CITY ENGINEERING COLLEGE
Doddakallasandra, Bangalore-560061

DEPARTMENT OF CIVIL ENGINEERING

ACADEMIC YEAR 2019-20

COURSE OUTCOMES (EVEN)

8th Semester

COURSE NAME: QUANTITY SURVEYING AND CONTRACTS MANAGEMENT

COURSE CODE: 15CV81(C801)

COs	STATEMENTS
C801.1	Prepare detailed and abstract estimates for roads and building.
C801.2	Prepare valuation reports of buildings.
C801.3	Interpret Contract documents of domestic and international construction works

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DEPARTMENT OF CIVIL ENGINEERING

ACADEMIC YEAR 2019-20

COURSE OUTCOMES (EVEN)

8th Semester

COURSE NAME: DESIGN OF PRE-STRESSED CONCRETE ELEMENTS

COURSE CODE: 15CV82(C802)

COs	STATEMENTS
C802.1	Understand the requirement of PSC members for present scenario.
C802.2	Analyse the stresses encountered in PSC element during transfer and at working.
C802.3	Understand the effectiveness of the design of PSC after studying losses
C802.4	Capable of analyzing the PSC element and finding its efficiency.
C802.5	Design PSC beam for different requirements.

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DEPARTMENT OF CIVIL ENGINEERING

ACADEMIC YEAR 2019-20

COURSE OUTCOMES (EVEN)

8th Semester

COURSE NAME: PAVEMENT DESIGN

COURSE CODE: 15CV833(C803)

COs	STATEMENTS
C803.1	Systematically generate and compile required data for design of pavement (Highway & Airfield).
C803.2	Analyze stress, strain and deflection by boussinesq's, burmister's and westergaard's theory.
C803.3	Design rigid pavement and flexible pavement conforming to IRC58-2002 and IRC37-2001.
C803.4	Evaluate the performance of the pavement and also develops maintenance statement based on site specific requirements.

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ACADEMIC YEAR 2019-20

COURSE OUTCOMES (EVEN)

6th Semester

COURSE NAME: CONSTRUCTION MANAGEMENT AND ENTREPRENEURSHIP

COURSE CODE: 17CV61(C601)

COs	STATEMENTS
C601.1	Understand the construction management process.
C601.2	Understand and solve variety of issues that are encountered by every professional in discharging professional duties.
C601.3	Fulfill the professional obligations effectively with global outlook

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ACADEMIC YEAR 2019-20

COURSE OUTCOMES (EVEN)

6th Semester

COURSE NAME: DESIGN OF STEEL STRUCTURAL ELEMENTS

COURSE CODE: 17CV62(C602)

COs	STATEMENTS
C602.1	Possess a knowledge of Steel Structures Advantages and Disadvantages of Steel structures, steel code provisions and plastic behaviour of structural steel
C602.2	Understand the Concept of Bolted and Welded connections.
C602.3	Understand the Concept of Design of compression members, built-up columns and columns splices.
C602.4	Understand the Concept of Design of tension members, simple slab base and gusseted base.
C602.5	Understand the Concept of Design of laterally supported and un-supported steel beams.

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ACADEMIC YEAR 2019-20

COURSE OUTCOMES (EVEN)

6th Semester

COURSE NAME: HIGHWAY ENGINEERING

COURSE CODE: 17CV63(C603)

COs	STATEMENTS
C603.1	Acquire the capability of proposing a new alignment or re-alignment of existing roads, conduct necessary field investigation for generation of required data.
C603.2	Evaluate the engineering properties of the materials and suggest the suitability of the same for pavement construction.
C603.3	Design road geometrics, structural components of pavement and drainage.
C603.4	Evaluate the highway economics by few select methods and also will have a basic knowledge of various highway financing concepts.

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ACADEMIC YEAR 2019-20

COURSE OUTCOMES (EVEN)

6th Semester

COURSE NAME: WATER SUPPLY AND TREATMENT ENGINEERING

COURSE CODE: 17CV64(C604)

COs	STATEMENTS
C604.1	Estimate average and peak water demand for a community.
C604.2	Evaluate available sources of water, quantitatively and qualitatively and make appropriate choice for a community.
C604.3	Evaluate water quality and environmental significance of various parameters and plan suitable treatment system.
C604.4	Design a comprehensive water treatment and distribution system to purify and distribute water to the required quality standards.

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ACADEMIC YEAR 2019-20

COURSE OUTCOMES (EVEN)

6th Semester

COURSE NAME: SOLID WASTE MANAGEMENT

COURSE CODE: 17CV651(C605)

COs	STATEMENTS
C605.1	Analyse existing solid waste management system and to identify their drawbacks.
C605.2	Evaluate different elements of solid waste management system.
C605.3	Suggest suitable scientific methods for solid waste management elements.
C605.4	Design suitable processing system and evaluate disposal sites.

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ACADEMIC YEAR 2019-20

COURSE OUTCOMES (EVEN)

6th Semester

COURSE NAME: WATER RESOURCES MANAGEMENT

COURSE CODE: 17CV661 (C606)

COs	STATEMENTS
C606.1	Assess the potential of groundwater and surface water resources.
C606.2	Address the issues related to planning and management of water resources.
C606.3	Know how to implement IWRM in different regions.
C606.4	Understand the legal issues of water policy.
C606.5	Select the method for water harvesting based on the area.

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ACADEMIC YEAR 2019-20

COURSE OUTCOMES (EVEN)

6th Semester

COURSE NAME: SOFTWARE APPLICATION LAB

COURSE CODE: 17CVL67 (C607)

COs	STATEMENTS
C607.1	use software skills in a professional set up to automate the work and thereby reduce cycle time for completion of the work

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ACADEMIC YEAR 2019-20

COURSE OUTCOMES (EVEN)

6th Semester

COURSE NAME: EXTENSIVE SURVEY PROJECT

COURSE CODE: 17CVL68 (C608)

COs	STATEMENTS
C608.1	Apply Surveying knowledge and tools effectively for the projects
C608.2	Understanding Task environment, Goals, responsibilities, Task focus, working in Teams towards common goals, Organizational performance expectations, technical and behavioral competencies.
C608.3	Application of individual effectiveness skills in team and organizational context, goal setting, time management, communication and presentation skills.
C608.4	Professional etiquettes at workplace, meeting and general
C608.5	Establishing trust-based relationships in teams & organizational environment
C608.6	Orientation towards conflicts in team and organizational environment, Understanding sources of conflicts, Conflict resolution styles and techniques

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ACADEMIC YEAR 2019-20

COURSE OUTCOMES (EVEN)

4th Semester

COURSE NAME: COMPLEX ANALYSIS, PROBABILITY AND STATISTICAL METHODS

COURSE CODE: 18MAT41 (C401)

COs	STATEMENTS
C401.1	Use the concepts of analytic function and complex potentials to solve the problems arising in electromagnetic field theory.
C401.2	Utilize conformal transformation and complex integral arising in aerofoil theory, fluid flow visualization and image processing.
C401.3	Apply discrete and continuous probability distributions in analyzing the probability models arising in engineering field.
C401.4	Make use of the correlation and regression analysis to fit a suitable mathematical model for the statistical data.
C401.5	Construct joint probability distributions and demonstrate the validity of testing the hypothesis.

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ACADEMIC YEAR 2019-20

COURSE OUTCOMES (EVEN)

4th Semester

COURSE NAME: ANALYSIS OF DETERMINATE STRUCTURES

COURSE CODE: 18CV42 (C402)

COs	STATEMENTS
C402.1	Identify different forms of structural systems.
C402.2	Construct ILD and analyse the beams and trusses subjected to moving loads
C403.3	Understand the energy principles and energy theorems and its applications to determine the deflections of trusses and beams.
C404.4	Determine the stress resultants in arches and cables.

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ACADEMIC YEAR 2019-20

COURSE OUTCOMES (EVEN)

4th Semester

COURSE NAME: APPLIED HYDRAULICS

COURSE CODE: 18CV43 (C403)

COs	STATEMENTS
C403.1	Apply dimensional analysis to develop mathematical modeling and compute the parametric values in prototype by analyzing the corresponding model parameters
C403.2	Design the open channels of various cross sections including economical channel sections
C403.3	Apply Energy concepts to flow in open channel sections, Calculate Energy dissipation,
C403.4	Compute water surface profiles at different conditions
C403.5	Design turbines for the given data, and to know their operation characteristics under different operating conditions

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ACADEMIC YEAR 2019-20

COURSE OUTCOMES (EVEN)

4th Semester

COURSE NAME: CONCRETE TECHNOLOGY

COURSE CODE: 18CV44 (C404)

COs	STATEMENTS
C404.1	Relate material characteristics and their influence on microstructure of concrete.
C404.2	Distinguish concrete behavior based on its fresh and hardened properties.
C404.3	Illustrate proportioning of different types of concrete mixes for required fresh and hardened properties using professional codes.
C404.4	Adopt suitable concreting methods to place the concrete based on requirement.
C404.5	Select a suitable type of concrete based on specific application.

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ACADEMIC YEAR 2019-20

COURSE OUTCOMES (EVEN)

4th Semester

COURSE NAME: ADVANCED SURVEYING

COURSE CODE: 18CV45 (C405)

COs	STATEMENTS
C405.1	Apply the knowledge of geometric principles to arrive at surveying problems
C405.2	Use modern instruments to obtain geo-spatial data and analyse the same to appropriate engineering problems.
C405.3	Capture geodetic data to process and perform analysis for survey problems with the use of electronic instruments
C405.4	Design and implement the different types of curves for deviating type of alignments.

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DEPARTMENT OF CIVIL ENGINEERING

ACADEMIC YEAR 2019-20

COURSE OUTCOMES (EVEN)

4th Semester

COURSE NAME: WATER SUPPLY AND TREATMENT ENGINEERING

COURSE CODE: 18CV46 (C406)

COs	STATEMENTS
C406.1	Estimate average and peak water demand for a community.
C406.2	Evaluate available sources of water, quantitatively and qualitatively and make appropriate choice for a community
C406.3	Evaluate water quality and environmental significance of various parameters and plan suitable treatment system.
C406.4	Design a comprehensive water treatment and distribution system to purify and distribute water to the required quality standards.

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DEPARTMENT OF CIVIL ENGINEERING

ACADEMIC YEAR 2019-20

COURSE OUTCOMES (EVEN)

4th Semester

COURSE NAME: ENGINEERING GEOLOGY LABORATORY

COURSE CODE: 18CVL47 (C407)

COs	STATEMENTS
C407.1	The students able to identify the minerals, rocks and utilize them effectively in civil engineering practices.
C407.2	The students will interpret and understand the geological conditions of the area for implementation of civil engineering projects.
C407.3	The students will interpret subsurface information such as thickness of soil, weathered zone, depth of hard rock and saturated zone by using geophysical methods.
C407.4	The students will learn the techniques in the interpretation of LANDSAT Imageries to find out the lineaments and other structural features for the given area.
C407.5	The students will be able to identify the different structures in the field.

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ACADEMIC YEAR 2019-20

COURSE OUTCOMES (EVEN)

4th Semester

COURSE NAME: FLUID MECHANICS AND HYDRAULIC MACHINES LABORATORY

COURSE CODE: 18CVL48 (C408)

COs	STATEMENTS
C408.1	Properties of fluids and the use of various instruments for fluid flow measurement.
C408.2	Working of hydraulic machines under various conditions of working and their characteristics.

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CITY ENGINEERING COLLEGE

Department of Computer Science and Engineering

2.6.1QlM Programme Outcomes (POs) and Course Outcomes (COs) offered by the department - EVEN Semester
Academic Year 2019-2020

SL NO	SEMESTER	SUBJECT/SUBJECT CODE
1	4	Complex Analysis, Probability and Statistical Methods(18MAT41)
2		Design and Analysis of Algorithms (18CS42)
3		Operating System(18CS43)
4		Microcontroller And Embedded Systems (18CS44)
5		Object Oriented Concepts(18CS45)
6		Data Communication(18CS46)
7		Design and Analysis of Algorithm Laboratory(18CSL47)
8		Microcontroller and Embedded Systems Laboratory(18CSL48)
9	6	Cryptography, Network Security and Cyber Law (17CS61)
10		Computer Graphics and Visualization(17CS62)
11		System Software And Compilers (17CS63)
12		Operating system (17CS64)
13		Total Quality Management (17ME664)
14		System Software Laboratory(17CSL66)
15		Computer Graphics Laboratory with Mini Project (17CSL67)
16	8	Internet of things and applications (15CS81)
17		Big Data Analytics (15CS82)

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2.6.1 Program outcomes, program specific outcomes and course outcomes for all programs offered by the Institution

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

ACADEMIC YEAR: 2019-20

EVEN SEMESTER-IV

Course Name: Complex Analysis, Probability and Statistical Methods **Course Code: 18MAT41/C401**

Cos	Statements
C401.1	Use the concepts of analytic function and complex potentials to solve the problems arising in electromagnetic field theory.
C401.2	Utilize conformal transformation and complex integral arising in aerofoil theory, fluid flow visualization and image processing.
C401.3	Apply discrete and continuous probability distributions in analyzing the probability models arising in engineering field.
C401.4	Apply greedy and input enhancement methods to solve graph & string based computational problems.
C401.5	Make use of the correlation and regression analysis to fit a suitable mathematical model for the statistical data.
C401.6	Construct joint probability distributions and demonstrate the validity of testing the hypothesis.

Co-Po Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1	1	1							1	1	1	1
CO2	2	2	1	1	1				2	1		2	1	1	3
CO3	3	3	3	1	1					1		2	2	2	2
CO4	3	3	3	3	1	1		1	1	3		2	3	1	1
CO5	2	3	3	1	2					1		3	2	1	2
AVG	2.6	2.4	2.2	1.4	1.2	1	0	1	1.5	1.5	0	2	1.8	1.2	1.8

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

ACADEMIC YEAR: 2019-20

EVEN SEMESTER-IV

Course Name: Design and Analysis of Algorithms **Course Code: 18CS42/C402**

Cos	Statements
C402.1	Describe computational solution to well known problems like searching, sorting etc.
C402.2	Estimate the computational complexity of different algorithms.
C402.3	Devise an algorithm using appropriate design strategies for problem solving.
C402.4	Apply appropriate method to solve a given problem.
C402.5	Describe various methods of algorithm analysis.

CO PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1	3	1								1	1	1
CO2	2	2	1	2	1								1	1	3
CO3	3	3	3	3	1								2	2	2
CO4	3	3	3	2	1								3	1	1
CO5	2	3	3	3	2								2	1	2
AVG	2.6	2.4	2.2	2.6	1.2	0	0	0	0	0	0	0	1.8	1.2	1.8

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2.6.1 Program outcomes, program specific outcomes and course outcomes for all programs offered by the Institution

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

ACADEMIC YEAR: 2019-20

EVEN SEMESTER-IV

Course Name: Operating Systems **Course Code: 18CS43/C403**

Cos	Statements
C403.1	Demonstrate need for OS and different types of OS
C403.2	Apply suitable techniques for management of different resources
C403.3	Use processor, memory, storage and file system commands
C403.4	Analyse various normalization forms for the given application.
C403.5	Realize the different concepts of OS in platform of usage through case studies

Co-Po Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1	1	1	1							1	2	1
CO2	3	1	1	1								2	2	1	2
CO3	3	3	3	3	1								3	3	3
CO4	1	3	3	1	1								2	2	2
CO5	3	3	3	1	3	3						1	3	3	3
AVG	2.6	2.2	2.2	1.4	1.5	2	0	0	0	0	0	1.5	2.2	2.2	2.2

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2.6.1 Program outcomes, program specific outcomes and course outcomes for all programs offered by the Institution

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

ACADEMIC YEAR: 2019-20

EVEN SEMESTER-IV

Course Name: Microcontroller and Embedded Systems **Course Code 18CS44/C404**

Cos	Statements
C404.1	Describe the architectural features and instructions of ARM microcontroller
C404.2	Apply the knowledge gained for Programming ARM for different applications.
C404.3	Interface external devices and I/O with ARM microcontroller. Interpret the basic hardware components and their selection method based on the characteristics and attributes of an embedded system.
C404.4	Develop the hardware /software co-design and firmware design approaches.
C404.6	Demonstrate the need of real time operating system for embedded system applications

Co-Po Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	1	1									1	1	1
CO2	1	1	1	1								2	1	1	2
CO3	2	2	3	2	2						1	1	2	2	2
CO4	2	2	1	2							1	1	2	2	2
CO5	2	2	2	1										1	1
AVG	1.6	1.6	1.6	1.4	2	0	0	0	0	0	1	1.3	1.5	1.4	1.6

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2.6.1 Program outcomes, program specific outcomes and course outcomes for all programs offered by the Institution

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

ACADEMIC YEAR: 2019-20

EVEN SEMESTER-IV

Course Name: Object Oriented Concepts **Course Code 18CS45/C405**

Cos	Statements
C405.1	Explain the object-oriented concepts and JAVA.
C405.2	Develop computer programs to solve real world problems in Java.
C405.3	Set up Java JDK environment to create, debug and run simple Java programs .
C405.4	Create multi-threaded programs and event handling mechanisms.
C405.5	Develop simple GUI interfaces for a computer program to interact with users, and to understand the event-based GUI handling principles using swings.

Co-Po Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	2	1								3	1	1	3
CO2	1	1	2	1								2	1	2	2
CO3	1	1	2	1								2	1	1	2
CO4	1	1	1	1								2	1	2	1
CO5	1	1	1	2								3	1	2	3
AVG	1	1	1.6	1.2	0	0	0	0	0	0	0	2.4	1	1.6	2.2

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2.6.1 Program outcomes, program specific outcomes and course outcomes for all programs offered by the Institution

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

ACADEMIC YEAR: 2019-20

EVEN SEMESTER-IV

Course Name: Data Communication **Course Code 18CS46/C406**

Cos	Statements
C406.1	Explain the various components of data communication.
C406.2	Explain the fundamentals of digital communication and switching.
C406.3	Compare and contrast data link layer protocols.
C406.4	Demonstrate Medium Access Control protocols for reliable and noisy channels.
C406.5	Summarize IEEE 802.xx standards .

Co-Po Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1					1			1	3	1	1	3
CO2	3	1	1					1		1	1	2	1	2	2
CO3	3	2	1					1		1		2	1	1	2
CO4	3	1	1							1		2	1	2	1
CO5	2	1	1					1				3	1	2	3
AVG	1.8	1.2	1	0	0	0	2.8	1	0	1	1	2.4	1	1.6	2.2

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2.6.1 Program outcomes, program specific outcomes and course outcomes for all programs offered by the Institution

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

ACADEMIC YEAR: 2019-20

EVEN SEMESTER-IV

Course Name: Design and Analysis of Algorithm Laboratory **Course Code 18CSL7/C407**

Cos	Statements
C407.1	Design algorithms using appropriate design techniques (brute-force, greedy, dynamic programming, etc.)
C407.2	Implement a variety of algorithms such assorting, graph related, combinatorial, etc., in a high level language.
C407.3	Analyze and compare the performance of algorithms using language features.
C407.4	Measure and compare the performance of different algorithms.
C407.5	Apply and implement learned algorithm design techniques and data structuresto solve real-world problems.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

ACADEMIC YEAR: 2019-20

EVEN SEMESTER-IV

Course Name: Microcontroller and Embedded Systems Laboratory **Course Code 18CSL48/C408**

Cos	Statements
C408.1	Develop and test program using ARM7TDMI/LPC2148
C408.2	Conduct the following experiments on an ARM7TDMI/LPC2148 evaluation board using evaluation version of Embedded 'C' & Keil Uvision-4 tool/compiler.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

ACADEMIC YEAR: 2019-20

EVEN SEMESTER-VI

Course Name: Cryptography, Network Security and Cyber Law **Course Code: 17CS61 /C601**

Cos	Statements
C601.1	Discuss the cryptography and its need to various applications
C601.2	Design and Develop simple cryptography algorithms
C601.3	Understand the different types of encryption protocols.
C601.4	Understand the IEEE 802.11
C601.5	Understand the cyber security and need cyber Law

Co-Po Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	2	1								3	1	1	3
CO2	1	1	2	1								2	1	2	2
CO3	1	1	2	1								2	1	1	2
CO4	1	1	1	1								2	1	2	1
CO5	1	1	1	2								3	1	2	3
AVG	1	1	1.6	1.2	0	0	0	0	0	0	0	2.4	1	1.6	2.2

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2.6.1 Program outcomes, program specific outcomes and course outcomes for all programs offered by the Institution

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

ACADEMIC YEAR: 2019-20

EVEN SEMESTER-VI

Course Name: Computer Graphics and Visualization **Course Code: 17CS62 /C602**

Cos	Statements
C602.1	Design and implement algorithms for 2D graphics primitives and attributes.
C602.2	Construct geometric objects using Computer Graphics principles and OpenGL APIs
C602.3	Illustrate Geometric transformations on both 2D and 3D objects.
C602.4	Apply concepts of clipping and visible surface detection in 2D and 3D viewing, and Illumination Models.
C602.5	Decide suitable hardware and software for developing graphics packages using OpenGL.

Co-Po Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1					1			1	3	1	1	3
CO2	3	1	1					1		1	1	2	1	2	2
CO3	3	2	1					1		1		2	1	1	2
CO4	3	1	1							1		2	1	2	1
CO5	2	1	1					1				3	1	2	3
AVG	1.8	1.2	1	0	0	0	2.8	1	0	1	1	2.4	1	1.6	2.2

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2.6.1 Program outcomes, program specific outcomes and course outcomes for all programs offered by the Institution

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

ACADEMIC YEAR: 2019-20

EVEN SEMESTER-VI

Course Name: System Software **Course Code: 17CS63/C603**

Cos	Statements
C603.1	Explain system software
C603.2	Design and develop lexical analyzers, parsers and code generators
C603.3	Familiarize with source file, object file and executable file structures and libraries
C603.4	Describe the front-end and back-end phases of compiler and their importance to students
C603.5	Utilize lex and yacc tools for implementing different concepts of system software

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1	1	1							1	1	1	3
CO2	2	3	1	1	1							1	1	2	2
CO3	2	2	1	2	1							1	1	1	2
CO4	1	3	2	1	1							1	1	1	1
CO5	3	2	2	1	1							1	1	1	3
AVG	2.2	2.2	1.4	1.2	1	0	0	0	0	0	0	1	1	1.2	2.2

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2.6.1 Program outcomes, program specific outcomes and course outcomes for all programs offered by the Institution

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

ACADEMIC YEAR: 2019-20

EVEN SEMESTER-VI

Course Name: Operating Systems **Course Code: 17CS64/C604**

Cos	Statements
C604.1	Demonstrate need for OS and different types of OS
C604.2	Understanding concepts of Muti-Threading.
C604.3	Discuss suitable techniques for management of different resources
C604.4	Illustrate processor, memory, storage and file system commands
C604.5	Explain the different concepts of OS in platform of usage through case studies

Co-Po Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	1	1									1	1	1
CO2	1	1	1	1								2	1	1	2
CO3	2	2	3	2	2						1	1	2	2	2
CO4	2	2	1	2							1	1	2	2	2
CO5	2	2	2	1										1	1
AVG	1.6	1.6	1.6	1.4	2	0	0	0	0	0	1	1.3	1.5	1.4	1.6

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2.6.1 Program outcomes, program specific outcomes and course outcomes for all programs offered by the Institution

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

ACADEMIC YEAR: 2019-20

EVEN SEMESTER-VI

Course Name: Total Quality Management **Course Code: 17ME664 /C605**

Cos	Statements
C605.1	Explain the various approaches of TQM
C605.2	Infer the customer perception of quality
C605.3	Analyze customer needs and perceptions to design feedback systems.
C605.4	Apply statistical tools for continuous improvement of systems
C605.5	Apply the tools and technique for effective implementation of TQM.

Co-Po Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	1	1									1	1	1
CO2	1	1	1	1								2	1	1	2
CO3	2	2	3	2	2						1	1	2	2	2
CO4	2	2	1	2							1	1	2	2	2
CO5	2	2	2	1										1	1
AVG	1.6	1.6	1.6	1.4	2	0	0	0	0	0	1	1.3	1.5	1.4	1.6

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

ACADEMIC YEAR: 2019-20

EVEN SEMESTER-VI

Course Name: System Software Laboratory **Course Code: 17CSL66 /C606**

Cos	Statements
C606.1	To make students familiar with Lexical Analysis and Syntax Analysis phases of Compiler Design and implement programs on these phases using LEX & YACC tools and/or C/C++/Java
C606.2	To enable students to learn different types of CPU scheduling algorithms used in operating system.
C606.3	Implement and demonstrate Lexer‟s and Parser‟s .
C606.4	Evaluate different algorithms required for management, scheduling, allocation and communication used in operating system.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

ACADEMIC YEAR: 2019-20

EVEN SEMESTER-VI

Course Name: COMPUTER GRAPHICS LABORATORY WITH MINI PROJECT **Course Code: 17CSL66 /C606**

Cos	Statements
C606.1	Apply the concepts of computer graphics
C606.2	Implement computer graphics applications using OpenGL
C606.3	Animate real world problems using OpenGL .

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2.6.1 Program outcomes, program specific outcomes and course outcomes for all programs offered by the Institution

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

ACADEMIC YEAR: 2019-20

EVEN SEMESTER-VII

Course Name: Internet of things and applications **Course Code: 15CS81/C801**

Cos	Statements
C801.1	Interpret the impact and challenges posed by IoT networks leading to new architectural models.
C801.2	Compare and contrast the deployment of smart objects and the technologies to connect them to network.
C801.3	Appraise the role of IoT protocols for efficient network communication.
C801.4	Elaborate the need for Data Analytics and Security in IoT
C801.5	Illustrate different sensor technologies for sensing real world entities and identify the applications of IoT in Industry.

CO PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1	1								2	3	1	3
CO2	2	1	3	3	2	2			2	1		3	3	2	1
CO3	2	1	2	1	1	2			2	2		2	3	3	1
CO4	3	1	1	2	1	1			1	3		2	3	1	1
CO5	1	1	1	1	1	1			1	1	3	3	3	1	3
AVG	2.2	1	1.6	4	1.2	1.5	0	0	1.5	1.7	3	2.4	3	1.6	1.8

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2.6.1 Program outcomes, program specific outcomes and course outcomes for all programs offered by the Institution

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

ACADEMIC YEAR: 2019-20

EVEN SEMESTER-VI

Course Name: Big data Analytics **Course Code: 15CS82/C802**

Cos	Statements
C802.1	Master the concepts of HDFS and MapReduce framework
C802.2	Investigate Hadoop related tools for Big Data Analytics and perform basic Hadoop Administration
C803.3	Recognize the role of Business Intelligence, Data warehousing and Visualization in decision making
C804.4	Infer the importance of core data mining techniques for data analytics
C805.5	Compare and contrast different Text Mining Techniques

Co-Po Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	1	1									1	1	1
CO2	1	1	1	1								2	1	1	2
CO3	2	2	3	2	2						1	1	2	2	2
CO4	2	2	1	2							1	1	2	2	2
CO5	2	2	2	1										1	1
AVG	1.6	1.6	1.6	1.4	2	0	0	0	0	0	1	1.3	1.5	1.4	1.6

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Department of Electronics and Communication Engineering

Academic Year: 2019-20

IV - Semester

2.6.1 Program outcomes, program specific outcomes and course outcomes for all programs offered by the Institution

Course Name : Complex Analysis, Probability and Statistical Theory
Course Code : 18MAT41

Cos	Statements
C301.1	Use the concepts of analytic function and complex potentials to solve the problems arising in electromagnetic field theory
C301.2	Utilize conformal transformation and complex integral arising in aero foil theory, fluid flow visualization and image processing
C301.3	Apply discrete and continuous probability distributions in analyzing the probability models arising in engineering field
C301.4	Make use of the correlation and regression analysis to fit a suitable mathematical model for the statistical data
C301.5	Construct joint probability distributions and demonstrate the validity of testing the hypothesis

Co-Po Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1													
CO2	1													
CO3	1	1		1		1								
CO4	1													
CO5	1	1		1										
AVERAGE	1	0.4		0.4		1								

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Academic Year: 2019-20

IV - Semester

2.6.1 Program outcomes, program specific outcomes and course outcomes for all programs offered by the Institution

Course Name : Analog Circuits
Course Code : 18EC42

Cos	Statements
C303.1	Understand the characteristics of BJTs and FETs.
C303.2	Design and analyze BIT and FET amplifier circuits
C303.3	Design sinusoidal and non-sinusoidal oscillators
C303.4	Understand the functioning of linear ICs
C303.5	Design of Linear IC based circuits

Co-Po Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1													
CO2	2			1		1							2	
CO3	2												2	
CO4	2			1									1	
CO5	2					1							2	
AVERAGE	1.8			0.4		0.4							1.4	

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Academic Year: 2019-20

IV - Semester

2.6.1 Program outcomes, program specific outcomes and course outcomes for all programs offered by the Institution

Course Name : Control System
Course Code : 18EC43

Cos	Statements
C304.1	Develop the mathematical model of mechanical and electrical systems.
C304.2	Develop transfer function for a given control system using block diagram reduction techniques and signal flow graph method
C304.3	Determine the time domain specifications for first and second order systems
C304.4	Determine the stability of a system in the time domain using Routh- Hurwitz criterion and Root-locus technique
C304.5	Determine the s stability of a system in the frequency domain using Nyquist and bode plots

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1												1	
CO2	1												1	
CO3	1			1		1							1	
CO4	1												1	
CO5	1												1	
AVERAGE	1			1		1							1	

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Academic Year: 2019-20

IV - Semester

2.6.1 Program outcomes, program specific outcomes and course outcomes for all programs offered by the Institution

Course Name : Engineering Statics and Linear Algebra
Course Code : 18EC44

Cos	Statements
C306.1	Analyze and evaluate single and multiple random variables
C306.2	Identify and associate Random Variables and Random Processes in Com-munication events
C306.3	Analyze and model the Random events in typical communication events to extract quantitative statistical parameters
C306.4	Analyze and model typical signal sets in terms of a basis function set of Amplitude, phase and frequency
C306.5	Demonstrate by way of simulation or emulation the ease of analysis em-ploying basis functions, statistical representation and Eigen values.

Co-Po Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1				1		1								
CO2	1													
CO3	1			1										
CO4		1				1								
CO5	1												1	
AVERAGE	0.6	1		0.4		0.4							1	

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Academic Year: 2019-20

IV - Semester

2.6.1 Program outcomes, program specific outcomes and course outcomes for all programs offered by the Institution

Course Name : Signals and Systems
Course Code : 18EC45

Cos	Statements
C305.1	Analyze the different types of signals and systems
C305.2	Determine the linearity, causality, time-invariance and stability proper-ties of continuous and discrete time systems.
C305.3	Evaluate the convolution sum and integral
C305.4	Represent continuous and discrete signals & systems in frequency domain using Fourier representations
C305.5	Analyze discrete time signals and systems using Z-transforms

Co-Po Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1													
CO2	1			1		1								
CO3	1												1	
CO4	1			1		1								
CO5	1													
AVERAGE	1			0.4		0.4							1	

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Academic Year: 2019-20

IV - Semester

2.6.1 Program outcomes, program specific outcomes and course outcomes for all programs offered by the Institution

Course Name : Microcontroller
Course Code : 18EC46

Cos	Statements
C305.1	Explain the difference between Microprocessors & Microcontrollers, Architecture of8051 Microcontroller, Interfacing of 8051 to external memory and Instruction set of8051
C305.2	Write 8051 Assembly level programs using 8051 instructions set.
C305.3	Explain the Interrupt system, operation of Timers/Counters and Serial port of8051
C305.4	Write 8051 Assembly language programs to generate square wave on 8051 I/O port pin using interrupt and C Programme to send & receive serial data using 8051 serial port

Co-Po Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1													
CO2				1		1							1	
CO3				1		1								
CO4				1		1								
AVERAGE	1			0.75		0.75							1	

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Academic Year: 2019-20

IV - Semester

2.6.1 Program outcomes, program specific outcomes and course outcomes for all programs offered by the Institution

Course Name : Microcontroller Laboratory
Course Code : 18ECL47

Cos	Statements
C305.1	Enhance programming skills using Assembly language and C.
C305.2	Write Assembly language programs in 8051 for solving simple problems that manipulate input data using different instructions of 8051.
C305.3	Interface different input and output devices to 8051 and control them using Assembly language programs
C305.4	Interface the serial devices to 8051 and do the serial transfer using C programming
C305.5	Develop applications based on Microcontroller 8051

Co-Po Mapping

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
CO1	1	1											2	
CO2	1			1										
CO3	2	1				1							1	
CO4	2												2	
CO5	2												2	
AVERAGE	1.6	0.4		1		1							1.4	

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Academic Year: 2019-20

IV - Semester

2.6.1 Program outcomes, program specific outcomes and course outcomes for all programs offered by the Institution

Course Name : Analog Circuit Laboratory
Course Code : 18ECL48

Cos	Statements
C305.1	Analyze Frequency response of JFET/MOSFET amplifier
C305.2	Design BJT/FETs amplifier with and without feedback and evaluate their performance characteristics
C305.3	Apply the knowledge gained in the design of BJT/FET circuits in Oscillators
C305.4	Design analog circuits using OPAMPs for different applications
C305.5	Simulate and analyze analog circuits that uses ICs for different electronic applications

Co-Po Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1													
CO2	2												2	
CO3	1			1		1								
CO4	2			1		1							1	
CO5	1			1		1							1	
AVERAGE	1.4			0.6		0.6							0.8	

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Academic Year: 2019-20

VI - Semester

2.6.1 Program outcomes, program specific outcomes and course outcomes for all programs offered by the Institution

Course Name : Digital Communication
Course Code : 17EC61

Cos	Statements
C605.1	Associate and apply the concepts of Bandpass sampling to well specified signals and channels.
C605.2	Analyze and compute performance parameters and transfer rates for low pass and bandpass symbol under ideal and corrupted non band limited channels
C605.3	Test and validate symbol processing and performance parameters at the receiver under ideal and corrupted bandlimited channels.
C605.4	Demonstrate that bandpass signals subjected to corruption and distortion in a bandlimited channel can be processed at the receiver to meet specified performance criteria
C605.5	Understand the principles of spread spectrum communications

Co-Po Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1			1		1							1	
CO2														
CO3			1			2							2	
CO4	2												2	
CO5	2			1		1								
AVERAGE	1		1	0.4		0.8							1	

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Academic Year: 2019-20

VI - Semester

2.6.1 Program outcomes, program specific outcomes and course outcomes for all programs offered by the Institution

Course Name : Arm Embedded and Microcontroller System
Course Code : 17EC62

Cos	Statements
C605.1	Describe the architectural features and instructions of 32-bit microcontroller ARM Cortex M3
C605.2	Apply the knowledge gained for Programming ARM Cortex M3 for different applications
C605.3	Understand the basic hardware components and their selection method based on the characteristics and attributes of an embedded system.
C605.4	Develop the hardware /software co-design and firmware design approaches

Co-Po Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	1	1										1	
CO2	1			1		1								
CO3	1													
CO4	1													
AVERAGE	1	1	1	1		1							1	

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Academic Year: 2019-20

VI - Semester

2.6.1 Program outcomes, program specific outcomes and course outcomes for all programs offered by the Institution

Course Name : VLSI Design
Course Code : 17EC63

Cos	Statements
C605.1	Demonstrate understanding of MOS transistor theory, CMOS fabrication flow and technology scaling
C605.2	Draw the basic gates using the stick and layout diagrams with the knowledge of physical design aspects
C605.3	Interpret Memory elements along with timing considerations
C605.4	Demonstrate knowledge of FPGA based system design Interpret testing and testability issues in VLSI Design
C605.5	Analyze CMOS subsystems and architectural issues with the design constraints

Co-Po Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1												2	
CO2	2													
CO3				2		1								
CO4	2												2	
CO5	1			1		1							2	
AVERAGE	1			0.6		0.4							102	

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Academic Year: 2019-20

VI - Semester

2.6.1 Program outcomes, program specific outcomes and course outcomes for all programs offered by the Institution

Course Name : Computer Communication Networks
Course Code : 17EC64

Cos	Statements
C605.1	Identify the protocols and services of Data link layer
C605.2	Identify the protocols and functions associated with the transport layer services
C605.3	Describe the layering architecture of computer networks and distinguish between the OSI reference model and TCP/IP protocol suite
C605.4	Distinguish the basic network configurations and standards associated with each network
C605.5	Construct a network model and determine the routing of packets using different routing algorithms

Co-Po Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1			1	1	1							1	
CO2	1													
CO3	1			1		1							1	
CO4	1													
CO5	1												2	
AVERAGE	1			0.4	1	0.4							0.8	

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Academic Year: 2019-20

VI - Semester

2.6.1 Program outcomes, program specific outcomes and course outcomes for all programs offered by the Institution

Course Name : Digital Switching Systems
Course Code : 17EC654

Cos	Statements
C605.1	Describe the electromechanical switching systems and its comparison with the digital switching
C605.2	Determine the telecommunication traffic and its measurements
C605.3	Define the technologies associated with the data switching operations
C605.4	Describe the software aspects of switching systems and its maintenance.

Co-Po Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1												1	
CO2	1			1		1							1	
CO3	1												1	
CO4	1												1	
AVERAGE	1			1		1							1	

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Department of Electronics and Communication Engineering

Academic Year: 2019-20

VI - Semester

2.6.1 Program outcomes, program specific outcomes and course outcomes for all programs offered by the Institution

Course Name : Embedded Controller Laboratory
Course Code : 17ECL67

Cos	Statements
C605.1	Understand the instruction set of 32 bit microcontroller ARM Cortex M3, and the software tool required for programming in Assembly and C language
C605.2	Develop assembly language programs using ARM Cortex M3 for different applications
C605.3	Interface external devices and I/O with ARM Cortex M3.
C605.4	Develop C language programs and library functions for embedded system applications

Co-Po Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	1	1										1	
CO2	2	1	1											
CO3	2												2	
CO4	1			1		1							1	
AVERAGE	1.5	0.5	0.5	1		1							1	

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CITY ENGINEERING COLLEGE

Department of Electronics and Communication Engineering

Academic Year: 2019-20

VI - Semester

2.6.1 Program outcomes, program specific outcomes and course outcomes for all programs offered by the Institution

Course Name : Computer Networks laboratory
Course Code : 17ECL68

Cos	Statements
C605.1	Use the network simulator for learning and practice of networking algorithms.
C605.2	Illustrate the operations of network protocols and algorithms using C programming
C605.3	Simulate the network with different configurations to measure the performance parameters
C605.4	Implement the data link and routing protocols using C programming.

Co-Po Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	1											1	
CO2	1			1		1								
CO3	1													
CO4	1													
AVERAGE	1	1		1		1							1	

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CITY ENGINEERING COLLEGE

Department of Electronics and Communication Engineering

Academic Year: 2019-20

VIII - Semester

2.6.1 Program outcomes, program specific outcomes and course outcomes for all programs offered by the Institution

Course Name : Wireless Cellular and LTE 4G Broadband
Course Code :15EC81

Cos	Statements
C805.1	Understand the system architecture and the functional standard specified in LTE 4G.
C805.2	Analyze the role of LTE radio interface protocols and EPS Dataconvergence protocols to set up, reconfigure and release data and voice from users
C805.3	Demonstrate the UTRAN and EPS handling processes from set up to release including mobility management for a variety of data call scenarios.
C805.4	Test and Evaluate the Performance of resource management and packet data processing and transport algorithms

Co-Po Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1			1		1							1	
CO2	1													
CO3	2												2	
CO4	2													
AVERAGE	1.5			1		1							0.6	

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2 Department of Electronics and Communication Engineering

Academic Year: 2019-20

VIII - Semester

2.6.1 Program outcomes, program specific outcomes and course outcomes for all programs offered by the Institution

Course Name : Fiber Optics and Networks

Course Code : 15EC82

Cos	Statements
C805.1	Classification and working of optical fiber with different modes of signal propagation
C805.2	Describe the transmission characteristics and losses in optical fiber communication
C805.3	Describe the construction and working principle of optical connectors, multiplexers and amplifiers
C805.4	Describe the constructional features and the characteristics of optical sources and detectors
C806.5	Illustrate the networking aspects of optical fiber and describe various standards associated with it

Co-Po Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1			1		1								
CO2	1													
CO3	1													
CO4	1													
CO5	1												1	
AVERAGE	1			1		1							1	

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Department of Mechanical Engineering
ACADEMIC YEAR 2019-20
Course Outcomes

Subject: APPLIED THERMODYNAMICS		**Subject Code:**18ME42
Course Outcomes		
CO1	Apply thermodynamic concepts to analyze the performance of gas power cycles.	
CO2	Apply thermodynamic concepts to analyze the performance of vapour power cycles.	
CO3	Understand combustion of fuels and performance of I C engines.	
CO4	Apply Thermodynamic concepts to determine performance parameters of refrigeration and air-conditioning systems.	
CO5	Understand the working principle of Air compressors and Steam nozzles, applications, relevance of air and identify methods for performance improvement	

Subject: FLUID MECHANICS		**Subject Code:**18ME43
Course Outcomes		
CO1	Identify and calculate the key fluid properties used in the analysis of fluid behavior. Explain the principles of pressure, buoyancy and floatation	
CO2	Apply the knowledge of fluid statics, kinematics and dynamics while addressing problems mechanical and chemical engineering.	
CO3	Describe the principles of fluid kinematics and dynamics.	
CO4	Explain the concept of boundary layer in fluid flow and apply dimensional analysis to for dimensionless numbers in terms of input output variables.	
CO5	Illustrate and explain the basic concept of compressible flow and CFD	

Subject: KINEMATICS OF MACHINES		**Subject Code:**18ME44
Course Outcomes		
CO1	Identify the kinematic link, kinematic pairs, chains, mechanisms, mobility, and inversions.	
CO2	Determine the velocities and accelerations of linkages and joints of mechanisms graphical method.	
CO3	Apply the Freudenstein's equation to determine the velocities and accelerations by analytical method for slider crank mechanism and other applications.	
CO4	Analyse different cams and sketch the cam profiles for various motions of the follower, motion characteristics.	
CO5	Evaluate the velocity ratio and torque in various types of gear trains.	

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Subject: METAL CASTING AND WELDING		**Subject Code:**18ME45B
Course Outcomes		
CO1	Describe the casting process and prepare different types of cast products.	
CO2	Compare the Gas fired pit, Resistance, Coreless, Electrical and Cupola Metal Furnaces.	
CO3	Understand the Solidification process and Casting of Non-Ferrous Metals	
CO4	Describe the Metal Arc, TIG, MIG, Submerged and Atomic Hydrogen Welding processes etc. used in manufacturing	
CO5	Describe methods for the quality assurance of components made of casting and joining process	

Subject: MECHANICAL MEASUREMENTS AND METROLOGY		**Subject Code:**18ME46B
Course Outcomes		
CO1	Understand the objectives of metrology, methods of measurement, standards of measurement & various measurement parameters	
CO2	Understand limits, fits and tolerance and the working of comparators	
CO3	Describe measurement of major & minor diameter, pitch, angle and effective diameter of screw threads and gears	
CO4	Explain measurement systems, transducers, intermediate modifying devices and terminating devices	
CO5	Understand the measurement of force, Torque and Pressure	

Subject: MECHANICAL MEASUREMENTS AND METROLOGY LAB		**Subject Code:**18MEL47B
Course Outcomes		
CO1	Understand the Calibration of pressure gauge, thermocouple, LVDT, load cell, micrometer	
CO2	Apply concepts of Measurement of angle using Sine Centre/ Sine Bar/ Bevel Protractor, alignment using Autocollimator/ Roller set	
CO3	Demonstrate measurements using Optical Projector/Tool maker microscope, Optical flats and mechanical comparator	
CO4	Determine the screw thread parameters using gear tooth profile using gear tooth Vernier/Gear tooth micrometer	
CO5	Analyse tool forces using Lathe/Drill tool dynamometer	

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Subject: FOUNDRY, FORGING AND WELDING LAB		**Subject Code:**18MEL48B
Course Outcomes		
CO1	Identify the properties of moulding sand (Tension,compression,shear&permeability)	
CO2	Build sand moulds using hand tools ,patterns and cores	
CO3	Estimate the raw material required for change of cross s ection and dimensions.	
CO4	Demonostrate the forging operations	

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Subject: FINITE ELEMENT ANALYSIS		Subject Code:17ME61
Course Outcomes		
CO1	Demonstrate the basic concepts of Finite Element methods with its potential applications.	
CO2	Interpret the use of the basic finite elements for structural applications using truss, beam, frame, and plane elements.	
CO3	Derive element matrix equation by different methods by applying basic laws in mechanics.	
CO4	Make use of professional-level finite element software to solve engineering problems in Solid mechanics, fluid mechanics and heat transfer.	
CO5	Implement finite element methods for simple problems such as beam analysis and 1-D heat conduction either by hand calculation or by programming.	

Subject: COMPUTER INTEGRATED MANUFACTURING		Subject Code:17ME62
Course Outcomes		
CO1	Explain the CAD, CAM, CNC, CIM and Flexible Manufacturing System.	
CO2	Understand the Robotic application in processing, assembly and inspection.	
CO3	Describe the Additive manufacturing and IOT.	
CO4	Apply the CNC programming, CAPP and Line balancing for manufacturing.	
CO5	Analyze the production rate, capacity utilization and material flow in automatedManufacturing.	

Subject: HEAT TRANSFER		Subject Code:17ME63
Course Outcomes		
CO1	Comprehend the modes of heat transfer and apply basic laws of heat transfer to formulate and solve steady state heat transfer problems	
CO2	study and evaluate critical thickness of insulation, steady and variable thermal conductivity of fins, and heat transfer in finite, semi infinita and finite solids	
CO3	explain the principles of radiation heat transfer and predict the temperature distribution using numerical approach for heat conduction problems	
CO4	Interpret and compute forced, free convection heat transfer.	
CO5	design heat exchangers using LMTD and NTU methods and explain the concept of condensationand boiling of liquids.	

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Subject: DESIGN OF MACHINE ELEMENTS -II		**Subject Code:**17ME64
Course Outcomes		
CO1	Understand & Analyze the stresses in curved beams, cylinders, and cylinder heads	
CO2	Decide flexible drives (belts, ropes, and chains) required for power transmission and springs	
CO3	Analyze and design different types of gears for static and dynamic loads and apply in real life application	
CO4	Design clutches, and brakes for static and dynamic loads	
CO5	Carry out the design of journal bearing by choosing the lubricant and choice of ball and roller bearings	

Subject: AUTOMOBILE ENGINEERING		**Subject Code:**17ME655
Course Outcomes		
CO1	Apply the knowledge of engineering fundamental related to automobile engines to solve the complex engineering problems	
CO2	Analyze the design of engine, transmission and controlling system to draw the conclusion on the basis of engineering sciences to address the performance parameters of the engines	
CO3	Apply the knowledge of transmission, controlling, auxiliary systems and other support systems employed in automobile to find solution to complex engineering problems	
CO4	To incorporate the contextual knowledge of standards and norms to address the safety and legal issues related to automobiles in ones professional engineering practice	
CO5	demonstrate the knowledge of standards and norms towards automobile pollution and respective control system to address environment and sustainability issues	

Subject: HEAT TRANSFER LAB		**Subject Code:**17MEL67
Course Outcomes		
CO1	Perform experiments to determine the thermal conductivity of a metal rod and emissivity of a test plate	
CO2	Estimate the effective thermal resistance in composite slabs and efficiency in pin-fin	
CO3	Conduct experiments to determine convective heat transfer coefficient for free and forced convection and correlate with theoretical values	
CO4	Determine Boiling of Liquid and Condensation of Vapour and Estimate the performance of a refrigerator	
CO5	Calculate temperature distribution of study and transient heat conduction through a plane wall, cylinder and fin	

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Subject: MODELING AND ANALYSIS LAB(FEA)		**Subject Code:**17MEL68
Course Outcomes		
CO1	Analyze the structural members like bars, trusses, and beams for different loads.	
CO2	Determine the stresses in plates under plane stress conditions.	
CO3	Solve for temperature distribution in 1D and 2D members under conduction and convection heat transfer.	
CO4	Analyze bars and beams for dynamic response	

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Subject: OPERATIONS RESEARCH		**Subject Code:**15ME81
Course Outcomes		
CO1	Apply the significance of Operations Research in decision making and identify and develop mathematical model from verbal description of real system problems	
CO2	Obtain the solution of formulated real life problem with its inherent resources and constraints	
CO3	Recognize and formulate a transportation and assignment model and obtain optimal solution with all the variants of models.	
CO4	Construct network diagram and determine critical path, floats for deterministic and PERT networks including crashing of networks and waiting line problems for M/M/1 and M/M/K queuing theory	
CO5	Solve problems on game theory for pure and mixed strategy under competitive environment and also Determine minimum processing times for sequencing of n jobs-2 machines, n jobs-3machines,n jobs-m machinesand 2 jobs-n machines using Johnsons algorithm	

Subject: ADDITIVE MANUFACTURING		**Subject Code:**15ME82
Course Outcomes		
CO1	Apply the knowledge of Additive Manufacturing and Rapid Prototyping technologies	
CO2	Choose various nanomaterial's production techniques.	
CO3	Develop NC machine program	
CO4	Automate the process by analyzing the required type of Pneumatic and hydraulics Systems in various application areas	
CO5	Decide the types of Industrial controls required	

Subject: PRODUCT LIFE CYCLE MANAGEMENT		**Subject Code:**15ME835
Course Outcomes		
CO1	Point out the Components, Phases, Characteristics, and Opportunities, benefits, Views, feasibility, vision and Drivers of PLM.	
CO2	Choose Conceptualization, Design, Development, Validation, Production, implementation of PLM and PDM.	
CO3	Calculate the Engineering prototype development, design for environment, virtual testing, validation and Creation of animation using CAD software	
CO4	Analyze the parameterization of design, optimization of products, Digital manufacturing, virtual learning curve, production planning.	
CO5	Evaluate the PLM strategy, PLM initiatives to support corporate objectives Infrastructure assessment, assessment of current systems and applications.	

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Subject: INTERNSHIP		**Subject Code:**15ME84
Course Outcomes		
CO1	Apply modern techniques, resources, engineering and IT tools while addressing complex engineering problems.	
CO2	Make use of contextual knowledge to access societal, health, safety and cultural issues normally encountered in industries.	
CO3	Choose the engineering solutions for the sustainable development in societal and environmental context and exercise professional ethics, norms, standards and responsibilities in engineering practice.	
CO4	Identify to work as a team member as well a leader while demonstrating the knowledge of project management, finance handling and other management practices in multidisciplinary environment.	
CO5	Build the knowledge of documentation, report writing, effective presentation, receiving and delivering clear instructions in the professional environment and recognize the need & have preparation ability to engage in independent &life- long learning facing the challenges of technological changes.	

Subject: PROJECT PHASE II		**Subject Code:**15MEP85
Course Outcomes		
CO1	Review the research literature,identify and analyze the complex engineering problems, formulate the sustainable conclusions or solutions using the basic principles of applied mathematics,science and engineering	
CO2	Design proper methodology to derive the solutions for the existing or anticipated complex engineering problems in concern with the issues of public health ,safety societal, cultural and environmental areas.	
CO3	Practice and establish the professional engineering methodology for sustainable development in the society to address the complex engineering problems associated with societal and environmental factors.	
CO4	Form internal & external group to work together as a team in the project under consideration under multi disciplinary settings.	
CO5	Communicate effectively addressing the complex engineering activities with documentation reports and proper presentation tools.	

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Subject: SEMINAR		**Subject Code:**15MES86
Course Outcomes		
CO1	Identify, formulate and analyze the complex engineering problems through extornius literature study on basic principles of engineering sciences.	
CO2	Evaluate, interpret, synthesize and conclude on the information so obtained through literature study,physical observations and experimental data.	
CO3	Connect the Engineering knowledge to the society by accessing the various issues on social health, environment sustainability, safety, legal, cultural etc by compiling the knowledge so acquired using modern tools during the process of preparation to the course through self learning.	
CO4	Present and communicate effectively with acquired oral and written documentation skills addressing the complex engineering activities	
CO5	Pursue the need to Engage himself in the further learning throughout based on technological and societal changes	

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CITY ENGINEERING COLLEGE

Department of Basic Science

2.6.1 QlM Programme Outcomes (POs) and Course Outcomes (COs) offered by the department (EVEN and ODD) ACY 2019-2020

I YEAR COURSES

Sl. No	Course Name	Course Code
1	Calculus and Linear Algebra	18MAT11
2	Engineering Physics	18PHY12/22
3	Basic Electrical Engineering	18ELE13/23
4	Elements of Civil Engineering and Mechanics	18CIV14/24
5	Engineering Graphics	18EGDL15/25
6	Engineering Physics laboratory	18PHYL16/26
7	Basic Electrical and Engineering laboratory	18ELEL17/27
8	Technical English-I	18EGH18
9	Engineering Chemistry	18CHE12/22
10	C programming for problem Solving	18CPS13/23
11	Basic Electronics	18ELN14/24
12	Elements of Mechanical Engineering	18ME15/25
13	Engineering Chemistry Laboratory	18CHEL16/26
14	Advanced Calculus and Numerical Methods	18MAT21
15	Technical English II	18EGH28

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CITY ENGINEERING COLLEGE

DEPARTMENT OF BASIC SCIENCE

ACADEMIC YEAR 2019-20

COURSE OUTCOMES OF I YEAR

COURSE NAME: CALCULUS AND LINEAR ALGEBRA
COURSE CODE: 18MAT11 [C101]

COs	STATEMENTS
C101.1	Apply the knowledge of calculus to solve problems related to polar curves and its applications in determining the bentness of a curve.
C101.2	Learn the notion of partial differentiation to calculate rates of change of multivariate functions and solve problems related to composite functions and Jacobians
C101.3	Apply the concept of change of order of integration and variables to evaluate multiple integrals and their usage in computing the area and volumes
C101.4	Solve first order linear/nonlinear differential equation analytically using standard methods
C101.5	Make use of matrix theory for solving system of linear equations and compute eigen values and eigenvectors required for matrix diagonalization process

CO-PO-PSO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C101.1	3	2													
C101.2	3	2													
C101.3	3	2													
C101.4	3	2											2	1	
C101.5	3	2											3	2	

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COURSE NAME: Engineering Physics

COURSE CODE: 18PHY12/22 [C102]

COs	STATEMENTS
C102.1	Understand various types of oscillations and the implications, the role of Shock waves in various fields and Recognize the elastic properties of materials for engineering applications.
C102.2	Realize the inter relation between time varying electric field and magnetic field, the transverse nature of the EM waves and their role in optical fiber communication
C102.3	Compute Eigen values, Eigen functions, momentum of Atomic and subatomic particles using Time independent 1-D Schrodinger's wave equation.
C102.4	Apprehend theoretical background of laser, construction and working of different types of laser and its applications indifferent fields
C102.5	Understand various electrical and thermal properties of materials like conductors, semiconductors and dielectrics using different theoretical models.

CO-PO-PSO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C102.1	2	2											2		
C102.2	2	2													
C102.3	2	1													
C102.4	2	2											2		
C102.5	2	2													

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COURSE NAME: Basic Electrical Engineering
COURSE CODE: 18ELE13/23 [C103]

COs	STATEMENTS
C103.1	Analyse D.C and A.C circuits.
C103.2	Explain the principle of operation and construction of single-phase transformers
C103.3	Explain the principle of operation and construction of DC machines and synchronous machines.
C103.4	Explain the principle of operation and construction of three phase induction motors.
C103.5	Discuss concepts of electrical wiring, circuit protecting devices and earthing.

CO-PO-PSO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C103.1	3	2													
C103.2	3	2													
C103.3	3	2													
C103.4	3	2											1		
C103.5	2					2		2					1		

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COURSE NAME: Elements of Civil Engineering and Mechanics
COURSE CODE: 18CIV14/24 [C104]

COs	STATEMENTS
C104.1	Mention the applications of various fields of Civil Engineering.
C104.2	Compute the resultant of given force system subjected to various loads.
C104.3	Comprehend the action of Forces, Moments and other loads on systems of rigid bodies and compute their active forces that develop as a result of the external loads.
C104.4	Locate the Centroid and compute the Moment of Inertia of regular and built-up sections.
C104.5	Express the relationship between the motion of bodies and analyze the bodies in motion.

CO-PO-PSO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C104.1	2						1						2	2	
C104.2	3	3													
C104.3	3	3													
C104.4	3	3													
C104.5	2	2											1		

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COURSE NAME: Engineering Graphics

COURSE CODE: 18EGDL15/25 [C105]

COs	STATEMENTS
C105.1	Prepare engineering drawings as per BIS conventions mentioned in the relevant codes.
C105.2	Produce computer generated drawings using CAD software.
C105.3	Use the knowledge of orthographic projections to represent engineering information/concepts and present the same in the form of drawings.
C105.4	Develop isometric drawings of simple objects reading the orthographic projections of those objects.
C105.5	Convert pictorial and isometric views of simple objects to orthographic views.

CO-PO-PSO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C105.1	3	3			3							1	2	1	
C105.2	3	3			3							1	2		
C105.3	3	3			3							1	2	1	
C105.4	3	3			3							1	2		
C105.5	3	3			3							1	2	1	

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COURSE NAME: Engineering Physics laboratory

COURSE CODE: 18PHYL16/26 [C106]

COs	STATEMENTS
C106.1	Apprehend the concepts of interference of light, diffraction of light, Fermi energy and magnetic effect of current
C106.2	Understand the principles of operations of optical fibers and semiconductor devices such as Photodiode, and NPN transistor using simple circuits
C106.3	Determine elastic moduli and moment of inertia of given materials with the help of suggested procedures
C106.4	Recognize the resonance concept and its practical applications
C106.5	Understand the importance of measurement procedure, honest recording and representing the data, reproduction of final results

CO-PO-PSO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C106.1	3			3											
C106.2	3			3									1		
C106.3	3			3											
C106.4	3			3									1		
C106.5	3			3											

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COURSE NAME: Basic Electrical and Engineering laboratory
COURSE CODE: 18ELEL17/27 [C107]

COs	STATEMENTS
C107.1	Identify the common electrical components and measuring instruments used for conducting experiments in the electrical laboratory.
C107.2	Compare power factor of lamps.
C107.3	Determine impedance of an electrical circuit and power consumed in a 3-phase load.
C107.4	Determine earth resistance and understand two way and three-way control of lamps.

CO-PO-PSO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C107.1	3	2				1			1	1			1		
C107.2	3	2				1			1	1					
C107.3	3	2				1			1	1					
C107.4	3	2				1			1	1					

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COURSE NAME: Technical English-I
COURSE CODE: 18EGH18 [C108]

COs	STATEMENTS
C108.1	Use grammatical English and essentials of language skills and identify the nuances of phonetics, intonation and flawless pronunciation
C108.2	Implement English vocabulary at command and language proficiency
C108.3	Identify common errors in spoken and written communication
C108.4	Understand and improve the nonverbal communication and kinesics
C108.5	Perform well in campus recruitment, engineering and all other general competitive examinations

CO-PO-PSO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C108.1										2		1		1	
C108.2										2		1		1	
C108.3										2		1			
C108.4										2		1			
C108.5										2		1		1	2

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Course Name: Engineering Chemistry

COURSE CODE: 18CHE12/22 [C109]

COs	STATEMENTS
C109.1	Use of free energy in equilibrium, rationalize bulk properties and processes using thermodynamic considerations, electrochemical energy systems.
C109.2	Causes & effects of corrosion of metals and control of corrosion. Modification of surface properties of metals to develop resistance to corrosion, wear, tear, impact etc. by electroplating and electroless plating
C109.3	Production & consumption of energy for industrialization of country and living standards of people. Electrochemical and concentration cells. Classical, modem batteries and fuel cells. Utilization of solar energy for different useful forms of energy.
C109.4	Environmental pollution, waste management and water chemistry.
C109.5	Different techniques of instrumental methods of analysis. Fundamental principles of Nano materials.

CO-PO-PSO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C109.1	3														
C109.2	3														
C109.3	3														
C109.4							2						1		
C109.5	3												1	1	

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Course Name: C programming for problem Solving

COURSE CODE: 18CPS13/23 [C110]

COs	STATEMENTS
C110.1	Illustrate simple algorithms from the different domain such as mathematics, physics etc
C110.2	Construct a programming solution to the given problem using C
C110.3	Identify and correct the syntax and logical errors in C programs.
C110.4	Modularize the given problem using functions and structures.
C110.5	Understand the basic concept of recursion and pre-processor directives.

CO-PO-PSO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C110.1	2											2	2		
C110.2		2	2										2	1	
C110.3		2											2		
C110.4			2						2						
C110.5			2						2					1	

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Course Name: Basic Electronics

COURSE CODE: 18ELN14/24 [C111]

COs	STATEMENTS
C111.1	Describe the operation of diodes, BJT, FET and Operational Amplifiers.
C111.2	Design and explain the construction of rectifiers, regulators, amplifiers and oscillators
C111.3	Describe general operating principles of SCRs and its application.
C111.4	Explain the working and design of Fixed voltage IC regulator using 7805 and Astable oscillator using Timer IC555.
C111.5	Explain the different number system and their conversions and construct simple combinational and sequential logic circuits using Flip-Flops.
C111.6	Describe the basic principle of operation of communication system and mobile phones.

CO-PO-PSO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C111.1	2	2													
C111.2	2	2	2										1		
C111.3	2	2	2												
C111.4	2		2										1		
C111.5	2	2											1		

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Course Name: Elements of Mechanical Engineering

COURSE CODE: 18ME15/25 [C112]

COs	STATEMENTS
C112.1	Identify different sources of energy and their conversion process.
C112.2	Explain the working principle of hydraulic turbines, pumps, IC engines and refrigeration
C112.3	Recognize various metal joining processes and power transmission elements
C112.4	Understand the properties of common engineering materials and their applications in engineering industry.
C112.5	Discuss the working of conventional machine tools, machining processes, tools and accessories.
C112.6	Describe the advanced manufacturing systems.

CO-PO-PSO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C112.1	2						2					2	1		
C112.2	2											2	2	1	
C112.3	2	2	1				2					2	1		
C112.4	2	2										1			
C112.5	2				2							2	1		

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Course Name: Engineering Chemistry Laboratory

COURSE CODE: 18CHEL16/26 [C113]

COs	STATEMENTS
C113.1	Handling different types of instruments for analysis of materials using small quantities of materials involved for quick and accurate results.
C113.2	Carrying out different types of titrations for estimation of concerned in materials using comparatively more quantities of materials involved for good results

CO-PO-PSO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C113.1	2												1		
C113.2	2												1		

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Course Name: Advanced Calculus and Numerical Methods

COURSE CODE: 18MAT21 [C201]

COs	STATEMENTS
C201.1	Illustrate the applications of multivariate calculus to understand the solenoidal and irrotational vectors and also exhibit the interdependence of line, surface and volume integrals.
C201.2	Demonstrate various physical models through higher order differential equations and solve such linear ordinary differential equations.
C201.3	Construct a variety of partial differential equations and solution by exact methods/method of separation of variables.
C201.4	Explain the applications of infinite series and obtain series solution of ordinary differential equations
C201.5	Apply the knowledge of numerical methods in the modelling of various physical and engineering phenomena.

CO-PO-PSO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C201.1	3	2													
C201.2	3	2											1		
C201.3	3	2											2		
C201.4	3	2											2		
C201.5	2	2											3	2	

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Course Name: Technical English II
COURSE CODE: 18EGH28 [C202]

COs	STATEMENTS
C202.1	Identify common errors in spoken and written communication
C202.2	Get familiarized with English vocabulary and language proficiency
C202.3	Improve nature and style of sensible writing and acquire employment and workplace communication skills
C202.4	Improve their Technical Communication Skills through Technical Reading and Writing practices
C202.5	Perform well in campus recruitment, engineering and all other general competitive examinations

CO-PO-PSO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C202.1										2		1		1	
C202.2										2		1		1	
C202.3										2		1			
C202.4										2		1			
C202.5										2		1			2

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