In addition to credits, it is recommended that there should be audit course in preferably in each semester from second year to supplement knowledge and skills. A student will be awarded the bachelor’s degree if he/she earns 190 credits and clears all the audit courses specified in the syllabus. The student will be awarded grade as AP on successful completion of audit course. The student may opt for one of the audit courses per semester, starting from second year first semester. Though not mandatory, such a selection of the audit courses helps the learner to explore the subject of interest in greater details resulting in achieving the very objective of audit course's inclusion. List of options offered is provided. Each student has to choose one audit course from the list per semester. Evaluation of audit course will be done at institute level itself. Method of conduction and method of assessment for audit courses are suggested.

**Criteria:**

The student registered for audit course shall be awarded the grade AP (Audit Course Pass) and shall be included such AP grade in the Semester grade report for that course, provided student has the minimum attendance as prescribed by the Savitribai Phule Pune University and satisfactory in-semester performance and secured a passing grade in that audit course. No grade points are associated with this 'AP' grade and performance in these courses is not accounted in the calculation of the performance indices SGPA and CGPA. Evaluation of audit course will be done at institute level itself. (Ref- http://www.unipune.ac.in/Syllabi_PDF/revised-2015/engineering/UG_RULE_REGULATIONS_FOR_CREDIT_SYSTEM-2015_18June.pdf)

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

- Lectures/ Guest Lectures
- Visits (Social/Field) and reports
- Demonstrations

- Surveys
- Mini Project
- Hands on experience on specific focused topic

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

- Written Test
- Demonstrations/ Practical Test
- Presentations

- IPR/Publication
- Report

**Audit Course 1 Options**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Audit Course Title</th>
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<tbody>
<tr>
<td>AC1-I</td>
<td>Road Safety</td>
</tr>
<tr>
<td>AC1-II</td>
<td>Humanities and Social Sciences</td>
</tr>
<tr>
<td>AC1-III</td>
<td>Environmental Studies</td>
</tr>
<tr>
<td>AC1-IV</td>
<td>Smart Cities</td>
</tr>
<tr>
<td>AC1-V</td>
<td>Foreign Language (one of Japanese/Spanish/French/German). Course contents for Japanese (Module 1) are provided. For other languages institute may design suitably.</td>
</tr>
</tbody>
</table>
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, as also 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.

**Course Contents:**

1. Existing Road Transport Scenario
2. Accident Causes & Remedies
3. Road Accident Investigation & Investigation Methods
4. Vehicle Technology – CMVR & Road Safety
5. Regulatory / Legislative Provisions for Improving Road Safety
6. Behavioral Training for Drivers for Improving Road Safety
7. Road Safety Education
8. Road Engineering Measures for Improving Road Safety

**References:**

3. Road User’s Handbook, ROADS & MARITIME PUBLICATIONS
4. "Improving Road Safety in Developing Countries”, The national Academic Press
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 and the 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.

Course Objectives:
- Human and social development;
- Contemporary national and international affairs;
- Emergence of Indian society and Economics

Course Outcomes:
On completion of the course, student will be able to–
- Making engineering and technology students aware of the various issues concerning man and society.
- These issues will help to sensitize students to be broader towards the social, cultural, economic and human issues, involved in social changes
- Able to understand the nature of the individual and the relationship between the self and the community
- Understanding major ideas, values, beliefs, and experiences that have shaped human history and cultures

Course Contents


**References:**

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 aspects of environmental issues.

**Course Objectives:**
- Understanding the importance of ecological balance for sustainable development.
- Understanding the impacts of developmental activities and mitigation measures.
- Understand and realize the multi-disciplinary nature of the environment, its components, and inter-relationship between man and environment.
- Understand the relevance and importance of the natural resources in the sustenance of life on earth and living standard.

**Course Outcomes:**
On completion of the course, student will be able to—
- Comprehend the importance of ecosystem and biodiversity
- To correlate the human population growth and its trend to the environmental degradation and develop the awareness about his/her role towards environmental protection and prevention
- Identify different types of environmental pollution and control measures
- To correlate the exploitation and utilization of conventional and non-conventional resources

**Course Contents:**

1. **Natural Resources:** Introduction, Renewable and non-renewable, Forest, water, mineral, food, energy and land resources, Individual and conservation of resources, Equitable use of resources.
2. **Ecosystems:** Concept, Structure, Function, Energy flow, Ecological succession, Forest, grassland, desert and aquatic ecosystems - Introduction, characteristic features, structure and function.
3. **Biodiversity:** Genetic, Species and ecological diversity, Biogeographical classification of India, Value and hot spots, Biodiversity at global, national and local levels, India as mega-biodiversity nation, Threats to biodiversity, Endangered and endemic species of India, Conservation of Biodiversity, Endangered and endemic species, Conservation of biodiversity.
4. **Pollution:** Definition, Causes, effects and control measures of the pollution – Air, soil, Noise, Water, Marine and Thermal and Nuclear Pollution, Solid waste management, Role of Individual in Prevention of Pollution, Pollution case studies, Disaster management

**References:**
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 us to 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.

Course Objectives:
- To identify urban problems
- To study effective and feasible ways to coordinate urban technologies.
- To study models and methods for effective implementation of Smart Cities.
- To study new technologies for Communication and Dissemination.
- To study new forms of Urban Governance and Organization.

Course Outcomes:
On completion of the course, learner will be able to–
- Better understanding of the dynamic behavior of the urban system by going beyond the physical appearance and by focusing on representations, properties and impact factors
- Exploration of the city as the most complex human-made organism with a metabolism that can be modeled in terms of stocks and flows
- Knowledge about data-informed approaches for the development of the future city, based on crowd sourcing and sensing
- Knowledge about the latest research results in for the development and management of future cities
- Understanding how citizens can benefit from data-informed design to develop smart and responsive cities

Course Contents:
Urbanization and Ubiquity - The slow emergence of learning cities in an urbanizing world. Cities as collective learners, what do we know? - Framing a view - A gamut of learning types - Secrets of knowing and accelerating change - Why some cities learn and others do not.

References:
**Savitribai Phule Pune University**  
**Second Year of Computer Engineering (2015 Course)**  
**210250: Audit Course 1**  
**AC1-V: Foreign Language- Japanese (Module 1)**

**About course:**
With changing times, the competitiveness has gotten into the nerves and 'Being the Best' at all times is only the proof of it. Nonetheless, 'Being the best' differs significantly from 'Communicating the best'. The best can merely be communicated whilst using the best suited Language!

Japanese is the new trend of 21st century. Not only youngsters but even the professionals seek value in it. It is the engineer’s companion in current times with an assertion of a thriving future. Pune has indisputably grown to become a major center of Japanese Education in India while increasing the precedence for Japanese connoisseurs.

Japanese certainly serves a great platform to unlock a notoriously tough market & find a booming career. While the companies prefer candidates having the knowledge of the language, it can additionally help connect better with the native people thus prospering in their professional journey. Learning Japanese gives an extra edge to the ‘resume’ since the recruiters consciously make note of the fact it requires real perseverance and self-discipline to tackle one of the most complex languages.

It would be easy for all time to quit the impossible; however it takes immense courage to reiterate the desired outcomes, recognize that improvement is an ongoing process and ultimately soldier on it. The need of an hour is to introduce Japanese language with utmost professionalism to create awareness about the bright prospects and to enhance the proficiency and commitment. It will then prove to be the ultimate path to the quest for professional excellence!

**Course Objectives:**
- To meet the needs of ever growing industry with respect to language support.
- To get introduced to Japanese society and culture through language.

**Course Outcomes:**
On completion of the course student
- will have ability of basic communication.
- will have the knowledge of Japanese script.
- will get introduced to reading, writing and listening skills
- will develop interest to pursue professional Japanese Language course.

**Course Contents:**

<p>| | |</p>
<table>
<thead>
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<tbody>
<tr>
<td>1</td>
<td>Introduction to Japanese Language. Hiragana basic Script, colors, Days of the week</td>
</tr>
</tbody>
</table>
| 2 | Hiragana : modified Kana, double consonant, Letters combined with ya, yu, yo  
   | Long vowels, Greetings and expressions |
| 3 | Self Introduction, Introducing other person, Numbers, Months, Dates, Telephone numbers,  
   | Stating one’s age. |

**References:**
2. [http://www.tcs.com](http://www.tcs.com/news_events/press_releases/Pages/TCS-Inaugurates-Japan-centric-Delivery-Center-Pune.aspx)
In addition to credits, it is recommended that there should be audit course in preferably in each semester from second year to supplement their knowledge and skills. Student will be awarded the bachelor’s degree if he/she earns 190 credits and clears all the audit courses specified in the syllabus. The student will be awarded grade as AP on successful completion of audit course.

The student may opt for one of the audit courses per semester, starting in second year first semester. Though not mandatory, such a selection of the audit courses helps the learner to explore the subject of interest in greater detail resulting in achieving the very objective of audit course's inclusion. List of options offered is provided. Each student has to choose one audit course from the list per semester. Evaluation of audit course will be done at institute level itself. Method of conduction and method of assessment for audit courses are suggested.

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

- Lectures/ Guest Lectures
- Visits (Social/Field) and reports
- Demonstrations

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

- Written Test
- Demonstrations/ Practical Test
- Presentations

- Surveys
- Mini Project
- Hands on experience on specific focused topic

- IPR/Publication
- Report

**Audit Course 2 Options**

<table>
<thead>
<tr>
<th>Audit Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>AC2-I</td>
<td>Water Management</td>
</tr>
<tr>
<td>AC2-II</td>
<td>Intellectual Property Rights and Patents</td>
</tr>
<tr>
<td>AC2-III</td>
<td>The Science of Happiness</td>
</tr>
<tr>
<td>AC2-IV</td>
<td>Stress Relief: Yoga and Meditation</td>
</tr>
<tr>
<td>AC2-V</td>
<td>Foreign Language (one of Japanese/Spanish/French/German) Course contents for Japanese( Module 2) are provided. For other languages institute may design suitably.</td>
</tr>
</tbody>
</table>
Water is a vital resource for all life on the planet. Only three percent of the water resources on Earth are fresh and two-thirds of the freshwater is locked up in ice caps and glaciers. One fifth of the remaining one percent is in remote, inaccessible areas. As time advances, water is becoming scarcer and having access to clean, safe, drinking water is limited among countries. Pure water supply and disinfected water treatment are prerequisites for the well-being of communities all over the world. One of the biggest concerns for our water-based resources in the future is the sustainability of the current and even future water resource allocation. This course will provide students a unique opportunity to study water management activities like planning, developing, distributing and optimum use of water resources. This course covers the topics that management of water treatment of drinking water, industrial water, sewage or wastewater, management of water resources, management of flood protection.

Course Objectives:
- To develop understanding of water recourses.
- To study global water cycle and factors that affect this cycle.
- To analyze the process for water resources and management.
- To study the research and development areas necessary for efficient utilization and management of water recourses.

Course Outcomes:
On completion of the course, learner will be able to–
- Understanding of the global water cycle and its various processes
- Understanding of climate change and their effects on water systems
- Understanding of Drinking treatment and quality of groundwater and surface water
- Understanding of the Physical, chemical, and biological processes involved in water treatment and distribution.

Course Contents:
1. Understanding ‘water’-Climate change and the global water cycle, Understanding global hydrology
2. Water resources planning and management-Water law and the search for sustainability: a comparative analysis, Risk and uncertainty in water resources planning and management
3. Agricultural water use -The role of research and development for agriculture water use
4. Urban water supply and management - The urban water challenge, Water sensitive urban design

References:
**Savitribai Phule Pune University**  
Second Year of Computer Engineering (2015 Course)  
210258: Audit Course 2  
AC2-II: Intellectual Property Rights and Patents

Intellectual property is the area of law that deals with protecting the rights of those who create original works. It covers everything from original plays and novels to inventions and company identification marks. The purpose of intellectual property laws is to encourage new technologies, artistic expressions and inventions while promoting economic growth.

Innovation and originality have great potential value. Whatever line of activity you are engaged in, future success depends on them. The last few years have seen intellectual property rights become an issue of general interest: the smart phone “patent wars”, the introduction of Digital Rights management (DRM) and the rise of generic pharmaceuticals and open-source software are just some examples that have been in the public eye. Protecting your intellectual rights appropriately should be a top priority. Yet too many people embark on their chosen professions without even a basic awareness of intellectual property.

**Course Objectives:**
- To encourage research, scholarship, and a spirit of inquiry
- To encourage students at all levels to develop patentable technologies.
- To provide environment to the students of the Institute for creation, protection, and commercialization of intellectual property and to stimulate innovation.

**Course Outcomes:**
On completion of the course, learner will be able to—
- Understand the fundamental legal principles related to confidential information, copyright, patents, designs, trademarks and unfair competition
- Identify, apply and assess principles of law relating to each of these areas of intellectual property
- Apply the appropriate ownership rules to intellectual property you have been involved in creating

**Course Contents:**
- **Introduction to Intellectual Property Law** – The Evolutionary Past - The IPR Tool Kit- Para -Legal Tasks in Intellectual Property Law
- **Introduction to Trade mark** – Trade mark Registration Process – Post registration Procedures – Trade mark maintenance - Transfer of Rights – Inter partes Proceeding – Infringement - Dilution Ownership of Trade mark
- **Introduction to Copyrights** – Principles of Copyright Principles -The subjects Matter of Copy right – The Rights Afforded by Copyright Law – Copy right Ownership, Transfer and duration – Right to prepare Derivative works
- **Introduction to Trade Secret** – Maintaining Trade Secret – Physical Security – Employee Limitation - Employee confidentiality agreement

**References:**
### Savitribai Phule Pune University  
Second Year of Computer Engineering (2015 Course)  
210258: Audit Course 2  
AC2-III : The Science of Happiness

Everybody wants to be happy. One can explore innumerable ideas about what happiness is and how we can get some. But not many of those ideas are based on science. That's where this course comes in. The “Science of Happiness” aims to teach the pioneering science of positive psychology, which explores the ancestry of a happy and meaningful life. Clinical psychologists have been dealing with miserable feelings since their discipline was established. In the last 30 years, neuroscientists have made major headway in the understanding of the sources of anger, depression, and fear. Today, whole industries profit from this knowledge—producing pills for every sort of pathological mood disturbance. But until recently, few neuroscientists focused on the subject of happiness. This course focuses on discovering how cutting-edge research can be applied to their lives. Students will learn about the Intra-disciplinary research supporting this view, spanning the fields of psychology, neuroscience, evolutionary biology, and beyond. The course offers students practical strategies for tapping into and nurturing their own happiness, including trying several research-backed activities that foster social and emotional well-being, and exploring how their own happiness changes along the way.

### Course Objectives:
- To understand the feeling of happiness  
- To study the sources of positive feelings  
- To analyze the anatomy of the happiness system  
- To study the effect of thoughts and emotions on the happiness system

### Course Outcomes:
On completion of the course, learner will be able to—
- Ability to understand what happiness is and why it matters to you  
- Ability to learn how to increase your own happiness  
- Understanding of the power of social connections and the science of empathy  
- Ability to understand what is mindfulness and its real world applications

### Course Contents:

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<tbody>
<tr>
<td>3. The autonomy of positive feelings</td>
<td>4. Positive feelings as a compass</td>
</tr>
<tr>
<td>5. The happiness system</td>
<td>6. Foundations: Emotions, Motivation and nature of Well being</td>
</tr>
<tr>
<td>7. Subjective well being</td>
<td>8. Love and well being</td>
</tr>
<tr>
<td>9. Optimal well being</td>
<td>10. Religion, Spirituality and well being</td>
</tr>
</tbody>
</table>

### References:
The concepts and practices of Yoga originated in India about several thousand years ago. Its founders were great Saints and Sages. The great Yogis presented rational interpretation of their experiences of Yoga and brought about a practical and scientifically sound method within every one’s reach. Yoga today, is no longer restricted to hermits, saints, and sages; it has entered into our everyday lives and has aroused a worldwide awakening and acceptance in the last few decades. The science of Yoga and its techniques have now been reoriented to suit modern sociological needs and lifestyles.

Yoga is one of the six systems of Vedic philosophy. The Yoga advocates certain restraints and observances, physical discipline, breathe regulations, restraining the sense organs, contemplation, meditation and Samadhi. The practice of Yoga prevents psychosomatic disorders and improves an individual’s resistance and ability to endure stressful situations.

**Course Objectives:**

- To impart knowledge about the basic technique and practice of yoga, including instruction in breath control, meditation, and physical postures
- To gain an intellectual and theoretical understanding of the principles embodied in the Yoga Sutras, the Bhagavad-Gita, and other important texts and doctrines
- Relaxation and stress reduction, Personal insight and self understanding, Personal empowerment, Gaining wisdom and spiritual discernment
- Awakening the abilities or powers of the Super conscious mind

**Course Outcomes:**

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

- Students understanding of philosophy and religion as well as daily life issues will be challenged and enhanced.
- Enhances the immune system.
- Intellectual and philosophical understanding of the theory of yoga and basic related Hindu scriptures will be developed.
- Powers of concentration, focus, and awareness will be heightened.

**Course Contents:**

1. Meaning and definition of yoga – Scope of Yoga – Aims and Objectives of Yoga – Misconception about yoga.
2. Ayurveda: an introduction to this system of health care derived from the Vedic tradition Anatomy and Physiology as they relate to Yoga
3. Yoga Philosophy and Psychology

**References:**

With changing times, the competitiveness has gotten into the nerves and ‘Being the Best’ at all times is only the proof of it. Nonetheless, ‘being the best’ differs significantly from ‘Communicating the best’. The best can merely be communicated whilst using the best suited Language!!

**Course Objectives:**
- To meet the needs of ever growing industry with respect to language support.
- To get introduced to Japanese society and culture through language.

**Course Outcomes:**
On completion of the course student-
- will have ability of basic communication.
- will have the knowledge of Japanese script.
- will get introduced to reading, writing and listening skills for language Japanese.
- will develop interest to pursue professional Japanese Language course.

**Course Contents:**
- Katakana basic Script, Denoting things (nominal & prenominal demonstratives), Purchasing at the Market / in a shop / mall (asking & stating price)

- Katakana : Modified kana, double consonant, letters with ya, yu, yo, Long vowels, Describing time, describing starting & finishing time (kara ~ made), Point in time (denoting the time when any action or the movement occurs)

- Means of transport (Vehicles), Places, Countries, Stating Birth date, Indicating movement to a certain place by a vehicle

**References:**
2. [http://www.tcs.com](http://www.tcs.com/news_events/press_releases/Pages/TCS-Inaugurates-Japan-centric-Delivery-Center-Pune.aspx)