CRITERION – 2
TEACHING - LEARNING AND EVALUATION

KEY INDICATOR – 2.6
STUDENT PERFORMANCE AND LEARNING OUTCOME

METRIC NO. – 2.6.1

Shri Sant Gajanan Maharaj College of Engineering, Shegaon

Self-Study Report Cycle - III

SHRI GAJANAN SHIKSHAN SANSTHA'S
SHRI SANT GAJANAN MAHARAJ COLLEGE OF ENGINEERING,
SHEGAON – 444203, DIST. BULDHANA (MAHARASHTRA STATE), INDIA
* Recognized by A.I.C.T.E., New Delhi,* Affiliated to Sant Gadge Baba Amravati University, Amravati &
*Approved by the D.T.E., M.S. Mumbai
ESTD.1983

Ph.Nos : 8669638081 / 8669638082
Website : www.ssgmce.ac.in
Email- principal@ssgmce.ac.in
registrar@ssgmce.ac.in

Date : 04-03-2024

Declaration

This is to declare that the information, reports, true copies and numerical data etc, furnished in this file as supporting documents is verified by IQAC and found correct.

Hence this certificate.

Dr. A. U. Jawadekar
IQAC Coordinator

Dr. S. B. Somani
PRINCIPAL
Shri Sant Gajanan Maharaj
College of Engineering,Shegaon.

Shri Sant Gajanan Maharaj College of Engineering
SHEGAON
444 203

Shri Gajanan Shikshan Sanstha's
SHRI SANT GAJANAN MAHARAJ COLLEGE OF ENGINEERING
SHEGAON – 444203, DIST. BULDHANA (MAHARASHTRA STATE), INDIA
"Recognized by A.I.C.T.E., New Delhi" Affiliated to Sant Gadge Baba Amravati University, Amravati
"Approved by the D.T.E., M.S. Mumbai"

Ph : +918669638081/82 Email.principal@ssgmce.ac.in, registrar@ssgmce.ac.in
Website- www.ssgmce.ac.in

2.6.1. Programme Outcomes (POs) and Course Outcomes (COs) for all Programmes offered by the institution are stated and displayed on website and attainment of POs and COs are evaluated.

Index

SN	Description	Link
1	Process of Course Outcomes Formation	Click Here
2	Course Outcomes of all Departmental Courses	Click Here
3	Display of COs, POs, PSOs	Click Here

Shri Sant Gajanan Maharaj College of Engineering SHEGAON 444 203

PRINCIPAL
Shri Sant Gajanan Maharaj
College of Engineering,Shegaon.

Shri Gajanan Shikshan Sanstha's
SHRI SANT GAJANAN MAHARAJ COLLEGE OF ENGINEERING
SHEGAON – 444203, DIST. BULDHANA (MAHARASHTRA STATE), INDIA
"Recognized by A.I.C.T.E., New Delhi" Affiliated to Sant Gadge Baba Amravati University, Amravati
"Approved by the D.T.E., M.S. Mumbai"

Ph : +918669638081/82 Email.principal@ssgmce.ac.in, registrar@ssgmce.ac.in
Website- www.ssgmce.ac.in

Process of Course Outcomes (COs) Formation

At the outset of each semester, our dedicated faculty members work diligently to define clear and measurable learning outcomes for every course. These learning objectives, known as Course Outcomes (COs), are thoughtfully crafted by the respective course instructors and are solidified through regular departmental meetings. Course Outcomes (COs) are developed through a series of essential steps. Typically, 4 to 6 COs are defined using active verbs to describe the actions students will take, aligning with the principles of the Revised Bloom's Taxonomy. These outcomes closely reflect the course content, ensuring clarity, specificity, and measurability, enabling assessment through various means. Furthermore, COs are directly linked to program objectives and maintain adaptability to changing needs. The process incorporates feedback from students, faculty, and industry experts for continuous improvement. Most importantly, COs comprehensively cover the entire syllabus, ensuring students have ample opportunities to achieve the desired learning outcomes for the course

Faculty members shoulder the responsibility of effectively imparting these COs to students during classroom sessions. Additionally, Course Outcomes (COs) are meticulously documented in course files and made readily available on the official website, ensuring increased accessibility and awareness throughout the academic community.

In a broader context, our Program Outcomes (POs) are derived from NBA Annexure-1, while Program Specific Outcomes (PSOs) are developed with precision by each department through extensive deliberations. The AICTE Examination Reform Policy of 2018 has played a pivotal role in enhancing our assessment strategy for Outcome-Based Education (OBE). This policy provides a structured framework for defining and measuring program outcomes, aligning them with examinations, and assessing the skills and competencies cultivated through the curriculum. To assess the achievement of these competencies, each department within our institution defines specific skills that students should acquire for each PO. Performance Indicators are established as a basis for this assessment, enabling faculty members to map course outcomes with program outcomes effectively.

Shri Gajanan Shikshan Sanstha's
SHRI SANT GAJANAN MAHARAJ COLLEGE OF ENGINEERING
SHEGAON – 444203, DIST. BULDHANA (MAHARASHTRA STATE), INDIA
"Recognized by A.I.C.T.E., New Delhi" Affiliated to Sant Gadge Baba Amravati University, Amravati
"Approved by the D.T.E., M.S. Mumbai"
Ph : +918669638081/82 Email.principal@ssgmce.ac.in, registrar@ssgmce.ac.in
Website- www.ssgmce.ac.in

Institute's Implementation of OBE Framework

The institute follows a structured approach to implement Outcome-Based Education (OBE)

Phase I: Before the Start of the Semester

Faculty members work on defining clear and measurable learning outcomes for each course

Faculty members identify and secure the necessary resources, including textbooks, materials, and equipment required for effective course delivery.
Faculty creates Lesson Plan and lecture plan of the assigned course

Data and feedback from the previous semester are reviewed, if applicable, to make improvements and adjustments to the course materials and teaching strategies.

Phase II: During the Semester

Faculty conducts regular assessments to measure student progress and comprehension of course material.

Faculty promotes active student participation through discussions, group work, and interactive activities.

Faculty adapts teaching methods based on ongoing assessment results and feedback from students to address areas needing improvement.

Faculty provides academic support through mentoring programs or offer additional tutoring sessions for students in need of extra assistance.

Phase III: End of the semester

Faculty conducts assessments and evaluations to measure the attainment of Course Outcomes (COs) and Program Outcomes (POs) and comprehensively analyzes the results.

Faculty shares the analysis findings with the Head of Department (HOD) for further review and action.

Faculty administers surveys to collect feedback from students regarding the effectiveness of the course, teaching methods, and overall learning experiences.

Ph : +918669638081/82 Email.principal@ssgmce.ac.in, registrar@ssgmce.ac.in
Website- www.ssgmce.ac.in

External experts or evaluators are engaged to review the course materials, teaching methods, and assessment strategies from an objective perspective.

Guidelines for Course Outcome Statements

The development of Course Outcomes (COs) involves the following steps:

Formation of COs:
The number of COs should typically range from 4 to 6.
Active Verbs:
Formulate COs using active verbs that describe the actions students will perform (e.g., analyze, design, evaluate).

Alignment with Revised Bloom's Taxonomy:
COs should be based on the principles of the Revised Bloom's Taxonomy.

Alignment with Course Content:
COs should closely align with the course content, reflecting the key concepts and topics covered in the course.

Clarity and Specificity:
COs must be written with clarity and specificity, leaving no room for ambiguity regarding what students are expected to learn and demonstrate.

Measurability:

COs should be designed in a way that makes them measurable, allowing for assessment through various means such as tests, assignments, projects, and practical exercises.

Relevance to Program Objectives: COs should be directly linked to the broader program objectives and goals, ensuring that each course contributes to the overall educational mission of the program.

Adaptability: COs may be adjusted or refined based on changes in course content, teaching methods, or industry demands to ensure their ongoing relevance and effectiveness.

Feedback Loop:

Ph : +918669638081/82 Email.principal@ssgmce.ac.in, registrar@ssgmce.ac.in
Website- www.ssgmce.ac.in

Feedback from students, faculty, and industry experts is often used to assess the attainment of COs and make improvements to the course or curriculum as needed.

Coverage of Entire Syllabus:

COs should comprehensively cover the entire syllabus, ensuring that students have the opportunity to achieve the desired learning outcomes for the course.

Shri Gajanan Shikshan Sanstha's
SHRI SANT GAJANAN MAHARAJ COLLEGE OF ENGINEERING
SHEGAON – 444203, DIST. BULDHANA (MAHARASHTRA STATE), INDIA
"Recognized by A.I.C.T.E., New Delhi" Affiliated to Sant Gadge Baba Amravati University, Amravati
"Approved by the D.T.E., M.S. Mumbai"

Ph : +918669638081/82 Email.principal@ssgmce.ac.in, registrar@ssgmce.ac.in
Website- www.ssgmce.ac.in

.

PROGRAM OUTCOMES (POs) defined by NBA (UG Programs)

PO1 **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2 **Problem analysis**: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3 **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4 **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5 **Modern tool usage**: Create, select, 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 **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7 **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8 **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

Ph : +918669638081/82 Email.principal@ssgmce.ac.in, registrar@ssgmce.ac.in
Website- www.ssgmce.ac.in

PO9 **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10 **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11 **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12 **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change

PROGRAM OUTCOMES (POs) (PG Programs)

PO1: An ability to independently carry out research /investigation and development work to solve practical problems.

PO2: Ability to write and present a substantial technical report/document.

PO3: Students should be able to demonstrate a degree of mastery over the area as per the specialization of the program. The mastery should be at a level higher than the requirements in the appropriate bachelor program

PRINCIPAL
Shri Sant Gajanan Maharaj
College of Engineering,Shegaon.


SHRI SANT GAJANAN MAHARAJ COLLEGE OF ENGINEERING
विद्यया अमृतम् अश्नुते
EST.1983

END OF POINT

Shri Gajanan Shikshan Sanstha's
SHRI SANT GAJANAN MAHARAJ COLLEGE OF ENGINEERING
SHEGAON – 444203, DIST. BULDHANA (MAHARASHTRA STATE), INDIA
"Recognized by A.I.C.T.E., New Delhi" Affiliated to Sant Gadge Baba Amravati University, Amravati
"Approved by the D.T.E., M.S. Mumbai"

Ph : +918669638081/82
Website- www.ssgmce.ac.in
Email.principal@ssgmce.ac.in, registrar@ssgmce.ac.in

Course Outcomes

Department of Computer Science and Engineering

SSGMCE SHEGAON

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

COURSE OUTCOMES OF ALL COURSES OF THIRD SEMESTER BE CSE (COMPUTER SCIENCE AND ENGINEERING)

3KS01 ENGINEERING MATHEMATICS – III

On completion of the course, the students will be able to:

1. Solve the Linear Differential equations with constant coefficients by various methods.
2. Find Laplace Transform of various types of functions and apply this knowledge to find Laplace Transform of Periodic, Impulse & Unit step function.
3. Use Laplace Transform to solve Linear Differential equations with constant coefficients & Find Fourier Transform of various types of functions and apply this knowledge to find Fourier Transform of functions, in their core subjects.
4. Find the solution of partial differential equations of first order also learn statistical methods
5. Test the analyticity, find the harmonic conjugates and expand the function in Taylor's or Laurent's series, find conformal mapping.
6. Differentiate vector point functions, find gradient of scalar point function, and find divergence and curl of vector point function. Integrate vector point functions Evaluate line, surface and volume integrals.

3KS02 DISCRETE STRUCTURES AND GRAPH THEORY

On completion of the course, the students will be able to:

1. Analyze and express logic sentence in terms of predicates, quantifiers, and logical connectives.
2. Derive the solution for a given problem using deductive logic and prove the solution based on logical inference.
3. Classify algebraic structure for a given mathematical problem.
4. Perform combinatorial analysis to solve counting problems.
5. Perform operation on trees data structures.
6. Develop the given problem as graph networks and solve with techniques of graph theory

3KS03 OBJECT ORIENTED PROGRAMMING

On completion of the course, the students will be able to:

1. Apply Object Oriented approach to design software.
2. Implement programs using classes and objects.
3. Specify the forms of inheritance and use them in programs.
4. Analyze polymorphic behaviour of objects.
5. Design and develop GUI programs.
6. Develop Applets for web applications

3KS04 DATA STRUCTURES

On completion of the course, the students will be able to:

1. Apply various linear and nonlinear data structures
2. Demonstrate operations like insertion, deletion, searching and traversing on various data structures.
3. Examine the usage of various structures in approaching the problem solution.
4. Choose appropriate data structure for specified problem domain

3KS05 ANALOG & DIGITAL ELECTRONICS

At the end of course students will able to:

1. Explain basic concepts of semiconductor devices and its application.
2. Compare different Number System and basics of conversion of number systems.
3. Realize different minimization technique to obtain minimized expression.
4. Design Combinational Circuits.
5. Design and Develop Sequential Circuits.

3KS06 OBJECT ORIENTED PROGRAMMING LAB

Design, implement, test, and debug simple programs in an object-oriented programming language.

1. To develop the knowledge of object-oriented paradigm in the Java programming language.
2. To evaluate classical problems using java programming.
3. To develop software development skills using java programming for real world applications.

3KS07 DATA STRUCTURE LAB

On completion of the course, the students will be able to:

1. Apply various linear and nonlinear data structure.
2. Demonstrate operations like insertion, deletion, searching and traversing on various data Structures.
3. Examine the usage of various structures in approaching the problem solution.
4. Choose appropriate data structure for specified problem domain

3KS08 ANALOG & DIGITAL ELECTRONICS LAB

After successfully completing the lab, the students will be able to:

1. Apply practically the concepts of analog and digital electronics.
2. Explain the operation and characteristics of semiconductor devices.
3. Illustrate the operation of various logic gates and their implementation using digital IC‟s.
4. Design and implement various combinational logic circuits.
5. Design and implement various sequential logic circuits

3KS09 C-SKILL-LAB I

On completion of the course, the students will be able to:

1. Describe the Numbers, Math functions, Strings, List, Tuples and Dictionaries in Python
2. Interpret different Decision-Making statements, Functions, Object oriented programming in Python
3. Summarize different File handling operations
4. Explain how to design GUI Applications in Python and evaluate different database operations
5. Develop applications using Django framework or Flask

SSGMCE SHEGAON

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

COURSE OUTCOMES OF ALL COURSES OF FOURTH SEMESTER
BE CSE (COMPUTER SCIENCE AND ENGINEERING)

4KS01 ARTIFICIAL INTELLIGENCE

On completion of the course, the students will be able to:

1. Explain concepts of Artificial Intelligence and different types of intelligent agents and their architecture.
2. Formulate problems as state space search problem & efficiently solve them.
3. Summarize the various searching techniques, constraint satisfaction problem and example problems - game playing techniques.
4. Apply AI techniques in applications which involve perception, reasoning and learning.
5. Compare the importance of knowledge, types of knowledge, issues related to knowledge acquisition and representation.

4KS02 DATA COMMUNICATION AND NETWORKING

On completion of the course, the students will be able to:

1. Describe data communication Components, Networks, Protocols and various topology-based network architecture.
2. Design and Test different encoding and modulating techniques to change digital –to- digital conversion, analog-to-digital conversion, digital to analog conversion, analog to analog conversion.
3. Explain the various multiplexing methods and evaluate the different error detection & correction techniques.
4. Illustrate and realize the data link control and data link protocols.
5. Describe and demonstrate the various Local area networks and the IEEE standards.

4KS03 OPERATING SYSTEM

On completion of the course, the students will be able to:

1. Explain memory management issues like external fragmentation, internal fragmentation.
2. Illustrate multithreading and its significance.
3. List various protection and security mechanisms of OS.
4. Analyze and solve the scheduling algorithms.
5. Analyze the deadlock situation and resolve it.
6. Compare various types of operating systems.

4KS04 MICROPROCESSOR & ASSEMBLY LANGUAGE PROGRAMMING

On completion of the course, the students will be able to:

1. Describe 8086 microprocessor and its architecture; also understand instruction processing during the fetch-decode-execute cycle.
2. Design and Test assembly language programs using 8086 microprocessor instruction set.
3. Demonstrate the implementation of standard programming constructs, including control structures and functions, in assembly language.
4. Illustrate and realize the Interfacing of memory & various I/O devices with 8086 microprocessors.
5. Explain the basic concepts of Internet of Things

4KS05 THEORY OF COMPUTATION

On completion of the course, the students will be able to:

1. To construct finite state machines to solve problems in computing.
2. To write regular expressions for the formal languages.
3. To construct and apply well defined rules for parsing techniques in compiler.
4. To construct and analyze Push Down, Turing Machine for formal languages.
5. To express the understanding of the Chomsky Hierarchy.
6. To express the understanding of the decidability and un-decidability problems.

4KS06 DATA COMMUNICATION & NETWORKING LAB

On completion of the course, the students will be able to:

1. Analyze performance of various communication protocols.
2. Implement Configure various network protocols.
3. Compare IP Address classes of networks.

4KS07 OPERATING SYSTEM LAB

On completion of the course, the students will be able to:

1. Explain memory management issues like external fragmentation, internal fragmentation.
2. Illustrate multithreading and its significance.
3. List various protection and security mechanisms of OS.
4. Analyze and solve the scheduling algorithms.
5. Analyze the deadlock situation and resolve it.
6. Compare various types of operating systems.

4KS08 MICROPROCESSOR & ASSEMBLY LANG. PROG LAB

On completion of the course, the students will be able to:

1. Analyze the internal workings of the microprocessor.
2. Design and develop programs in Assembly Language Programming.
3. Describe 8086 microprocessor and its architecture; also understand instruction processing during the fetch-decode-execute cycle.
4. Design and Test assembly language programs using 8086 microprocessor instruction set.
5. Demonstrate the implementation of standard programming constructs, including control structures and functions, in assembly language.
6. Illustrate and realize the Interfacing of memory & various I/O devices with 8086 microprocessor.

4KS09 C-SKILL-LAB II

On completion of the course, a student will be able to:

1. Develop client server program and web applications.
2. Make use of project-based experience for web application development.
3. Create embedded systems using Raspberry Pi/Arduino.

SSGMCE SHEGAON

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

COURSE OUTCOMES OF ALL COURSES OF FIFTH SEMESTER
BE CSE (COMPUTER SCIENCE AND ENGINEERING)

5KS01 DATABASE MANAGEMENT SYSTEMS

On completion of the course, the students will be able to:

1. Model, design and normalize databases for real life applications.
2. Discuss data models, conceptualize and depict a database system using ER diagram.
3. Query Database applications using Query Languages like SQL.
4. Design & develop transaction processing approach for relational databases.
5. Understand validation framework like integrity constraints, triggers and assertions.

5KS02 COMPILER DESIGN

On completion of the course, the students will be able to:

1. Describe the fundamentals of compiler and various phases of compilers.
2. Design and implement LL and LR parsers.
3. Solve the various parsing techniques like SLR, CLR, LALR.
4. Examine the concept of Syntax-Directed Definition and translation.
5. Assess the concept of Intermediate-Code Generation and run-time environment.
6. Explain the concept code generation and code optimization

5KS03 COMPUTER ARCHITECTURE & ORGANIZATION

On completion of the course, the students will be able to:

1. Discuss basic structure of computer.
2. Understand the basic operation of CPU.
3. Compare and select various Memory and I/O devices as per requirement.
4. Solve the concepts of number representation and their operation.
5. Explain the concept of parallel processing and pipelining.

5KS04 COGNITIVE TECHNOLOGIES

On completion of the course, the students will be able to:

1. Describe the Cognitive computing and principles of cognitive systems.
2. Identify role of Natural Language Processing in cognitive system.
3. Outline application of advanced analytics in cognitive computing.
4. Justify role of Cloud and Distributed Computing in Cognitive Computing.
5. Assess the process of building a Cognitive Application.
6. Identify the Emerging Areas and Future Applications of Cognitive Computing.

5KS04 DATA SCIENCE AND STATISTICS

On completion of the course, the students will be able to:

1. Explain basics and need of data science.
2. Demonstrate proficiency with statistical analysis of data.
3. Perform linear and multiple linear regression analysis.
4. Develop the ability to build and assess classification-based models.
5. Evaluate outcomes and make decisions based on data.
6. Compare machine learning techniques to solve data science business problems.

5KS04 INTERNET OF THINGS

On completion of the course, the students will be able to:

1. Understand the basics of IoT.
2. Understand design methodology and platforms involved in IoT.
3. Apply the knowledge to interface various sensors with IoT development.
4. Design and Implement IoT system for real time application

5KS04 INTRODUCTION TO CYBER SECURITY

After completion of this course, the students should be able to:

1. Know fundamentals of Cybercrimes and Cyber offenses.
2. Realize the Cyber threats, attacks and Vulnerabilities.
3. Explore the industry practices and tools.
4. Comprehend the Access Control and Authentication Process.
5. Implement Intrusion Detection and Prevention.

5KS05 PRINCIPLES OF MARKETING FOR ENGINEERING

On completion of the course, the students will be able to:

1. Identify the importance of the digital marketing for marketing success,
2. Manage customer relationships across all digital channels and build better customer relationships.
3. Create a digital marketing plan, starting from the SWOT analysis and defining a target group.
4. Identify digital channels, their advantages and limitations, to perceiving ways of their integration taking into consideration the available budget.

5KS05 Open Elect. I (i) FUNDAMENTALS OF FINANCE & ACCOUNTING

On completion of the course, the students will be able to:

1. Define bookkeeping and accounting.
2. Explain the general purposes and functions of accounting.
3. Explain the differences between management and financial accounting.
4. Describe the main elements of financial accounting information – assets, liabilities, revenue and expenses.
5. Identify the main financial statements and their purposes.

5KS05 ENTREPRENEURSHIP

On completion of this course, the students should be able to:

1. Analyze the business environment in order to identify business opportunities,
2. Identify the elements of success of entrepreneurial ventures.
3. Evaluate the effectiveness of different entrepreneurial strategies.
4. Specify the basic performance indicators of entrepreneurial activity.
5. Explain the importance of marketing and management in small businesses venture,
6. Interpret their own business plan.

5KS06 DATABASE MANAGEMENT SYSTEMS LAB

On completion of the course, the students will be able to:

1. Design ER model for any kind of application.
2. Design and develop database.
3. Apply normalization.
4. Query the database.
5. Apply various integrity constraints.
6. Build indices, views.
7. Implement triggers, assertions.

5KS07 COMPILER DESIGN – Lab

On completion of the course, the students will be able to:

1. Identify the fundamentals of compiler and its phases.
2. Use the powerful compiler generation tools such as Lex and Yacc.
3. Write a lexical scanner, either from scratch or using Lex.
4. Develop program for solving parser problems.
5. Examine the various optimization techniques.

5KS08 EMERGING TECHNOLOGY LAB I

On completion of the course, the students will be able to:

1. Demonstrate proficiency with statistical analysis of data.
2. Build skills in transformation and merging of data for use in analytic tools.
3. Perform linear and multiple linear regression analysis.
4. Develop the ability to build and assess data-based models.
5. Evaluate outcomes and make decisions based on data.

5KS08 DATA SCIENCE AND STATISTICS – LAB

On completion of the course, the students will be able to:

1. Demonstrate proficiency with statistical analysis of data.
2. Build skills in transformation and merging of data for use in analytic tools.
3. Perform linear and multiple linear regression analysis.
4. Develop the ability to build and assess data-based models.
5. Evaluate outcomes and make decisions based on data.

5KS09 C-Skill Lab – III

On completion of the course, the students will be able to:

1. Explain the various tools, packages and modules required for Web Development.
2. Discuss the workings of web server, cookies, routes, etc.
3. Develop a mobile application using JS Framework.
4. Design GUI using JS framework and/or Libraries.
5. Create applications using Angular, React, Node and Express.

SSGMCE SHEGAON

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

COURSE OUTCOMES OF ALL COURSES OF SIXTH SEMESTER
BE CSE (COMPUTER SCIENCE AND ENGINEERING)

6KS01 SECURITY POLICY & GOVERNANCE

On completion of the course, the students will be able to:

1. List and discuss the key characteristics of Information Security, Leadership and Management
2. Differentiate between Law and Ethics.
3. Describe why ethical codes of conduct are important to Information Security.
4. Discuss the importance, benefits and desired outcomes of Information Security Governance
5. Discuss the process of developing, implementing and maintaining various types of Information Security Policies.
6. Define Risk Management and its role in the organization.

6KS02 DESIGN AND ANALYSIS OF ALGORITHMS

On completion of the course, the students will be able to:

1. Carry out the analysis of various Algorithms for mainly Time complexity.
2. Apply design principles and concepts to algorithm design.
3. Understand different algorithmic design strategies.
4. Analyze the efficiency of algorithms using time complexity.
5. Apply the standard sorting algorithms.

6KS03 SOFTWARE ENGINEERING

On completion of the course, the students will be able to:

1. Decide on a process model for a developing a software project.
2. Classify software applications and identify unique features of various domains.
3. Design test cases of a software system.
4. Understand basics of Project management.
5. Plan, schedule and execute a project considering the risk management.
6. Apply quality attributes in software development life cycle.
7. Understand quality control and to ensure good quality software.

6KS04 NATURAL LANGUAGE PROCESSING

On completion of the course, the students will be able to:

1. Understand how to tag a given text with basic Language features.
2. Design an innovative application using NLP components.
3. Implement a rule-based system to tackle morphology/syntax of a language.
4. Design a tag set to be used for statistical processing for real-time applications.
5. Compare and contrast the use of different statistical approaches for different types of NLP applications.

6KS04 BIG DATA ANALYTICS

On completion of the course, the students will be able to:

1. Explain basics and need of data science.
2. Demonstrate proficiency with statistical analysis of data.
3. Perform linear and multiple linear regression analysis.
4. Develop the ability to build and assess classification-based models.
5. Evaluate outcomes and make decisions based on data.
6. Compare machine learning techniques to solve data science business problems.

6KS04 SENSORS AND ACTUATORS

On completion of the course, the students will be able to:

1. Fabricate some of those sensors.
2. Simulate sensors and characterize before fabricating it.
3. Design application with sensors and actuators for real world.

6KSO4 CRYPTOGRAPHY

On completion of the course, the students will be able to:

1. Classify the symmetric encryption techniques.
2. Illustrate various public key cryptographic techniques.
3. Evaluate the authentication and hash algorithms.
4. Discuss authentication applications.
5. Summarize the intrusion detection and its solutions to overcome the attacks.
6. Understand basic concepts of system level security.

6KSO5 COMPUTATIONAL BIOLOGY

On completion of the course, the students will be able to:

1. Understand what types of biological questions can be investigated using computers, and what limitations computational methods impose on the understanding of biology.
2. Describe the properties of DNA, RNA, and proteins, the relationships among these molecules.
3. Analyze how to convert a biological question into a computational problem that can be solved using computers.
4. Explain general approaches for solving computational problems, and will be able to apply these approaches to new problems you encounter.
5. Understand how implement the algorithms by writing computer programs.

6KSO5 CYBER LAWS & ETHICS

On completion of this course, the students should be able to:

1. Understand Cyber Space, Cyber Crime, Information Technology, Internet & Services.
2. List and discuss various forms of Cyber Crimes.
3. Explain Computer and Cyber Crimes.
4. Understand Cyber Crime at Global and Indian Perspective.
5. Describe the ways of precaution and prevention of Cyber Crime as well as Human Rights.

6KS05 INTELLECTUAL PROPERTY RIGHTS

On completion of the course, the students will be able to:

1. Demonstrate a breadth of knowledge in Intellectual property.
2. Assess fundamental aspects of Intellectual Property Rights.
3. Discuss Patents, Searching, filling and drafting of Patents.
4. Discuss the basic principles of geographical indication, industrial designs, and copyright.
5. Explain of Trade Mark and Trade Secret.
6. Investigate current trends in IPR and Government initiatives in fostering IPR.

6KS06 DESIGN AND ANALYSIS OF ALGORITHMS – LAB

On completion of the course, the students will be able to:

1. Carry out the analysis of various Algorithms for mainly Time complexity.
2. Apply design principles and concepts to algorithm design.
3. Understand different algorithmic design strategies.
4. Analyze the efficiency of algorithms using time complexity.
5. Apply the standard sorting algorithms.

6KS07 SOFTWARE ENGINEERING LAB

On completion of the course, the students will be able to:

1. Understand basic Software engineering methods and practices, and their appropriate application.
2. Describe software process models such as the waterfall and evolutionary models.
3. Discuss role of project management including planning, scheduling and, risk management.
4. Explain data models, object models, context models and behavioral models.
5. Understand of different software architectural styles and Process frame work.

6KS09 C SKILL LAB IV– LAB (DevOps)

On completion of the course, the students will be able to:

1. Install and setup of Jenkins on your systems.
2. Create and run jobs in Jenkins.
3. Add and manage plugins. Use plugins in jobs.
4. Create and run pipelines in Jenkins.
5. Setup, configure, and deploy jobs.

SSGMCE SHEGAON

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

COURSE OUTCOMES OF ALL COURSES OF SEVENTH SEMESTER
BE CSE (COMPUTER SCIENCE AND ENGINEERING)

7KS01 SOCIAL SCIENCE & ENGINEERING ECONOMICS

On completion of the course, the students will be able to:

1. To identify the importance of fundamental rights as well as fundamental duties.
2. To study the composition and powers of the Indian Parliament.
3. To study the impact of science and technology on culture and civilization.
4. To identify the different market structures.
5. To study the decision-making process and the relationship between engineering and economics.
6. To identify the importance of Economic Development on the livelihood of the citizens.

7KS02 COMPUTER NETWORKS

On completion of the course, the students will be able to:

1. Describe the basic concepts of Computer Graphics.
2. Demonstrate various algorithms for basic graphics primitives.
3. Apply 2-D geometric transformations on graphical objects.
4. Use various Clipping algorithms on graphical objects.
5. Explore 3-D geometric transformations, curve representation techniques and projections methods
6. Explain visible surface detection techniques and Animation

7KS03 CLOUD COMPUTING

On completion of the course, the students will be able to:

1. Describe the fundamental concept, architecture and applications of Cloud Computing.
2. Discuss the problems related to cloud deployment model.
3. Examine the concept of virtualization.
4. Identify the role of network connectivity in the cloud.
5. Assess different Cloud service providers.
6. Inspect the security issues in cloud service models.

7KS04 ROBOTICS

On completion of the course, the students will be able to:

1. Describe basic concept of robotics.
2. Explain Components of a Robot System & Mechanical Systems.
3. Illustrate Control of Actuators in Robotic Mechanisms.
4. Compare and contrast Robotic Sensory Devices.
5. Recommend Robotics Hardware & Software Considerations in Computer Vision
6. Design Robotic system by taking real time considerations.

7KS04 DATA WAREHOUSE AND MINING

On completion of the course, the students will be able to:

1. Explain the basics of data mining techniques.
2. Identify the similarity and dissimilarity between the data sets.
3. Apply Data Preprocessing to techniques.
4. Describe Data Warehouse fundamentals, Data Mining Principles.
5. Illustrate Multidimensional Data Analysis in Cube Space.
6. Assess Mining Frequent Patterns, Associations, and Correlations.

7KS04 EMBEDDED SYSTEM

On completion of the course, the students will be able to:

1. Describe the basics of embedded systems and structural core units as well as memory organization for embedded system.
2. Explain components of embedded system, characteristics and quality attributes of embedded systems.
3. Discuss role of 8051 microcontroller and its architecture in design of embedded systems.
4. Examine the different Addressing modes and Instruction Set of 8051 microcontrollers.
5. Use knowledge of C programming to do embedded programming.
6. Assess the Real-Time Operating System concepts with VxWorks RTOS.

7KS04 Digital Forensics

On completion of the course, the students will be able to:

1. Describe Digital Forensics and its related preparation
2. Outline Data Acquisition tools
3. Use knowledge to improve crime investigations.
4. Examine Digital Forensic and its validation
5. Assess role of email and social media in investigations
6. Discuss Cloud Forensics.

7KS05 BLOCK CHAIN FUNDAMENTALS

On completion of the course, the students will be able to:

1. Understand the concept of decentralization of the block chain with different layers of blockchain
2. Apply basic cryptographic primitives with encryption standards.
3. Analyze & Design Consensus Algorithms.
4. Examine fundamentals of Bitcoin, how Bitcoin transactions are constructed and used with Bitcoin addresses, accounts, and mining.
5. Understand foundation, architecture, and use of the Ethereum blockchain.
6. Execute & build block chain application/ transaction.

7KS05 IMAGE PROCESSING

On completion of the course, the students will be able to:

1. Explain fundamental steps in Image Processing.
2. Compare different methods for image transform with its properties.
3. Illustrate Image Enhancement in spatial domain.
4. Examine Image Enhancement in Frequency Domain.
5. Apply various methods for segmenting image and identifying image components.

7KS05 OPTIMIZATION TECHNIQUES

On completion of the course, the students will be able to:

1. Describe statement of an optimization problem
2. Examine linear programming procedures to solve optimization problems.
3. Compare different nonlinear programming methods of optimization
4. Discuss Geometric Programming with different constraint
5. Identify the appropriate optimization technique for the given problem
6. Synthesize algorithms to solve real time optimization problems.

7KS06 COMPUTER GRAPHICS LAB

On completion of the course, the students will be able to:

1. Describe the basic concepts of Computer Graphics.
2. Demonstrate various algorithms for basic graphics primitives.
3. Apply 2-D geometric transformations on graphical objects.
4. Use various Clipping algorithms on graphical objects
5. Explore 3-D geometric transformations, curve representation techniques and projections methods
6. Explain visible surface detection techniques and Animation.

SSGMCE SHEGAON

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

COURSE OUTCOMES OF ALL COURSES OF FIRST SEMESTER ME CE (COMPUTER ENGINEERING)

1KMEF1 ADVANCED COMPUTER ARCHITECTURE

After completing this course, student will be able to

1. Understand Fundamental Concepts of Computer Architecture
2. Identify limitations and other issues of Pipelining in DLX Architecture
3. Understand Advanced Pipeline and Instruction Level Parallelism with its Limitations
4. Explain Cache hit and miss Primary and Virtual Memory and Memory Hierarchy design challenges.
5. Understand Storage system, working of OS and inter connected networks.

1KMEF2 ALGORITHMICS

After completing this course, student will be able to

1. Understand the fundamental algorithms like searching, sorting, graph traversal and divide-and-conquer
2. Understand how algorithm can be used in engineering applications
3. Make use of dynamic programming to solve optimization problem
4. Apply Dijkstra's, Kruskal's and Prim's algorithm to solve complex problem
5. Analyze computational complexity of different algorithms
6. Design the algorithm to solve problem efficiently

1KMEF3 OPERATING SYSTEM DESIGN

After completing this course, student will be able to

1. Possess knowledge of the role of Operating Systems and their types.
2. Apply the concept of a process, thread and scheduling algorithms.
3. Apply the concepts of process synchronization and how it is achieved.
4. Realize the concept of deadlock and different ways to handle it.
5. Realize various memory management techniques.
6. Realize the concept of I/O management and File system

1KMEF4 OBJECT-ORIENTED SYSTEMS

After completing this course, student will be able to

1. Explain OOAD concepts and various UML diagrams
2. Select an appropriate design pattern
3. Illustrate about domain models and conceptual classes
4. Compare and contrast various testing techniques
5. Construct projects using UML diagrams

1KMEF5 MOBILE COMPUTING

After completing this course, student will be able to

1. Identify the characteristics and infrastructure of different wireless communication systems, such as cellular, satellite, Ad Hoc and sensor networks, wireless MANs, LANs, and PANs
2. Explain the propagation mechanisms and types of radio waves used in wireless communication, including free space propagation, land propagation, path loss, and interference
3. Evaluate the cellular concept, frequency reuse, and channel allocation techniques, including fixed, dynamic, and hybrid allocation methods
4. Analyze mobile communication systems' infrastructure, handoff parameters, roaming support, and security measures, and compare existing wireless systems such as AMPS, IS-41, GSM, and IMT-2000
5. Discuss ad hoc and sensor networks, routing protocols, and wireless MANs, LANs, and PANs, including recent advances and ultra-wideband technology
6. Evaluate multimedia service requirements, resource management, directional and smart antennas, and security issues in wireless communication systems

SSGMCE SHEGAON

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

COURSE OUTCOMES OF ALL COURSES OF SECOND SEMESTER

ME CE (COMPUTER ENGINEERING)

2KMEF1 NETWORK SYSTEMS DESIGN

After completing this course, student will be able to

1. Develop an understanding of the network analysis, architecture, and design process, including system and service descriptions, performance characteristics, and network supportability
2. Apply requirements analysis techniques, such as identifying and listing user, application, device, network, and performance requirements, developing service metrics, and creating behavior characterizations
3. Analyze flow basics, including flow identification and development, flow models, prioritization, and specifications, and comprehend network architecture, including component architectures, reference architecture, and systems and network architectures
4. Evaluate addressing and routing architecture fundamentals, addressing and routing mechanisms, strategies, and considerations, and their impact on network architecture
5. Define network management architecture objectives and basics, network management mechanisms, and architectural considerations for network management architecture
6. Analyze performance architecture objectives and basics, performance mechanisms, and architectural considerations for performance mechanisms, and develop network layout, design traceability, and design metrics

2KMEF2 ADVANCED COMPILING TECHNIQUES

After completing this course, student will be able to

1. Acquire knowledge of different phases and passes of the compiler and also able to use the compiler tools like LEX, YACC, etc. Students will also be able to design different types of compiler tools to meet the requirements of the realistic constraints of compilers.
2. Understand the parser and its types i.e. Top-Down and Bottom-up parsers and construction of LL, SLR, CLR, and LALR parsing table.
3. Implement the compiler using syntax-directed translation method and get knowledge about the synthesized and inherited attributes.
4. Acquire knowledge about run time data structure like symbol table organization and different techniques used in that.
5. Understand the target machine's run time environment, its instruction set for code generation and techniques used for code optimization.

2KMEF3 EMBEDDED SYSTEMS DESIGN

After completing this course, student will be able to

1. Understand the concepts of embedding system including hardware, software and firmware
2. Understand the fundamentals of real time systems and challenges associated with designing
3. Analyze electronic circuits like digital logic gates, analog circuits and power supplies
4. Implement real world embedded system project with its functionality and performance
5. Develop problem solving skills to address challenges in embedded system such as reliability, security and performance

2KMEF4 SYSTEMS SECURITY

After completing this course, student will be able to

1. Understand fundamental concepts of system security such as attacks and their solutions.
2. Understand components of attacks on application programs and control measures on this.
3. Know Operating System protection through protection mechanism and Trusted Operating System Designs.
4. Understand Database security through various aspects of security mechanism.
5. Understand threats to Computer Network and its controls.

Shri Gajanan Shikshan Sanstha's
SHRI SANT GAJANAN MAHARAJ COLLEGE OF ENGINEERING
SHEGAON – 444203, DIST. BULDHANA (MAHARASHTRA STATE), INDIA
"Recognized by A.I.C.T.E., New Delhi" Affiliated to Sant Gadge Baba Amravati University, Amravati
"Approved by the D.T.E., M.S. Mumbai"

Ph : +918669638081/82 Email.principal@ssgmce.ac.in, registrar@ssgmce.ac.in
Website- www.ssgmce.ac.in

Course Outcomes

Department of Electrical Engineering

SSGMCE SHEGAON

DEPARTMENT OF ELECTRICAL ENGINEERING

COURSE OUTCOMES OF ALL COURSES OF FIRST SEMESTER
BE ELECTRICAL (ELECTRONICS & POWER)

1A1 ENGINEERING MATHEMATICS - I

After completing this course, student will be able to

1. Find n^{th} order derivative of functions and product of functions and expand the function in a power series and evaluation of limits of indeterminate forms.
2. Find the partial derivatives and Jacobian of explicit and implicit functions
3. Obtain maxima and minima of a function with constraints by using Lagrange's method of undetermined multipliers.
4. Find the powers and roots of complex numbers, separate the complex quantity in real & imaginary parts, and find the logarithms of complex numbers.
5. Able to solve ordinary differential equations of first order and first degree by various methods and apply these to solve problems in engineering fields.
6. Able to solve ordinary differential equations of first order and higher degree by various methods

1A2 ENGINEERING PHYSICS

After completing this course, student will be able to

1. To apply the knowledge of solid-state devices such as semiconductor diode, Zener diode & LED in various Electronics applications.
2. To apply the knowledge of Quantum Mechanics in engineering fields
3. To apply the principles of electron ballistics to demonstrate the functioning of CRO & mass spectrograph.
4. To apply the principles of geometrical optics such as interference & diffraction in various engineering fields
5. To apply the principles of fiber optics, LASER & fundamentals of acoustics, ultrasonics & fluid dynamics in various engineering domains

1A3 ENGINEERING MECHANICS

After completing this course, student will be able to

1. Compose and resolve the forces along with its effect.
2. Apply principles of statics to the system of rigid bodies and analyse simple structures.
3. Calculate frictional forces for simple contact, wedges and belt friction.
4. Locate centroid and calculate moment of inertia.
5. Calculate various kinematic quantities.
6. Solve the problems using different kinetic equations related to direct and interconnected particles.
7. Apply principle of conservation of momentum and laws of impact.

1A4 COMPUTER PROGRAMMING

After completing this course, student will be able to

1. To explain fundamental concepts of computer and computing.
2. To test and execute the programs and correct syntax and logical errors.
3. To demonstrate various operators and expressions to solve real life problems.
4. To demonstrate various concepts of control structure to solve complex problems
5. To use arrays, strings and structures to formulate algorithms and programs.
6. To demonstrate various concepts of functions, pointers and file handling mechanism.

1A5 WORKSHOP PRACTICE

After completing this course, student will be able to

1. Upon completion of this course, the students will gain knowledge of different manufacturing processes which are commonly employed in industry.
2. Upon completion of this course, the students will be able to fabricate the components using various manufacturing techniques.
3. The students will be conversant with the concept of dimensional accuracy and tolerances.

SSGMCE SHEGAON

DEPARTMENT OF ELECTRICAL ENGINEERING

COURSE OUTCOMES OF ALL COURSES OF SECOND SEMESTER BE ELECTRICAL (ELECTRONICS & POWER)

1B1 ENGINEERING MATHEMATICS – II

After completing this course, student will be able to

1. Use matrices for solving system of simultaneous linear equations, Find Eigen values and Eigen vectors of the matrix. Find inverse of matrix by various methods
2. Find the Fourier expansion of periodic and non-periodic functions
3. Explain curve tracing with justification which are useful in applications of integration. Use technique of Differentiation under integral sign to evaluate integrals. Find Product of Vectors
4. Acquire knowledge about Gamma & Beta function, Reduction Formulae and rectification
5. Evaluate double integral and its application to find area
6. Evaluation and application of triple integrals in Engineering problems

1B2 ENGINEERING CHEMISTRY

After completing this course, student will be able to

1. Identify the various methods of water softening along with application of water and its quality parameters for the use of water in industry
2. Explain the various types of corrosion, its control methods and battery technology
3. Identify the various materials such as Cement, lubricant, Ceramics, Refractory, Nonmaterial
4. used for future technology with their application in day-to-day life
5. Identify the fuel for IC engines and their characteristics with respect to its working
6. To utilize the knowledge about polymer and engineering materials towards different applications
7. To provide the knowledge about Metallurgy and analytical techniques

1B3 BASIC ELECTRICAL ENGINEERING

After completing this course, student will be able to

1. Solve numerical on basic electric and magnetic circuits.
2. Apply AC fundamentals to analyse single phase & three phase circuits.
3. Explain the operating principles of various electrical machines
4. Explain the working of various measuring instruments and importance of earthing.

1B4 ENGINEERING GRAPHICS

After completing this course, student will be able to

1. read/prepare/understand the engineering drawings
2. create the projections and sectional views of 3D objects
3. draw the orthographic and isometric views of 3D objects
4. use graphics software to create Engineering drawings and represent engineering systems

1B5 ENGLISH COMMUNICATION SKILLS LABORATORY

After completing this course, student will be able to

1. The learning outcome of students will be assessed through assignments, tests and final exams and most importantly through practical performances.
2. Through these tests, it would be revealed that students are able to reproduce their understanding of concepts/principles of communication in English language.
3. Students can present themselves well in front of large audience on a variety of topics. Moreover, they get the knack for structured conversation to make their point of views clear to the listeners.

SSGMCE SHEGAON

DEPARTMENT OF ELECTRICAL ENGINEERING

COURSE OUTCOMES OF ALL COURSES OF THIRD SEMESTER BE ELECTRICAL (ELECTRONICS & POWER)

3EP01 ENGINEERING MATHEMATICS – III

After completing this course, student will be able to

1. solve the Linear Differential equations with constant coefficients and apply this knowledge to Electrical circuits
2. analyse Laplace Transform of various types of functions and able to find Laplace Transform of Periodic, Impulse & Unit step function. Use LT to solve LDE
3. apply the knowledge of Laplace Transform to find solution of Linear Differential equations with constant coefficients.
4. find Fourier Transform of various types of functions and apply this knowledge to find Fourier Transform of functions, in their core subjects
5. find Z Transform of various types of functions and apply this knowledge to problems in Electrical Engineering.
6. Differentiate and integrate the vector point functions and apply this knowledge to problems in Electrical Engineering, especially in Electric and Magnetic fields.

3EP02 ELECTRICAL CIRCUIT ANALYSIS

After completing this course, student will be able to

1. Analyze electric and magnetic circuits using basic circuital laws
2. Analyze the circuit using Network simplification theorems
3. Solve circuit problems using concepts of electric network topology
4. Evaluate transient response of different circuits using Laplace transform
5. Evaluate two-port network parameters and network functions

3EP03 ELECTRICAL MACHINE – I

After completing this course, student will be able to

1. Explain the Construction, working, operation of DC Machines.
2. Determine Performance Parameter of DC machine by conducting various tests on DC Machine
3. Illustrate characteristics, starting, braking of DC Motors
4. Demonstrate the construction, working, types of connection and Application of Transformers.
5. Determine Performance Parameter of Transformer by conducting various tests on Transformers

3EP04 ENERGY RESOURCES AND GENERATION

After completing this course, student will be able to

1. Explain the operation of Thermal, Hydro, Nuclear and Diesel power plants
2. Summarize solar energy conversion, solar radiation measuring instruments, wind energy conversion and their applications.
3. Outline the principle and operation of fuel cells, ocean & tidal energy conversion, and other nonconventional energy resources.
4. Determine the various factors and curves related to electrical load & generating plant**.**

3EP05 ELECTRONIC DEVICES & CIRCUITS

After completing this course, student will be able to

1. Demonstrate the knowledge of semiconductor physics and PN Junction Diode
2. Analyze the rectifier and regulator circuits.
3. Analyze the operational parameters of BJT
4. Analyze various multistage amplifier circuits
5. Demonstrate the knowledge of JFET, MOSFET, UJT and their operational parameters

SSGMCE SHEGAON

DEPARTMENT OF ELECTRICAL ENGINEERING

COURSE OUTCOMES OF ALL COURSES OF FOURTH SEMESTER BE ELECTRICAL (ELECTRONICS & POWER)

4EP01 ELECTROMAGNETIC FIELD

After completing this course, student will be able to

1. Demonstrate the understanding of basic mathematical concepts related to electromagnetic vector fields
2. Apply the principles of electrostatics to the solutions of problems relating to electric field
3. Apply the principles of magneto statics to the solutions of problems relating to magnetic field
4. Apply Maxwell's equation in different forms (differential and integral) to diverse engineering problems.

4EP02 ELECTRICAL MEASUREMENT & INSTRUMENTATION

After completing this course, student will be able to

1. Classify the various measuring instruments like PMMC, MI, Electrodynamometer, and Induction type instruments for measurement of current, voltage, power, and energy.
2. Demonstrate the construction & working of Instrument Transformers and special purpose meters.
3. Analyze various methods for measurement of resistance, inductance, and capacitance using AC/DC bridges.
4. Explain the working of various Digital measuring instruments.
5. Explain the generalized Instrumentation system & working of different transducers.

4EP03 CONTROL SYSTEM

After completing this course, student will be able to

1. Demonstrate the fundamental concepts of automatic Control and mathematical modelling of the System
2. Determine the transfer function of control system components
3. Analyze the time response of various systems and performance of controllers
4. Evaluate the stability of linear systems using various methods

4EP04 NUMERICAL METHODS & OPTIMIZATION TECHNIQUES

After completing this course, student will be able to

1. Determine solutions for linear and simultaneous equations using numerical methods.
2. Apply various curve fitting techniques.
3. Make use of various numerical methods for solving Numerical differentiation, integration, and Differential Equations.
4. Determine the optimum scheduling by using CPM and PERT.

4EP05 ANALOG & DIGITAL CIRCUITS

After completing this course, student will be able to

1. Explain the principles of operational amplifiers, parameters of op-amp
2. Illustrate the linear and nonlinear applications of op-amp
3. Demonstrate the knowledge of Voltage regulator and Timer ICs
4. Describe the working of Logic families and their applications.
5. Demonstrate the knowledge of combinational and sequential circuits and its application

SSGMCE SHEGAON

DEPARTMENT OF ELECTRICAL ENGINEERING

COURSE OUTCOMES OF ALL COURSES OF FIFTH SEMESTER
BE ELECTRICAL (ELECTRONICS & POWER)

5EP01 POWER SYSTEM – I

After completing this course, student will be able to

1. Analyze the transmission system with respect to various electrical parameters
2. Examine the performance of transmission line
3. Describe transmission lines' voltage control and power factor improvement methods
4. Model power system using single line, impedance and reactance diagrams.
5. Illustrate Corona phenomenon, Ferranti effect, various Insulators, its string efficiency and underground cables

5EP02 MICROPROCESSOR & MICROCONTROLLER

After completing this course, student will be able to

1. Identify the architectural and functioning difference between microprocessor 8085,8086 and microcontroller 8051
2. Make use of Assembly Language Programming of Microprocessor 8085
3. Select a peripheral to be interface with microprocessor for control and measurement application
4. Experiment with microprocessor 8085 and peripherals for control and measurement of electrical quantities

5EP03 ELECTRICAL MACHINE – II

After completing this course, student will be able to

1. Describe the construction, working operation & performance characteristics of three phase Induction Motor
2. Analyze the starting, braking and speed control of three phase induction motors by various methods
3. Describe the construction, working operation & performance characteristics of single-phase Induction Motor
4. Demonstrate the construction, working operation & performance characteristics of synchronous machine
5. Explain the construction & working of special motors like Universal, Reluctance, PMSM & BLDC Motor

5EP04 SIGNAL & SYSTEM (Professional Elective – I)

After completing this course, student will be able to

1. Demonstrate the understanding of continuous-time and discrete-time signals and systems
2. Analyze the continuous-time and Discrete time systems using Fourier transform
3. Apply sampling theorem for different applications
4. Analyze DT systems using Z-transforms

5EP04 NETWORK ANALYSIS AND SYNTHESIS (Professional Elective – I)

After completing this course, student will be able to

1. Analyze the transient response of series and parallel A.C. circuits
2. Demonstrate the properties of network functions.
3. Demonstrate the properties of positive Real Functions
4. Synthesize driving point functions of RL, RC and RLC
5. Synthesize two port network functions
6. Design passive filters to meet desired specifications

5EP05 POWER SUPPLY SYSTEM (Open Elective – I)

After completing this course, student will be able to

1. Distinguish between construction and working of various power generation plants
2. Describe layout and working of Substations
3. Compare various power distribution system
4. Explain types of wiring, necessity of earthing and safety precautions.

5EP05 ELECTRICAL DRIVES (Open Elective – I)

After completing this course, student will be able to

1. Explain the basic Concept of electrical drives
2. Describe Power Electronics devices & their applications
3. Demonstrate various starting, braking and speed control methods of D.C. Motors
4. Demonstrate various starting, braking and speed control methods of three phase Induction Motor.
5. Describe the construction, working principle and applications of single-phase Induction Motor special motors.

SSGMCE SHEGAON

DEPARTMENT OF ELECTRICAL ENGINEERING

COURSE OUTCOMES OF ALL COURSES OF SIXTH SEMESTER BE ELECTRICAL (ELECTRONICS & POWER)

6EP01 POWER ELECTRONICS

After completing this course, student will be able to

1. Explain the knowledge about fundamental concepts and techniques used in power electronics
2. Analyze various single phase and three phase power converter and Inverter circuits
3. Analyze the operation of DC/DC and AC/AC converter circuits
4. Implement industrial applications of power electronic circuits.

6EP02 ELECTRICAL ENERGY DISTRIBUTION & UTILIZATION

After completing this course, student will be able to

1. Demonstrate the knowledge of distribution substation
2. Compare different power distribution systems
3. Describe elements of distribution Automation system
4. Select proper electrical drive for industrial applications
5. Explain the working of electric traction system
6. Design an illumination system for various locations

6EP03 COMPUTER AIDED ELECTRICAL MACHINE DESIGN

After completing this course, student will be able to

1. Apply the suitable method for Computer aided machine design & select the proper material .
2. Design the single phase & three phase transformer.
3. Evaluate the performance of the transformer from its design data
4. Design the three phase Induction motor
5. Develop the computer program for design of transformer and three phase IM

6EP04 ADVANCE CONTROL SYSTEM (Professional Elective – II)

After completing this course, student will be able to

1. Design compensator using time and frequency domain specifications
2. Analyze the system using state space Model
3. Apply Z Transform to analyse Digital systems
4. Analyze the Nonlinear systems

6EP04 PROCESS CONTROL SYSTEMS (Professional Elective – II)

After completing this course, student will be able to

1. Explain the various Electronic Instruments for measurement of electrical parameters.
2. Analyse the different signals
3. Demonstrate the signal counting, recording and working of digital readout devices.
4. Demonstrate the Various techniques of A/D and D/A conversions.
5. Apply various signal processing tools as per requirement
6. Develop ladder diagrams &programmes for PLC

6EP05 ENERGY AUDIT & MANAGEMENT (Open Elective - II)

After completing this course, student will be able to

1. Discuss energy scenario and it's management.
2. Conduct the energy audit of different systems.
3. Determine the economics of energy conservation
4. Discuss various energy Conservation methods & their case studies
5. Explain fundamentals of Harmonics.

6EP05 ELECTRICAL ESTIMATING & COSTING (Open Elective – II)

After completing this course, student will be able to

1. Understand methods of installation and estimation of service connection
2. Decide type of wiring, its estimation and costing for residential building
3. Carry out electrification of commercial complex, factory unit installations
4. Design & estimate for feeders & distributors
5. Understand contract, tendering and work execution process.

SSGMCE SHEGAON

DEPARTMENT OF ELECTRICAL ENGINEERING

COURSE OUTCOMES OF ALL COURSES OF SEVENTH SEMESTER BE ELECTRICAL (ELECTRONICS & POWER)

7EP01 POWER SYSTEM – II

After completing this course, student will be able to

1. Explain the basic Concept of Fault Analysis in Electrical systems.
2. Analyze the different types of symmetrical and Unsymmetrical Fault in Electric Power System
3. Explain the concept of Power System Stability and synchronous machine parameter determination.
4. Analyze the steady state stability of system.
5. Assess transient state stability of two-machine system

7EP02 DIGITAL SIGNAL PROCESSING

After completing this course, student will be able to

1. Analyze the discrete time signals in time domain
2. Analyze the discrete time systems using DTFT and DFT
3. Explain the concept of Bandpass sampling
4. Design the structures of different types of digital filters
5. Analyze the frequency response of various digital filters
6. Apply the knowledge of multi-rate signal processing

7EP03 ENTREPRENEURSHIP AND PROJECT MANAGEMENT

After completing this course, student will be able to

1. Understand the concept of entrepreneurship and its role in economic development.
2. Compare the various business model and select the most suitable.
3. Identify & formulate the project report and Source of finance for a project.
4. Estimate the cost, time & resources for the project work.

7EP04 POWER SYSTEM OPERATION & CONTROL (Professional Elective-III)

After completing this course, student will be able to

1. Apply the knowledge of preliminaries on power system operation and control.
2. Determine the optimal scheduling of generation for a two-plant system with and without losses for the economic operation of the power system.
3. Develop the mathematical model of the Automatic Voltage Regulator (AVR) loop and the Automatic Load-Frequency Control (ALFC) loop.
4. Build the block diagram of two area system.
5. Explain the role of the power system stabilizer in damping the steady-state oscillations set up in the power system

7EP04 WIND AND SOLAR SYSTEMS (Professional Elective-III)

After completing this course, student will be able to

1. Understand the energy scenario and the consequent growth of the power generation from renewable energy sources.
2. Understand the basic physics of wind and solar power generation.
3. Understand the power electronic interfaces for wind and solar generation.
4. Understand the issues related to the grid-integration of solar and wind energy systems.

7EP05 ARTIFICIAL INTELLIGENCE (Professional Elective-IV)

After completing this course, student will be able to

1. Build Artificial model of neuron and architectures of neural network
2. Make use of supervised /unsupervised learning methods for training of ANN
3. Apply fuzzy logic for solving engineering problems
4. Utilize genetic algorithm for optimization of engineering problem

7EP05 ELECTRICAL DRIVES & CONTROL (Professional Elective-IV)

After completing this course, student will be able to

1. Elaborate the Concept of electrical drives.
2. Demonstrate the knowledge of modern speed and torque control techniques of electrical drives.
3. Elaborate the scalar control strategies of AC drives.
4. Discuss the vector controlled strategies for AC motor drives
5. Explain direct torque & flux control techniques of Electrical drives.

SSGMCE SHEGAON

DEPARTMENT OF ELECTRICAL ENGINEERING

COURSE OUTCOMES OF ALL COURSES OF EIGHTH SEMESTER
BE ELECTRICAL (ELECTRONICS & POWER)

8EP01 POWER SYSTEM PROTECTION

After completing this course, student will be able to

1. Explain the construction, working and characteristics of different types of protective relays.
2. Develop the protection systems for Distribution and transmission line.
3. Develop the protection systems for various elements of a power system like Alternators, Transformers, Motors & Busbar.
4. Explain the construction & working of different types of circuit breakers, MCB, ELCB, RCCB & fuses.

8EP02 COMPUTER METHODS IN POWER SYSTEM ANALYSIS

After completing this course, student will be able to

1. Develop mathematical model to represent the power system components
2. Demonstrate the topology of electrical power system.
3. Formulate Bus Impedance & admittance matrices for Power System Network
4. Conduct short circuit studies of electrical power system.
5. Carry out the load flow Analysis of electrical power system.
6. Perform stability study of electrical power system

8EP03 HIGH VOLTAGE ENGINEERING (Professional Elective-V)

After completing this course, student will be able to

1. Explain the breakdown mechanism in solid, liquid, and gaseous dielectrics.
2. Select an appropriate protective device to protect the power system against overvoltage's caused by internal and external causes.
3. Utilize different circuits for the generation of high AC, DC, and impulse voltages.
4. Measure high AC, DC, and impulse voltages.
5. Test the insulation of various high voltage apparatus used in the power system.

8EP03 HVDC and FACTS (Professional Elective-V)

After completing this course, student will be able to

1. Discuss different components of HVDC transmission system.
2. Explain the operation and control of HVDC converters.
3. Identify the suitable reactive power compensation technique and filter for HVDC system.
4. Choose proper FACTS controller for the specific application based on system requirements.
5. Analyze the circuits of static shunt and static series compensators used for the prevention of voltage instability and improvement of transient stability and power damping oscillations.
6. Demonstrate the knowledge of Unified power flow controller (UPFC).

8EP04 POWER QUALITY (Professional Elective-VI)

After completing this course, student will be able to

1. Illustrate the concept, need, and standards of Power Quality
2. Classify Power quality characteristics
3. Select power conditioning device for mitigation of power quality problem
4. Make use of measurement tools for power quality survey

8EP04 ELECTRICAL ENERGY CONSERVATION AND AUDITING (Professional Elective-VI)

After completing this course, student will be able to

1. Summarize Indian and global energy scenario.
2. Explain types of energy Audit and its procedure.
3. Discuss economics of energy conservation
4. Elaborate the concepts of energy conservation and management.
5. Choose Appropriate energy efficient techniques for energy conservation
6. Apply the understanding of energy conservation and management for industrial applications.

Shri Gajanan Shikshan Sanstha's
SHRI SANT GAJANAN MAHARAJ COLLEGE OF ENGINEERING
SHEGAON – 444203, DIST. BULDHANA (MAHARASHTRA STATE), INDIA
"Recognized by A.I.C.T.E., New Delhi" Affiliated to Sant Gadge Baba Amravati University, Amravati
"Approved by the D.T.E., M.S. Mumbai"

Ph : +918669638081/82 Email.principal@ssgmce.ac.in, registrar@ssgmce.ac.in
Website- www.ssgmce.ac.in

Course Outcomes

Department of Electronics and Telecommunication Engineering

S.S.G.M.C.E. SHEGAON

DEPARTMENT OF ELECTRONICS AND TELECOMMUNICATION ENGINEERING

COURSE OUTCOMES OF ALL COURSES OF THE THIRD SEMESTER B.E. (ELECTRONICS AND TELECOMMUNICATION ENGINEERING)

3ETC01 - Engineering Mathematics-III

After successfully completing the course, the students will be able to:

CO1	Demonstrate the knowledge of differential equations to solve engineering problems of analog systems.
CO2	Apply Laplace Transform to solve Linear Differential equations.
CO3	Apply the knowledge of vector calculus.
CO4	Comprehend knowledge of complex analysis in terms of complex variables, harmonic functions and conformal mappings.
CO5	Apply numerical method to obtain approximate solutions to mathematical problems.
CO6	Identify and solve certain forms of difference equations as applied to discrete systems. Identify and solve various forms of partial differential equations.

3ETC02 - Electronic Devices and Circuits

After successfully completing the course, the students will be able to:

CO1	Comprehend the knowledge of PN-junction diode and its applications in rectifiers, clippers and clampers circuits.
CO2	Analyse different wave shaping circuits and their responses to various signals.
CO3	Understand the construction and characteristics of BJT, JFET, MOSFET and UJT.
CO4	Analyse single stage and multistage amplifier circuits using BJT.
CO5	Analyse negative feedback amplifiers and oscillator circuits using BJT.

3ETC03 - Digital System Design

After successfully completing the course, the students will be able to:

CO1	Use Boolean algebra to solve logic functions, minimization techniques number systems and its conversion.
CO2	Identify, analyze and design of combinational and sequential logic circuits.
CO3	Understand digital logic families and their characteristics.
CO4	Use the knowledge of semiconductor memories, programmable logic devices in digital design.

3ETC04 - Electromagnetic Waves

After successfully completing the course, the students will be able to:

CO1	Apply vector calculus to understand the behavior of static electric and magnetic fields.
CO2	Formulate and solve problems in electrostatics and magneto-statics in dielectric media.
CO3	Describe and analyze electromagnetic wave propagation in free-space.
CO4	Analyze plane electromagnetic waves at boundaries between homogeneous media.
CO5	Analyze the electromagnetic radiation from localized charges considering retardation effects.

3ETC05 - Object Oriented Programming

After successfully completing the course, the students will be able to:

CO1	To understand the important concepts of object-oriented programming like object and class, Encapsulation, inheritance, and polymorphism; compare procedure and object-oriented approach; write the skeleton of C++ program and able to make use of objects and classes for developing programs.
CO2	To apply features of C++ like type conversion, polymorphism and inheritance, constructors, destructors, Friend Functions and Virtual functions etc to develop small programs.
CO3	To analyse and evaluate the use of various concepts of object-oriented programming
CO4	To design and develop the applications using object-oriented programming

S.S.G.M.C.E. SHEGAON

DEPARTMENT OF ELECTRONICS AND TELECOMMUNICATION ENGINEERING

COURSE OUTCOMES OF ALL COURSES OF THE FOURTH SEMESTER B.E. (ELECTRONICS AND TELECOMMUNICATION ENGINEEING)

4ETC01 - Analog and Digital Communication

After successfully completing the course, the students will be able to:

CO1	Understand the necessity of modulation and identify the various components of analog and Digital communication systems.
CO2	Understand different modulation and demodulation schemes in analog communication systems.
CO3	Apply the concepts of Probability theory in communication systems.
CO4	Analyze the performance of various pulse modulation scheme
CO5	Understand concepts of information theory and analyze information transmission over communication channel.

4ETC02 - Analog Circuits

After successfully completing the course, the students will be able to:

CO1	Comprehend the knowledge of basic concepts and performance parameters of Op Amp.
CO2	Design and anlaysis of Op-Amp based linear and non-linear applications.
CO3	Comprehend the knowledge of IC based voltage regulator(723) and waveform generators(555)
CO4	Comprehend the knowledge of PLL, its applications and data converters.

4ETC03 - Network Theory

After successfully completing the course, the students will be able to:

CO1	Analyze electrical circuits using Mesh and Node analysis.
CO2	Apply suitable Network Theorem to analyze electrical circuits.
CO3	Draw oriented Graph of the network to determine their currents and voltages.
CO4	Implement the concept of Laplace Transform for electrical circuit analysis.
CO5	Apply Two-Port network theory for electrical network analysis.
CO6	Evaluate different Network Functions

4ETC04 - Signal and Systems

After successfully completing the course, the students will be able to:

CO1	Understand and apply the continues time signals and systems mathematically and their classification along with the mathematical operations performed on them.
CO2	Analyze the spectral characteristics of continuous-time periodic signals and systems using Fourier series. Apply the spectral characteristics of continuous-time aperiodic signals and systems using Fourier Transform.
CO3	Apply the Laplace transform for analysis of continuous-time systems. Evaluate the classical Solution of Linear Difference Equations. Apply the discrete time signals and systems mathematically and analyze their classification along with the mathematical operations that can be performed on them.
CO4	Analyze and evaluate the spectral characteristics of Discrete Time signals and systems using DTFT and its properties.

4ETC05 - Values and Ethics

After successfully completing the course, the students will be able to:

CO1	To explore possibilities for better life through value education.
CO2	To Apply the concept of coexistence in life situations.
CO3	To cultivate harmony in nature through emphasis on dimensions of human endeavor.
CO4	To Implement the concept of ethical human conduct.
CO5	To distinguish between ethical and unethical professionalism.

S.S.G.M.C.E. SHEGAON

DEPARTMENT OF ELECTRONICS AND TELECOMMUNICATION ENGINEERING

COURSE OUTCOMES OF ALL COURSES OF THE FIFTH SEMESTER B.E. (ELECTRONICS AND TELECOMMUNICATION ENGINEERING)

5ETC01 - Microcontroller

After successfully completing the course, the students will be able to:

CO1	Describe the architecture of 8085/8051 and advanced RISC processors
CO2	Understand /analyse addressing modes, Instructions set and execute algorithm in assembly language using processor for timers /counters
CO3	Develop a skill to write a simple algorithm for different applications
CO4	Apply various interfacing of peripheral devices

5ETC02 - Control System

After successfully completing the course, the students will be able to:

CO1	Classify mathematical models of electrical, mechanical and electromechanical systems
CO2	Determine transfer functions from block diagrams and signal flow graph
CO3	Evaluate transient response and steady state response parameters
CO4	Analyse stability of the LTI system using Routh criterion and root locus
CO5	Analyse stability of the LTI system using bode plot and Nyquist criterion
CO6	Create the state model and Evaluate response of the system using state variable method

5ETC03 - Digital Signal Processing

After successfully completing the course, the students will be able to:

CO1	Understand the basic concepts of signals, systems and their characteristics.
CO2	Analyse the concepts of Z-transformation and their applications.
CO3	Apply DFT and DTFT for the analysis of digital signals and systems.
CO4	Design FIR, IIR filters and understand the basics of Multirate Digital Signal

5ETC04 - Power Electronics (PE-I)

After successfully completing the course, the students will be able to:

CO1	Understand the characteristics of SCR and firing circuits.
CO2	Understand Triac /Diac Power devices like Transistor, MOSFET and IGBT and force commutation techniques.
CO3	Understand and analyse controlled rectifiers and dual converters.
CO4	Understand DC to AC and DC to DC converters.
CO5	Understand principle of Cyclo-Converter and controlling DC/universal motor.

5ETC04 - Fiber Optics Communication (PE-II)

After successfully completing the course, the students will be able to:

CO1	Understand the principles of fiber-optic communication, the components and Losses and dispersion in fiber
CO2	Understand the properties of optical fibers and optical components in sources.
CO3	Understand operation of lasers, LEDs and detectors in fiber
CO4	Analyze system performance of optical communication systems in networks
CO5	Understand the block diagram of FOC system with Power budgeting parameters.
CO6	To apply the knowledge of fiber optical components, links and systems

5ETC05 - Sensors and Transducers

After successfully completing the course, the students will be able to:

CO1	To understand the basic aspect of transducers and sensors
CO2	To gain knowledge of statistical characteristic and Errors of system.
CO3	To realize the fundamental concept about temperature and Velocity measurement
CO4	To acquire knowledge of measurement of displacement and Humidity.
CO5	To familiarise the basic information about measurement of Pressure, Flow, Level
CO6	To aware about the basics of Strain gauge and smart sensors

S.S.G.M.C.E. SHEGAON

DEPARTMENT OF ELECTRONICS AND TELECOMMUNICATION ENGINEERING

COURSE OUTCOMES OF ALL COURSES OF THE SIXTH SEMESTER B.E. (ELECTRONICS AND TELECOMMUNICATION ENGINEERING)

6ETC01 - Computer Networking

After successfully completing the course, the students will be able to:

CO1	Identify different types of network devices and their functions within a network.
CO2	Understand the basic functions of data logical link control and media access control and protocol used in these layers.
CO3	Distinguish between the layers of the OSI and TCP/IP model.
CO4	Analyze, specify, and design routing strategies for an IP-based networking infrastructure
CO5	Understand the concept of reliable and unreliable transfer protocol of data and how TCP and UDP implement these concepts.
CO6	Understand various Application layer Protocols.

6ETC02 - Computer Architecture

After successfully completing the course, the students will be able to:

CO1	Understand the working and performance parameters of the computers
CO2	Perform floating point arithmetic operations and design ALU as per the requirement
CO3	Understand the trade-offs in choosing the appropriate microinstruction programming and microprogrammed Control Unit
CO4	Understand and design different types of memory systems
CO5	Understand how the input-output units communicate with the processor and also the use of parallel and pipelined architectures

6ETC03 - Satellite Communication

After successfully completing the course, the students will be able to:

CO1	Understand history, architecture, frequency bands, types, different phenomenon in satellite communication
CO2	Apply the concepts related to orbital mechanics and satellite channels
CO3	Analyse various subsystems in satellite communication
CO4	Understand VSAT and GPS

6ETC04 - Wireless Communication

After successfully completing the course, the students will be able to:

CO1	Illustrate the evolution of cellular mobile system and understand cellular concepts.
CO2	Use fundamentals of cellular radio system.
CO3	Understand propagation mechanism in mobile radio system.
CO4	Demonstrate concepts of various 2nd and 3rd generation cellular systems and wireless data communication networks

6ETC05 - Engineering Economics

After successfully completing the course, the students will be able to:

CO1	To Learn basics of Engineering Economics
CO2	To Understand and compute the production cost
CO3	To Study different cash flow methods and Understand depreciation analysis
CO4	To Understand Indian Banking System and evaluate Engineering alternatives

S.S.G.M.C.E. SHEGAON

DEPARTMENT OF ELECTRONICS AND TELECOMMUNICATION ENGINEERING

COURSE OUTCOMES OF ALL COURSES OF THE SEVENTH SEMESTER B.E. (ELECTRONICS AND TELECOMMUNICATION ENGINEERING)

7ETC01 - Cryptography and Network Security

After successfully completing the course, the students will be able to:

CO1	Analyse concepts of security and various ciphers
CO2	Understand various encryption and decryption algorithms
CO3	Apply authentication functions and hash algorithms
CO4	Understand the concepts of Emil and transport security

7ETC02 - Digital Image & Video Processing

After successfully completing the course, the students will be able to:

CO1	Understand the 2D signal terminology and basics of digital image processing, elements of visual perception, etc., and analyse various types and formats of images.
CO2	Analyse and implement spatial and frequency domain filtering techniques for gray images and 2D-discrete Fourier transform for image processing.
CO3	Implement the various methodologies for image Segmentation, Compression and Restoration etc., for practical applications.
CO4	Understand and analyse basics of time-varying image formation model (video), 3D motion model, geometric and photometric image formation, temporal segmentation, video object detection and tracking, etc.

7ETC03 - Project Management & Entrepreneurship

After successfully completing the course, the students will be able to:

CO1	Understand basic concept of Project management
CO2	Attain the knowledge of cost estimation & working capital
CO3	Prepare Cost Sheets, balance sheets and Cash Flow statements
CO4	Understand the Entrepreneurial competencies & traits
CO5	Discuss the Management skills for Entrepreneurs
CO6	Understand Social Entrepreneurship

7ETC04 - Mobile Communication and Networks

After successfully completing the course, the students will be able to:

CO1	Explain basic concept of cellular systems and standards
CO2	Demonstrate knowledge of Signal propagation model
CO3	Understand and compare different multiple access techniques in mobile communication and demonstrate advance knowledge of MIMO
CO4	Understand the concept of rake receiver and Know various Mobile Communication Systems and standards

7ETC05 - Introduction to MEMS

After successfully completing the course, the students will be able to:

CO1	Consider recent advancements in MEMS for project, research and academic work.
CO2	Demonstrate skills to select appropriate material for MEMS devices
CO3	Understand the fabrication process of MEMS
CO4	Select the appropriate sensor and actuator in a given application.

S.S.G.M.C.E. SHEGAON

DEPARTMENT OF ELECTRONICS AND TELECOMMUNICATION ENGINEERING

COURSE OUTCOMES OF ALL COURSES OF THE EIGHTH SEMESTER B.E. (ELECTRONICS AND TELECOMMUNICATION ENGINEERING)

8ETC01 - Embedded Systems

After successfully completing the course, the students will be able to:

CO1	Understand the concepts and quality attributes of Embedded Systems
CO2	Understand the architecture and inbuilt peripherals of AVR Microcontroller
CO3	Develop and analyze the programming of AVR Microcontroller in C for various loads
CO4	Understand the concepts of RTOs and debugging of Embedded Systems

8ETC02 - Microwave Theory and Techniques

After successfully completing the course, the students will be able to:

CO1	Understand operations of microwave active and passive devices.
CO2	Understand operations of Semiconductor Microwave Devices.
CO3	Describe characteristics of microwave propagation through waveguide and parallel microstrip line
CO4	Understand Operations of Microwave resonators.
CO5	Use S-parameters for characterization of microwave devices.
CO6	Measure various parameters of microwave system

8ETC03 - Wireless Sensor Networks

After successfully completing the course, the students will be able to:

CO1	Understand the basis of Sensors with its applications
CO2	To learn the architecture and placement strategies of Sensors
CO3	To analyze routing and congestion algorithms
CO4	To design, develop, and carry out performance analysis of sensors on specific applications
CO5	To explore and implement solutions to real-world problems using sensor devices, enumerating its principles of working
CO6	To understand the working through the case study on WSN

8ETC04 - 5G-6G Mobile Communication

After successfully completing the course, the students will be able to:

CO1	Illustrate the evolution of mobile communication leading to the introduction of 5G.
CO2	Explain the key innovations in radio and networks.
CO3	Elaborate the standardization process and timeline for 5G and to know key issues and challenges in 5G deployment.
CO4	Identify the spectrum requirements of 5G and understand the concept of 6G

S.S.G.M.C.E. SHEGAON

DEPARTMENT OF ELECTRONICS AND TELECOMMUNICATION ENGINEERING

COURSE OUTCOMES OF ALL COURSES OF THE FIRST SEMESTER M.E.

(DIGITAL ELECTRONICS)

1UMEF-1/2UMEP-1- Digital Instrumentation

After successfully completing the course, the students will be able to:

CO1	Design and implement the various digital measurement techniques, display and recording systems..
CO2	Comprehend the knowledge of the concept of digital signal analysis & analyzers.
CO3	Comprehend the knowledge of smart sensors/digital sensors and smart or automatic test equipment's and reliability.
CO4	Design and implementation of digital controllers, Programmable Logic controller and its functions.
CO5	Design of various biomedical instrumentation systems.

1UMEF2-Advanced Digital Signal Processing

After successfully completing the course, the students will be able to:

CO1	Understand the various analysis techniques of discrete time signals..
CO2	Analyse the finite impulse and infinite impulse response filters
CO3	Understand the implementation of sampling rate converters.
CO4	Develop the various adaptive filtering and two dimension transformation algorithms

1UMEF3- Modern Electronic Design Techniques

After successfully completing the course, the students will be able to:

CO1	Understand isolation and Design techniques for amplifiers.
CO2	Design buck, boost, buck-boost their control techniques
CO3	Understand Communication and Control System Design
CO4	Understand design of Portable Electronic System
CO5	Understand design of Electronic System for Production

1UMEF4- Digital Communication Technique

After successfully completing the course, the students will be able to:

CO1	Understand the fundamental and advanced concepts of digital communication systems including the digital transmission over fading channels.
CO2	Solve the problems associated with various impairments in digital communication systems.
CO3	Study and analyse the effects of channel bandwidth and channel noise on transmitted waveform.
CO4	Design optimum receivers for a given signal-space structure for additive Gaussian channels and assess performance of digital communication receivers for additive Gaussian channels.
CO5	Analyse the effect of ISI and Equalization in digital communication.
CO6	Apply the knowledge to analyse the digital communication system with spread spectrum modulation

1UMEF5- Embedded System Design

After successfully completing the course, the students will be able to:

CO1	Explain architecture of Microcontroller
CO2	Distinguish real-time embedded systems from other systems.
CO3	Evaluate the need for real-time operating system
CO4	Interpret real-time algorithm for task scheduling.
CO5	Summarize technique used for product enclosure design and development

S.S.G.M.C.E. SHEGAON

DEPARTMENT OF ELECTRONICS AND TELECOMMUNICATION ENGINEERING

COURSE OUTCOMES OF ALL COURSES OF THE SECOND SEMESTER M.E. (DIGITAL ELECTRONICS)

2UMEF1- Digital Image Processing

After successfully completing the course, the students will be able to:

CO1	Understand and analyze basic terminology of digital image processing, elements of visual perception, image quantization, image types. Zoom operation, Basic gray level Transformations, Histogram Processing, etc
CO2	Examine and analyze various types of images, intensity transformations, and various spatial domain image transforms. Analyze Arithmetic and logic operations, spatial domain filtering, bit-plane slicing, median filter, color image processing, fundaments, and color image models.
CO3	Examine and analyze the 2D Fourier transform and other frequency domain transformation and enhancement techniques. Examine and analyze the Image Restoration and Denoising models for image enhancement.
CO4	Evaluate and apply the methodologies for image segmentation, image Compression, and restoration etc. Analyze the image morphological techniques. Create a term/mini-project for practical applications to image processing.

2UMEF2- CMOS VLSI Design

After successfully completing the course, the students will be able to:

CO1	Build upon the theoretical, mathematical and physical analysis of digital VLSI circuits, for proper understanding of concept, working and analysis
CO2	Analyze the various analog integrated circuits

CO3	Analyse the various RF integrated circuits
CO4	Understand the various partitioning ,floor planning and placement algorithms in ASIC.

4UMEP1 / 2UMEF3- Parallel Computing

After successfully completing the course, the students will be able to:

CO1	Understand the concepts Parallel Computers, Data and Temporal Parallelism
CO2	Understand Pipelining and superscalar Techniques
CO3	Understand Parallel and scalable architectures
CO4	Understand Programming on Parallel Computers, Parallel Program Development and Environment

2UMEF4- Artificial Intelligent System

After successfully completing the course, the students will be able to:

CO1	Develop algorithms for supervised and unsupervised ANN
CO2	Implement the ANN concepts to solve real life problems
CO3	Analyze the ANN network.
CO4	Develop algorithms in fuzzy logic for applications such as pattern recognition
CO5	Implement the fuzzy logic concepts to solve real life problems.

2UMEF5- High Speed Digital System Design

After successfully completing the course, the students will be able to:

CO1	Understand fundamentals of transmission line , cross talk estimation and minimization.
CO2	Aware about non ideal interconnect issues and transmission line losses
CO3	Understand non ideal return paths , switching losses and different design methodology.
CO4	Know about the buffer modelling , timing analysis and high speed measurements techniques .

Shri Gajanan Shikshan Sanstha's
SHRI SANT GAJANAN MAHARAJ COLLEGE OF ENGINEERING
SHEGAON – 444203, DIST. BULDHANA (MAHARASHTRA STATE), INDIA
"Recognized by A.I.C.T.E., New Delhi" Affiliated to Sant Gadge Baba Amravati University, Amravati
"Approved by the D.T.E., M.S. Mumbai"

Ph : +918669638081/82 Email.principal@ssgmce.ac.in, registrar@ssgmce.ac.in
Website- www.ssgmce.ac.in

Course Outcomes

Department of Information Technology

Shri SantGajananMaharaj College of Engineering, Shegaon

Department of Information Technology

Course Outcomes (CO)

Academic Year-2023-24

Year: 2N Semester-Autumn (III)

Subject: Engineering Mathematics-III **Subject Code:3IT01**

CO1: Solve the Linear Differential equations with constant coefficients by various methods.

CO2: Find Laplace Transform of various types of functions and also able to find Laplace Transform of Periodic, Impulse & Unit step function. Use Laplace Transform to solve Linear Differential equations with constant coefficients.

CO3: Find Z Transform of various types of functions and apply this knowledge to solve the Linear Difference equations with constant coefficients.

CO4: Find Fourier Transform of various types of functions. Also find the solution of partial differential equations of first order.

CO5: Test the function for analyticity; find the harmonic conjugate, and able to expand the function in Taylor's or Laurent's series, find conformal mapping.

CO6: Differentiate vector point functions, find gradient of scalar point function, and find curl and divergence of vector point function. Integrate vector point functions Evaluate line, surface and volume integrals.

Subject: Discrete Structures and Graph Theory **Subject Code:3IT02**

CO1: After successfully completing the course, the students will be able to demonstrate the basic terminologies of mathematical logic, theory of inference and set theory.

CO2: After successfully completing the course, the students will be able to apply mathematical logic, inference theory and set theory, to solve engineering problems.

CO3: After successfully completing the course, the students will be able to apply algebraic structures, grammar, polish expressions and lattices to solve the mathematics expressions.

CO4: After successfully completing the course, the students will be able to apply the lattices for partially ordered relations and Boolean algebraic simplification methods to minimize the Boolean functions

CO5: After successfully completing the course, the students will be able to analyze graphs based on various parameters for graph manipulation and storage representation.

Subject: Object Oriented Programming **Subject Code:3IT03**

CO1: Use the fundamental concepts of Java(L3)

CO2: Apply concepts of class and objects and arrays in Java(L3)

CO3: Apply concepts of class and objects and arrays in Java(L3)

CO4: Use concepts of exceptions and perform the various operations

CO5: Apply concepts of applet,event handling and abstract window tool kit in Java(L3)

Subject: Assembly Language Programming Subject Code:3IT04

CO1: Illustrate the organization of register & memory in 8086 microprocessor.

CO2: Analyse different instruction format & addressing modes in 8086.

CO3: Apply the concept of control flow instruction in 8086 programming.

CO4: Demonstrate the stack & sub routine concept in 8086 programming.

CO5: Explore how I/P interface & interrupt interacted with microprocessor

Subject: Analog and Digital Electronics Subject Code:3IT05

CO1: Understand the basic applications of BJT.

CO2: Get acquainted with analog ICs like Op-Amp IC-741 and Timer IC-555

CO3: Discriminate the working of sinusoidal and non-sinusoidal waveform generators.

CO4: Apply the concept of K-map to simplify logic expressions.

CO5: Design and implement Combinational circuits

CO6: Explore the applications of Sequential circuits

Shri Sant Gajanan Maharaj College of Engineering, Shegaon

Department of Information Technology

Course Outcomes (CO)

Year: 2N Semester-Autumn (IV)

Subject: Computer Organization and Architecture Subject Code: 4IT01

CO1: Understand the basics of instructions sets and their impact on processor design

CO2: Demonstrate an understanding of the design of the functional units of a digital computer system.

CO3: Evaluate cost performance and design trade-offs in designing and constructing a computer processor including memory.

CO4: Design a pipeline for consistent execution of procedure and multi processors.

Subject: DATA COMMUNICATION & NETWORKING **Subject Code:4IT02**

CO1: Demonstrate the principles and fundamental concepts of computer networks.

CO2: Demonstrate and explain data communication systems with their techniques and applications.

CO3: Identify various error detection and correction techniques in data transmission.

CO4: Evaluate the network addresses and learn routing mechanism protocols.

CO5: Design TCP connection and analyze upper OSI layer functions and services.

Subject: Operating System **Subject Code: 4IT03**

CO1: Able to control access to a computer and the files that may be shared.

CO2: Demonstrate the knowledge of the components of computer and their respective roles in computing.

CO3: Understand to recognize and resolve user problems with standard operating environments

CO4: Analyze the practical knowledge of how programming languages, operating systems, and architectures interact and how to use each effectively

Subject: Data Structure **Subject Code: 4IT04**

CO1: Understand basic data structures such as arrays, strings, and linked lists

CO2: Understand linear data structures such as stacks and queues and understand their difference

CO3: Understand the concept of hash function and collision and its resolution methods.

CO4: Understand the concept of memory management.

CO5: Analyze the basic operations of tree, heap and graphs.

CO6: Analyze different techniques for solving problems like sorting and searching

Subject: Social Science and Engineering Economics **Subject Code: 4IT05**

CO 1: Exercise his/her fundamental rights in the proper sense and at the same time identity his/her responsibilities in nation-building.
CO 2. Understand the composition and powers of the Indian Parliament.
CO 3. Measure the impact of science and technology on culture and civilization.
CO 4. Assess the different market structures and their implications on the Economy.
CO 5. Analyze and compare different factors of production using the concept of cost, and returns to scale.
CO 6. Predict the impact of various obstacles to economic growth in the Indian context.

Shri Sant Gajanan Maharaj College of Engineering, Shegaon

Department of Information Technology

Course Outcomes (CO)

Academic Year-2023-24

Year: 3N Semester-Autumn (V)

Subject: Database Management System **Subject Code: 5IT01**

CO1: Understand the concepts of database and analyze ER model.

CO2: Categorize different normal forms and build relational algebra queries.

CO3: Classify different operations and construct SQL queries.

CO4: Understand the basic concepts of transactions and use them in schedules.

CO5: Choose the proper concurrency control scheme and evaluate database security.

Subject: Theory of Computation **Subject Code: 5IT02**

CO1: To analyze formal languages with help of fundamental concepts and Finite Automata

CO2: To create regular expressions and grammars which can be used to represent formal language in different forms.

CO3: To analyze the formal languages, their powers using different forms of grammars and classify them according to Chomsky hierarchy.

CO4: To design Push Down Automata for a Context Free Language along with context sensitive languages.

CO5: To design Turing machine for performing different types for computations.

CO6: To identify the decidability and undecidability of problems in case of formal languages.

Subject: Software Engineering **Subject Code: 5IT03**

CO1: Understand the Fundamental Concepts of software engineering life cycle

CO2: Summarize the software engineering requirements specification and the SRS documents

CO3: Understand the software engineering layered technology and process framework

CO4: Illustrate the various design and development solution with proper analysis

CO5: Demonstrate the competence in communication planning, analysis, design, construction, and development of software as per requirement

CO6: Demonstrate the software project management skill through case studies

Subject: Data Science and Statistics **Subject Code: 5IT04**

CO1: On completion of the course, the students will be able to Apply Numpy and Pandas Library functions on datasets.

CO2: On completion of the course, the students will be able to Analyze data by performing EDA and data visualization by using various plots.

CO3: On completion of the course, the students will be able to Create hypothesis on data and perform various hypothesis testing test

CO4: On completion of the course, the students will be able to Measure the Performance of Linear regression model on dataset.

CO5: On completion of the course, the students will be able to Measure the Performance of Logistic regression model on dataset.

Subject: Power Supply System (Open Elective – I) **Subject Code: 5IT05**

CO1: Distinguish between construction and working of various power generation plants

CO2: Describe layout and working of Substations

CO3: Compare various power distribution system

CO4: Explain types of wiring, necessity of earthing and safety precautions

Shri Sant Gajanan Maharaj College of Engineering, Shegaon

Department of Information Technology

Course Outcomes (CO)

Year: 3N Semester-Autumn (VI)

Subject: COMPILER DESIGN Subject Code: 6IT01

CO1: Apply lexical analysis methods for specifying and recognizing the tokens.

CO2: Apply top-down parsing methods for error detection and error recovery in predictive parsing.

CO3: Apply bottom-up parsing methods for error detection and error recovery in predictive parsing.

CO4: Apply the syntax-directed translation rules for the generation of an annotated parse tree.

CO5: Assess the various source language issues during the intermediate code generation and run-time environment.

Subject: Design and Analysis of Algorithm **Subject Code: 6IT02**

CO1: Analyze worst-case running times of algorithms using asymptotic analysis.

CO2: Describe the divide-and-conquer paradigm and explain when an algorithmic design situation calls for it.

CO3: Differentiate the greedy-programming paradigm and solve an algorithmic design situation calls for it.

CO4: Examine the dynamic programming approach and explain when an algorithmic design situation calls for it.

CO5: Differentiate and Apply the concept of Backtracking, Polynomial Time & Non Polynomial Time Algorithms.

Subject: Artificial Intelligence **Subject Code: 6IT03**

CO1- Define Artificial Intelligence and identify problems for which solution by AI methods can be devised.

CO2- Evaluate of different uninformed search with stating valid conclusions that the evaluation supports.

CO3: Design and Analysis of informed search algorithms on well formulated problems.

CO4: Formulate and solve given problem using Propositional and First order logic.

CO5: Apply reasoning for non-monotonic AI problems.

CO6: Have a basic understanding of some of the more advanced topics of AI such as learning, Understanding, Natural Language

Subject: Big Data Analytics **Subject Code: 6IT04**

CO1- Understand concepts of big data and analyze diverse business approaches.

CO2- Categorize different components of the Hadoop ecosystem and NoSQL data stores.

CO3- Classify different operations of MapReduce.

CO4- Examine various issues in stream processing and identify various algorithms for data.

CO5- Choose the proper big data mining algorithm based on a variety of applications.

Subject: Web Commerce **Subject Code: 6IT05**

CO1: Demonstrate the basics of e-commerce, security approach, payment system, e-mail technologies and resources for e-commerce website establishment.

CO2: Apply the secure transport protocols and secure transaction protocols to make e-commerce safe.

CO3: Identify the processes for the internet monetary payment and security to make safe payment and order processes

CO4: Analyze the internet security issues and relevant solutions for the safe e-commerce.

CO5: Identify the models and technologies for message handling for the secured communication in e-commerce.

CO6: Identify the various internet resources and tools for the e-commerce website establishment.

Shri Sant Gajanan Maharaj College of Engineering, Shegaon

Department of Information Technology

Course Outcomes (CO)

Academic Year-2023-24

Year: 4N Semester-Autumn (VII)

Subject: Mobile Computing Subject Code: 7IT01

CO1: Gain knowledge of basic concepts of Mobile Computing and Principals of cellular communication

CO2: Understand different devices for mobile computing and understand Mobile client application.

CO3: Understand concepts of wireless application protocol & fundamental of wireless markup language.

CO4: Develop ability for developing open platform mobile development.

CO5: Explore concepts of database for mobile computing.

CO6: Identify & understand different security issues in mobile computing.

Subject: Embedded System **Subject Code: 7IT02**

CO1: After successfully completing the course, the students will be able to demonstrate the basic components (hardware, application software and operating system) required for the development of embedded applications.

CO2: After successfully completing the course, the students will be able to identify the various components, computing models and communication devices required for the embedded applications.

CO3: After successfully completing the course, the students will be able to apply the programming, data structures and modelling processes for the implementation of network protocols.

CO4: After successfully completing the course, the students will be able to develop the programming model for the priority-based multitasking real-time embedded systems.

CO5: After successfully completing the course, the students will be able to analyze the priority-based inter-process communication and synchronization issues and relevant solutions to make embedded applications real-time

Subject: Cloud Computing **Subject Code: 7IT03**

CO1: Describe the fundamental concept, architecture and applications of Cloud Computing.

CO2: Discuss the problems related to cloud deployment model.

CO3: Examine the concept of virtualization

CO4: Identify the role of network connectivity in the cloud.

CO5: Assess different Cloud service providers.

CO6: Inspect the security issues in cloud service models.

Subject: Data Warehousing and Mining **Subject Code: 7IT04**

CO1: Be familiar with basic concepts of Data Warehousing and OLAP operations.

CO2: Understand the principal of data warehousing and data pre-processing.

CO3: Identify appropriate data mining algorithm to solve real world problems.

CO4: Characterize the kind of patterns that can be discovered by association rules.

CO5: Understand various classification and clustering technique and tools.

CO6: Describe complete data types with respect to spatial and web mining.

Subject: Blockchain Foundation **Subject Code: 7IT05**

CO1: Examine the concept of decentralization and its importance in blockchain systems.

CO2: Illustrate the process of Crypto currency transactions & role of miner in securing Crypto currency networks.

CO3: Evaluate the limitations of Bitcoin and propose alternative solutions for specific use cases.

CO4: Develop and deploy basic smart contracts using the Solidity programming language

CO5: Utilize development frameworks to streamline smart contract deployment and DApp development.

CO6: Evaluate the features and functionalities of alternative Blockchains

Shri Sant Gajanan Maharaj College of Engineering, Shegaon

Department of Information Technology

Course Outcomes (CO)

Year: 4N Semester-Autumn (VIII)

Subject: Object-oriented analysis and design **Subject Code: 8IT01**

CO 1: To understand concept of Object oriented modeling in modern software development.

CO 2: To analyses the concept of Unified Modeling Language (UML) for representation of an object oriented system using class diagram.

CO 3: Develop Use case and Activity diagram for different scenario based on requirements of the systems.

CO 4: Able to Analyze the Domain and identify different models like class models, state model and Interaction model for the system.

CO 5: Able to Break a system into subsystems by evaluating information and requirements of the system.

CO 6: Able to create and organize a class design.

Subject: Professional Ethics and Management **Subject Code: 8IT02**

CO1: Ability to distinguish between ethical and non ethical situations

CO2: Infer the moral judgment and correlate the concepts in addressing the ethical dilemmas

CO3: Resolve the moral issues in profession

CO4: Relate the code of ethics to social experimentation

Subject: Entrepreneurship And Project Management **Subject Code: 8IT03**

CO1: Understand the concept of management, organization, planning, staffing

CO2: Understand the importance of Directing and controlling, leadership styles, Communication, Coordination and Controlling.

CO3: Understand the role of entrepreneurs in economic development, and barriers, Identification of business opportunities, feasibility studies.

CO4: Understand the contents of project report, ERP and project.

CO5: Understand IPRs and institutional support in entrepreneurship, Case Study of Entrepreneurs.

Subject Name: Virtual and Augmented Reality **Subject Code:8IT04**

CO1: Interpret the basic concept of VR & AR.

CO2: Identify the different Input/output devices for VR.

CO3: Applying the knowledge of rendering pipeline and graphics rendering pipeline in creating VR experience.

CO4: Analyze the hardware & software needed for AR..

CO5: Examine the advantage & disadvantages of AR applications & their future trends.

Shri Gajanan Shikshan Sanstha's
SHRI SANT GAJANAN MAHARAJ COLLEGE OF ENGINEERING
SHEGAON – 444203, DIST. BULDHANA (MAHARASHTRA STATE), INDIA
"Recognized by A.I.C.T.E., New Delhi" Affiliated to Sant Gadge Baba Amravati University, Amravati
"Approved by the D.T.E., M.S. Mumbai"

Ph : +918669638081/82
Website- www.ssgmce.ac.in
Email.principal@ssgmce.ac.in, registrar@ssgmce.ac.in

Course Outcomes

Department of Mechanical Engineering

SHRI SANT GAJANAN MAHARAJ COLLEGE OF ENGINEERING, SHEGAON

DEPARTMENT OF MECHANICAL ENGINEERING

COURSE OUTCOMES OF ALL COURSES OF THIRD SEMESTER

BE MECHANICAL ENGINEERING

3ME01 Mathematics - III

After successfully completing the course, students will be able to:

1. Solve the Linear Differential equations with constant coefficients by various methods
2. Find Laplace Transform of various types of functions and find Laplace Transform of Periodic, Impulse & Unit step function. Use LTto solve LDE
3. Find the solution of partial differential equation of first order, curve fitting by method of least square, correlation& regression & find the binomial & Poisson distribution
4. Test the analyticity, find the harmonic conjugates, and expand the function in Taylor's or Laurent's series, find conformal mapping.
5. Obtain the solution of algebraic solution of transcendental equation &the solution of linear system of equation by various methods
6. Differentiate vector point functions, find gradient of scalar point function, and find divergence and curl of vector point function. Evaluate line, surface, and volume integrals.

3ME02 Manufacturing Processes

After successfully completing the course, students will be able to:

1. Understand the working principles of basic manufacturing processes.
2. Apply the knowledge of casting processes for the specified working conditions.
3. Analyze the various causes of casting defects to provide remedial action
4. Apply the knowledge of various forming processes for the given operating conditions.
5. Apply the knowledge of basic and advance welding processes for detection and prevention of welding defects.

3ME03 Mechanics of Materials

After successfully completing the course, students will be able to:

1. Determine stresses and strains in the members subjected to axial, bending and torsional load
2. Analyze beams for shear force, bending moments and shear stress distribution
3. Determine strain energy in members under different loading conditions
4. Analyze beams with different loading conditions for slope and deflection

3ME04 Engineering Thermodynamics

After successfully completing the course, students will be able to:

1 Analyze various thermodynamic systems involving heat and work interaction.

2 Apply first law of thermodynamics to open and closed system.

3 Apply second law of thermodynamics to various engineering problems.

4 Analyze thermodynamic cycles of various thermal systems.

3ME05 Fluid Mechanics

After successfully completing the course, students will be able to:

1 Determine the values of various fluid properties at rest and in motion.

2 Apply general governing equations for fluid flow problems.

3 Apply the concept of Boundary layer theory for internal and external fluid flow

4 Analyze the principle of impulse momentum to hydraulic jets.

SHRI SANT GAJANAN MAHARAJ COLLEGE OF ENGINEERING, SHEGAON

DEPARTMENT OF MECHANICAL ENGINEERING

COURSE OUTCOMES OF ALL COURSES OF FOURTH SEMESTER

BE MECHANICAL ENGINEERING

4ME01 Material Science

After successfully completing the course, students will be able to:

1. Demonstrate the concept, classification and applications of material science.
2. Demonstrate phase diagrams, microstructure of basic alloys and their properties.
3. Explain various heat treatment process and its effects on microstructure and mechanical properties of materials.
4. Explain Powder metallurgy, hot and cold working techniques and their effects on mechanical properties of the material.

4ME02 Energy Conversion - I

After successfully completing the course, students will be able to:

1. Select the different types of boiler and its mounting and accessories
2. Analyze the performance of boiler, condenser, nozzle and turbines
3. Select different types of nuclear reactor.
4. Identify various renewable energy sources for power generations.

4ME03 Manufacturing Technology

After successfully completing the course, students will be able to:

1. Apply the concept of mechanics of metal cutting for various machining processes.
2. Analyze the process parameters for given machining operations.
3. Apply the concept of grinding process for finishing operations.
4. Identify the various unconventional machining processes.

4ME04 Basic Electrical Drives and Control

After successfully completing the course, students will be able to:

1. Understand the working of electrical drives and their components
2. Understand the basics of DC motors and their characteristics

3 Understand the working of AC motors, induction motors and concept of braking

4 Understand the different speed control methods of A.C. and D.C. motors

5 Understand the design of transducers and their applications

6 Understand the industrial applications of different drives

4ME05 Hydraulic Machines

After successfully completing the course, students will be able to:

1 Analyse different turbines for engineering applications.

2 Compare pumping systems & examine their performance characteristics .

3 Identify various principles of compressible flow .

4 Classify different types of hydraulic systems

SHRI SANT GAJANAN MAHARAJ COLLEGE OF ENGINEERING, SHEGAON

DEPARTMENT OF MECHANICAL ENGINEERING

COURSE OUTCOMES OF ALL COURSES OF FIFTH SEMESTER

BE MECHANICAL ENGINEERING

5ME01 Heat Transfer

After successfully completing the course, students will be able to:

1. Analyze the thermal systems by applying the fundamental concept of conduction, convection and radiation.
2. Apply the laws of radiations to heat transfer systems
3. Evaluate the heat transfer coefficients for forced and free convection.
4. Analyze the performance of heat exchangers

5ME02 Metrology and Quality Control

After successfully completing the course, students will be able to:

1. Apply the concept of quality, concept of frequency distribution to the sampling data.
2. Apply various control charts for quality improvement of products.
3. Apply the basic concepts of Nondestructive testing of components.
4. Determine the linear and angular dimensions of the components.

5ME03 Kinematics of Machines

After successfully completing the course, students will be able to:

1. Analyze machines & mechanisms for different working condition.
2. Evaluate different special purpose mechanisms & machine parts.
3. Apply principles of kinematics to machines & mechanisms.
4. Test mechanisms for complex engineering problems.

5ME04 Measurement Systems

After successfully completing the course, students will be able to:

1. Identify types, functional elements of Measurement system and types of input to the measurement system.
2. Use concepts of general performance characteristics for choosing measuring instrument.

3 Demonstrate process of calibration of instruments.

4 Select and use instrument for various physical quantities.

5ME05 Industrial Robotics and Applications

After successfully completing the course, students will be able to:

1 Illustrate Robot's anatomy, joints types, wrist construction, robot standard configurations and their work space.

2 Explain the construction and working of different types of End Effectors.

3 Explain various robot drives, robot motion control and its levels.

4 Explain various methods of teaching and programming the robots.

5 Explain principle of working and applications of different types of robot sensors.

6 Identify a particular type of robot depending on the its application in manufacturing.

SHRI SANT GAJANAN MAHARAJ COLLEGE OF ENGINEERING, SHEGAON

DEPARTMENT OF MECHANICAL ENGINEERING

COURSE OUTCOMES OF ALL COURSES OF SIXTH SEMESTER

BE MECHANICAL ENGINEERING

6ME01 Design of Machine Elements

After successfully completing the course, students will be able to:

1. Understand the concept of various stresses and apply the design procedure to riveted joints and welded joints.
2. Understand design procedure of knuckle joint, springs and power screw.
3. Analyze & select types of shafts, keys, couplings for various machines and industrial applications.
4. Analyze the various types of bearings and understand the design procedure of IC Engine parts.

6ME02 Dynamics of Machines

After successfully completing the course, students will be able to:

1. Analyze the mechanisms to attain equilibrium.
2. Determine the effect of gyroscopic couple on a dynamic body.
3. Calculate the natural frequency of the vibrating system.
4. Determine balancing for rotating and reciprocating mass system.

6ME03 Control System Engineering

After successfully completing the course, students will be able to:

1. Demonstrate of basics of Control Systems.
2. Develop Mathematical Model and the transfer functions of the basic systems.
3. Demonstrate mathematical modelling of PID controllers, automatic speed controllers.
4. Check system stability using Bode Plot, Root Locus and Rauth's Criterion

6ME04 Non-Conventional Energy Sources

After successfully completing the course, students will be able to:

1. Able to study the concept of renewable and non-renewable sources.
2. Apply the basic concept of solar energy utilization and storage.

3 Apply the concept of energy from ocean and wind.

4 Study the concept of bio-mass energy resources.

6ME04 Lean Manufacturing

After successfully completing the course, students will be able to:

1 Explain the concept, history and applications of lean manufacturing

2 Interpret different element of lean manufacturing

3 Interpret different tools of lean manufacturing

4 Apply lean manufacturing in real life situation.

5 Identify the barriers in implementation of Lean Manufacturing

6 Explain the concept of Six Sigma

SHRI SANT GAJANAN MAHARAJ COLLEGE OF ENGINEERING, SHEGAON

DEPARTMENT OF MECHANICAL ENGINEERING

COURSE OUTCOMES OF ALL COURSES OF SEVENTHW SEMESTER

BE MECHANICAL ENGINEERING

7ME01 Mechatronics

After successfully completing the course, students will be able to:

1. Identification of key elements of mechatronics system and its representation in terms of block diagram
2. Demonstrating the concept of signal processing and use of interfacing systems such as ADC,DAC, digital I/O
3. Design logic networks.
4. Design simple pneumatic and hydraulic circuits.

7ME02 Productivity Techniques

After successfully completing the course, students will be able to:

1. Apply project selection methods to evaluate the feasibility of projects.
2. Use appropriate project management practices, tools, and methodologies.
3. Define, analyze, refine, and document project requirements, assumptions, and constraints.
4. Analyze and refine project time and cost estimates to define project baseline, schedule and budget.
5. Organize and manage critical resources for effective project implementation
6. Identify, analyze, quantify and mitigate risks in implementing project

7ME03 Industrial Management & Costing

After successfully completing the course, students will be able to:

1. To apply the concepts of Management and Finance for industry.
2. To apply the process of Marketing ,promotions and sales to serve the demands of society.
3. To analyze the concepts of estimation, costing and balance sheet for the industry.
4. To plan for managerial and financial activities for the industry.

7ME04 Energy Conversion-II

After successfully completing the course, students will be able to:

1. Evaluate power producing and power consuming devices.
2. Solve numerical based on Compressor, refrigeration cycle and gas turbine.
3. Select different types of nuclear reactor.
4. Identify various renewable energy sources for power generations.

7ME05 Automobile Engineering

After successfully completing the course, students will be able to:

1 Compare the different types of automobiles and their working
2 Analyze the concepts of fuels supply system and cooling system in automobile
3 Identify the need of different electrical systems in automobile
4 Explain the functioning of Transmission, Suspension, lubrication and control systems in Automobile

SHRI SANT GAJANAN MAHARAJ COLLEGE OF ENGINEERING, SHEGAON

DEPARTMENT OF MECHANICAL ENGINEERING

COURSE OUTCOMES OF ALL COURSES OF EIGHTH SEMESTER

BE MECHANICAL ENGINEERING

8ME01 Operation Research Techniques

After successfully completing the course, students will be able to:

1. Convert real life situation with limited constraints into a mathematical model
2. Solve mathematical models manually and using software for OR problems
3. Analyze network models/situations using PERT/ CPM techniques
4. Apply queuing theory and sequencing technique for different situations in OR
5. Analyze real life situations using simulation and dynamic programming
6. Analyze replacement situations using individual and group replacement policies

8ME02 I.C. Engines

After successfully completing the course, students will be able to:

1. Evaluate performance parameters of IC engines by using principles of thermodynamics.
2. Analyze the major fuel groups for IC engines.
3. Distinguish combustion processes in SI and CI engines.
4. Demonstrate relevance of environment and emissions from IC engine

8ME03 Production Planning & Control

After successfully completing the course, students will be able to:

1. Understand the importance of production planning and control, its functions, advantages.
2. Apply the skills of calculating for sales forecasts using various forecasting methods.
3. Remember concept of machine capacity, loading of machines and man machine activity charts.
4. Understand concept of inventory control & various cases of inventory system and modern techniques/philosophies of management like CIM, JIT, MRP-I and MRP-II.

8ME03 Artificial Intelligence

After successfully completing the course, students will be able to:

1. Illustrate the concept of knowledge and knowledge base.
2. Apply the skills of development of expert system for industrial problems.
3. Describe the design pre-requisites and design procedure of expert system.
4. Illustrate the concept of fuzzy logic and will try to implement in project work.

8ME04 Refrigeration & Air Conditioning

After successfully completing the course, students will be able to:

1. Examine different types of refrigeration systems.

2 Analyze different air conditioning systems.
3 Apply psychrometric principles to study moist air properties.
4 Solve engineering numerical of refrigeration &air-conditioning.

8ME04 Robotics & Industrial Applications

After successfully completing the course, students will be able to:

1 Understand the concept of robotics, its history.
2 Remember robot anatomy and various configurations for different industrial applications
3 Understand the concept of kinematic analysis of robots.
4 Remember the concept robot programming, its methods and programming languages.

8ME07 Project

After successfully completing the course, students will be able to:

1 Apply creative process techniques in synthesizing information, problem-solving and critical thinking to demonstrate a sound technical knowledge of their selected project topic.
2 Undertake problem identification, formulation and solution.
3 Design engineering solutions to complex problems utilizing a systems approach.
4 Conduct an engineering project, use sustainable materials and manufacturing processes & Carry out cost and benefit analysis through various cost models.
5 Demonstrate the knowledge, skills and attitudes of a professional engineer.

SHRI SANT GAJANAN MAHARAJ COLLEGE OF ENGINEERING, SHEGAON

DEPARTMENT OF MECHANICAL ENGINEERING

COURSE OUTCOMES OF ALL COURSES OF FIRST SEMESTER

ME MECHANICAL ENGINEERING

ADVANCED MANUFACTURING AND MECHANICAL SYSTEM DESIGN

1MMD1 Advanced Manufacturing Processes

After successfully completing the course, students will be able to:

1 Understand the mechanics of metal machining processes.
2 Apply the concept of computer numerical control technology.
3 Understand various metal casting processes.
4 Distinguish the various welding processes.
5 Analyze various metal forming processes.
6 Apply various unconventional machining processes.

1MMD2 Advanced Machine Design

After successfully completing the course, students will be able to:

1 Apply failure theories to ductile and brittle materials
2 Apply Stress-Life approach
3 Apply Strain-Life approach
4 Apply LEFM approach
5 Apply fatigue from variable amplitude loading and statistical aspects
6 Apply surface failure approach in mechanical design

1MMD3 Computer Aided Design and Engineering

After successfully completing the course, students will be able to:

1 Illustrate concept of CAD/ CAM and CIM.
2 Apply knowledge using CAD modeling for component design.
3 Illustrate the fundamentals of finite element analysis
4 Apply FEA techniques to analyze problems in stress on beams, three dimensional frames, heat transfer and fluid flow.

1MMD4 Design for Material Handling Equipments

After successfully completing the course, students will be able to:

1. Selection of a proper material handling system
2. Awareness about the specifications of the elements of a material handling system like ropes, chains, pulleys, sheaves etc. for Hoist.
3. Forces involved with in material handling like load lifting, buckets, belts etc.
4. Types of conveyors and the Safety associated with it.
5. Selection of Drives and Grabbing and Arresting Mechanism Attachments for materials handling

1MMD5 Lean Manufacturing

After successfully completing the course, students will be able to:

1. Explain the concept, history and applications of lean manufacturing
2. Interpret different elements of Toyota Production System,
3. Interpret different tools of lean production processes
4. Apply cellular systems for production.
5. Apply the concepts of TPM for quality improvement.
6. Apply the concepts of Lean Manufacturing for sustaining improvements

SHRI SANT GAJANAN MAHARAJ COLLEGE OF ENGINEERING, SHEGAON

DEPARTMENT OF MECHANICAL ENGINEERING

COURSE OUTCOMES OF ALL COURSES OF SECOND SEMESTER

ME MECHANICAL ENGINEERING

ADVANCED MANUFACTURING AND MECHANICAL SYSTEM DESIGN

2MMD1 Advanced Material Technology

After successfully completing the course, students will be able to:

1 Comprehensive understanding of various advanced materials.

2 Understanding the principles and concepts of internal structure of materials.

3 Applying the knowledge of material properties for various applications.

4 Exploring the advanced manufacturing techniques of various metals and non metals.

2MMD2 Rapid Prototyping & Tooling

After successfully completing the course, students will be able to:

1 Aware of role of rapid prototyping in product development process

2 To identify various Rapid Prototyping Processes

3 Analyze the principles of Stereo lithography and Laser sintering process

4 Understand various types of Pre-processing, processing, post-processing errors in Rapid prototyping.

5 To Identify the various types of data formats and software's used in Rapid prototyping

6 To Understand the concept of Reverse engineering

2MMD3 Mechatronics in System Design

After successfully completing the course, students will be able to:

1 Understand scope and application of mechatronics with various electromechanical devices and components

2 Understand basics of electronic signals, working, applications of electronic devices like microcontroller, PLC etc.

3 Understand role, working of different control components of hydraulic, pneumatic systems and their Applications

4 Make pneumatic circuits commonly used in mechanical line automation and their industrial applications.

5 Make hydraulic circuits commonly used in mechanical line automation and their industrial applications.

6 Analyze and also make simple but complete mechatronics systems.

2MMD4 Experimental Stress Analysis

After successfully completing the course, students will be able to:

1 Apply stress optic law using photo elastic bench

2 Use strain measurement methods

3 Use electrical resistance strain gauge

4 Apply Moire Methods

5 Apply brittle coating methods

2MMD5 Computer Assisted Production Management

After successfully completing the course, students will be able to:

1 Explain the fundamental knowledge of Computer Aided Process Planning

2 Explain Computer Assisted Quality Control

3 Explain Capacity Planning

4 Explain the Just in Time and Computer Aided Inventory Control.

Shri Gajanan Shikshan Sanstha's
SHRI SANT GAJANAN MAHARAJ COLLEGE OF ENGINEERING
SHEGAON – 444203, DIST. BULDHANA (MAHARASHTRA STATE), INDIA
"Recognized by A.I.C.T.E., New Delhi" Affiliated to Sant Gadge Baba Amravati University, Amravati
"Approved by the D.T.E., M.S. Mumbai"

Ph : +918669638081/82 Email.principal@ssgmce.ac.in, registrar@ssgmce.ac.in
Website- www.ssgmce.ac.in

Course Outcomes

Department of Business Administration and Research

Department of Business Administration and Research

Shri Sant Gajanan Maharaj College of Engineering, Shegaon

Course outcomes – New syllabus

Semester – 1

Subject Name	Subject Code	Course Outcomes
Managerial Economics	101	1- Develop a fundamental understanding of supply, demand, buyer surplus, seller's surplus, and elasticities. 2- Understand competitive markets and economic efficiency. 3- Use firm and industry cost analysis for production and strategic decisions. 4- Distinguish between different market structures and different business strategies
Legal and Business Environment	**102**	1- Identify and evaluate the complexities of business environment and their impact on the business. 2- Analyze the relationships between Government and business and understand the political, economic, legal and social policies of the country. 3- Analyze current economic conditions in developing emerging markets, and evaluate present and future opportunities. 4- Understand the Industrial functioning and strategies to overcome challenges in competitive markets.
Financial Reporting, Statement and Analysis	**103**	1. Understand the basic concepts of accounting and also able to know the difference between accounting, financial accounting, management accounting and Cost accounting. 2. Prepare financial statements and also able to make decisions with the help of various

		financial analysis tools. 3. Acquainting the knowledge regarding various cost accounting concepts with analytical skills for its application in managerial decision making. 4. Able to present the financial results and position of a company relative to its industry by developing skills for interpretation to adopt for financial reporting purposes.
Indian Ethos and Business Ethics	104	1- Students will be acquainted with the fundamentals of Indian ethos and its relevance in the practical aspects. 2- Students will comprehend the allied root reasons and nature of ethical issues. 3- Aspirants will endeavor to find remedies for ethical issues being faced by organizations, employees, managers and policy makers. 4- Students will reflect a personality well equipped by values and spread the same at workplaces in future.
Organizational Behaviour	105	After completion of this course the students will be able to- 1. Aware the students regarding human interaction in an organization. 2. Finding what forces enhancing it for setting better results in attending the business goals. 3. Formulate approaches to reorient individual, team, managerial and leadership behavior in order to achieve organizational goals. 4. Abel to analyze the behavior of individuals and groups in organizations in terms of the key factors that influence organizational behavior and demonstrate skills required for working in groups

Computer Application for Business	106	1. Students will possess a comprehensive understanding of Management Information Systems, encompassing information concepts, subsystems, and the development phases of MIS 2. Develop the basic understanding and describe various aspects of IT, including telecommunication and networks, data management systems, and IT-enabled services. 3. Students will be able to explain the decision-making process and the role of Information Systems in supporting decision-making phases, including the construction of Decision Support Systems. 4. Students will be able to understand the management issues associated with MIS, including information security and control, quality assurance, ethical and social dimensions, intellectual property rights, and the challenges of managing global information systems
Business Statistics and Analytics for decision Making	107	1 Develop an understanding of Business Statistics and Analytics and its managerial applications in the real business world. 2 Make the student familiar with statistical techniques in Business Decision Making. 3 Expand the knowledge of inferential statistics for developing criteria for decision making. 4 Understanding of basic and advance quantitative models in management decision making.

Department of Business Administration and Research

Shri Sant Gajanan Maharaj College of Engineering, Shegaon

Course outcomes – New syllabus

Semester – 2

Subject Name	Subject Code	Course Outcomes
BC	201	1- Demonstrate students to verbal and non-verbal communication ability to solve workplace communication issues. 2- Create and deliver effective business presentations, using appropriate tools. 3- Draft effective business correspondence with brevity and clarity. 4- Develop the students for job market.
MM	202	1- Develop an understanding of the underlying concept, theories and strategies involved in the marketing of product and services. 2- Capable to apply the three steps of target marketing: market segmentation, target marketing, and market positioning. 3- Able to evaluate different distribution channel options and their suitability for the company's product. 4- Develop a suitable promotion mix (advertising, sales promotion, public relations, personal selling, and direct marketing etc.) for the product.
CF	203	1- Aware of the basic concepts related to financial management, various techniques and tools to mange finance function. 2- Gaining the knowledge of principles and concepts used in financial decision making and familiarizing the students with the valuation of firm. 3- Able to find out the best course of action among several financial options with the technique of capital budgeting and restructuring. 4- Assessing the impact of corporate investment decisions in financing of

Department of Business Administration and Research

Shri Sant Gajanan Maharaj College of Engineering, Shegaon

Course outcomes – New syllabus

Semester- 3

Subject Name	Subject Code	Course Outcomes
International Business Environment	301	1- Get acquainted with the fundamentals of International trade and business. 2- Analyse and evaluate International marketing environment and the export procedures. 3- Analyse and evaluate Global logistics and Supply chain environment. 4- Analyse and evaluate International financial environments and working of institutions.
Investment Analysis and Portfolio Management	3101	1- Understand and get insights into investment analysis for investment decision making. 2- Acquire knowledge and skills on Technical and Fundamental analysis. 3- Understand concept of Equity valuation. 4- Learn the concept of Portfolio management along with different theories.
Indian Financial System and Financial Markets	3102	1. Understand the role, function, components and regulation of the financial system in reference to the macro economy. 2. Identify the existence of regulatory authority and development of Banking and non-banking financial institutions. 3. Know the instruments, participants, structure and operation of various financial market working in India. 4. Assess the important role of development banks in the Indian financial system and create strategies to promote financial inclusion.
Financial Derivatives and Risk Management	3103	1. Describe and explain the fundamental features of a range of key financial derivatives instruments.

		2. Solve problems requiring pricing derivative instruments and hedge market risk based on numerical data and current market trends. 3. Acquire ability to selection of various options strategies and able to determine option prices with Binominal and Black Sholes models. 4. Estimate the value of interest rate and foreign exchange swaps; Be able to understand the structure of commodity market.
Behavioral Finance	3104	1. Explain and demonstrate using empirical data the challenges to the efficient market hypothesis. 2. Explain the nature and forecast the consequences of key behavioural biases of investors. 3. Demonstrate the effect of Emotional Factors and Social Forces on investment 4. Explain the psychological factors influencing decision-making.
RETAIL MANAGEMENT	3201	1- Acquaintance budding managers with knowledge of planning, designing, implementation and assessment of retail strategies based on consumer needs and prevailing trends 2- Understands evolution of retail industry, strategies and apply in retail sector. 3- Understand characteristics of retail trading area, factors of site locations, information system requirements and techniques of customer retention 4- Understand the role of ICT in retail management in today's market scenario.
CONSUMER BEHAVIOR	3202	**Course Outcomes-** After completion of this course the students will be able to- 1. Understand consumer behavior in totality and its application in marketing

		2. Understand marketing decisions and its interlink with consumer behavior 3. Recognize social, technological, implications of marketing actions on consumer behavior 4. Design a Models and analyses latest trends which influence consumer behavior
BRAND MANAGEMENT	3203	1- Train students to manage product, and building brand equity in the market of an organization 2- Give students an insight of managing brand over multiple categories, over time and across multiple market segments 3- Gain knowledge and skills in brand architecture and brand engagement. 4- Build strategies for launching product across markets.
SALES AND DISTRIBUTION MANAGEMENT	3204	1- Learner understand importance of SDM in marketing functional and its interlinks with other functional areas. 2- Had knowledge and understand the diverse variables affecting sales and distribution functions and various plans of distribution. 3- Develop expertise in designing and effectively managing company's sales and distributions operations 4- Understand fundamentals of distribution channels, logistics and supply chain management
TALENT ACQUISITION AND DEVELOPMENT	3301	1. Students will be able to understand and explain talent acquisition process and retain talent. 2. Students will be able to understand the interplay between various aspects of talent acquisition retention and development of talent. 3. Students will be able to analyses the need assessment of training and its methods. 4. Student will be able to learn to design

		training programme and also can explore issues and possible solutions for evaluating training
EMPLOYEE RELATIONS	3302	After completion of this course the students will be able to- 1. Elaborate the IR perspective in detail. 2. Illustrate the role of trade union in the industrial setup 3. Comprehend the causes and impact of industrial disputes 4. Understand importance and process of developing and maintaining harmonious relationships between the management and all level of employees.
PERFORMANCE MANAGEMENT SYSTEM	3303	1- Explain the concept of performance management, challenges of performance management and different advantages of implementing well-designed performance management systems. 2- Understand that performance management is an on-going process composed of several sub-processes, such as performance planning, execution, assessment, and review. 3- Analyze different methods and approaches to performance measurement and also can identify some of the common challenges, problems with the performance appraisal process. 4- Design a performance management system and also can develop key skills involved in effective performance management and employee development.
COMPENSATION AND BENEFIT MANAGEMENT	3304	1- Students will be able to design rational and contemporary compensation systems in modern organization and analyses different types of rewarding procedures of employees on the basis of performance. 2- Students will be able to analyses, integrate, and apply the knowledge to solve compensation and reward related problems in organization Students will

		be able to justify the existing pay structure to employees. 3- Students can hold the knowledge of the different softwares used for compensation management in this technological era. 4- Students will be able to summarize the important provisions of social security legislation in reference to Employee State Insurance Act 1948, Payment of Gratuity Act 1982, and Employee's provident Fund Act 1952.

		working capital needs and the long term capital needs of the business organization.
Research Methodology	204	1. Understand the basics of marketing research, literature review and research design 2. Understand the different tools and techniques of measurement, scaling and data collection 3. Understand sampling, sample design and descriptive statistics 4. Acqure an ability to conduct hypothesis testing
Production and Operation Management	205	1 Equip students with process of planning, organizing and controlling activities of production. 2 Educate them on resources system used for transforming raw materials in to value added products. 3 Explain the students various dimensions of production planning and control and their inter-linkages with forecasting. 4 Students can measure performance related to productivity and will be able to conduct basic industrial engineering study on men and machines.
HRM	206	After successful completion of the course the students will be able 1. to judge Human Resource Management scenario and practices for acquisition of manpower in India. 2. to implement Human Resource Development practices for development of human resources. 3. to judge their role according to problems and situations in human resource department. 4. to implement training methods and practices on employee development.

		5. to project human resource management policies for any organization.
ED	207	1- Explore entrepreneurial path and acquaint them with the essential knowledge of starting new ventures. 2- Students will learn tools and techniques for generating, testing and developing innovative startup ideas into successful enterprise.

Department of Business Administration and Research

Shri Sant Gajanan Maharaj College of Engineering, Shegaon

Course outcomes – New syllabus

Semester- 4

Subject Name	Subject Code	Course outcomes
Strategic Management	401	1. To understand the fundamental aspects of strategy, strategic management process and its intents. 2. To analyses the importance of environmental and competitive analysis for formulating Corporate strategy 3. To categorizing different level of Corporate strategies and its alternatives in strategy formulation 4. To apply the strategic alternative and implement & control in corporate setting.
(Finance Specialisation) Managing Banks and Financial Institutions	4101	1 Understand functioning of banking industry and able to know about the various financial services provided by banks. 2 Aware aboutsignificance of modern banking products and schemes. 3 Learn about the important concepts like investment banking and wealth management along with practical approach. 4 Understand the technology driven banking system like e-banking, electronic fund transfer and electronic payment system.
Financial Markets and Financial Services	4102	1 Identify the functions of financial markets and institutions and examine their impact on financial system of a country. 2 Describe the framework of Forex markets and mechanism of exchange rate determination. 3 Analyse the salient features of various financial products, services and instruments.

		4 Acquire knowledge of modern financial services and familiarize with Fintech and Digital currency.
Project Appraisal and Finance	4103	1 Acquire the knowledge of Project Management and able to prepare Detail project report. 2 Gain the knowledge about different sources of financing and financial appraisal technique. 3 Understanding the concept of Corporate restructuring, Mergers and Acquisitions. 4 Analyse various types of Project risk and preparation of project report
Working Capital Management	4104	1 Evaluate Working Capital effectiveness of a company based on its operating and cash conversion cycles, and compare the company's effectiveness with that of peer companies 2 Identify and evaluate the necessary tools to use in managing a company's net daily cash position. 3 Estimating a company's management of accounts receivable policy, inventory, and accounts payable over time and compared to peer companies. 4 Evaluating the choices of short-term funding available to a company and recommend a financing method.
(SERVICES MARKETING) DIGITAL MARKETING	4201	1 To familiarize aspirants with fundamental of digital Marketing 2 Implement a process of planning of social media or digital marketing activities 3 Use tools and techniques to manage digital and social media marketing programs 4 Design social media programs that directly support business and marketing goals
INTEGRATED MARKETING COMMUNICATION	4202	1 To recognise the significance of IC in the contemporary times and understand fundamentals thereof. 2 To comprehend the advertising media related attributes thoroughly and modern

		media platforms. 3 To enable aspirants to design the advertising body copy and campaign. 4 To contribute to advertising arena with a due consideration for ethical and social aspects.
SALES PROMOTION MANAGEMENT	4203	1 Learn sales promotion techniques for consumer, trade, company and sales force 2 Develop sales promotion campaign, establishing its objectives, tools and program 3 Understand its roles and purpose to serve in overall marketing communication, assessing effectiveness of tools used in promotion, know modern day tools of promotion
SERVICE MARKETING	4204	1 Have a greater understanding of services marketing, specialties of how it dominates the business landscape 2 Acquaintance with major elements needed to improve marketing of services and adding value to the customers perception 3 Appraise the nature and development of strategies of marketing of services 4 Handling customers complaints and insight to service recovery management
(ORGANIZATIONAL BEHAVIOUR) LEGAL FRAMEWORK GOVERNING HUMAN RELATIONS	4301	1 Students will gain a basic understanding of objectives and importance of laws relating to industrial disputes and management of trade union and the role of trade unions in changing environment. 2 Understanding of various factors responsible for growth and development of labour laws. 3 Student will be able to summarize the important provisions of Wage Legislations, in reference to Payment of Wages Act 1936, Minimum Wages Act 1948 & Payment of Bonus Act 1965. 4 Students will be able to understand the laws related to working conditions in factories.
ORGANIZATIONAL CHANGE AND	4302	1 Students will be able to understand theories and models that form the foundation of

INTERVENTION STRATEGIES		disciplines as well as the OD diagnostic process. 2 Students of the able to understand the ethics of OD professional and also can recognise ethical principles in organisational development. 3 Students will comprehend the main approaches of change and will be equipped with knowledge and skills required for effective change and organisational development. 4 Students will be able to apply various in OD interventions and can develop a working knowledge of all aspects of OD intervention process.
TEAM DYNAMICS AT WORK	4303	1 Students will be able to justify formation and development of teams and can explain the dynamics of Team & Team Building and different learning methodologies in team decision-making. 2 Student will be able to justify the applicability of various theories of Motivation,T-group sensitivity training and Johari Window and also able to justify the Conflict resolution strategy. 3 Student will be able to understand the development of team and can discover orientation through FIRO-B . 4 Students will be able to determine the importance of Interpersonal Communication and can increases their self-awareness and strengthens ability to better understand others.
INTERNATIONAL HUMAN RESOURCE MANAGEMENT	4304	1 Student will be able to Recognize, outline, and illustrate the enduring global contexts of International HRM understanding and key skills required by HR professionals working in an international context with multinational organizations. 2 Student will be able to Demonstrate, appraise the implications of IHRM in the Host Country Context and managing alliances and joint venture.

		3 Student can able to differentiate the Context of Cross-border Alliances, prepare staffing international operations for sustained global growth, recruiting and selecting staff for international assignments, Interpret; analyze the International Industrial Relation issues and performance management. 4 Students will be able to Evaluate, interpret issues of international training, development and also can able to comprehend HRM practices in different countries
(Business Analytics) Data Analytics with R	4401	1 Demonstrate skill in data management. 2 Understand the basic concept of R programming. 3 Demonstrate skills in data visualization. 4 Describe their proficiency in business statistical analysis of data.
Data Mining for Business Decisions	4402	1 Realize Data Mining (DM) principles and techniques. 2 Analyse large sets of data to gain useful business understanding. 3 Interpret business applications of data mining 4 Demonstrate skills in new trends of Data Mining in relevant business fields.
Marketing Analytics	4403	1 Develop the skill in marketing analytics. 2 Predict the market scenario for effective marketing decision. 3 Analyze the customer behavior for strategy formation. 4 Assess the advertising effect to form adequate retailing policies.
Financial Credit Risk Analytics	4404	1 Understand about various types of financial credit. 2 Interpret the credit risk and its rating. 3 Inspect the risk to frame effective management and governance policies. 4 Demonstrate skill of credit analysis.


SHRI SANT GAJANAN MAHARAJ COLLEGE OF ENGINEERING
विद्यया अमृतम् अश्नुते
EST.1983

END OF POINT

Shri Gajanan Shikshan Sanstha's
SHRI SANT GAJANAN MAHARAJ COLLEGE OF ENGINEERING
SHEGAON – 444203, DIST. BULDHANA (MAHARASHTRA STATE), INDIA
"Recognized by A.I.C.T.E., New Delhi" Affiliated to Sant Gadge Baba Amravati University, Amravati
"Approved by the D.T.E., M.S. Mumbai"

Ph : +918669638081/82 Email.principal@ssgmce.ac.in, registrar@ssgmce.ac.in
Website- www.ssgmce.ac.in

Display of COs, POs, PSOs

Course Outcomes of all Departmental Courses-Website Link

SN	Department	Link
1	Computer Science and Engineering	https://www.ssgmce.ac.in/page_details.php?page_id=14&department_id=2
2	Electrical Engineering	https://www.ssgmce.ac.in/page_details.php?page_id=40&department_id=3
3	Electronics and Telecommunication Engineering	https://www.ssgmce.ac.in/page_details.php?page_id=56&department_id=4
4	Information Technology	https://www.ssgmce.ac.in/page_details.php?page_id=76&department_id=5
5	Mechanical Engineering	https://www.ssgmce.ac.in/page_details.php?page_id=94&department_id=6
6	MBA	https://www.ssgmce.ac.in/page_details.php?page_id=113&department_id=7

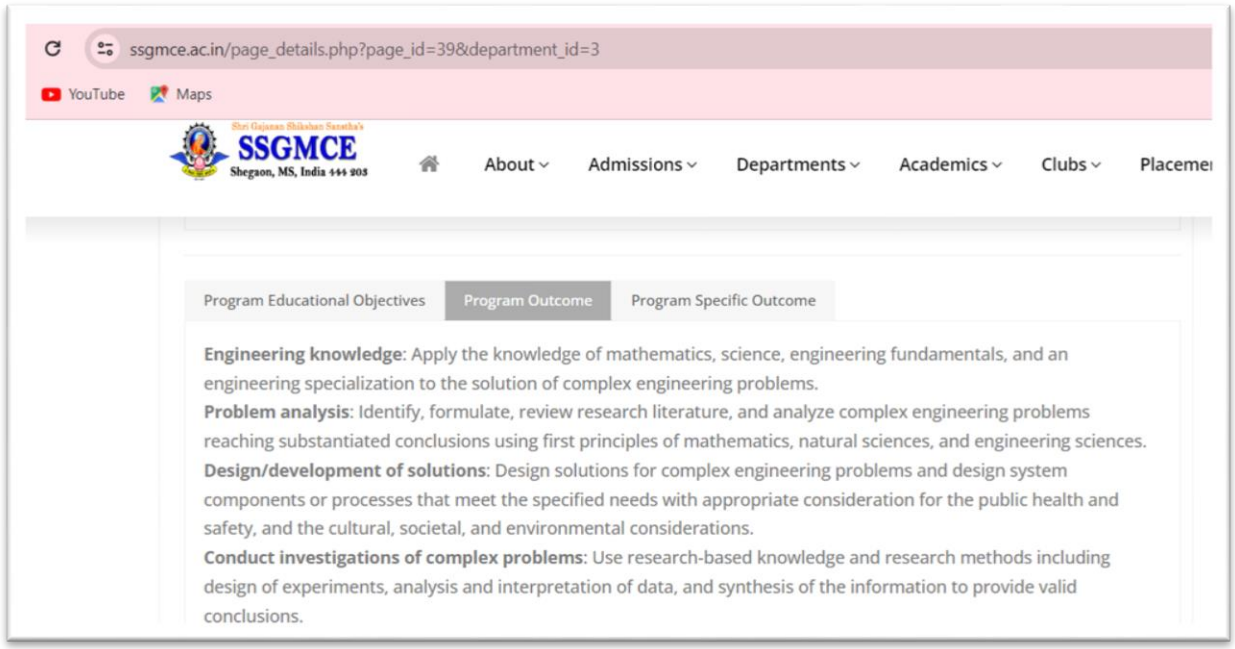
Shri Sant Gajanan Maharaj College of Engineering SHEGAON 444 203

PRINCIPAL
Shri Sant Gajanan Maharaj
College of Engineering,Shegaon.

Shri Gajanan Shikshan Sanstha's
SHRI SANT GAJANAN MAHARAJ COLLEGE OF ENGINEERING
SHEGAON – 444203, DIST. BULDHANA (MAHARASHTRA STATE), INDIA
"Recognized by A.I.C.T.E., New Delhi" Affiliated to Sant Gadge Baba Amravati University, Amravati
"Approved by the D.T.E., M.S. Mumbai"

Ph : +918669638081/82 Email.principal@ssgmce.ac.in, registrar@ssgmce.ac.in
Website- www.ssgmce.ac.in

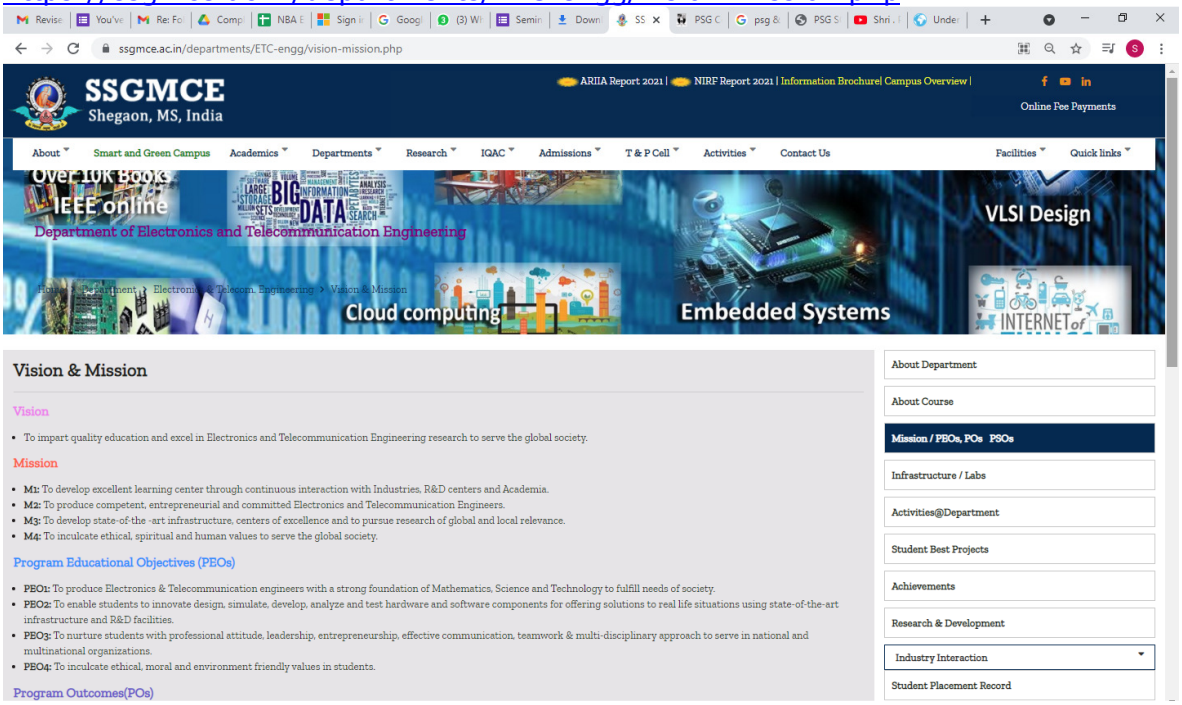
Display of Program outcomes on website
College Website:
https://www.ssgmce.ac.in/page_details.php?page_id=39&department_id=3



Dissemination Details

Display of Vision, Mission and PEOs on college website

https://ssgmce.ac.in/departments/ETC-engg/vision-mission.php

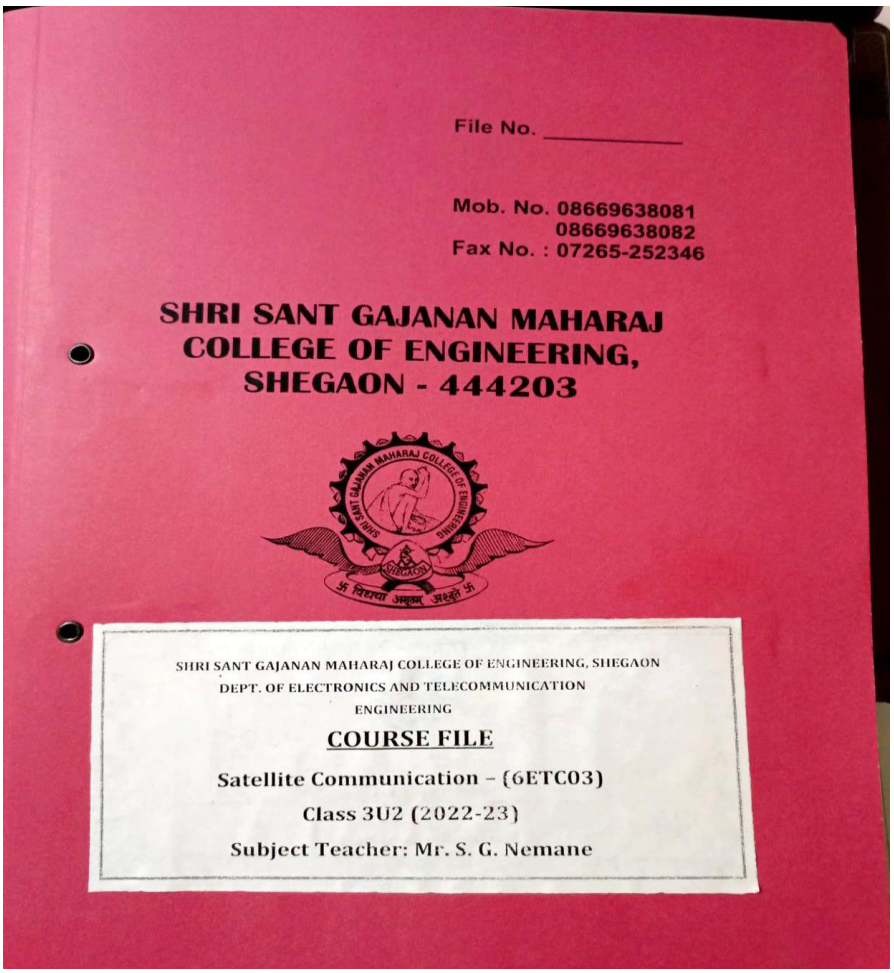


Dissemination on Website

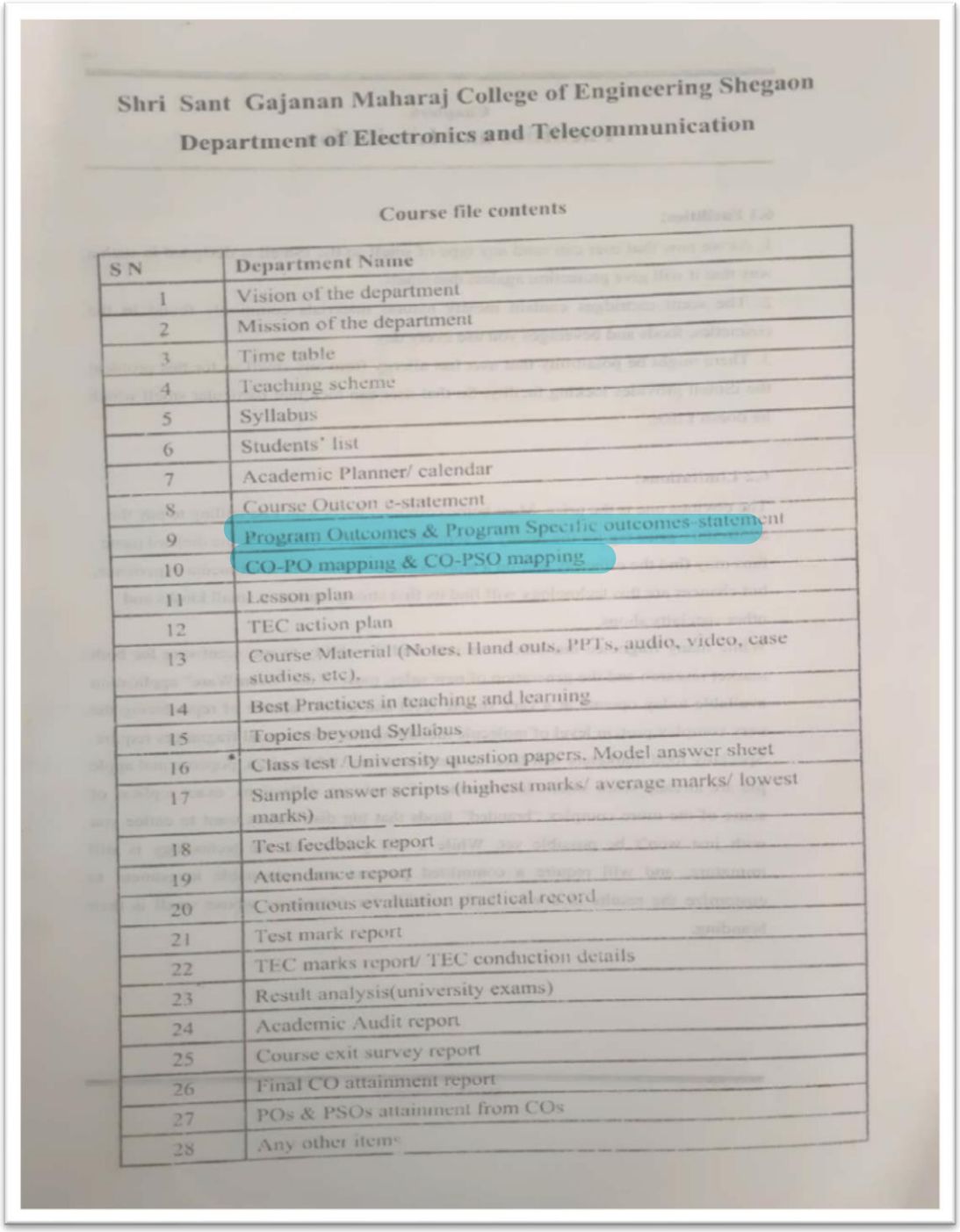
Shri Gajanan Shikshan Sanstha's
SHRI SANT GAJANAN MAHARAJ COLLEGE OF ENGINEERING
SHEGAON – 444203, DIST. BULDHANA (MAHARASHTRA STATE), INDIA
"Recognized by A.I.C.T.E., New Delhi" Affiliated to Sant Gadge Baba Amravati University, Amravati
"Approved by the D.T.E., M.S. Mumbai"

Ph : +918669638081/82 Email.principal@ssgmce.ac.in, registrar@ssgmce.ac.in
Website- www.ssgmce.ac.in

Display of Course Outcomes -Program outcomes in Course File



Ph : +918669638081/82 Email.principal@ssgmce.ac.in, registrar@ssgmce.ac.in
Website- www.ssgmce.ac.in



Shri Sant Gajanan Maharaj College of Engineering Shegaon

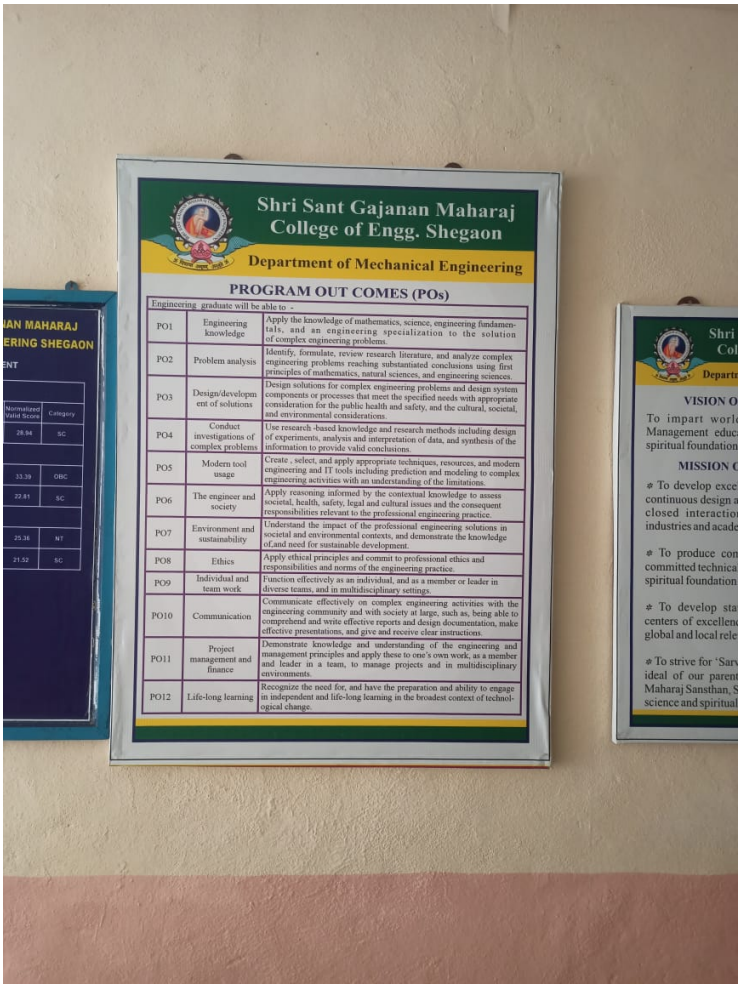
Department of Electronics and Telecommunication

Course file contents

S N	Department Name
1	Vision of the department
2	Mission of the department
3	Time table
4	Teaching scheme
5	Syllabus
6	Students' list
7	Academic Planner/ calendar
8	Course Outcon e-statement
9	Program Outcomes & Program Specific outcomes statement
10	CO-PO mapping & CO-PSO mapping
11	Lesson plan
12	TEC action plan
13	Course Material (Notes, Hand outs, PPTs, audio, video, case studies, etc).
14	Best Practices in teaching and learning
15	Topics beyond Syllabus
16	Class test /University question papers, Model answer sheet
17	Sample answer scripts (highest marks/ average marks/ lowest marks)
18	Test feedback report
19	Attendance report
20	Continuous evaluation practical record
21	Test mark report
22	TEC marks report/ TEC conduction details
23	Result analysis(university exams)
24	Academic Audit report
25	Course exit survey report
26	Final CO attainment report
27	POs & PSOs attainment from COs
28	Any other items

CO-PO : Displayed in Course File

Display at Corriodor

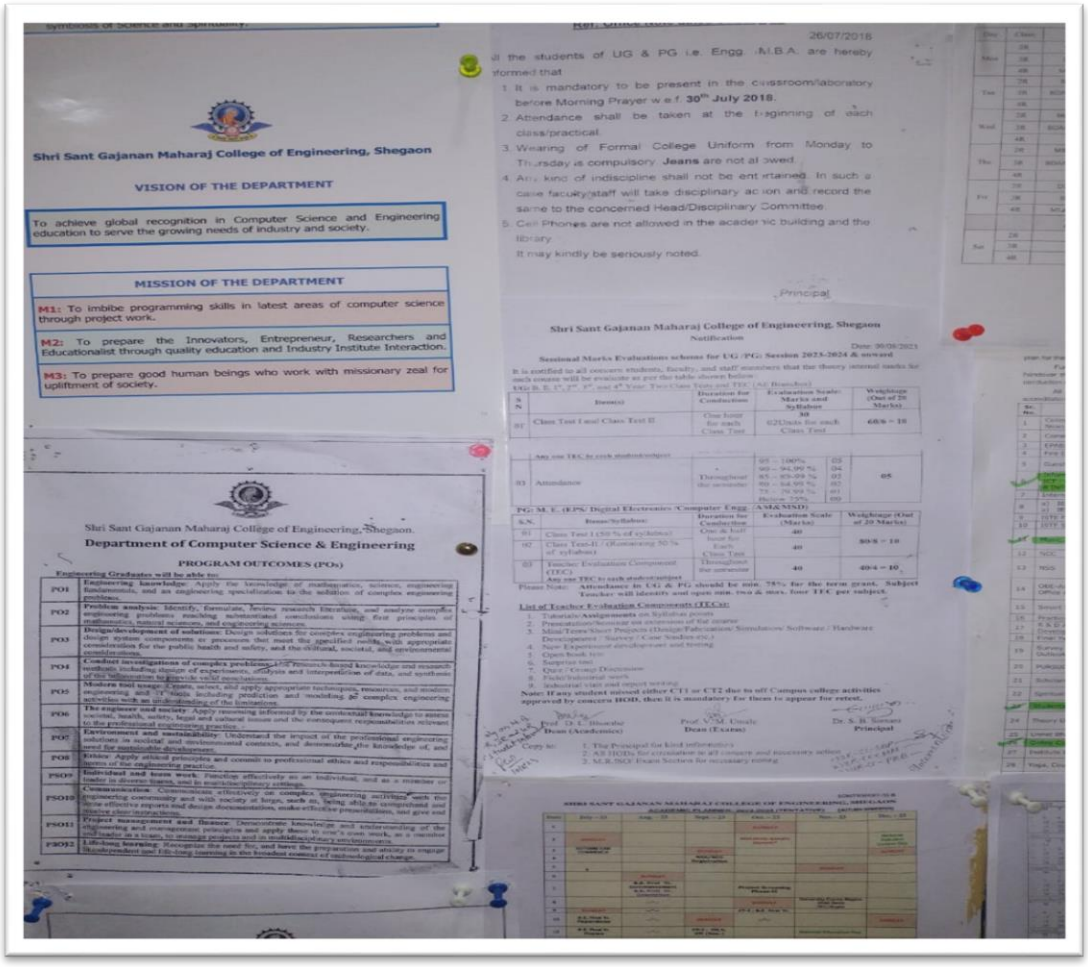


Dissemination of POs in Mechanical Department

Shri Gajanan Shikshan Sanstha's
SHRI SANT GAJANAN MAHARAJ COLLEGE OF ENGINEERING
SHEGAON – 444203, DIST. BULDHANA (MAHARASHTRA STATE), INDIA
"Recognized by A.I.C.T.E., New Delhi" Affiliated to Sant Gadge Baba Amravati University, Amravati
"Approved by the D.T.E., M.S. Mumbai"

Ph : +918669638081/82 Email.principal@ssgmce.ac.in, registrar@ssgmce.ac.in
Website- www.ssgmce.ac.in

Student Notice Board



Dissemination of POs on Students' Notice Board

Shri Gajanan Shikshan Sanstha's
SHRI SANT GAJANAN MAHARAJ COLLEGE OF ENGINEERING
SHEGAON – 444203, DIST. BULDHANA (MAHARASHTRA STATE), INDIA
"Recognized by A.I.C.T.E., New Delhi" Affiliated to Sant Gadge Baba Amravati University, Amravati
"Approved by the D.T.E., M.S. Mumbai"

Ph : +918669638081/82 Email.principal@ssgmce.ac.in, registrar@ssgmce.ac.in
Website- www.ssgmce.ac.in

Notice Board for Students

Shri Gajanan Shikshan Sanstha's
SHRI SANT GAJANAN MAHARAJ COLLEGE OF ENGINEERING
SHEGAON – 444203, DIST. BULDHANA (MAHARASHTRA STATE), INDIA
"Recognized by A.I.C.T.E., New Delhi" Affiliated to Sant Gadge Baba Amravati University, Amravati
"Approved by the D.T.E., M.S. Mumbai"

Ph : +918669638081/82 Email.principal@ssgmce.ac.in, registrar@ssgmce.ac.in
Website- www.ssgmce.ac.in

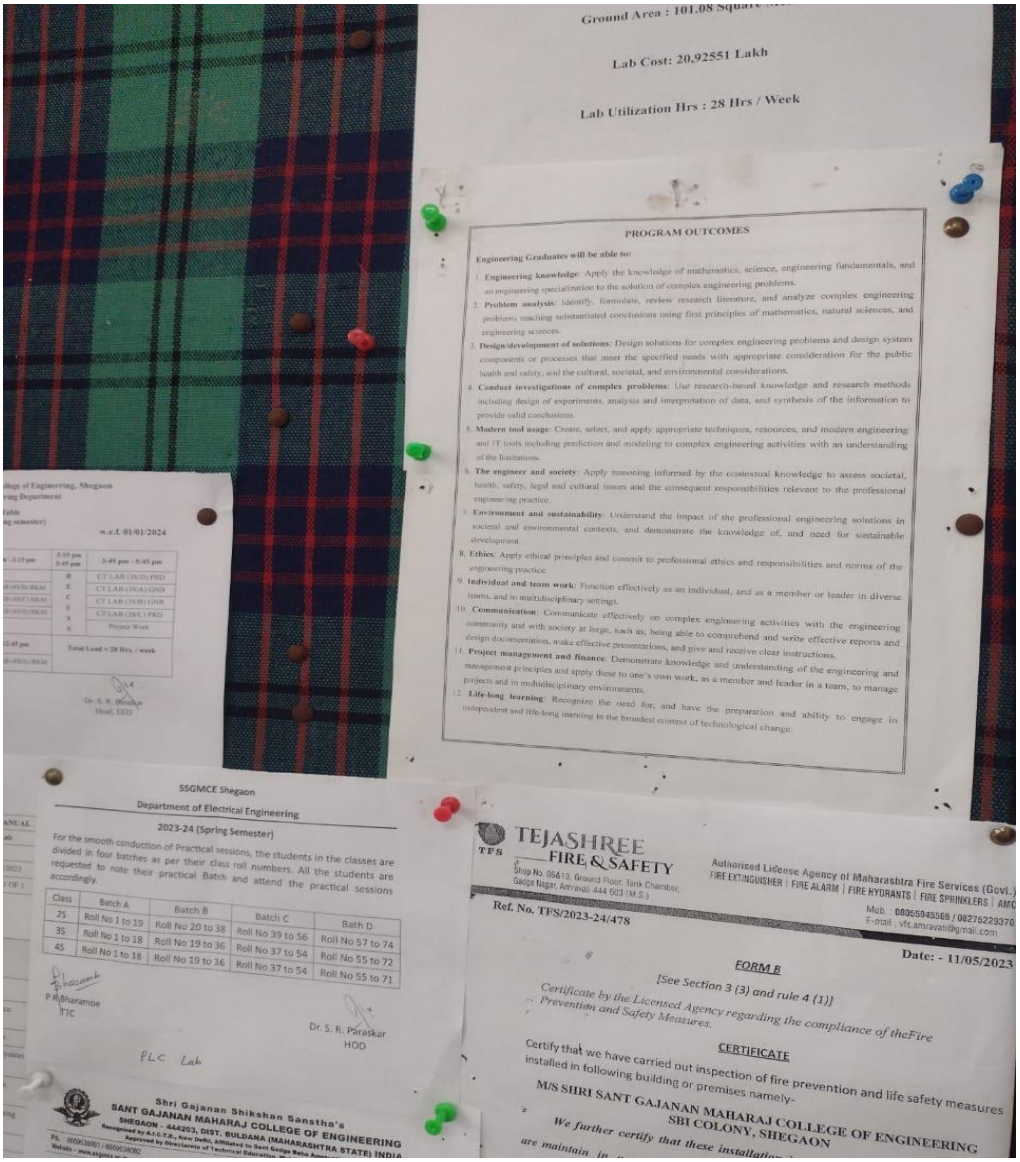
HOD Cabin

Dissemination of POs in HoD Cabin

Shri Gajanan Shikshan Sanstha's
SHRI SANT GAJANAN MAHARAJ COLLEGE OF ENGINEERING
SHEGAON – 444203, DIST. BULDHANA (MAHARASHTRA STATE), INDIA
"Recognized by A.I.C.T.E., New Delhi" Affiliated to Sant Gadge Baba Amravati University, Amravati
"Approved by the D.T.E., M.S. Mumbai"

Ph : +9186696380 81/82 Email.principal@ssgmce.ac.in, registrar@ssgmce.ac.in
Website- www.ssgmce.ac.in

Laboratory Notice Board

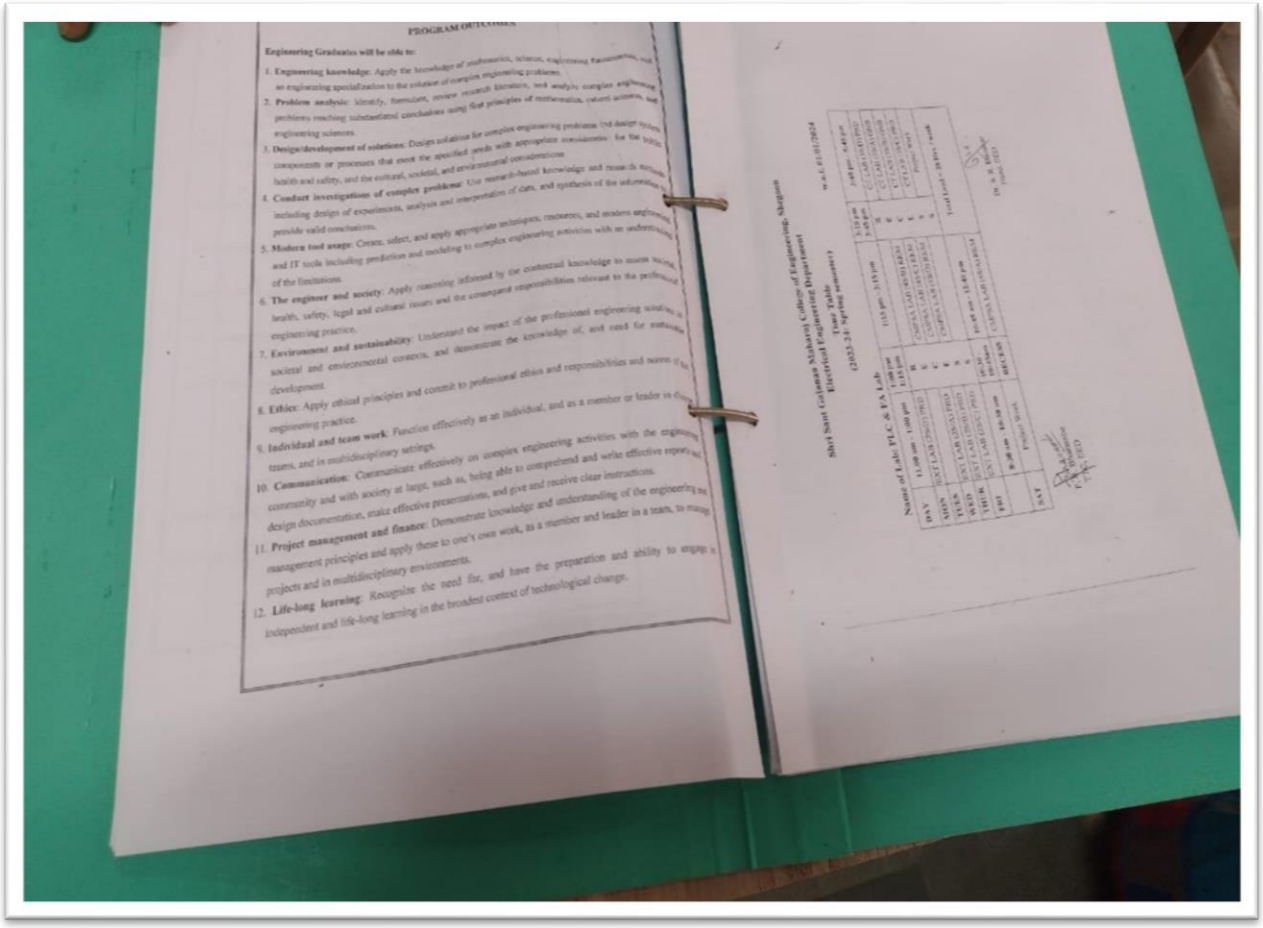


Display of POs :Laboratory Notice Board

Shri Gajanan Shikshan Sanstha's
SHRI SANT GAJANAN MAHARAJ COLLEGE OF ENGINEERING
SHEGAON – 444203, DIST. BULDHANA (MAHARASHTRA STATE), INDIA
"Recognized by A.I.C.T.E., New Delhi" Affiliated to Sant Gadge Baba Amravati University, Amravati
"Approved by the D.T.E., M.S. Mumbai"

Ph : +918669638081/82 Email.principal@ssgmce.ac.in, registrar@ssgmce.ac.in
Website- www.ssgmce.ac.in

Laboratory File



Dissemination of POs in Laboratory File

Shri Sant Gajanan Maharaj College of Engineering SHEGAON 444 203

PRINCIPAL
Shri Sant Gajanan Maharaj
College of Engineering,Shegaon.

This Document is Certified from Page 1 to 142

SUNIL BHIKAMCHAND SOMANI

Digitally signed by SUNIL BHIKAMCHAND SOMANI
Date: 2024.04.04 08:15:51 +05'30'