1.3.1 Institution integrates cross- cutting issues relevant to Professional Ethics Gender, Human Values, Environment andSustainability, and into the Curriculum

The curriculum incorporates the issues on Professional Ethics, Gender, Human Values, Environment and Sustainability through following elective courses, audit courses, value added courses and activities.

SN	Cross-cutting Issues	Program	Class	Course Code	Course Name
1	**Professional Ethics**	Chemical	SE	209345	Soft Skills
			BE	409344B	Industrial Management and Entrepreneurship
		Civil	SE	201007	Road Safety Management
					Foreign Language
					Awareness to civil Engineering Practices
			TE	301011	Professional Ethics and Etiquettes
		Electrical	SE	203151	Soft Skills
			TE	303153A	Ethical Practices for Engineers
				303153B	Project Management
			BE	403147B	Engineering Economics I Engineering Economics II
		Mechanical & Mechanical Sandwich	SE	202046 Audit Course - III	Technical English For Engineers Entrepreneurship Development Developing soft skills and personality Design Thinking Foreign Language (preferably German/ Japanese)Science, Technology and Society
			SE	202053 Audit Course - IV	Language & Mind Emotional Intelligence Advanced Foreign Language (preferably German/ Japanese) Speaking Effectively Business Ethics Technical writing/ Research writing
			TE	302047	Skill Development
				302048	Engineering Economics Entrepreneurship and IP strategy
				302056	International Business

					Business and Sustainable Development
			BE	402055A	Managing Innovation
		Computer	SE	210260	The Science and Happiness
				210260	Intellectual Property rights and patents
			SE	202049	Business Communication Skills
			TE	310249	Seminar and Technical Communication
				310250	Professional Ethics and Etiquettes Engineering Economics Foreign Language MOOC- Learn New Skills
				310259	Digital and Social Media Marketing Foreign Language MOOC- Learn New Skills
		Electronics & E&TC	SE	204190 Audit Course - 3	Technical English For Engineers Introduction to Japanese Language and Culture German I
				204201 Audit Course - 4	Enhancing Soft Skills and Personality Language & Mind German II Speaking Effectively
			TE	304190	Skill Development
				304191A	
				304191B	
			SE	211090 AC 3:	Road Safety
		Production Sandwich	SE TE	AC 4: 211122	Soft Skills
				311094	Technical Writing and Communication Skill
			TE TE	311091(A)	Financial Management and Costing (Ele.)
				401010	Communication Etiquette in Workplaces
2	**Gender**	Civil	BE	401019	Social Responsibilities
			PG		Human Rights
			BE		Human Behavior

		Computer	SE	202051 AC-III	Social Awareness and Governance Program
		Electronics	SE	202053 Audit Course - IV	Human Behavior Science, Technology and Society
3	**Human Values**	Mechanical	BE	402054A	Yoga Practices Stress Management
			SE	210250	Humanity and Social Science
		Computer	SE	210246	Humanity and Social Science
			SE	210260	Stress Relief: Yoga and Meditation
			TE	310249	Cyber Security
			TE SE	310259	Leadership and Personality Development
				204201 AC- 4	Emotional Intelligence Human Behavior
		E&TC	BE	AC-8	V Emotional Intelligence III Social Media and Analytics
			BE	AC-7	Educational Leadership Human Resource Development Knowledge management Management Information System
		Electronics	TE	301021	Leadership and Personality Development
		Civil	BE	401010	Stress Management by Yoga
			FE	101007	Audit Course I Environmental Studies-I
4	**Environment and Sustainability**	First Engineering	FE SE		Audit Course -II Environmental Studies-I
				203152	Audit Course-III A- Solar Thermal System B- C Language Programming Japanese Language-I
		Electrical	SE TE	203153	Audit Course-IV A- Solar Photovoltaic B- Systems C- Installation & Maintenance of Electrical appliances C- Japanese Language-II
				303151D	D- Energy Management (Elective)
			TE	303147A	A: Energy Storage Systems

				303147B	B: Start-up and Disruptive Innovation
		Electrical	BE	403147C	Sustainability (IGBC)
			BE SE	403153C	Green Building
				403144B	Electric and Hybrid Vehicle
				204190 AC-3	Ecology and Environment Ecology and Society
		E&TC	BE	AC-7	Industrial Safety and Environment Consciousness
			BE TE	AC8	Conservational Interfaces
				AC-7	Energy Economics and Policy
		Electronics		301011	Sustainable Energy Systems
		Civil	TE BE	301021	Industrial Safety
				301015F	Elective-Solid Waste Management
			BE	401013	Earthquake Engineering
			BE	401004A	Air Pollution and Control (Elective)
				401014E	Green Structure and Smart Cities
				401014F	Rural Water Supply and Sanitation
			TE	311087	I-Disaster Management II- Industrial Waste Management
		Production SW		311094	Energy Auditing and Management in Industries
			BE	409344 C	Green Technology
		Chemical	TE	309345	Chemical Industry Management
		Computer	SE	210251 AC-III	Humanity and Social Science Environmental Studies Smart Cities
			SE	210260 AC-IV	Water Management

Description of few courses under each cross-cutting issues is given below:

A. Professional Ethics

A.1 Soft Skills (SE Chemical, Electrical, Production)

In this subject emphasis is placed on building interpersonal skills and to develop skill to communicate clearly, to enhance team building and time

management skills. Students are motivated learn active listening and responding skills. On completion of the course, students will be able to- Make use of techniques for self-awareness and self-development, apply the conceptual understanding of communication into everyday practice, understand the importance of teamwork and group discussions skills, Develop time management and stress management, apply business etiquette skills effectively an engineer requires.

A.2 Industrial Management and Entrepreneurship (BE Chemical)

Among the electives provided for BE 2019 pattern, Industrial Management and Entrepreneurship (409344 B) is the elective course which caters the need of human values & professional ethics irrespective of gender by providing the knowledge to students for the basic concepts of entrepreneurship development. This study further caters them to study the concepts of creating entrepreneurial venture and project management, the role of central government and state government in entrepreneurship development, the concepts of management theories and managerial work, project and marketing management. Thus contribute them for enriching human values & professional ethics in to curriculum. The students of this course have been evaluatedby in semester and end semester theory examinations.

A.3 Road safety management (SE Civil)

In this subject, emphasis is given on need for stricter enforcement of law to ensure greater safety on roads and an environment-friendly road transport operation. Focus is given on Safety and security concerns for businesses, governments and the traveling public around the world, as also in India. It is essential to benefit human beings, totake new initiatives in raising awareness, skill and knowledge of students as one ofthe ibid stake holders who are expected to follow the rules and policies of the government in order to facilitate safety of

individual and safe mobility of others.

Attention to this in the curriculum helps to develop in students:

a. To explain the engineering & legislative measures for road safety.
b. To discuss measures for improving road safety education levels among the public.
c. Improve road safety together leading to casualty.

A.4 Professional Ethics and Etiquettes (TE Computer)

Professional ethics is the underlying concept behind the successful accomplishment ofany act of a professional towards achieving the individual and societal goals. Thesegoals should ultimately result in morally, legally, ethically and even culturallyacceptable good things for all. Engineers being special group of professionals need tobe more conscious of their acts since their duties, rights and responsibilities permeateinto the society and the surroundings. To practice professional ethics, understanding of values and concepts are essential.

A.5 Industrial Organization and Management (TE Chemical)

The course Industrial Organization and Management (309343) and have been structured in TE 2015 pattern syllabi in order to familiarize the students for industrial terms and protocols to some extent. It covers management science, managerial skills to increase the productivity, knowledge of international trade, stores management, management laws and patent laws. The syllabus thus has been divided in six units. The students' progress is assessed by theory, practical, oral, in semester and end semester examinations.

A.6 Skill Development (TE Mechanical)

The subject aims at the development of the skill for assemble and disassemble of machines. Students get knowledge of the different tools and tackles used in machine assembly shop and also apply theoretical knowledge in practice.

The course teaches practical aspect of the each component in the assembly of the machine.

A.7 Financial Management & Costing (BE Production)

This course teaches the financial management, ratio analysis, operating and financial Leverages. It covers capital budgeting, working capital management, funds flow analysis. Different methods of costing, consideration of material losses –wastage, Depreciation, Overheads estimation are also studied. The course covers important aspect such as budgetary control and variance analysis, cost control, project planning

A.8 Engineering Economics and Financial management (T E Civil), Economics and finance for engineers (PG Civil)

In this subject importance is given to understand various economical as well as financial aspects associated with various theories and concepts of economics and its applicability to construction industry in the form of overall sustainability of the project by seeking a balance between strength, durability, serviceability, quality as well as optimality of the cost and design of various construction structures. It also teaches various financial aspects and methodologies to be developed for project analysis prior to, as well as after completion of any construction project.

A.9 Awareness to Civil engineering practices (SE Civil)

In this subject, emphasis is given on providing insight of code of ethics, duties and responsibilities as a Civil Engineer and Different safety practices on the site. It discusses on issues such as sustainability, eco-friendly techniques, use of locally available materials etc. directly related to techno economic development of society. The course aims to provide insight of the different practices followed by the industry such use of different contracts in civil engineering practice, local by-laws, duties and responsibilities of the Engineers,

site records and diaries, Health and Safety practiceson site, etc. This is very necessary to have knowledge of health and safety practiceson construction site for any Civil Engineer to solve different societal problems by engineering knowledge.

A.10 Technical Communication (SE Chemical)

The course such as Technical Communication (209346) was conducted for SE students in order to cater the need of general awareness like language, non-verbal communication, personal communication, meetings, group discussion, audiovisual aids, technical proposals and research papers. The students are submitting the assignments and presentations here and have been assessed by term work at the end of semester.

A.11 Seminar (TE Production)

The seminar have been structured in TE 2015 pattern syllabi in order to make the students acquainted for literature survey in respective field, analysis of literature survey, building of oral and written presentation skills, concept in novel work, technical writing skills and the advances in the areas of chemical engineering. The seminar has been evaluated by term work. This provides them strong background for final year project.

A.12 Industrial Training – I (TE Chemical)

The course Industrial Training-I (303946/ 309347) is structured at SE level whereas Industrial Training-II (409347 /409346) is structured at TE level. The students of SE completing Industrial Training-I course are evaluated in immediate next term TE by term work assessment with presentation.

A.13 Industrial and Technology Management (TE Electrical)

This course introduces different types of business organization and the fundamentalsof economics and management. It teaches importance of technology

management and quality management and also explains characteristics of marketing and its types. Alsoit describes qualities of a good leader

A.14 Industrial Management (TE Electronics)

Graduate programs in industrial management draw on Sloan's idea and provide engineers with a strategic management education with a focus on production management, marketing, financial management, human resources as well as commercial law supplemented by corporate governance, corporate social responsibility and sustainability topics. The primary goal is to enable students and professionals to take a holistic approach to industry management. Study programs in industrial management are very popular in economies with a high value of manufacturing output, such as the United States and Germany. Especially German research universities incorporate a large number of advanced courses in engineering in their graduate program in industrial management and are, thus, more like Master of Engineering programs. On the other hand, U.S. universities and universities of applied sciences in Germany offer MBA programs in industrial management that follow more the original idea of Sloan and emphasize hands-on application of theory.

A.15 Industrial Training – II (BE Chemical)

The students of TE completing Industrial Training-II course is evaluated in immediate next term BE by term work assessment with presentation. The purpose of these courses makes them to handle actual working environment and enable them to operate in chemical plants. Also the students share theoretical knowledge in actual industrial practice and gain industrial needs to some extent.

A.16 Employable skill development (SE E&TC)

In this subject, emphasis is given on professional ethics and how to make a candidate employable. Focus is given on what actually employers expect from graduates. Students are taught how to make career action plan. Attention to this in

the curriculum and in professional development helps to develop in students:

1. The capacity to work creatively with professional codes of ethics, such that they are not used legalistically.
2. The capacity to articulate and effectively embody professional values.
3. The capacity to engage in dialogue and debate with value and belief systems within, and outside, the community of practice.
4. The capacity to challenge values, respectfully and appropriately.
5. Responsibility for ethical awareness and response. In this, ethics is seen as a learning process, not something preformed, to be applied to situations.and scheduling, cost reporting and corrective action and different types of costing methods.

A.17 Industrial In-plant Training for 6 months (TE, Mechanical Sandwich, BE Production)

To know the requirement of the industry the students should undergo training program prepared by the industry in the area of plant layout, plant maintenance, housekeeping, material handling & safety, production planning and control, quality assurance, material management, industrial engineering, costing and cost control, management information system (M.I.S.), incentive schemes, labor laws, factory acts, import export procedures, machine / process diagnosis. The should also look into the quality assurance, quality improvement, maintenance of machines, housekeeping, safety precautions, computer based information study for stores, purchase wastage of material.

A.18 Seminar and Technical Communication (TE Computer), Technical Paper Presentation (BE Mechanical S/W), Technical Paper Presentation (BE Production)

The course is introduced in the curriculum so that students know the professional ethics of writing the technical paper and the elements of the technical paper.

A.19 Safety practices in Construction (PG Civil)

This subject deals with details of Construction Safety And Safety Technology, Government's policy in industrial safety; safety & health legislation in India, Construction Sites (Safety) Regulations; Codes of practice which are the factors that can be related to professional ethics, as safety of each resource involved in construction project is direct responsibility of any civil engineer. Workplace ergonomics Construction Safety Management and Accident Prevention Safety training; safety policy; safety committees; safety inspection; safety audit; reporting accidents and dangerous occurrences, also forms an important form in inducing human values.

A.20 Audit Course 1 (Road Safety) (SE Production)

Road transport remains the least safe mode of transport, with road accidents representing the main cause of death of people. The boom in the vehicle population without adequate road infrastructure, poor attention to driver training and unsatisfactory regulation has been responsible for increase in the number of accidents. India's vehicle population is negligible as compared to the World statistics; but the comparable proportion for accidents is substantially large. The need for stricter enforcement of law to ensure greater safety on roads and an environment-friendly road transport operation is of paramount importance. Safety and security are growing concerns for businesses, governments and the traveling public around the world, asalso in India. It is, therefore, essential to take new initiatives in raising awareness, skill and knowledge of students as one of the ibid stake holders who are expected to follow the rules and policies of the government in order to facilitate safety of individual and safe mobility of others.

A.21 Engineering Economics and Financial management (T E Civil), Economics and finance for engineers (PG Civil)

In this subject importance is given to understand various economical as well as financial aspects associated with various theories and concepts of economics and its applicability to construction industry in the form of overall sustainability of the project by seeking a balance between strength, durability, serviceability, quality as well as optimality of the cost and design of various construction structures. It also teaches various financial aspects and methodologies to be developed for project analysis prior to, as well as after completion of any construction project.

B. Gender

B.1 Human rights (PG Civil)

The subject helps in understanding the concept of human rights and the Indian constitution. It also creates awareness of the students towards the problems of the various sections of the society such as child labor, under-privileged and unorganized. It also inculcates human values in the students by introducing role of citizens in the development of society. It covers various value based aspect such as Police & Human Rights, Judiciary & Human Rights, Prisons & Human Rights, National and State Human Rights Commissions. The subject also strengthens the responsibility of individual towards the environment by teaching the topics such as right to Environment, particularly Industrial sectors of Civil Engineering and Mechanical Engineering, Globalization and Human Rights.

B.2 Audit Course: Human Behavior (BE E&Tc, BE Electronics)

Objective of Humanities and Social Science (HSS) is to produce well-rounded engineers, not only having good technological skills but also with the ability to interact with different organs of an organization. HSS is concerned with society andthe relationships among individuals within a society. It in turn has many branches, each of which is considered a "social science". The main social sciences include economics, political science, human geography,

demography and sociology. In a wider sense, social science also includes some fields in the humanities such as anthropology, archaeology, psychology, history, law and linguistics.

C. Human Values

C.1 Emotional Intelligence and Human Behavior (SE E&TC)

This Emotional Intelligence and Human Behavior (EI) audit course is focus on the five corecompetencies of emotional intelligence: self-awareness, self-regulation, motivation, empathy and interpersonal skills. Participants will learn to develop and implement these to enhance their relationships in work and life by increasing their understandingof social and emotional behaviors, and learning how to adapt and manage their responses to particular situations. Various models of emotional intelligence will be covered.

C.2 Yoga Practices and Stress management (BE Mechanical), Stress management by Yoga (TE Civil)

The course on Yoga teaches students the different yoga techniques, difference between physical exercises and yogasans, impact of yogasans on human body, benefits of yogasans, technique of different yogasans like, Trikonasan, Ardhachandrasan, Padmasan, Akarnadhanurasan, Ardhamatsendrasan, Vajrasan, Pachhimottasan, Bhujangasan, Shalbhasan, Dhanurasan, Naukasan, Makrasan, Pawanmuktasan, Halasan, Sarvangasan, Shavasan, Suryanamaskar (Sun Salutation); and Yoga and Food. It also includes meditation, Breathing technique, Pranayama, Benefits of pranayama, Prcautions for pranayama, Kumbhak, Bandh (Locks), Chakras, Mudra, Technique of pranayama, Anulom- Vilom Pranayam, Ujjayi Pranayam, Bhramari Pranayam, BhastrikaPranayam, Agnisar Pranayam and Kapalbhati Pranayam.

D. Environment and Sustainability

D.1 Environmental Studies I (FE Common)

The subject introduces the concept of biotic, abiotic factors and ecological cycle. Impact of the human behaviour and the technological advancements on the environment are discussed. Engineer's role in achieving sustainable development and need for conserving natural resources and preserving the environment is highlighted. The subject also introduces planning for the built environment, energy and environmental pollution. Need for harnessing alternative energies to meet the increased demand. Different methods of harnessing energies, effects and remedial measures associated with air pollution, water treatment, noise pollution, land pollution are also studied.

2 Environmental Studies-II (FE Common)

Environmental studies are the field that examines this relationship between people and the environment. An environmental study is an interdisciplinary subject examining the interplay between the social, legal, management, and scientific aspectsof environmental issues.

D.3 Audit Course Environmental Studies (SE Production), Audit Course: Ecology and Environment (SE E&Tc), Audit Course: Environment & Development (TE Elex), Audit Course: Globalization & Culture (TE E&Tc)

These courses introduce Renewable and non-renewable, Forest, water, mineral, food, energy and land resources. The concept, structure, function, energy flow, ecological succession, forest, grassland, desert and aquatic ecosystems and function of different ecosystems are studied. Biodiversity of India as mega biodiversity nation, Threats to biodiversity, Endangered and endemic species of India, Conservation of Biodiversity, Endangered and endemic species, Conservation of biodiversity are also discussed. Different types of pollution their causes, effects and control measures of the pollution, role of individual in

prevention of pollution are also addressed.

D.4 Solar Thermal Systems: (SE Electrical)

The course will introduces the basics of solar energy, availability, applications, heat transfer as applied to solar thermal systems, various types of solar thermal systems, introduction to manufacturing of the systems, characterization, quality assurance, standards, certification and economics. The following topics may be broadly covered in the classroom. The field visits will be designed for first-hand experience and basic understanding of the system elements.

D.5 Installation & Maintenance of Electrical appliances (SE Electrical)

This course has been designed to provide the knowledge of Repairing and Maintenance of home appliances. Students will be familiar with maintenance and effective use of everyday household necessities.

D.6 Air pollution and control (BE Civil)

In this subject, emphasis is placed on the practical application of control of air pollution. The techniques employed to reduce or eliminate the emission into the atmosphere of substances that can harm the environment or human health are covered in air pollution control. Air is considered to be polluted when it contains certain substances in concentrations high enough and for durations long enough to cause harm or undesirable effects. These include adverse effects on human health, property, and atmospheric visibility. The atmosphere is susceptible to pollution from natural sources as well as from human activities. The primary focus of air pollution regulation in industrialized countries has been on protecting ambient, or outdoor, air quality. This involves the control of a small number of specific “criteria” pollutants known to contribute to urban smog and chronic public health problems. The criteria pollutants include fine particulates, carbon monoxide, sulfur dioxide, nitrogen dioxide, ozone, and lead. The best way to protect air quality is to reduce the emission of pollutants by changing to cleaner

fuels and processes. Pollutants not eliminated in this way must be collected or trapped by appropriate air-cleaning devices as they are generated and before they can escape into the atmosphere.

D.7 Rural Water Supply Sanitation (BE Civil)

In this subject, emphasis is placed on the practical application of water and waste water engineering theory and principles to comprehensive environmental control. The number and complexity of unit processes and in turn unit operations comprising awater purification or wastewater treatment facility are functions of the legal and operational requirements of the treated water, the nature and degree of contaminationof the incoming water (raw water to the plant), and the quantities of water to be processed. This means that water treatment facilities from a design and operational standpoints vary, but they do rely on overlapping and even identical unit processes.This is necessary if available knowledge is to benefit humans in future generations without transferring an environmental problem from one media (air, water, or land) to another. In addition, and in deliberate contrast to complement other texts, empirical formulas, rule of thumb, experience, and good practice are identified and applied when possible to illustrate best possible solution under the particular circumstances.

D.8 Green structure and Smart Cities (TE Civil), Smart Cities (SE Computer)

We breathe in a world defined by urbanization and digital ubiquity, where mobile broadband connections outnumber fixed ones, machines dominate a new "internet of things," and more people live in cities than in the countryside. This course enables usto take a broad historical look at the forces that have shaped the planning and design of cities and information technologies from the rise of the great industrial cities of the nineteenth century to the present. This course considers the motivations, aspirations, and shortcomings of them all while offering a new civics to guide our efforts as we build the future together, one click at a time.

D.9 Industrial Pollution Control (PG Chemical)

The elective Industrial Pollution Control (509110) has been structured at ME 2013 pattern (PG level) in order to enrich the students' knowledge for the level of environment & sustainability. This have been catered by the structure of the course which show types of pollution, application of knowledge for the protection and improvement of the environment, selection and use of suitable wastewater treatment techniques, identifying suitable sampling, analysis and equipment for air pollutants, identification of environmental problems at industrial level, application of knowledge in controlling the pollution in process industries and environmental management systems (EMS) as industrial case study. This contributes them for enriching towards environment & sustainability in to curriculum. The knowledge is judged by examining them at in semester and end semester level.

D.10 Disaster Management (TE Production, PG Electrical)

The subject focuses on the causes of disasters and how to minimize their impact. It enables student to learn different areas of disaster management, which includes management of the situation, response to the needs of the people and the area, evacuation process, distribution of food and medical care for the injured people. During the course student will be introduced to environmental systems, field operations organizational management, and Disaster Management.

D.11 Elective: Renewable energy Systems & DSM (BE Elex)

Environmental pollution signifies the major risk for all life cycle on our planet. Protection of environment through the sustainable development is very much required. One of the effective ways for the sustainable development is the optimum use of available energy sources with minimum losses. Energy management is thesystematic approach for the effective utilization of energy sources without affectingthe quality of product or services. Energy audit, energy policy, bench marking ofenergy performance, environmental pollution, energy economics, energy conservationopportunities in thermal and electrical utilities and waste heat recovery are the majoraspects of the Energy management. The

subject "Energy management and audit"provides very good exposure to the Mechanical Engineering students in all importantaspects of Energy management. This subject helps student to understand theprinciples of energy management, methodology to carry out energy audit andidentification of energy conservation opportunities in thermal and electrical utilities.Waste heat recovery options which help in reducing environmental pollution are alsodiscussed in this subject.

D.12 Environmental Engineering (BE Chemical)

The environmental engineering course is one of elective opted predominantly in order to cater the need of social awareness. The course comprises study of environmental laws, standards and climate change, sources of air pollutionand its effects on human health, plants, animals and materials, design particulate control devices, water analysis report evaluation, selection of suitable waste watertreatment process and knowing ethical and societal responsibilities.

The course is evaluated at in semester and end semester examinations by theory as well as presentation in terms of term work. As the course is application oriented, studentsfind out implementation of course-knowledge learnt till extent.

D.13 Water Management (SE Computer):

This course provide students an unique opportunity to study water management activities like planning developing, distributing an optimum use of water resources. This course covers topics such as water treatment for drinking water, management of industrial waste water, sewage water, management of water resources and flood protection.

AISSMS COLLEGE OF ENGINEERING PUNE-1

PRINCIPAL
ALL INDIA SHRI SHIVAJI MEMORIAL SOCIETY'S
COLLEGE OF ENGINEERING
KENNEDY ROAD, PUNE-411 001