method	Marks
Continuous Assessment	60
Semester Examination (Duration: 3 Hours)	40
Total	100

- ii) *Continuous Assessment* shall be based on attendance, regular performance of the student in laboratory classes and a model examination conducted at the end of the semester. Attendance carries 10 marks (10 marks for 100% to 95% attendance, 8 marks for 94% to 90% attendance, 6 marks 89% to 85% attendance, 4 marks for 84% to 80% attendance and 2 marks for 79% to 75% attendance).

The regular performance in the laboratory will be evaluated for 30 marks as detailed below:

Observation and completion of work : 15 marks

Record : 15 marks

Performance in the Model examination will be evaluated for 20 marks as detailed below:

Procedure : 5 marks

Laboratory work and calculations : 10 marks

Viva-Voce : 5 marks

iii) The *Semester Examination* of the laboratory courses will be evaluated for 40 marks by a panel of examiners comprising of an internal examiner and an external examiner. The Break-up of marks is as follows:

<i>Procedure</i>	: 10 marks
<i>Laboratory work and calculations</i>	: 20 marks
<i>Viva-Voce</i>	: 10 marks

7.3 Theory Combined with Practical courses:

i) Evaluation method for Theory Combined with Practical (*denoted as TCP*) courses is as follows:

Assessment Method	Marks
Theory Part	70
Practical Part	30
Total	100

ii) The distribution of marks for *theory part* is as follows:

Assessment Method	Marks
Continuous Assessment	20
Semester Examination (Duration: 3 Hours)	50
Total	70

Continuous Assessment shall be based on two cycle tests carrying 10 marks each. Performance in the best two of the three tests will be taken for assessment.

The pattern of *Semester Examination* question papers for the *theory part* of the TCP courses is as follows:

- The duration shall be 3 hours with maximum marks of 50
- The question paper shall contain Five either or type of questions, one question from each unit. Each question carries 10 marks. Based on the necessity each question may contain sub divisions.

iii) The distribution of marks for *practical part* is as follows:

Assessment Method	Marks
Attendance	10
Regular practical works	10
Model Examination	10
Total	30

The *practical part* is evaluated for 30 marks through *internal assessment*. Out of the total 30 marks, attendance carries 10 marks (10 marks for 100% to 95% attendance, 8 marks for 94% to 90% attendance, 6 marks 89% to 85% attendance, 4 marks for 84% to 80% attendance and 2 marks for 79% to 75% attendance), regular practical work carries 10 marks and a model examination conducted internally at the end of the semester carries 10 marks.

7.4 **Practice Oriented Design courses:** Practice Oriented Design (*denoted as POD*) courses are treated as either Practical courses or Theory courses. The decision to consider a POD as either a practical or a theory is left to the discretion of the respective Board of Studies. If it is considered as a practical course, then the evaluation procedure for Practical courses shall be followed. If it is considered as a theory course, then the evaluation method is as described below:

a) The question paper shall contain one or two questions of design/problem solving type with 'either' 'or' choice. Accordingly, each question may carry 60 marks or 30 marks.

(OR)

b) The question paper shall contain Five either or type of problems. Each question carries 12 marks. Based on necessity, each question may contain sub divisions.

7.5 **Engineering Graphics/Drawing Courses:**

i) Engineering Graphics/Drawing (*denoted as EGD*) subjects are a type of Practice Oriented Design subjects that are assessed as follows:

Assessment Method	Marks
Continuous Assessment	50
Semester Examination (Duration: 3 Hours)	50
Total	100

ii) *Continuous Assessment* shall be based on attendance, performance of the student in regular drawing classes and a model examination conducted at the end of the semester. Attendance carries 10 marks (10 marks for 100% to 95% attendance, 8 marks for 94% to 90% attendance, 6 marks 89% to 85% attendance, 4 marks for 84% to 80% attendance and 2 marks for 79% to 75% attendance). Performance in the regular drawing classes carries 20 marks and the model examination carries 20 marks.

iii) *Semester Examination* is a theory type examination carrying a total of 50 marks. The pattern of Semester Examination question papers is as follows:

a) The duration shall be 3 hours with maximum marks of 50.

b) The question paper shall contain Five either or type of questions, one question from each unit. Each question carries 10 marks. Based on necessity, each question may contain sub divisions.

7.6 Project Work:

- i) The Project work is carried out in two phases, *Phase I* in seventh semester and *Phase II* in eighth semester. The Project work shall be assessed as follows:

Assessment Method	Marks	
	Phase I	Phase II
Continuous Assessment (<i>Internal Evaluation</i>)	100	60
Semester Examination (<i>External Evaluation</i>)	-	40
Total	100	100

- ii) Marks allocated for *Continuous Assessment* are distributed as given in the following table.

Continuous Assessment	Marks	
	Phase I	Phase II
Guide	40	25
Project Evaluation Committee	60	35
Total	100	60

- a) Guide shall evaluate the student for 40 marks in Phase-I and 25 marks in Phase-II based on the work carried out.
- b) The Project Evaluation Committee comprising of the Head of the Department or his/her nominee (Chairman), Project coordinator (Professor/Associate Professor) and two other faculty members shall evaluate the project for 60 marks in Phase-I and 35 marks in Phase-II. The Project Evaluation Committee is constituted by the Head of the Department with the approval of the Dean (Examinations). The distribution of marks for each review is as follows:

Phase I		Phase II	
Project Review	Marks	Project Review	Marks
Preliminary Review	10	Review III	10
Review I	25	Review IV	10
Review II	25	Final Review	15
Total	60	Total	35

The scheme of allocation of marks for each review will be prepared by the Project Evaluation Committee and approved by the Dean (Examinations).

iii) The final *Semester Examination* of the Project Work conducted in Phase II carries 40 marks. The evaluation will be conducted by a panel of examiners comprising of an internal examiner and an external examiner. The Break-up of marks is as follows:

Project report	: 15 marks
Presentation	: 15 marks
Viva-Voce	: 10 marks

7.7 Comprehensive test cum Viva Voce:

i) The evaluation of 'Comprehensive test cum viva voce' course offered in the 8th semester is as follows:

Assessment Method	Marks
Continuous Assessment (Objective type tests)	60
Semester Examination (Viva voce)	40
Total	100

ii) *Continuous Assessment* is conducted through three objective type tests. Each test carries 20 marks. All the three tests put together shall cover the syllabi of all the core courses of curriculum. A committee comprising the Head of the Department or his/her nominee and two faculty members of the department shall coordinate the conduct of the comprehensive tests. The Head of the Department shall constitute this committee and take the approval of the Dean (Examinations).

iii) The *Semester Examination* for this course will be a Viva voce examination conducted by a panel of examiners comprising of an internal examiner and an external examiner.

7.8 **One Credit Courses:** The one credit courses namely Professional Development Courses, Soft Skill Development Course and Professional Ethics and Practice course are evaluated through continuous assessment only. The scheme of evaluation for the one credit courses shall be prepared by the respective Department and submitted to the *Academic Courses Committee* for approval.

8. DECLARATION OF RESULTS

8.1 Examination Passing Criteria:

(a) A student is declared to have **passed** in a course if he gets 40% marks and above in the Semester Examination and 50% marks and above overall (Semester Exam marks and Continuous Assessment marks put together).

(b) If a student fails to clear the semester examination in a subject after three consecutive attempts, the passing criteria from the fourth attempt onwards will be based on the marks

earned by the student in the end semester examination only. The student is deemed to have passed the subject if the mark scored in the end semester examination is 50% and above and he will be awarded only **E grade** irrespective of the mark scored.

8.2 **Result Passing Board:** The Dean (Examinations) shall constitute a **Result Passing Board** for each branch of study. The *Result Passing Board* shall meet soon after the valuation of Semester examination answer scripts to analyze the relative performance of students and award appropriate grace marks, if necessary, for overall improvement in the result. On finalization of the results by *Result Passing Board*, the Dean (Examinations) shall declare the results.

8.3 **Photocopy of the Answer Script and Revaluation:**

- i) After declaration of results,
 - a) Photocopy of valued answer scripts with the marks awarded to individual answers shall be made available to the students on submission of an application along with the prescribed fees to Dean (Examinations).
 - b) Students can get their answer scripts revalued by submitting an application along with the prescribed fees to the Dean (Examinations).
- ii) The provision for getting the photocopy of valued answer scripts and revaluation is extended to all the students including those who have passed the examination.
- iii) The Dean (Examinations) shall get the answer script revalued by appointing an examiner other than the one who has valued the script earlier and revise the grade accordingly.
- iv) The marks obtained after revaluation will be taken as final irrespective of the marks awarded earlier. That is, if the marks obtained after revaluation happens to be lower than the original marks then '*the lower mark*' will be considered for the award of revised grade.

8.4 **Grade Card:** On declaration of results, Grade Cards will be issued to the students. The Grade Card will contain the list of courses for that semester, the grades obtained by the student, the GPA and the CGPA.

9. AWARD OF GRADES

The performance of students in a course is expressed in terms of Letter Grades, each carrying certain Grade Points. A total of Six passing Grades namely S, A, B, C, D and E is awarded. Total marks (*sum of Continuous Assessment and Semester Examination marks*) in percentage (%) secured by a student in a subject is used for computing his Grade by fitting the percentage mark into the Range of Marks assigned for each Grade. The Range of Marks for each one of the six Grades is calculated by taking the difference ($DM = M - 50$) between the highest mark (M) and

the minimum pass mark (50) and dividing this difference DM into 6 equal intervals. This Interval, defined as $K = DM/6$, should not be rounded off to less than two decimal places. Calculation of Range of Marks for the six Grades is as shown in the Table below. The Range of Marks (M-K), (M-2K), (M-3K) etc., shall be rounded off to the nearest whole number. The Range of Marks calculated for each one of the six grades shown in the Table below forms the **Grading Scale** for fixing the Grades in the regular examination of a particular subject.

Table: Grading Scale

Range of Marks (%)	Letter Grade	Grade Points
M to (M-K)+1	S	10
(M-K) to (M-2K)+1	A	9
(M-2K) to (M-3K)+1	B	8
(M-3K) to (M-4K)+1	C	7
(M-4K) to (M-5K)+1	D	6
(M-5K) to 50	E	5
Below 50 (Fail)	F	0

If the highest mark scored in a subject is 75% or less, then the Grade will be awarded based on the following Table.

Table: Grading Scale if the highest mark if 75% or less

Range of Marks (%)	Letter Grade	Grade Points
75 to 71	A	9
70 to 66	B	8
65 to 61	C	7
60 to 56	D	6
55 to 50	E	5
Below 50	F	0

- 9.1 The **Grading Scale** computed for a particular subject based on the highest mark scored in a regular examination will be used as it is for the subsequent arrear and supplementary examinations irrespective of the highest mark scored in these examinations and this Grading Scale will remain effective until the next regular examination.
- 9.2 If and when a student opts for **Revaluation** of answer script in a particular subject, the Grade will be awarded by fitting the revised mark obtained after revaluation into the Grading Scale that was originally used for the award of Grades in the Regular Examination, even if the revised mark happens to be higher than the highest mark scored in the regular examination.
- 9.3 The other Letter Grades that shall be indicated in the Grade Card are as follows:

Criterion	Letter Grade	Grade Point
Failed to Score Pass Mark in the Subject	F	0
Partial Withdrawal from Semester Examination	W	-
Audited the Course	X	-
Absent for the semester examination	Z	0

'F' grade denotes failure in the course, 'W' grade indicates authorized partial withdrawal (*vide Regulation 14.2*), 'X' Grade denotes that the student has audited the course and 'Z' grade denotes absent for the Semester Examination. A student who has secured 'F'/'W'/'Z' grade shall reappear for the examination in the following semesters. A student who has scored a pass grade cannot reappear for the examination.

- 9.4 A student securing 'F' grade in an elective course may reappear for the examination in the following semester or drop the elective course and subsequently register for another elective course in the following semester in place of the dropped elective course.
- 9.5 *Grade Point Average* (GPA) indicates the performance of a student in all the examinations appeared by him in a particular semester. GPA score will appear in all the Semester Examination Grade Cards. The *Grade Point Average* (GPA) for a particular semester is calculated as the ratio of the sum of the products of the number of Credits of a course (C_i) and the Grade Points scored in that course (GP_i), taken for all the courses, to the sum of the number of credits of all the courses (n) registered in that semester.

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

where, n is the number of courses registered in that semester. For a student who has partially withdrawn from writing examinations of courses in a semester, n is counted as total number of courses appeared in that semester minus the number of courses partially withdrawn.

- 9.6 *Cumulative Grade Point Average* (CGPA) indicates the performance of a student in all the examinations appeared by him up to a particular semester excepting the first and second semester (*i.e., the performance in the first and second semester examinations is not considered for CGPA calculations*). CGPA score will appear in all the Semester Examination Grade Cards starting from the third semester. The *Cumulative Grade Point Average* (CGPA) up to a particular semester is calculated as follows:

$$CGPA = \frac{\sum_{i=1}^N C_i GP_i}{\sum_{i=1}^N C_i}$$

where, C_i is the Credit of a course, GP_i is the Grade Point obtained by the student in that course and N is the total number of courses registered up to that semester starting from the third semester. For a student who has partially or completely withdrawn from writing examinations of courses in a semester, N is counted as total number of courses registered up to that semester starting from the third semester minus the number of courses withdrawn.

10. REGISTRATION AND ENROLLMENT

- 10.1 All the students of the B.Tech. programme shall register for the courses during a specified period in the beginning of the semester provided he fulfills the eligibility criteria prescribed for enrollment and for registration of courses in that particular semester. The Dean (Academics) shall regulate the registration process.
- 10.2 A student will be eligible for enrolment only if he has cleared all the dues to the Institute, Hostel, and Library up to the end of the previous semester and not had been debarred from enrolment by disciplinary action committee of the Institute.
- 10.3 List of students enrolled in a particular semester of a branch of study shall include
- i) Students who rejoin the programme after temporary break (*vide Regulation 16*)
 - ii) Students who rejoin the programme after having been stopped from moving to higher semester due to non-fulfillment of attendance requirement (*vide Regulation 17*)
 - iii) Students who are otherwise eligible for enrollment (*vide Regulation 10.2*)
- 10.4 **Pre-Registration:** Programme Elective and General Elective courses will be offered in every semester starting from the fourth semester to the eighth semester. In order to facilitate proper planning of elective courses to be offered in a semester, it is essential for the students to *declare their intent to register for (or audit) an elective course well in advance*, before the actual start of the semester classes, through the process of *Pre-Registration*, which is mandatory for all the students of third or higher semester. All the students moving to fourth or higher semester are required to have completed the *Mandatory Pre-Registration* of elective courses at least Three weeks before the last day of classes in the current semester. A list of elective courses offered in the next higher semester will be made available to the students One week before Pre-Registration. A student can choose

the elective courses in consultation with the concerned *Faculty Adviser (vide Regulation 21.1)*.

10.5 The curriculum of any semester will have theory and practical courses prescribed for a specified number of credits. Students shall register for all the prescribed number of credits in the *First, Second and Third* semesters. However, in the *Fourth, Fifth, Sixth, Seventh and Eighth* semesters, the student will have a choice of registering for a higher or a lower number of credits than that is prescribed for that semester. If a student, for some valid reason, finds the theory subject load in a particular semester to be too heavy to handle, he may register for a lesser number of credits by choosing one or two elective courses lesser than what is prescribed for that semester. Similarly, a fast pace learner can register for more number of credits than prescribed by choosing one additional elective course. Only a student who has maintained consistently good academic record by not having any arrear and by scoring a CGPA of 7.5 and above in the previous semesters is entitled to avail the choice of registering for extra elective course in a semester.

10.6 ***Dropping of Courses:*** After completing the registration of courses for a particular semester, if for some reason a student wants to drop one or more elective courses, he can do so within three weeks of the commencement of the semester with the written approval of the Faculty Adviser and the Head of the Department. However, a student is not permitted to drop the core courses.

11. TRANSFER OF CREDITS

The courses credited elsewhere, in Indian or foreign University/Institution/Colleges, by students during their study period at PEC may count towards the credit requirements for the award of degree. The credits thus transferred will reduce the number of courses to be registered by the student at PEC. The guidelines for the transfer of credits are as follows:

11.1 Students with consistent academic performance (*having a CGPA of 7.5 or above and no arrear*) can credit courses in other institutions during third and fourth year with the approval of the Academic Council of PEC

11.2 Students can earn external credits only from Institutions of national importance such as IISc/IITs/NITs/IIMs/IISERs and other Indian or foreign Universities/Institutes/Colleges with which PEC has a MoU (*and MoU must have a specific clause for provision of credit transfer*)

11.3 The BoS of the concerned department shall evaluate all the details of a course such as course contents, number of contact hours, course evaluation system, and approval or acceptance letter from the other institution and decide the *Equivalent Course(s)* in PEC

curriculum and the number of *Equivalent Credits* the student earns for the course. The BoS shall also evolve a method for calculating the *Equivalent Grades* for the credit transferred courses by taking into account the course evaluation system followed in the other institution. The BoS shall issue a *Credit Transfer Certificate* mentioning in it the details of *Equivalent Courses*, corresponding *Credits* and *Equivalent Grades* for the credit transferred courses. The complete details will then be forwarded to the Dean (Academics), who in turn will place it in the Academic Council for approval

11.4 Credits and the Grades earned by the student under this Credits Transfer scheme will be reflected in the corresponding *Semester Grade Card* (*vide Regulation 8.4*) issued by PEC by entering the *Equivalent Grades* for the credit transferred subjects

11.5 Credit transfer can be considered only for the courses at the Under Graduate level

11.6 The maximum number of credits that can be transferred by a student shall be limited to 50

11.7 A student has to get minimum passing grade/marks for such courses for which the credits transfer are to be made

11.8 Credits transfers availed by a student shall be properly recorded in *Consolidated Grade Card* (*vide Regulation 19*) issued to the student

12. MIGRATION OF STUDENTS FROM OTHER UNIVERSITY / COLLEGE

Migration of students from other Colleges / Universities shall be permitted directly to the third semester of the B.Tech. programme, against the vacancies notified in various disciplines of engineering, strictly on the basis of merit and admission norms laid down by the college.

12.1 Migration of students shall be permitted only to the third semester and not to any lower or higher semester.

12.2 A committee constituted by the Principal with Dean (Academics) and Dean (Examinations) as members will compare the courses completed by the student with the courses offered in the first year of the B.Tech. curriculum of PEC and if found necessary suggest a list of first year courses which the student shall be required to register and complete before the end of fifth semester.

13. ELIGIBILITY FOR APPEARING FOR SEMESTER EXAMINATION

13.1 There shall be not any adverse report regarding the conduct of the student to be eligible to appear for the semester examination.

- 13.2 Although 100% overall attendance in all the courses in a semester is desirable, a student should not have less than 75% overall attendance to become eligible to appear for the examination.
- 13.3 A student, whose overall attendance falls below 75% but 60% and above in a semester, shall be permitted only on medical grounds to appear for semester examination after payment of prescribed condonation fee along with a medical certificate obtained from a medical officer and duly acknowledged by the in-house medical officer of the College.
- 13.4 A student whose overall attendance in a semester falls below 60% shall not be permitted to appear for the semester examination and shall not be allowed to move to the next semester (*vide Regulation 17*). A student who is stopped from moving to the higher semester is required to rejoin the course in the same semester in the following academic year.

14. WITHDRAWAL FROM SEMESTER EXAMINATION

- 14.1 **Complete Withdrawal:** A student, who is otherwise eligible to appear for the semester examinations, will be permitted to withdraw from appearing for the entire Semester Examination as one unit (*Complete Withdrawal*) for valid reasons and on the recommendation of the Head of the Department and with the approval of the Dean (Academics). Complete Withdrawal application shall be made before the commencement of the first examination pertaining to the semester. Such withdrawal shall be permitted **only once** during the entire programme.
- 14.2 **Partial Withdrawal:** If a student falls sick in the middle of the Semester Examinations, he can withdraw from one or more subjects on production of valid medical certificate (*Partial Withdrawal*). The student is permitted to exercise this provision of partial withdrawal from the courses in the middle of the semester examinations **only once** in the entire course.
- 14.3 A student who has partially or completely withdrawn from appearing for semester examinations in a particular semester should appear for the examinations of all the withdrawn subjects in the next semester itself.
- 14.4 Other conditions being satisfactory, students who withdraw from semester examinations are eligible to be awarded *First Class with Distinction* whereas they are not eligible to be awarded a *rank*.
- 14.5 Only a student who has not failed in any subject in all the previous semesters (*eligibility condition for 'First Class with Distinction' classification*) is eligible to opt for the Withdrawal from the semester examinations.

14.6 The provision for withdrawal (complete/partial) is allowed only for third to seventh semester examinations.

15. SUPPLEMENTARY EXAMINATIONS

15.1 Supplementary examinations will be conducted only for theory subjects during the summer vacation of every academic year, three weeks after the declaration of even semester examination results. The results of the supplementary examinations will be declared before the date of registration of odd semester courses.

15.2 Only the following students are eligible to appear for Supplementary examinations:

- i) Students who are eligible to move to the seventh semester (*vide Regulation 17*) but having arrears in not more than three subjects up to sixth semester. These students will get a chance to clear the pending arrears and become eligible for campus placements in the fourth year of the B.Tech. programme.
- ii) Students who are passing out after completing 8th semester examinations but having arrears in not more than two subjects.

15.3 The eligible student shall submit an application for the supplementary examinations along with prescribed examination fee to The Dean (Examinations) within five working days from the date of declaration of even semester examination results.

15.4 The application for the Supplementary Examinations shall be forwarded by the Head of the Department with the recommendations of the Faculty Advisor to the Dean (Examinations).

16. TEMPORARY BREAK OF STUDY FROM THE PROGRAMME

A student may be permitted by the Dean (Academics) to withdraw temporarily from the programme for reasons of ill-health and for any other valid reasons on the recommendation of HoD. A student after temporary discontinuance may rejoin the programme at the commencement of the semester at which he discontinued. However, the total period for the completion of the course, reckoned from the commencement of the first semester to which the student was admitted, shall not in any case exceed seven years (*six years for lateral entry students*), including the period of authorized temporary discontinuance.

17. MOVEMENT TO HIGHER SEMESTERS

17.1 A student can move to the next semester provided he has fulfilled the minimum attendance requirement for appearing in the semester examination (*vide Regulation 13*).

- 17.2 The student who has failed to fulfill the above conditions will not be permitted to move to the higher semester, and shall rejoin the programme only after a temporary break.
- 17.3 A student, after the temporary break, will be permitted to rejoin the programme at the appropriate semester along with the regular students at the time of normal commencement of that semester.
- 17.4 A student who rejoins the programme after the temporary break shall be governed only by the rules, regulations, courses of study and syllabus in force, at the time of his rejoining the course.

18. CLASSIFICATION

After successful completion of the programme, degree will be awarded (*vide Regulation 20*) as per the following classifications based on the final CGPA (*which is calculated by excluding the Grade Points scored in the first year subjects*):

- 18.1 Students who have successfully completed the programme within eight consecutive semesters (*six consecutive semesters for lateral entry students*) and obtained a final CGPA of **8.5** or above by passing all the courses from third to eighth semester in the *first attempt* will be declared to have passed in **First Class with Distinction**. Students who have secured a final CGPA of 8.5 or above but failed to clear the courses offered from third to eighth semester in the first attempt are not eligible for **First Class with Distinction** classification. However, those students who have opted for authorized withdrawal from examination (*vide Regulation 14*) or temporary break of study (*vide Regulation 16*) will be eligible for **First Class with Distinction** classification.
- 18.2 Students who have obtained a final CGPA of **6.5** or above, but below **8.5**, shall be declared to have passed in **First Class**. Students who have lost the eligibility for **First Class with Distinction** classification by failing to clear the courses offered from third to eighth semester in the first attempt but securing a final CGPA of 8.5 or above shall also be declared to have passed in **First Class**.
- 18.3 Students who have obtained final CGPA below **6.5** will be declared to have passed in **Second Class**.
- 18.4 **Three Ranks** will be awarded in each branch of study in the order of merit among the students who are declared to have passed in **First Class with Distinction**. However, a student who has passed in First Class with Distinction but falls in one of the following categories is not eligible for award of Rank:

- i) A student who has successfully completed the programme after availing the provision of 'Withdrawal from Examinations' (*vide Regulation 14*) and declared to have passed in First Class with Distinction.
- ii) A student who has failed to clear the courses offered in first and second semester in the first attempt, but declared to have passed in *First Class with Distinction*.

19. CONSOLIDATED GRADE CARD

At the end of the programme, all successful students will be issued a consolidated *Grade Card* which will contain the following particulars:

- a) Grades in the subjects of all the semesters with month and year of passing
- b) CGPA
- c) Classification - First class with Distinction/First class/Second class

20. ELIGIBILITY FOR THE AWARD OF DEGREE

A student shall be eligible for the award of the degree of the Bachelor of Technology (B. Tech) only if he:

- a) has earned the required number of credits specified in the curriculum of the relevant branch of study within the maximum duration prescribed;
- b) has no dues to the Institution, Library, Hostels, etc., and
- c) has no disciplinary proceeding pending against him.

21. FUNCTIONARIES AND COMMITTEES

21.1 FACULTY ADVISOR

In the first year, the students in every class will be divided into three groups, with each group having around 20 numbers of students. One *Faculty Advisor* will be attached to each one of the groups of students. The faculty advisor, who is a faculty from the parent department, will play a proactive role in closely monitoring the academic performance, attendance and discipline of the students, attached to him. Further, the faculty advisor will help the students in planning their courses of study, and render general advice regarding the academic programme or any other activity. The set of students attached to a Faculty Advisor will continue to be under the guidance of the same Faculty Advisor, till they complete the programme.

21.2 CLASS ADVISOR

One of the course instructors of a class shall be designated as the *Class Advisor* for that class. The class advisor shall keep track of the general academic performance, discipline and attendance of the students in the class. He will act as a *liaison officer* between the class and

the HoD. He shall act as the convener of the Class Committee and minute the proceedings of the class committee meetings. He shall assist the HoD in implementing the suggestions and recommendations of the class committee for improving the overall teaching-learning process in the class.

21.3 CLASS COMMITTEE

Every class shall have a class committee consisting of four students (two girls and two boys) from the class, all the faculties handling the subjects for the class, and the Head of the Department, who will be the chairperson of the class committee. One of the faculties will be designated as the ***Class Advisor*** and shall act as the convener of the committee. The first year coordinator shall be the Chairperson for the class committee of the first year classes. The class committees shall be constituted by the respective Head of the Department/the first year coordinator in the first week of the semester and communicated to the Dean (Academics). The class committee shall meet thrice during the semester. The first meeting will be conducted within three weeks from the date of commencement of the semester to discuss the nature of cycle tests, assignments, and assessment procedure. The second and third meetings will be held soon after the declaration of first and second cycle tests respectively to analyze the test performance and discuss various measures for improving the overall performance of students. The committee will also look into the regularity of the classes held, attendance of the students, and express opinions and suggestions on the improvement of teaching-learning process.

21.4 ACADEMIC COURSES COMMITTEE

The Academic Courses Committee is an internal academic body constituted by the Principal with Dean (Academics) as Convener, Associate Deans (Academics), Dean (Examinations) and all Heads of the Departments as members. The Convenor will chair the meetings of Academic Courses Committee.

The role of the committee is as follows:

- a) Discuss and arrive at the general framework of curriculum and syllabi for various branches of study;
- b) Prepare the consolidated list of General Electives for each academic year;
- c) Prepare the course booklet for each academic year containing the courses offered and the faculty teaching the courses for the purpose of Registration and Time table;
- d) Approve/modify the list of Professional Development Courses;
- e) Approve the curriculum and assessment scheme for the Professional Development Courses;
- f) Approve/modify the list of Mandatory Certificate Courses and the criteria for successful completion and

- g) Discuss and deliberate on any other academic matter, on the direction of the Principal

The Academic Courses Committee will meet as and when required. The decisions taken in the meetings of the committee are subject to the approval of the Principal. If and when necessary, the Principal may get the decisions of the Committee approved by the Academic Council.

21.5 ACADEMIC APPEALS BOARD

The entire process of Continuous Assessment shall be made transparent, and the course instructor shall explain to a student why he gets whatever marks awarded, if and when required. However, if a student finds some anomaly in the award of marks in the continuous assessment, he can make an appeal to the *Academic Appeals Board* for review of marks awarded. Before appealing for such review, a student shall first approach the concerned Course Instructor and then the concerned Head of the Department, with a request to do the needful. Only after exhausting the above options and in situations where satisfactory actions / remedial measures have not been taken, the student may appeal to the Academic Appeals Board. The Academic Appeals Board is constituted with Dean (Academics) as convener, Associate Deans (Academics) and one senior level professor as members, and the concerned Head of the Department and Class Advisor as co-opted members. The board will receive the grievance/complaints in writing from the aggrieved student regarding anomaly in award of marks. The board will examine the complaints and recommend appropriate measures to the Principal, for necessary action.

22. ACADEMIC CODES MANUAL

Dean (Academics), in consultation with the HoDs, shall prepare an *Academic Codes Manual* and get it approved by the Principal. *Academic Codes Manual* is a set of guidelines on the roles and functions of various academic functionaries and committees. The manual shall contain the procedures and guidelines for effective implementation of various provisions contained in the Academic Regulations, for imparting instruction of courses, achieving high academic standards and maintaining academic discipline. On the advice of the Principal, the Dean (Academics) may revise or modify the contents of the manual, if and when necessary. The procedures and guidelines given in the *Academic Codes Manual*, on approval by the Principal, shall be binding on all the stakeholders concerned, including Students, Faculty, Staff and Department.

Annexure I

B.Tech courses in which admission is sought	Diploma courses eligible for admission
Civil Engineering	<ul style="list-style-type: none"> • Civil Engineering • Civil and Rural Engineering • Architectural Assistantship • Architecture • Agricultural Engineering
Mechanical Engineering	<ul style="list-style-type: none"> • Mechanical Engineering • Automobile Engineering • Agricultural Engineering • Mechanical and Rural Engineering • Refrigeration and Air-conditioning • Agricultural Engineering & Farm Equipment Technology • Metallurgy • Production Engineering • Machine Design & Drafting • Machine tool maintenance and Repairs • Printing Technology/Engineering • Textile Engineering /Technology • Tool Engineering
<ol style="list-style-type: none"> 1. Electrical and Electronics Engineering 2. Electronics and Communication Engineering 3. Electronic and Instrumentation Engineering 4. Instrumentation and Control Engineering 5. Bio Medical Engineering 	<ul style="list-style-type: none"> • Electrical Engineering • Electrical and Electronics Engineering • Electronics and Instrumentation Engineering • Instrumentation Engineering /Technology • Electronics and Communication Engineering • Electronics Engineering • Medical Electronics • Instrumentation and Control Engineering • Applied Electronics
Chemical Engineering	<ul style="list-style-type: none"> • Chemical Engineering • Chemical Technology • Petrochemical Technology • Petroleum Engineering • Ceramic Technology • Plastic Engineering • Paper & Pulp Technology • Polymer Technology
<ol style="list-style-type: none"> 1. Information Technology 2. Computer Science & Engineering 	<ul style="list-style-type: none"> • Computer Science and Engineering • Computer Technology • Electrical and Electronics Engineering • Electronics & Communication Engineering • Electronics & Instrumentation Engineering • Instrumentation Engineering /Technology