



BRILLIANT GRAMMAR SCHOOL EDUCATIONAL SOCIETY'S GROUP OF INSTITUTIONS-INTEGRATED CAMPUS

(Approved by A.I.C.T.E & P.C.I, New Delhi, Affiliated to JNTUH, Hyderabad)

Abdullapur (V), Abdullapurmet (M), R.R Dist. Hyderabad – 501505

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Samples of Program Outcomes and Course Outcomes of all departments displayed in College Website in college website:

BRILLIANT GRAMMAR SCHOOL EDUCATIONAL SOCIETY'S GROUP OF INSTITUTIONS
INTEGRATED CAMPUS (FACULTY OF ENGINEERING & FACULTY OF PHARMACY)
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Civil Docket

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- Classroom Management Tool

Civil Dept Program Outcomes

Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilla

- **Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **Problem Analysis:** Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **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.
- **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.
- **Modern Tool Usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT

6:14 PM 3/19/2013

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ECE Docket

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ECE Dept Program Outcomes

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CSE Docket

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CSE Dept Program Outcomes

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CSE (Networks) Docket

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CSE Dept Program Outcomes

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CSE (Data Science) Docket

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CSE Dept Program Outcomes

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M. Pharmacy (Pharmaceutics) Docket

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M. phaRmacy (Pharmaceutics) Program Outcomes

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Civil Engineering I&II Sem Course Outcomes for the Academic Year 2021-2022

Civil Engineering I&II Sem Course Outcomes for the Academic Year 2021-2022			
S.No.	Year/Sem	Course Name	Course Outcomes
1	II/I	Surveying and Geomatics	CO1: Calculate angles, distances and levels
			CO2: Identify data collection methods and prepare field notes
			CO3: Understand the working principles of survey instruments
			CO4: Estimate measurement errors and apply corrections
			CO5: Interpret survey data and compute areas and volumes
2	II/I	Engineering geology	CO1: Understand weathering process and mass movement
			CO2: Distinguish geological formations
			CO:3 Identify geological structures and process for rock mass quality
			CO:4 Identify subsurface information and groundwater potential sites through geophysical investigations
			CO:5 Apply geological principles for mitigation of natural hazards and select sites for dams and tunnels
3	II/I	Strength of Materials-1	CO:1 Analyze the statically determinate and indeterminate problems.
			CO:2 Determine the stresses and strains in the members subjected to axial bending
			CO:3 Evaluate the slope and deflection of beams subjected to loads.
			CO:4 Determine the principal stresses and strains in structural members
			CO:5 Frame an idea to design a system, component or process
4	II/I	Probability and Statistics	CO:1 Understand concepts of discrete probability, conditional probability, independence, and be able to apply these concepts to engineering applications



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			CO:2 Be able to use statistical concepts to analyse and interpret engineering data.
			CO:3 Equipping students with essential tools for statistical analyses at the graduate level
			CO:4 Providing students with a formal treatment of probability theory
			CO:5 Formulate and solve problems involving random variables and apply statistical methods for analyzing experimental data
5	II/I	Fluid Mechanics	CO1: Apply conservation laws to derive governing equations of fluid flows
			CO2: Compute hydrostatic and hydrodynamic forces.
			CO3: Analyze and design simple pipe systems.
			CO4: Apply principles of dimensional analysis to design experiments.
			CO5: Compute drag and lift coefficients.
6	III/I	Surveying Lab	CO1: Able to perform chain survey and plotting of closed traverse and also obstacles
			CO2: Determines distance between two inaccessible points with compass
			CO3: Perform reduced level and distances using tachometric survey
			CO4: Able to perform trigonometric leveling using theodolite for heights and distances problems.
			CO5: Determines Radiation method, intersection methods by plane table survey
7	II/I	Strength of Materials Lab	CO1: Conduct tension test on materials like steel etc.
			CO2: Conduct compression tests on spring, wood and concrete
			CO3: Conduct flexural and torsion test to determine elastic constants
			CO4: Determine hardness of metals

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			CO5:Write a technical laboratory report
8	II/I	Engineering geology Lab	CO:1Undestsnd weathering process and mass movement
			CO:2Distinguish geological formations
			CO:3Identify geological structures and process for rock mass quality
			CO:4Identify subsurface information and groundwater potential sites through geophysical investigations
			CO:5Apply geological principles for mitigation of natural hazards and select sites for dams and tunnels
9	II/I	Constitution of India	CO:1Understand the emergence and evaluation of Indian constitution
			CO:2Understand the structure and composition of Indian constitution
			CO:3Understand and analyses federalism in the Indian context
			CO:4Analyse panchayathi Raj institutions as a medium of decentralization
			CO:5Understand and analyze the three organs of the state in the contemporary scenario
10	II/II	Basic Electrical and Electronics Engineering	CO:1To analyze and solve electrical circuits using network laws and theorems.
			CO:2To understand and analyze basic electrical and magnetic circuits
			CO:3To study the working principles of electrical machines
			CO:4To introduce components of low voltage electrical installations
			CO:5To identify and characterize diodes and various types of transistors

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11	II/II	Basic Mechanical Engineering for Civil Engineering	CO1:To understand the mechanical equipment for the usage at civil engineering systems.
			CO:2To familiarize with the general principles and requirements for refrigeration, manufacturing
			CO:3To realize the techniques employed to construct civil engineering systems
			CO:4To understand the manufacturing process for the usage at civil engineering constructions
			CO:5Learning the design and working process of machine tools for the usage of construction field
12	II/II	Building Materials Construction and Planning	CO:1Define the basic terminology that is used in the industry
			CO:2Categorize different building materials, properties and their uses
			CO:3Understand the prevention of damage measures and good workmanship
			CO:4Explain different building services
			CO:5Explain different building plan services
13	II/II	Strength of Materials-II	CO:1Describe the concepts and principles, understand the theory of elasticity, and perform calculations, relative to the strength of mechanical components in particular to torsion and direct compression;
			CO:2To evaluate the strains and deformation that will result due to the elastic stresses developed within the materials for simple types of loading
			CO:3Analyze strength and stability of structural members subjected To Direct, and Direct and Bending stresses;
			CO:4Understand and evaluate the shear center and unsymmetrical bending.
			CO:5Frame an idea to design a system, component or process

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14	II/II	Hydraulics and Hydraulic Machinery	CO:1 Apply their knowledge of fluid mechanics in addressing problems in open channels and hydraulic machinery.
			CO:2 Understand and solve problems in uniform, gradually and rapidly varied flows in open channel in steady state conditions.
			CO:3 Apply dimensional analysis and to differentiate the model, prototype and similitude conditions for practical problems.
			CO:4 Get the knowledge on different hydraulic machinery devices and its principles that will be utilized in hydropower development and for other practical usages
			CO:5 Students able to know the performance of single stage and multistage pumps
15	II/II	Structural Analysis-I	CO:1 An ability to apply knowledge of mathematics, science, and engineering
			CO:2 Analyse the statically indeterminate bars and continuous beams
			CO:3 Draw strength behaviour of members for static and dynamic loading
			CO:4 Calculate the stiffness parameters in beams and pin jointed trusses.
			CO:5 Understand the indeterminacy aspects to consider for a total structural system
16	II/II	Computer aided Civil Engineering Drawing	CO:1 Use the Autocad commands for drawing 2D & 3D building drawings required for different civil engg applications.
			CO:2 Plan and draw Civil Engineering Buildings as per aspect and orientation.
			CO:3 Presenting drawings as per user requirements and preparation of technical report
17	II/II	Hydraulics and Hydraulic Machinery Lab	CO:1 Describe the basic measurements techniques of fluid mechanics and its appropriate application.
			CO:2 Interpret the results obtained in the laboratory for various experiments

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			CO:3 Discover the practical working of Hydraulic machines different types of Turbines, pumps, and other miscellaneous hydraulic machines
			CO:4 Compare the results of analytical models introduced in lecture to the actual behaviour of real fluid flows and draw correct and sustainable conclusions.
			CO:5 Write a technical laboratory report
18	II/II	Basic Electrical and Electronics Engineering Lab	CO:1 To analyze and solve electrical circuits using network laws and theorems.
			CO:2 To understand and analyze basic electrical and magnetic circuits
			CO:3 To study the working principles of electrical machines
			CO:4 To introduce components of low voltage electrical installations
			CO:5 To identify and characterize diodes and various types of transistors
19	II/II	Gender Sensitization Lab	CO:1 Students will have developed a better understanding of important issues related to gender in contemporary India.
			CO:2 Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
			CO:3 Students will acquire insight into the gendered division of labour and its relation to politics and economics.
			CO:4 Men and women students and professionals will be better equipped to work and live together as equals.
			CO:5 Students will develop a sense of appreciation of women in all walks of life
20	III/I	Structural Analysis-II	CO:1 Analyze the two hinged arches.
			CO:2 Solve statically indeterminate beams and portal frames using classical methods
			CO:3 Sketch the shear force and bending moment diagrams for indeterminate



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			structures.
			CO:4Formulate the stiffness matrix and analyze the beams by matrix methods
			CO:5Analyze to know the influence lines for indeterminate structures
21	III/I	Geotechnical Engineering	CO:1Characterize and classify the soils
			CO:2Able to estimate seepage, stresses under various loading conditions and compaction characteristics
			CO:3Able to analyse the compressibility of the soils
			CO:4Able to understand the strength of soils under various drainage conditions
			CO:5Able to know the failure mechanism and the shear strength of soils
22	III/I	Structural Engineering-I (RCC)	CO:1Compare and design the singly reinforced, doubly reinforced and flanged sections.
			CO:2Design the axially loaded, uniaxial and biaxial bending columns
			CO:3Classify the footings and design the isolated square, rectangular and circular footings
			CO:4Distinguish and design the one-way and two-way slabs.
			CO:5Students able to know the design of footings for different foundations
23	III/I	Transportation Engineering	CO:1An ability to apply the knowledge of mathematics, science and engineering in the areas of traffic engineering, highway development and maintenance
			CO:2An ability to design, conduct experiments to assess the suitability of the highway materials like soil, bitumen, aggregates and a variety of bituminous mixtures. Also the students will develop the ability to interpret the results and assess the suitability of these materials for construction of highways.
			CO:3An ability to design flexible and rigid highway pavements for varying traffic compositions as well as soil subgrade and environmental conditions using standards stipulated by Indian Roads Congress.



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			CO:4An ability to evaluate the structural and functional conditions of in-service highway pavements and providesolution in the form of routine maintenance measures or designed overlays using Indian Roads congress guidelines
			CO:5An ability to assess the issue related to road traffic and provide engineering solutions supported with an understanding of road user psychological and behavioural patterns.
24	III/I	Concrete Technology	CO:1Determine the properties of concrete ingredients i.e. cement, sand, coarse aggregate by conducting differenttests.
			CO:2Recognize the effects of rheology and early age properties of concrete on its long term behaviour.
			CO:3Apply the use of various chemical admixtures and mineral additives to design cement-based materials with tailor-made properties
			CO:4Use advanced laboratory techniques to characterize cement-based materials.
			CO:5Perform mix design and engineering properties of special concretes such as high-performance concrete, self-compacting concrete, and fibre reinforced concrete.
25	III/I	Engineering Economics and Accountancy	CO:1To perform and evaluate present and future worth of the alternate projects and to appraise projects by using traditional and DCF methods.
			CO:2To carry out cost benefit analysis of projects and to calculate BEP of different alternative projects.
26	III/I	Highway Engineering and Concrete	CO:1Categorize the test on materials used Civil Engineering Buildings & Pavement constructions

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		Technology Lab	CO:2To perform the tests on concrete for it characterization
			CO:3To design concrete mix proportioning by using Indian standard method
			CO:4Examine the tests performed for bitumen mixes
			CO:5To prepare a laboratory report
27	III/I	Geotechnical Engineering Lab	CO:1At the end of the course, the students will be able to classify and evaluate the behaviour of the soils subjected to various loads.
28	III/I	Advanced Communication Skills Lab	CO:1The students will able to use english language both written and spoken
			CO:2The students will able to enrich their comprehension ability and fluency
			CO:3To understand the concept and will gain confidence level in the appearing in the jam, debate role-play
			CO:4The students will able to develop the study skills and communication skills in formal and informal situations
			CO:5The students will able to improve the language proficiency in English with writing skills also
29	III/I	Intellectual Property Rights	CO:1Intellectual property, international organizations, agencies and treaties, importance of intellectual property rights.
			CO:2Purpose and function of trademarks, acquisition of trade mark rights
			CO:3Foundation of patent law, patent searching process, ownership rights and transfer
			CO:4New development of intellectual property: new developments in trade mark law; copy right law,patent law, intellectual property audits
30	III/II	Hydrology and Water Resource	CO:1Understand the different concepts and terms used in engineering hydrology



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		Engineering	CO:2To identify and explain various formulae used in estimation of surface and ground water hydrology components
			CO:3Demonstrate their knowledge to connect hydrology to the field requirement
			CO:4The students will able to know the to increase the ground water table depends upon clainmatic factors
			CO:5To understand and the importance of canal regulation system in irrigation
31	III/II	Environmental Engineering	CO:1Assess characteristics of water and wasterwater and their impacts
			CO:2Estimate quantities of water and wasterwater and plan conveyance components
			CO:3Design components of water and waste water treatment plants
			CO:4Be conversant with issues of air pollution and control
			CO:5To understand the concept of various unit operations and design of water treatment systems
32	III/II	Foundation Engineering	CO:1Understands the principles and methods of Geotechnical Exploration
			CO:2Decide the suitability of soils and check the stability of slopes
			CO:3Calculate lateral earth pressures and check the stability of retaining walls
			CO:4Analyse and design the shallow and deep foundations
			CO:5Student will able to analyse and design of well foundations
33	III/II	Structural Engineering-II (Steel)	CO:1Analyze the tension members, compression members.
			CO:2Design the tension members, compression members and column bases and joints and connections
			CO:3Analyze and design the beams including built-up sections and beam and connections.
			CO:4Identify and Design the various components of welded plate girder



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			including stiffeners
			CO:5 Analyse and design of roof trusses
34	III/II	Prestressed Concrete	CO:1 Acquire the knowledge of evolution of process of prestressing
			CO:2 Acquire the knowledge of various prestressing techniques
			CO:3 Develop skills in analysis design of prestressed structural elements as per the IS codai provisions
			CO:4 To develop transformation of stresses in pretensioned members
			CO:5 Students will able to know the composite beams and deflections
35	III/II	Environmental Engineering Lab	CO:1 Understand about the equipment used to conduct the test procedures
			CO:2 Perform the experiments in the lab
			CO:3 Examine and Estimate water waste water, air and soil Quality
			CO:4 Compare the water, air quality standards with prescribed standards set by the local governments
			CO:5 Develop a report on the quality aspect of the environment
36	III/II	Computer Aided Design Lab	CO:1 Model the geometry of real-world structure represent the physical model of structural element /structure
			CO:2 Perform analysis
			CO:3 Design the structural elements and a system as per IS Codes
			CO:4 Interpret from the post processing results
37	III/II	Environmental	CO:1 Get the knowledge about the differents types of resources like land, water, mineral and energy and also about the effects of environments by the usage of

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		Science	these resources
			CO:2Get the information about ecosystem and also about its functions like food chain Ecological pyramids etc
			CO:3Gain the knowledge about the ecosystem diversity its values and also about the importance of the endemic species and different techniques involved in its conservation
			CO:4Gain the knowledge about the different types of pollutions and their control technologies, Waste water treatment , Bio medical waste management etc
			CO:5Get the complete information about EIA-Environmental Impact Assasement ,Sustainable developmental activities , enviromental policies and regulations awareness among people
38	III/II	Advanced Structural Analysis	CO:1Analyze the multistory building frames by various approximate methods
			CO:2Solve the continuous beams portal frames by matrix methods of analysis
			CO:3Analyze and design of large frames with or without shear walls
			CO:4Analyze and design plane truss continous beams
			CO:5\students will able to know the structural behaviour of large frames
39	IV/I	Transportation Engineering-II	CO:1Understand Plan highway networks
			CO:2Design highway gecometrics
			CO:3Design Intersections and prepare traffic management plans.
			CO:4Design flexiable and rigid pavements
			CO:5An ability to assess the issue related to road traffic and provide engineering solutions supported with an understanding of road user



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			psychological and behavioural patterns.
40	IV/I	Estimation Quantity Surveying and Valuation	CO:1 Understand the technical specifications for various works to be performed for a project
			CO:2 Quantify the worth of a structure by evaluating the quantities of constituents, derive their cost rates
			CO:3 Understand how competitive bidding works and how to submit a bidding proposal
			CO:4 An idea of how to optimize construction projects based on costs
			CO:5 An ability to put forward ideas and understandings to others with effective communication processes
41	IV/I	Ground Improvement Techniques	CO 1 Identify the purpose of ground improvement techniques to obtain the suitable construction site for long-lasting structures.
			CO 2 List the problematic soils and its characteristics to select the suitable method for ground improvement.
			CO 3 Illustrate the various methods of ground improvement techniques to increase load bearing capacity of beneath and surface soils
			CO 4 Apply the methods of physical, chemical, mechanical and hydraulic for obtaining void less soils
			CO 5 Explain the various grouting techniques and its applications for improving loadbearing of beneath soils
42	IV/I	Traffic Engineering	CO:1 Understand basics principal of Traffic Engineering
			CO:2 Analyze parking data and model accidents
			CO:3 Determine capacity and LOS.
			CO:4 To provide engineering techniques to achieve safe and efficient movement of people and goods on roadways
			CO:5 Students will be able to know deal with traffic issues including safety planning design operation and control

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43	IV/I	Utilization of Electrical Energy	CO:1 Able to maintain electric drives used in an industries
			CO:2 Able to identify a heating/ welding scheme for a given application
			CO:3 Able to maintain/ Trouble shoot various lamps and fittings in use
			CO:4 Able to figure-out the different schemes of traction schemes and its main components
			CO:5 Able to design a suitable scheme of speed control for the tractuon systems
			CO:6 Able to identify the job/higher education / research opportunities in Electric Utilization industry
44	IV/I	Airports, Railways and Waterways	CO:1 At the end of this course, the students will develop:
			CO:2 An ability to design of runways and taxiways.
			CO:3 An ability to design the infrastructure for large and small airports
			CO:4 An ability to design various crossings and signals in Railway Projects.
			CO:5 An ability plan the harbors and ports projects including the infrastructure required for new ports and harbors.
45	IV/I	Non-Conventional Energy Sources	CO:1 Demonstrate the generation of electricity from various Non-Conventional sources of energy, have a working knowledge on types of fuel cells.
			CO:2 Estimate the solar energy, Utilization of it, Principles involved in solar energy collection and conversion of it to electricity generation.
			CO:3 Explore the concepts involved in wind energy conversion system by studying its components, types and performance
			CO:4 Illustrate ocean energy and explain the operational methods of their utilization

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			CO:5 Acquire the knowledge on Geothermal energy.
46	IV/I	Ground Water Hydrology	CO:1 Various components of hydrologic cycle that affect the movement of water in the earth
			CO:2 Various Stream flow measurements technique
			CO:3 the concepts of movement of ground water beneath the earth
			CO:4 the basic requirements of irrigation and various irrigation techniques, requirements of the crops
			CO:5 Distribution systems for canal irrigation and the basics of design of unlined and lined irrigation canals design CO- 6 Basic components of river Training works.
47	IV/I	Transportation Engineering Lab	CO:1 At the end of the course, the students will be able to Assess for Highway construction properties of highway materials
48	IV/I	Environmental Engineering Lab	CO:1 The students will develop the knowledge in mathematics science and engineering
			CO:2 The students will be able to design and conduct experiments interpret and analyze data and report results
			CO:3 The students will demonstrate the ability to design of civil Engineering systems or a process that meets desired specifications and requirements related to all fields of civil Engineering
			CO:4 The students will demonstrate the ability to function on engineering and science laboratory teams, as well as on multidisciplinary design teams
			CO:5 The students will demonstrate the ability to identify, formulate and solve Civil engineering problems
49	IV/I	Industry Oriented Mini Project	CO:1 Formulate a real world problem and develop its requirements
			CO:2 Ability to plan and execute well defined objective
			CO:3 Ability to work in team at component level
			CO:4 Ability to solve problems on analysis & design


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			CO:5Self learn new softwares and /or techniques that contribute to the software solution of the project
50	IV/I	Seminar	CO:1The students will be able to recall existing technologies in the area of Designing
			CO:2The students will be to able describe compare and evaluate different technologies
			CO:3The students will be to able decide the area of interst
			CO:4The students will demonstrate the ability to identify, formulate and solve Civil engineering problems
			CO:5The students will be to able to write technical reports
51	IV/II	Solid Waste Management	CO:1Identify the physical and chemical composition of wastes
			CO:2Analyze the functional elements for soild waste management
			CO:3Analyze the functional elements for liquid waste management
			CO:4To understand the effluent treatment Plants and its disposal
			CO:5Plan measures for reclamation of saline soils
52	IV/II	Industrial Waste Water Treatment	CO:1Identify the characteristics of industrial wastewaters
			CO:2Describe pollution effects of disposal of industrial effluents
			CO:3Identify and design treatment options for industrial wastewater
			CO:4Formulate environmental management plan
			CO:5Suggestion methods for safe disposal of hazardous wasters
53	IV/II	Pavement Design	CO:1Characterize the response characteristics of soil, aggregate, asphalt mixes
			CO:2Analyze flexible pavements
			CO:3Analyze rigid pavements

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			CO:4Design a flexible pavement using IRC, Asphalt Institute and AASHTO methods
			CO:5Design a rigid pavement using IRC, and AASHTO methods
54	IV/II	Major Project	CO:1Student will able to work in a group as a part of multidisciplinary team with professional responsibility
			CO:2Student will able to Analyse and design of structure to meet desired needs with in realistic constraints
			CO:3Student is capable of doing Review literature and finalizes problem statement
			CO:4Student can plan activity schedule and implementation in agiven time span
			CO:5Student will be able to prepare and present technical report

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Electrical & Electronics Engineering I & II Sem Course outcomes for the Academic year 2020- 2021

S.NO.	YEAR/ SEM	COURSE NAME	Course Outcomes
1	II/I	Engineering Mechanics	CO1: Determine resultant of forces acting on a body and analyse equilibrium of a body subjected to a system of forces.
			CO2: Solve problem of bodies subjected to friction.
			CO3: Find the location of centroid and calculate moment of inertia of a given section.
			CO4: Understand the kinetics and kinematics of a body undergoing rectilinear, curvilinear, rotatory motion and rigid body motion.
			CO5: Solve problems using work energy equations for translation, fixed axis rotation and planar motion and solve problems of vibration.
2	II/I	Electrical Circuit Analysis	CO1: Apply network theorems for the analysis of electrical circuits.
			CO2: Obtain the transient and steady-state response of electrical circuits.
			CO3: Analyze circuits in the sinusoidal steady-state (single-phase and three-phase).
			CO4: Analyze two port circuit behavior.
			CO1: Know the characteristics, utilization of various components.
			CO2: Understand the biasing techniques



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3	II/I	Analog Electronics	CO3: Design and analyze various rectifiers, small signal amplifier circuits.
			CO4: Design sinusoidal and non-sinusoidal oscillators.
			CO5: A thorough understanding, functioning of OP-AMP, design OP-AMP based circuits with linearintegrated circuits
4	II/I	Electrical Machines - I	CO1: Identify different parts of a DC machine & understand its operation
			CO2: Carry out different testing methods to predetermine the efficiency of DC machines
			CO3: Understand different excitation and starting methods of DC machines
			CO4: Control the voltage and speed of a DC machines
			CO5 Analyze single phase and three phase transformers circuits.
5	II/I	Electromagne	CO1: To understand the basic laws of electromagnetism.
			CO2: To obtain the electric and magnetic fields for simple configurations under static conditions.
			CO3: To analyze time varying electric and magnetic fields.
			CO4: To understand Maxwell's equation in different forms and different media.

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		tic Fields	CO5: To understand the propagation of EM waves.
6	II/I	Electrical Machines Lab –I	CO1: Start and control the Different DC Machines
			CO2: Assess the performance of different machines using different testing methods
			CO3: Identify different conditions required to be satisfied for self - excitation of DC Generators.
			CO4: Separate iron losses of DC machines into different components
7	II/I	Analog Electronics Lab	CO1: Know the characteristics, utilization of various components.
			CO2: Understand the biasing techniques
			CO3: Design and analyze various rectifiers, small signal amplifier circuits
			CO4: Design sinusoidal and non-sinusoidal oscillators.
			CO5: A thorough understanding, functioning of OP-AMP, design OP-AMP based circuits with linear integrated circuits.
			CO1: Use the Laplace transforms techniques for solving ODE's


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8	II/II	Laplace Transforms, Numerical Methods And Complex Variables	CO2: Find the root of a given equation.
			CO3: Estimate the value for the given data using interpolation
			CO4: Find the numerical solutions for a given ODE's
			CO5: Analyze the complex function with reference to their analyticity, integration using Cauchy's integral and residue theorems
			CO6: Taylor's and Laurent's series expansions of complex function
9	II/II	Electrical Machines – II	CO1: Understand the concepts of rotating magnetic fields.
			CO2: Understand the operation of ac machines
			CO3: Analyze performance characteristics of ac machines.
10	II/II	Digital Electronics	CO1: Understand working of logic families and logic gates.
			CO2: Design and implement Combinational and Sequential logic circuits.
			CO3: Understand the process of Analog to Digital conversion and Digital to Analog conversion
			CO4: Be able to use PLDs to implement the given logical problem.
			CO1: Understand the modeling of linear-time-invariant systems using



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11	II/II	Control Systems	transfer function and state-space representations
			CO2: Understand the concept of stability and its assessment for linear-time invariant systems
			CO3: Design simple feedback controllers.
12	II/II	Power System-I	CO1: Understand the concepts of power systems
			CO2: Understand the operation of conventional generating stations and renewable sources of electrical power.
			CO3: Evaluate the power tariff methods
			CO4: Determine the electrical circuit parameters of transmission lines
			CO5: Understand the layout of substation and underground cables and corona.
13	II/II	Digital Electronics Lab	CO1: Understand working of logic families and logic gates.
			CO2: Design and implement Combinational and Sequential logic circuits.
			CO3: Understand the process of Analog to Digital conversion and Digital to Analog conversion.
			CO4: Be able to use PLDs to implement the given logical problem.

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14	II/II	Electrical Machines Lab –II	CO1: Assess the performance of different machines using different testing methods
			CO2: To convert the Phase from three phase to two phase and vice
			CO3: Compensate the changes in terminal voltages of synchronous generator after estimating the change by different methods
			CO4: Control the active and reactive power flows in synchronous machines
			CO5: Start different machines and control the speed and power factor
15	II/II	Control Systems Lab	CO1: How to improve the system performance by selecting a suitable controller and/or a compensator for a specific application
			CO2: Apply various time domain and frequency domain techniques to assess the system performance
			CO3: Apply various control strategies to different applications (example: Power systems, electrical drives etc)
			CO4: Test system controllability and observability using state space representation and applications of state space representation to various systems
16	III/I	Power Electronics	CO1: Understand the differences between signal level and power level devices.
			CO2: Analyze controlled rectifier circuits.


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			CO3: Analyze the operation of DC-DC choppers.
			CO4: Analyze the operation of voltage source inverters.
17	III/I	Power System –II	CO1: Analyze transmission line performance.
			CO2: Apply load compensation techniques to control reactive power
			CO3: Understand the application of per unit quantities
			CO4: Design over voltage protection and insulation coordination
			CO5: Determine the fault currents for symmetrical and unbalanced fault
18	III/I	Measurements And Instrumentation	CO1: Understand different types of measuring instruments, their construction, operation and characteristics
			CO2: Identify the instruments suitable for typical measurements
			CO3: Apply the knowledge about transducers and instrument transformers to use them effectively.
			CO4: Apply the knowledge of smart and digital metering for industrial applications
19	III/I	High Voltage Engineering	CO1: Understand the basic physics related to various breakdown processes in solid, liquid and gaseous insulating materials
			CO2: Knowledge of generation and measurement of D.C, A.C, & Impulse voltages.
			CO3: Knowledge of tests on H. V. equipment and on insulating materials, as per the standards.
			CO4: Knowledge of how over-voltages arise in a power system, and

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			protection against these over-voltages.
20	III/I	Business Economics And Financial Analysis	CO1: The students will understand the various Forms of Business and the impact of economic variables on the Business
			CO2: The Demand, Supply, Production, Cost, Market Structure, Pricing aspects are learnt.
			CO3: Students can study the firm's financial position
			CO4: by analyzing the Financial Statements of a Company.
21	III/I	Power System Simulation Lab	CO1: Perform various transmission line calculations
			CO2: Understand Different circuits time constants
			CO3: Analyze the experimental data and draw the conclusions.
22	III/I	Power Electronics Lab	CO1: Understand the operating principles of various power electronic converters.
			CO2: Use power electronic simulation packages& hardware to develop the power converters.
			CO3: Analyze and choose the appropriate converters for various applications
23	III/II	Disaster Preparedness & Planning Management	CO1: the application of Disaster Concepts to Management
			CO2: Analyzing Relationship between Development and Disasters
			CO3: Ability to understand Categories of Disasters
			CO4: Realization of the responsibilities to society.
24	III/II	Power	CO1: Identify the drawbacks of speed control of motor by conventional



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		Semiconduct or Drives	methods. CO2: Differentiate Phase controlled and chopper-controlled DC drives speed-torque characteristics merits and demerits CO3: Understand Ac motor drive speed–torque characteristics using different control strategies its merits and demerits CO4: Describe Slip power recovery schemes
25	III /II	Signals & Systems	CO1: Differentiate various signal functions. CO2: Represent any arbitrary signal in time and frequency domain. CO3: Understand the characteristics of linear time invariant systems CO4: Analyze the signals with different transform technique
26	III/II	Microprocessors & Microcontrollers	CO1: Understands the internal architecture, organization and assembly language programming of 8086 processors. CO2: Understands the internal architecture, organization and assembly language programming of 8051/controllers CO3: Understands the interfacing techniques to 8086 and 8051 based systems. CO4: Understands the internal architecture of ARM processors and basic concepts of advanced ARM processors.
27	III/II	Power System Protection	CO1: Compare and contrast electromagnetic, static and microprocessor-based relays CO2: Apply technology to protect power system components CO3: Select relay settings of over current and distance relays. CO4: Analyze quenching mechanisms used in air, oil and vacuum circuit breakers



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28	III/II	Power System Lab	CO1: Perform various load flow techniques
			CO2: Understand Different protection methods
			CO3: Analyze the experimental data and draw the conclusions.
29	III/II	Microprocessors & Microcontrollers Lab	CO1: Assembly Language Programs to 8086to Perform 1. Arithmetic, Logical, String Operations on 16 Bit and 32-Bit Data.
			CO2: Bit level Logical Operations, Rotate, Shift, Swap and Branch Operations.
			CO3: Assembly Language Programs to Perform Arithmetic (Both Signed and Unsigned) 16 Bit Data Operations, Logical Operations (Byte and Bit Level Operations), Rotate, Shift, Swap and Branch Instructions
			CO4: Time delay Generation Using Timers of 8051
			CO5: Serial Communication from / to 8051 to / from I/O devices
30	III/II	Signals and Systems lab	CO1: Understand the concepts of continuous time and discrete time systems.
			CO2: Analyse systems in complex frequency domain
			CO3: Understand sampling theorem and its implications.

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31	IV/I	Artificial Intelligence	CO1: To learn the distinction between optimal reasoning Vs. human like reasoning
			CO2: To understand the concepts of state space representation, exhaustive search, heuristic search together with the time and space complexities.
			CO3: To learn different knowledge representation techniques.
			CO4: To understand the applications of AI, namely game playing, theorem proving, and machine learning.
32	IV/I	Digital Signal Processing	CO1: Understand the LTI system characteristics and Multirate signal processing
			CO2: Understand the inter-relationship between DFT and various transforms.
			CO3: Design a digital filter for a given specification
			CO4: Understand the significance of various filter structures and effects of round off errors
33	IV/I	Hvdc Transmission	CO1: Compare EHV AC and HVDC system and to describe various types of DC links
			CO2: Analyze Graetz circuit for rectifier and inverter mode of operation
			CO3: Describe various methods for the control of HVDC systems and to perform power flow analysis in AC/DC systems
			CO4: Describe various protection methods for HVDC systems and classify Harmonics and design different types of filters
34	IV/I		CO1: The students understand the significance of Management in their



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		Fundamentals Of Management For Engineers	Profession CO2: various Management Functions like Planning, Organizing, Staffing, Leading, Motivation CO3: Control aspects are learnt in this course. CO4: The students can explore the Management Practices in their domain area.
35	IV/I	Electrical & Electronics Design Lab	CO1: Get practical knowledge related to electrical CO2: Fabricate basic electrical circuit elements/networks CO3: Trouble shoot the electrical circuits CO4: Get hardware skills such as soldering, winding etc.
36	IV/II	Non-Conventional Sources Of Energy	CO1: Identify renewable energy sources and their utilization. Understand the basic concepts of solar radiation and analyze the working of solar and thermal systems. CO2: Understand principles of energy conversion from alternate sources including wind, geothermal, ocean, biomass, biogas and hydrogen CO3: Understand the concepts and applications of fuel cells, thermoelectric convertor and MHD generator. CO4: Identify methods of energy storage for specific applications
37	IV/II	Power Quality &	CO1: Know the severity of power quality problems in distribution system CO2: Understand the concept of voltage sag transformation from up-stream (higher voltages) to down-stream (lower voltage) CO3: Concept of improving the power quality to sensitive load by



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		Facts	various mitigating custom power devices
			CO4: Choose proper controller for the specific application based on system requirements
			CO5: Understand various systems thoroughly and their requirements
			CO6: Understand the control circuits of Shunt Controllers SVC & STATCOM for various functions viz. Transient stability Enhancement, voltage instability prevention and power oscillation damping
			CO7: Understand the Power and control circuits of Series Controllers GCSC, TSSC and TCSC
38	IV/II	Electrical Distribution Systems	CO1: distinguish between transmission, and distribution line and design the feeders
			CO2: compute power loss and voltage drop of the feeders
			CO3: design protection of distribution systems
			CO4: understand the importance of voltage control and power factor improvement

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MECHANICAL ENGINEERING I and II Course Outcomes for the Academic Year 2021-2022

S.NO.	YEAR/SEM	COURSE NAME	Course Outcomes
1	II/I	METALLURGY AND MATERIAL SCIENCE	CO1: Identify the properties of metals with respect to crystal structure and grain size
			CO2: Interpret the phase diagrams of materials
			CO3: Classify and Distinguish different types of cast irons, steels and non ferrous alloys
			CO4: Describe the concept of heat treatment of steels & strengthening mechanisms
			CO5: Explain the powder metallurgy process, types and manufacturing of composite materials
2	II/I	MECHANICS OF SOLIDS	CO1: Understand the concepts of stress and strain and evaluate
			CO2: Apply the concept of shear force and bending moment for simple structural problems
			CO3: Apply the concepts of principal stresses and strains, body subjected to direct stresses accompanied by shear stresses
			CO4: Evaluate bending stresses and shear stresses for simple structures
			CO5: Analyze thin cylinders subjected to various stresses
			CO6: Evaluate stresses in shafts.
3	II/I	THERMODYNAMICS	CO1: Understand and differentiate between different thermodynamic system and process
			CO2: Understand and apply the laws of thermodynamics to



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			different types of systems.
			CO3: Undergoing various processes and to perform thermodynamic analysis.
			CO4: Understand and analyze the thermodynamic cycle.
			CO5: Understand and evaluate performance parameters.
			CO6: Develop the concept of power cycle with description and representation on p-v and T-S diagram
4	II/I	PRODUCTION TECHNOLOGY	CO1: Elaborate the fundamentals of various moulding casting techniques and furnaces.
			CO2: Identify the importance of permanent joining and principle behind different welding processes
			CO3: Explain the concepts of solid-state welding processes
			CO4: Understand the concepts of rolling and sheet metal operations in metal working.
			CO5: Elaborates the uniqueness of extrusion, forging and high energy rate forming processes in metal working.
			CO6: Develop process-maps for metal forming process using plasticity principles and identify the effect of process variable to manufacturing defect free products.
5	II/I	MACHINE DRAWING PRACTICE	CO1: Preparation of engineering and working drawings with dimensions and bill of material during design and development. Developing assembly drawings using part drawings of machine components
			CO2: Conventional representation of materials, common machine



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			<p>elements and parts such as screws, nuts, bolts, keys, gears, webs, ribs.</p> <p>CO3: Types of sections – selection of section planes and drawing of sections and auxiliary sectional views. Parts not usually sectioned.</p> <p>CO4: Methods of dimensioning, general rules for sizes and placement of dimensions for holes, centers, curved and tapered features.</p> <p>CO5: Title boxes, their size, location and details - common abbreviations and their liberal usage.</p> <p>CO6: Types of Drawings – working drawings for machine parts.</p>
6	II/I	PROBABILITY AND STATISTICS & COMPLEX VARIABLE	<p>CO1: Formulate and solve problems involving random variables and apply statistical methods for analyzing experimental data.</p> <p>CO2: analyze the complex function with reference to their analyticity, integration using Cauchy's integral and residue theorems</p> <p>CO3: Taylor's and Laurent's series expansions of complex function</p> <p>CO4: Evaluate the integrals using Cauchy's integral formula and residue theorems.</p> <p>CO5: Solve the problems involving random variables.</p>
7	III/I	DYNAMICS OF MACHINERY	<p>CO1: Apply the knowledge of the gyroscopic effect and evaluate the stability of Ship, Aero plane, Two wheeler and Four wheeler.</p> <p>CO2: Understand the concept of Equilibrium of a body subjected to static and dynamic forces</p>



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			<p>CO3: Analyze the concept of fluctuation energy, inertia of connecting rod- inertia force in reciprocating engines</p> <p>CO4: Develop the ability to identify a problem and apply the fundamental concepts of transmission and concepts of friction</p> <p>CO5: Understand the significance of governors and balancing of masses in various machines where ever applicable</p> <p>CO6: Develop the ability to function on multi-disciplinary teams by having knowledge of vibrations</p>
8	III/I	THERMAL ENGINEERING - II	<p>CO1: Develop state – space diagrams based on the schematic diagrams of process flow of steam and gas turbine plants</p> <p>CO2: Apply the laws of Thermodynamics to analyze thermodynamic cycles</p> <p>CO3: Differentiate between vapour power cycles and gas power cycles</p> <p>CO4: Infer from property charts and tables and to apply the data for the evaluation of performance parameters of the steam and gas turbine plants</p> <p>CO5: Understand the functionality of major components of steam and gas turbine plants and to do the analysis of these components</p>
9	III/I	DESIGN OF MACHINE MEMBERS-I	<p>CO1: The student acquires the knowledge about the principles of design, material selection, component behavior subjected to loads, design on the basis of strength & rigidity, and analyze the</p>



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			stresses & strains induced in a machine element
			CO2: Understands the concepts of principal stresses, Failure theories and design of components subjected to various static loads
			CO3: Student can able to design the machine components subjected to various varying & reversal loadings considering stress concentration in machine members
			CO4: Students will able to design the joints such as Bolted, Welded and Riveted Joints used in industrial Applications
			CO5: Students can design various keys used in Power Transmission Applications and also they can able to design various Cotter and Knuckle Joints
			CO6: Students can able to design the shafts and their couplings used in Industrial Power Transmission Applications
10	III/I	METROLOGY AND MACHINE TOOLS	CO1: Identify techniques to minimize the errors in measurement.
			CO2: Identify methods and devices for measurement of length, angle, and gear & thread parameters, surface roughness and geometric features of parts.
			CO3: Understand working of lathe, shaper, and planer, drilling, milling and grinding machines.
			CO4: Comprehend speed and feed



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			mechanisms of machine tools
			CO5: Estimate machining times for machining operations on machine tools
11	III/I	BUSINESS ECONOMICS AND FINANCIAL ANALYSIS	<p>CO1: Understand the elasticity of the demand of the product, different types, and measurement of elasticity of demand and factors influencing on elasticity of demand.</p> <p>CO2: Recognize the Production function, features of Iso-Quants and Iso-Costs, different types of internal economies, external economies and law of returns with appropriate examples.</p> <p>CO3: Illustrate the features, merits and demerits of different forms of business organizations existing in the modern business.</p> <p>CO4: Enumerate the concept of capital budgeting and allocations of the resources through capital budgeting methods and compute simple problems for project management.</p> <p>CO5: Evaluate different types of financial ratios for knowing liquidity and profitability positions of business concern.</p>
12	III/I	OPERATIONS RESEARCH	<p>CO1: Identify and develop operational research models from the verbal description of the real system.</p> <p>CO2: Understand the mathematical tools that are needed to solve optimization problems.</p> <p>CO3: Use mathematical software to solve the proposed models.</p> <p>CO4: Develop a report that</p>

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			describes the model and the solving technique, analyze the results and propose recommendations in language understandable to the decision-making processes in Management Engineering.
			CO5: Linear programming: solving methods, duality, and sensitivity analysis.
13	IV/I	POWER PLANT ENGINEERING	CO1: Able to get the basics of Power Plants.
			CO2: Able to get the idea about the power generation by renewable and non-renewable energy resources.
			CO3: Able to know about the different types of cycles and natural resources used in power plants and their applications.
14	IV/I	REFRIGERATION AND AIR CONDITIONING	CO1: Analyze the reversed Carnot cycle and vapour compression refrigeration cycle (VCR).
			CO2: Select the air-refrigeration systems for aircraft, and vapour absorption refrigeration system for rural and remote areas and select environmental friendly refrigerants considering the international standards.
			CO3: Identify the Psychometric processes for different applications and design the parameters of air-conditioning system as per standards.
			CO4: Understand the human comfort, ASHRAE chart and concept of effective temperature
			CO5: Estimate cooling load and heating load considering human comfort and optimize the air conditioning system as per

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			requirements.
15	IV/I	MEMS	CO1: Students will be able to understand working principles of currently available micro sensors, actuators, and motors, valves, pumps, and fluidics used in Microsystems.
			CO2: Students will be able to apply scaling laws that are used extensively in the conceptual design of micro devices and systems. Students will be able to differentiate between the positive and negative consequences of scaling down certain physical quantities that are pertinent to Microsystems.
			CO3: Students will be able to use materials for common micro components and devices.
			CO4: Students will be able to choose a micromachining technique, such as bulk micromachining and surface micromachining for a specific MEMS fabrication process.
			CO5: Students will be able to consider recent advancements in the field of MEMS and devices
			CO6: Students will be able to communicate their results and findings orally via formal presentations and in writing through reports.
16	IV/I	FLUID POWER SYSTEM	CO1: Understand the Properties of fluids, Fluids for hydraulic systems,
			CO2: governing laws. distribution of fluid power, Design and analysis of typical hydraulic circuits
			CO3: Know accessories used in fluid power system, Filtration



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			systems
			CO4: maintenance of system.
			CO5: Under Stand the maintenance of the pneumatic system.
17	IV/I	UTILIZATION OF ELECTRICAL ENGERGY	CO1: Understand basic principles of electric heating and welding.
			CO2: Determine the lighting requirements for flood lighting, household and industrial needs.
			CO3: Calculate heat developed in induction furnace.
			CO4: Evaluate speed time curves for traction
			CO5: To understand the concepts of electric drives and their application to electrical traction systems.
18	II/II	KINEMATICS OF MACHINERY	CO1: Understand the various elements in mechanism and the inversions of commonly used mechanisms such as four bar, slider crank and double slider crank mechanisms
			CO2: Draw the velocity and acceleration polygons for a given configuration of a mechanism.
			CO3: Mechanical Engineering we come across number of mechanisms such as four bar/slider crank/double slider crank/straight line motion mechanism etc.
			CO4: Once we make a study considering for us also there it is called kinetics. The first course deals with mechanisms, their inversions straight line motion mechanisms steering mechanisms etc.
			CO5: Also study of cams/gears & gear trains & belts are also



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			introduced.
			CO6: The main purpose is to give an idea about the relative motions obtained in all the above type of components used in mechanical Engineering.
19	II/II	FLUID MECHANICS AND HYDRAULIC MACHINES	<p>CO1: Able to explain the effect of fluid properties on a flow system.</p> <p>CO2: Able to identify type of fluid flow patterns and describe continuity equation.</p> <p>CO3: To analyze a variety of practical fluid flow and measuring devices and utilize Fluid Mechanics principles in design.</p> <p>CO4: To select and analyze an appropriate turbine with reference to given situation in power plants</p> <p>CO5: To estimate performance parameters of a given Centrifugal and Reciprocating pump.</p> <p>CO6: To estimate performance parameters of a given Centrifugal and Reciprocating pump.</p>
20	II/II	INSTRUMENTATION AND CONTROL SYSTEMS	<p>CO1: To identify various elements and their purpose in typical instruments, to identify various errors that would occur in instruments</p> <p>CO2: Analysis of errors so as to determine correction factors for each instrument.</p> <p>CO3: To understand static and dynamic characteristics of instrument and should be able to determine loading response time.</p> <p>CO4: For given range of displacement should be able to specify transducer, its accurate and loading time of that transducer.</p> <p>CO5: Identifying properties used for evaluating the thermal systems.</p>



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			CO6: Identifying errors and their types that would occur in an instrument.
21	II/II	THERMAL ENGINEERING – I	CO1: the student should be able to evaluate the performance of IC engines and compressors under the given operating conditions
			CO2: Apply the laws of Thermodynamics to evaluate the performance of Refrigeration and air-conditioning cycles.
			CO3: Understand the functionality of the major components of the IC Engines and effects of operating conditions on their performance
			CO4: The functionality of the major components of the IC engine
			CO5: evaluate the perform analysis of the major components and systems of IC engines, refrigeration cycles and their applications.
22	II/II	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING	CO1: To analyze and solve electrical circuits using network laws and theorems
			CO2: To understand and analyze basic Electric and Magnetic circuits
			CO3: To study the working principles of Electrical Machines
			CO4: To introduce components of Low Voltage Electrical Installations
			CO5: To identify and characterize diodes and various types of transistors.
23	III/II	CAD & CAM	CO1: Understand geometric transformation techniques in CAD
			CO2: Develop mathematical



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			<p>models to represent curves and surfaces. Model engineering components using solid modeling techniques.</p> <p>CO3:Develop programs for CNC to manufacture industrial components</p> <p>CO4: To understand the application of computers in various aspects of Manufacturing.</p> <p>CO5: Design, Proper planning, Manufacturing cost, Layout & Material Handling system.</p>
24	III/II	HEAT TRANSFER	<p>CO1:Understand the basic modes of heat transfer</p> <p>CO2:Compute one dimensional steady state heat transfer with and without heat generation</p> <p>CO3:Understand and analyze heat transfer through extended surfaces</p> <p>CO4:Interpret and analyze forced and free convective heat transfer</p> <p>CO5:Understand the principles of boiling, condensation and radiation heat transfer</p> <p>CO6:Design of heat exchangers using LMTD and NTU methods</p>
25	III/II	UNCONVENTIONAL MACHINING PROCESSES	<p>CO1:Understand the basic techniques of Unconventional Machining processes modeling</p> <p>CO2:To teach the modeling technique for machining processes</p> <p>CO3:To teach the mechanics and thermal issues associated with chip formation</p> <p>CO4:To teach the effects of tool geometry on machining force components and surface finish</p> <p>CO5:To teach the machining surface finish and material removal rate</p>

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			CO6: Estimate the material removal rate and cutting force, in an industrially useful manner, for Unconventional Machining processes.
26	III/II	FINITE ELEMENT METHODS	CO1: At the end of the course, the student will be able to, Apply finite element method to solve problems in solid mechanics, fluid mechanics and heat transfer.
			CO2: Formulate and solve problems in one dimensional structures including trusses, beams and frames.
			CO3: Formulate FE characteristic equations for two dimensional elements and analyze plain stress, plain strain, axi-symmetric and plate bending problems. ANSYS, ABAQUS, NASTRAN, etc.
			CO4: Implementation of material model in finite element method and applications
			CO5: Importance of interfaces and joints on the behavior of engineering systems
27	III/II	DESIGN OF MACHINE MEMBERS-II	CO1: Ability to use Standard Design Data Book and knowledge about journal bearing design
			CO2: Estimation of life of rolling element bearings and their selection for given service conditions
			CO3: Knowledge of design of Internal Combustion Engine Components
			CO4: Student can able to design different belt drives, pulleys & various springs used in industrial and Automobile Applications
			CO5: Ability to design Spur gears

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			used in Industrial & Automotive Applications
			CO6: Knowledge of design of Helical gears used in Industrial & Automotive Applications
28	III/II	DISASTER MANAGEMENT	CO1: To Understand basic concepts in Disaster Management
			CO2: To Understand Definitions and Terminologies used in Disaster Management
			CO3: To Understand Types and Categories of Disasters.
			CO4: To Understand the Challenges posed by Disasters.
			CO5: To understand Impacts of Disasters Key Skills.
			CO6:
29	IV/II	BASIC POWER PLANT ENGINEERING	CO1: To understand Basic Rankine cycle and its modifications, layout of modern coal power plant, super critical boilers
			CO2: To understand FBC boilers, turbines, condensers, steam and heating rates, subsystems of thermal power plants, fuel and ash handling, draught system, feed water treatment, binary cycles and cogeneration systems
			CO3: Explain Brayton cycle analysis and optimization, components of gas turbine power plants, combined cycle power plants, Integrated Gasifier based Combined Cycle (IGCC) systems.
			CO4: Layout and subsystems of nuclear power plants, Boiling Water Reactor (BWR), Pressurized Water Reactor (PWR), CANDU Reactor, Pressurized Heavy Water Reactor (PHWR), Fast Breeder Reactors (FBR), gas cooled and



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			liquid metal cooled reactors, safety measures for nuclear power plants.
			CO5: To understand Power tariffs, load distribution parameters, load curve, capital and operating cost of different power plants, pollution control technologies including waste disposal options for coal and nuclear plants.
30	IV/II	INDUSTRIAL ROBOTICS	CO1: the student will be able to understand the basic components of robots.
			CO2: Differentiate types of robots and robot grippers. Model forward and inverse kinematics of robot manipulators.
			CO3: Analyze forces in links and joints of a robot. Programme a robot to perform tasks in industrial applications.
			CO4: Design intelligent robots using sensors.
			CO5: Enable the students to acquire practical experience in the field of Robotics through design projects and case studies.
			CO6: The goal of the course is to familiarize the students with the concepts and techniques in robotic engineering, manipulator kinematics, dynamics and control, chose, and incorporate robotic technology in engineering systems.
31	IV/II	INDUSTRIAL MANAGEMENT	CO1: Able to apply techniques for plant location, design plant layout and value analysis
			CO2: Able to carry out work study to find the best method for doing the work and establish standard time for a given method
			CO3: Able to apply various quality control techniques and sampling



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			plans
			CO4: Able to do job evaluation and network analysis.
			CO5: Able to design the organization structure
32	III/I	PRODUCTION TECHNOLOGY LAB	CO1: Understanding the properties of moulding sands and pattern making.
			CO2: Fabricate joints using gas welding and arc welding.
			CO3: Evaluate the quality of welded joints.
			CO4: Basic idea of press working tools and performs moulding studies on plastics.
33	II/I	MATERIAL SCIENCE & MECHANICS OF SOLIDS LAB	CO1: The Primary focus of the MMS program is to provide undergraduates with a fundamental knowledge based associated materials properties, and their selection and application
			CO2: Upon graduation, students would have acquired and developed the necessary background and skills for successful careers in the materials-related industries
			CO3: Furthermore, after completing the program, the student should be well prepared for management positions in industry or continued education toward a graduate degree.
34	III/I	THERMAL ENGINEERING LAB	CO1: Measure thermo-physical properties of solid, liquid and gaseous fuels.
			CO2: Identify various systems and subsystems of Diesel and petrol engines
			CO3: Analyze the performance characteristics of internal combustion engines



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			<p>CO4: Interpret the performance characteristics of air compressors</p> <p>CO5: Able to understand different types of boilers</p>
35	III/I	METROLOGY & MACHINE TOOLS LAB	<p>CO1: Apply the procedures to measure length, angles, width, depth, bore diameters, internal and external tapers, tool angles, and surface roughness by using different instruments and by different indirect methods</p> <p>CO2: Use effective methods of measuring straightness, Squareness, flatness, roundness, profile, screw threads and gear teeth.</p> <p>CO3: Able to understand various types of machines, tools and their operations.</p> <p>CO4: Able to perform various types of machining operations.</p>
36	III/I	KINEMATICS & DYNAMICS LAB	<p>CO1: Upon successful completion of this lab, students should be able to: Understand types of motion•</p> <p>CO2: Analyze forces and torques of components in linkages</p> <p>CO3: Understand static and dynamic balance</p> <p>CO4: Understand forward and inverse kinematics of open-loop mechanisms</p>
37	II/II	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LAB	<p>CO1: To analyze and solve electrical circuits using network laws and theorems.</p> <p>CO2: To understand and analyze basic Electric and Magnetic circuits</p> <p>CO3: To study the working principles of Electrical Machines</p> <p>CO4: To introduce components of Low Voltage Electrical Installations</p>



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			CO5: To identify and characterize diodes and various types of transistors.
38	II/II	FLUID MECHANICS AND HYDRAULIC MACHINES LAB	CO1: Able to explain the effect of fluid properties on a flow system
			CO2: Able to identify type of fluid flow patterns and describe continuity equation.
			CO3: To analyze a variety of practical fluid flow and measuring devices and utilize fluid mechanics principles in design.
			CO4: To select and analyze an appropriate turbine with reference to given situation in power plants.
			CO5: To estimate performance parameters of a given Centrifugal and Reciprocating pump.
			CO6: Able to demonstrate boundary layer concepts
39	II/II	INSTRUMENTATION AND CONTROL SYSTEMS LAB	CO1: At the end of the course, the student will be able to Characterize and calibrate measuring devices.
			CO2: Identify and analyze errors in measurement. Analyze measured data using regression analysis.
			CO3: Calibration of Pressure Gauges, temperature, LVDT, capacitive transducer, rotameter.
40	III/II	HEAT TRANSFER LAB	CO1: Perform steady state conduction experiments to estimate thermal conductivity of different materials.
			CO2: Perform transient heat conduction experiment.
			CO3: Estimate heat transfer coefficients in forced convection, free convection, condensation and correlate with theoretical values.

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			<p>CO4: Obtain variation of temperature along the length of the pin fin under forced and free convection.</p> <p>CO5: Perform radiation experiments: Determine surface emissivity of a test plate and Stefan Boltzmann's constant and compare with theoretical value.</p>
41	III/II	CAD & CAM LAB	<p>CO1: To understand the analysis of various aspects in of manufacturing design.</p> <p>CO2: To understand and able use different Designing and Analysis software's.</p> <p>CO3: Able to create programming by making use of programming languages of CAM.</p>
42	III/II	ADVANCED COMMUNICATION SKILLS LAB	<p>CO1: Able to speak fluently.</p> <p>CO2: Able to take part in Social and Professional Communication.</p> <p>CO3: Able to communicate their ideas relevantly and coherently in writing.</p>

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ELECTRONICS AND COMMUNICATION AND ENGINEERING

I & II SEM COURSE OUTCOMES FOR THE ACADEMIC YEAR: 2021-2022

S.No.	YEA R/SE M	COURSE NAME	Course Outcomes
1	II/I	Electronics Devices & Circuits	CO1: Analyze the applications of the p-n diode as rectifier and Zener diode as voltage regulator
			CO2: Analyze the characteristics of BJT in CB, CE and CC configurations
			CO3: Design and analyze the transistor biasing circuits for a given operating point
			CO4: Design and analyze amplifiers at low frequencies using h parameter model
			CO5: Analyze FET and MOSFET amplifiers at low frequencies
2	II/I	Digital System Design.	CO1: Understand the numerical information in different forms and Boolean Algebra theorems.
			CO2: Understand Postulates of Boolean algebra and to minimize combinational functions.
			CO3: Design and Analyze combinational and sequential circuits.
			CO4: Know about the logic families and realization of logic gates.
3	II/I	Network Analysis & Transmission Theory	CO1: Gain the knowledge on basic RLC circuits behavior
			CO2: Analyze the Steady state and transient analysis of RLC Circuits.
			CO3: Know the characteristics of two port network parameters
			CO4: Analyze the transmission line parameters and configurations
	II/I	Probability Theory and	CO1: Understand probabilities and able to solve using an appropriate sample space

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4		Stochastic Process	CO2: Compute various operations like expectations from probability density functions (pdfs) and probability distribution functions
			CO3: Perform Likelihood ratio tests from pdfs for statistical engineering Problems
			CO4: : Mean and covariance functions for simple random variables
			CO5: Understand Auto-correlation and cross correlation properties between two random variables
			CO6: Explain the concept of random process, differentiate between stochastic and ergodic processes
			CO7: Explain the concept of power spectral density and power density spectrum of a random process. 8. Apply the principles of a random process in system concepts.
5	II/I	Signals and Systems	CO1: Defining the various signals and identifying the signal functions & relations
			CO2: Represent any arbitrary signal in time and frequency domain.
			CO3: Understand the characteristics of linear time invariant systems.
			CO4: Analyze the signals with different transform technique
6	II/I	Electronics Devices & Circuits Lab	CO1: Analyze the characteristics of p-n junction diode and Zener diode and calculate the dynamic and static resistance in forward bias and reverse bias respectively
			CO2: Calculate the ripple factor and efficiency of Half Wave and Full wave rectifiers with and without filters.
			CO3: Analyze the characteristics of BJT in Common Emitter and Common Base configurations and calculate the corresponding h-parameters
			CO4: Analyze the characteristics of FET in Common Source configuration and calculate the gm and rd. CO 5 Calculate Bandwidth of BJT/FET amplifier from its frequency response.
			CO5: Obtain the characteristics of UJT and SC
7	II/I	Digital System Design Lab	CO1: Implement Boolean Expressions using universal logic gates .
			CO2: Design and verify Combinational logic circuits using IC's .
			CO3: Design and verify Sequential logic circuits using IC's

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			CO4: Implement Counters & Shift registers using FF's
8	II/I	Basic Simulation Lab	CO1: Synthesize a given waveform using standard test signals and sequences.
			CO2: Analyze the effect of various transformations applied on independent and dependent variables of a signal.
			CO3: Determine the symmetry (even/odd) of signals /sequences.
			CO4: Classify a system based on its characteristics and find its response for various excitations.
			CO5: Convert time domain signal into frequency domain using Fourier transform and plot its magnitude and phase spectrum.
9	II/II	Laplace Transforms, Numerical Methods & Complex Variables	CO1: understand the Laplace transforms techniques for solving ode's
			CO2: find the root of a given equation.
			CO3: calculate the value for the given data using interpolation
			CO4: analyze the numerical solutions for a given ode's
			CO5: analyze the complex function with reference to their analyticity, integration using cauchy's integral and residue theorems.
			CO6: understand taylor's and laurent's series expansions of complex function.
10	II/II	Electromagnetic Fields and Waves	CO1: Get the knowledge of Basic Laws, Concepts and proofs related to Electrostatic Fields and Magnetostatic Fields.
			CO2: Distinguish between the static and time-varying fields, establish the corresponding sets of Maxwell's Equations and Boundary Conditions.
			CO3: Analyze the Wave Equations for good conductors, good dielectrics and evaluate the UPW Characteristics for several practical media of interest.
			CO4: To analyze completely the rectangular waveguides, their mode characteristics, and design waveguides for solving practical problems
11	II/II	Analog and Digital Communications	CO1::Analyze and design of various continuous wave and angle modulation and demodulation techniques
			CO2: Understand the effect of noise present in continuous wave and angle modulation techniques.


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			CO3: Attain the knowledge about AM , FM Transmitters and Receivers
			CO4: Analyze and design the various Pulse Modulation Techniques.
			CO5: Understand the concepts of Digital Modulation Techniques and Baseband transmission
12	II/II	Linear IC Applications	CO1: Understand the internal operation of Op-Amp and its specifications.
			CO2: Analyze and design linear applications like adder, subtractor, instrumentation amplifier and etc. using Op-Amp.
			CO3: Analyze and design nonlinear applications like multiplier, comparator and etc, using Op-Amp.
			CO4: Attain the knowledge of functional diagrams and applications of IC 555 and IC565 and applications
			CO5: Acquire the knowledge about the Data converters.
13	II/II	Electronic Circuit Analysis	CO1: Analyze single stage amplifiers at Mid-band, Low frequency and High frequency regions
			CO2: Analyze multistage amplifiers at Mid-band, Low frequency and High frequency regions.
			CO3: Design and analyze different types of feedback amplifiers and oscillators using transistors
			CO4: Analyze different types of power amplifiers and compare them in terms of efficiency.
			CO5: Analyze tuned amplifiers and the effects of cascading tuned amplifiers



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14	II/II	Analog and Digital Communications.	CO1: Analyze the spectrum of various analog modulation techniques
			CO2: Design a multiplexing system using FDM
			CO3: Examine various pulse modulation techniques
			CO4: Analyze different digital modulation and demodulation
15	II/II.	IC Applications Lab	CO1: Design analog circuits for practical applications using Op Amp IC-741
			CO2: Design waveform generators and PLL circuits using ICs
			CO3: Design multi vibrators using IC555 and Schmitt trigger using IC741
			CO4: Analyze the practical applications of Voltage Regulator using various ICs.
16	II/II	Electronic Circuits Analysis Lab	CO1: Design, simulate and verify basic amplifier circuits
			CO2: Design, simulate and verify feedback amplifiers and oscillators.
			CO3: Design, simulate and verify power amplifier circuits
			CO4: Design, simulate and verify Multivibrators and Sweep Circuits.
17	II/II	Gender Sensitization Lab	CO1: Develop a better understanding of important issues related to gender in contemporary India.
			CO2: Analyze basic dimensions of the biological, sociological, psychological and legal aspects of gender.
			CO3: Develop a sense of appreciation of women in all walks of life and will be equipped to work and live together as equals.
			CO4: Examine the new laws for women protection & relief, and empower students to understand and respond to gender violence
18	III/I	Microprocessors & Microcontrollers	CO1: Understands the internal architecture, organization and assembly language programming of 8086 processors.
			CO2: Understands the internal architecture, organization and assembly language programming of 8051/controllers
			CO3: Understands the interfacing techniques to 8086 and 8051 based systems.



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			CO4: Understands the internal architecture of ARM processors and basic concepts of advanced ARM processors.
19	III/I	Data Communications and Networks	CO1: Analyze the Categories and functions of various Data communication Networks
			CO2: Design and analyze various error detection techniques
			CO3: Demonstrate the mechanism of routing the data in network layer
			CO4: Analyze the significance of various Flow control and Congestion control Mechanisms
			CO5: Analyze the Functioning of various Application layer Protocols.
			CO6: Analyze the features and operations of various user interface protocols.
20	III/I	Control Systems	CO1: Explain different ways of system representations such as Transfer function
			CO2: Apply various time domain and frequency domain techniques to assess the system performance
			CO3: Apply various control strategies to different applications like power systems, electrical drives etc
			CO4: Design various controllers and compensators to improve system performance
			CO5: Construct the State models for continuous & discrete time systems and comment on controllability and Observability of the system
			CO6: Compute the transfer function of system by different techniques.
21	III/I	Business Economics & Financial Analysis	CO1: Understand the various forms of business
			CO2: contrast of demand and supply
			CO3: change production, cost market structures and pricing
			CO4: study the firm's financial position
			CO5: Relate to analyze the financial statements of a company
22	III/I	Electronic Measurements and Instrumentati	CO1: Identify the various electronic instruments based on their specifications for carrying out a particular task of measurement.
			CO2: Measure various physical parameters by appropriately selecting the transducers.



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		on	<p>CO3: Use various types of signal generators, signal analyzers for generating and analyzing Various real-time signals.</p> <p>CO4: Explain functioning, specification and applications of signal generators, signal analyzers for generating and analyzing various real-time signals.</p>
23	III/I	Microprocessors & Microcontrollers Lab	<p>CO1: Write programs in assembly language using the instruction set of 8086 through MASM software as well as using 8086 Kit.</p> <p>CO2: Interface different I/O devices with 8086 and establish communication between them.</p> <p>CO3: Write programs in assembly language using instruction set of 8051 and execute the same.</p> <p>CO4: Verify the operations of the timer, counter and serial port (UART) of 8051.</p>
24	III/I	Data Communications and Networks Lab	<p>CO1:Create and evaluate the performance of various LAN topologies</p> <p>CO2:Evaluate the performance of queue management, scheduling mechanisms and protocols</p> <p>CO3:Evaluate the performance of routing protocols and IEEE 802.x standards</p> <p>CO4:Analyze various protocols using packet capture monitoring tools.</p>
25	III/I	Advanced Communication Skills Lab	<p>CO1:Build sound vocabulary and use functional English effectively</p> <p>CO2:Analyze the given text and respond appropriately and develop efficacious writing skills</p> <p>CO3:Develop effective speaking skills and maximize job prospects</p> <p>CO4:Plan and make different forms of presentation using various techniques.</p>
26	III/II	Antennas and Wave Propagation	<p>CO1: Explain radiation mechanism and various parameters of an antenna.</p> <p>CO2: Design Loop, Helical, Horn and Yagi–Uda antennas.</p> <p>CO3: Explain the working principle of Microstrip, Reflector and Lens antennas.</p> <p>CO4:. Design different types of arrays and explain the test procedures involved in Antenna Measurements.</p>

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			CO5: Explain the mechanisms of wave propagation and atmospheric effects on radio wave propagation
27	III/II	Digital Signal Processing	CO1: Understand the LTI system characteristics and Multirate signal processing
			CO2: Understand the inter-relationship between DFT and various transforms
			CO3: Design a digital filter for a given specification.
			CO4: Understand the significance of various filter structures and effects of round off errors
28	III/II	VLSI Design	CO1: Explain MOS technology of NMOS, PMOS, CMOS and BiCMOS.
			CO2: Design stick diagrams and draw the layout of a logic circuit
			CO3: Analyze the architectural issues involved in subsystem design.
			CO4: Design building blocks of data path subsystems and analyze simple memories using MOS transistors.
			CO5: Apply concepts of VLSI design methodology and explain the test principles
29	III/II	Embedded System Design	CO1: To understand the selection procedure of Processors in the embedded domain
			CO2: Design Procedure for Embedded Firmware.
			CO3: To visualize the role of Real time Operating Systems in Embedded Systems.
			CO4: To evaluate the Correlation between task synchronization and latency issues.
30	III/II	Disaster Preparedness planning Management	CO1: Explain disaster management theory (cycle, phases, risk, crisis, emergency, disasters, resilience)
			CO2: Compare hazards, disasters and associated natural phenomena and their interrelationships, causes and their effects - developing humanitarian Assistance before and after disast
			CO3: Compare anthropogenic hazards, disasters and associated activities and their interrelationships of the subsystems - Green House Effect, Global warming, Causes and their effects and development of humanitarian assistance before and after disaster


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			CO4: Apply knowledge about existing global frameworks and existing agreements and role of community in successful Disaster Risk Reduction
			CO5: Evaluate DM study including data search, analysis and presentation as a case study.
			CO6: Create Technological innovations in Disaster Risk Reduction: Advantages and problems
31	III/II	Digital Signal Processing	CO1:Generate sinusoidal and noise waveforms using different approaches
			CO2:Analyze Impulse and frequency response of various digital filters.
			CO3:Verify different algorithms of DSP through simulation
			CO4:Implement various DSP algorithms in hardware.
32	III/II	e-CAD Lab	CO1: Verify the functionality of digital circuits using Xilinx ISIM simulator
			CO2: Implement digital circuits on various FPGA boards using Xilinx tools
			CO3:Design layout for digital circuits and perform physical verification
			CO4: Analyze static timing, IR drop and crosstalk in digital circuit layouts
33	III/II	Scripting Languages Lab	CO1:Design and test programs to solve mathematical problems
			CO2:Develop programs Using Ruby Script
			CO3:Develop Programs Using TCL Script
			CO4:Develop Programs Using Perl Script
34	IV/I	Microwave and Optical Communications	CO1:Analyze various modes of microwave transmission lines.
			CO2: Examine various waveguide components and their applications.
			CO3:Analyze the characteristics of O-type and M-type microwave tubes
			CO4:Estimate S-parameters of multiport junction devices
			CO5:Measure various parameters using microwave bench
			CO6:Understand the mechanism of light propagation through Optical Fibers
	IV/I	Professional	CO1:understand the importance of professional practice and Law Ethics


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35		Practice, Law & Ethics	
			CO2: Define the law of contract and its key elements of valid contract
			CO3: judge arbitration and conciliation and alternative Dispute resolution
			CO4: role play the labor and construction related laws
			CO5: Explain the students rights and Responsibility as an Employee
36	IV/I	Network Security and Cryptography	CO1: Describe network security fundamental concepts and principles
			CO2: Encrypt and decrypt messages using block ciphers and network security technology and protocols
			CO3: Analyze key agreement algorithms to identify their weaknesses
			CO4: Identify and assess different types of threats, malware, spyware, viruses, vulnerability
37	IV/I	Digital Image Processing	CO1: Remember Upon completing this course, the student will be able to Explore the fundamental relations between pixels
			CO2: Understand utility of 2-D transforms in image
			CO3: Apply processor the enhancement, segmentation
			CO4: Analyze restoration processes on an image.
			CO5: Evaluate Implement the various Morphological operations on an image
			CO6: Create the need of compression and evaluation of basic compression algorithms.
38	IV/I	Artificial Intelligent	CO1: Ability to formulate an efficient problem space for a problem expressed in natural language.
			CO2: Select a search algorithm for a problem and estimate its time and space complexities.
			CO3: Possess the skill for representing knowledge using the appropriate technique for a given problem
			CO4: Possess the ability to apply AI techniques to solve problems of game playing, and machine learning.


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39	IV/I	Microwave and Optical Communications lab	CO1: Analyze the characteristics of microwave sources and devices.
			CO2: Measure different parameters of various microwave devices.
			CO3: Measure the Scattering Parameters of various Tee Junctions
40	IV/I	Seminar	CO1: Identify emerging topic specific to the programmer
			CO2: Extract the information relevant to the chosen topic.
			CO3: Deliver the knowledge using multimedia
			CO4: Answer the queries with appropriate explanation and elaboration.
41	IV/1	Project Stage - I	CO1: Identify problem, conduct relevant literature survey and formalize it.
			CO2: Analyze & design efficient, cost-effective and eco-friendly solutions using relevant tools (if necessary) and processes
			CO3: Implement the design and demonstrate the functionality of developed model
			CO4: Evaluate the results to derive the conclusion and provide scope for future enhancement.
42	IV/11	Radar Systems	CO1: Analyze the performance of Radar system and its parameters
			CO2: Analyze the functionality of CW and FMCW radar
			CO3: Classify the mechanism of detecting stationary and moving targets
			CO4: Compare the working mechanism of various tracking radars.
			CO5: Analyze the radar signals in noisy environment.
			CO6: Assess various components and parameters of Radar Receivers
43	IV/11	System on Chip Architecture	CO1: Remember SOC Architectural features.
			CO2: Understand to acquire the knowledge on processor selection criteria and limitations
			CO3: Apply to acquire the knowledge on processor selection limitations

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			CO4: Analyze to acquires the knowledge of memory architectures on SOC.
			CO5: Evaluate to the interconnection strategies on SOC.
			CO6: Create to the interconnection strategies customization on SOC.
44	IV/11	Database Management Systems	CO1: Gain knowledge of fundamentals of DBMS, database design and normal forms
			CO2: Master the basics of SQL for retrieval and management of data
			CO3: Be acquainted with the basics of transaction processing and concurrency control.
			CO4: Familiarity with database storage structures and access techniques.
45	IV/11	Project Stage – II	CO1: Identify problem, conduct relevant literature survey and formalize it.
			CO2: Analyze & design efficient, cost-effective and eco-friendly solutions using relevant tools (if necessary) and processes
			CO3: Implement the design and demonstrate the functionality of developed model
			CO4: Evaluate the results to derive the conclusion and provide scope for future enhancement.

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S.NO.	YEAR/ SEM	COURSE NAME	Course Outcomes
1	II/I	Data Structures	CO1: Ability to select the data structures that efficiently model the information in a problem.
			CO2: Ability to assess efficiency trade-offs among different data structure implementations or combinations.
			CO3: Implement and know the application of algorithms for sorting and pattern matching.
			CO4: Design programs using a variety of data structures, including hash tables, binary and general tree structures, search trees, tries, heaps, graphs, and AVL-trees
2	II/I	COMPUTER ORGANIZATION AND ARCHITECTURE	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 instructions with minimum hazards.
			CO5: Recognize and manipulate representations of numbers stored in digital computers.
3	II/I	OBJECT ORIENTED PROGRAMMING USING C++	CO1: Able to develop programs with reusability
			CO2: Develop programs for file handling
			CO3: Handle exceptions in programming
			CO4: Develop applications for a range of problems using object-oriented programming techniques
			CO1: Know the characteristics of various components


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4	II/I	ANALOG AND DIGITAL ELECTRONICS	CO2: Understand the utilization of components
			CO3: Design and analyze small signal amplifier circuits.
			CO4: Learn Postulates of Boolean algebra and to minimize combinational functions
			CO5: Design and analyze combinational and sequential circuits
			CO6: Know about the logic families and realization of logic gates.
5	II/I	COMPUTER ORIENTED STATISTICAL METHODS	CO1: Apply the concepts of probability and distributions to some case studies
			CO2: Correlate the material of one unit to the material in other units
			CO3: Resolve the potential misconceptions and hazards in each topic of study
			CO4: To measure experimental result based on hypothesis using chi square techniques
6	II/I	ANALOG AND DIGITAL ELECTRONICS	Co1: Know the characteristics of various components.
			CO2: Understand the utilization of components.
			CO3: Design and analyze small signal amplifier circuits
			CO4: Postulates of Boolean algebra and to minimize combinational functions
			CO5: Design and analyze combinational and sequential circuits
7	II/I	Data Structure Lab	CO1: Ability to develop C programs for computing and real-life applications using basic elements like control statements, arrays, functions, pointers and strings, and data structures like stacks, queues and linked lists.
			CO2: Ability to Implement searching and sorting algorithms
8	II/I	C++ LAB	CO1: Ability to develop applications for a range of problems using object-oriented programming techniques

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9	II/I	Gender Sensitization Lab	CO1: To develop students' sensibility with regard to issues of gender in contemporary India.
			CO2: To provide a critical perspective on the socialization of men and women.
			CO3: To introduce students to information about some key biological aspects of genders.
			CO4: To expose the students to debates on the politics and economics of work.
			CO5: To help students reflect critically on gender violence
			CO6: To expose students to more egalitarian interactions between men and women
10	III/I	COMPUTER NETWORKS	CO1: Gain the knowledge of the basic computer network technology
			CO2: Gain the knowledge of the functions of each layer in the OSI and TCP/IP reference model
			CO3: Obtain the skills of sub netting and routing mechanisms
			CO4: Familiarity with the essential protocols of computer networks, and how they can be applied in network design and implementation.
11	III/I	Software Engineering	CO1: Ability to translate end-user requirements into system and software requirements, using e.g.UML, and structure the requirements in a Software Requirements Document (SRD).
			CO2: Identify and apply appropriate software architectures and patterns to carry out high level design of a system and be able to critically compare alternative choices.
			CO3: Will have experience and/or awareness of testing problems and will be able to develop a simple testing report
12	III/I	WEB TECHNOLOGIES	CO1: gain knowledge of client-side scripting, validation of forms and AJAX programming
			CO2: understand server-side scripting with PHP language
			CO3: understand what is XML and how to parse and use XML Data



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			with Java
			CO4: To introduce Server-side programming with Java Servlets and JSP
13	III/I	PRINCIPLES OF PROGRAMMING LANGUAGES	CO1: Acquire the skills for expressing syntax and semantics in formal notation
			CO2: Identify and apply a suitable programming paradigm for a given computing application
			CO3: Gain knowledge of and able to compare the features of various programming languages
			CO4: Combine the constructs of programming structures with efficiently using oops, concurrency management and event handling
			CO5: Demonstrate the working of functional and logic programming language
14	III/I	Formal languages & Automate theory	CO1: Able to understand the concept of abstract machines and their power to recognize the languages
			CO2: Able to employ finite state machines for modeling and solving computing problems
			CO3: Able to design context free grammars for formal languages
			CO4: Able to distinguish between decidability and undecidability.
			CO5: Able to gain proficiency with mathematical tools and formal methods.
15	III/I	INFORMATION RETRIEVAL SYSTEMS	CO1: Ability to apply IR principles to locate relevant information large collections of data
			CO2: Ability to design different document clustering algorithms
			CO3: Implement retrieval systems for web search tasks.
			CO4: Design an Information Retrieval System for web search tasks


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16	III/I	SOFTWARE ENGINEERING LAB	CO1: Ability to translate end-user requirements into system and software requirements
			CO2: Ability to generate a high-level design of the system from the software requirements
			CO3: Will have experience and/or awareness of testing problems and will be able to develop a simple testing report
17	III/I	CN&WT LAB	CO1: Implement data link layer farming methods
			CO2: Analyze error detection and error correction codes
			CO3: Implement and analyze routing and congestion issues in network design.
			CO4: Implement Encoding and Decoding techniques used in presentation layer
18	IV/I	DATA MINING	CO1: Ability to understand the types of the data to be mined and present a general classification of tasks and primitives to integrate a data mining system.
			CO2: Apply preprocessing methods for any given raw data.
			CO3: Extract interesting patterns from large amounts of data.
			CO4: Discover the role played by data mining in various fields
			CO5: Choose and employ suitable data mining algorithms to build analytical applications
19	IV-1	CLOUD	CO1: Ability to understand various service delivery models of a cloud computing architecture
			CO2: Ability to understand the ways in which the cloud can be programmed and deployed.

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		COMPUTING	CO3: Understanding cloud service providers.
20	IV-I	SOFTWARE PROCESS & PROJECT MANAGEMENT	CO1: Gain knowledge of software economics, phases in the life cycle of software development, project organization, project control and process instrumentation
			CO2: Analyze the major and minor milestones, artifacts and metrics from management and technical perspective
			CO3: Design and develop software product using conventional and modern principles of software project management
21	IV-I	PRINCIPLES OF PROGRAMMING LANGUAGES	CO1: Acquire the skills for expressing syntax and semantics in formal notation
			CO2: Identify and apply a suitable programming paradigm for a given computing application
			CO3: Gain knowledge of and able to compare the features of various programming languages
22	IV/I	PYTHON PROGRAMMING	CO1: Examine python syntax and semantics and befluent in the use of python basic types and functions.
			CO2: Demonstrate proficiency in handling Exceptions, modules and Files.
			CO3: Create, run and manipulate Python Multithreading programs and use Regular Expressions.
			CO4: Implement GUI Applications related to Web Services in Python.
			CO5: Develop exemplary applications related to Databases.
23	IV/I	INDUSTRY ORIENTED MINI PROJECT	CO1: Student will able to learn about mini project



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24	II/II	DISCRETE MATHEMATICS	CO1: Ability to understand and construct precise mathematical proofs
			CO2: Ability to use logic and set theory to formulate precise statements
			CO3: Ability to analyze and solve counting problems on finite and discrete structures
			CO4: Ability to describe and manipulate sequences
			CO5: Ability to apply graph theory in solving computing problems
25	II/II	OPERATING SYSTEMS	CO1: Will be 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: Ability to recognize and resolve user problems with standard operating environments
			CO5: Understanding file system structure and directory structure.

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Computer Science and Engineering (NETWORKS) I & II Sem Course Outcomes For The Academic Year 2021-2022

S.NO.	YEAR/ SEM	COURSE NAME	Course Outcomes
1	II/I	Data Structures	CO1: Ability to select the data structures that efficiently model the information in a problem.
			CO2: Ability to assess efficiency trade-offs among different data structure implementations or combinations.
			CO3: Implement and know the application of algorithms for sorting and pattern matching.
			CO4: Design programs using a variety of data structures, including hash tables, binary and general tree structures, search trees, tries, heaps, graphs, and AVL-trees
2	II/I	COMPUTER ORGANIZATION AND ARCHITECTURE	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 instructions with minimum hazards.
			CO5: Recognize and manipulate representations of numbers stored in digital computers.
3	II/I	PYTHON PROGRAMMING	CO1: Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.
			CO2: Demonstrate proficiency in handling Strings and File Systems.
			CO3: Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.


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			CO4: Interpret the concepts of Object-Oriented Programming as used in Python
			CO5: Implement exemplary applications related to Network Programming, Web Services and Databases in Python
4	II/I	ANALOG AND DIGITAL ELECTRONICS	CO1: Know the characteristics of various components
			CO2: Understand the utilization of components
			CO3: Design and analyze small signal amplifier circuits.
			CO4: Learn Postulates of Boolean algebra and to minimize combinational functions
			CO5: Design and analyze combinational and sequential circuits
			CO6: Know about the logic families and realization of logic gates.
5	II/I	COMPUTER ORIENTED STATISTICAL METHODS	CO1: Apply the concepts of probability and distributions to some case studies
			CO2: Correlate the material of one unit to the material in other units
			CO3: Resolve the potential misconceptions and hazards in each topic of study
			CO4: To measure experimental result based on hypothesis using chi square techniques
6	II/I	ANALOG AND DIGITAL ELECTRONICS	Co1: Know the characteristics of various components.
			CO2: Understand the utilization of components.
			CO3: Design and analyze small signal amplifier circuits
			CO4: Postulates of Boolean algebra and to minimize combinational functions
			CO5: Design and analyze combinational and sequential circuits
			CO1: Ability to develop C programs for computing and real-life applications using basic elements like control statements, arrays,



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7	II/I	Data Structure Lab	functions, pointers and strings, and data structures like stacks, queues and linked lists.
			CO2: Ability to Implement searching and sorting algorithms
8	II/I	PYTHON PROGRAMMING LAB	CO1: Student should be able to understand the basic concepts scripting and the contributions of scripting language
			CO2: Ability to explore python especially the object-oriented concepts, and the built in objects of Python.
			CO3: Ability to create practical and contemporary applications such as TCP/IP network programming, Web applications, discrete event simulation
9	II/I	Gender Sensitization Lab	CO1: To develop students' sensibility with regard to issues of gender in contemporary India.
			CO2: To provide a critical perspective on the socialization of men and women.
			CO3: To introduce students to information about some key biological aspects of genders.
			CO4: To expose the students to debates on the politics and economics of work.
			CO5: To help students reflect critically on gender violence
			CO6: To expose students to more egalitarian interactions between men and women
10	II/II	DISCRETE MATHEMATICS	CO1: Ability to understand and construct precise mathematical proofs
			CO2: Ability to use logic and set theory to formulate precise statements
			CO3: Ability to analyze and solve counting problems on finite and discrete structures
			CO4: Ability to describe and manipulate sequences



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			CO5: Ability to apply graph theory in solving computing problems
11	II/II	BUSINESS ECONOMICS AND FINANCIAL ANALYSIS	CO1: The students will understand the various Forms of Business and the impact of economic variables on the Business
			CO2: The Demand, Supply, Production, Cost, Market Structure, Pricing aspects are learnt.
			CO3: The Students can study the firm's financial position by analysing the Financial Statements of a Company.
12	II/II	OPERATING SYSTEMS	CO1: Will be 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: Ability to recognize and resolve user problems with standard operating environments
			CO4: Gain practical knowledge of how programming languages, operating systems, and architectures interact and how to use each effectively.
13	II/II	COMPUTER NETWORKS	CO1: Gain the knowledge of the basic computer network technology
			CO2: Gain the knowledge of the functions of each layer in the OSI and TCP/IP reference model
			CO3: Obtain the skills of sub netting and routing mechanisms
			CO4: Familiarity with the essential protocols of computer networks, and how they can be applied in network design and implementation.
14	II/II	JAVA PROGRAMMING	CO1: Able to solve real world problems using OOP techniques
			CO2: Able to understand the use of abstract classes.
			CO3: Able to solve problems using java collection framework and I/o classes.
			CO4: Able to develop multithreaded applications with synchronization.

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			CO5: Able to develop applets for web applications.
			CO6: Able to design GUI based applications
15	II/II	OS LAB	CO1: Simulate and implement operating system concepts
			CO2: Able to implement C programs using Unix system calls
16	II/II	COMPUTER NETWORKS LAB	CO1: Implement data link layer framing methods
			CO2: Analyze error detection and error correction codes
			CO3: Implement and analyze routing and congestion issues in network design.
17	II/II	JAVA PROGRAMMING LAB	CO1: Able to write programs for solving real world problems using java collection frame work
			CO2: Able to write programs using abstract classes.
			CO3: Able to write multithreaded programs
			CO4: Able to write GUI programs using swing controls in Java.
18	II/II	CONSTITUTION OF INDIA	CO1: Able to understand the concept of abstract machines and GUI based applications.
			CO2: Able to employ finite state machines for modeling and solving computing problems.
			CO3: Able to design context free grammars for formal languages.
			CO4: Able to distinguish between decidability and undecidability.
			CO5: Able to gain proficiency with mathematical tools and formal methods.

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Computer Science and Engineering (DATA SCIENCE) I & II Sem Course Outcomes For The Academic Year 2021-2022

S.NO.	YEAR/ SEM	COURSE NAME	Course Outcomes
1	II/I	DISCRETE MATHEMATICS	CO1: Ability to understand and construct precise mathematical proofs
			CO2: Ability to use logic and set theory to formulate precise statements
			CO3: Ability to analyze and solve counting problems on finite and discrete structures
			CO4: Ability to describe and manipulate sequences
			CO5: Ability to apply graph theory in solving computing problems
2	II/I	Data Structures	CO1: Ability to select the data structures that efficiently model the information in a problem.
			CO2: Ability to assess efficiency trade-offs among different data structure implementations or combinations.
			CO3: Implement and know the application of algorithms for sorting and pattern matching.
			CO4: Design programs using a variety of data structures, including hash tables, binary and general tree structures, search trees, tries, heaps, graphs, and AVL-trees
		COMPUTER ORGANIZATION AND ARCHITECTURE	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.


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3	II/I		CO4: Design a pipeline for consistent execution of instructions with minimum hazards.
4	II/I	PYTHON PROGRAMMING	CO1: Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.
			CO2: Demonstrate proficiency in handling Strings and File Systems.
			CO3: Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.
			CO4: Interpret the concepts of Object-Oriented Programming as used in Python
			CO5: Implement exemplary applications related to Network Programming, Web Services and Databases in Python
5	II/I	BUSINESS ECONOMICS AND FINANCIAL ANALYSIS	CO1: The students will understand the various Forms of Business and the impact of economic variables on the Business
			CO2: The Demand, Supply, Production, Cost, Market Structure, Pricing aspects are learnt.
			CO3: The Students can study the firm's financial position by analysing the Financial Statements of a Company.
6	II/I	MATHEMATICAL AND STATISTICAL FOUNDATIONS	CO1: Apply the number theory concepts to cryptography domain
			CO2: Apply the concepts of probability and distributions to some case studies
			CO3: Correlate the material of one unit to the material in other units
			CO4: Resolve the potential misconceptions and hazards in each topic of study
			CO1: Ability to develop C programs for computing and real-life



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7	II/I	Data Structure Lab	applications using basic elements like control statements, arrays, functions, pointers and strings, and data structures like stacks, queues and linked lists.
			CO2: Ability to Implement searching and sorting algorithms
8	II/I	PYTHON PROGRAMMING LAB	CO1: Student should be able to understand the basic concepts scripting and the contributions of scripting language
			CO2: Ability to explore python especially the object-oriented concepts, and the built in objects of Python.
			CO3: Ability to create practical and contemporary applications such as TCP/IP network programming, Web applications, discrete event simulation
9	II/I	Gender Sensitization Lab	CO1: To develop students' sensibility with regard to issues of gender in contemporary India.
			CO2: To provide a critical perspective on the socialization of men and women.
			CO3: To introduce students to information about some key biological aspects of genders.
			CO4: To expose the students to debates on the politics and economics of work.
			CO5: To help students reflect critically on gender violence
			CO6: To expose students to more egalitarian interactions between men and women
10	II/II		CO1: Able to understand the concept of abstract machines and their power to recognize the languages
			CO2: Able to employ finite state machines for modeling and solving computing problems
			CO3: Able to design context free grammars for formal languages



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		Formal languages & Automate theory	CO4: Able to distinguish between decidability and undecidability.
			CO5: Able to gain proficiency with mathematical tools and formal methods.

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Humanity & Sciences I & II Sem Course outcomes for the Academic year 2020-2021

S.No	SUBJECT CODE	SUBJECT NAME	Course Outcomes
1	MA101BS	M-I	CO1:Identify the matrix representation of a set of linear equations and to analyze the solution of the system of equations
			CO2:Calculate the Eigen values and Eigen vectors
			CO3:Analyze the nature of sequence and series.
			CO4:Evaluate the improper integrals using Beta and Gamma functions
			CO5:Solve the extreme values of functions of two or three variables with/ without constraints.
2	EN105HS	English	CO1:Identify the importance of Raman Effect with technical vocabulary.
			CO2:Comprehend the importance of ancient architecture in India
			CO3:Develop interest to know the process of making Jeans.
			CO4:Examine the habits of eating in the form of essay writing
			CO5:Critically appreciate the latest technology
3	EN107HS	English	CO1:Develop their confidence while giving introduction, describing a



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		Language and Communication Skills Lab	<p>place and giving directions.</p> <p>CO2:Use various functions of english like asking for and giving information inviting people for events/occations,and requesting people</p> <p>CO3:Narrate the past experiences and events in speaking and writin</p> <p>CO4:Express their views and opinions logically and appropriately in spoken and written format.</p> <p>CO5:Deliver logically organised speches and present them without hesitations.</p>
4	AP202BS	Applied Physics	<p>CO1:The student would be able to learn the fundamental concepts on Quantum behavior of matter in its micro state.</p> <p>CO2:The knowledge of fundamentals of Semiconductor physics, Optoelectronics, Lasers and fibre optics enable the students to apply to various systems like communications, solar cell, photo cells and so on.</p> <p>CO3:Design, characterization and study of properties of material help the students to prepare new materials for various engineering applications.</p> <p>CO4:The course also helps the students to be exposed to the phenomena of electromagnetism and also to have exposure on magnetic materials and dielectric materials.</p>
5	AP205BS	Applied Physics Lab	<p>CO1:Understand the practical knowledge Energy gap of P-N junction diode:Light emitting diode.</p> <p>CO2: Determine the energy gap of a semiconductor diode.</p> <p>CO3:Understand the practical knowledge Solar Cell,Photoelectric effect,Hall effect.</p>


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			CO4:To study the Stewart – Gee's experiment.
			CO5:TO IDENTIFY Laser ,Optical fibre characteristics.
6	PH102BS	Engineering Physics	CO1:understand about Newtonian mechanics in different coordinates
			CO2:understanding conservation of energy and charges in harmonic oscillation
			CO3:application of wave motion in one dimension of longitudinal and transverse nature
			CO4:knowledge of light propagation in different optical devices
			CO5:application of laser and fiber optics in required areas
7	PH105BS	Engineering Physics Lab	CO1::understand the practical knowledge of Melde's experiment, Torsional pendulum: & Coupled Oscillator
			CO2:understand the practical knowledge of Newton's rings, Diffraction grating & Dispersive power
			CO3:understand the practical knowledge of LCR Circuit
			CO4:understand the practical knowledge of LASER, Optical fiber
8	CH102BS	chemistry	CO1:Identify the knowledge of atomic, molecular and electronic changes, band theory related to conductivity.
			CO2:Comprehend the required principles and concepts of electrochemistry, corrosion and in understanding the problem of water and its treatments

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			CO3:Develop the the required skills to get clear concepts on basic spectroscopy and application to medical and other fields.
			CO4:Develop the knowledge of configurational and conformational analysis of molecules and reaction mechanisms..
			CO5:Examine the paracetamol and aspirin.
9	CH106BS	Engineering Chemistry Lab	CO1:Determination of total hardness of water by complexometric method using EDTA?HHH
			CO2:Estimation of an HCl by Conductometric titrations .
			CO3:Verification of freundlich adsorption isotherm-adsorption of acetic acid on charcoal.
			CO4:Develop the Synthesis of Aspirin and Paracetamol.
			CO5:Examination of chloride content of water by Argentometry .
10	EE103ES	Basic Electrical Engineering	CO1:To analyze and solve electrical circuits using network laws and theorems in DC circuits.
			CO2:To analyze and solve electrical circuits using network laws and theorems in AC circuits
			CO3:To understand and analyze basic Electric and Magnetic circuits
			CO4:To study the working principles of Electrical Machines
			CO5:To introduce components of Low Voltage Electrical Installations



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11	EE108ES	Basic Electrical Engineering Lab	CO1: Get an exposure to basic electrical laws.
			CO2: Understand the response of different types of electrical circuits to different excitations.
			CO3: Understand the measurement, calculation and relation between the basic electrical parameters
			CO4: Understand the basic characteristics of transformers and electrical machines.
			CO5: Understand how to measure voltage current, power in AC circuits.
			CO6: Understand the performance characteristics of generators & motors.
			CO7: Understand torque-speed characteristics of motors
12	ME204ES	Engineering Graphics	CO1: understand the basic rules of engineering graphics
			CO2: construction of the conic curves, cycloide curves and scales
			CO3: understand the ortho projection of points, lines & planes
			CO4: understand the ortho projection of solides and section of solides
			CO5: understand the surface development and intersection of solides
			CO6: evaluate the iso to ortho and ortho to iso projectiones

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13	ME203ES	Engineering Mechanics	CO1:Determine resultant of forces acting on a body and analyze equilibrium of a body subjected to a system of forces
			CO2:Study the effect of friction in static and dynamic conditions
			CO3:Find the location of centroid and calculate moment of inertia of a given section.
			CO4:Understand the kinetics and kinematics of a body undergoing rectilinear, curvilinear, rotatory motion and rigid body motion
			CO5:Solve problems using work energy equations for translation, fixed axis rotation and plane motion and solve problems of vibration

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B.Pharmacy I&I Sem Course Outcomes for the Academic Year 2021-2022

B.Pharmacy I&I Sem Course Outcomes for the Academic Year 2021-2022

S.No.	Year/Sem	Course Name	Course Outcomes
1	I/I	Human Anatomy and Physiology- I	CO1: Explain the gross morphology, structure, and functions of various organs of the human body.
			CO2: Describe the various homeostatic mechanisms and their imbalances.
			CO3: Identify the various tissues and organs of different systems of human body
			CO4: Perform the various experiments related to special senses and nervous system:
			CO5: Appreciate coordinated working pattern of different organs of each system
2	I/I	Pharmaceutical Analysis- I	CO1: understand the principles of volumetric and electro chemical analysis
			CO2: carryout various volumetric and electrochemical titrations
			CO3: develop analytical skills
			CO4: To Explain The Concept And Types Of Redox Titrations
			CO5: To Explain The Electrochemical Methods Of Analysis
3	I/I	Pharmaceutics- I	CO1: Know the history of profession of pharmacy.
			CO2: Understand the basics of different dosage forms, pharmaceutical



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			incompatibilities and pharmaceutical calculations
			CO3: Understand the professional way of handling the prescription
			CO4: Preparation of various conventional dosage forms
			CO5: To Explain the total concept of semi solid dosages forms
4	I/I	Pharmaceutical Inorganic Chemistry-I	CO1: know the sources of impurities and methods to determine.
			CO2: impurities in inorganic drugs and pharmaceuticals
			CO3: understand the medicinal and pharmaceutical importance of inorganic compounds
			CO4: To explain the uses and preparations of pharmaceutical in organic compounds
			CO5: to explain the pharmaceutical application of radioactive substances.
5	I/I	COMMUNICATION SKILLS	CO1: Understand the behavioral needs for a Pharmacist to function effectively in the areas of pharmaceutical operation
			CO2: Communicate effectively (Verbal and Non Verbal)
			CO3: Effectively manage the team as a team player
			CO4: Develop interview skills.
			CO5: Develop Leadership qualities and

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			essentials
6	I/I	REMEDIAL BIOLOGY	CO1: know the classification and salient features of five kingdoms of life
			CO2: understand the basic components of anatomy & physiology of plant
			CO3: know understand the basic components of anatomy & physiology animal with special reference to human
			CO4: To explain the Nitrogen metabolism, and Photosynthesis
			CO5: To explain the cell division, tissues, plant growth and development.
7	I/I	Human Anatomy and Physiology-I lab	CO:1 . Study of compound microscope Microscopic study of epithelial and connective tissue , Microscopic study of muscular and nervous tissue
			CO2: 4. Identification of axial bones and appendicular bones . To study the integumentary and special senses using specimen, models, etc
			CO3: To study the nervous system using specimen, models, etc., To study the endocrine system using specimen, models, etc To demonstrate the general neurological examination
			CO:4 To demonstrate the function of olfactory nerve , To examine the different types of taste, To demonstrate the visual acuity
			CO:5 To demonstrate the reflex activity ,Recording of body temperature ,To

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			demonstrate positive and negative feedback mechanism
8	I/I	PHARMACEUTICAL ANALYSIS - I lab	CO:1 Preparation and standardization of Sodium hydroxide and Sulphuric acid
			CO2:Preparation and standardization of Sodium thiosulfate , Potassium permanganate and Ceric ammonium sulphate
			CO3: Assay of the following compounds along with Standardization of Titrant Ammonium chloride by acid base titration and Ferrous sulphate by Cerimetry
			CO:4 Sodium benzoate by non-aqueous titration and Sodium Chloride by precipitation titration
			CO:5 Determination of Normality by electro-analytical methods and Conductometric titration of strong acid against strong base
9	I/I	PHARMACEUTICS - I LAB	Co1:Preparation of Syrups and Elixirs
			CO2: Preparation of Linctus and Solutions
			CO3: Preparation of Suspensions and Emulsions
			CO:4 Preparation of Powders and Granules, Suppositories
			CO:5 Preparation of Semisolids ,Gargles and Mouthwashes
10	I/I	PHARMACEUTICAL INORGANIC CHEMISTRY - LAB	CO:1 Limit test for Chlorides and Sulphates, Modified limit test for Chlorides and Sulphates Limit test for Iron



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			<p>CO2: Limit test for Heavy metals , Lead and Arsenic</p> <p>CO3: Identification tests for Magnesium hydroxide, Ferrous sulphate ,Sodium bicarbonate, Calcium gluconateand Copper sulphate</p>
11			<p>CO:4 Test for purity Swelling power of Bentonite Neutralizing capacity of aluminum hydroxide</p> <p>CO:5 Preparation of inorganic pharmaceuticals Boric acid, Potash alum and Ferrous sulphate</p>
12	I/I	COMMUNICATION SKILLS - LAB	<p>CO:1 To explain Basic communication covering the following topics Meeting People Asking Questions</p> <p>CO2: To explain Pronunciations covering the following topics Pronunciation (Consonant Sounds)</p> <p>CO3: To explain Advanced Learning Listening Comprehension / Direct and Indirect Speech</p> <p>CO:4 To explain Figures of Speech Effective Communication Writing Skills Effective Writing</p> <p>CO:5 To explain Interview Handling Skills E-Mail etiquette Presentation Skills</p>
13	I/I	REMEDIAL BIOLOGY LAB	<p>CO:1 Introduction to experiments in biology</p> <p>CO2: Study of cell and its inclusions</p> <p>CO3: Study of Stem, Root, Leaf and its</p>


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			<p>modifications</p> <p>CO:4 Detailed study of frog by using computer models</p> <p>CO:5 Microscopic study and identification of tissues</p>
14	I/II	Human Anatomy and Physiology- II	<p>CO1: Explain the gross morphology, structure, and functions of various organs of the human body.</p> <p>CO2: Describe the various homeostatic mechanisms and their imbalances.</p> <p>CO3: Identify the various tissues and organs of different systems of human body.</p> <p>CO4: Perform the hematological tests like blood cell counts, hemoglobin estimation, bleeding/clotting time etc and also record blood pressure, heart rate, pulse and respiratory volume.</p> <p>CO5: Appreciate the interlinked mechanisms in the maintenance of normal functioning.(homeostasis) of human body.</p>
15	I/II	PHARMACEUTICAL ORGANIC CHEMISTRY – I	<p>CO1:write the structure, name and the type of isomerism of the organic compound</p> <p>CO2:write the reaction, name the reaction and orientation of reactions</p> <p>CO3:account for reactivity/stability of compounds,</p> <p>CO4:identify/confirm the identification of organic compound</p> <p>CO5: Structure and Uses of Carboxylic</p>


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			acids Aliphatic amines.
16	I/II	BIOCHEMISTRY	CO1: Understand the catalytic role of enzymes, importance of enzyme inhibitors in design of new drugs, therapeutic and diagnostic applications of enzymes.
			CO2: Understand the metabolism of nutrient molecules in physiological and pathological conditions.
			CO3: Understand the genetic organization of mammalian genome and functions of DNA in the synthesis of RNAs and proteins.
			CO4: Introduction, classification, chemical nature and biological role of Bio molecules.
			CO5: Introduction, properties, nomenclature, and IUB classification of enzymes.
10	I/II	PATHOPHYSIOLOGY	CO1: Describe the etiology and pathogenesis of the selected disease states;
			CO2: Name the signs and symptoms of the diseases;
			CO3: Mention the complications of the diseases.
			CO4: Introduction, classification, chemical nature and biological role of Bio molecules
			CO5: Introduction, properties, nomenclature, and IUB classification of enzymes
11	I/II	COMPUTER APPLICATIONS IN PHARMACY	CO1: know the various types of application of computers in pharmacy



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			<p>CO2:know the various types of databases</p> <p>CO3:know the various applications of databases in pharmacy</p> <p>CO4: Introduction, Objective of Bioinformatics.</p> <p>CO5: Computers as data analysis in Preclinical development</p>
I/II	HUMAN ANATOMY AND PHYSIOLOGY – II LAB		<p>CO:1. Introduction to hemocytometry, Enumeration of white blood cell (WBC) count and red blood corpuscles (RBC) count</p> <p>CO2: Determination of bleeding time and clotting time , Estimation of hemoglobin content</p> <p>CO3: . Determination of blood group and erythrocyte sedimentation rate (ESR), Determination of heart rate and pulse rate.</p> <p>CO:4 Recording of blood pressure, Determination of tidal volume and vital capacity, and Study of digestive, respiratory, cardiovascular systems, urinary and reproductive systems with the help of models, charts and specimens.</p> <p>CO:5. Study of family planning devices and pregnancy diagnosis test.. Demonstration of total blood count by cell analyser, Permanent slides of vital organs and gonads</p>
I/II	PHARMACEUTICAL ORGANIC CHEMISTRY - I LAB		<p>CO:1Systematic qualitative analysis of unknown organic compounds like 1. Preliminary test: Color, odour, aliphatic/aromatic compounds, saturation and unsaturation, etc. 2. Detection of elements like Nitrogen, Sulphur and Halogen</p>



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			<p>by Lassaigne's test 3. Solubility test</p> <p>CO2: Functional group test like Phenols, Amides/ Urea, Carbohydrates, Amines, Carboxylic acids, Aldehydes and Ketones, Alcohols, Esters, Aromatic and Halogenated Hydrocarbons, Nitro compounds and Anilides.</p> <p>CO3: Identification of the unknown compound from the literature using melting point/ boiling point, Preparation of the derivatives and confirmation of the unknown compound by melting point/ boiling point.</p> <p>CO:4Preparation of suitable solid derivatives from organic compounds</p> <p>CO:5Construction of molecular models</p>
I/II	BIOCHEMISTRY LAB		<p>CO:1Qualitative analysis of carbohydrates (Glucose, Fructose, Lactose, Maltose, Sucrose and starch)</p> <p>CO2: Identification tests for Proteins (albumin and Casein) , Quantitative analysis of reducing sugars (DNSA method) and Proteins (Biuret method)</p> <p>CO3: Qualitative analysis of urine for abnormal constituents,. Determination of blood creatinine and blood sugar</p> <p>CO:4Determination of serum total cholesterol, Preparation of buffer solution and measurement of pH , Study of enzymatic hydrolysis of starch</p> <p>CO:5Determination of Salivary amylase</p>



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			activity , Study the effect of Temperature on Salivary amylase activity and Study the effect of substrate concentration on salivary amylase activity
	I/II	COMPUTER APPLICATIONS IN PHARMACY LAB	<p>CO:1Design a questionnaire using a word processing package to gather information about a particular disease. 2. Create a HTML web page to show personal information. 3 Retrieve the information of a drug and its adverse effects using online tools</p> <p>CO2: Creating mailing labels Using Label Wizard , generating label in MS WORD 5 Create a database in MS Access to store the patient information with the required fields Using access</p> <p>CO3: Design a form in MS Access to view, add, delete and modify the patient record in the database and Generating report and printing the report from patient database</p> <p>CO:4Creating invoice table using – MS Access , Drug information storage and retrieval using MS Access</p> <p>CO:5. Creating and working with queries in MS Access , Exporting Tables, Queries, Forms and Reports to web pages , Exporting Tables, Queries, Forms and Reports to XML page</p>
12	II/I	PHARMACEUTICAL ORGANIC CHEMISTRY –II	<p>CO1: write the structure, name and the type of isomerism of the organic compound•</p> <p>CO2: write the reaction, name the reaction and orientation of reactions•</p> <p>CO3:account for reactivity/stability of</p>



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			compounds
			CO4 prepare organic compounds
			CO5 :structural activity and stability of Cyclo alkanes
13	II/I	PHYSICAL PHARMACEUTICS - I	CO1 : Understand various physicochemical properties of drug molecules in the designing the dosage form
			CO2 : Know the principles of chemical kinetics & to use them in assigning expiry date for formulation
			CO3 :Demonstrate use of physicochemical properties in evaluation of dosage forms
			CO4 Appreciate physicochemical properties of drug molecules in formulation research and development
			CO5 : applications of pH, buffers and Isotonic solutions
14	II/I	PHARMACEUTICAL MICROBIOLOGY	CO1 : Understand methods of identification, cultivation and preservation of various microorganisms
			CO2 : Importance of sterilization in microbiology. and pharmaceutical industry
			CO3 :Learn sterility testing of pharmaceutical products
			CO4 :Microbiological standardization of Pharmaceuticals
			CO5 :Understand the cell culture technology and its applications in pharmaceutical industries.



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15	II/I	PHARMACEUTICAL ENGINEERING	CO1: To know various unit operations used in Pharmaceutical industries and To understand the material handling techniques
			CO2: To perform various processes involved in pharmaceutical manufacturing process
			CO3: To carry out various test to prevent environmental pollution.
			CO4: To appreciate and comprehend significance of plant lay out design for optimum use of resources.
			CO5: To appreciate the various preventive methods used for corrosion control in Pharmaceutical industries.
	II/I	PHARMACEUTICAL ORGANIC CHEMISTRY - II LAB	CO:1 Experiments involving laboratory techniques Recrystallization
			CO2: Determination of following oil values (including standardization of reagents) Acid value Saponification value Iodine value
			CO3: Preparation of compounds Benzanilide/Phenyl benzoate/Acetanilide from Aniline/ Phenol /Aniline by acylation• reaction. 2,4,6-Tribromo aniline/Para bromo acetanilide from Aniline/ Acetanilide by• halogenation (Bromination) reaction. 5-Nitro salicylic acid/Meta di nitro benzene from Salicylic acid / Nitro benzene by• nitration reaction.
			CO:4 Dibenzal acetone from Benzaldehyde by Claisen Schmidt reaction Cinnamic acid from Benzaldehyde by Perkin reaction• P-Iodo benzoic acid from P-amino benzoic



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			acid•
			CO:5 Benzoic acid from Benzyl chloride by oxidation reaction. Benzoic acid/ Salicylic acid from alkyl benzoate/ alkyl salicylate by hydrolysis• reaction. 1-Phenyl azo-2-naphthol from Aniline by diazotization and coupling reactions. •
			CO:1 Determination the solubility of drug at room temperature at different pH conditions 2. Determination of pKa value by Half Neutralization/ Henderson Hassel Balch equation
			CO2: Determination of Partition co- efficient of benzoic acid in benzene and water , Determination of Partition co- efficient of Iodine in CCl4 and water 5. Determination of % composition of NaCl in a solution using phenol-water system by CST method
			CO3: Determination of particle size, particle size distribution using sieving method and . Determination of particle size, particle size distribution using Microscopic method
			CO:4 Determination of bulk density, true density and porosity , Determine the angle of repose and influence of lubricant on angle of repose
			CO:5 Determination of stability constant and donor acceptor ratio of PABA-Caffeine complex by solubility method and Determination of stability constant and donor acceptor ratio of Cupric-Glycine complex by pH titration method
	II/I	PHYSICAL PHARMACEUTICS – I LAB	

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	II/I	PHARMACEUTICAL MICROBIOLOGY LAB	<p>CO:1 Introduction and study of different equipments and processing, e.g., B.O.D. incubator, laminar flow, aseptic hood, autoclave, hot air sterilizer, deep freezer, refrigerator, microscopes used in experimental microbiology</p> <p>CO2: Sterilization of glassware, preparation and sterilization of media, Sub culturing of bacteria and fungus. Nutrient stabs and slants preparations.</p> <p>CO3: Staining methods- Simple, Grams staining and acid fast staining and Isolation of pure culture of micro-organisms by multiple streak plate technique and other techniques</p> <p>CO:4 Microbiological assay of antibiotics by cup plate method and other methods and Motility determination by Hanging drop method, Sterility testing of pharmaceuticals.</p> <p>CO:5 Bacteriological analysis of water</p>
	II/I	PHARMACEUTICAL ENGINEERING LAB	<p>CO:1 Determination of radiation constant of brass, iron, unpainted and painted glass. 2. Steam distillation – To calculate the efficiency of steam distillation. 3. To determine the overall heat transfer coefficient by heat exchanger.</p> <p>CO2: Determination of moisture content and loss on drying , Determination of humidity of air – i) from wet and dry bulb temperatures –use of Dew point method.</p> <p>CO3: Description of Construction working and application of Pharmaceutical Machinery such as rotary tablet machine,</p>

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			<p>fluidized bed coater, fluid energy mill, de humidifier, Size analysis by sieving – To evaluate size distribution of tablet granulations – Construction of various size frequency curves including arithmetic and logarithmic probability plots.</p> <p>CO:4 Size reduction: To verify the laws of size reduction using ball mill and determining Kicks, Rittinger's, Bond's coefficients, power requirement and critical speed of Ball Mill Demonstration of colloid mill, planetary mixer, fluidized bed dryer, freeze dryer and such other major equipment</p> <p>CO:5 Factors affecting Rate of Filtration and Evaporation (Surface area, Concentration and Thickness/ viscosity . To study the effect of time on the Rate of Crystallization. To calculate the uniformity Index for given sample by using Double Cone Blender</p> <p>CO5: Classification of dispersed systems & their general characteristics Colloidal dispersions</p>
II/II	PHARMACEUTICAL ORGANIC CHEMISTRY – III		<p>CO1: understand the methods of preparation and properties of organic compounds</p> <p>CO2: explain the stereo chemical aspects of organic compounds and stereo chemical reactions</p> <p>CO3: know the medicinal uses and other applications of organic compounds</p>

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			CO4: Synthesis, reactions and medicinal uses of Imidazole, Pyridine compounds.
			CO5: importance and medical uses of organic reagents.
	II/II	MEDICINAL CHEMISTRY – I	CO1: understand the chemistry of drugs with respect to their pharmacological activity
			CO2: understand the drug metabolic pathways, adverse effect and therapeutic value of drugs
			CO3: know the Structural Activity Relationship (SAR) of different class of Drugs
			CO4: write the chemical synthesis of some CO5: To explain the MOA and SAR of central nervous system drugs.
			drugs
	II/II	PHYSICAL PHARMACEUTICS - II	CO1: Understand various physicochemical properties of drug molecules in the designing the dosage form
			CO2: Know the principles of chemical



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			<p>kinetics & to use them in assigning expiry date for Formulation</p> <p>CO3: Demonstrate use of physicochemical properties in evaluation of dosage forms.</p> <p>CO4: Appreciate physicochemical properties of drug molecules in formulation research and Development</p> <p>CO5: Classification of dispersed systems & their general characteristics Colloidal dispersions</p>
19	II/II	PHARMACOLOGY - I	<p>CO1: Understand the pharmacological actions of different categories of drugs</p> <p>CO2: Explain the mechanism of drug action at organ system/sub cellular/ macromolecular levels.</p> <p>CO3: Apply the basic pharmacological knowledge in the prevention and treatment of various diseases.</p> <p>CO4: Observe the effect of drugs on animals by simulated experiments</p> <p>CO5: Appreciate correlation of pharmacology with other bio medical sciences</p>
20	II/II	PHARMACOGNOSY AND PHYTOCHEMISTRY - I	<p>CO1: to know the techniques in the cultivation and production of crude drugs</p>

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			<p>CO2: to know the crude drugs, their uses and chemical nature</p> <p>CO3: know the evaluation techniques for the herbal drugs</p> <p>CO4: to carry out the microscopic and morphological evaluation of crude drugs</p> <p>CO5: Study of biological source, chemical nature and uses of plant products</p>
	II/II	MEDICINAL CHEMISTRY – I LAB	<p>CO:1 Preparation of drugs/ intermediates 1 1,3-pyrazole 2 1,3-oxazole 3 Benzimidazole 4 Benzotriazole</p> <p>CO2: 2,3- diphenyl quinoxaline 6 Benzocaine 7 Phenytoin 8 Phenothiazine 9 Barbiturate</p> <p>CO3: Assay of drugs 1 Chlorpromazine 2 Phenobarbitone 3 Atropine</p> <p>CO:4 Assay of drugs ibuprofen ,Aspirin , Furosemide</p> <p>CO:5 Determination of Partition coefficient for any two drugs</p>
	II/II	PHYSICAL PHARMACEUTICS – II LAB	<p>CO:1 Determination of surface tension of given liquids by drop count and drop weight method 2. Determination of HLB number of a surfactant by saponification method</p> <p>CO2: Determination of Freundlich and Langmuir constants using activated char coal .Determination of critical micellar concentration of surfactants . Determination of viscosity of liquid using Ostwald's viscometer</p> <p>CO3: Determination sedimentation volume with effect of different suspending agent .</p>



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			<p>Determination sedimentation volume with effect of different concentration of single suspending agent</p> <p>CO:4 Determination of viscosity of semisolid by using Brookfield viscometer . Determination of reaction rate constant first order.</p> <p>CO:5 Determination of reaction rate constant second order and Accelerated stability studies</p>
II/II	PHARMACOLOGY – I LAB		<p>CO:1 Introduction to experimental pharmacology. 2. Commonly used instruments in experimental pharmacology. 3. Study of common laboratory animals</p> <p>CO2: Maintenance of laboratory animals as per CPCSEA guidelines. Common laboratory techniques. Blood withdrawal, serum and plasma separation, anesthetics and euthanasia used for animal studies. Study of different routes of drugs administration in mice/rats</p> <p>CO3: Study of effect of hepatic microsomal enzyme inducers on the phenobarbitone sleeping time in mice. Effect of drugs on ciliary motility of frog oesophagus .Effect of drugs on rabbit eye</p> <p>CO:4 Effects of skeletal muscle relaxants using rota-rod apparatus. Effect of drugs on locomotor activity using actophotometer. Anticonvulsant effect of drugs by MES and PTZ method</p> <p>CO:5 . Study of stereotype and anti-catatonic activity of drugs on rats/mice. .</p>



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			Study of anxiolytic activity of drugs using rats/mice. Study of local anesthetics by different methods
	II/II	PHARMACOGNOSY AND PHYTOCHEMISTRY – I LAB	<p>CO:1 Analysis of crude drugs by chemical tests: (i)Tragacanth (ii) Acacia (iii)Agar (iv) Gelatin (v) starch (vi) Honey (vii) Castor oil 2. Determination of stomatal number and index</p> <p>CO2: Determination of vein islet number, vein islet termination and palisade ratio. Determination of size of starch grains, calcium oxalate crystals by eye piece micrometer</p> <p>CO3: Determination of Fiber length and width . Determination of number of starch grains by Lycopodium spore method</p> <p>CO:4 Determination of Ash value . Determination of Extractive values of crude drugs</p> <p>CO:5 Determination of moisture content of crude drugs . Determination of swelling index and foaming</p>
21	III/I	MEDICINAL CHEMISTRY – II	<p>CO1: Understand the chemistry of drugs with respect to their pharmacological activity</p> <p>CO2: Understand the drug metabolic pathways, adverse effect and therapeutic value of drugs</p> <p>CO3: Know the Structural Activity Relationship of different class of drugs</p> <p>CO4: Study the chemical synthesis of</p>



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			selected drugs
			CO5: To study the MOA and SAR of anti diabetic agents and local agents.
22	III/I	INDUSTRIAL PHARMACY - I	CO1: Know the various pharmaceutical dosage forms and their manufacturing techniques.
			CO2: Know various considerations in development of pharmaceutical dosage forms.
			CO3: Formulate solid, liquid and semisolid dosage forms and evaluate them for their quality
			CO4: To study of the Parenteral Products and Ophthalmic Preparations.
			CO5: To study about the Cosmetics and Pharmaceutical Aerosols
23	III/I	PHARMACOLOGY - II	CO1: Understand the mechanism of drug action and its relevance in the treatment of different diseases
			CO2: Demonstrate isolation of different organs/tissues from the laboratory animals by simulated experiments
			CO3: Demonstrate the various receptor actions using isolated tissue preparation•
			CO4: Appreciate correlation of pharmacology with related medical sciences
			CO5: Pharmacology of drugs acting on endocrine system.
24	III/I	PHARMACOGNOSY AND PHYTOCHEMISTRY - II	CO1: To know the modern extraction

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			<p>techniques, characterization and identification of the herbal drugs and phytoconstituents</p> <p>CO2: To understand the preparation and development of herbal formulation</p> <p>CO3: To understand the herbal drug interactions</p> <p>CO4: To carryout isolation and identification of phytoconstituents</p> <p>CO5: Industrial production, estimation and utilization of the phytoconstituents.</p>
25	III/I	COSMETIC SCIENCE	<p>CO1: Upon completion of the course the student shall be able to know the regulations pertaining to cosmetics and cosmetic excipients.</p> <p>CO2: They will be knowing the preparations of various skin care products like creams, antiperspirants, deodorants, hair care products etc</p> <p>CO3: They also know about the role of herbs in sunscreens</p> <p>CO4: explain the Definition of cosmetics as per Indian and EU regulations.</p> <p>CO5:study of Basic understanding of the terms of Comedogenic, dermatitis</p>
26	III/I	ENVIRONMENTAL SCIENCES	<p>CO1: Create the awareness about environmental problems among learners</p> <p>CO2: Impart basic knowledge about the environment and its allied problems.</p>

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			<p>CO3: Develop an attitude of concern for the environment.</p> <p>CO4: Motivate learner to participate in environment protection and environment improvement</p> <p>CO5: Acquire skills to help the concerned individuals in identifying and solving environmental problems.</p>
	III/I	INDUSTRIAL PHARMACY LAB	<p>CO:1 Preformulation study for prepared granules 2. Preparation and evaluation of Paracetamol tablets</p> <p>CO2: Preparation and evaluation of Aspirin tablets , Coating of tablets . Preparation and evaluation of Tetracycline capsules</p> <p>CO3: Preparation of Calcium Gluconate injection and Ascorbic Acid injection</p> <p>CO:4 Preparation of Paracetamol Syrup and Eye drops . Preparation of Pellets by extrusion spheronization technique</p> <p>CO:5 Preparation of Creams (cold / vanishing cream) . Evaluation of Glass containers (As per IP)</p>
	III/I	PHARMACOLOGY - II LAB	<p>CO:1 Introduction to in-vitro pharmacology and physiological salt solutions. Effect of drugs on isolated frog heart. Effect of drugs on blood pressure and heart rate of dog</p> <p>CO2: Study of diuretic activity of drugs using rats/mice. DRC of acetylcholine using frog rectus abdominis muscle. Effect of physostigmine and atropine on DRC of acetylcholine using frog rectus abdominis</p>


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			<p>muscle and rat ileum respectively.</p> <p>CO3: Bioassay of histamine using guinea pig ileum by matching method. Bioassay of oxytocin using rat uterine horn by interpolation method. Bioassay of serotonin using rat fundus strip by three point bioassay.</p> <p>CO:4 Bioassay of acetylcholine using rat ileum/colon by four point bioassay. Determination of PA2 value of prazosin using rat anococcygeus muscle (by Schilds plot method). Determination of PD2 value using guinea pig ileum</p> <p>CO:5 Effect of spasmogens and spasmolytics using rabbit jejunum. Anti-inflammatory activity of drugs using carrageenan induced paw-edema model. Analgesic activity of drug using central and peripheral methods</p>
III/I	PHARMACOGNOSY AND PHYTOCHEMISTRY II LAB		<p>CO:1 (1) Morphology, histology and powder characteristics & extraction & detection of: Cinchona, Cinnamon, Senna, Clove, Ephedra, Fennel and Coriander</p> <p>CO2: Exercise involving isolation & detection of active principles a. Caffeine - from tea dust. b. Diosgenin from Dioscorea c. Atropine from Belladonna d. Sennosides from Senna</p> <p>CO3: Separation of sugars by Paper chromatography (4) TLC of herbal extract</p> <p>CO:4 Distillation of volatile oils and detection of phytoconstituentents by TLC</p> <p>CO:5 Analysis of crude drugs by chemical</p>



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			tests: (i) Asafoetida (ii) Benzoin (iii) Colophony (iv) Aloes (v) Myrrh
27	III/II	MEDICINAL CHEMISTRY – III	CO1: Understand the importance of drug design and different techniques of drug design.
			CO2: Understand the chemistry of drugs with respect to their biological activity.
			CO3: Know the metabolism, adverse effects and therapeutic value of drugs•
			CO4: Know the importance of SAR of drugs.
			CO5:study of drug design and Physicochemical parameters used in quantitative structure activity relationship (QSAR)
28	III/II	PHARMACOLOGY - III	CO1: Understand the mechanism of drug action and its relevance in the treatment of different infectious diseases
			CO2: Comprehend the principles of toxicology and treatment of various poisonings and appreciate correlation of pharmacology with related medical sciences.
			CO3: to study the Chemotherapy of anti viral and anti fungal agents.
			CO4: The study of Chemotherapy and Urinary tract infections and sexually transmitted diseases.
			CO5: Principles of toxicology.
29	III/II	HERBAL DRUG TECHNOLOGY	CO1: understand raw material as source of herbal drugs from cultivation to herbal drug



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			product
			CO2: know the WHO and ICH guidelines for evaluation of herbal drugs
			CO3: know the herbal cosmetics, natural sweeteners, nutraceuticals
			CO4: appreciate patenting of herbal drugs, GMP .
			CO5: Good Manufacturing Practice of Indian systems of medicine.
30	III/II	BIOPHARMACEUTICS AND PHARMACOKINETICS	CO1: Understand the basic concepts in biopharmaceutics and pharmacokinetics.
			CO2: Use plasma data and derive the pharmacokinetic parameters to describe the process of drug absorption, distribution, metabolism and elimination.
			CO3: Critically evaluate biopharmaceutic studies involving drug product equivalency
			CO4: Design and evaluate dosage regimens of the drugs using pharmacokinetic and biopharmaceutic parameters.
			CO5: Detect potential clinical pharmacokinetic problems and apply basic pharmacokinetic principles• to solve them
31	III/II	PHARMACEUTICAL QUALITY ASSURANCE	CO1: Understand the cGMP aspects in a pharmaceutical industry
			CO2: Appreciate the importance of documentation
			CO3: Understand the scope of quality certifications applicable to pharmaceutical

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			industries
			CO4: Understand the responsibilities of QA & QC departments
			CO5: to study about the Calibration and Validation techniques.
	III/II	MEDICINAL CHEMISTRY- III LAB	<p>CO:1 Preparation of drugs and intermediates a. Sulphanilamide b. 7-Hydroxy, 4-methyl coumarin c. Chlorobutanol</p> <p>CO2: Assay of drugs a. Isonicotinic acid hydrazide b. Chloroquine c. Metronidazole</p> <p>CO3: Preparation of medicinally important compounds or intermediates by Microwave irradiation technique</p> <p>CO:4 Drawing structures and reactions using chem draw</p> <p>CO:5 Determination of physicochemical properties such as logP, clogP, MR, Molecular weight, Hydrogen bond donors and acceptors for class of drugs course content using drug design software Drug likeliness screening (Lipinskies RO5)</p>
	III/II	PHARMACOLOGY - III LAB	<p>CO:1 Dose calculation in pharmacological experiments 2. Antiallergic activity by mast cell stabilization assay 3. Study of anti-ulcer activity of a drug using pylorus ligand (SHAY) rat model and NSAIDS induced ulcer model.</p> <p>CO2: Study of effect of drugs on gastrointestinal motility . Effect of agonist and antagonists on guinea pig ileum . Estimation of serum biochemical parameters by using semi- autoanalyser</p>

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			<p>CO3: Effect of saline purgative on frog intestine . Insulin hypoglycemic effect in rabbit . Test for pyrogens (rabbit method)</p> <p>CO:4 Determination of acute oral toxicity (LD50) of a drug from a given data . Determination of acute skin irritation / corrosion of a test substance .Determination of acute eye irritation / corrosion of a test substance</p> <p>CO:5 Calculation of pharmacokinetic parameters from a given data . Biostatistics methods in experimental pharmacology (student's t test, ANOVA) .Biostatistics methods in experimental pharmacology (Chi square test, Wilcoxon Signed Rank test)</p>
III/II	HERBAL DRUG TECHNOLOGY LAB		<p>CO:1 To perform preliminary phytochemical screening of crude drugs. 2. Evaluation of excipients of natural origin</p> <p>CO2: Incorporation of prepared and standardized extract in cosmetics formulations like creams, lotions, Shampoos and their evaluation.</p> <p>CO3: Incorporation of prepared and standardized extract in cosmetics formulations like Syrups, Mixtures and tablets and their evaluations as per pharmacopoeial requirements</p> <p>CO:4 Monograph analysis of herbal drugs from recent Pharmacopoeias . Determination of Aldehyde content</p> <p>CO:5 Determination of phenolic content . Determination of total alkaloids</p>


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32	IV/I	INSTRUMENTAL METHODS OF ANALYSIS	CO1: Understand the interaction of matter with electromagnetic radiations and its applications in drug analysis
			CO2: Understand the chromatographic separation and analysis of drugs.
			CO3: Perform quantitative & qualitative analysis of drugs using various analytical instruments
			CO4: to study about the Gas chromatography and High performance liquid chromatography (HPLC).
			CO5: To study about the Ion exchange chromatography Gel chromatography.
33	IV/I	INDUSTRIAL PHARMACY - II	CO1: Know the process of pilot plant and scale up of pharmaceutical dosage forms
			CO2: Understand the process of technology transfer from lab scale to commercial batch
			CO3: Know different laws and acts that regulate pharmaceutical industry in India and US
			CO4: Understand the approval process and regulatory requirements for drug products
			CO5: To study about the Indian Regulatory Requirements.
34	IV/I	PHARMACY PRACTICE	CO1: Know various drug distribution methods in a hospital
			CO2: Appreciate the pharmacy stores management and inventory control
			CO3: Monitor drug therapy of patient


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			through medication chart review and clinical review
			CO4: Know pharmaceutical care services
			CO5: do patient counseling in community pharmacy
35	IV/I	NOVEL DRUG DELIVERY SYSTEMS	CO1: To understand various approaches for development of novel drug delivery systems.
			CO2: To understand the criteria for selection of drugs and polymers for the development of Novel drug delivery systems, their formulation and evaluation
			CO3: To study about the Transdermal Drug Delivery Systems and Gastroretentive drug delivery systems.
			CO4: study about the Nanotechnology and its Concepts.
			CO5: To study about the Ocular Drug Delivery Systems Intrauterine Drug Delivery Systems
36	IV/I	PHARMACOVIGILANCE	CO1: History and development of pharmacovigilance
			CO2: National and international scenario of pharmacovigilance
			CO3: International standards for classification of diseases and drugs
			CO4: Data during pre-clinical, clinical and post approval.

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			CO5: Adverse drug reaction reporting systems and communication in pharmacovigilance
37	IV/II	BIOSTATISTICS AND RESEARCH METHODOLOGY	CO1: Know the operation of M.S. Excel, SPSS, R and MINITAB®, DoE (Design of Experiment)
			CO2: Know the various statistical techniques to solve statistical problems
			CO3: Appreciate statistical techniques in solving the problems.
			CO4: To about the Online Statistical Software's to Industrial and Clinical trial approach.
			CO5: To about the Factorial Design and Response Surface methodology
38	IV/II	SOCIAL AND PREVENTIVE PHARMACY	CO1: Acquire high consciousness/realization of current issues related to health and pharmaceutical problems within the country and worldwide.
			CO2: Have a critical way of thinking based on current healthcare development.
			CO3: Evaluate alternative ways of solving problems related to health and pharmaceutical issues
			CO4: To study about the National health intervention programme.
			CO5: To study about the Community services in rural, urban and school health.
39	IV/II	PHARMACEUTICAL JURISPRUDENCE	CO1: The Pharmaceutical legislations and their implications in the development and



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			marketing
			CO2: Various Indian pharmaceutical Acts and Laws
			CO3: The regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals
			CO4: The code of ethics during the pharmaceutical practice
			CO5: To study about the Pharmaceutical Legislations.
40	IV/II	NANO TECHNOLOGY	CO1: The students should be able to select the right kind of materials, able to develop nano formulations with appropriate technologies, evaluate the product related test and for identified diseases
			CO2: To study about the Synthesis of Nanomaterials.
			CO3: To study about the Biomedical applications of Nanotechnology.
			CO4: To study about the Design of nanomaterials for drug delivery.
			CO5: To study about the Characterization, drug release and stability studies of nanomaterials.
41	IV/II	INSTRUMENTAL METHODS OF ANALYSIS LAB	CO1: determination of absorption maxima and effect of solvents on absorption maxima of organic compounds
			CO2: Estimation of dextrose and sulfanilamide by colorimetry
			CO3: TO explain the assay of paracetamol



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			by UV spectrophotometry
			CO4:To determine the sodium and potassium by flame photometry
			CO5:To explain the demonstration of HPLC and Gas chromatography
42	IV/II	PRACTICE SCHOOL	CO1; To explain about the practice school is an educational innovation seeking to link industry experience with university insruction
			CO2:To explain the departments of pharmaceutical industry
			CO3:To study about the definition,classification and functions of the hospital
			CO4:To explain the definition and functions of hospital pharmacy
			CO5;TO explain the pharmacognstic study of medicinal plants

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M.Pharmacy I&I Sem Course Outcomes for the Academic Year 2021-2022

M .Pharmacy I&I Sem Course Outcomes for the Academic Year 2021-2022			
S.No.	Year/Sem	Course Name	Course Outcomes
1	I/I	MODERN PHARMACEUTICS -1	CO1: To study about the preformulation parameters
			CO2 .To explain about formulation and development ,use of excipients in tablets and powders
			CO3:To explain about formulation and development ,use of excipients in micro encapsules and coating techniques
			CO4: To explain about formulation development of soft and hard gelatin capsules
			CO5: To study about the statistical design in different formulations
2	I/I	APPLIED BIOPHARMACEUTICS AND PHARMACOKINETICS	CO1;To study about the factors affecting bioavailability and stability of the dosage form
			CO2: To study about the pharmacokinetics and drug disposition
			CO3: to explain the total study of absorption parameter
			CO4:TO study about the experimental study of absorption
			CO5: To explain the time dependent pharmacokinetics
3	I/I	Drug regulatory affairs	CO1: Know the history of profession of pharmacy.
			CO2: Understand the basics of different dosage forms, pharmaceutical incompatibilities and pharmaceutical calculations



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			<p>CO3: Understand the professional way of handling the prescription</p> <p>CO4: Preparation of various conventional dosage forms</p> <p>CO5: To Explain the total concept of semi solid dosages forms</p>
4	I/I	Cosmetics and cosmeceuticals	<p>CO1: know the sources of impurities and methods to determine.</p> <p>CO2: impurities in inorganic drugs and pharmaceuticals</p> <p>CO3: understand the medicinal and pharmaceutical importance of inorganic compounds</p> <p>CO4: To explain the uses and preparations of pharmaceutical in organic compounds</p> <p>CO5: to explain the pharmaceutical application of radioactive substances.</p>
5	I/I	Research methodology and IPR	<p>CO1: Understand research problem formulation.</p> <p>CO2: Analyze research related information</p> <p>CO3: Follow research ethics</p> <p>CO4: Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity.</p> <p>CO5: Understanding that when IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular</p>
6	I/I	MODERN PHARMACEUTICS – I LAB	<p>CO1: To carry out the preformulation studies of</p>



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			<p>solid dosage forms</p> <p>CO2: To study the effect of compressional force on tablet disintegration time</p> <p>CO3: To study the micromeritic properties of powders and granules</p> <p>CO4: To study the effect of particle size on dissolution of tablets</p> <p>CO5: To study the effect of binders on dissolution of tablets</p>
7	I/I	APPLIED BIOPHARMACEUTICS AND PHARMACOKINETICS –LAB	<p>CO1: Analysis of dissolution by various data-kinetic modelling. 2. Calibration curve of different API's by UV/HPLC/HPTLC</p> <p>CO2: Dissolution of immediate release, sustained release and delayed release. 4. Evaluation of drug-protein binding analysis</p> <p>CO3: Assignment of numerical problems, one compartment and two compartment disposition, method of residuals, AUC and evaluation of pharmacokinetic parameters</p> <p>CO4: Calculation of Ka(absorption rate constant) absorption curve- Wagner nelson method , Loo-Riegel method</p> <p>CO5: Construction of IVIVC from the data 9. Calculation of Urinary Pharmacokinetics</p>
8	I/I1	MODERN PHARMACEUTICS -II	<p>CO1: Pilot plant scale-up techniques used in pharmaceutical manufacturing</p> <p>CO2: Formulation development of parenteral dosage form</p> <p>CO3: Pharmaceutical Aerosols</p>


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			<p>CO4: Formulation approaches, preparation & method of manufacturing labelling & Q.C. of anti-ageing products, sun screen lotion and fairness creams</p> <p>CO5: Aseptic processing operation</p>
9	I/II	ADVANCED DRUG DELIVERY SYSTEMS	<p>CO1: Fundamentals of controlled drug delivery systems, pharmacokinetic and pharmacodynamic basis of controlled drug delivery</p> <p>CO2: Design, fabrication, evaluation and applications of the following a. Implantable Therapeutic systems b. Transdermal delivery systems</p> <p>CO3: Biochemical and molecular biology approaches for drug delivery using following technologies a. Bioadhesive drug delivery systems b. Nasal drug delivery systems</p> <p>CO4: Biochemical and molecular biology approaches to control drug delivery of a. Liposomes b. Niosomes c. Microspheres</p> <p>CO5: Drug targeting to particular organs a. Delivery to lungs b. Delivery to the brain and problems involved</p>
10	I/II	INDUSTRIAL PHARMACY	<p>CO1: A detailed study involving machinery and theory of Pharmaceutical unit operations like milling, mixing, filtration, granulation, drying and blending</p> <p>CO2: Study of the principles, production techniques in the large scale production of tablets, capsules, suspensions, liquid pharmaceuticals, ophthalmic products and sterile products.</p> <p>CO3: Production organization, objectives and</p>



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			<p>policies of good manufacturing practices, layout of buildings, services, equipments and their maintenance</p> <p>CO4: Effluent Testing and Treatment: Effluent analysis, specifications and preventive measures water of pollution, solid pollution, air pollution and sound pollution</p> <p>CO5: Regulatory basis, validation process for solid dosage forms, sterile products, and liquid dosage forms.</p>
12	I/I1	NUTRACEUTICALS	<p>CO1: Definitions of Functional foods, Nutraceuticals and Dietary supplements. Classification of Nutraceuticals</p> <p>CO2: Phytochemicals as nutraceuticals: Occurrence and characteristic features</p> <p>CO3: Free radicals, reactive oxygen species, production of free radicals in cells, damaging reactions of free radicals on lipids, proteins, Carbohydrates, nucleic acids</p> <p>CO4: Endogenous antioxidants – enzymatic and nonenzymatic antioxidant defence, Superoxide dismutase, catalase, Glutathione peroxidase, Glutathione Vitamin C, Vitamin E, αLipoic acid, melatonin</p> <p>CO5: Food Laws and Regulations; FDA, FPO, MPO, AGMARK. HACCP and GMPs on Food Safety. Adulteration of foods</p>
13	I/I1	MODERN PHARMACEUTICS -II LAB	<p>CO1: Scale up calculations from R&D to pilot plant for the following unit operations</p> <p>CO2: Preparation of Injectables, Ampoules & Vials</p> <p>CO3: Preparation of Ophthalmic products, Eye</p>



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			drops and Eye ointments
			CO4: Preparation of Dry powder Inhalations
			CO5: Formulation Development and Demonstration of function of DPI of marketed products
14	I/II	ADVANCED DRUG DELIVERY SYSTEM LAB	CO1: Study on diffusion of drugs through various polymeric membranes
			CO2: Formulation and Evaluation of sustained release Oral Matrix Tablet
			CO3: Formulation and Evaluation of sustained release Oral Reservoir System (
			CO4: Formulation and Evaluation of Microspheres / Microencapsules
			CO5: Study of in-vitro Dissolution of various SR products in market
15	II/1	SCALE UP AND TECHNOLOGY TRANSFER	CO1: Manage the scale up process in pharmaceutical industry
			CO2: Assist in technology transfer
			CO3: To establish safety guidelines, which prevent industrial hazards
			CO4: Importance, IQ, OQ, PQ for equipments
			CO5: Control of environmental pollution.
16	III	COSMETIC SCIENCE	CO1; To study about the classification of cosmetics and cosmeceutical products

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			CO2:Principles of formulation and building blocks of skin care and hair care products
			CO3:to study about the role of herbs in cosmetics and analytical cosmetics
			CO4:To study about the principle of cosmetic evaluation
			CO5:To study about the cosmetic problems associated with hair and skin


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