

# UNIVERSITY OF MUMBAI



## Bachelor of Engineering

**First Year Engineering (Semester I & II), Revised course (REV-2019 'C' Scheme) from Academic Year 2019 – 20 (Common for All Branches of Engineering)**

Under

## FACULTY OF SCIENCE & TECHNOLOGY

(As per AICTE guidelines with effect from the academic year 2019–2020)

## Structure for Student Induction Program

New students enter an institution with diverse thoughts, backgrounds and preparations. It is important to help them adjust to the new environment and inculcate in them the ethos of the institution with a sense of larger purpose.

The Induction Program is designed to make the newly joined students feel comfortable, sensitize them towards exploring their academic interests and activities, reducing competition and making them work for excellence, promote bonding within them, build relations between teachers and students, give a broader view of life, and building of character.

Its purpose is to make the students feel comfortable in their new environment, open them up, set a healthy daily routine, create bonding in the batch as well as between faculty and students, develop awareness, sensitivity and understanding of the self, people around them, society at large, and nature.

Transition from school to university/college life is one of the most challenging events in student's life. Therefore, it should be taken seriously, and as something more than the mere orientation program.

The time during the Induction Program is also used to rectify some critical lacunas, for example, English background, for those students who have deficiency in it.

New students be informed that the Induction is mandatory non-credit course for which a certificate will be issued by the institution.

At the start of the induction, the incumbents learn about the institutional policies, processes, practices, culture and values, and their mentor groups are formed. The different activities are:

1. **Orientation:** In the first session of Induction program learners and parents to be oriented about institute policies, processes, practices, culture and values. In addition to this, learners will be educated for 1<sup>st</sup> year academic program information in terms of academic calendar, Assessment plan, grading information, university ordinances, rules and regulations related to academics.
2. **Mentoring:** Mentoring and connecting the students with faculty members is the most important part of student induction. Mentoring process shall be carried out in small groups, group of 10 students to be formed and allocate one senior student from 3<sup>rd</sup> year of same program in which new students have taken admission, students mentor will continue for two years, till student mentors graduate from the institute. For two (2) such groups one faculty mentor to be allocated from the same department/program, who will remain the mentor till those students graduates from the institute. In the second session of Induction program, groups for mentoring to be formed and student mentors and faculty mentors to be introduced to newly inducted students. Introduction of mentoring system to be given to new students. Minimum one meeting to be conducted every month during semesters with students group by faculty mentors. For record keeping appropriate formats to be developed and information to be updated regularly by faculty mentors.

3. **Universal Human Values:** Universal Human Values gets the student to explore oneself and experience the joy of learning, prepares one to stand up to peer pressure and take decisions with courage, be aware of relationships and be sensitive to others, understand the role of money in life and experience the feeling of prosperity. Need for character building has been underlined by many thinkers, universal human values provide the base. Methodology of teaching this content is extremely important. It must not be through do's and don't's, but by getting the students to explore and think by engaging them in a dialogue. It is best taught through group discussions and real life activities rather than lecturing. The role of group discussions, however, with clarity of thought of the teachers cannot be over emphasized. It is essential for giving exposure, guiding thoughts, and realizing values.

4. **Proficiency Modules:** The induction program period can be used to overcome some critical lacunas that students might have, for example, English, Mathematics, computer familiarity etc. These should run like crash courses, so that when normal courses start after the induction program, the student has overcome the lacunas substantially.

A diagnostic test should be conducted on Day 2 itself. Before the test, the students should be informed that the test would not affect their grades, branch change, or any aspect of their admission, placement, study, etc. Purpose of the test is to provide help to those students who need help in English, Mathematics, Computer proficiency etc. Students having more than 80% marks in their qualifying examination in respective subjects need not take the diagnostic test. For those below this cut-off, writing the test is mandatory. Students with weak performance in the test, must attend a non-credit course in Basic English, Basic Mathematics, and Basic Computer Operation etc. Their attending the course is mandatory. There would be no separate fee payable for the course. The classes of Basic courses must start from Day 4 at the latest. Students those who are excluded from basic courses, for them some activity in the domain of creative arts, cultural and literature to be organised.

5. **Physical Activity:** Fitness session, yoga classes, lecture(s) on facing world with sportsman spirit, making young students aware that there is nothing like being failure in the world. The world gives opportunities to all.

The incoming students must be divided into batches of 50 students maximum, and a qualified coach in physical education/ faculty member should be attached to each batch. The list of available games, sport, or physical activities should be announced in orientation program on Day 1. They should be asked to fill their choice with three preferences, and the game or sport be allotted to them as per their preference. The physical activity should start from Day 3 onwards, wherein the student learns and plays his assigned game during the induction program. It is also important that along with his assigned game the student also practises yoga.

6. **Creative Arts, Cultural and Literary Activity:** Qualified instructors for arts may be hired on contract basis and be paid honorarium as per norms of the institute. Daily 90 to 120 minute sessions may be arranged. The list of available art forms, such as vocal music, instrumental music, folk music, painting,

sketching, dance, group dance, clay modelling, pottery, dramatics, etc. should be announced. They should be asked to fill their choice with three preferences, and the art form be allotted to them as per their preference. There should be sufficient number of teachers for each art form. The ratio may be kept as 1 teacher for every 25 students.

A faculty member interested in literary activity should be assigned for organizing the activity. A list of books which are interesting and educational should be prepared beforehand. Books in Indian languages must be included and even given priority. Students are losing connection with languages in general and their own language, in particular. Students should be assigned a book or other smaller reading material. They should be asked to read and write a critical summary. They should present their summary in front of their group. A literary group may consist of around 30-40 students. Similarly, debating and public speaking activity could also be undertaken. If the college can arrange for a drama workshop where a group of students learn and enact a play it would be very good. Not all the incoming students would do this, but those who wish may be provided the opportunity. Help may be taken from senior students engaged in such extra-curricular activities in the college.

7. **Familiarisation with Institute and Department:** The students admitted in a branch would visit their allotted department or branch. The Head of the department and other associated faculty should address the new student's right on Day 2 or so. Arrangements should be made about the meeting/gathering. The parents of the students should also be welcomed if they accompany their ward. It would be helpful if an alumnus of the Dept. relates his professional experience related to the field of the study to the incoming students.
8. **Lectures /Workshops by Eminent People:** Eminent people from all walks of life may be invited to deliver lectures, namely, from industry, academia, social science (authors, historians), social work, civil society, alumni etc. be identified and invited to come and address the new students. Motivational lectures about life, meditation, etc. by Ramakrishna Mission, Art of Living, S-VYASA university, VivekanandKendras, etc. may be organized. Workshops which rejuvenate or bring relief to students would also be welcome, such as, Art of Living workshops.
9. **Extra-Curricular Activity:** Every college has extra-curricular activities. Most of them are student driven. They are organized by student councils and clubs. The extra-curricular activities going on in the college should be presented to the new students under the guidance of faculty advisors for such activity. The new students should be informed about how they can join the activities. Related facilities should be described to them. Presentation on the activities by the student council should be made.
10. **Feedback and Report on the Program:** A formal feedback at the end of the program should be collected from students by their filling a form in writing or online. Besides the above, each group (of 20 students) should write a report on the Induction Program towards the end of the semester. They would also have to make a presentation of their report. They should be encouraged to use slides while making a

presentation. Presentation of the report should be made in the language they are comfortable with, without any insistence that it should be in English. It is more important that they feel comfortable and confident. Each group may make the presentation through 4-5 of its group members or more. In case, the number of new students in a college is large, the presentation should be made by each group in front of 4 other groups besides their own, thus there would be about 100 students (in 5 groups) in the audience in a session. Several such sessions could run in parallel or serially. In each session, their faculty mentors and student guides, if any, should also be in the audience. These sessions would tell you how well the program ran, and what the students are feeling at the end of the program. This would also serve as a grand closure to the program.

A certificate shall be awarded to all the students, upon successful completion of the induction program based on their report and presentation.

**Tentative schedule of 1<sup>st</sup> Week Induction Program:**

<b>Day 1</b>	Session 1	Orientation program
	Session 2	Mentoring (group formation and introduction)
<b>Day 2</b>	Session 3	Diagnostic test (basic English, maths and computer operation)
	Session 4	Familiarisation of Department and Institute (Visits to department, laboratory, Library, Examination cell, office etc)
<b>Day 3</b>	Session 5	Physical Activity ( Yoga, sports etc)
	Session 6	Universal human values session
<b>Day 4</b>	Session 7	Proficiency Modules (Short courses on basic maths, English and computer operation etc. for identified students)
	Session 8	Physical Activity ( Yoga, sports etc)
<b>Day 5</b>	Session 9	Proficiency Modules (Short courses on basic maths, English and computer operation etc. for identified students)
	Session 10	Creative Arts, Cultural and Literary Activity

A session may be conducted for around 2-3 hours each.

Minimum 12 sessions to be conducted from the following 20 sessions, from 2<sup>nd</sup> week to last week of academics, throughout the semester.

Session 11	Physical Activity ( Yoga, sports etc)- 1
Session 12	Extra-Curricular Activity- 1
Session 13	Physical Activity ( Yoga, sports etc)-2
Session 14	Extra-Curricular Activity- 2
Session 15	Physical Activity ( Yoga, sports etc)- 3
Session 16	Lectures /Workshops by Eminent People- 1
Session 17	Physical Activity ( Yoga, sports etc)- 4
Session 18	Lectures /Workshops by Eminent People- 2
Session 19	Creative Arts, Cultural and Literary Activity- 1
Session 20	Lectures /Workshops by Eminent People- 3
Session 21	Creative Arts, Cultural and Literary Activity- 2
Session 22	Universal Human Values- 1(Group Discussion among students as per mentoring group on various aspects of life, values, ethics etc.)
Session 23	Creative Arts, Cultural and Literary Activity- 3
Session 24	Universal Human Values- 2 (Group Discussion among students as per mentoring group on various aspects of life, values, ethics etc.)
Session 25	Creative Arts, Cultural and Literary Activity- 4
Session 26	Universal Human Values- 3 (Group Discussion among students as per mentoring group on various aspects of life, values, ethics etc.)
Session 27	Creative Arts, Cultural and Literary Activity- 5
Session 28	Physical Activity ( Yoga, sports etc)- 5
Session 29	Feedback and Report on the Program- 1
Session 30	Feedback and Report on the Program- 2

## Semester II

Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned				
		Theory	Pract.	Tut.	Theory	Pract.	Tut.	Total	
FEC201	Engineering Mathematics-II	3	--	1*	3	--	1	4	
FEC202	Engineering Physics-II	2	--	--	2	--	--	2	
FEC203	Engineering Chemistry-II	2	--	--	2	--	--	2	
FEC204	Engineering Graphics	2	--	--	2	--	--	2	
<b>FEC205</b>	<b>C programming</b>	<b>2</b>	<b>--</b>	<b>--</b>	<b>2</b>	<b>--</b>	<b>--</b>	<b>2</b>	
FEC206	Professional Communication and Ethics- I	2	--	--	2	--	--	2	
FEL201	Engineering Physics-II	--	1	--	--	0.5	--	0.5	
FEL202	Engineering Chemistry-II	--	1	--	--	0.5	--	0.5	
FEL203	Engineering Graphics	--	4	--	--	2	--	2	
<b>FEL204</b>	<b>C programming</b>	<b>--</b>	<b>2</b>	<b>--</b>	<b>--</b>	<b>1</b>	<b>--</b>	<b>1</b>	
FEL205	Professional Communication and Ethics- I	--	2	--	--	1	--	1	
FEL206	Basic Workshop practice-II	--	2	--	--	1	--	1	
<b>Total</b>		<b>13</b>	<b>12</b>	<b>01</b>	<b>13</b>	<b>06</b>	<b>01</b>	<b>20</b>	
Course Code	Course Name	Examination Scheme							
		Theory					Term Work	Pract. /oral	Total
		Internal Assessment			End Sem. Exam.	Exam. Duration (in Hrs)			
		Test1	Test 2	Avg.					
FEC201	Engineering Mathematics-II	20	20	20	80	3	25	--	125
FEC202	Engineering Physics-II	15	15	15	60	2	--	--	75
FEC203	Engineering Chemistry-II	15	15	15	60	2	--	--	75
FEC204	Engineering Graphics	15	15	15	60	3	--	--	75
<b>FEC205</b>	<b>C programming</b>	<b>15</b>	<b>15</b>	<b>15</b>	<b>60</b>	<b>2</b>	<b>--</b>	<b>--</b>	<b>75</b>
FEC206	Professional Communication and Ethics- I	10	10	10	40	2	--	--	50
FEL201	Engineering Physics-II	--	--	--	--	--	25	--	25
FEL202	Engineering Chemistry-II	--	--	--	--	--	25	--	25
FEL203	Engineering Graphics	--	--	--	--	--	25	50	75
<b>FEL204</b>	<b>C programming</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>25</b>	<b>25</b>	<b>50</b>
FEL205	Professional Communication and Ethics- I	--	--	--	--	--	25	--	25
FEL206	Basic Workshop practice-II	--	--	--	--	--	50	--	50
<b>Total</b>		<b>--</b>	<b>--</b>	<b>90</b>	<b>360</b>	<b>--</b>	<b>200</b>	<b>75</b>	<b>725</b>

\* May be conducted batch-wise

Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned				
		Theory	Pract.	Tut.	Theory	Tut.	Pract.	Total	
FEC205	C Programming	2	--	--	2	--	--	2	
Course Code	Course Name	Examination Scheme							
		Theory					Term Work	Pract. /oral	Total
		Internal Assessment			End Sem. Exam.	Exam. Duration (in Hrs)			
		Test1	Test 2	Avg.					
FEC205	C Programming	15	15	15	60	2	--	--	75

### Objectives

To provide exposure to problem-solving by developing an algorithm, flowchart and implement the logic using C programming language.

**Outcomes:** Learner will be able to...

1. Formulate simple algorithms for arithmetic, logical problems and translate them to programs in C language
2. Implement, test and execute programs comprising of control structures.
3. Decompose a problem into functions and synthesize a complete program.
4. Demonstrate the use of arrays, strings and structures in C language.
5. Understand the concept of pointers

Module	Detailed Contents	Hrs.
1	<b>Introduction</b>	5
	<ul style="list-style-type: none"> <li>● Introduction to components of a Computer System</li> <li>● Introduction to Algorithm and Flowchart</li> </ul>	
1	<b>Fundamentals of C Programming</b>	5
	<ul style="list-style-type: none"> <li>● Keywords, Identifiers, Constants and Variables</li> <li>● Data types in C</li> <li>● Operators in C</li> <li>● Basic Input and Output Operations</li> <li>● Expressions and Precedence of Operators</li> <li>● In-built Functions</li> </ul>	
2	<b>Control Structures</b>	7
	<ul style="list-style-type: none"> <li>● Introduction to Control Structures</li> </ul>	
2	<b>Branching and looping structures</b>	7
	<ul style="list-style-type: none"> <li>● If statement, If-else statement, Nested if-else, else-if Ladder</li> <li>● Switch statement</li> <li>● For loop, While loop, Do while loop</li> <li>● break and continue</li> </ul>	
3	<b>Functions</b>	4
	<ul style="list-style-type: none"> <li>● Introduction to functions</li> <li>● Function prototype, Function definition, Accessing a function and parameter passing.</li> <li>● Recursion.</li> </ul>	
4	<b>Arrays and Strings</b>	4

	<ul style="list-style-type: none"> <li>● Introduction to Arrays</li> <li>● Declaration and initialization of one dimensional and two-dimensional arrays.</li> <li>● Definition and initialization of String</li> <li>● String functions</li> </ul>	
5	<b>Structure and Union</b>	4
	<ul style="list-style-type: none"> <li>● Concept of Structure and Union</li> <li>● Declaration and Initialization of structure and union</li> <li>● Nested structures</li> <li>● Array of Structures</li> <li>● Passing structure to functions</li> </ul>	
6	<b>Pointers</b>	4
	<ul style="list-style-type: none"> <li>● Fundamentals of pointers</li> <li>● Declaration, initialization and dereferencing of pointers</li> <li>● Operations on Pointers</li> <li>● Concept of dynamic memory allocation</li> </ul>	

### **Assessment:**

#### **Internal Assessment Test:**

Assessment consists of two class tests of 15 marks each. The first class test is to be conducted when approx. 40% syllabus is completed and second class test when additional 35% syllabus is completed. Duration of each test shall be one hour.

#### **End Semester Theory Examination:**

1. Question paper will comprise of total 06 questions, each carrying 15marks.
2. Total 04 questions need to be solved.
3. Question No: 01 will be compulsory and based on entire syllabus wherein sub-questions of 2 to 5 marks will be asked.
4. Remaining questions will be mixed in nature.( e.g. Suppose Q.2 has part (a) from module 3 then part (b) will be from any module other than module 3)
5. In question paper weightage of each module will be proportional to number of respective lecture hrs as mentioned in the syllabus.

#### **Text Books:**

1. E. Balaguruswamy, Programming in ANSI C, McGraw-Hill
2. Kernighan , Ritchie, —The C programming Language, Prentice Hall of India
3. Sumitabha Das, Computer Fundamentals and C Programming, McGraw-Hill
4. Pradeep Day and ManasGosh ,—Programming in C, Oxford University Press.

#### **References:**

1. Byron Gottfried, —Programming with C, McGraw Hill ( Schaum’s outline series)
2. Venugopal K.R, Prasad Sudeep, —Mastering C, McGraw-Hill
3. Kanetkar Yashwant, —Let Us C, BPB Publication.

Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned				
		Theory	Pract.	Tut.	Theory	Tut.	Pract.	Total	
FEL204	C programming	--	2	--	--	--	1	1	
Course Code	Course Name	Examination Scheme							
		Theory					Term Work	Pract. /oral	Total
		Internal Assessment			End Sem. Exam.	Exam. Duration (in Hrs)			
		Test1	Test 2	Avg					
FEL204	C programming	--	--	--	--	--	25	25	50

**Outcomes:** Learner will be able to...

1. Translate given algorithms to a program.
2. Correct syntax and logical errors.
3. Write iterative as well as recursive programs.
4. Represent data in arrays, strings and structures and manipulate them through a program.
5. Declare pointers and demonstrate call by reference concept.

**Lab Description:**

Weekly 2 hours of laboratory Programming Assignments on the following topics:

1. Basic data types and I/O operations
2. Branching Statements
3. Loop Statements
4. Arrays
5. Strings
6. Functions
7. Recursion
8. Structure and Union
9. Pointers

**Term Work:**

**Experiments (20 Programs) and Assignments (2 Assignments) should be completed by students on the given time duration**

Experiments:	15Marks
Assignment:	05Marks
Attendance:	05Marks
<b>Total:</b>	<b>25Marks</b>

The final certification and acceptance of TW ensures the satisfactory performance of laboratory work and minimum passing in the TW.

**Practical and Oral :**

**Practical and oral Exam should be conducted for the Lab, on Computer Programming in C subject for given list of experiments.**

Implementation:	15 Marks
Oral:	10 Marks