

SAVITRIBAI PHULE PUNE UNIVERSITY



Board of Studies in Civil Engineering

Structure and Syllabus for B.E. Civil 2015 Course (w. e. f. June, 2018)



SAVITRIBAI PHULE PUNE UNIVERSITY
Board of Studies in Civil Engineering
Structure for B.E. Civil 2015 Course (w. e. f. June 2018)

Semester-I											
Subject code	Subject	Teaching Scheme Hrs/Week			In-Semester Assessment	TW	Pract /Or	End- Semester Exam	Total	Credit	
		Lect	Tu	Pr						Th	Lab
401 001	Environmental Engineering II	3	--	2	30	--	50	70	150	3	1
401002	Transportation Engineering	3	--	2	30	50	--	70	150	3	1
401 003	Structural Design and Drawing III	4	--	2	30	--	50	70	150	4	1
401 004	Elective I	3	--	2	30	50	--	70	150	3	1
401 005	Elective II	3	--	--	30	--	--	70	100	3	--
401 006	Project (Phase-I)	--	2	--	--	--	50	--	50	--	2
Total :		16	2	8	150	100	150	350	750	16	6
										22 Credits	

Semester-II											
Subject code	Subject	Teaching Scheme Hrs/Week			In-Semester Assessment	TW	Or	End- Semester Exam	Total	Credit	
		Lect	Tu	Pr						Th	Pr
401 007	Dams and Hydraulic Structures	3	--	2	30	--	50	70	150	3	1
401008	Quantity Surveying, Contracts and tenders	3	--	2	30	--	50	70	150	3	1
401 009	Elective III	3	--	2	30	50	--	70	150	3	1
401 010	Elective IV	3	--	2	30	50	--	70	150	3	1
401 006	Project	--	6	--	--	50	100	--	150	--	6
Total :		12	6	8	120	150	200	280	750	12	10
										22 Credits	

Following will be the list of electives.

Semester I

Elective-I 401 004	Elective-II 401 005
1. Structural Design of Bridges	1. Matrix Methods of Structural Analysis
2. Systems Approach in Civil Engineering	2. Integrated Water Resources Planning and Management
3. Advanced Concrete Technology	3. TQM & MIS in Civil Engineering
4. Architecture and Town Planning	4. Earthquake Engineering
5. Advanced Engineering Geology with Rock Mechanics	5. Advanced Geotechnical Engineering

Semester-II

Elective-III 401 009	Elective-IV 401 010
1. Advanced Structural Design	1. Construction Management
2. Statistical Analysis and Computational Methods in Civil Engineering	2. Advanced Transportation Engineering
3. Hydropower Engineering	3. Advanced foundation Engineering.
4. Air Pollution and control	4. Coastal Engineering
5. Finite Element Method in Civil Engineering	5. Open Elective
6. Airport and Bridge Engineering	a) Plumbing Engineering
	b) Green Building Technology
	c) Ferrocement Technology
	d) Sub sea Engineering
	e) Geoinformatics

Savitribai Phule University of Pune

M. E. Civil (Structures)

COURSE STRUCTURE (2017Course)

(w.e.f. June 2017)

University of Pune, Document on Rules and Regulation for P.G. Courses be referred for the detailed information

SEMESTER I

Code	Subject	Teaching scheme	Examination scheme					Credit
		Lect / practical	Paper		TW	Oral / presentation	Total	
			In Sem	End Sem				
501001	Theory of Elasticity & Plasticity	04	50	50	--	--	100	04
501002	Structural Dynamics	04	50	50	--	--	100	04
501003	Advanced Design of Steel Structures	04	50	50	--	--	100	04
501004	Numerical Methods in Structural Engineering	04	50	50	--	--	100	04
501005	Elective I	05	50	50	--	--	100	05
501006	Lab Practice I	04	--	--	50	50	100	04
Total		25	250	250	50	50	600	25

SEMESTER II

Code	Subject	Teaching scheme	Examination scheme					Credit
		Lect / practical	Paper		TW	Oral / presentation	Total	
			In Sem	End Sem				
501007	Finite Element Method	04	50	50	--	--	100	04
501008	Theory of Plates & Shells	04	50	50	--	--	100	04
501009	Advanced Design of Concrete Structures	04	50	50	--	--	100	04
501010	Elective II	05	50	50	--	--	100	05
501011	Lab Practice II	04	--	--	50	50	100	04
501012	Seminar I	04	--	--	50	50	100	04
Total		25	200	200	100	100	600	25

SEMESTER III

Code	Subject	Teaching scheme	Examination scheme					Credit	
			Lect/practical	Paper		TW	Oral/presentation		Total
				In Sem	End Sem				
601013	Research Methodology	04	50	50	--	--	100	04	
601014	Analysis and Design of Earthquake Resistant Structures	04	50	50	--	--	100	04	
601015	Elective III	05	50	50	--	--	100	05	
601016	Seminar II	04	--	--	50	50	100	04	
601017	Project Stage I	08	--	--	50	50	100	08	
Total		25	150	150	100	100	500	25	

SEMESTER IV

Code	Subject	Teaching scheme	Examination scheme					Credit
		Lect/practical	Paper		TW	Oral/presentation	Total	
			In Sem	End Sem				
601018	Seminar III	05	--	--	50	50	100	05
601019	Project Stage II	20	--	--	150	50	200	20
Total		25	--	--	200	100	300	25

Note: The Contact Hours for the calculation of load of teacher: Seminar - 1 hr /week/student &

Project - 2 hr/week/ student

**Faculty of Engineering
Savitribai Phule Pune University, Pune
Maharashtra, India**



**Syllabus
for
Fourth Year of Computer Engineering
(2015 Course)
(with effect from 2018-19)**

Prologue

It is with great pleasure and honor that I share the syllabi for Fourth Year of Computer Engineering (2015 Course) on behalf of Board of Studies (BoS), Computer Engineering. We, members of BoS are giving our best to streamline the processes and curricula design at both UG and PG programs.

It is always the strenuous task to balance the syllabus with the blend of core subjects, current developments and exotic subjects. By considering all the aspects with adequate prudence the contents are designed to make the graduate competent enough as far as employability is concerned. It is absolutely necessary and justified to add sufficient flexibility in the given constraints leading the curriculum design near to perfection.

It may be highly subjective to include or exclude the courses, but benefit of the learner is always the nucleus the process. Many thoughts, suggestions, recommendations and directions help us to come up with the final contents. For the final year finishing touch is absolutely necessary which is provided with project based learning at the most.

I sincerely thank all the minds and hands who work adroitly to materialize these tasks. I really appreciate everyone's contribution and suggestions in finalizing the contents.

Dr. Varsha H. Patil

Coordinator, Board of Studies (Computer Engineering), SPPU, Pune

[This document contents Program Educational Objectives - Program Outcomes - Program Specific Outcomes(page 3),Courses (teaching scheme, examination, marks and credit)(page 4-5), Courses syllabi(page 7-85) and FE to BE courses at a glance(Page 86-87)].

Other related Syllabus Links:

[Syllabus for First Year Engineering \(2015 Course\)](#)

[Syllabus for Second Year Computer Engineering \(2015 Course\)](#)

[Syllabus for Third Year Computer Engineering \(2015 Course\)](#)

Savitribai Phule Pune University, Pune

Bachelor of Computer Engineering

Program Educational Objectives

1. To prepare globally competent graduates having strong fundamentals, domain knowledge, updated with modern technology to provide the effective solutions for engineering problems.
2. To prepare the graduates to work as a committed professional with strong professional ethics and values, sense of responsibilities, understanding of legal, safety, health, societal, cultural and environmental issues.
3. To prepare committed and motivated graduates with research attitude, lifelong learning, investigative approach, and multidisciplinary thinking.
4. To prepare the graduates with strong managerial and communication skills to work effectively as individual as well as in teams.

Program Outcomes

Students are expected to know and be able –

1. To apply knowledge of mathematics, science, engineering fundamentals, problem solving skills, algorithmic analysis and mathematical modeling to the solution of complex engineering problems.
2. To analyze the problem by finding its domain and applying domain specific skills
3. To understand the design issues of the product/software and develop effective solutions with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.
4. To find solutions of complex problems by conducting investigations applying suitable techniques.
5. To adapt the usage of modern tools and recent software.
6. To contribute towards the society by understanding the impact of Engineering on global aspect.
7. To understand environment issues and design a sustainable system.
8. To understand and follow professional ethics.
9. To function effectively as an individual and as member or leader in diverse teams and interdisciplinary settings.
10. To demonstrate effective communication at various levels.
11. To apply the knowledge of Computer Engineering for development of projects, and its finance and management.
12. To keep in touch with current technologies and inculcate the practice of lifelong learning.

Program Specific Outcomes (PSO)

A graduate of the Computer Engineering Program will demonstrate-

PSO1: Professional Skills-The ability to understand, analyze and develop computer programs in the areas related to algorithms, system software, multimedia, web design, big data analytics, and networking for efficient design of computer-based systems of varying.

PSO2: Problem-Solving Skills- The ability to apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success.

PSO3: Successful Career and Entrepreneurship- The ability to employ modern computer languages, environments, and platforms in creating innovative career paths to be an entrepreneur, and a zest for higher studies.

Savitribai Phule Pune University
Fourth Year of Computer Engineering (2015 Course)
(with effect from 2018-19)

Semester I

Course Code	Course	Teaching Scheme Hours / Week		Examination Scheme and Marks						Credit	
		Theory	Practical	In-Sem	End-Sem	TW	PR	OR/*PRE	Total	TH/TUT	PR
410241	High Performance Computing	04	--	30	70	--	--	--	100	04	--
410242	Artificial Intelligence and Robotics	03	--	30	70	--	--	--	100	03	--
410243	Data Analytics	03	--	30	70	--	--	--	100	03	--
410244	Elective I	03	--	30	70	--	--	--	100	03	--
410245	Elective II	03	--	30	70	--	--	--	100	03	--
410246	Laboratory Practice I	--	04	--	--	50	50	--	100	--	02
410247	Laboratory Practice II	--	04	--	--	50	--	*50	100	--	02
410248	Project Work Stage I	--	02	--	--	--	--	*50	50	--	02
Total Credit										16	06
Total		16	10	150	350	100	50	100	750	22	
410249	Audit Course 5										Grade
Elective I				Elective II							
410244 (A) Digital Signal Processing				410245 (A) Distributed Systems							
410244 (B) Software Architecture and Design				410245 (B) Software Testing and Quality Assurance							
410244 (C) Pervasive and Ubiquitous Computing				410245 (C) Operations Research							
410244 (D) Data Mining and Warehousing				410245 (D) Mobile Communication							

410249-Audit Course 5 (AC5) Options:

AC5-I [Entrepreneurship Development](#)

AC5-IV: [Industrial Safety and Environment Consciousness](#)

AC5-II: [Botnet of Things](#)

AC5-V: [Emotional Intelligence](#)

AC5-III: [3D Printing](#)

AC5-VI: [MOOC- Learn New Skills](#)

Abbreviations:

TW: Term Work

TH: Theory

OR: Oral

PR: Practical

Sem: Semester

PRE: Project/ Mini-Project Presentation

Savitribai Phule Pune University
Fourth Year of Computer Engineering (2015 Course)
(with effect from 2018-19)

Semester II

Course Code	Course	Teaching Scheme Hours / Week		Examination Scheme and Marks						Credit	
		Theory	Practical	In-Sem	End-Sem	TW	PR	OR/ *PRE	Total	TH/ TUT	PR
410250	Machine Learning	03	--	30	70	--	--	--	100	03	--
410251	Information and Cyber Security	03	--	30	70	--	--	--	100	03	--
410252	Elective III	03	--	30	70	--	--	--	100	03	--
410253	Elective IV	03	--	30	70	--	--	--	100	03	--
410254	Laboratory Practice III	--	04	--	--	50	50	--	100	--	02
410255	Laboratory Practice IV	--	04	--	--	50	--	*50	100	--	02
410256	Project Work Stage II	--	06	--	--	100	--	*50	150	--	06
Total Credit										12	10
Total		12	14	120	280	200	50	100	750	22	
410257	Audit Course 6										Grade
Elective III						Elective IV					
410252 (A) Advanced Digital Signal Processing						410253 (A) Software Defined Networks					
410252 (B) Compilers						410253 (B) Human Computer Interface					
410252 (C) Embedded and Real Time Operating System						410253 (C) Cloud Computing					
410252 (D) Soft Computing and Optimization Algorithms						410253 (D) Open Elective					

410259-Audit Course 6 (AC6) Options:

AC6-I: [Business Intelligence](#)AC6-IV: [Usability Engineering](#)AC6-II: [Gamification](#)AC6-V: [Conversational Interfaces](#)AC6-III: [Quantum Computing](#)AC6-VI: [MOOC- Learn New Skills](#)

Abbreviations:

TW: Term Work**TH:** Theory**OR:** Oral**PR:** Practical**Sem:** Semester**PRE:** Project/ Mini-Project Presentation

Faculty of Engineering
Savitribai Phule Pune University, Pune



Syllabus

Master of Computer Engineering
(Course 2017)

(with effect from Year 2017-18)

Prologue

It is with great pleasure and honor that I present the syllabus for Master of Computer Engineering (2017 Course) on behalf of Board of Studies (BoS), Computer Engineering. We, members of BoS are giving our best to streamline the processes and curricula design.

While revising syllabus, honest and sincere efforts are put to tune curriculum for post graduate program in Computer Engineering in tandem with the objectives of Higher Education of India, AICTE, UGC and affiliated University- Savitribai Phule Pune University (SPPU) by keeping an eye on the technological advancements and industrial requirements globally.

The basic motives of designing the contents of various courses is to focus on independent learning convergence to special domains, development of research attitude and comprehensive coverage of technologies. Elective courses with choice for module selection provide flexibility and opportunity to explore the domain specific knowledge.

The open elective is to invite the attention to multidisciplinary, interdisciplinary, exotic, employability or update to technology course. The institute may design the syllabus accordingly. However such designed syllabus needs to be approved by SPPU authority before implementation.

While framing each course contents, Course advisor, Course Coordinators and Team Members have put arduous efforts in meeting the standards of the Courses at PG level. Everybody in the team has meticulously stuck to the guidelines and recommendations to materialize the team efforts. The fruition is only due to sincere efforts, active participation, expert opinions and suggestions from domain professionals.

I am sincerely indebted to all the minds and hands who work dexterously and synchronously to materialize the huge task.

Thanks.

Dr. Varsha H. Patil

Coordinator, Board of Studies (Computer Engineering), SPPU, Pune

Tuesday, March 28, 2017. Mail-id: yh_patil2003@yahoo.com

[This document includes Program Educational Objectives - Program Outcomes, Program Specific Outcomes (page 3-4), Semester-wise Courses (teaching scheme, examination, marks and credit) (page 5-6), Courses syllabi (page 7-63)] and Non Credit Course Contents [64-70].

Program Educational Objectives

- PEO1:** To prepare globally competent post graduates with enhanced domain knowledge and skills attaining professional excellence and updated with modern technology to provide effective solutions for engineering and research problems.
- PEO2:** To prepare the post graduates to work as a committed professionals with strong professional ethics and values, sense of responsibilities, understanding of legal, safety, health, societal, cultural and environmental issues.
- PEO3:** To prepare motivated post graduates with research attitude, lifelong learning, investigative approach, and multidisciplinary thinking to succeed in the career in industry/academia/research
- PEO4:** To prepare post graduates with strong managerial and communication skills to work effectively as an individual as well as in teams.

Program Outcomes

Students are expected to know and be able –

PO1: Scholarship of Knowledge

Acquire in-depth knowledge of Computer Science and Engineering, including wider and global perspective, with an ability to discriminate, evaluate, analyze and synthesize existing and new knowledge, and integration of the same for enhancement of knowledge.

PO2: Critical Thinking

Analyze complex engineering problems critically; apply independent judgment for synthesizing information to make intellectual and/or creative advances for conducting research in a wider theoretical, practical and policy context.

PO3: Problem Solving

Think laterally and originally, conceptualize and solve engineering problems, evaluate a wide range of potential solutions for those problems and arrive at feasible, optimal solutions after considering public health and safety, cultural, societal and environmental factors in the core areas of expertise.

PO4: Research Skills

Extract information pertinent to unfamiliar problems through literature survey and experiments, apply appropriate research methodologies, techniques and tools, design, conduct experiments, analyze and interpret data, demonstrate higher order skill and view things in a broader perspective, contribute individually/in group(s) to the development of scientific/technological knowledge in one or more domains of engineering.

PO5: Usage of Modern Tools

Create, select, learn and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modeling, to complex engineering activities with an understanding of the limitations.

PO6: Collaborative and Multidisciplinary work

Possess knowledge and understanding of group dynamics, recognize opportunities and contribute positively to collaborative-multidisciplinary scientific research, demonstrate a capacity for self-management and teamwork, decision-making based on open-mindedness,

objectivity and rational analysis in order to achieve common goals and further the learning of themselves as well as others.

PO7: Project Management and Finance

Demonstrate knowledge and understanding of Computer Science & Engineering and management principles and apply the same to one's own work, as a member and leader in a team, manage projects efficiently in respective disciplines and multidisciplinary environments after consideration of economical and financial factors.

PO8: Communication

Communicate with the engineering community, and with society at large, regarding complex engineering activities confidently and effectively, such as, being able to comprehend and write effective reports and design documentation by adhering to appropriate standards, make effective presentations, and give and receive clear instructions.

PO9: Life-long Learning

Recognize the need for, and have the preparation and ability to engage in life-long learning independently, with a high level of enthusiasm and commitment to improve knowledge and competence continuously.

PO10: Ethical Practices and Social Responsibility

Acquire professional and intellectual integrity, professional code of conduct, ethics of research and scholarship, consideration of the impact of research outcomes on professional practices and an understanding of responsibility to contribute to the community for sustainable development of society.

PO11: Independent and Reflective Learning

Observe and examine critically the outcomes of one's actions and make corrective measures subsequently, and learn from mistakes without depending on external feedback.

Program Specific Outcomes (PSO)

A post graduate of the Computer Engineering Program will demonstrate-

PSO1: Professional Skills

The ability to understand, analyze and develop software in the areas related to system software, multimedia, web design, big data analytics, networking, and algorithms for efficient design of computer-based systems of varying complexities.

PSO2: Problem-Solving Skills

The ability to apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success.

PSO3: Successful Career and Entrepreneurship

The ability to employ modern computer languages, environments, and platforms in creating innovative career paths to be an entrepreneur, with zest for research.

PSO4: Research Skills

The ability to study, experiment, interpret, analyze and explore the solutions to the engineering problems which are effective, efficient, optimized and feasible.

Savitribai Phule Pune University, Pune
Master of Computer Engineering (2017 Course)
 (with effect from June 2017)

Semester I

Course Code	Course	Teaching Scheme Hours / Week		Examination Scheme and Marks					Credit	
		Theory	Practical	In-Sem	End-Sem	TW	OR/ PRE	Total	TH	PR
510101	Research Methodology	04	--	50	50	--	--	100	04	--
510102	Bio-Inspired Optimization Algorithms	04	--	50	50	--	--	100	04	--
510103	Software Development and Version Control	04	--	50	50	--	--	100	04	--
510104	Embedded and Real Time Operating Systems	04	--	50	50	--	--	100	04	--
510105	Elective I	05	--	50	50	--	--	100	05	-
510106	Laboratory Proficiency I	--	08	--	--	50	50	100	--	04
	Total Credit								21	04
Total		21	08	250	250	50	50	600	25	
510107	Non-Credit Course I								Grade	
Elective I										
510105A	Advanced Digital Signal Processing			510105B		Data Mining				
510105C	Network Design and Analysis			510105D		Data Algorithms				
510105E	Open Elective									

Semester II

Course Code	Course	Teaching Scheme Hours / Week		Examination Scheme and Marks					Credit	
		Theory	Practical	In-Sem	End-Sem	TW	OR/ PRE	Total	TH	PR
510108	Operations Research	04	--	50	50	--	--	100	04	--
510109	System Simulation and Modeling	04	--	50	50	--	--	100	04	--
510110	Machine Learning	04	--	50	50	--	--	100	04	--
510111	Elective II	05	--	50	50	--	--	100	05	--
510112	Seminar I		04	--	--	50	50	100	--	04
510113	Laboratory Proficiency II	--	08	--	--	50	50	100	--	04
	Total Credit								17	08
Total		17	12	200	200	100	100	600	25	
510114	Non-Credit Course II								Grade	
Elective II										
510111A	Image Processing			510111B		Web Mining				
510111C	Pervasive and Ubiquitous Computing			510111D		Network Security				
510111E	Open Elective									

Abbreviations: TW: Term Work , TH: Theory, OR: Oral, PRE: Presentation, Sem: Semester

Savitribai Phule Pune University, Pune										
Master of Computer Engineering (2017 Course)										
Semester III										
Course Code	Course	Teaching Scheme Hours / Week		Examination Scheme and Marks					Credit	
		Theory	Practical	In-Sem	End-Sem	TW	OR/PRE	Total	TH	PR
610101	Fault Tolerant Systems	04	--	50	50	--	--	100	04	--
610102	Information Retrieval	04	--	50	50	--	--	100	04	--
610103	Elective III	05	--	50	50	--	--	100	05	--
610104	Seminar II	--	04	--	--	50	50	100	--	04
610105	Dissertation Stage I	--	08	--	--	50	50	100	--	08
Total Credit									13	12
Total		13	12	150	150	100	100	500	25	
610106	Non-Credit Course III								Grade	
Elective III										
610103A	Cloud Security	610103B		Speech Signal Processing						
610103C	Mobile Ad-hoc Network	610103D		Pattern Recognition	610103E		Open Elective			
Semester IV										
Course Code	Course	Teaching Scheme Hours / Week		Examination Scheme and Marks			Credit			
		Practical		TW	OR/PRE	Total	PR			
610107	Seminar III	05		50	50	100	05			
610108	Dissertation Stage II	20		150	50	200	20			
Total		25		200	100	300	25			
Non-Credit Courses										
Typically curriculum is constituted by credit, non-credit and audit courses. These courses are offered as compulsory or elective. Non Credit Courses are compulsory. No grade points are associated with non-credit courses and are not accounted in the calculation of the performance indices SGPA & CGPA. However, the award of the degree is subject to obtain a PP grade for non credit courses. Conduction and assessment of performance in said course is to be done at institute level. The mode of the conduction and assessment can be decided by respective course instructor. Recommended but not limited to- (one or combination of) seminar, workshop, MOOC Course certification, mini project, lab assignments, lab/oral/written examination, field visit, field training. Examinee should submit report/journal of the same. Reports and documents of conduction and assessment in appropriate format are to be maintained at institute. <u>Result of assessment will be PP or NP.</u> Set of non-credit courses offered is provided. The Examinee has to select the relevant course from pool of courses offered. Course Instructor may offer beyond this list by seeking recommendation from SPPU authority. The selection of 3 distinct non-credit courses, one per semester (Semester I, II & III). The Contents of Non Credit Courses are Provided at page 63 onwards.										
<u>Open Elective:</u> The open elective is to invite the attention to multidisciplinary, interdisciplinary, exotic, employability or update to technology course. The institute may design the syllabus accordingly. However such designed syllabus needs to be approved by SPPU authority before implementation.										
Recommended Set of Non-Credit Courses(510107, 510114, 610106):										
NCC1: Game Engineering				NCC2: Advanced Cognitive Computing						
NCC3: Reconfigurable Systems				NCC4: Convergence Technology						
NCC5: Machine Learning				NCC6: Storage Area Networks						
NCC7: Search Engine Optimization				NCC8: Virtual Reality						
NCC9: Machine Translation				NCC10: Infrastructure Management						

SAVITRIBAI PHULE PUNE UNIVERSITY



FACULTY OF ENGINEERING

SYLLABUS FOR

B.E. ELECTRICAL ENGINEERING

(2015 course)

WITH EFFECT FROM YEAR 2018-2019

Savitribai Phule Pune University
FACULTY OF ENGINEERING

B.E. Electrical Engineering (2015 Course)
(w.e.f. 2018-2019)

SEMESTER-I													
Sr No	Subject Code	Subject Title	Teaching Scheme (Hrs/Week)			Examination Scheme (Marks)					Total Marks	Credit	
			TH	PR	TU	PP		TW	PR	OR		TH / TU	PR + OR
						In Sem	End Sem						
1	403141	Power System Operation and Control	03	02	--	30	70	25	--	25	150	03	01
2	403142	PLC and SCADA Applications	04	02	--	30	70	25	50	--	175	04	01
3	403143	Elective I	03	02	--	30	70	25	--	--	125	03	01
4	403144	Elective II	03	--	--	30	70	--	--	--	100	03	--
5	403145	Control System II	03	02	--	30	70	25	--	25	150	03	01
6	403146	Project I	--	--	02	--	--	--	--	50	50	02	--
	403152	Audit Course V											
TOTAL			16	08	02	150	350	100	50	100	750	18	04
SEMESTER-II													
Sr No	Subject Code	Subject Title	Teaching Scheme (Hrs/Week)			Examination Scheme (Marks)					Total Marks	Credit	
			TH	PR	TU	PP		TW	PR	OR		TH / TU	PR + OR
						In Sem	End Sem						
1	403147	Switchgear and Protection	03	02	--	30	70	50	--	25	175	03	01
2	403148	Power Electronic Controlled Drives	04	02	--	30	70	25	50	--	175	04	01
3	403149	Elective III	03	02	--	30	70	25	--	25	150	03	01
4	403150	Elective IV	03	--	--	30	70	--	--	--	100	03	--
5	403151	Project II	--	--	06	--	--	50	--	100	150	06	--
	403153	Audit Course VI											
TOTAL			13	06	06	120	280	150	50	150	750	19	03

TH Theory lectures hours/week
 PR Practical hours/week
 TU Tutorial hours/week

TW Term work
 OR Oral
 PP Paper- In semester and End Semester

Elective I (403143) A) <u>Fundamentals of Microcontroller MSP430 and its Applications [Open Elective]</u> B) <u>Power Quality</u> C) <u>Renewable Energy Systems</u> D) <u>Digital Signal Processing</u>	Elective II (403144) A) <u>Restructuring and Deregulation</u> B) <u>Electromagnetic Fields</u> C) <u>EHVAC Transmission</u> D) <u>Electric and Hybrid Vehicles</u> E) <u>Special Purpose Machines</u>
Elective III (403149) A) <u>High Voltage Engineering</u> B) <u>HVDC and FACTS</u> C) <u>Digital Control System</u> D) <u>Intelligent Systems and Applications in Electrical Engineering</u> E) <u>Analog Electronics and Sensing Technology [Open Elective]</u>	Elective IV (403150) A) <u>Smart Grid</u> B) <u>Robotics and Automation</u> C) <u>Illumination Engineering</u> D) <u>VLSI Design[Open Elective]</u>

Audit Course

- Audit Course: Optional for 1st and 2nd term of BE Electrical Engineering
- ‘Audit Courses’ means a Course in which the student shall be awarded Pass or Fail only. It is left to the discretion of the respective affiliated institute to offer such courses to the students. Evaluation of audit course will be done at institute level itself.
- Teaching-learning process for these subjects is decided by concern faculty/industry experts appointed by the affiliated Engineering College based on the syllabus and guidelines given.
- Marks obtained by student for audit course will not be taken into consideration of SGPA or CGPA.

Audit Course V **(A) Hydro Energy Systems**
403152 **(B) Foreign Language – German**

Audit Course VI **Energy Storage Systems**
403153

Savitribai Phule Pune University
Faculty of Science & Technology



B.E. (Electronics & Telecommunication)
(2015 Pattern) Syllabus
(With effect from Academic Year 2018-19)

Savitribai PhulePune University
Final Year E&TC Engineering (2015 Course)
 (With effect from Academic Year 2018-19)

Semester I													
Course Code	Course	Teaching Scheme Hours / Week			Semester Examination Scheme of Marks						Credits		
		Theor y	Tut	Pract	In- Sem	End- Sem	TW	PR	OR	Total	TH/TW	PR+OR	
404181	VLSI Design& Technology	3	--	--	30	70	--	--	--	100	3	--	
404182	Computer Networks & Security	4	--	--	30	70	--	--	--	100	4	--	
404183	Radiation & Microwave Techniques	3	--	--	30	70	--	--	--	100	3	--	
404184	Elective I	3	--	--	30	70	--	--	--	100	3	--	
404185	Elective II	3			30	70	--	--	--	100	3	--	
404186	Lab Practice -I (CNS+ RMT)	--	--	4	--	--	50	--	50	100	--	2	
404187	Lab Practice -II (VLSI + Elective I)	--	--	4	--	--	50	50		100	--	2	
404188	Project Stage I	-	2	--	--	--	-	--	50	50	--	2	
	Audit Course 5	--	--	--	--	--	--	--	--	--	----		
Total		16	2	8	150	350	100	50	100	750	16	6	
Total Credits											22		
<u>Elective I</u> 1 Digital Image and Video Processing 2. Industrial Drives and Control 3. Embedded Systems & RTOS 4. Internet of Things				<u>Elective II</u> 1. Wavelets 2. Electronics Product Design 3. Optimization Techniques 4. Artificial Intelligence 5. Electronics in agriculture				<u>Audit Course 5</u> 1. Green Energy 2. Human Behaviour					

Final Year E&TC Engineering (2015 Course)

(With effect from Academic Year 2018-19)

Semester II												
Course Code	Course	Teaching Scheme			Semester Examination Scheme of						Credit	
		Hours / Week			Marks						TH/TW	PR+OR
Theory	Tut	Pract	In-Sem	End-Sem	TW	PR	OR	Total				
404189	Mobile Communication	3	--	--	30	70	--	--	--	100	3	--
404190	Broadband Communication Systems	4	--	--	30	70	--	--	--	100	4	--
404191	Elective III	3	--	--	30	70	--	--	--	100	3	--
404192	Elective IV	3	--	--	30	70	--	--	--	100	3	--
404193	Lab Practice –III (MC+BCS)	--	--	4	--	--	50	50	--	100	--	2
404194	Lab Practice –IV (Elective III)	--	--	2	--	--	--	--	50	50	--	1
404195	Project Stage II	--	6	-	--	--	150	--	50	200	--	6
	Audit Course 6	--	--	--	--	--	--	--	--	--		
Total		13	6	6	120	280	200	50	100	750	13	9
Total Credits											22	
Elective III				Elective-IV					Audit Course 6			
1. Machine Learning 2. PLC s and Automation 3. Audio and Speech Processing 4. Software Defined Radio 5. Audio Video Engineering				1. Robotics 2. Biomedical Electronics 3. Wireless Sensor Networks 4. Renewable Energy Systems 5. Open Elective*					1. Team Building, Leadership and Fitness 2. Environmental issues and Disaster Management			

*Any one course from the list of Elective IV of computer/IT/Electrical/Instrumentation or Institute can offer elective IV based on any industry need with prior approval from BoS(Electronics & Telecommunication). Repetition of course or topics should be avoided.

FACULTY OF ENGINEERING

Savitribai Phule Pune University

Syllabus for the

M.E (Electronics & Telecommunications Engineering –Microwave)

(2017 Course)

(w.e.f. June 2017)

M.E. (Electronics and Telecommunications- Microwave)
2017 Pattern
Syllabus Structure

First Year – Semester I

Sr.No.	Subject Code	Subject	Examination Scheme						Credits
			L/P	Paper		TW	OR	Total	
				ISA	ESA				
1	504301	Electromagnetics and Antenna Theory	4	50	50	-	-	100	4
2	504302	RF and Microwave Circuits	4	50	50	-	-	100	4
3	504303	Microwave Measurements	4	50	50	-	-	100	4
4	504104	Research Methodology	4	50	50	-	-	100	4
5	504305	Elective I	5	50	50	-	-	100	5
6	504306	Lab Practice I	4	-	-	50	50	100	4
		Total	25	250	250	50	50	600	25

Elective I:

1. Signal Processing for Wireless Communications
2. Communication Network
3. Fiber Optic Communication
4. Mathematics for Microwave Engineering

*LATEX

First Year – Semester II

Sr.No.	Subject Code	Subject	Examination Scheme						Credits
				Paper				Total	
			L/P	ISA	ESA	TW	OR		
1	504307	Computational Electromagnetics	4	50	50	-	-	100	4
2	504308	RF and MMIC Technology	4	50	50	-	-	100	4
3	504309	Wireless Communication System	4	50	50	-		100	4
4	504310	Elective II	5	50	50	-	-	100	5
5	504311	Lab Practice II	4	-	-	50	50	100	4
6	504312	Seminar I	4	-	-	50	50	100	4
		Total	25	200	200	100	100	600	25

Elective II :

1. Micro Strip Antennas
2. Smart Antennas
3. Cognitive Radio
4. Remote Sensing and Satellite Image Processing

*Software Tools

Second Year – Semester I

Sr.No.	Subject Code	Subject	Examination Scheme						Credits
				Paper				Total	
			L/P	ISA	ESA	TW	OR		
1	604301	EMI and EMC Techniques	4	50	50	-	-	100	4
2	604302	Radar and Satellite Communications	4	50	50	-	-	100	4
3	604103	Elective III	5	50	50	-	-	100	5
4	604304	Seminar II	4	-	-	50	50	100	4
5	604305	Project Stage I	08	-	-	50	50	100	8
		Total	25	150	150	100	100	500	25

Elective III:

For 3 credits

1. Value Education, Human Rights and Legislative Procedures
2. Environmental Studies
3. Energy Studies
4. Disaster Management
5. Knowledge Management
6. Foreign Language
7. Economics for Engineers
8. Engineering Risk – Benefit Analysis
9. Technology Play

For 2 credits

1. Optimization Techniques
2. Fuzzy Mathematics
3. Design and Analysis of Algorithms
4. CUDA

Note: Syllabus for Elective III is common for all discipline.

*Elective III will be combination of subjects with 3 credits and 2 credits

Second Year – Semester II

Sr.No.	Subject Code	Subject	Examination Scheme						Credits
			Paper					Total	
			L/P	ISA	ESA	TW	OR		
1	604306	Seminar III	5	---	---	50	50	100	5
2	604307	Project Work Stage II	20	---	---	150	50	200	20
		Total	25	---	---	200	100	300	25

Faculty of Science and Technology

Syllabus B.E. (Electronics) 2015 Course

(With effect from Academic Year 2018 - 19)



SAVITRIBAI PHULE PUNE UNIVERSITY

**THE SYLLABUS IS PREPARED BY:
B.O.S. in Electronics & Telecommunication,
Savitribai Phule Pune University**

Savitribai Phule Pune University
Final Year Electronics Engineering (2015 Course)

(With effect from Academic Year 2018-19)

Semester I												
Course Code	Course	Teaching Scheme Hours / Week			Semester Examination Scheme of Marks						Credits	
		TH	TUT	PR	In-Sem	End-Sem	TW	PR	OR	Total	TH/TW	PR+OR
404201	VLSI Design	3	--	--	30	70	--	--	--	100	3	--
404202	Advanced Power Electronics	4	--	--	30	70	--	--	--	100	4	--
404203	Electronics System Design	3	--	--	30	70	--	--	--	100	3	--
404204	Elective I	3	--	--	30	70	--	--	--	100	3	--
404205	Elective II	3	--	--	30	70	--	--	--	100	3	--
404206	Lab practice -I (APE+ ESD)	--	--	4	--	--	50	50	--	100	--	2
404207	Lab practice -II (VLSI + Ele I)	--	--	4	--	--	50	50	--	100	--	2
404208	Project Stage I	-	2	--	--	--	-	--	50	50	--	2
	Audit Course 5	--	--	--	--	--	--	--	--	--	----	
Total		16	2	8	150	350	100	100	50	750	16	6
Total Credits											22	

Elective I	Elective II
Digital Image and Video Processing	Mobile communication
Audio and Speech Processing	Bio-Medical Electronics
Embedded Systems & RTOS	Optimization techniques
Internet of Things	Computer modelling and simulation
Software Defined Radio	Digital Signal Processor TMS320C67X

Audit Course 5	Foreign Language (Japanese Module 3)
	Critical Thinking

Final Year Electronics Engineering (2015 Course)

(With effect from Academic Year 2018-19)

Semester II												
Course Code	Course	Teaching Scheme Hours / Week			Semester Examination Scheme of Marks						Credit	
		TH	TUT	PR	In-Sem	End-Sem	TW	PR	OR	Total	TH/TW	PR+OR
404209	Computer Networks & Security	3	--	--	30	70	--	--	--	100	3	--
404210	Process Instrumentation	4	--	--	30	70	--	--	--	100	4	--
404211	Elective III	3	--	--	30	70	--	--	--	100	3	--
404212	Elective IV	3	--	--	30	70	--	--	--	100	3	--
404213	Lab practice -III (CNS+PI)	--	--	4	--	--	50	50	--	100	--	2
404214	Lab practice -IV (Elective- III)	--	--	2	--	--	--	50	--	50	--	1
404215	Project Stage II	--	6	--	--	--	150	--	50	200	--	6
	Audit Course 6	--	--	--	--	--	--	--	--	--		
Total		13	6	6	120	280	200	100	50	750	13	9
Total Credits											22	

Elective III	Elective-IV
Automotive Electronics	Robotics
Artificial Intelligence and Machine Learning	Wireless Sensor Networks
Optical and Microwave Communication	Renewable Energy Systems & DSM
Audio Video Engineering	TM4C123GH6PM Microcontroller
Testing and verification for SoC Design	Open Elective*

*Any one subject from the list of Elective IV of computer/IT/Electrical/Instrumentation or Institute can offer elective IV based on any industry need with prior approval from BoS (Electronics). Repetition of subjects or topics is to be avoided.

Audit Course 6	Foreign Language (Japanese Module 4)
	Technologies, Disruptions and Entrepreneurial Opportunities

FACULTY OF ENGINEERING

Syllabus

B.E. (Information Technology) 2015 Course

(With effect from Academic Year 2018-2019)

SAVITRIBAI PHULE PUNE UNIVERSITY

The syllabus is prepared by

B.O.S. in Information Technology, Savitribai Phule Pune University

INDEX

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PROGRAM EDUCATIONAL OBJECTIVES

The students of Information Technology course after passing out will

1. Graduates of the program will possess strong fundamental concepts in mathematics, science, engineering and Technology to address technological challenges with emerging trends.
2. Possess knowledge and skills in the field of Computer Science & Engineering and Information Technology for analyzing, designing and implementing multifaceted engineering problems of any domain with innovative and efficient approaches.
3. Acquire an attitude and aptitude for research, entrepreneurship and higher studies in the field of Computer Science & Engineering and Information Technology.
4. Learn commitment to ethical practices, societal contributions through communities and life-long intellect.
5. Attain better communication, presentation, time management and team work skills leading to responsible & competent professionals and will be able to address challenges in the field of IT at global level.

PROGRAM OUTCOMES

The students in the Information Technology course will attain:

1. An ability to apply knowledge of computing, mathematics including discrete mathematics as well as probability and statistics, science, engineering and technology.
2. An ability to define a problem and provide a systematic solution with the help of conducting experiments, as well as analyzing and interpreting the data.
3. An ability to design, implement, and evaluate a software or a software/hardware co-system, component, or process to meet desired needs within realistic constraints.
4. An ability to identify, formulate, and provide systematic solutions to complex engineering problems.
5. An ability to use the techniques, skills, and modern engineering technologies tools, standard processes necessary for practice as a IT professional.
6. An ability to apply mathematical foundations, algorithmic principles, and Information Technology theory in the modeling and design of computer-based systems with necessary constraints and assumptions.
7. An ability to analyze the local and global impact of computing on individuals, organizations and society.
8. An ability to understand professional, ethical, legal, security and social issues and responsibilities.
9. An ability to function effectively as an individual or as a team member to accomplish a desired goal(s).
10. An ability to engage in life-long learning and continuing professional development to cope up with fast changes in the technologies/tools with the help of electives, professional organizations and extra-curricular activities.
11. An ability to communicate effectively in engineering community at large by means of effective presentations, report writing, paper publications, demonstrations.
12. An ability to understand engineering, management, financial aspects, performance, optimizations and time complexity necessary for professional practice.
13. An ability to apply design and development principles in the construction of software systems of varying complexity.

B.E. (Information Technology) 2015 Course to be implemented from Academic Year 2018-19**SEMESTER-I**

Subject Code	Subject	Teaching Scheme			Examination Scheme					Total Marks	Credits
		Lecture	Practical	Tutorial	In-Sem	TW	PR	OR	End-Sem		
414453	Information and Cyber Security	3	--	--	30	--	--	--	70	100	3
414454	Machine Learning and Applications	4	--	--	30	--	--	--	70	100	4
414455	Software Design and Modeling	3	--	--	30	--	--	--	70	100	3
414456	Elective-I	3	--	--	30	--	--	--	70	100	3
414457	Elective -II	3	--	--	30	--	--	--	70	100	3
414458	Computer Laboratory-VII	--	4	--	--	50	50	--	--	100	2
414459	Computer Laboratory-VIII	--	4	--	--	50	--	50	--	100	2
414460	Project Phase-I	--	--	2	--	--	--	50	--	50	2
414461	Audit Course-V	--	--	--	--	--	--	--	--	Grade	
Total		16	8	2	150	100	50	100	350	750	22
Total of Part-I		26				750					

Abbreviations: TW: Term Work TH: Theory OR: Oral PR: Practical Sem: Semester

Computer Laboratory-VII (Information and Cyber Security+ Machine Learning and Application)

Computer Laboratory-VIII (Software Design and Modeling)

Elective I		Elective II	
414456 A	1. Wireless Communications	414457A	1. Software Defined Networks
414456B	2. Natural Language Processing	414457B	2. Soft Computing
414456C	3. Usability Engineering	414457C	3. Software Testing and Quality Assurance
414456D	4. Multicore and Concurrent Systems	414457D	4. Compiler Construction
414456E	5. Business Analytics and Intelligence	414457E	5. Gamification

Audit Course-V	
414461A	1. Emotional Intelligence
414461B	2. Green Computing
414461C	3. Critical Thinking
414461D	4. Statistical Learning model using R.

SEMESTER –II

Subject Code	Subject	Teaching Scheme			Examination Scheme					Total Marks	Credits
		Lecture	Practical	Tutorial	In-Sem	TW	PR	OR	End-Sem		
414462	Distributed Computing System	3	--	--	30	--	--	--	70	100	3
414463	Ubiquitous Computing	3	--	--	30	--	--	--	70	100	3
414464	Elective-III	3	2	--	30	25	--	25	70	150	4
414465	Elective-IV	3	--	--	30	--	--	--	70	100	3
414466	Computer Laboratory-IX	--	4	--	--	50	50	--	--	100	2
414467	Computer Laboratory-X	--	2	--	--	25	--	25	--	50	1
414468	Project Work	--	--	6	--	50	--	100	--	150	6
414469	Audit Course-VI	--	--	--	--	--	--	--	--	Grade	
Total		12	8	6	120	150	50	150	280	750	22
Total of Part-II		26				750					

Abbreviations: TW: Term Work TH: Theory OR: Oral PR: Practical Sem: Semester
 Computer Laboratory-IX (Distributed Computing System)
 Computer Laboratory-X (Ubiquitous Computing)

Elective III		Elective IV	
414464A	1. Internet of Things (IoT)	414465A	1. Rural Technologies and Community Development
414464B	2. Information storage and retrieval	414465B	2. Parallel Computing
414464C	3. Multimedia Techniques	414465C	3. Computer Vision
414464D	4. Internet and Web Programming	414464D	4. Social Media Analytics
414464E	5. Computational Optimization	414465E	5. Open Elective

Audit Course-VI	
414469A	1. IoT – Application in Engineering field
414469B	2. Entrepreneurship
414469C	3. Cognitive Computing
414469D	4. AI and Robotics

Savitribai Phule Pune University



Faculty of Science and Technology

Syllabus for Final Year of Mechanical Engineering

(Course 2015)

Savitribai Phule Pune University

B. E. (Mechanical) (2015 Course) Semester – I

Code	Subject	Teaching Scheme Hrs / week			Examination Scheme					Total Marks	Credits	
		Lecture	Tut	Pract	In Sem	End Sem	TW	PR	OR		Theory	TW/ Pr/OR
402041	Hydraulics and Pneumatics	3	-	2	30	70	25	-	25	150	3	1
402042	CAD CAM Automation	3	-	2	30	70	25	50	-	175	3	1
402043	Dynamics of Machinery	4	-	2	30	70	25	-	25	150	4	1
402044	Elective-I	3	-	2	30	70	25	-	-	125	3	1
402045	Elective-II	3	-	-	30	70	-	-	-	100	3	-
402046	Project-I	-	-	4	-	-	25	-	25	50	-	2
Total		16	-	12	150	350	125	50	75	750	16	6
											22	

B. E. (Mechanical) (2015 Course) Semester – II

Code	Subject	Teaching Scheme Hrs / week			Examination Scheme					Total Marks	Credits	
		Lecture	Tut	Pract	In Sem	End Sem	TW	PR	OR		Theory	TW/ Pr/OR
402047	Energy Engineering	3	-	2	30	70	25	-	25	150	3	1
402048	Mechanical System Design	4	-	2	30 (1.5 Hrs)	70 (3 Hrs)	25	-	50	175	4	1
402049	Elective-III	3	-	2	30	70	25	-	-	125	3	1
402050	Elective-IV	3	-	-	30	70	-	-	-	100	3	-
402051	Project-II	-	-	12	-	-	100	-	100	200	-	6
Total		13	-	18	120	280	175	-	175	750	13	9
											22	

Elective – I		Elective – II	
Code	Subject	Code	Subject
402044 A	Finite Element Analysis	402045 A	Automobile Engineering
402044 B	Computational Fluid Dynamics	402045 B	Operation Research
402044 C	Heating Ventilation and Air Conditioning	402045 C	Energy Audit and Management
		402045 D	Open Elective**

Elective – III		Elective – IV	
Code	Subject	Code	Subject
402049 A	Tribology	402050 A	Advanced Manufacturing Processes
402049 B	Industrial Engineering	402050 B	Solar & Wind Energy
402049 C	Robotics	402050 C	Product Design and Development
		402050 D	Open Elective**

UNIVERSITY OF PUNE, PUNE

Structure and Syllabus

FOR

**M. E. (Mechanical) (Design Engineering)
2017- Course**



UNDER FACULTY OF ENGINEERING

EFFECTIVE FROM JULY 2017

University of Pune

M.E. Mechanical Engineering (Design Engineering) - 2017 Course

SEMESTER I

CODE	SUBJECT	TEACHING SCHEME	EXAMINATION SCHEME					CREDITS
		Lect./ Pr	Paper		TW	Oral/ Presentation	Total	
			In Semester Assessment	End Semester Assessment				
507201	Advanced Mathematics@	4	50	50	-	-	100	4
502202	Material Science and Mechanical Behavior of Materials	4	50	50	-	-	100	4
502203	Advanced Stress Analysis	4	50	50	-	-	100	4
502104	Research Methodology	4	50	50	-	-	100	4
502205	Elective I**	5	50	50	-	-	100	5
502206	Lab Practice I	4			50	50	100	4
Total		25	250	250	50	50	600	25

SEMESTER II

CODE	SUBJECT	TEACHING SCHEME	EXAMINATION SCHEME					CREDITS
		Lect./ Pr	Paper		TW	Oral/ Presentation	Total	
			In Semester Assessment	End Semester Assessment				
502207	Analysis and Synthesis of Mechanisms	4	50	50	-	-	100	4
502208	Advanced Mechanical Vibrations	4	50	50	-	-	100	4
502209	Finite Element Method	4	50	50	-	-	100	4
502210	Elective II	5	50	50	-	-	100	5
502211	Lab Practice II	4	-	-	50	50	100	4
502212	Seminar I	4	-	-	50	50	100	4
Total		25	200	200	100	100	600	25

Note:

Elective I:** Common to All M.E. Mechanical Specializations

@ Syllabus is common with Automotive Engineering. Hence End Semester examination paper will be same.

University of Pune

SEMESTER III

CODE	SUBJECT	TEACHING SCHEME	EXAMINATION SCHEME					CREDITS
		Lect./ Pr	Paper		TW	Oral/ Presentation	Total	
			In Semester Assessment	End Semester Assessment				
602213	Optimization Techniques	4	50	50	-	-	100	4
602214	Mechanical Measurements and Controls	4	50	50	-	-	100	4
602215	Elective III	5	50	50	-	-	100	5
602216	Seminar II	4	-	-	50	50	100	4
602217	Project Stage I	08	-	-	50	50	100	8
Total		25	150	150	100	100	500	25

SEMESTER IV

CODE	SUBJECT	TEACHING SCHEME	EXAMINATION SCHEME					CREDITS
		Lect./ Pr	Paper		TW	Oral/ presentation	Total	
602218	Seminar III	5	-	-	50	50	100	5
602219	Project Work Stage II	20	-	-	150	50	200	20
Total		25	-	-	200	100	300	25

Lab Practice I & II:

The laboratory work will be based on completion of assignments confined to the courses of that semester.

SEMINAR:

The student shall deliver the seminar on a topic approved by authorities.

Seminar I : shall be on state of the art topic of student's own choice approved by authority. The student shall submit the seminar report in standard format, duly certified for satisfactory completion of the work by the concerned Guide and head of the department/institute.

Seminar II : shall be on the topic relevant to latest trends in the field of concerned branch, preferably on the topic of specialization based on the electives selected by him/her approved by authority. The student shall submit the seminar report in standard format, duly certified for satisfactory completion of the work by the concerned Guide and head of the department/institute.

Seminar III: shall be extension of **seminar II**. The student shall submit the seminar report in standard format, duly certified for satisfactory completion of the work by the concerned Guide and head of the department/institute.

UNIVERSITY OF PUNE

**RULES & REGULATIONS, STRUCTURE and
SYLLABUS**

for

Ph.D. COURSE WORK

Under

FACULTY OF ENGINEERING

RULES & REGULATIONS

Appendix for Revised rules for Ph. D under Faculty of Engineering

The candidates who have registered for Ph.D. Program on or after 11th July 2009 are governed by

UGC (MINIMUM STANDARDS AND PROCEDURE FOR AWARD OF M.Phil/Ph.D. DEGREE), REGULATION, 2009 PUBLISHED IN THE GAZETTE OF INDIA, DATED 11TH July, 2009.

Based on and adhering to this, University of Pune has formulated the Revised rules for Ph.D. and circulated vide circular no.406/2009 dated 29th December 2009.

All the Procedures, rules and regulations regarding Short title, Applications, Commencement, Supervisor Eligibility Criterion, Procedure for Admission, Course work, Evaluation and Assessment methods etc. as laid down in these revised rules, are applicable to PhD Programs under Faculty of Engineering, University of Pune.

The following guidelines are a supplement to these rules and regulations; for only those sections, which require better and adequate comprehension.

1 - COURSE WORK:

TABLE- 1

STRUCTURE FOR Ph.D. COURSE WORK (common for all branches)

CODE	NAME OF COURSE	CONTACT HOURS	EXAMINATION SCHEME			CREDITS
			CONTINUOUS ASSESSMENT	END SEMESTER EXAM	TOTAL	
700001	Research Methodology	5	50	100	150	5
700002	Seminar	10	50	50	100	5
700003	Faculty Specific Topics for Engineering Research Part-A (700003-A) Mathematics for Engineering Research Part-B (700003-B) Branch Specific Topics	10	100	100	200	10
Total		25	200	250	450	20

CODE	Branch Specific Topics		CODE	Branch Specific Topics
700003-B1	Advances in Civil Engineering		700003-B8	Advances in Chemical Engineering
700003-B2	Advances in Mechanical Engineering		700003-B9	Advances in Computer Engineering
700003-B3	Advances in Electrical Engineering		700003-B10	Advances in Production & Industrial Engineering
700003-B4	Advances in Electro & Tel Engineering		700003-B11	Advances in Petroleum & Petro chemical. Engineering
700003-B5	Advances in Metallurgy Engineering		700003-B12	Advances in Architecture
700003-B6	Advances in Instrumentation Engg.		700003-B13	Advances in Information technology
700003-B7	Advances in Printing Engineering		700003-B14	Advances in Biotechnology

R-1.1

After having been admitted, each Ph.D. student shall be required to undertake course work for a minimum period of one semester. The course work shall be treated as pre- Ph.D. preparation.

R-1.2

If found necessary, course work may be carried out by doctoral candidates in sister departments / institutes either within or outside the University for which due credit will be given to them.

R-1.3

The Ph.D. Course work for all branches under Faculty of Engineering shall be offered with credit system.

R-1.4

The total credit requirement for entire course work shall be of 20 credits. Students are required to earn these 20 credits in maximum three semesters.

R-1.5

The structure for Ph.D. course work for all branches under Faculty of Engineering shall be as given in Table- 1.

R-1.6

The course, Faculty Specific Topics for Engineering Research will consists of;
Part-A: Mathematics for Engineering Research, the contents of syllabus of which will be based on the advance topics from engineering mathematics. It will consist of minimum 15 units of 2 credits each.

Part-B: Branch Specific Topics, the contents of syllabus of which will be based on the advance topics/technology pertaining to the branch. It will consist of minimum of 10 units with 2 credits each.

Syllabus

Savitribai Phule Pune University

Faculty of Engineering

Fourth Year Production Engineering

(Course 2015)

(with effect from June 2018)

Savitribai Phule Pune University, Pune
Syllabus for Fourth Year Production Engineering
(2015 Course)

(With effect from Academic Year 2018-19)

Semester- I

Course Code	Course	Teaching Scheme (Hrs/week)			Examination Scheme						Credit	
		Theory	Practical	Tutorial	Paper		TW	OR	PR	Total	TH/TW/TUT	PR/OR
					In-Sem	End-Sem						
411081	Machine Tool Design	3			30	70				100	3	
411082	Automation & Control Engineering	3			30	70				100	3	
411083	Operations Research	4			30	70				100	4	
411084	Elective I	3			30	70				100	3	
411085	Elective II	3			30	70				100	3	
411086	Machine Tool Design Lab		2					50		50		1
411087	Automation & Control Engineering Lab		2						50	50		1
411088	Operations Research Lab		2				50			50	1	
411089	Elective I Lab		2				50			50	1	
411090	Project Phase-I		2				50			50	1	1
											19	3
Total		16	10	0	150	350	150	50	50	750	22	

Elective I

- (a) Product Design & Development
- (b) Financial Management and Costing
- (c) Data Analytics
- (d) Advanced Thermal Engineering
- (e) Mechatronics

Elective II

- (a) Nano Manufacturing
- (b) Simulation & Modeling
- (c) Additive Manufacturing
- (d) Reliability Engineering
- (e) Advanced Materials

Abbreviations:

TW: Term Work, TH: Theory, OR: Oral, TUT: Tutorial, PR: Practical

Savitribai Phule Pune University, Pune
Syllabus for Fourth Year Production Engineering
(2015 Course)
(With effect from Academic Year 2018-19)

Semester- II

Course Code	Course	Teaching Scheme (Hrs/week)			Examination Scheme						Credit	
		Theory	Practical	Tutorial	Paper		TW	OR	PR	Total	TH/TW/TUT	PR/OR
					In-Sem	End-Sem						
411091	Computer Integrated Design & Manufacturing	3			30	70				100	3	
411092	Industrial Robotics	3			30	70				100	3	
411093	Elective III	3			30	70				100	3	
411094	Elective IV	3			30	70				100	3	
411095	Computer Integrated Design & Manufacturing Lab		2						50	50		1
411096	Industrial Robotics Lab		2					50		50		1
411097	Elective III Lab		2				50			50	1	
411098	Elective IV Lab		2				50			50	1	
411099	Project Work			6			50	100		50	1	5
											15	7
Total		12	8	6	120	280	150	150	50	750	22	

Elective III

- (a) Sustainability Engineering
- (b) Supply Chain Management
- (c) Automobile Engineering
- (d) Entrepreneurship
- (e) Human Resource & Management

Elective IV

- (a) Intelligent Manufacturing System
- (b) Energy Management
- (c) World Class Manufacturing
- (d) Finite Element Analysis
- (e) Environmental Engineering

Abbreviations:

TW: Term Work, TH: Theory, OR: Oral, TUT: Tutorial, PR: Practical

Savitribai Phule Pune University

Revised Syllabus

Master of Business Administration
(MBA)

Choice Based Credit System and Grading System

Two Year Full Time Four Semester

POST GRADUATE PROGRAMME

MBA I Year Curriculum Applicable w.e.f. AY 2016-17

MBA II Year Curriculum Applicable w.e.f. AY 2017-18

1. Title

Name of the Programme: Master of Business Administration (MBA).

Nature of the Programme: MBA is two year full time post-graduate degree programme.

2. Preamble: The revised curriculum for MBA is developed keeping in mind the *national priorities* and *international practices*. It also attempts to align the programme structure and course contents with student aspirations & recruiter expectations. This syllabus also attempts to align with National Goal of “Make in India”, “Start – Up and Stand – Up India” and “Digital India”.

2.1 Need for Revision of the Curriculum: The MBA programme curriculum of the Savitribai Phule Pune University was last revised in the AY 2013 and there was a need for revision of the curriculum in view of the dynamism in the industry practices, evolution in technology and the evolving expectations of key stakeholders viz. students, the industry and faculty members at large. It also has relevance due to changed technological, social, cultural and economic environment of the nation.

Specifically, the triggers for the comprehensive revamp of the curriculum are -

- a) **New Skills & Competencies desired due to dynamic business environment:** Jobs of today were perhaps not created about 5 years ago. This aspect has a direct linkage with contents and structure of syllabus across the *Knowledge, Skills and Attitude (KSA) dimensions*, which calls for frequent and meaningful updating of the curriculum.
- b) **Concerns expressed by the Industry:** The industry has expressed concerns about the need for improvement in the *communication skills, inter-personal skills, domain knowledge basics, business environment awareness, technology proficiency, and attitude* of the MBA graduates. *Newer and innovative evaluation methods* are necessary to address these concerns of the industry.
- c) **Application Orientation:** There is a pressing need to *imbibe application oriented thinking*, based on sound knowledge of management theories, principles and concepts. Management education needs to move out of the classrooms and instead focus on *group activity, field work, experiential learning, etc.* This can be achieved only through a radical change in the evaluation pattern and course delivery methodology.
- d) **Changing mindset of the Learner:** The profile of the students for the management programme, their learning styles and the outlook towards higher education has undergone a gradual transformation. The expectations of the students from the MBA programme have changed over the last decade.
- e) **Integrate a basket of skill sets:** B-Schools are expected to imbibe varied aspects of ‘learning beyond the syllabus through innovative curriculum design, contemporary syllabus, effective delivery and comprehensive evaluation.
- f) **Entrepreneurial aspirations and preparedness for the same:** The youth now aspires to become masters of their own and wish to start up their new ventures. These will create further growth opportunities.

Specifically the following skill sets are in focus:

- i. Reading & Listening Skills
- ii. Problem Definition & Problem Solving Skills
- iii. Application of Technology Tools
- iv. Mastery of Analytics (Quantitative Aspects)
- v. Sensitization to Cross-Functional skills
- vi. Sensitization to Cross-Cultural skills
- vii. Sensitization to Global perspectives
- viii. Peer-based Learning - Working in groups
- ix. Learning by application and doing – Experiential learning
- x. Team building basics and its orientation

2.2 MBA Programme Objectives: The MBA programme prepares a student for a career in diverse sectors of the industry domestically and globally. The MBA programme facilitates learning in theory and practice of different functional areas of management and equips the students with an integrated approach to various functions of management. However, the demand for managerial skills is not limited to the industry. Managerial talent is much sought by the Government Sector, NGOs, non-corporate sector as well.

Students also expect to become entrepreneurs. Their aspirations also require a broad based learning encompassing the end to end processes involved in developing entrepreneurial skills. Institutes, Faculty and Students need to move away from the excessive focus on industry and look at needs and demands of broader sections of the society also.

Specifically the objectives of the MBA Programme are:

1. To equip the students with requisite knowledge, skills & right attitude necessary to provide effective leadership in a global environment.
2. To develop competent management professionals with strong ethical values, capable of assuming a pivotal role in various sectors of the Indian Economy & Society, aligned with the national priorities.
3. To develop proactive thinking so as to perform effectively in the dynamic socio-economic and business ecosystem.
4. To harness entrepreneurial approach and skillsets.

2.3 Highlights of the New Curriculum: The New Curriculum intends to add immense value to all stakeholders by effectively addressing their requirements in more than one way by:

1. Enhancing *the brand value of the MBA programme of the Savitribai Phule Pune University*.
2. Providing the much needed flexibility to individual Institutes to carve a niche for themselves.
3. Emphasizing the *centrality of the student and teacher-student relationship* in the learning process.
4. Focusing on '*Concurrent Evaluation*' i.e. continuous evaluation throughout the programme.
5. Empowering the Institutes through *cafeteria approach – by providing Generic Core, Subject Core, Generic Elective, and Subject Elective Courses*. This shall provide in-built flexibility in the curriculum to help the institutes to offer tailor made courses preferred by students, from a wider basket of courses.
6. Evaluating *all Half Credit Courses completely on Concurrent Evaluation* pattern.
7. Emphasizing *Experiential Learning* aspect through Half Credit Courses.
8. Supplementing traditional classroom teaching/learning with focus on *group activity, field work, experiential learning, self-study, projects, Industry Exposure Programmes* etc.
9. Incorporating new specializations viz. Retail Management, Services Management, International Finance, Travel & Tourism, Media & Communication and Entrepreneurship Development thereby providing wider choice to the students.
10. A thorough revamp of Systems and Operations Specializations to make them more meaningful and attractive to BCA, BCS, BE students.
11. Providing opportunity to students to choose courses from other electives to explore *cross-functional issues*.
12. Emphasizing on *Research, Inter-personal, Analytical, Cross-Cultural, Entrepreneurial Skills, and Global aspects* of managerial careers throughout the curriculum.

3. Pattern: The Programme comprises of 4 Semesters and adopts the Choice Based Credit System (CBCS) and Grading System.

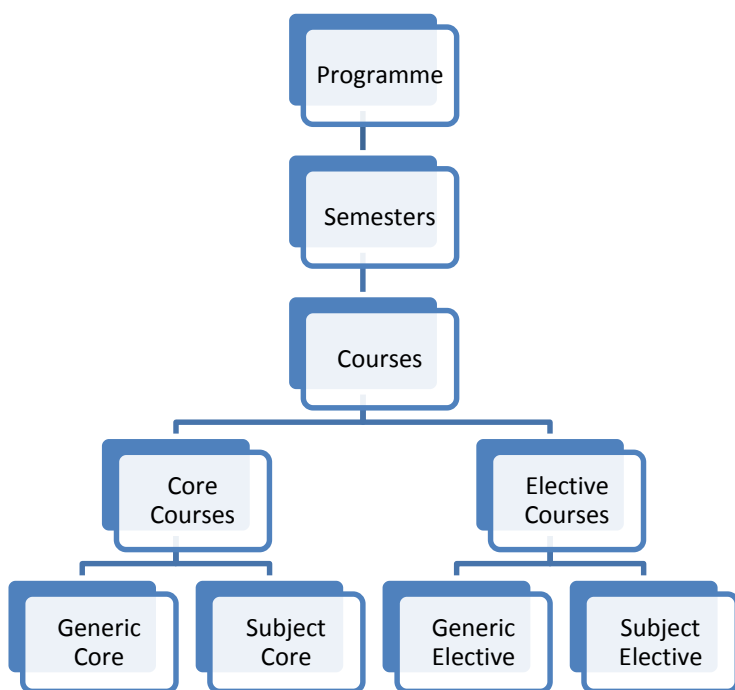
3.1 Choice Based Credit System: Choice Based Credit System (CBCS) offers wide ranging choice for students to opt for courses based on their aptitude and their career goals. CBCS works on the fundamental premise that students are mature individuals, capable of making their own decisions.

CBCS enables a student to obtain a degree by accumulating required number of credits prescribed for that degree. The number of credits earned by the student reflects the knowledge or skill acquired him / her. Each course is assigned a fixed number of credits based on the contents to be learnt & the expected effort of the student. The grade points earned for each course reflects the student's proficiency in that course. CBCS is a process of evolution of educational reforms that would yield the result in subsequent years and after a few cycles of its implementation.

3.1.1 Key features of CBCS:

1. **Enriching Learning Environment:** A student is provided with an academically rich, highly flexible learning system blended with abundant provision for skill practice and activity orientation that he/she could learn in depth without sacrificing his/her creativity. There is a definite movement away from the traditional lectures and written examination.
2. **Learn at your own pace:** A student can exercise the option to decide his/her own pace of learning- *slow, normal or accelerated plan*. Students can select courses according to their aptitude, tastes and preferences.
3. **Continuous Learning & Student Centric Concurrent Evaluation:** CBCS makes the learning process continuous and the evaluation process is not only made continuous but also made learner-centric. The evaluation is designed to recognize the capability and talent of a student.
4. **Active Student-Teacher Participation:** CBCS leads to quality education with active teacher-student participation. This provides avenues to meet student's scholastic needs and aspirations.
5. **Industry Institute Collaboration:** CBCS provides opportunities for meaningful collaboration with industry and foreign partners to foster innovation, by introduction of electives and half credit courses through the cafeteria approach. This will go a long way in capacity building of students and faculty.
6. **Interdisciplinary Curriculum:** Cutting edge developments generally occur at the interface of two or more discipline. Interdisciplinary approach enables integration of concepts, theories, techniques, and perspectives from two or more disciplines to advance fundamental understanding or to solve problems whose solutions are beyond the scope of a single discipline.
7. **Employability Enhancement:** CBCS shall ensure that students enhance their skill/employability by taking up project work, entrepreneurship and vocational training.
8. **Faculty Expertise:** CBCS shall give the Institutes the much needed flexibility to make best use of the expertise of available faculty.

3.1.2 Programme Structure in Choice Based Credit System:



3.2 Time Schedule: An academic year is divided into two terms – I and II. Each term has one semester. Term I shall have SEM I and III, whereas Term II shall have SEM II and IV. In each semester, courses are offered in 15 teaching weeks and the remaining 5 weeks are to be utilized for conduct of examinations and evaluation purposes.

For students, each week has 40 working hours spread over 5/6 days a week consisting of lectures, tutorials, assignments, class participation, library work, special counseling, Sports, project work, field visit, youth welfare and social activities.

3.3 Course: A “Course” is a component of programme, i.e. in the new system; papers will be referred to as courses. Each course is identified by a unique course code. While designing curriculum, course can have defined weightage. These weightages are called credits.

Each course, in addition to having a syllabus, has learning objectives and learning outcomes. A course may be designed to comprise lectures/ tutorials/ laboratory work/ field work/ project work/vocational training /viva voce etc. or a combination of some of these.

3.3.1 Core Courses: The Curriculum comprises of Core Courses and Elective Courses.

Core courses are the foundation courses of management education. They are compulsory for all the students. Core courses are of two types: Generic Core & Subject Core.

Generic Core: This is the course which should compulsorily be studied by a candidate as a core requirement to complete the requirement of a degree in a said discipline of study. Therefore, Generic Core courses are mandatory and fundamental in nature. These courses cannot be substituted by any other courses. Such courses are also known as **Hard Core Courses**.

A Hard core course may be a Theory, Practical, Field based or Project Work based subject which is a compulsory component in the Programme Structure.

Subject Core: A Core course may be a Subject Core if there is a choice or an option for the candidate to choose from a broad category (grouping) of subjects (specializations). These are also known as **Soft Core Courses**.

Following Specializations shall be offered:

1. Marketing Management (MKT)
2. Financial Management (FIN)
3. Information Technology Management (IT)
4. Operations Management (OPE)
5. Human Resources Management (HR)
6. International Business Management (IB)
7. Supply Chain Management (SCM)
8. Rural & Agribusiness Management (RABM)
9. Family Business Management (FBM)
10. Technology Management (TM)
11. Banking and Insurance Management (BIM)
12. Healthcare Management (HM)
13. Entrepreneurship Development (ED)
14. Services Management (SM)
15. Retail Management (RM)
16. Digital Media & Communication Marketing(MC)
17. Tourism and Hospitality Management (THM)
18. Defence Management (DM)

Students shall study 2 Full Credit Courses & 4 Half Credit Courses in Semester III and IV each for specialization courses i.e. a total of 16 specialization courses of which 4 are full credits and 8 are half credits.

- Generic Core courses in Semester I provide *foundations of management*.
- Generic Core courses in Semester II focus on *functional areas*.