सावित्रीबाई फुले पुणे विद्यापीठ

SAVITRIBAI PHULE PUNE UNIVERSITY

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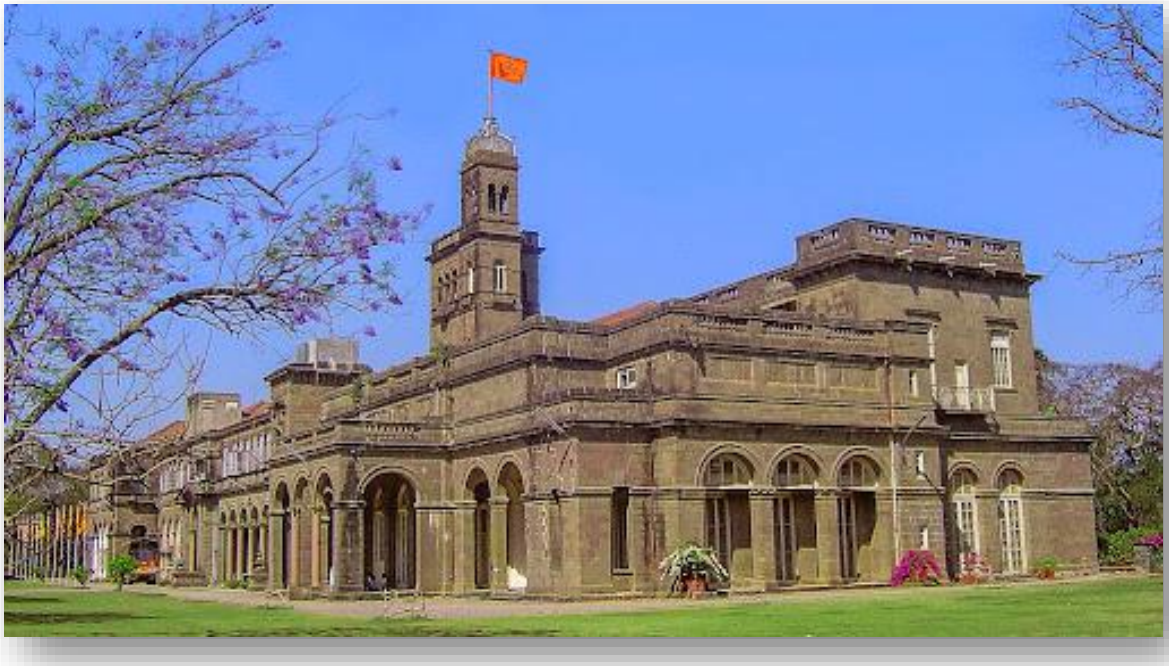
Savitribai Phule Pune University, Pune



Credit Framework, Guidelines, Rules and Regulations

As per

National Education Policy 2020

For

4 Years UG Engineering Programme

Under

Faculty of Science and Technology

With Effective from Academic Year 2024-25

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Preamble

NEP 2020 recommended that the Four-year Bachelor's Multidisciplinary Engineering Degree Programme should allow the students to experience the full range of holistic and multidisciplinary education in addition to a focus on the chosen major and minors as per their choices and the feasibility of exploring learning in different institutions. A holistic and multidisciplinary education, as described so beautifully in India 's past, is indeed what is needed for the education of India to lead the country into the 21st century and the fourth industrial revolution. We are striving to in prepare professionals in cutting-edge areas that are fast gaining prominence, such as Artificial Intelligence (AI), 3-D machining, big data analysis, and machine learning, with important applications to health, environment, and sustainable living that will be woven into undergraduate education for enhancing the employability of the youth.

The syllabus has been revised in the framework of National Education Policy – NEP 2020 and Outcome based Education. For each course, course outcomes are defined. The course outcomes are related to program outcomes. The syllabus is consistent with the NEP-2020 curriculum in terms of weightages of different components: Basic Science, Other Engineering disciplines, Core Engineering, Humanities, Electives, Projects, etc. Accordingly, the new structure and curriculum are being introduced to be implemented from the academic year 2024-25 for First Year Engineering and the process will continue for subsequent years for second, third- and fourth-year engineering.

The Directorate of Higher Education , Directorate of Technical Education and SPPU have implemented NEP initiatives at a large scale including, Multiple Entry-Multiple Exit options in the 'Curriculum Credit Framework', Credits for courses such as Generic/ Open Electives, Vocational Skill and Skill Enhancement Courses, Ability Enhancement Courses, Indian Knowledge System, Value Education Courses, On Job Training/Internship, Field projects, Community engagement project, Co-Curricular Courses, Research Methodology, Liberal Learning Course, Courses on Humanities, Social Science and Management.

This booklet gives the guidelines for effective implementation of syllabus, examination pattern and grading systems.

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Abbreviations

AEC	Ability Enhancement Course
BSC	Basic Science Course
CCC	Co-Curricular Courses
CCE	Comprehensive Continuous Evaluation
CEP	Common Engineering Project
CEO	College Examination Officer
CO	Course Outcome
ELC	Experiential Learning Courses
ESC	Engineering Science Course
FP	Field Project
IKS	Indian Knowledge System
INT	Internship
MDM	Multidisciplinary Minor
NEP	National Education Policy
OE	Open Elective
OJT	On Job Training
PCC	Program Core Course
PEC	Programme Elective Course
PO	Program Outcomes
PR	Practical
PRJ	Project
PSO	Program Specific Outcome
RM	Research Methodology
TH	Theory
TU	Tutorials
VEC	Value Education Course
VSE	Vocational and Skill Enhancement Course

Implementation of Four Year UG Engineering Curriculum

The Credit and Multidisciplinary Curricular Framework, designed on the lines of the National Credit Framework and AICTE Approval Process Handbook, is to be made applicable in first phase to the AICTE-regulated UG (B.E./B.Tech. or equivalent) Engineering/ Technology Programs conducted in Engineering Colleges affiliated to Savitribai Phule Pune University and State University Campuses in Maharashtra with effect from Academic Year 2023-24.

Credit Framework with Multiple Entry and Multiple Exit options

The Four-year Bachelor's Multidisciplinary Engineering Degree Programme allows the students to experience the full range of holistic and multidisciplinary education in addition to a focus on the chosen major and minors as per their choices and the feasibility of exploring learning in different institutions. The minimum and maximum credit structure for different levels under the Four-year Bachelor's Multidisciplinary Engineering UG Programme with multiple entry and multiple exit options are as given below:

Credit Framework

Levels	Qualification Title	Credit Requirements		Semester	Year
		Minimum	Maximum		
4.5	One Year UG Certificate in Engg/Tech	40	44	2	1
5.0	Two Years UG Diploma in Engg/Tech	80	88	4	2
5.5	Three Years Bachelor's Degreein Vocation (B. Voc)/B. Sc. (Engg/Tech)	120	132	6	3
6.0	4-Years Bachelor's degree (BE/ BTech or Equivalent) in Engg/Tech with Multidisciplinary Minor	160	176	8	4
6.0	4-Years Bachelor's degree (B.E./ B.Tech. or Equivalent) in Engg./ Tech.- Honors and Multidisciplinary Minor	180	194	8	4
6.0	4-Years Bachelor's degree (BE/BTech or Equivalent) in Engg/Tech.- Honors with Research and Multidisciplinary Minor	180	194	8	4
6.0	4-Years Bachelor's degree (B.E./ B.Tech. or Equivalent) in Engg./ Tech.- Major Engg. Discipline with Double Minors (Multidisciplinary and Specialization Minors)	180	194	8	4

(a) Credits offered per Semester will be a Minimum 20 and a Maximum 22. While minimum credits are mandatory as per National Credit Framework, the Universities and Autonomous Engineering Colleges can evolve the mechanism for providing Semester/ Level wise credit attainment flexibility within the broad framework.

(b) With effect from Academic Year 2023-24, the first year of 4-Years Multidisciplinary Bachelor's Degree in Engg./ Tech. Program (B.E./ B.Tech. or Equivalent) will be introduced. Thus, the Fourth Year of Bachelor's Engg./ Tech. Degree (Level 6.0) with various options- Bachelor's Engg./ Tech. Degree in chosen Major Engg./ Tech. Discipline with Multidisciplinary Minor (160-176 credits), OR Bachelor's Engg./ Tech. Honours Degree in chosen Major Engg./ Tech. Discipline with Multidisciplinary Minor (180-194 credits) OR Bachelor's Engg./ Tech. Honours with Research Degree in chosen Major Engg./ Tech. Discipline with Multidisciplinary Minor (180-194 credits) OR Bachelor's Engg./ Tech. Degree in chosen Major Engg./ Tech. Discipline with Double Minor (Multidisciplinary and Specialisation Minor, 180-194 credits) will begin with effect from Academic Year 2026-27.

(c) Under Bachelor's Engg./ Tech. Honours with Research Degree in chosen Major Engg./ Tech. Discipline with Multidisciplinary Minor (180-194 credits), the students will work on a research project or dissertation for 18 credits in the fourth year in the respective Major Engg./ Tech. Discipline. The decision regarding the distribution of 18 credits for Research Project in Semesters VII and VIII of the Fourth Year will be taken by Academic Authorities of University/ Autonomous Engineering Colleges. These 18 Credits will be over and above the min.160-max.176 Credits prescribed for Four Year Multidisciplinary Bachelor's Degree in Engg./ Tech. Program.

(d) The Bachelor's Engg./ Tech. Honours Degree in chosen Major Engg./ Tech. Discipline with Multidisciplinary Minor (180-194 credits) enables students to take up five-six additional courses in the same Engg./ Tech. discipline of 18 to 20 credits distributed over semesters III to VIII. The decision regarding the mechanism of distribution of these 18-20 credits over semesters III to VIII, which are over and above the min.160-max.176 Credits prescribed for Four Year Multidisciplinary Bachelor's Degree in Engg./ Tech., will be taken by Academic Authorities of University/ Autonomous Engineering Colleges.

(e) Under Bachelor's Engg./ Tech. Degree in chosen Major Engg./ Tech. Discipline with Double Minor (Multidisciplinary and Specialisation Minor, 180-194 credits), students would take up five-six additional courses of 18 to 20 credits in another Engg./ Tech. discipline/ Emerging Areas Specialization distributed over semesters III to VIII. The decision regarding the mechanism of distribution of these 18-20 credits over semesters III to VIII, which are over and above the min.160-max.176 Credits prescribed for Four Year Multidisciplinary Bachelor's Degree in Engg./Tech., will be taken by Academic Authorities of University/ Autonomous Engineering Colleges.

(f) The NEP 2020 Four Year Multidisciplinary Engineering Curriculum Framework offers:

i. The flexibility to move from one discipline of study to another.
ii. The opportunity for learners to choose the courses of their interest in all disciplines.
iii. The multiple entry and exit options with the award of UG certificate/ UG diploma/ or three-year degree depending upon the number of credits secured.
iv. The flexibility for learners to move from one institution to another to enable them to have multi and/or interdisciplinary learning.
v. Mandatory One Semester Internship/ On Job Training (OJT).
vi. Provision of Vocational and Skill Enhancement Courses (VSEC), Indian Knowledge System (IKS), Community Engagement Project (CEP)/Field Project (FP) in Major Discipline Degree.
vii. Horizontal and Vertical mobility with multiple entry and exit options at each Level.
viii. Provision of NSQF compliant Skill-based Courses and internships for Exits at different Levels.
ix. Credits for Co-curricular and Extra-Curricular Activities as Curricular activities besides provision of credits for the Ability Enhancement Courses (AEC) and Value Education Courses (VEC).
x. Interdisciplinary or Multidisciplinary education through Single and Double Minors and Open Electives (OE).
xi. The flexibility to switch to alternative modes of learning (offline, ODL, and Online learning, and hybrid modes of learning).

Distribution of Credits across FourYears Engineering Programmes

The four years' bachelor's degree programme, the distribution of credits will be as follows:

(a) Major (Core) Subject comprising Mandatory and Elective Courses:

i. Minimum 50% of total credits corresponding to Three/Four - year UG Degree-Mandatory Courses offered in all Four years;
ii. Elective courses of Major will be offered in the third and/or final year.
iii. Vocational Skill Courses, Internship/ Apprenticeship, Community Engagement Project (CEP)/ Field Projects (FP), Research Projects connected to Major

(b) Compulsory Multidisciplinary Minor Subject: 14 Credits

i. The Minor subjects may be from the different disciplines of the Engineering faculty, or they can be from different faculty altogether.
ii. The credits of compulsory Minor subjects shall be completed from the second year to the final year of UG Programme.

(c) Generic/ Open Elective Courses (OE): 08 credits

i. It is to be offered in Second and/or Third year
ii. Faculty-wise baskets of OE shall be prepared by the University.
iii. OE is to be chosen compulsorily from faculty other than that of the Major Discipline.

(d) Vocational and Skill Enhancement Courses (VSEC): 08 credits

- Vocational Skill Courses (VSC): 04 credits, including Hands on Training corresponding to the Major and/or Minor Subject:
    i. To be offered in first three years;
    ii. Wherever applicable vocational courses will include skills based on advanced laboratory practical of Major.
- Skill Enhancement Courses (SEC) : 04 credits
    i. To be offered in first three years;
    ii. To be selected from the basket of Skill Courses approved by University/ Autonomous Engineering Colleges

(e) Ability Enhancement Courses (AEC), Indian Knowledge System (IKS) and Value Education Courses (VEC): 10 Credits

- AEC: 04 credits
    i. To be offered in First and Second year
    ii. ii. English: 02 Credits
- Modern Indian Language: 02 credits
    i. To be offered from the Basket approved by University / Autonomous College;

The focus for both languages should be on linguistic and communication skills.

- IKS: 02 Credits
    i. To be offered in First Year
    ii. Courses on IKS to be selected from the basket of IKS courses approved by

iii. University/ Autonomous Colleges or as per UGC Guidelines on IKS.

- VEC: 04 Credits

(f) Field Projects/ Internship/ Apprenticeship/ Community Engagement Projects corresponding to the Major (Core) Subject, Co-curricular Courses (CC).

- Internship/Apprenticeship corresponding to the Major (Core) Subject: 12 Credits. Internship of One Semester duration shall be offered either in the VII or VIII semesters. Courses offered during the Internship Semester shall be offered in online mode.
- Field Projects/Community Engagement Projects corresponding to the Major (Core) Subject: minimum 02 credits
- To be offered in Second year of UG Degree Programmes.
- Co-curricular Courses (CC) such as Health and Wellness, Yoga education sports, and fitness, Cultural Activities, NSS/NCC and Fine/ Applied/ Visual/ Performing Arts: 04 credits
- To be offered in First year

(g) Additional Credits for Bachelor's Degree- with Double Minor OR Honours: 18-20 Credits

- These are additional credits to be offered from the second year to the final year and will be offered as an option to students.

(h) Additional Credits for Bachelor's Degree- Honours with Research: Minimum 18 Credits

- These are additional credits to be offered in the final year and will be offered as an option to students.

The UGC Regulations, 2021 permit up to 40% of the total courses being offered in a particular programme in a semester through the Online Learning Courses offered through the SWAYAM platform and/or other State Level Common Platforms which can be developed in due course with the participation of different Universities/ HEIs.

Semester wise Credit distribution structure for Four Year UG Engineering Program - One Major, One Minor

Semester		I	II	III	IV	V	VI	VII	VIII	Total Credits
Basic Science Course	BSC/ESC	06-08	08-10		--	--	--	--	--	14-18
Engineering Science Course		10-08	06-04		--	--	--	--	--	16-12
Programme Core Course(PCC)	Program Courses	--	02	08-10	08-10	10-12	08-10	04-06	04-06	44-56
Programme Elective Course(PEC)		--	--	--	--	04	08	02	06	20
Multidisciplinary Minor(MDM)	Multidisciplinary Courses		-	02	02	04	02	02	02	14
Open Elective (OE) Otherthan a particular program		--	--	04	02	02	--	--	--	08
Vocational and Skill Enhancement Course(VSEC)	Skill Courses	02	02	--	02	--	02	--	--	08
Ability Enhancement Course (AEC -01, AEC-02)	Humanities Social Science and Management (HSSM)	02	--	--	02	--	--	--	--	04
Entrepreneurship/Economics/ Management Courses		--		02	02	--	--	--	--	04
Indian Knowledge System(IKS)			02		--	--	--	--	--	02
Value Education Course(VEC)		--	--	02	02	--	--	--	--	04
Research Methodology	Experiential Learning Courses	--	--	--	--	--	--		04	04
Comm. Engg. Project (CEP)/ Field Project (FP)		--	--	02	--	--	--	-	-	02
Project		--	--	--	--	--	--		04	04
Internship/ OJT		--	---			--	--	12	-	12
Co-curricular Courses (CC)	Liberal Learning Courses	02	02		--	--	--	--	-	04
Total Credits (Major)		**20-22**	**20-22**	**20-22**	**20-22**	**20-22**	**20-22**	**20-22**	**20-22**	**160-176**

Choice of Major and Minor Subjects/ Discipline

Major (Core) Subject

Major (Core) Subject is the Engineering/ Technology discipline or subject of main focus and the degree will be awarded in that discipline/ Subject. Students should secure a minimum 50% of total credits through Core Courses (mandatory courses, electives, vocational courses, Internship/ Field Projects/ Apprenticeship/ Community Engagement Projects, Seminars, and Group Discussions). In addition, for the award of Bachelor's Degree- with Double Minor OR Honours students shall have to earn additional 18-20 credits by opting for courses of Emerging Specialisations or the Same Discipline, respectively. For the award of Bachelor's Degree- Honours with Research, students shall have to earn additional 18-20 credits through Research Project or Dissertation.

In addition, from the perspective of promoting Multidisciplinary and Interdisciplinary Thinking, the University can exercise the design of Major Subjects on the lines of Multidisciplinary or School, Interdisciplinary, Double Major besides Department Specific Major Subjects such as Civil Engineering, Mechanical Engineering, Electrical Engineering, Chemical Engineering.

(b) Students shall select a 'Major (Core) Subject' and a 'Minor Subject' from the lists of various Subject Combinations and Options provided by the State Universities.

Courses on Indian Knowledge System (IKS)

The concerned academic authorities, while defining the curriculum for modules/ courses on IKS, may take the support of the Indian Knowledge System (IKS)

Cell under the Ministry of Education (MoE) at AICTE, New Delhi which is established to promote interdisciplinary research on all aspects of IKS, preserve and disseminate IKS for further research and societal applications. The IKS Cell has established multiple IKS Centers at different Institutes in various parts of the country to act as a catalyst for initiating research, education, and outreach activities. In addition, the list of courses may be developed and offered in online or offline mode by the parent university or the specialized HEIs.

The courses to be developed under the Indian Knowledge Systems (IKS) are as follows:

I. Generic IKS Course: These are expected to contain basic knowledge of the IKS subject. It should contain introductory information to the IKS. The student should be able to acquire basic knowledge after completion of the course.

II. Subject-Specific IKS Courses: These courses should contain advanced information pertaining to the subject as these will be considered as a part of the major credit. The student should have completed the Generic level as a prerequisite before enrolling in the discipline-related course.

The Universities may evolve their own IKS subject-related courses by following UGC guidelines in this regard.

Credit Specifications

i. Theory Courses: 13-15 hours of teaching per credit is required in a semester.
ii. Laboratory Course: 26-30 hours in laboratory activities per credit is required in a semester.
iii. Studio activities: Studio activities involve the engagement of students in creative or artistic activities. Every student is engaged in performing a creative activity to obtain a specific outcome. Studio-based activities involve visual- or aesthetic-focused experiential work. A minimum of 26-30 hours in studio activities per credit in a semester is required.
iv. Workshop-based activities: Courses involving workshop-based activities require the engagement of students in hands-on activities related to work/vocation or professional practice. Every student is engaged in performing a skill-based activity. Related to specific learning outcome(s). 26- 30 hours of workshop-based activities per credit in a semester is required.
v. Seminar/ Group Discussion: 13-15 hours of participation in seminar/ Group Discussion activity per credit in a semester is required.
vi. Internship: Credits for internship shall be one credit per two weeks of internship (or 36-40 hours of engagement), The internship shall be monitored jointly by the faculty and Industry/ Organisation Mentor. Internship of One Semester duration shall be offered either in the VII or VIII semesters. Courses offered during the Internship Semester shall be offered in online mode.
vii. Field-based Learning/ Practices: These are the courses requiring students to participate in field-based learning/projects generally under the supervision of faculty. A minimum of 26-30 hours of learning activities per credit in a semester is required.
viii. Community Engagement Projects: These are the courses requiring students to participate in field-based learning/projects generally under the supervision of faculty. The curricular component of ‘community engagement and service’ will involve activities that would expose students to the socio-economic issues in society so that the

theoretical learnings can be supplemented by actual life experiences to generate solutions to real-life problems. 26-30 hours of contact time per credit in a semester along with 13-15 hours of activities such as preparation for community engagement and service, preparation of reports, etc., and independent reading and study with 2 credit course.

Definition of Credit

- 1 hour Lecture (TH) per week per semester = 1 Credit
- 1 hours Tutorial (TU)per week per semester = 1 Credit
- 2 hours Practical (PR)/Laboratory per week = 1 Credit
- 4 Credit theory courses shall be designed for a minimum of 50 hours of the Teaching-Learning process.
- 3 Credit theory courses shall be designed for a minimum of 40 hours of the Teaching-Learning process.
- Two-credit theory courses shall be designed for a minimum of 25 hours of the Teaching-Learning process
- One credit theory course shall be designed for a minimum of 15 hours of the Teaching-Learning process

Students Induction Program (SIP)

Induction programme for first year engineering students is introduced to familiarize them to the new environment and encourage them to learn beyond classrooms. Objective is to help first year engineering students adjust and feel comfortable in the new environment, inculcate in them the ethos and culture of the institution, help them build bonds with other students and faculty members, and expose them to a sense of larger purpose and self-exploration. Induction Program should be preferably of 3 weeks (2 weeks at beginning first semester and 1 week at the beginning of second semester). In order to implement the (SIP) the following activities can be taken at college.

- **Physical Activity:** - This would involve a daily routine of physical activity with games and sports.
- **Creative Arts**: - Every students would chose one skill related to arts whether visual arts or performing arts.
- **Mentoring and Universal Human values:-**Mentoring and connecting the students with faculty members and other students is the most important part of student induction. This can be effectively done by forming a group of 22-24 students with a faculty mentor

each. This can be implemented through group discussion and real life activities rather than only lecturing.

- **Familiarization with College, Department and Branch :-** The incoming student should be told about the credit, grading system and scheme of the examination. They should be explained how the study in College differs from the study in school. They should be taken on College tour and shown important facilities such as library, canteen, gymkhana etc. They should be shown their own department.
- **Literary Activity**:- Literary Activity would compass reading book, writing a summary, debating, enacting a play etc.
- **Proficiency modules:** - The modules can be designed to overcome some critical lacunas that students might have like English Speaking, Computer familiarity etc.
- **Lectures by Eminent People:** - The lectures of Eminent people be organized to expose the students to social activity and public life.
- **Visit to local Area:-** A couple of visits to the landmarks of the city or a hospital are orphanage could be organized.
- **Extracurricular activities in College:-** The new students should be introduced to the extracurricular activities at the College.
- **Feedback and Report on the program:-**Students should be asked to give their mid program Feedback wherein each group of 22-24 students should be asked to prepare a single report on their experience of the program.

To summarize the above activity the sequence of activities can be planned as given below:

- Address by Director/Principal, HoD's and other functionaries and welcome the new students along with their parents.
- The branch wise allocation of students to be done and a group of 22-24 students is to be formed along with one faculty as mentor.
- A detail time table of various activities is to be prepared and displayed for all students. The timetable should give details of location and details of faculty in charge of the activity.
- The visit to local areas can be arranged on Saturdays.

The various activities to be carried out can be divided into three phases :-

1. **Initial phase:-** Which may include Address by Principal, HOD's and other functionaries College and Dept Visit, interaction with parents Forming of students group and assigning of mentor mentee.

2. **Regular Phase:-** This phase may include the activities such as creative arts / universal Human values Games & Sports in the morning session and in the afternoon session. Literary activities, Proficiency module, Lectures & workshop, Extracurricular Activities etc. can be scheduled.
3. **Closing Phase**:- This phase may include taking feedback of students, preparation of Report by each group, Test of creative Arts, Human Values can be taken.

These are summarized guidelines to be given to the student inducing induction programme (SIP). Please refer SIP Manual published by AICTE for detail guidelines.

Undergraduate Engineering Programme Structure

Each B.E. / B. Tech. programme is of 4 years' duration. The minimum total number of credit requirement for each programme is 170. In the structure, the credits are distributed over 8 semesters. The Credit structure for Bachelor of Engineering programme is given below in Table

Structure for First Year Engineering – Semester I

Level 4.5													
Course Code	Course Name	Teaching Scheme (Hrs./week)			Examination Scheme and Marks					Credits			
		Theory	Tutorial	Practical	CCE*	End-Sem	Term work	Practical	Oral	Theory	Tutorial	Practical	Total
BSC-101-BES	Engineering Mathematics- I	3	1	-	30	70	25	-	-	3	1	-	4
BSC-102-BES/ BSC-103-BES	Engineering Physics / Engineering Chemistry	3	-	2	30	70	25	-	-	3	-	1	4
ESC-101-ETC / ESC-102-ELE	Basic Electronics Engineering / Basic Electrical Engineering	2	-	2	30	70	25	-	-	2	-	1	3
ESC-103-MEC/ ESC-104-CVL	Engineering Graphics / Engineering Mechanics	2	-	2	30	70	25	-	-	2	-	1	3
ESC-105-COM	Fundamentals of Programming Languages	2	-	2	30	70	25	-	-	2	-	1	3
VSE-101/ VSE-102	Manufacturing Practice Workshop/ Design Thinking and Idea Lab	-	-	2	-	-	25	-	-	-	-	1	1
AEC-101	Professional Communication Skills	-	2	-	-	-	25	-	-	-	2	-	2
CCC-101	Co-Curricular Course-I	-	-	4	-	-	25	-	-	-	-	2	2
Total		**12**	**03**	**14**	**150**	**350**	**200**	**-**	**-**	**12**	**03**	**07**	**22**

Structure for First Year Engineering – Semester II

Level 4.5													
Course Code	Course Name	Teaching Scheme (Hrs./week)			Examination Scheme and Marks					Credits			
		Theory	Tutorial	Practical	CCE*	End-Sem	Term work	Practical	Oral	Theory	Tutorial	Practical	Total
BSC-151-BES	Engineering Mathematics- II	3	1	-	30	70	25	-	-	3	1	-	4
BSC-103-BES/ BSC-102-BES	Engineering Chemistry/ Engineering Physics	3	-	2	30	70	25	-	-	3	-	1	4
ESC-102-ELE/ ESC-101-ETC	Basic Electrical Engineering/ Basic Electronics Engineering	2	-	2	30	70	25	-	-	2	-	1	3
ESC-104-CVL/ ESC-103-MEC	Engineering Mechanics/ Engineering Graphics	2	-	2	30	70	25	-	-	2	-	1	3
PCC-151-ITT	Programming and Problem Solving	2	-	2	30	70	25	-	-	2	-	1	3
VSE-102/ VSE-101	Design Thinking and Idea Lab / Manufacturing Practice Workshop	-	-	2	-	-	25	-	-	-	-	1	1
IKS-151	Indian Knowledge System	-	2	-	-	-	25	-	-	-	2	-	2
CCC-151	Co-Curricular Course-II	-	-	4	-	-	25	-	-	-	-	2	2
Total		**12**	**03**	**14**	**150**	**350**	**200**	**-**	**-**	**12**	**03**	**07**	**22**

Guidelines for Practical/Tutorials

1. Practical (PR)/Tutorial (TU) must be conducted in three batches per division.
2. Minimum number of required Experiments/Assignments in PR/ Tutorial shall be carried out as mentioned in the syllabi of respective subjects.
3. Every Student should appear for Engineering Physics, Engineering Chemistry, Engineering Mechanics, Basic Electrical Engineering, Basic Electronics Engineering, Programming and Problem solving during the year.
4. College is allowed to distribute Teaching workload of subjects Engineering Physics, Engineering Chemistry, Basic Electrical Engineering, Basic Electronics Engineering, and Engineering Mechanics in semester I and II dividing number of First Year divisions into two appropriate groups.
5. Assessment of tutorial work has to be carried out as term- work examination. Term-work Examination and Practical Examination at first year of engineering course shall

be internal continuous assessment only.

6. 1 credit of tutorial and practical shall be awarded on internal continuous assessment only.
7. Credit for the course of workshop practical is to be awarded on the basis of continuous assessment / submission of job work

Guidelines for Examination Scheme

Theory Examination: The theory examination shall be conducted in two different parts Comprehensive Continuous Evaluation (CCE) and End-Semester Examination (ESE).

Comprehensive Continuous Evaluation (CCE)

Comprehensive Continuous Evaluation (CCE) of 30 marks based on all the Units of course syllabus to be scheduled and conducted at institute level. To design a Comprehensive Continuous Evaluation (CCE) scheme for a theory subject of 30 marks with the specified parameters, the allocation of marks and the structure can be detailed as follows:

Sr.	Parameters	Marks	Coverage of Units
1.	Unit Test	12 Marks	Units 1 & Unit 2 (6 Marks/Unit)
2.	Assignments / Case Study	12 Marks	Units 3 & Unit 4 (6 Marks/Unit)
3.	Seminar Presentation / Open Book Test/ Quiz	06 Marks	Unit 5

Format and Implementation of Comprehensive Continuous Evaluation (CCE)

Unit Test:

Format: Questions designed as per Bloom's Taxonomy guidelines to assess various cognitive levels (Remember, Understand, Apply, Analyze, Evaluate, Create).

Implementation: Schedule the test after completing Units 1 and 2. Ensure the question paper is balanced and covers key concepts and applications.

Sample Question Distribution:

- Remembering (2 Marks): Define key terms related to [Topic from Units 1 and 2].
- Understanding (2 Marks): Explain the principle of [Concept] in [Context].
- Applying (2 Marks): Demonstrate how [Concept] can be used in [Scenario].
- Analyzing (3 Marks): Compare & contrast [Two related concepts] from Units 1 and 2.
- Evaluating (3 Marks): Evaluate the effectiveness of [Theory/Model] in [Situation].

Assignments / Case Study:

Students should submit one assignment or one Case Study Report based on Unit 3 and one assignment or one Case Study Report based on Unit 4.

Format: Problem-solving tasks, theoretical questions, practical exercises, or case studies that require in-depth analysis and application of concepts.

Implementation: Distribute the assignments or case study after covering Units 3 and 4. Provide clear guidelines and a rubric for evaluation.

Seminar Presentation:

Seminar Presentation Format:

- Oral presentation on a topic from Unit 5, followed by a Q&A session.
- Deliverables: Presentation slides, a summary report in 2 to 3 pages, and performance during the presentation.

Implementation: Schedule the seminar presentations towards the end of the course. Provide students with ample time to prepare and offer guidance on presentation skills.

Open Book Test:

Format: Analytical and application-based questions to assess depth of understanding.

Implementation: Schedule the open book test towards the end of the course, ensuring it covers critical aspects of Unit 5.

Quiz :

Format: Quizzes can help your students practice existing knowledge while stimulating interest in learning about new topic in that course. You can set your quizzes to be completed individually or in small groups.

Implementation: Online tools and software can be used create quiz. Each quiz is made up of a variety of question types including multiple choice, missing words, true or false etc

Example Timeline for conducting CCE:

Weeks 1-4	: Cover Units 1 and 2
Week 5	: Conduct Unit Test (12 marks)
Weeks 6-8	: Cover Units 3 and 4
Week 9	: Distribute and collect Assignments / Case Study (12 marks)
Weeks 10-12	: Cover Unit 5
Week 13	: Conduct Seminar Presentations or Open Book Test or Quiz (6 marks)

Evaluation and Feedback:

Unit Test: Evaluate promptly and provide constructive feedback on strengths and areas for improvement.

Assignments / Case Study: Assess the quality of submissions based on the provided rubric. Offer feedback to help students understand their performance.

Seminar Presentation: Evaluate based on content, delivery, and engagement during the Q&A session. Provide feedback on presentation skills and comprehension of the topic.

Open Book Test: Evaluate based on the depth of analysis and application of concepts. Provide feedback on critical thinking and problem-solving skills.

By following this scheme, you can ensure a structured and comprehensive evaluation of students' understanding and application of the course material, adhering to Bloom's Taxonomy guidelines for cognitive skills evaluation.

End-Semester Examination (ESE)

End-Semester Examination (ESE) of 70 marks written theory examination based on all the unit of course syllabus scheduled by university. Question papers will be sent by the University through QPD (Question Paper Delivery). University will schedule and conduct ESE at the end of the semester.

Format and Implementation of End-Semester Examination (ESE)

Question Paper Design

Below structure is to be followed to design an End-Semester Examination (ESE) for a theory subject of 70 marks on all 5 units of the syllabus with questions set as per Bloom's Taxonomy guidelines and 14 marks allocated per unit.

Balanced Coverage: Ensure balanced coverage of all units with questions that assess different cognitive levels of Bloom's Taxonomy: Remember, Understand, Apply, Analyze, Evaluate, and Create. The questions should be structured to cover:

- Remembering: Basic recall of facts and concepts.
- Understanding: Explanation of ideas or concepts.
- Applying: Use of information in new situations.
- Analyzing: Drawing connections among ideas.
- Evaluating: Justifying a decision or course of action.
- Creating: Producing new or original work (if applicable).

Detailed Scheme: Unit-Wise Allocation (14 Marks per Unit): Each unit will have a combination of questions designed to assess different cognitive levels. By following this scheme, you can ensure a comprehensive and fair assessment of students' understanding and application of the course material, adhering to Bloom's Taxonomy guidelines for cognitive skills evaluation.

Guidelines for Term Work Evaluation

Term Work assessment shall be conducted for the theory courses, lab practical, VSE, IKS, AEC and CCC assignments submitted in journal form. Term work is continuous assessment based on work done, submission of work in the form of report/journal, timely completion, attendance, and understanding.

It should be assessed by subject teacher of the institute and the final grade for a Term Work shall be assigned based on the performance of the student and is to be submitted to the Savitribai Phule Pune University (SPPU) at the end of the semester.

Overview:

Students will submit a journal documenting their practical assignments, providing a comprehensive record of their practical work and learning experiences throughout the course. The journal will include detailed descriptions of the practical assignments, observations, results, reflections, and any additional relevant materials.

Journal Components:

Practical Assignments: Each practical assignment should be clearly labelled and dated. Include the assignment prompt, objectives, materials used, procedures, observations, and results. Ensure assignments cover a variety of practical skills and techniques as outlined in the syllabus.

Reflections: Reflective entries should accompany each practical assignment. Discuss the learning process, challenges faced, and how they were overcome. Highlight key takeaways and how the practical assignment contributed to overall understanding.

Supplementary Materials: Include any additional materials relevant to the practical assignments (e.g., raw data, sketches, photographs, feedback received). Supplementary materials should be organized and clearly linked to the corresponding assignments.

Evaluation Criteria:

- **Completeness (20%):** All practical assignments are included, completed, and properly labeled. Reflective entries are present for each practical assignment.
- **Quality of Work (40%):** Practical assignments are completed with a high level of accuracy and thoroughness. Demonstrates a strong understanding of practical techniques and principles. Reflective entries provide meaningful insights into the learning process.
- **Organization (20%):** The journal is well-organized and easy to navigate. Practical assignments and reflections are clearly labeled and ordered chronologically. Supplementary materials are appropriately linked and referenced.

- **Presentation (10%):** The journal is neatly presented and free of spelling and grammatical errors. Includes a cover page with the student's name, course title, and submission date. Utilizes a consistent format and style throughout.
- **Creativity and Engagement (10%):** Demonstrates creativity in approach and presentation. Engages deeply with the practical work, going beyond surface-level understanding. Shows evidence of critical thinking and personal engagement with the assignments.

Submission Guidelines:

Journals should be submitted in a bound or digital format as specified by the instructor. Ensure that all components are included and properly organized before submission. Late submissions may be subject to penalties as per the course policy.

Example Timeline:

- **Weeks 1-3 :** Complete and document Practical Assignments 1 and 2, including reflections.
- **Weeks 4-6 :** Complete and document Practical Assignments 3 and 4, including reflections.
- **Weeks 7-9** : Complete and document Practical Assignments 5 and 6, including reflections.
- **Week 10 :** Finalize and organize the journal.
- **Week 11 :** Submit the completed journal for evaluation.

Benefits:

- Encourages regular and consistent engagement with practical work.
- Provides a comprehensive record of student progress and learning.
- Develops skills in reflection, organization, and presentation.
- Allows for personalized feedback and growth opportunities.
- By structuring term work evaluation through journal submissions, students can benefit from a holistic and continuous assessment process that supports their practical skills development and academic growth.

Guidelines for conducting 1 Hour Tutorial Session

Conducting a two-hour tutorial session allows for more in-depth exploration and interaction compared to shorter sessions. Here are comprehensive guidelines to effectively conduct a two-hour tutorial session for a theory subject:

1. Preparation:

Review Content: Ensure a thorough understanding of the theory subject and select key topics or concepts to cover during the session.

Set Objectives: Define clear learning objectives that align with the course syllabus and students' learning needs.

Prepare Materials: Gather necessary materials such as lecture notes, slides, handouts, and any supplementary resources or examples.

2. Structure of the Tutorial:

Introduction and Agenda Setting (05 minutes): Welcome students and outline the agenda for the tutorial session. Clarify the learning objectives and expectations for the session.

Recap or Review (07 minutes): Recap briefly the key points from previous sessions or relevant topics. Address any lingering questions or uncertainties from the previous material.

Presentation and Explanation (15 minutes): Present new material or delve deeper into selected topics. Provide clear explanations using examples, diagrams, or visual aids to aid understanding. Break down complex ideas into manageable parts and ensure clarity in explanations.

Interactive Discussion and Q&A (12 minutes): Engage students in discussions related to the presented material. Encourage active participation and critical thinking through open-ended questions. Address student queries and encourage them to ask questions for clarification.

Application and Practice (15 minutes): Assign activities or problem-solving exercises that apply the newly learned concepts. Monitor students' progress and provide guidance as they work through the tasks. Facilitate peer-to-peer learning by encouraging students to discuss their approaches with peers.

Summary and Conclusion (05 minutes): Summarize the main points covered during the tutorial session. Reinforce key concepts and their relevance to the broader course objectives. Prepare students for the next steps in their learning journey related to the topic.

Feedback and Next Steps (05 minutes): Gather feedback from students on the tutorial session, including what they found most helpful and any areas needing improvement. Provide recommendations for further study, additional resources, or upcoming assignments related to the topic.

3. Engagement Strategies:

Active Participation: Encourage all students to actively engage in discussions and activities throughout the session.

Use of Technology: Utilize multimedia presentations or online tools to enhance learning experiences and engagement.

Group Activities: Incorporate group discussions or collaborative activities to promote peer learning and interaction.

4. Assessment and Evaluation:

Formative Assessment: Assess student understanding through informal assessments, discussions, and problem-solving activities.

Feedback Mechanism: Provide timely feedback on students' participation and comprehension to support their learning progress.

5. Logistics and Environment:

Classroom Setup: Ensure a comfortable and conducive learning environment with adequate seating, lighting, and equipment for presentations.

Time Management: Manage time effectively to cover all planned activities within the two-hour duration.

6. Post-Tutorial Follow-Up:

Reflection: Reflect on the tutorial session to evaluate its effectiveness and identify areas for improvement in future sessions.

Student Support: Offer additional office hours or online support for students who may need further assistance with tutorial material or assignments.

By following these guidelines, you can conduct a structured and engaging two-hour tutorial session that enhances students' understanding and retention of theory subjects while fostering active learning and participation.

End Semester Examination Guidelines

Question Paper :

1. Question Paper will have only one section five questions for ESE. For each question there will be alternate Question based on same unit and of the same marks.
2. Framing of questions should be according to Anderson/Revised Bloom's Taxonomy and disseminated through the question papers with a mention of course outcomes as well.

Assessment

1. Assessment will be done at the centralized assessment programme (CAP) Centre of the College by the Expert who is appointed as an examiner for the courses as per 48(3) panel of Maharashtra public university act 2016.
2. Moderation will be done at the CAP Centre designated by the University by the Expert who is appointed as an examiner for the subject as per 48(3) panel.

Rules for Term Work

1. Term Work assessment shall be conducted for the Lab Practice, Project, Tutorials and Seminar.
2. Term work is continuous assessment based on work done, submission of work in the form of report/journal, timely completion, attendance, and understanding.
3. It should be assessed by subject teacher of the institute for first to sixth semester and by the external examiner at seventh and eighth semester. At the end of the semester, the

final grade for a Term Work shall be assigned based on the performance of the student and is to be submitted to the Savitribai Phule Pune University.

4. To pass the Term Work/Practical/Oral, the student has to earn Minimum of 40 percent marks in each respective examination head.
5. A student who fails in the Term Work on account of unsatisfactory performance shall be given F grade and on the account of inadequate attendance shall be given FX grade. Failing in a particular course Term Work shall not be the criteria for detention in the semester.

Rules for Practical/Oral/Presentation:

1. Practical/Oral/presentation is to be conducted and assessed jointly by internal and external examiners. The performance in the Practical/Oral/Presentation examination shall be assessed by at least one pair of examiners appointed as examiners by the Savitribai Phule Pune University.
2. The examiners will prepare the mark / grade sheet in the format as specified by the Savitribai Phule Pune University and authenticate it.
3. To pass the Term Work/Practical/Oral, the student has to earn Minimum of 40 percent marks in each respective examination head.
4. Student can apply only for the Revaluation/Photocopying of End-Semester theory examination.

Monitoring of CCE

1. Periodic monitoring of CCE will be done by respecting board of studies members, whenever required.
2. Colleges should maintain all the records related to CCE with CEO for verification.
3. Staff members should keep all the records of Unit Tests, Assignments / Case Study, Seminar Presentation / Open Book Test/ Quiz duly signed by head of the institute with College Examination officer.

Rules of ATKT (Allowed To Keep Term):

1. A student can register for the third semester (SE), if he/she earns minimum 50% credits of the total of first and second semesters (FE).
2. A student can register for the fifth semester (TE), if he/she earns minimum 50% credits of the total of third and fourth semesters (SE) and all the credits of first and second semester (FE).

3. A student can register for the seventh semester(BE), if he/she earns minimum 50% credits of the total of fifth and sixth semesters(TE) and all the credits of third and fourth semester(SE).
4. A student will be awarded the bachelor's degree if he/she earns 170 credits and clears all the mandatory non-credit courses in respective semesters

Assessment and Grade Point Average

1. **Marks/Grade/Grade Point :** A grade is assigned to each head based on marks obtained by a student in examination of the course. The marks obtained in In-semester and end-semester examination are considered together to calculate the grade of the course. These grades, their equivalent grade points are given in Table 2.

Table 2. Grade and Grade Point

Sr. No.	% of Max. Marks	Grade Point	Grade Letter
1	90 ≤ Marks ≤ 100	10	O (Outstanding)
2	75 ≤ Marks ≤ 89	9	A+ (Excellent)
3	60 ≤ Marks ≤ 74	8	A (Very Good)
4	55 ≤ Marks ≤ 59	7	B+ (Good)
5	50 ≤ Marks ≤ 54	6	B (Above Average)
6	45≤ Marks ≤49	5	C (Average)
7	40≤ Marks ≤44	4	D (Pass)
8	Marks <40	0	F (Fail)
9	Nil	0	Ab (Absent)
10	--	0	FX (Detained, Repeat the Course)
11	--	0	IC (Incomplete Course- Absent for Exam but continue for the course)
12	--	0	AC (Audit Course Completed)
13	--	--	ACN (Audit Course Not Completed)

2. **Passing Grade:**
   - The grades O, A+,A, B+, C, D are passing grades.
   - A candidate acquiring any one of these grades in a course shall be declared as PASS. And student shall earn the credits for a course only if the student gets passing grade in that course.
   - F Grade -The Grade F shall be treated as a failure grade.
   - The student with F grade will have to pass the concerned course by re-appearing for the examination.
   - The student with F grade for any stage of the Project Work, will have to carry out additional work/ improvement as suggested by the examiners and re-appear for the

examination.

- FX Grade-The grade FX in a course is awarded by the college, if a student does not maintain the minimum attendance in the Lecture / Tutorial class as prescribed by the SPPU and/or his performance during the semester is not satisfactory and/or he/she fails in the Term Work head of that course.
- The student with FX grade in a given course is not permitted to take the end of semester examination in that course. Such a student will have to re-register for the course.
- The student with F / FX in a course shall not be awarded any credits for that course.
- AC and ACN Grade -The student registered for audit course shall be awarded the grade AC after satisfactory completion of audit course and shall be included in the Semester grade report for that course, provided student has the minimum attendance as prescribed by the SPPU and satisfactory In-semester performance and secured a passing grade in that course. Student who is unable to complete audit course will be awarded as ACN grade.

Rules for Passing CCE and ESE :

R1 (Term Work/Practical/Oral Seminar/Presentation): To pass any practical-related component (like term work, practical exams, or presentations), the student must score at least 40% in each individual component.

R2 (Theory - CCE): For theory subjects, the student must score at least 40% (12 Marks) in the Comprehensive Continuous Evaluation (CCE) part.

R3 (Theory - ESE): Similarly, the student must score at least 40% (28 Marks) in the End-Semester Examination (ESE) for theory subjects.

R4 (Theory - Overall): A student must score at least 40% (40 Marks) in the combined total of both the CCE and ESE to pass the theory subject.

R5 (Repeating CCE): If a student fails in CCE, they have the option to repeat it in either an odd or even semester, at the college level.

R6 (Repeating ESE): A failing student can repeat the End-Semester Examination (ESE) in either the odd or even semester, conducted by Savitribai Phule Pune University.

R7 (Carry Forward Marks): If a student has scored at least 40% in either CCE or ESE, the marks for that component will be carried forward to the next semester.

R8 (Course Credits): In order to earn credits for any course (whether it's a theory, term work, practical, or other components), the student must pass the course with the minimum required marks or grade.

R9 (Revaluation/Photocopying): Students are allowed to apply for revaluation or photocopying of their End-Semester Theory Examination papers.

Performance Indices

The semester end grade sheet will contain grades for the courses along with titles and SGPA. Final grade sheet and transcript shall contain CGPA.

SGPA -The performance of a student in a semester is indicated by a number called the Semester Grade Point Average (SGPA). The SGPA is the weighted average of the grade points obtained in all the courses, seminars and projects registered by the student during the semester.

SGPA -The performance of a student in a semester is indicated by a number called the Semester Grade Point Average (SGPA). The SGPA is the weighted average of the grade points obtained in all the courses, seminars and projects registered by the student during the semester.

$$CGPA = \frac{\sum_{i=1}^{p} CiGi}{\sum_{i=1}^{p} Ci}$$

$$SGPA = \frac{\sum GradePointsEarned\ x\ CreditsForEachCourse}{TotalCredits}$$

For Example: suppose in a given semester a student has registered for five courses having credits C1, C2, C3, C4, C5 and his / her grade points in those courses ar G1, G2, G3, G4, G5 respectively. Then students

$$SGPA = \frac{C1G1 + C2G2 + C3G3 + C4G4 + C5G5}{C1 + C2 + C3 + C4 + C5}$$

SGPA and CGPA is calculated up to two decimal places by rounding off.

CGPA- The CGPA is the weighted average of the grade points obtained in all the courses (Theory/term work/practical/oral/presentation) of first semester to eighth semester for the students admitted in the First year and third to eighth semester for the students directly admitted at Second year. CGPA is calculated in the same manner as the SGPA.

ln case of a student passing a failed course or in case of improvement, the earlier grade would be replaced by the new grade in calculation of the SGPA and CGPA.

Percentage calculation of a corresponding CGPA

The calculation of Percentage from CGPA the following equation can be used:-

% of Marks

If O grade then 20 x CGPA — 100
If A+ grade then 10 x CGPA — 5
If A grade then 10 x CGPA — 5
If B+ grade then 12 x CGPA - 20
If B grade then 5 x CGPA + 23.75
If C grade then 10 x CGPA - 2.50
If D grade then 6.6 x CGPA + 13.6

Examples of CGPA to percentage calculations: -

CGPA	Calculations	Corresponding Percentage	Grade
10	20 x 10 -100	100	O
9.75	20 x 9.75 – 100	95	O
9.5	20 x 9.5-100	90	O
9.0	12 x 9 – 24	84	A+
8.25	12 x 8.25 – 24	75	A+
8.0	10 x 8 – 7.5	72.5	A
7.0	10 x 7 – 7.5	62.5	A
6.75	10 x 6.75 – 7.5	60	A
6.25	5 x 6.25 + 26.25	57.5	B+
5.75	5 x 5.75 + 26.25	55	B+
5.5	10 x 5.5 – 2.5	52.5	B
5.25	10 x 5.25 – 2.5	50	B
4.75	10 x 4.75 – 2.50	45	C
4.0	6.6 x 4.0 + 13.6	40	D

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