

**1.3.1 Institution integrates crosscutting issues relevant to Professional Ethics, Gender, Human Values, Environment and Sustainability into the Curriculum**  
**Upload a description in maximum of 200 words.**

The institute is affiliated to SPPU and the curriculum has integrated the cross cutting issues such as Gender, Environment and Sustainability, Human Values, Professional Ethics.

- **Gender**  
To address the Gender the course Enternshi Analysis- Desk Research is offered in the curriculum. Institute conducts Nirbhay Kanya Abhiyan and implements the gender equality by opting Gender Neutral Uniform.
- **Environment and Sustainability**  
The curriculum has the courses which integrates Environment and Sustainability e.g. Environmental Studies, Water Engineering, Heating, Ventilation, Air Conditioning &refrigeration Engineering, Solar & Wind Energy, Energy Engineering etc.  
Institute also has National Service Scheme team under which Camps in Rural areas, tree plantation and Swachata abhiyan are organized.
- **Human Values**  
In the curriculum the courses on Human values are Road Safety Management, Humanity & Social Science, Code of Conduct, Principles and Practices of Management and Organizational Behaviour.

During the pandemic period institute has started spiritual Online Series Tejas. The Institute also implement the Earn & Learn scheme and organises Blood donation camp

- **Professional Ethics**  
The courses on professional ethic are organisational behaviour, Employability Skills Development, Code of Conduct, Skill Development, Industry Engineering, Indian Ithos & Business Ethics etc.  
Inspite of these Career development program, Aptitude and soft skills sessions organized to develop professional ethics.



  
**Principal**  
Shree Chanakya Education Society's  
Indira College of Engineering & Management  
Parandwadi, Pune.



# INDIRA COLLEGE OF ENGINEERING AND MANAGEMENT

Parandwadi, Pune – 410506, Ph. 02114 661500, [www.indiraicem.ac.in](http://www.indiraicem.ac.in)

Topic	Year	Name of Subject	Percentage Covered	Page no.	Branch
Environment and Sustainability	FE	Environment Studies-I	100	3	Civil
		Environment Studies-II	100	5	
	SE	Engineering Geology	100	7	
		Geotechnical Engineering	100	11	
		Disaster Management	100	15	
	TE	Waste Water Engineering	100	16	
		Solid Waste Management (Elective-II)	100	20	
		Hydrology and Water Resources Engineering	100	24	
	BE	Transportation Engineering	100	28	
		Air Pollution and control( Elective)	100	32	
		Environmental Engineering - II	100	35	
	SE	Audit Coures- III( Environment Studies)	100	39	Computer
	SE	Audit Coures- I( Environment Studies)		40	
	TE	Audit Course- IV(Sustainable Energy System)	100	41	
	BE	Audit Course- V( Industrial Saftey & Environmental Consciousness)	30	42	
	SE	Applied Thermodynamics	100	46	Mechanical
	TE	Heating, Ventilation, Air Conditioning &refrigeration Engineering	100	49	
		Energy Audit & Management	100	52	
		Solar & Wind Energy	100	54	
	BE	Energy Engineering	100	56	
		Corporate Social Responsibility & Sustainability	35	60	MBA

Human Values	SE	Audit Course-I (Road Safety Management)	100	61	Civil
	SE	Humanity & Social Science	100	63	Computer
		Code of Conduct	100	69	
		Audit Course- IV(Yoga & Meditation)	100	73	
	TE	Audit Course I : Fire & Safety Technology	100	74	Mechanical
	FY	Principles and Practices of Management and Organizational Behavior	30	79	MCA

Professional Ethics	FY	Principles and Practices of Management and Organizational Behavior	30	78	MCA
	SE	Awareness to Civil Engineering Practices	100	80	Civil
		Project Based Learning	100	82	





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	TE	Seminar	100	86	
		Project Management	100	87	
		Internship	100	89	
		Employability Skills Development	100	93	
	BE	Project-I	100	95	
		Project Work	100	97	
	SE	Code of Conduct	100	98	Computer
	TE	Audit Course- V(Professional Ethics & Etiquettes)	100	102	
		Seminar & Technical Communiucation	100	104	
		Audit Course- VI(Leadership & Personality Development)	100	106	
	BE	Project Work- StageI	100	107	
		Project Work- StageII	100	108	
		Audit Course-III	100	109	Mechanical
		Machine Shop	100	110	
		Project Based Learning-II	100	111	
		Audit Course- IV	100	114	
	TE	Skill Development	100	115	
		Audit Course- V(Smart Maunfacturing)	100	117	
		Industrial In-plant Training-I	100	120	
	BE	Project-I	100	124	
		Project-II	100	129	
		Industry Engineering	100	134	
		Indian Ithos & Buisness Ethics	80	137	MBA
	FE	Verbal Communication Lab	100	138	

Gender Equality	SE	Enternshi Analysis- Desk Research	10	139	MBA
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Topic	Color Code
Environment and Sustainability	
Human Values	
Professional Ethics	
Gender Equality	

TH:02 Hrs./week	101007: Environmental Studies-I (Mandatory Non-Credit Course)
<b>Course Objectives:</b> <ol style="list-style-type: none"> <li>1. To explain the concepts and strategies related to sustainable development and various components of environment.</li> <li>2. To examine biotic and abiotic factors within an ecosystem, to identify food chains, webs, as well as energy flow and relationships.</li> <li>3. To identify and analyze various conservation methods and their effectiveness in relation to renewable and nonrenewable natural resources.</li> <li>4. To gain an understanding of the value of biodiversity and current efforts to conserve biodiversity on national and local scale.</li> </ol>	
<b>Course Outcomes:</b> On completion of the course, learner will be able to— <b>CO1:</b> Demonstrate an integrative approach to environmental issues with a focus on sustainability. <b>CO2:</b> Explain and identify the role of the organism in energy transfers in different ecosystems. <b>CO3:</b> Distinguish between and provide examples of renewable and nonrenewable resources & analyze personal consumption of resources. <b>CO4:</b> Identify key threats to biodiversity and develop appropriate policy options for conserving biodiversity in different settings.	

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<b>Unit I Introduction to environmental studies (02 Hrs)</b> Multidisciplinary nature of environmental studies; components of environment – atmosphere, hydrosphere, lithosphere and biosphere. Scope and importance; Concept of sustainability and sustainable development.		
<b>Unit II Ecosystems (06 Hrs)</b> What is an ecosystem? Structure and function of ecosystem; Energy flow in an ecosystem: food chain, food web and ecological succession. Case studies of the following ecosystems: a) Forest ecosystem b) Grassland ecosystem c) Desert ecosystem d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)		
<b>Unit III Natural Resources: Renewable and Non-renewable Resources (08 Hrs)</b> Land Resources and land use change; Land degradation, soil erosion and desertification. Deforestation: Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations. Water: Use and over-exploitation of surface and ground water, floods droughts, conflicts over water (international & inter-state). Heating of earth and circulation of air; air mass formation and precipitation. Energy resources: Renewable and non-renewable energy sources, use of alternate energy sources, growing energy needs, case studies.		
<b>Unit IV Biodiversity and Conservation (08 Hrs)</b> Levels of biological diversity: genetic, species and ecosystem diversity; Biogeography zones of India; Biodiversity patterns and global biodiversity hot spots. India as a mega-biodiversity nation; Endangered and endemic species of India. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts, biological invasions; Conservation of biodiversity; In-situ and Ex-situ conservation of biodiversity. Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value.		
<b>Suggested Readings:</b> <ol style="list-style-type: none"> <li>1. Carson, R. 2002. Silent spring. Houghton Mifflin Harcourt.</li> <li>2. Gadgil, M., &amp; Guha, R.1993. This Fissured Land: An Ecological History of India. Univ. of California Press.</li> <li>3. Gleeson,B. and Low, N. (eds.) 1999. Global Ethics and Environment, London, Routledge.</li> <li>4. Gleick, P.H. 1993. Water in Crisis. Pacific Institute for Studies in Dev., Environment &amp; Security. Stockholm Env. Institute, Oxford Univ. Press.</li> <li>5. Groom, Martha J. Gary K. Meffe, and Carl Ronald carroll. Principals of Conservation Biology. Sunderland: Sinauer Associates, 2006.</li> <li>6. Grumbine, R. Edward, and Pandit, M.K. 2013. Threats from India's Himalaya dams. Science, 339:36-37.</li> <li>7. McCully, P.1996. Rivers no more: the environmental effects of dams (pp.29-64). Zed Books.</li> <li>8. McNeil, John R. 2000. Something New Under the Sun: An Environmental History of the Twentieth Century.</li> </ol>		
<b>107008 – Engineering Mathematics – II</b>		
<b>Teaching Scheme:</b> <b>TH : 4 Hrs./Week</b> <b>TUT : 1 Hr./Week</b>	<b>Credits</b> <b>05</b>	<b>Examination Scheme:</b> <b>In-Semester : 30 Marks</b> <b>End-Semester : 70 Marks</b> <b>TW : 25 Marks</b>
<b>Prerequisites:</b> Integration, Differential Equation, Three-dimensional coordinate systems		



101014: Environmental Studies-II		
Mandatory Non-Credit Course		
TH: 02 Hr/week		
<b>Course Objectives:</b> <ol style="list-style-type: none"> <li>1. To provide a comprehensive overview of environmental pollution and the science and technology associated with the monitoring and control.</li> <li>2. To understand the evolution of environmental policies and laws.</li> <li>3. To explain the concepts behind the interrelations between environment and the development.</li> <li>4. To examine a range of environmental issues in the field, and relate these to scientific theory.</li> </ol>		
<b>Course Outcomes:</b> On completion of the course, learner will be able to– <b>CO1:</b> Have an understanding of environmental pollution and the science behind those problems and potential solutions. <b>CO2:</b> Have knowledge of various acts and laws and will be able to identify the industries that are violating these rules. <b>CO3:</b> Assess the impact of ever increasing human population on the biosphere: social, economic issues and role of humans in conservation of natural resources. <b>CO4:</b> Learn skills required to research and analyze environmental issues scientifically and learn how to use those skills in applied situations such as careers that may involve environmental problems and/or issues.		
Course Contents		
<b>Unit V</b>	<b>Environmental Pollution</b>	<b>(08 Hrs)</b>
Environmental pollution : types, causes, effects and controls; Air, water, soil, chemical and noise pollution		
Nuclear hazards and human health risks		
Solid waste management: Control measures of urban and industrial waste		



Pollution case studies.

**Unit VI Environmental Pollution (07 Hrs)**

Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities & agriculture. Environment Laws : Environment Protection Act; Air (Prevention & Control of Pollution) Act; Water (Prevention and control of Pollution) Act; Wildlife protection Act; Forest Conservation Act; International agreements; Montreal and Kyoto Protocols and conservation on Biological Diversity (CBD). The Chemical Weapons Convention (CWC). Nature reserves, tribal population and rights, and human, wildlife conflicts in Indian context

**Unit VII Human Communities and the Environment (06 Hrs)**

Human population and growth; Impacts on environment, human health and welfares. Carbon foot-print. Resettlement and rehabilitation of project affected persons; case studies. Disaster management: floods earthquakes, cyclones and landslides. Environmental movements: Chipko, Silent valley, Bishnios of Rajasthan. Environmental ethics: Role of Indian and other religions and cultures in environmental conservation. Environmental communication and public awareness, case studies (e.g., CNG vehicles in Delhi).

**Unit VIII Field work (05 Hrs)**

- Visit to an area to document environmental assets; river/forest/flora/fauna, etc.
- Visit to a local polluted site – Urban/Rural/Industrial/Agricultural.
- Study of common plants, insects, birds and basic principles of identification.
- Study of simple ecosystems-pond, river Delhi Ridge, etc

**Suggested Readings:**

1. Carson, R. 2002. Silent spring. Houghton Mifflin Harcourt.
2. Gadgil, M., & Guha, R. 1993. This Fissured Land: An Ecological History of India. Univ. of California Press.
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**Savitribai Phule Pune University, Pune**  
**Second Year Civil Engineering (2019 Pattern)**  
**Road Safety Management**  
**Audit Course I**

**Teaching Scheme:**

Practical: 01 hrs/week

**(Certificate to be issued by institute based on performance assessment)**

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 implementation of regulations have 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 strict 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, as also in India. It is, therefore, essential to take new initiatives in raising awareness, skill and knowledge of students as one of the important 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.

**Course Objectives:**

1. To provide basic overview on road safety & traffic management issues in view of the alarming increase in vehicular population of the country.
2. To explain the engineering & legislative measures for road safety.
3. To discuss measures for improving road safety education levels among the public.

**Course Outcomes:**

On completion of the course, learners will be able to...

**CO1:** Summarize the existing road transport scenario of our country

**CO2:** Explain the method of road accident investigation

**CO3:** Describe the regulatory provisions needed for road safety

**CO4:** Identify the safety issues for a road and make use of IRC's road safety manual for conducting road safety audit.

**Course Contents (During 1hr Practical Session per week)**

**Unit I: Existing Road Transport Scenario**

**(02 Hours.)**

Introduction, national & international statistics related to road transport. Factors responsible for increase in vehicle growth. Share of public transport: importance and current scenario (national & international)

Suggestion for effective content delivery: Displaying updated and authentic statistics & real time scenario images during the session.

**Unit II: Road Accidents & its Investigation**

**(03 Hours.)**

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Definition of road accident. National & international statistics related to road accidents. Causes of road accident. Remedies / Measures for control road accidents. Methods for accident investigation. Condition diagram & collision diagram. Black spots & its identification based on accident data.

Suggestion for effective content delivery:

i.] Activity related to drawing condition & collision diagram based on actual accident data. ii.]

Activity related to identification of black spots based on actual accident data

**Unit III: Motor Vehicle Act & Central Motor Vehicle Rules**

**(03 Hours.)**

The Motor Vehicle Act of 1988. Central Motor Vehicle Rules (CMVR) of 1989. Amendments to CMVR – 2017 & 2019.

Suggestion for effective content delivery:

i.] Guest lecture by RTO Officer / Traffic Police Officer.

ii.] Public awareness campaign

**Unit IV: Road Safety Audit (RSA)**

**(04 Hours.)**

Introduction & importance of RSA. Methodology, phases and checklists for Road Safety Audit as per IRC SP: 88 – 2010 (Manual on Road Safety Audit)

Suggestion for effective content delivery:

Mini project – Conducting Road Safety Audit on minimum 2 km (both directions included) road stretch in the nearby vicinity.

**Guidelines for Conduction (Any one or more of following but not limited to)**

1. Guest Lectures.
2. Visits and reports.
3. Assist government authorities like Municipal corporations, RTO in Road Safety Audits
4. Mini Project

**Guidelines for Assessment (Any one or more of following but not limited to)**

1. Written Test
2. Practical Test
3. Presentation
4. Report



**Savitribai Phule Pune University, Pune**  
**Second Year Civil Engineering (2019 Pattern)**  
**Awareness to Civil Engineering Practices**  
**Audit Course I**

**Teaching Scheme:**

Practical: 01 hrs/week

**(Certificate to be issued by institute based on performance assessment)**

Civil Engineering is the oldest engineering profession comprising of a variety of sub-disciplines such as Structural Engineering, Geotechnical, Water resources, Environmental Engineering, Construction technology, Transportation Engineering etc. Undergraduate programs are designed with different theoretical approaches on the application of basic sciences to solve different societal problems by engineering knowledge. However, there is a need to make the students aware about how the Civil Engineering industry operates and how theories taught in different courses are applied in practice. The students can learn from the experience gained from different workplaces such as Civil Engineering consultancies, contracting companies, construction sites etc. The course aims to provide insight of the different practices followed by the industry such as use of different documents & contracts in Civil Engineering practice, drawings required, engineering ethics, duties and responsibilities of the engineers, site records and diaries, health and safety practices on site.

**Course Objectives:**

1. To provide basic overview of functioning of different Civil Engineering related industries / firms.
2. To create awareness about application of different drawings, contract documents in Civil Engineering.
3. To provide insight of code of ethics, duties and responsibilities, health and safety as a Civil Engineer.

**Course Outcomes:**

On completion of the course, learner will be able to...

**CO1:** Describe functioning/working of different types of industries/sectors in Civil Engineering.

**CO2:** Describe drawings and documents required and used in different Civil Engineering works.

**CO3:** Understand the importance of Code of Ethics to be practiced by a Civil Engineer and also understand the duties and responsibilities as a Civil Engineer.

**CO4:** Understand different health and safety practices on the site.

**Course Contents (During 1hr. Practical Session per week)**

**Unit I: Sectors in Civil Engineering**

**(03 Hours.)**

Details of different Sectors/sub-disciplines in Civil Engineering along with the following details: description, eminent institutes in India & abroad, related research institutes, noteworthy projects, higher education, latest & ongoing research in the domain, jobs opportunities in government as well as private sector.

Suggestion for effective content delivery:

Lecture cum interaction by alumni of your college working in different sectors of Civil Engineering

**Unit II: Drawings and Documents**

**(03 Hours.)**

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Types of drawings in different construction projects. Contract agreement & other documents in different construction projects.

Suggestion for effective content delivery:

i.] Visit to various construction sites/ architectural firms/ structural engineering firms etc. to understand drawings, documents & working culture.

ii.] Lecture by professional practitioner

### **Unit III: Engineering Ethics**

**(03 Hours.)**

Introduction, moral issues and moral dilemmas. Code of ethics in Civil Engineering followed by Construction Industry Development Council (CIDC) of India, national & international associations and institutes. Effective case studies (Minimum 2 case studies).

Suggestion for effective content delivery:

Case study based content delivery method, Lecture by professional practitioner

### **Unit IV: Construction Site Safety**

**(03 Hours.)**

Importance of site safety. Different health and safety parameters during actual execution of Civil Engineering constructions. Safety measures: conventional and modern.

Suggestion for effective content delivery:

On site visit & lecture by professional practicing Safety Engineer.

### **Guidelines for Assessment (Any one or more of following but not limited to)**

1. Group discussion
2. Presentation
3. Mini Project / Activity
4. Site visit report
5. Guest lecture report



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2. Business Communication, P.D. Chaturvedi, Pearson Education
3. Business Communication, T N Chhabra, Bhanu Ranjan, Sun India
4. Verbal and Non-Verbal Reasoning, Prakash, P, Macmillan India Ltd., New Delhi
5. Objective English, Thorpe, E, and Thorpe, S, Pearson Education, New Delhi

**Suggested Reference Books:**

1. Communication Skills for Effective Management, Hargie et. al., Palgrave
2. Communication for Business, Tayler Shinley, Pearson Education
3. Technical Communication, Anderson, P.V, Thomson Wadsworth, New Delhi
4. The Oxford Guide to Writing and Speaking, John Seely, Oxford University Press, New Delhi
5. Dictionary of Common Errors, Turton, N.D and Heaton, J.B, Addison Wesley Longman Ltd.

Semester I		114 - Enterprise Analysis - Desk Research
2 Credits	LTP: 0:3:1	Generic Elective – Institute Level

**Course Outcomes: On successful completion of the course the learner will be able to**

CO#	COGNITIVE ABILITIES	COURSE OUTCOMES
CO114.1	REMEMBERING	DESCRIBE the key historical, organizational, market related, financial, governance, leadership and social responsibility dimensions of a real world business organization.
CO114.2	UNDERSTANDING	SUMMARIZE the regional, national and global footprint of a real world business organization.
CO114.3	APPLYING	DEMONSTRATE the use of secondary – offline and online resources to profile a real world business organization.
CO114.4	ANALYSING	ANALYSE, using tables and charts, the trends in market standing and financial performance of a real world business organization over the last 5 years.
CO114.5	EVALUATING	COMPOSE a succinct summary of future plans of a real world business organization the company website, shareholders reports and other information available in the public domain.
CO114.6	CREATING	IMAGINE the key challenges and opportunities for a real world business organization in the immediate future (1 to 3 years).

1. **Enterprise History & Background:** Establishment, Original & Current Promoters, Business Group or Business Family to which it belongs, Vision-Mission-Philosophy – Values-Quality Policy, Brief profiles of the Chairman, CEO, MD, Members of Board of Directors along with their career highlights CSR Initiatives, Technical and other collaborations if any, Recent Mergers and Acquisitions, if any. (6)
2. **Organization :** Organization Structure, Geographical (domestic and global) foot print – at the time of inception and spread over the years, company's current head quarter worldwide as well as head quarter / corporate office in India, Manufacturing /Service locations Indian and major worldwide, Certifications if any - ISO / EMS / FDA / CMMI , etc. Online presence. Initiatives towards gender diversity, Initiatives towards social inclusion, Initiatives towards environment conservation. Current Talent needs. Key highlights of the company's website. (6)
3. **Markets:** Major Customers, customer segments, Products, Product lines, Major Brands, Market Share – nationally, region wise, product wise, Advertising Agency, Advertising Punch Line/Slogan, Logo, Key Alliances in the past 5 years & impact. Mergers & Acquisitions, if any. Technological developments. Disruptive innovations affecting the organization. Labour unrest if any – reasons thereof and impact. Emerging potential competition through first generation entrepreneurs or global / local players. (6)
4. **Financials:** Data to be studied, tabulated, graphically depicted, analyzed and presented for last 5 years for the Revenues, Profitability, Market Capitalization, Segmented Revenues, Auditors. Listing status & Scrip Codes – BSE and NSE, Global Listings on International Stock Markets, Share Price Face Value, Current Market Value, Annual High Low Figures, P/E Ratio, Shareholding Pattern. (6)
5. **Governance:** Philosophy, Action taken by SEBI if any, Involvement in Scams, Insider Trading Issues, Standard & Poor's Corporate Governance Scores, CRISIL Rating. Major Awards and Achievements of the Organization in the last 5 years. Forward looking statements of the top management. (6)

**Note:**

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