ACADEMIC REGULATIONS, PROGRAM STRUCTURE AND SYLLABUS

ELECTRICAL AND ELECTRONICS ENGINEERING

For

B.TECH. FOUR YEARS DEGREE PROGRAM

(Applicable to the batches admitted from 2020-21)

(I & II Semesters)

ADITYA ENGINEERING COLLEGE

An Autonomous Institution

Approved by AICTE, Affiliated to JNTUK & Accredited by NBA, NAAC with 'A' Grade

Recognized by UGC under the sections 2(f) and 12(B) of UGC act 1956

Aditya Nagar, ADB Road, SURAMPALEM - 533 437

ABOUT ADITYA ENGINEERING COLLEGE

ADITYA ENGINEERING COLLEGE (AEC) was established in 2001 at Surampalem, Kakinada, Andhra Pradesh in 180 Acres of pollution free and lush green landscaped surroundings by the visionaries of Aditya Academy who have been in the field of education since last 3 ½ decades, extending their relentless and glorious services.

AEC believes in the holistic development of society at large and is striving hard by putting its efforts in multi-disciplinary activities. The College shoulders the responsibility of shaping the Intellect, Character and Physique of every student, because it believes that these are rudimentary aspects for students to develop a humanized and harmonious society, and become meaningful architects of the nation as a whole.

Our vision is to impart quality education, in a congenial atmosphere, as comprehensive as possible, with the support of all the modern technologies and produce graduates and post graduates in engineering with the ability and passion to work wisely, creatively, and effectively for the welfare of the society. It is our endeavor to develop a system of Education which can harness students' capabilities, potentialities and the muscles of the mind thoroughly trained to enable it to manifest great feats of intellectualism.

AEC has International standards and aims to be a centre of excellence to produce principal architects of the future. AEC is in the field of education for enriching the knowledge of budding youth with innovative calibre and to equip them with competitive skills fit for job, fit for life.

SALIENT FEATURES:

- Autonomous status by UGC, Accredited by NBA & NAAC with A Grade.
- Rated as "SILVER" by AICTE for best industry linked institution under CII.
- Recognized by UGC under sections 2(f) &12(B).
- Recognized by JNTUK, Affiliating University as "Research Center".
- Rated Grade "A" by Govt. of AP.
- Students from 17 states across India & 15 foreign countries, 500+ International students.
- 36 Ph. Ds,50+Research Scholars,25Patents&600+ National/International Research Publications.
- An ISO 9001-2015 certified institution.
- Recognized by Scientific and Industrial Research Organizations (SIROs) Govt. of India.

- Incubation Centre Campus & only campus in the state to receive financial Assistance from Govt. of India.
- Infosys Campus Connect Institution.
- NASCOM certification training program Campus.
- Collaboration with Co-cubes and AMCAT for Scientific Assessment.
- Nodal Center for Indian School of Business & AP Information Tech. Academy (APITA).
- Honoured with Best Placement Award by Chief Minister of AP.
- Only college in AP to receive Best Performance Award from Tech Mahindra for its outstanding achievement in campus placements.
- Special CRT Training from first year with 30experienced faculty.
- Received 13 Pratibha Awards from Govt. of AP at District Level.
- Got 1st prize in AICTE CHHATRA VISWAKARMA student research awards at all India level in Water and Irrigation Category and received award from Hon'ble Vice-President of India.
- MOU with Educational Consultants India Ltd., (EdCIL) and MOUs with 5 foreign universities.
- MOU with CL Educate to increase the research activities in students.
- In campus hostels for Boys and Girls with good infrastructure facilities.
- Transportation facility with 80+ buses.
- Best Rankings & Ratings
  - Careers360-AAA.
  - Times Engineers-13th Rank in AP.
  - India Today-14th Rank in AP & 132nd Rank at All India Level.
  - THE WEEK-89th Rank in South Zone & 13th Rank in AP.
  - Digital Learning- AAAA.
  - The Academic Insights-35th Rank in top 50 Colleges in India.
  - Silicon India-17th rank in top 100 colleges in India and 4th Rank in South Zone.
  - The Sunday Indian-One of the best 20 Engineering Colleges in India.
  - 4Ps-13 rank in India out of top 25 Engineering Colleges.
  - WCRC Leaders-Asia Top 100 colleges.
  - Higher Education Review-India's 34 rank.
- Established Applied Robo Controlled Lab (ARC) Siemens Centre of Excellence Campus, in association with APSSDC, Indo European Skilling Centers for Mechatronics and Industrial Robotics.
- Established 7 excellent engineering labs by incurring Rs. 12 crores for improving skill based training in the students funded by SIEMENS. The only campus to receive such huge amount from SIEMENS through APSSDC in the district.
- Recognized as CM Centre of Excellence Campus. APSSDC with the collaboration of Dassault Systems have established 4 prestigious labs under this program.
- Recognized as PMKVY-TI Centre by AICTE.
- Fellowship program with Stanford University, California, USA
- India's first Microsoft Ed-vantage Platinum Campus, Microsoft Innovation Centre campus.

- Recognized by Computer Society of India (CSI) as Best Accredited Student Branch
- NPTEL Best Local Chapter Award with AA Grade and stood 39th position in India and 7th position in AP
- MOUs with CISCO Networking Academy, SAP, ORACLE Academy, Dell EMC, Red Hat Academy, VMWare IT Academy, Hacker Rank, Comp Tia, SAK Robotix Lab, ARM University, GIT Hub, Ui Path and more under Aditya's Technical HUB (T-HUB)
- Campus with Student Start-ups & these Start-ups received appreciation from Chief Minister of AP.
- Received Gold medal from Governor of AP (through Red Cross) for conducting Blood Donation camps every year & highest No. of students donated blood in a single phase (2541 Students) in 2017-18
- Strong Network of ALUMNI
- 100% Wi-fi Campus, 100% Surveillance Campus under CC cameras and in campus Bank with 8 ATMs.

VISION & MISSION OF THE COLLEGE

VISION

To induce higher planes of learning by imparting technical education with International standards, Applied research, Creative ability and Value based instruction to emerge as a premier institute.

MISSION

Achieving academic excellence by providing globally acceptable technical education by forecasting technology through

- Innovative research & development
- Industry institute interaction
- Empowered manpower

VISION & MISSION OF THE DEPARTMENT

VISION

To excel in education, research and technological services in Electrical and Electronics engineering in tune with societal needs.

MISSION

M1: By imparting quality education to produce globally competent electrical and electronics engineers capable of extending technological services.

M2: By engaging cutting edge at research & development in sustainable technologies, by collaborating with industries.

M3: By nurturing scientific temperament, professional ethics among the students.

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PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

Graduates of the Program will

PEO 1	Specialize in specific areas of interest and work successfully in their chosen career.
PEO 2	Design and develop innovative products and services in the field of electrical and electronics engineering.
PEO 3	Work effectively as individuals and as team members in multidisciplinary projects.
PEO 4	Engage in lifelong learning, career enhancement and adopt to changing professional and societal needs.

PROGRAM OUTCOMES (POs)

After successful completion of the program, the graduates will be able to

PO 1	Apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.
PO 2	Identify, formulate, research literature and analyze complex engineering problems, reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
PO 3	Design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.
PO 4	Conduct investigations of complex problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.
PO 5	Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex engineering activities, with an understanding of the limitations.
PO 6	Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice.
PO 7	Understand the impact of professional engineering solutions in societal and environmental contexts and demonstrate knowledge of, and need for sustainable development.
PO 8	Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.
PO 9	Function effectively as an individual, and as a member or leader in diverse teams and in multidisciplinary settings.
PO 10	Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to

	comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	Demonstrate knowledge and understanding of engineering management principles and apply these to one's own work, as a member and leader in a team and to manage projects in multidisciplinary environments.
PO 12	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs)

After successful completion of the program, the graduates will be able to

PSO 1	Design and develop controllers for electrical and electronic systems to improve their transient and steady state.
PSO 2	Specify, design and analyze systems that efficiently generate, transmit and distribute electrical power, by considering environmental aspects.
PSO 3	Apply appropriate simulation tools like MATLAB and P-Spice for modeling and evaluation of electrical systems.

Mission of the department – PEOs mapping

PEOs Statements	M1	M2	M3
PEO 1: Specialize in specific areas of interest and work successfully in their chosen career.	3	2	2
PEO 2: Design and develop innovative products and services in the field of electrical and electronics engineering.	3	1	3
PEO 3: Work effectively as individuals and as team members in multidisciplinary projects.	2	1	2
PEO 4: Engage in lifelong learning, career enhancement and adopt to changing professional and societal needs.	2	3	2

Note:.

Bloom's Taxonomy Knowledge Level	Knowledge Level Representation
Remember	K1
Understand	K2
Apply	K3
Analyse	K4
Evaluate	K5
Create	K6

Mapping / Correlation levels
1: Slight (Low)
2: Moderate (Medium)
3: Substantial (High)

PROGRAM STRUCTURE

I SEMESTER

Course Code	Course Title	Course Component	Course Type	Total Number of contact hours				Credits (C)
				Lecture (L)	Tutorial (T)	Practical (P)	Total Hours	
201HS1T01	Communicative English	HSC	Theory	3	0	0	3	3
201BS1T01	Differential equations and Linear algebra	BSC	Theory	3	0	0	3	3
201BS1T03	Applied Physics	BSC	Theory	3	0	0	3	3
201ES1T02	Programming for Problem Solving using C	ESC	Theory	3	0	0	3	3
201ES1I01	Engineering Graphics and Design	ESC	Integrated	2	0	2	4	3
201HS1L01	Communicative English Lab	HSC	Lab	0	0	3	3	1.5
201BS1L02	Applied Physics Lab	BSC	Lab	0	0	3	3	1.5
201ES1L02	Programming for Problem Solving using C Lab	ESC	Lab	0	0	3	3	1.5
201MC1T01	Environmental Science	MC	Theory	2	0	0	2	0
			TOTAL	**16**	**0**	**11**	**27**	**19.5**

II SEMESTER

Course Code	Course Title	Course Component	Course Type	Total Number of contact hours				Credits (C)
				Lecture (L)	Tutorial (T)	Practical (P)	Total Hours	
201BS2T05	Partial Differential Equations and Vector Calculus	BSC	Theory	3	0	0	3	3
201BS2T06	Transform Techniques	BSC	Theory	3	0	0	3	3
201ES2T07	Data Structures through C	ESC	Theory	3	0	0	3	3
201ES2T09	Basic Electrical Circuits	ESC	Theory	3	0	0	3	3
201ES2T13	Basic Civil and Mechanical Engineering	ESC	Theory	3	0	0	3	3
201ES2L06	Data Structures through C Lab	ESC	Lab	0	0	3	3	1.5
201ES2L09	Electrical Engineering Workshop	ESC	Lab	0	0	3	3	1.5
201ES2L11	Basic Civil and Mechanical Engineering Lab	ESC	Lab	0	0	3	3	1.5
201MC2L01	Professional Communications Skills Lab	MC	Lab	0	0	3	3	0
201MC2T02	Constitution of India	MC	Theory	2	0	0	2	0
			TOTAL	**17**	**0**	**12**	**29**	**19.5**

BSC: Basic Sciences Courses; HSMC: Humanities and Social Sciences including Management Courses; ESC: Engineering Sciences Courses; PCC: Professional Core Courses; PEC: Professional Elective Courses; OEC: Open Elective Courses; MC: Mandatory Courses; PROJ: Project.

COMMUNICATIVE ENGLISH
(Common to all branches)

I Semester	**L**	**T**	**P**	**C**
Course Code: 201HS1T01	**3**	**0**	**0**	**3**

Introduction:

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training the students to acquire communicative competence, the syllabus has been designed to develop linguistic and communicative competence of the student's of Engineering.

As far as the detailed textbooks are concerned, the focus should be on the skills of listening, speaking, reading and writing. The non-detailed textbooks are meant for extensive reading for pleasure and profit.

Thus the stress in the syllabus is primarily on the development of communicative skills and fostering of ideas.

Course Objectives:

COB 1: To improve the language proficiency of the students in English with emphasis on LSRW skills.
COB 2: To enable the students to study and comprehend the prescribed lessons and subjects more effectively relating to their theoretical and practical components.
COB 3: To develop the communication skills of the students in both formal and informal situations.
COB 4: To develop the ways to overcome fear and use of words for irony.
COB 5: To make the learners understand the development conditions and the core Competences of the state to prioritize education system.
COB 6: To discuss that water is the world's most precious natural resources.
COB 7: To discuss how human sensitivity changes in accordance to times and situations in life.
COB 8: To inform the learner that all men can come together to abolish the war.

LISTENING SKILLS:
Objectives:

1. To enable the students to appreciate the role of listening skill and improve their pronunciation.
2. To enable the students to comprehend the speech of people belonging to different backgrounds and regions.
3. To enable the students to listen for general content, to fill up information and for specific information.

SPEAKING SKILLS:
Objectives:

1. To make the students aware of the importance of speaking for their personal and professional communication.

2. To enable the students to express themselves fluently and accurately in social and professional success.
3. To help the students describe objects, situations, and people.
4. To make the students participate in group activities like role-plays, discussions and debates.
5. To make the students participate in just a minute talk.

READING SKILLS:

Objectives:

1. To enable the students to comprehend a text through silent reading.
2. To enable the students to guess the meanings of words, messages and inferences of texts in given contexts.
3. To enable the students to skim and scan a text.
4. To enable the students to identify the topic sentence.
5. To enable the students to identify discourse features.
6. To enable the students to make intensive and extensive reading.

WRITING SKILLS:

Objectives:

1. To make the students understand that writing is an exact formal skill.
2. To enable the students to write sentences, paragraphs, e-mails and essays.
3. To make the students identify and use appropriate vocabulary.
4. To enable the students to narrate and describe.
5. To enable the students to write coherently and cohesively.

Course Outcomes:

At the end of the Course, Student will be able to:

CO 1: Identify the ways to overcome fear and use of words for irony.
CO 2: Interpret the development conditions and the core competences of the state to prioritize education system.
CO 3: Explain water as the world's most precious natural resources.
CO 4: Illustrate human sensitivity to the changing times and situations in life.
CO 5: Identify that all men can come together to abolish the war.
CO 6: Rephrase coherent writing in social, political and religious background.
CO 7: Demonstrate writing and concepts of grammar skills.

Mapping of course outcomes with program outcomes:

CO/PO	PO1 (K3)	PO2 (K4)	PO3 (K5)	PO4 (K5)	PO5 (K3)	PO6 (K3)	PO7 (K2)	PO8 (K3)	PO9 (K2)	PO 10 (K2)	PO11 (K3)	PO12 (K1)
CO1 (K3)	-	-	-	-	-	-	-	-	-	2	-	-
CO2 (K2)	-	-	-	-	-	-	-	-	-	3	-	-
CO3 (K2)	-	-	-	-	-	-	-	-	-	3	-	-
CO4 (K2)	-	-	-	-	-	-	-	-	-	3	-	-
CO5 (K3)	-	-	-	-	-	-	-	-	-	2	-	-
CO6 (K2)	-	-	-	-	-	-	-	-	-	3	-	-
CO7 (K2)	-	-	-	-	-	-	-	-	-	3	-	-

Mapping of course outcomes with program Specific Outcomes:

CO / PSO	PSO 1(K4)	PSO 2(K4)	PSO 3(K6)	PSO 4(K3)
CO1 (K3)	-		-	-
CO2 (K2)	-		-	2
CO3 (K2)	-		-	-
CO4 (K2)	-		-	2
CO5 (K3)	-		-	-
CO6 (K2)	-		-	-
CO7 (K2)	-		-	-

Methodology:

1. The class is to be learner-centered where the learners are to read the texts to get a comprehensive idea of those texts on their own with the help of the peer group and the teacher.
2. Integrated skill development methodology must be adopted with focus on individual language skills as per the tasks/exercise.
3. The tasks/exercises at the end of each unit should be completed by the learners only and the teacher intervention is permitted as per the complexity of the task/exercise.
4. The teacher is expected to use supplementary material wherever necessary and also generate activities/tasks as per the requirement.
5. The teacher is permitted to use lecture method when a completely new Concept is introduced in the class.

Recommended Topics:

UNIT-I:

1. An Astrologers's Day - R.K.Narayan (Detailed)
2. Bade Bhai Saab – Munshi Premchand (Non-Detail)

UNIT-II:

1. Building A New State - A. P. J.Abdul Kalam
2. Morning Bells- Jayashree Mohan Raj (Non-Detail)

UNIT-III:

1. Water: The Elixir Of Life- C. V. Raman (Detailed)
2. The Power Of Plate Of Rice- Ifeoma Okoye (Non-Detail)

UNIT-IV:

1. The Woodrose-Abburi Chaya Devi (Detailed)
2. The Cop And The Anthem- O.Henry (Non-Detail)

UNIT-V:

1. Progress- St. John Ervine (Detailed)
2. Dial 000- Barry Rosenberg (Non-Detail)

Text Books:

Detailed Text Book: 'Using English' by Orient Black Swan.
Non Detailed Text Book: 'Life, language and Culture -Explorations' by Cengage.

Reference Books:

1. Objective English, Pearson Publications.
2. Effective English Communication, Tata Mc Graw-Hill Publishing.
3. Effective Technical English, Scitech.

Web Links:

1. http://sittingbee.com/an-astrologers-day-r-k-narayan/
2. http://bbrenglishforall.blogspot.com/2014/01/building-new-state-study-material.html
3. https://www.literatureworms.com/2012/10/water-elixir-of-life-by-sircvraman.html
4. http://macon.hol.es/woodrose-abburi-chaya-devi.pdf
5. https://ardhendude.blogspot.com/2013/07/analysis-of-progress-by-st-john-ervine.html

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DIFFERENTIAL EQUATIONS AND LINEAR ALGEBRA

(Common to all branches)

I Semester	**L**	**T**	**P**	**C**
Course Code: 201BS1T01	**3**	**0**	**0**	**3**

Course Objectives:

COB 1: To equip the students with the necessary mathematical skills and techniques that are essential for an engineering course.

COB 2: To help the student form a necessary base to develop analytical and design skills.

Course Outcomes:

At the end of the Course, Student will be able to:

CO 1: Apply the concepts of Mean Value theorem, Partial Differentiation and identify the maxima and minima of a given function.

CO 2: Solve the linear differential equations and model various situations involving differential equations of first order.

CO 3: Solve linear differential equations of higher order and model various situations involving second order differential equations.

CO 4: Calculate Rank of a matrix and solve the system of Linear equations and find the Eigen values and Eigen vectors.

CO 5: Compute various powers of a matrix and identify the nature of the quadratic form.

Mapping of course outcomes with program outcomes:

CO / PO	PO 1 (K3)	PO 2 (K4)	PO 3 (K5)	PO 4 (K5)	PO 5 (K3)	PO 6 (K3)	PO 7 (K2)	PO 8 (K3)	PO 9 (K2)	PO 10 (K2)	PO11 (K3)	PO12 (K1)
CO 1 (K3)	3	2	-	-	-	-	-	-	-	-	-	-
CO 2 (K3)	3	2	-	-	-	-	-	-	-	-	-	-
CO 3 (K3)	3	2	-	-	-	-	-	-	-	-	-	-
CO 4 (K3)	3	2	-	-	-	-	-	-	-	-	-	-
CO 5 (K3)	3	2	-	-	-	-	-	-	-	-	-	-

Mapping of course outcomes with program Specific Outcomes:

CO / PSO	PSO 1 (K3)	PSO 2 (K3)	PSO 3 (K4)
CO 1 (K3)	-	-	-
CO 2 (K3)	-	-	-
CO 3 (K3)	-	-	-
CO 4 (K3)	-	-	-
CO 5 (K3)	-	-	-

UNIT-I:

Differential Calculus:

Rolle's theorem, Lagrange's theorem, Cauchy Mean Value theorem, Taylor's and Maclaurin's theorems (All theorems Without Proof).

Partial Differentiation: Euler's theorem (without proof), Total derivative, Chain rule, Taylor's and Maclaurin's series expansion of functions of two variables, Jacobian, Functional dependence.

Applications:

Maxima and Minima of functions of several variables without constraints and with constraints (Lagrange's method).

** (MATLAB Exercise: Plot graphs of various single and multivariable functions).

UNIT-II:

Differential Equations of First Order:

Introduction to differential equations, linear differential equation of first order - Bernoulli differential equation - Exact differential equations- Equations reducible to exact,

Applications:

Orthogonal trajectories, Newton's Law of cooling, RL circuit.

UNIT-III:

Linear Differential Equations of Second And Higher Order:

Linear differential equations of higher order with constant coefficients, Complementary function and Particular integral with RHS term of the type polynomials in x, e^{ax}, sin ax,

cos ax, e^{ax} V(x), xV(x)- Method of Variation of parameters, Equations reducible to constant coefficients –Cauchy-Euler equation, Legendre's equation.

Application: LCR Circuit

** (MATLAB Exercise: Introduction to MATLAB commands and Solution of Initial Value Problems)

UNIT-IV:

System of Linear Equations, Eigen Values and Eigen Vectors:

Definition of a Vector space, Linear dependence and independence of vectors, Rank of a matrix, Echelon form and Normal form, solving system of Homogenous and Non homogenous linear equations- Gauss Jordon elimination method, Eigen values, Eigen vectors, Properties of eigen values and eigen vectors (without proof).

Applications:

Free vibrations of a two mass system.

UNIT-V:

Quadratic Forms:

Cayley -Hamilton theorem (without proof), Inverse and powers of a matrix by using Cayley - Hamilton theorem, Diagonalization of a matrix, Quadratic forms, Reduction of quadratic form to canonical form using orthogonal transformation, Nature of the quadratic form.

****(MATLAB Exercise:** Basic Operations on matrices, computation of rank, computation of eigen values and eigen vectors)

**Not to be examined

Text Books:

1. Advanced Engineering Mathematics, R.K.Jain, S.R.K.Iyenkar, Alpha Science Publications
2. Advanced Engineering Mathematics, Erwin Kreyszig, 10th Edition, Wiley-India.
3. Higher Engineering Mathematics, B.S.Grewal, 43rd Edition, Khanna Publishers.
4. Engineering Mathematics, P.Sivaramakrishna Das, C.Vijayakumari, Pearson Publications.

Reference Books:

1. Advanced Engineering Mathematics, D.G.Zill, MICHAIL R CULTER, 3rd Edition Norosa Publications 2009.
2. Advanced engineering mathematics with MATLAB, Dean G. Duffy, CRC Press.
3. Advanced Engineering Mathematics, Peter O'neil, Cengage Learning.
4. Advanced modern engineering mathematics, Glyn James, Pearson education.

Web Links:

1. https://nptel.ac.in/courses/111106100/
2. https://nptel.ac.in/courses/122107037/14
3. https://nptel.ac.in/courses/111106051/
4. http://mathworld.wolfram.com
5. https://www.khanacademy.org
6. https://spoken-tutorial.org/tutorial-search/?search_foss= MATLAB & search_ language=English

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APPLIED PHYSICS

I Semester	**L**	**T**	**P**	**C**
Course Code: 201BS1T03	**3**	**0**	**0**	**3**

Course Objectives:

COB 1: To impart Knowledge of Physical Optics phenomena like Interference and Diffraction required to design instruments with higher resolution.
COB 2: To make the student understand Physics of Semiconductors and their working mechanism for their utility in sensors.
COB 3: To impart the knowledge of materials with characteristic utility in appliances.

Course Outcomes:
At the end of the Course, Student will be able to:

CO 1: Apply the principles of interference and diffraction to design and enhance the resolving power of various optical instruments.
CO 2: Explain the fundamental concepts of Quantum behavior of matter.
CO 3: Classify the solids based on energy band structure.
CO 4: Explain the basic concepts of Semi-Conductors and Identify the type of semiconductors using Hall Effect.
CO 5: Explain about magnetic and dielectric properties of different materials.

Mapping of course outcomes with program outcomes:

CO/PO	PO 1 (K3)	PO 2 (K4)	PO 3 (K5)	PO 4 (K5)	PO 5 (K3)	PO 6 (K3)	PO 7 (K2)	PO 8 (K3)	PO 9 (K2)	PO 10 (K2)	PO11 (K3)	PO12 (K1)
CO1 (K3)	3	2	-	-	-	-	-	-	-	-	-	-
CO2 (K2)	2	1	-	-	-	-	-	-	-	-	-	-
CO3 (K2)	2	1	-	-	-	-	-	-	-	-	-	-
CO4 (K2)	2	1	-	-	-	-	-	-	-	-	-	-
CO5 (K3)	3	2	-	-	-	-	-	-	-	-	-	-

Mapping of course outcomes with program Specific Outcomes:

CO / PSO	PSO 1 (K3)	PSO 2 (K4)	PSO 3 (K4)
CO1 (K3)			
CO2 (K2)			
CO3 (K2)			
CO4 (K2)			
CO5 (K3)			

UNIT-I:
Wave Optics: Principle of Superposition - Interference of light - Conditions for sustained Interference - Interference in thin films (reflected geometry) - Newton's Rings (reflected geometry).
Diffraction – Fraunhofer Diffraction - Diffraction due to Single slit (quantitative), Double slit, N -slits and circular aperture (qualitative) – Intensity distribution curves - Diffraction Grating
– Grating spectrum – missing order– resolving power – Rayleigh's criterion – Resolving powers of Microscope, Telescope and grating (qualitative).

UNIT-II:
Quantum Mechanics: Introduction – Matter waves – de Broglie's hypothesis –

Davisson- Germer experiment – G.P.Thomson experiment – Heisenberg's Uncertainity Principle – interpretation of wave function – Schröedinger Time Independent and Time Dependent wave equations – Particle in a potential box.

UNIT-III:

Free Electron Theory: Introduction – Classical free electron theory (merits and demerits only) - Quantum Free electron theory – electrical conductivity based on quantum free electron theory – Fermi Dirac distribution function – Temperature dependence of Fermi-Dirac distribution function - expression for Fermi energy - Density of states.

BAND THEORY OF SOLIDS Bloch's theorem (qualitative) – Kronig-Penney model(qualitative) – energy bands in crystalline solids – E Vs K diagram – classification of crystalline solids – effective mass of electron – m^* Vs K diagram - concept of hole.

UNIT-IV:

Semiconductor Physics: Introduction– Intrinsic semi-conductors - density of charge carriers Electrical conductivity – Fermi level – extrinsic semiconductors - p-type & n-type - Density of charge carriers - Dependence of Fermi energy on carrier concentration and temperature – Hall effect- Hall coefficient - Applications of Hall effect - Drift and Diffusion currents – Einstein's equation.

UNIT-V:

Magnetism: Introduction – Magnetic dipole moment – Magnetization – Magnetic susceptibility and permeability – Origin of permanent magnetic moment – Bohr magneton – Classification of magnetic materials: Dia, para & Ferro – Domain concept of Ferromagnetism Hysteresis – soft and hard magnetic materials – applications of Ferromagnetic material.

Dielectrics: Introduction - Dielectic polarization **–** Dielectric Polarizability, Susceptibility and Dielectric constant-types of polarizations: Electronic and Ionic (Quantitative), Orientational polarizations (qualitative) – Lorentz Internal field – Claussius-Mossoti equation - Frequency dependence of polarization – Applications of dielectrics.

Text Books:

1. " AText book of Engineering Physics" by M N Avadhanulu, P G Kshirsagar & T.V.S.Arun Murthy S Chand &Company Ltd, 11th edition.
2. "Engineering Physics" by D.K.Bhattacharya and Poonam Tandon, Oxford press (2015).
3. "Engineering Physics" by R.K Gaur. and S.L Gupta., - Dhanpat Rai publishers, 2012.

Reference Books:

1. "Engineering Physics" by M.R.Srinivasan, New Age international publishers (2009).
2. "Optics" by Ajoy Ghatak, 6th Edition McGraw Hill Education, 2017.
3. Engineering Physics by Mani naidu – Peasrson Publications – 2017.

Web Links:

1. http://nptel.ac.in/courses/122107035/11
2. http://nptel.ac.in/courses/115102023/
3. https://phet.colorado.edu/en/simulations/category/physics
4. http://physicsgecg.blogspot.in/p/reading-materials.html
5. https://sites.google.com/site/physicsbysureshsaganti/home

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PROGRAMMING FOR PROBLEM SOLVING USING C

(Common to EEE, ECE, CSE & IT)

I Semester		**L**	**T**	**P**	**C**
Course Code:	**201ES1T02**	**3**	**0**	**0**	**3**

Course Objectives:

COB 1: To impart adequate knowledge on the need of programming languages and problem solving techniques and develop programming skills.
COB 2: To enable effective usage of control structures and implement different operations on arrays.
COB 3: To demonstrate the use of strings and functions.
COB 4: To impart the knowledge on pointers and understand the principles of dynamic memory allocation.
COB 5: To make the students understand the concepts of structures, unions, files and their operations.

Course Outcomes:

At the end of the Course, Student will be able to:

CO 1: Illustrate the fundamental concepts of computers and basics of computer programming
CO 2: Make use of control structures and arrays in solving complex problems.
CO 3: Develop program on modular and strings fundamentals.
CO 4: Demonstrate the ideas of pointers usage.
CO 5: Solve real world problems using the concept of structures, unions and File operations.

Mapping of course outcomes with program outcomes:

CO/PO	PO 1 (K3)	PO 2 (K4)	PO 3 (K5)	PO 4 (K5)	PO 5 (K3)	PO 6 (K3)	PO 7 (K2)	PO 8 (K3)	PO 9 (K2)	PO 10 (K2)	PO11 (K3)	PO12 (K1)
CO1 (K2)	2	1	-	-	1	-	-	-	-	-	-	3
CO2 (K3)	3	2	1	1	3	-	-	-	-	-	-	3
CO3 (K3)	3	2	1	1	3	-	-	-	-	-	-	3
CO4 (K2)	2	1	-	-	2	-	-	-	-	-	-	3
CO5 (K3)	3	2	1	1	3	-	-	-	-	-	-	3

Mapping of course outcomes with program Specific Outcomes:

CO / PSO	PSO 1 (K3)	PSO 2 (K3)	PSO 3 (K4)
CO1 (K2)	2	2	1
CO2 (K3)	3	3	2
CO3 (K3)	3	3	2
CO4 (K2)	2	2	1
CO5 (K3)	3	3	2

UNIT-I:

Computer History, Hardware, Software, Programming Languages and Algorithms:

Components and functions of a Computer System, Concept of Hardware and Software Programming Languages: Low-level and High-level Languages, Program Design Tools: Algorithm, Flowchart, Pseudo code.

Introduction to C Programming: Introduction, Structure of a C Program,

Comments, Keywords, Identifiers, Data Types, Variables, Constants, Input/Output Statements, Operators, Type Conversion.

UNIT-II:

Control Flow, Relational Expressions & Arrays: Conditional Branching Statements: if, if-else, if-else–if, switch. Basic Loop Structures: while, do-while loops, for loop, nested loops, The Break and Continue Statements, goto statement.

Arrays: Introduction, Operations on Arrays, One dimensional Array, Two dimensional Array, Multi dimensional arrays.

UNIT-III:

Strings: String Fundamentals, String Processing with and without Library Functions.

Functions: Introduction, Function Declaration, Function Definition, Function call, Categories of Functions, passing parameters to Functions, Arrays as Function Arguments, Scope of Variables, Variable Storage Classes, Recursion.

UNIT-IV:

Pointers: Concept of a Pointer, Declaring and Initializing Pointer Variables, Pointer Expressions and Address Arithmetic, Null Pointers, Generic Pointers, Pointers as Function arguments, Pointers and Arrays, Pointers and Strings, Pointer to Pointer, Dynamic Memory Allocation, Dangling Pointer, Command line Arguments.

UNIT-V:

Structures, Unions, Bit Fields: Introduction, Nested Structures, Arrays of Structures, Structures and Functions, Self-Referential Structures, Unions, Enumerated Data Type –enum variables, Using Typedef keyword, Bit Fields.

Data Files: Introduction to Files, Using Files in C, Reading from Text Files, Writing to Text Files, Random File Access.

Text Books:

1. Computer Programming, Reema Thareja, Oxford University Press.
2. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill.

Reference Books:

1. C Programming – A Problem Solving Approach, Forouzan, Gilberg, Cengage.
2. The C Programming Language, Dennis Richie And Brian Kernighan, Pearson Education.
3. Programming in C, Ashok Kamthane, 2nd Edition, Pearson Education.
4. Programming in ANSI C, E. Balagurusamy, 4E, Tata Mc Graw-Hill Education, 2008.

Web Links:

1. http://www.c4learn.com/
2. http://www.geeksforgeeks.org/c/
3. http://nptel.ac.in/courses/122104019/
4. http://www.learn-c.org/
5. https://www.tutorialspoint.com/cprogramming/

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ENGINEERING GRAPHICS AND DESIGN
(Common to EEE & ECE)

I Semester		**L**	**T**	**P**	**C**
Course Code:	**201ES1I01**	**2**	**0**	**2**	**3**

Course Objectives:

COB 1: To impart the knowledge of drawing various engineering components.
COB 2: To develop graphical skills using software to design various engineering components.

Course Outcomes:
At the end of the Course, Student will be able to:

CO 1: Make use of fundamentals of Engineering Drawing to sketch basic curves, conic sections, cycloid and involute.
CO 2: Apply the principles of orthographic projections for points, lines and planes.
CO 3: Apply the principles of orthographic projections for solids.
CO 4: Explain the basic functions of drawing software.
CO 5: Apply the software for the orthographic projection of the machine parts.

Mapping of course outcomes with program outcomes:

CO/PO	PO 1 (K3)	PO 2 (K4)	PO 3 (K5)	PO 4 (K5)	PO 5 (K3)	PO 6 (K3)	PO 7 (K2)	PO 8 (K3)	PO 9 (K2)	PO 10 (K2)	PO11 (K3)	PO12 (K3)
CO1 (K3)	2	-	-	-	-	-	-	-	-	3	-	1
CO2 (K3)	2	-	-	-	-	-	-	-	-	3	-	1
CO3 (K4)	2	-	-	-	-	-	-	-	-	3	-	1
CO4 (K3)	2	-	-	-	2	-	-	-	-	3	-	1
CO5 (K3)	2	-	-	-	2	-	-	-	-	3	-	1

Mapping of course outcomes with program Specific Outcomes:

CO/ PSO	PSO 1	PSO 2	PSO 3
CO1 (K3)			
CO2 (K3)			
CO3 (K4)			
CO4 (K3)			
CO5 (K3)			

CONVENTIONAL DRAFTING

UNIT-I:
Introduction to Engineering Graphics-Principles of Engineering graphics and their significance – Conventions in drawing – Lettering- BIS conventions – Conic Sections by Eccentricity method.

UNIT-II:
Cycloid -Involute of Circle-Introduction to Orthographic projections- Projection of points.

UNIT-III:
Projections of Straight Lines -Introduction -Projections of lines inclined to one plane and both the reference planes.

UNIT-IV:
Projections of planes -Introduction – Projections of perpendicular planes and oblique planes.

UNIT-V:
Projections of Solids – Introduction – Projections of Prisms and Pyramids inclined to one reference plane.

COMPUTER AIDED DRAFTING

List of Experiments:

1. Initiating the Graphics Package; Setting the paper size, setting the limits, units, Using Drawing Aids (functional keys) and control keys.
2. Selecting commands & Working with drawing.
3. Viewing drawing and Working with coordinates.
4. Draw 2d models using Different colors & font command.
5. Creating simple entities by using draw commands.
6. Manipulating Objects (Modifying Tool Bar).
7. Getting drawing information& working with annotating drawing and practice.
8. Dimensioning drawing and practice.
9. 2D Drawing practice.
10. Orthographic Projections.
11. Working with Layouts.
12. Plotting in Model spaces & Paper space, and exporting to an Electronic Format.

Augmented Experiments (Any two of the following can be performed)

13. Apply the concept of layers and draw the 2D components.
14. Apply the concept of blocks and draw the 2D components.
15. Apply the concepts of Sections in drawing.
16. Drawing of various engineering components used in industry.

Text Books:

1. N.D.Bhatt, Engineering Drawing, 53rd Edition, Charotar Publishers, 2016.
2. K.L.Narayana & P.Kannaiah, Engineering Drawing, 3rd Edition, Scitech Publishers, Chennai, 2012.

Reference Books:

1. Dhanajay A Jolhe, Engineering Drawing, Tata McGraw-Hill, Copy Right, 2009.
2. Shah and Rana, Engineering Drawing, 2/e, Pearson Education, 2009.
3. Venugopal, Engineering Drawing and Graphics, 3/e, New Age Publishers, 2000.
4. K.C.John, Engineering Graphics, 2/e, PHI, 2013.
5. Basant Agarwal &C.M.Agarwal, Engineering Drawing, Tata McGraw-Hill, Copy Right, 2008.

Web Links:

1. https://www.wiziq.com/tutorials/engineering-drawing
2. www.me.umn.edu/courses
3. Youtube: http-sewor,Carleton.cag,kardos/88403/drawings.html conic sections-online,red woods.edu

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COMMUNICATIVE ENGLISH LAB
(Common to all branches)

I Semester	**L**	**T**	**P**	**C**
Course Code: 201HS1L01	**0**	**0**	**3**	**1.5**

Course Objectives:

COB 1: To facilitate computer-aidedmulti-media instruction enabling individual -ized and independent language learning.
COB 2: To sensitize the students to the nuances of English speech sounds, word accent and intonation.
COB 3: To bring a bout a consistent accent and intelligibility in their pronunciation of English by providing an opportunity for practice in speaking.
COB 4: To improve the fluency in spoken English and neutralize mother tongue influence.
COB 5: To train students to use language appropriately.

Course Outcomes:
At the end of the Course, Student will be able to:

CO 1: Demonstrate nuances of language through audio-visual experience and group activities.
CO 2: Identify accent for intelligibility.
CO 3: Demonstrate in conversation, JAMs and public speaking.
CO 4: Make use of the concepts to communicate confidently and competently in English Language in all spheres.

Mapping of course outcomes with program outcomes:

CO/PO	PO1 (K3)	PO2 (K4)	PO3 (K5)	PO4 (K5)	PO5 (K3)	PO6 (K3)	PO7 (K2)	PO8 (K3)	PO9 (K2)	PO 10 (K2)	PO11 (K3)	PO12 (K1)
CO1 (K2)	-	-	-	-	-	-	-	-	-	3	-	-
CO2 (K3)	-	-	-	-	-	-	-	-	-	2	-	-
CO3 (K2)	-	-	-	-	-	-	-	-	-	3	-	-
CO4 (K3)	-	-	-	-	-	-	-	-	-	2	-	-

Mapping of course outcomes with program Specific Outcomes:

CO / PSO	PSO 1 (K4)	PSO 2 (K4)	PSO 3 (K6)	PSO 4 (K3)
CO1 (K2)	-	-	-	-
CO2 (K3)	-	-	-	3
CO3 (K2)	1	1	-	2
CO4 (K3)	-	-	-	3

PRACTICE 1:
A. Greeting, Introducing and taking leave.
B. Pure Vowel.

PRACTICE 2:
A. Giving Information and Asking for Information.
B. Diphthongs.

PRACTICE 3:

A. Inviting, Accepting and Declining Invitations.
B. Consonants.

PRACTICE 4:

A. Commands, Instructions and Requests.
B. Accent and Rhythm.

PRACTICE 5:

A. Suggestions and Opinions.
B. Intonation.

Reference Books:

1. Strengthen your Communication Skills by Dr.M.Hari Prasad, Dr.Salivendra J.Raju and Dr.G.Suvarna Lakshmi, Maruthi Publications.
2. English for Professionals by Prof Eliah, B.S Publications, Hyderabad.
3. A Hand book of English for Professionals by Prof Eliah, B.S Publications.
4. Effective Technical Communication by M.Ashraf Rizvi, Tata McGraw–Hill Publishing Company.
5. Word power made handy, Dr. Shalini verma, S.Chand Company.
6. Let us hear them speak, Jayashree Mohan raj, Sage texts.

Web Links:

1. https://fauzigeneraloflostsaga.wordpress.com/b-inggris/bab-2/
2. https://www.lawlessenglish.com/learn-english/pronunciation/vowels-phonetics/
3. https://www.english-at-home.com/giving-personal-information/
4. https://englishpost.org/make-accept-decline-invitations/
5. https://www.ef.com/ca/english-resources/english-grammar/reported-speech-orders-requests-suggestions/

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APPLIED PHYSICS LAB

I Semester		**L**	**T**	**P**	**C**
Course Code:	**201BS1L02**	**0**	**0**	**3**	**1.5**

Course Objectives:

COB 1: To make the students gain practical knowledge to co- relate with the theoretical studies.
COB 2: To impart skills in measurements.
COB 3: To plan the experimental procedure and to record and process the results.

Course Outcomes:
At the end of the Course, Student will be able to:

CO 1: Use spectrometer, travelling microscope for making measurements.
CO 2: Determine energy gap of a semiconductor, draw characteristic curves to estimate thermal coefficient of a thermistor, Zener diode.
CO 3: Determine the dielectric constant and resistivity.
CO 4: Determine wavelength of source and width of the narrow slits.
CO 5: Find the strength of magnetic field.

Mapping of course outcomes with program outcomes:

CO/PO	PO1 (K3)	PO2 (K4)	PO3 (K5)	PO4 (K5)	PO5 (K3)	PO6 (K3)	PO7 (K2)	PO8 (K3)	PO9 (K2)	PO 10 (K2)	PO11 (K3)	PO12 (K1)
CO1 (K2)	2	1	-	-	-	-	-	-	-	-	-	-
CO2 (K3)	3	2	-	-	-	-	-	-	-	-	-	-
CO3 (K3)	3	1	-	-	-	-	-	-	-	-	-	-
CO4 (K2)	2	2	-	-	-	-	-	-	-	-	-	-
CO5 (K2)	2	2	-	-	-	-	-	-	-	-	-	-

Mapping of course outcomes with program Specific Outcomes:

CO / PSO	PSO 1 (K3)	PSO 2 (K4)	PSO 3 (K4)
CO1 (K2)			
CO2 (K3)			
CO3 (K3)			
CO4 (K2)			
CO5 (K2)			

LIST OF EXPERIMENTS
(Any 10 of the following experiments can be performed)

1. Determination of wavelength of a source-Diffraction Grating-Normal incidence.
2. Newton's rings – Radius of Curvature of Plano - Convex Lens.
3. Determination of thickness of a spacer using wedge film and parallel interference fringes.
4. Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus.
5. Energy Band gap of a Semiconductor p - n junction.
6. Characteristics of Thermistor – Temperature Coefficients.
7. Determination of dielectric constant by charging and discharging method.
8. Determination of resistivity of semiconductor by Four probe method.
9. Study the variation of B versus H by magnetizing the magnetic material (B-H

curve).
10. Measurement of magnetic susceptibility by Quincke's method.
11. Dispersive power of diffraction grating.
12. Resolving Power of telescope.
13. Resolving power of grating.
14. Determination of Hall voltage and Hall coefficients of a given semiconductor using Hall effect.
15. Variation of dielectric constant with temperature.

LIST OF AUGMENTED EXPERIMENTS

16 to 19 (Any two of the following experiments can be performed)

16. Determine the Young's Modulus of the material of the bar subjected to uniform bending.
17. Determine the Young's Modulus of the material of the bar subjected to non-uniform bending.
18. V-I characteristics of P-N junction Diode.
19. V-I characteristics and Breakdown voltage of Zener Diode.

Reference Books:

1. Engineering Physics Lab Manual by Dr.C.V.Madhusudhana Rao, V.Vasanth Kumar, Scitech Publications.
2. Laboratory Manual Cum Record for Engineering Physics I & II by Dr.Y.Aparna, Dr.K.Venkateswara Rao, VGS Technoseries.

APPLIED PHYSICS - VIRTUAL LAB – ASSIGNMENTS

LIST OF EXPERIMENTS

1. Hall Effect
2. Crystal Structure
3. Brewster's angle
4. Numerical Aperture of Optical fiber
5. Photoelectric Effect
6. LASER – Beam Divergence and Spot size
7. Michelson's interferometer
8. Black body radiation
9. Flywheel –moment of inertia
10. AC Sonometer
11. Resistivity by four probe method
12. Newton's rings –Refractive index of liquid

Web Links:

URL: www.vlab.co.in

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PROGRAMMING FOR PROBLEM SOLVING USING C LAB
(Common to EEE, ECE, CSE & IT)

I Semester	**L**	**T**	**P**	**C**
Course Code: 201ES1L02	**0**	**0**	**3**	**1.5**

Course Objectives:

COB 1: To impart knowledge on basic Linux commands, various Editors, Raptor.
COB 2: To make the students understand the concepts of C programming.
COB 3: To nurture the students on Control Structures and develop different operations on arrays.
COB 4: To enable the students to learn string fundamentals and modular programming constructs.
COB 5: To impart knowledge on dynamic memory allocation.
COB 6: To explain the concepts of Structure, Unions and files for solving various problems.

Course Outcomes:
At the end of the Course, Student will be able to:

CO 1: Develop the basic programs in C and draw the flowcharts using Raptor.
CO 2: Make use of conditional and iterative statements to solve real time scenarios in C.
CO 3: Apply the concept of arrays, modularity and strings to handle complex problems.
CO 4: Apply the dynamic memory allocation functions using pointers.
CO 5: Develop programs using structures, and Files.

Mapping of course outcomes with program outcomes:

CO/PO	PO 1 (K3)	PO 2 (K4)	PO 3 (K5)	PO 4 (K5)	PO 5 (K3)	PO 6 (K3)	PO 7 (K2)	PO 8 (K3)	PO 9 (K2)	PO 10 (K2)	PO11 (K3)	PO12 (K1)
CO1 (K2)	2	1	-	-	1	-	-	-	-	-	-	3
CO2 (K3)	3	2	1	1	3	-	-	-	-	-	-	3
CO3 (K3)	3	2	1	1	3	-	-	-	-	-	-	3
CO4 (K3)	2	1	-	-	3	-	-	-	-	-	-	3
CO5 (K3)	3	2	1	1	3	-	-	-	-	-	-	3

Mapping of course outcomes with program Specific Outcomes:

CO / PSO	PSO 1 (K3)	PSO 2 (K3)	PSO 3 (K4)
CO1 (K2)	2	2	1
CO2 (K3)	3	3	2
CO3 (K3)	3	3	2
CO4 (K3)	2	2	1
CO5 (K3)	3	3	2

List of Experiments:

1. Introduction to C Programming

1.1) Basic Linux Commands
1.2) Exposure to Turbo C, Vi, Emacs, Code Blocks IDE, Dev C++
1.3) Writing simple programs using printf(), scanf()

2. Raptor

2.1) Installation and Introduction to Raptor.

2.2) Draw a flow chart to find the Sum of 2 numbers.
2.3) Draw a flow chart to find Simple interest.

For the below experiments develop flow charts using Raptor and implement using C:

3. Basic Math
3.1) Convert Celsius to Fahrenheit and vice versa.
3.2) Find largest of three numbers using ternary operator.
3.3) Calculate area of a Triangle using Heron's formula.

4. Control Flow- I
4.1) Find Whether the Given Year is a Leap Year or not.
4.2) Find the roots of a Quadratic Equation.
4.3) Make a simple Calculator to Add, Subtract, Multiply or Divide Using switch…case.

5. Control Flow- II
5.1) Find Whether the Given Number is Prime number or not
5.2) Find Whether the Given Number is Armstrong Number or not.
5.3) Print Floyd Triangle.

6. Control Flow- III
6.1) Find the sum of individual digits of a positive integer.
6.2) Check whether given number is palindrome or not.
6.3) Read two numbers, x and n, and then compute the sum of the geometric progression $1+x+x^2+x^3+\ldots\ldots\ldots\ldots+x^n$.

7. Arrays
7.1) Search an element in the given array (Linear Search)
7.2) Perform matrix addition.
7.3) Perform matrix multiplication.

8. Strings
8.1) Implement string manipulation operations with library function.
copy
concatenate
length
compare
8.2) Implement string manipulation operations without library function.
copy
concatenate
length
compare
8.3) Verify whether the given string is a palindrome or not

9. Functions, Array & Pointers
9.1) Demonstrate parameter passing in Functions.
9.2) Find Fibonacci, Factorial of a number with Recursion and without Recursion.
9.3) Find the sum of given numbers with arrays and pointers.

10. Pointers

10.1) Perform Addition, Subtraction, Multiplication and Division of two numbers using Command line arguments.
10.2) Find sum of n elements entered by user. To perform this program, allocate memory dynamically using malloc () function.
10.3) Find sum of n elements entered by user. To perform this program, allocate memory dynamically using calloc () function.

11. Structures

11.1) Store Information of a book Using Structure
11.2) Add Two Complex Numbers by Passing Structure to a Function

12. Files

12.1) Open a file and to print the contents of the file on screen.
12.2) Copy content of one file to another file.
12.3) Merge two files and store content in another file.

LIST OF AUGMENTED EXPERIMENTS:

(Any 2 of the following experiments can be performed)

13. ATM Pin Generation:

Aditya purchased a credit card. He has to generate a PIN number to access the ATM and Net banking for which OTP was sent to his registered mobile number. Using this OTP number, he has to generate ATM PIN number. After generating PIN number, he can use it for further transactions. Maximum login he can make is 3 times.

Sample Input:
OTP: 6732
If valid
Enter PIN: 8858
Confirm your PIN: 8858

Sample output:
valid/Invalid
PIN generated successfully.
Note: OTP is hard coded.

14. Reset Password:

Aditya was using Syndicate Bank's Online Account. She wanted to pay her bills through Online. But she forgets her password. Now she has to reset the password. For resetting the password, she has to select reset option from the Menu.
NOTE: using switch case.

Sample input:
Fast withdrawal
Mini Statement
Balance Enquiry
Reset Password Enter your choice: 4
Sample Output:
Reset password: New password: ***** Confirm password: *****

15. Student Attendance Report Generation:

Some of the school staff had failed to maintain the attendance of the students, causing

lack of essential records related to student's attendance that should be submitted in a parent meet. The school management has decided to automate the process in order to maintain the attendance of every student effectively. You are asked to write a program to the above scenario and display whether the student can write the Exam or not.

Percentage<65	Detained
>=65 and <75	should pay condonation to appear for Exams
>=75	Allowed for exams

Sample Input:
Enter no of students: 5
Enter Students Details:

Rno:1	Name: Kalyan	Attendance (%): 67	Should pay condonation to appear for exams
Rno:2	Name: Laxman	Attendance (%): 56	
Rno:3	Name: Yamini	Attendance (%): 79	
Rno:4	Name: Aryan	Attendance (%): 60	
Rno:5	Name: Raghav	Attendance (%): 88	

Sample output:

Rno	Name	Attendance (%)	Remarks
1	Kalyan	67	67 should pay condonation to appear for Exams
2	Laxman	56	detained
3	Yamini	79	allowed for Exams
4	Aryan	60	detained
5	Raghav	88	allowed for Exams

16. Library Management

Shilpa is a student of PGEC got the Library Card. She wants to lend the books from the Library. The college gave two cards to every student. The students can lend only two books at a time and it must be returned after 15 days. If the books are not returned, late fee will be collected for no. of days lagged, after the due date. Late fee per day is Rs.50/-

Sample output:
Enter the name of student: nalini
Enter the Roll No.:555
Enter the branch: cse
Enter the section: A
Enter the year: 3
Enter the Date of Lend (dd mm yyyy): 08 08 2017
Enter the Date of return (dd mm yyyy): 09 10 2017
The no. of days book used by the student = 62
Extra days used by the student = 47
Late return fine fee = 2350

Reference Books:

1. Let Us C Yashwanth Kanetkar, Eighth edition, BPB Publications.
2. Programming in C A-Practical Approach Ajay Mittal. Pearson Education.
3. The C programming Language, Dennis Richie and Brian Kernighan, Pearson Education.

Web Links:

1. https://www.hackerrank.com/
2. https://www.codechef.com/
3. https://www.topcoder.com/
4. https://code-cracker.github.io/
5. https://raptor.martincarlisle.com/
6. https://nptel.ac.in/courses/106105085/2

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ENVIRONMENTAL SCIENCE
(Common to all branches)

I Semester	**L**	**T**	**P**	**C**
Course Code: 201MC1T01	**2**	**0**	**0**	**0**

Course Objectives:

COB 1: To define the various ecosystems and its diversity.
COB 2: To summarize the overall natural resources.
COB 3: To classify environmental impacts of developmental activities.
COB 4: To discuss social issues, environmental legislation and global t treaties.
COB 5: To educate human population and environment.

Course Outcomes:
At the end of the Course, Student will be able to:

CO 1: Identify the need for protecting the producers and consumers in various ecosystems and their role in the food web.
CO 2: Outline the natural resources and their importance for the sustenance of the life.
CO 3: List out the biodiversity of India, threats and its conservation methods.
CO 4: Illustrate various attributes of the pollution, impacts and measures to control the pollution along with waste management practices.
CO 5: Describe social issues both rural and urban environment to combat the challenges.
CO 6: Summarize the legislations of India in environmental protection.
CO 7: Explains the population growth and its implications.
CO 8: Transforms existing campus into self sustaining green campus with environment Friendly aspects of – Energy, Water and waste water reuse, plantation, rain water Harvesting and Parking Curriculum.

Mapping of course outcomes with program outcomes:

CO/PO	PO 1 (K3)	PO 2 (K4)	PO 3 (K5)	PO 4 (K5)	PO 5 (K3)	PO 6 (K3)	PO 7 (K2)	PO 8 (K3)	PO 9 (K2)	PO 10 (K2)	PO11 (K3)	PO12 (K1)
CO1 (K1)	-	-	-	-	-	-	2	-	-	-	-	-
CO2 (K2)	-	-	-	-	-	-	3	-	-	-	-	-
CO3 (K1)	-	-	-	-	-	-	2	-	-	-	-	-
CO4 (K2)	-	-	-	-	-	-	3	-	-	-	-	-
CO5 (K2)	-	-	-	-	-	-	3	-	-	-	-	-
CO6 (K2)	-	-	-	-	-	-	3	-	-	-	-	-
CO7 (K4)	-	-	-	-	-	-	3	-	-	-	-	-
CO8 (K2)	-	-	-	-	-	-	3	-	-	-	-	-

Mapping of course outcomes with program Specific Outcomes:

CO/PSO	PSO1 (K3)	PSO2 (K3)	PSO3 (K4)
CO1 (K1)	-	-	-
CO2 (K2)	-	2	-
CO3 (K1)	-	-	-
CO4 (K2)	-	-	-
CO5 (K2)	-	-	-
CO6 (K2)	-	-	-
CO7 (K4)	-	-	-
CO8 (K2)	2	2	-

UNIT-I:

Multidisciplinary Nature of Environmental Studies:

Definition, Scope and Importance, Need for Public Awareness.

Natural Resources: Renewable and non-renewable resources – Natural resources and associated problems.

UNIT-II:

Ecosystems: Concept of an ecosystem. – Structure and function of an ecosystem – Producers, consumers and decomposers. Food chains, food webs and ecological pyramids.

Biodiversity and Its Conservation: Definition: genetic, species and ecosystem diversity – Bio-geographical classification of India – Values of biodiversity. Hot-spots of biodiversity – Threats to biodiversity. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT-III:

Environmental pollution and Solid Waste Management:

Environmental Pollution: Definition, Cause, effects and control measures of:

a. Air Pollution.
b. Water pollution
c. Soil pollution
d. Marine pollution
e. Noise pollution

Solid Waste Management: Causes, effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution.

UNIT-IV:

Social Issues and the Environment: From Unsustainable to Sustainable development – Urban problems related to Energy &Water. Resettlement and rehabilitation of people, Environmental ethics, Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Environment Protection Act – Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act-Wildlife Protection Act – Forest Conservation Act – Issues involved in enforcement of environmental legislation – Public awareness.

UNIT-V:

Human Population and the Environment: Population growth, variation among nations. Environment and human health, Human Rights, Value Education. Role of Information Technology in Environment and human health.

Text Books:

1. Text book of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission, Universities Press.
2. Environmental Studies by Palaniswamy – Pearson education.
3. Environmental Studies by Dr.S.Azeem Unnisa, Academic Publishing Company.

Reference Books:

1. Textbook of Environmental Science by Deeksha Dave and E.Sai Baba Reddy, Cengage Publications.
2. Text book of Environmental Sciences and Technology by M.Anji Reddy, BS Publication.
3. Comprehensive Environmental studies by J.P.Sharma, Laxmi publications.
4. Environmental sciences and engineering – J. Glynn Henry and Gary W. Heinke – Prentice hall of India Private limited.
5. A Text Book of Environmental Studies by G.R.Chatwal, Himalaya Publishing House.
6. Introduction to Environmental engineering and science by Gilbert M. Masters and Wendell P. Ela - Prentice hall of India Private limited.

Web Links:

1. https://www.youtube.com/watch?v=mOwyPENHhbc
2. https://www.youtube.com/watch?v=_mgvsPnCYj4
3. http://nptel.ac.in/courses/122102006/1-20

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PARTIAL DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS

(Common to CE, EEE, ME, Min.E, PT & Ag.E)

II Semester		**L**	**T**	**P**	**C**
Course Code:	**201BS2T05**	**3**	**0**	**0**	**3**

Course Objectives:

COB 1: To equip the students with the necessary mathematical skills and techniques that are essential for an engineering course.
COB 2: To help the students acquire a necessary base to develop analytical and design skills.

Course Outcomes:
At the end of the Course, Student will be able to:

CO 1: Solve improper integrals using beta and gamma functions.
CO 2: Solve partial differential equations of first order.
CO 3: Compute the double integral over a region and triple integral over a volume.
CO 4: Calculate the gradient of a scalar function, divergence and curl of a vector function.
CO 5: Calculate line, surface and volume integrals.

Mapping of course outcomes with program outcomes:

CO/PO	PO 1 (K3)	PO 2 (K4)	PO 3 (K5)	PO 4 (K5)	PO 5 (K3)	PO 6 (K3)	PO 7 (K2)	PO 8 (K3)	PO 9 (K2)	PO 10 (K2)	PO11 (K3)	PO12 (K1)
CO1 (K3)	3	2	-	-	-	-	-	-	-	-	-	-
CO2 (K3)	3	2	-	-	-	-	-	-	-	-	-	-
CO3 (K3)	3	2	-	-	-	-	-	-	-	-	-	-
CO4 (K3)	3	2	-	-	-	-	-	-	-	-	-	-
CO5 (K3)	3	2	-	-	-	-	-	-	-	-	-	-

Mapping of course outcomes with program Specific Outcomes:

CO/ PSO	PSO 1 (K4)	PSO 2 (K4)	PSO 3 (K6)	PSO 4 (K3)
CO1 (K3)	-	-	-	-
CO2 (K3)	-	2	-	-
CO3 (K3)	-	-	-	-
CO4 (K3)	-	2	-	-
CO5 (K3)	-	2	-	-

UNIT-I:
Special Functions:
Beta and Gamma functions, Properties, Relation between Beta and Gamma functions, Evaluation of improper integrals.

UNIT-II:
Partial Differential Equations:
Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions, Solutions of first order linear partial differential equations, nonlinear partial differential equations (standard types), Homogeneous linear partial

differential equations with constant coefficients.

UNIT-III:
Multiple Integrals:
Double integrals, Change of order of integration, Change of variables, Double integral in polar coordinates, Triple integrals, Finding Area and Volume as a double integral.

UNIT-IV:
Vector Differentiation:
Introduction, Gradient of a scalar field, Directional Derivative, Divergence of a vector field, Curl of a vector field, Solenoidal and irrotational fields, Conservative force field, Scalar potential, Laplace operator, Vector identities.

UNIT-V:
Vector Integration:
Introduction, Line integral, Work done, Surface and volume integrals, Green's theorem, Stokes theorem and Gauss Divergence theorem (All theorems without proof) and related problems.

Text Books:

1. Advanced Engineering Mathematics, R.K.Jain, S.R.K.Iyenkar, Alpha Science Publications.
2. Advanced Engineering Mathematics, Erwin Kreyszig, 10th Edition, Wiley-India.
3. Higher Engineering Mathematics, B.S.Grewal, 43rd Edition, Khanna Publishers.
4. Engineering Mathematics, P.Sivaramakrishna Das, C.Vijayakumari, Pearson Publications.

Reference Books:

1. Advanced engineering mathematics with MATLAB, Dean G. Duffy, CRC Press.
2. Higher Engineering Mathematics, Dass H.K., Rajnish Verma. Er., S. Chand Co. Pvt. Ltd, Delhi.
3. Higher engineering mathematics by John Bird, 5th edition Elsevier Limited, 2006.

Web Links:

1. https://nptel.ac.in/courses/111107108/25
2. https://nptel.ac.in/courses/111103021/
3. https://nptel.ac.in/courses/111105122/
4. http://mathworld.wolfram.com
5. https://www.khanacademy.org

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TRANSFORM TECHNIQUES

II Semester	**L**	**T**	**P**	**C**
Course Code: 201BS2T06	**3**	**0**	**0**	**3**

Course Objectives:

COB 1: To equip the students with the necessary mathematical skills and techniques that are essential for an engineering course.
COB 2: To make the students acquire a necessary base to develop analytical and design skills.

Course Outcomes:
At the end of the Course, Student will be able to:

CO 1: Compute Laplace transform of standard functions and analyze the properties Laplace transform.
CO 2: Apply Laplace transform to solve Initial value problems.
CO 3: Compute the Fourier series of a given function and study the convergence of the series.
CO 4: Compute the Fourier transforms for certain functions and apply the properties of Fourier transforms.
CO 5: Compute the Z- transforms for certain functions and apply the properties of Z- transforms to solve difference equations.

Mapping of course outcomes with program outcomes:

CO/PO	PO 1 (K3)	PO 2 (K4)	PO 3 (K5)	PO 4 (K5)	PO 5 (K3)	PO 6 (K3)	PO 7 (K2)	PO 8 (K3)	PO 9 (K2)	PO 10 (K2)	PO11 (K3)	PO12 (K1)
CO1 (K3)	3	2	-	-	-	-	-	-	-	-	-	-
CO2 (K3)	3	2	-	-	-	-	-	-	-	-	-	-
CO3 (K3)	3	2	-	-	-	-	-	-	-	-	-	-
CO4 (K3)	3	2	-	-	-	-	-	-	-	-	-	-
CO5 (K3)	3	2	-	-	-	-	-	-	-	-	-	-

Mapping of course outcomes with program Specific Outcomes:

CO/PSO	PSO1 (K3)	PSO2 (K4)	PSO3 (K4)
CO1 (K3)	-	-	-
CO2 (K3)	-	-	-
CO3 (K3)	-	-	-
CO4 (K3)	-	-	-
CO5 (K3)	-	-	-

UNIT-I:
Laplace Transforms:
Laplace transforms of standard functions, First Shifting theorem, Change of scale, Multiplication with t, Division by t, Transforms of derivatives and integrals, Unit step function, Dirac delta function, Periodic function, Evaluating improper integrals by using Laplace Transform.

UNIT-II:

Inverse Laplace Transforms:

Inverse Laplace transforms, Convolution theorem (without proof), Second shifting theorem, Solving differential equations and integro-differential equations using Laplace transforms,

**(MATLAB Exercise: Computing Laplace transform of f(t) using symbolic toolbox, Solving initial value problems)

UNIT-III:

Fourier Series:

Fourier series of periodic function, Dirichlet's conditions for Fourier expansion, Functions having points of discontinuities, Change of interval, Even and odd functions, Half-range series.

UNIT-IV:

Fourier Transforms:

Fourier integral theorem (without proof), Fourier sine and cosine integrals, Fourier Transforms, Fourier sine and cosine transforms, properties, inverse transforms, Finite Fourier transforms.

UNIT-V:

Z-Transforms:

Introduction to power series, Definition of Z-transform, Properties, Damping rule, Shifting rule, Initial and final value theorem, Inverse z-transform, Convolution theorem (without proof), Solution of Difference equation by using z-transforms.

**Not to be examined

Text Books:

1. Advanced Engineering Mathematics, R.K.Jain, S.R.K.Iyenkar, Alpha Science Publications.
2. Advanced Engineering Mathematics, Erwin Kreyszig, 10th Edition, Wiley-India.
3. Higher Engineering Mathematics, B.S.Grewal, 43rd Edition, Khanna Publishers.
4. Engineering Mathematics, P.Sivaramakrishna Das, C.Vijayakumari, Pearson Publications.

Reference Books:

1. Advanced engineering mathematics with MATLAB, Dean G. Duffy, CRC Press.
2. Higher Engineering Mathematics, Dass H.K., Rajnish Verma. Er., S. Chand Co. Pvt. Ltd, Delhi.
3. Higher engineering mathematics by John Bird, 5th edition Elsevier Limited, 2006.

Web Links:

1. https://nptel.ac.in/courses/108106075/23
2. https://nptel.ac.in/courses/117105134/13
3. https://nptel.ac.in/courses/111103021/15
4. http://mathworld.wolfram.com
5. https://www.khanacademy.org

DATA STRUCTURES THROUGH C
(Common to EEE, CSE & IT)

II Semester	**L**	**T**	**P**	**C**
Course Code: 201ES2T07	**3**	**0**	**0**	**3**

Course Objectives:

COB 1: To make the students learn the basic Concepts of Data Structures and algorithms.
COB 2: To enable the students analyze the various Searching and Sorting techniques.
COB 3: To provide knowledge on Stacks and Queues
COB 4: To impart knowledge on list and its applications.
COB 5: To facilitate the students learn the various operations of Trees.
COB 6: To demonstrate the Graph Traversal Techniques.

Course Outcomes:
At the end of the Course, Student will be able to:

CO 1: Illustrate time and space complexities of an algorithm.
CO 2: Apply various searching and sorting techniques to solve computing problems.
CO 3: Make use of linear data structures to solve real time problems.
CO 4: Develop applications using Tree Data Structures.
CO 5: Solve problems using Graph Algorithms.

Mapping of course outcomes with program outcomes:

CO/PO	PO1 (K3)	PO2 (K4)	PO3 (K5)	PO4 (K5)	PO5 (K3)	PO6 (K3)	PO7 (K2)	PO8 (K3)	PO9 (K2)	PO10 (K2)	PO11 (K3)	PO12 (K1)
CO1 (K2)	2	1	-	-	2	-	-	-	-	-	-	-
CO2 (K3)	3	2	-	-	3	-	-	-	-	-	-	-
CO3 (K3)	3	2	-	-	3	-	-	-	-	-	-	-
CO4 (K3)	3	2	-	-	3	-	-	-	-	-	-	-
CO5 (K3)	3	2	-	-	3	-	-	-	-	-	-	-

Mapping of course outcomes with program Specific Outcomes:

CO/ PSO	PSO1(K3)	PSO2 (K3)	PSO3 (K2)
CO1 (K2)	2	2	3
CO2 (K3)	3	-	3
CO3 (K3)	3	-	3
CO4 (K3)	3	-	3
CO5 (K3)	3	-	3

UNIT-I:
Data Structures –Definition, Classification and Operations on Data Structures, Pseudo code, Algorithm analysis, Time and Space Complexity.
Searching: Linear search, Binary search.
Sorting: Insertion Sort, Selection Sort, Exchange (Bubble Sort, Quick Sort), merging (Merge sort), distribution (Radix Sort) algorithms.

UNIT-II:

Stacks: Introduction, Array Representation of Stacks, Operations and Implementation, Applications of Stacks-Reversing list, Infix to Postfix Conversion, Evaluating Postfix Expressions.

Queues: Introduction, Array Representation of Queues, Operations and Implementation, Types of Queues: Circular Queues, Deques and Priority Queues, Application of Queues.

UNIT-III

Linked Lists: Introduction, Singly linked list, Operations on Singly Linked list - Insertion, Deletion and Searching, Doubly linked list - Insertion, Deletion, Circular linked list-Insertion, Deletion, Linked Representation of Stacks and Queues, Applications of Linked lists-Addition of Polynomials, Sparse Matrix Representation using Linked List.

UNIT-IV

Trees: Basic Terminology in Trees, Binary Trees-Properties, Representation of Binary Trees using Arrays and Linked lists, Traversing a Binary Tree (In-Order, Pre-Order, Post-Order).

Binary Search Trees: Definition, Operations: Searching, Insertion, Deletion, Applications-Expression Trees, Heap Sort, Balanced Binary Trees- AVL Trees, Insertion, Deletion and Rotations.

UNIT-V

Graphs: Introduction, Graph Terminology, Representation of Graphs-Adjacency Matrix and using Linked list, Graph Traversals(BFT & DFT),Applications-Minimum Spanning Tree

Using Prims &Kruskals Algorithm, Dijkstra's Shortest Path, Warshall's Algorithm, Transitive Closure. (Algorithmic Concepts Only, No Programs required).

Text Books:

1. Data Structures Using C, Reema Thareja, Oxford University Press, 2nd Edition.
2. Data Structures and Algorithm Analysis In C, Mark Allen Weiss, 2nd Edition.

Reference Books:

1. Fundamentals of Data Structure in C, Horowitz,Sahni, Anderson Freed, University Press, 2nd Edition, 2008.
2. Data Structures, Richard F, Gilberg, Forouzan, Cengage Learning, 2nd Edition.
3. Data Structures and Algorithms, G. A.V.Pai, TMH, 2008.

Web Links:

1. http://nptel.ac.in/courses/106102064/
2. http://algs4.cs.princeton.edu/home/
3. https://faculty.washington.edu/jstraub/dsa/Master_2_7a.pdf
4. http://www.udacity.com/
5. http://www.courseera.com/

BASIC ELECTRICAL CIRCUITS

II Semester	**L**	**T**	**P**	**C**
Course Code: 201ES2T09	**3**	**0**	**0**	**3**

Course Objectives:

COB 1: To enable the student learn various methods of simplifying networks.
COB 2: To train the student understand the behavior of RLC networks.
COB 3: To make the student understand the concept of resonance.
COB 4: To nurture the applications of network theorems for analysis of electrical networks.
COB 5: To acquaint the student understand the applications of network topology to electrical circuits.
COB 6: To practice the student study the fundamental concepts of magnetic coupled circuit.

Course Outcomes:
At the end of the Course, Student will be able to:

CO 1: Make use of network elements, types of sources, source transformation, mesh and nodal analysis for network analysis.
CO 2: Summarize the behavior of RLC networks.
CO 3: Solve Electrical networks with network topology concepts.
CO 4: Explain electrical networks by using principles of network theorems.
CO 5: Determine resonant frequency and Q factor of an AC Circuit.
CO 6: Identify magnetic circuit with various dot conventions.

Mapping of course outcomes with program outcomes:

Course outcomes	PO 1 (K3)	PO 2 (K4)	PO 3 (K5)	PO 4 (K5)	PO 5 (K3)	PO 6 (K3)	PO 7 (K2)	PO 8 (K3)	PO 9 (K2)	PO 10 (K2)	PO11 (K3)	PO12 (K1)
CO 1 (K1)	1	-	-	2	-	-	-	-	-	-	1	-
CO 2 (K2)	2	1	-	-	-	-	3	-	-	-	2	-
CO 3 (K3)	3	2	2	-	-	-	-	-	-	-	-	-
CO 4 (K2)	2	1	-	-	-	-	3	-	-	-	-	-
CO 5 (K2)	2	1	-	-	-	-	3	-	-	-	-	-
CO 6 (K3)	3	2	2	-	-	-	3	-	-	-	-	-

Mapping of course outcomes with program Specific Outcomes:

Course outcomes	PSO 1(K5)	PSO 2(K5)	PSO 3(K3)
CO 1 (K1)	-	-	1
CO 2 (K2)	-	-	2
CO 3 (K3)	1	1	3
CO 4 (K2)	-	-	2
CO 5 (K2)	-	-	2
CO 6 (K3)	1	1	3

UNIT-I:
Introduction to Electrical Circuits
Passive components and their V-I relations- Sources (dependent and independent) - kirchhoff's laws, network reduction techniques (series, parallel, series - parallel, star-to-delta and delta-to-star transformation) - source transformation technique - nodal analysis and mesh analysis.

UNIT-II:

AC Fundamentals and Graph Theory

Concepts of AC circuits – rms value, average value, form and peak factors, steady state analysis of R, L and C circuits – real and reactive power – power factor.

Graph of a network – Incidence matrix, Cut set and Tie set matrices & Formation of equilibrium equations, Dual networks.

UNIT-III

Network Theorems (With AC & DC Excitations)

Superposition theorem, Thevenin's theorem, Norton's theorem, Maximum power transfer theorem, Reciprocity theorem, Millman's theorem, Compensation theorem, Tellegen's Theorem, Substitution Theorem. (including dependent sources).

UNIT-IV

Resonance

Resonant circuits-series, parallel, series-parallel circuits-effect of variation of Q on resonance. Relations between circuit parameters - Q, resonant frequency and bandwidth.

UNIT-V

Magnetic Circuit

Basic definition of Magneto Motive Force, flux and reluctance. analogy between electrical and magnetic circuits. Faraday's laws of electromagnetic induction concept of self and mutual inductance. Dot convention, coefficient of coupling, composite magnetic circuit- Analysis of series and parallel magnetic circuits.

Text Books:

1. Circuit Theory (Analysis and Synthesis) by A. Chakrabarthi, DhanpatRai & Co.
2. Electrical circuit analysis by A. Sudhakar & Shyammohan S Palli, McGraw Hill.
3. Network theory by Smarajit Ghosh, PHI learning Private Ltd.

Reference Books:

1. Fundamentals of Electrical Circuits by Charles K. Alexander and Mathew N. O. Sadiku, McGraw Hill Education (India).
2. Electric Circuits– (Schaum's outlines) by Mahmood Nahvi & Joseph Edminister, Adapted by K. Uma Rao, 5th Edition – McGraw Hill.
3. Engineering Circuit Analysis by William Hayt and Jack E. Kemmerley, McGraw Hill Company,6^{th} edition.
4. Network Analysis by Van Valkenburg; Prentice-Hall of India Private Ltd.
5. Introductory Circuit Analysis by Robert L Boylestad, Pearson Publications.
6. Basic Engineering Circuit Analysis by Ed. J. David Irwin, R. M. Nelms, Wiley Publications.

Web Links:

1. http://www.nptelvideos.in/2012/11/circuit-theory.html
2. https://www.youtube.com/user/nptelhrd/videos
3. https://en.wikipedia.org/wiki/Network_analysis_(electrical_circuits)
4. https://en.wikibooks.org/wiki/Circuit_Theory

BASIC CIVIL AND MECHANICAL ENGINEERING

II Semester	**L**	**T**	**P**	**C**
Course Code: 201ES2T13	**3**	**0**	**0**	**3**

Course Objectives:

COB 1: To impart basic principles of stress, strain, shear force and bending moment.
COB 2: To teach principles of strain measurement using electrical strain gauges.
COB 3: To impart basic characteristics of building materials.
COB 4: To familiarize the sources of energy, power plant economics and environmental aspects.
COB 5: To make the students to understand the basic concept of Boilers & I.C. engines.

Course Outcomes:
At the end of the Course, Student will be able to:

CO 1: Apply Shear force diagram & Bending moment diagram principles for Cantilever and Simply supported beams.
CO 2: Apply concepts of Rosette analysis for strain measurements.
CO 3: Analyze the characteristics of common building materials.
CO 4: Compare the working characteristics of Internal Combustion engines.
CO 5: Compare the differences between boiler mountings and accessories.

Mapping of course outcomes with program outcomes:

CO/PO	PO 1 (K3)	PO 2 (K4)	PO 3 (K5)	PO 4 (K3)	PO 5 (K3)	PO 6 (K3)	PO 7 (K2)	PO 8 (K3)	PO 9 (K2)	PO 10 (K2)	PO11 (K3)	PO12 (K1)
CO1 (K3)	3	2	-	-	-	-	2	-	-	-	-	-
CO2 (K3)	3	2	-	-	-	-	3	-	-	-	-	-
CO3 (K4)	3	3	-	-	-	-	3	-	-	-	-	-
CO4 (K4)	2	3	-	-	-	-	3	-	-	-	-	-
CO5 (K4)	3	3	-	-	-	-	3	-	-	-	-	-

Mapping of course outcomes with program Specific Outcomes:

CO / PSO	PSO 1(K5)	PSO 2(K5)	PSO 3(K3)
CO1 (K3)	-	-	-
CO2 (K3)	-	1	-
CO3 (K4)	-	2	-
CO4 (K4)	-	-	-
CO5 (K4)	-	2	-

UNIT-I:
Basic Definitions of Force – Stress – Strain – Elasticity. Shear force – Bending Moment – Torsion . Simple problems on Shear force Diagram and Bending moment Diagram for cantilever and simply supported beams.

UNIT – II:
Measurement of Strain - Electrical Capacitance and Resistance Strain gauges – multi channel strain indicators. Rosette analysis – Rectangular and Triangular strain rosettes.

UNIT – III:

Characteristics of common building materials – Brick – Types – Testing; Timber – Classification –Seasoning – Defects in Timber; Glass – Classification – uses; steel and its applications in construction industry.

UNIT –IV

Hydraulic Turbines And Pumps:

Introduction to Power transmission tools, Hydraulic Turbines: Classification-Difference between Impulse and Reaction turbine. Pumps: Classification of Pumps, Centrifugal Pump-Applications-Priming-Reciprocating Pumps, Single Acting & Double acting-Comparison with Centrifugal Pump.

UNIT –V

I.C Engine: Heat Engine – Types of Heat Engine –Classification of I.C. Engine-Valve Timing Diagram, Port Timing Diagram- Comparison of 2S & 4S Engines- Comparison of Petrol

Engine and Diesel Engine-Fuel System of a Petrol Engine-Ignition Systems.

Boilers: Classification of Boilers – Simple Vertical Boiler – Cochran Boiler –Babcock and Wilcox Boiler – Benson Boiler – Difference between Fire Tube and ater Tube Boilers – Boiler Mountings and Accessories.

Text Books:

1. Basic Civil and Mechanical Engineering, by Prof. V.Vijayan, Prof. M.Prabhakaran and Er.R.Viashnavi, S.ChandPublication.
2. Elements of Mechanical Engineering Fourth Edition S Trymbaka Murthy, University Press.
3. Shanmugam G and Palanichamy M S, “Basic Civil and Mechanical Engineering”, Tata McGraw Hill Publishing Co., NewDelhi.
4. Ramamrutham S., “Basic Civil Engineering”, Dhanpat Rai Publishing Co. (P)Ltd.

Reference Books:

1. Seetharaman S., “Basic Civil Engineering”, Anuradha Agencies.
2. Venugopal K. and Prahu Raja V., “Basic Mechanical Engineering”, Anuradha Publishers, Kumbakonam.
3. Er. R. Vaishnavi, Basic Civil and Mechanical Engineering, 2/e, S.Chand Publications.

Web Links:

1. http://www.umich.edu/~nppcpub/resources/compendia/ARCHpdfs/ARCHsbmIntro.pdf
2. http://www.hillagric.ac.in/edu/coa/agengg/lecture/243/Lecture%203%20Engine.pdf

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DATA STRUCTURES THROUGH C LAB
(Common to EEE, CSE & IT)

II Semester	**L**	**T**	**P**	**C**
Course Code: 201ES2L06	**0**	**0**	**3**	**1.5**

Course Objectives:

COB 1: To impart knowledge on linear and non-linear data structures.
COB 2: To facilitate the students, learn different sorting and searching techniques.
COB 3: To make the students implement operations and applications of stacks and queues.
COB 4: To demonstrate various operations on linked lists.
COB 5: To provide knowledge on trees and its operations.
COB 6: To illustrate concept of graph representation and traversals.

Course Outcomes:
At the end of the Course, Student will be able to:

CO 1: Develop programs using recursive functions.
CO 2: Examine searching, sorting algorithms.
CO 3: Develop programs for implementing various operations on linear data structures.
CO 4: Analyze various basic operations of Binary tree and Binary search tree to improve the efficiency.

Mapping of course outcomes with program outcomes:

CO/PO	PO1 (K3)	PO2 (K4)	PO3 (K5)	PO4 (K5)	PO5 (K3)	PO6 (K3)	PO7 (K2)	PO8 (K3)	PO9 (K2)	PO10 (K2)	PO11 (K3)	PO12 (K1)
CO1 (K3)	3	2	1	1	-	-	-	-	-	-	-	-
CO2 (K4)	3	3	2	2	3	-	-	-	-	-	-	-
CO3 (K3)	3	2	1	1	3	-	-	-	-	-	-	-
CO4 (K4)	3	3	2	2	3	-	-	-	-	-	-	-

Mapping of course outcomes with program Specific Outcomes:

CO / PSO	PSO1 (K3)	PSO2 (K3)	PSO3 (K2)
CO1 (K3)	3	3	3
CO2 (K4)	3	-	3
CO3 (K3)	3	-	3
CO4 (K4)	3	-	3

List of Experiments:
For the following experiments use C program to implement,
1. Searching
1.1) Recursive and non recursive functions to perform Linear search for a Key value in a given list.
1.2) Recursive and non recursive functions to perform Binary search for a Key value in a given list.

2. Sorting-I
2.1) Bubble sort, to sort a given list of integers.
2.2) Insertion sort, to sort a given list of integers.
2.3) Selection sort, to sort a given list of integers.

3. Quick sort, to sort a given list of integers.

4. Sorting-II

4.1) Merge sort, to sort a given list of integers.
4.2) Radix sort, to sort a given list of integers.
5. Stack operations using arrays.
6. Stack operations to evaluate the postfix expression.
7. Queue operations using arrays.
8. Singly linked list and its operations.
9. Doubly linked list and its operations.

10. Linked Lists

10.1) Stack operations using Linked List.
10.2) Queue operations using Linked List.
11. Binary tree traversals : inorder, preorder and postorder.
12. Binary Search Tree and its operations.

List of Augmented Experiments:

(Any 2 of the following experiments can be performed)

13. Balanced brackets problem using stack. A bracket is considered to be any one of the following characters: (,), {, }, [, or]. Two brackets are considered to be a matched pair if the an opening bracket (i.e., (, [, or {) occurs to the left of a closing bracket (i.e.,),], or }) of the exact same type.
14. Simplify an algebraic string of characters having '+', '-' operators and parenthesis. You need to print the simplified equation without the parenthesis.
    Example: Input: a-(b+c)
    Output: a-b-c
15. Represent Sparse Matrices using Linked Lists.
16. Towers of Hanoi Problem. Tower of Hanoi is a mathematical puzzle where we have three rods and n disks. The objective of the puzzle is to move the entire stack to another rod, obeying the following simple rules:
    Only one disk can be moved at a time.
    Each move consists of taking the upper disk from one of the stacks and placing it on top of another stack or on an empty rod.
    c) No larger disk may be placed on top of a smaller disk.

Reference Books:

1. Data Structures And Algorithm Analysis In C, Mark Allen Weiss,2nd Edition.
2. Data Structures And Algorithms.A.V.Pai,TMH,2008.
3. Data Structures With C,Seymour Lipsehutz, TMH.

Web Links:

1. http://nptel.ac.in/courses/106102064/
2. http://www.udacity.com/
3. http://www.courseera.com/
4. http://www.geeksforgeeks.org/data-structures/
5. http://www.studytonight.com/data-structures/

ELECTRICAL ENGINEERING WORKSHOP

II Semester		**L**	**T**	**P**	**C**
Course Code:	**201ES2L09**	**0**	**0**	**3**	**1.5**

Course Objectives:

COB 1: To make the student understand different tools, abbreviations and symbols used in Electrical Engineering.
COB 2: To train the students various wiring joints and measurement of gauge.
COB 3: To practice the student about the wiring and earthing for residential houses.
COB 4: To train the student understand wiring for induction motor and UPS.
COB 5: To enable the student analyze trouble shoot the electrical equipment (like fan, grinder, motor, etc.)

Course Outcomes:
At the end of the Course, Student will be able to:

CO 1: Demonstrate knowledge on different tools, abbreviations and symbols used in Electrical Engineering.
CO 2: Study of various wiring joints and measurement of gauge.
CO 3: Perform wiring and earthing for residential houses.
CO 4: Perform wiring for induction motor and UPS.
CO 5: Demonstrate how to trouble shoot the electrical equipment (like fan, grinder, motor, etc.)

Mapping of course outcomes with program outcomes:

CO/PO	PO 1 (K3)	PO 2 (K4)	PO 3 (K5)	PO 4 (K5)	PO 5 (K3)	PO 6 (K3)	PO 7 (K2)	PO 8 (K3)	PO 9 (K2)	PO 10 (K2)	PO11 (K3)	PO12 (K1)
CO1 (K2)	2	-	1	-	-	-	-	-	-	-	-	-
CO2 (K2)	2	-	1	-	-	-	-	-	-	-	-	-
CO3 (K2)	2	1	1	-	-	-	-	-	-	-	-	-
CO4 (K2)	2	1	1	-	-	-	-	-	-	-	-	-
CO5 (K2)	2	1	1	-	-	-	-	-	-	-	-	-

Mapping of course outcomes with program Specific Outcomes:

CO/PSO	PSO 1 (K5)	PSO 2 (K5)	PSO 3 (K3)
CO1 (K2)	-	-	1
CO2 (K2)	-	-	1
CO3 (K2)	-	-	1
CO4 (K2)	-	-	1
CO 5 (K2)	-	-	1

LIST OF EXPERIMENTS

1. Introduction to Electrical tools, symbols and abbreviations.
   a) Screw drivers
   b) Pliers
   c) Drilling machines & Drilling Bits.
   d) Rawl plug jumper, and poker
   e) Voltage/line tester
   f) Splicers (insulation remover)
   g) Standard Wire gauge

2. Perform Electrical Wiring Joints.
    a) Straight joint/ Married joint
    b) Prepare T joint
    c) Prepare Western union joint
    d) Prepare Pigtail joint
3. Measurement of wire gauges using gauge meter.
4. Perform of earthing and measurement of earth resistance.
5. Perform residential wiring (using Energy meter, Fuses, Switches, Indicator, Lamps, etc.).
6. Make a circuit with Two lamps controlled by two switches with PVC surface conduit system.
7. Perform UPS connection for 2/3 pin socket and one-way switch.
8. Perform wiring circuit for 3 phase Induction motor wiring using DOL starter.
9. Perform wiring circuit for 3 phase Induction motor wiring using star/delta starter.
10. Study of trouble shooting of electrical equipment's (fan, iron box, mixer-grinder, etc.).

LIST OF AUGMENTED EXPERIMENTS

(Any two of the following experiments can be performed)

11. Perform plate earthing.
12. Perform a circuit for two lamps controlled by 2 two-way switches.
13. Measurements of Electrical quantities (like Voltage, Current, Power, Power factor in RLC circuits).
14. Study of PV Cell.

Reference Books:

1. Electrical Wiring, Estimating and Costing by S. L. Uppal, J. M. Laroia, Khanna Publications.
2. Electrical Machines by R. K. Rajput, Lakshmi publications,5th edition
3. Lab manual of Electrical Engineering by NITTTR, Chennai
4. Electrical Wiring Practice by Keith Pethebridge, Ian Neeson, Paul Lowe, McGraw-Hill Education, 8th edition.

Web Links:

1. https://nptel.ac.in/courses/108108076
2. https://www.electrical4u.com/earthresistance/
3. www.electricaleasy.com

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BASIC CIVIL AND MECHANICAL ENGINEERING LAB

II Semester		**L**	**T**	**P**	**C**
Course Code:	**201ES2L11**	**0**	**0**	**3**	**1.5**

Course Objectives:

COB 1: To make the student learn about the constructional features and operational details of various types of internal combustion engines.
COB 2: To make the student learn about the constructional features, operational details of various types of hydraulic turbines
COB 3: To practice the student about the fundamental of fluid dynamic equations and its applications fluid jets.
COB 4: To train the student in the areas of types of hydro electric power plants, estimation and calculation of different loads by considering various factors.

Course Outcomes:
At the end of the Course, Student will be able to:

CO 1: Solve to arrive at finding constant speed and variable speed on IC engines and interpret their performance.
CO 2: Estimate energy distribution by conducting heat balance test on IC engines.
CO 3: Explain procedure for standardization of experiments.
CO 4: Determine flow discharge measuring device used in pipes channels and tanks.
CO 5: Determine fluid and flow properties.
CO 6: Solve for drag coefficients.
CO 7: Test for the performance of pumps and turbines.

Mapping of course outcomes with program outcomes:

CO/PO	PO 1 (K3)	PO 2 (K4)	PO 3 (K5)	PO 4 (K5)	PO 5 (K3)	PO 6 (K3)	PO 7 (K2)	PO 8 (K3)	PO 9 (K2)	PO 10 (K2)	PO 11 (K3)	PO 12 (K3)
CO1 (K3)	3	2	1	1	3	3	-	-	-	2	3	-
CO2 (K5)	3	3	-	-	3	3	-	-	-	3	3	-
CO3 (K2)	2	1	-	-	2	2	-	-	-	3	2	-
CO4 (K5)	3	3	3	3	3	3	-	-	-	-	3	-
CO5 (K5)	3	3	3	3	3	3	-	-	-	-	3	-
CO6 (K3)	3	2	1	1	3	3	-	-	-	3	3	-
CO7 (K4)	3	3	2	2	3	3	-	-	-	3	3	-

Mapping of course outcomes with program Specific Outcomes:

CO/ PSO	PSO 1 (K5)	PSO 2 (K5)	PSO 3 (K3)
CO1 (K3)	-	-	-
CO2 (K5)	-	-	-
CO3 (K2)	-	-	-
CO4 (K5)	-	-	-
CO5 (K5)	-	-	-
CO6 (K3)	-	-	-
CO7 (K4)	-	3	-

List of Experiments:

1. Valve time timing diagram on 4-S Diesel engine.
2. Valve time timing diagram on 4-S Petrol engine.
3. Port timing diagram on 2-S Petrol engine.
4. Study on Boiler models.
5. COP determination of Refrigeration tutor.
6. COP determination of Air conditioner tutor.
7. Determination of coefficient of discharge on Impact of Jets on Vanes apparatus.
8. Performance test on Pelton wheel.
9. Performance test on Francis turbine.
10. Performance test on Kaplan turbine.
11. Performance test on Single stage Centrifugal pump.
12. Performance test on Reciprocating pump.

List of Augmented Experiments:

(Any two of the following experiments can be performed)

13. Determination of Loss of head due to sudden contraction and sudden enlargement.
14. Heat balance sheet on Multi cylinder Petrol engine.
15. Heat balance sheet on 4-S diesel engine.
16. Determination of coefficient of discharge on Venturimeter.

Web Links:

1. https://www.iare.ac.in/sites/default/files/lab2/TE%2Blab.pdf
2. https://www.dbit.ac.in/ce/syllabus/hydraulics-and-hydraulic-machines-lab.pdf

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PROFESSIONAL COMMUNICATION SKILLS LAB
(Common to CE, EEE, ECE, CSE & IT)

II Semester	**L**	**T**	**P**	**C**
Course Code: 201MC2L01	**0**	**0**	**3**	**0**

Course Objectives:

COB 1: To facilitate computer-aided multi-media instruction enabling individua and independent language learning.
COB 2: To improve the fluency in spoken English and neutralize mother tongue Influence.
COB 3: To train students to use language appropriately.

Course Outcomes:
At the end of the Course, Student will be able to:

CO 1: Illustrate interpersonal skills using language confidently and effectively for personal and profession growth.
CO 2: Make use of effective delivery strategies to select, compile, and synthesize information for an oral presentation.
CO 3: Demonstrate in mock interviews, mock group discussion and public speaking.
CO 4: Identify communicative competency to respond to others in different situations.

Mapping of course outcomes with program outcomes:

CO/PO	PO 1 (K3)	PO 2 (K4)	PO 3 (K5)	PO 4 (K5)	PO 5 (K3)	PO 6 (K3)	PO 7 (K2)	PO 8 (K3)	PO 9 (K2)	PO 10 (K2)	PO11 (K3)	PO12 (K1)
CO1 (K2)	-	-	-	-	-	-	-	-	-	3	-	-
CO2 (K3)	-	-	-	-	-	-	-	-	-	2	-	-
CO3 (K2)	-	-	-	-	-	-	-	-	-	3	-	-
CO4 (K3)	-	-	-	-	-	-	-	-	-	2	-	-

Mapping of course outcomes with program Specific Outcomes:

CO / PSO	PSO 1 (K4)	PSO 2 (K4)	PSO 3 (K6)	PSO 4 (K3)
CO1 (K2)	-	-	-	-
CO2 (K3)	-	-	-	3
CO3 (K2)	1	1	-	2
CO4 (K3)	-	-	-	-

PRACTICE 1:
Body Language

PRACTICE 2:
Dialogues

PRACTICE 3:
Presentation Skills

PRACTICE 4:
Group Discussion

PRACTICE 5:
Interviews and Telephonic Interviews.

PRACTICE 6:
Debates

Reference Books:

1. Strengthen your Communication Skills by Dr.M.Hari Prasad, Dr. Salivendra J.Raju and Dr.G.Suvarna Lakshmi, Maruthi Publications.
2. English for Professionals by Prof Eliah,B.S Publications, Hyderabad.
3. A Hand book of English for Professionals by Prof Eliah, B.S Publications.
4. Effective Technical Communication by M. Ashraf Rizvi, Tata Mcraw – Hill Publishing Company.
5. Cornerstone, Developing soft skills, Pearson Education.

Web Links:

1. https://edu.gcfglobal.org/en/business-communication/how-to-deescalate-an-argument-at-work/1/
2. https://www.youtube.com/watch?v=NNamZZsggM4
3. https://www.inc.com/guides/how-to-improve-your-presentation-skills.html
4. https://www.skillsyouneed.com/ips/interview-skills.html
5. https://www.sfu.ca/cmns/130d1/HOWTODEBATE.htm

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CONSTITUTION OF INDIA
(Common to all branches)

II Semester	**L**	**T**	**P**	**C**
Course Code: 201MC2T02	**2**	**0**	**0**	**0**

Course Objectives:

COB 1: To enable the student to interpret the importance of constitution.
COB 2: To facilitate the students to illustrate the structure of executive, legislature and judiciary.
COB 3: To allow the students to classify philosophy of fundamental rights and duties.
COB 4: To facilitate the students to outline the autonomous nature of constitutional bodies like Supreme Court, High Court, Comptroller and Auditor General of India and Election Commission of India.
COB 5: To enable the student to interpret the central and state relations of finance and administration.

Course Outcomes:
At the end of the Course, Student will be able to:
CO 1: Explain historical background of the constitution making and its importance for building a democratic India.
CO 2: Compare the functioning of three wings of the government i.e.., executive, legislative and judiciary.
CO 3: Interpret the value of the fundamental rights and duties for becoming good citizen of India.
CO 4: Compare the decentralization of power between central, state and local self-government.
CO 5: Extend the knowledge in strengthening of the constitutional institutions like CAG, Election Commission and UPSC for sustaining democracy.

Mapping of course outcomes with program outcomes:

CO/PO	PO 1 (K3)	PO 2 (K4)	PO 3 (K5)	PO 4 (K5)	PO 5 (K3)	PO 6 (K3)	PO 7 (K2)	PO 8 (K3)	PO 9 (K2)	PO 10 (K2)	PO11 (K3)	PO12 (K1)
CO1 (K3)	-	-	-	-	-	-	-	-	2	-	-	-
CO2 (K2)	-	-	-	-	-	-	-	-	3	-	-	-
CO3 (K2)	-	-	-	-	-	-	-	-	3	-	-	-
CO4 (K2)	-	-	-	-	-	-	-	-	3	-	-	-
CO5 (K3)	-	-	-	-	-	-	-	-	2	-	-	-

Mapping of course outcomes with program Specific Outcomes:

CO/PSO	PSO1 (K4)	PSO2 (K4)	PSO3 (K6)	PSO4 (K3)
CO1 (K3)	-	-	-	-
CO2 (K2)	-	-	-	-
CO3 (K2)	-	-	-	-
CO4 (K2)	-	-	-	-
CO5 (K3)	-	-	-	-

UNIT-I
Introduction to Indian Constitution: Constitution' meaning of the term, Indian Constitution - Sources and constitutional history, Features - Citizenship, Preamble, Fundamental Rights and Duties, Directive Principles of State Policy.

UNIT-II

Union Government and its Administration Structure of the Indian Union: Federalism, Centre- State relationship, President: Role, power and position, PM and Council of ministers, Cabinet and Central Secretariat, Lok Sabha, Rajya Sabha, The Supreme Court and High Court: Powers and Functions.

UNIT-III

State Government and its Administration Governor - Role and Position - CM and Council of ministers, State Secretariat: Organization, Structure and Functions.

UNIT-IV

A .Local Administration - District's Administration Head - Role and Importance, Municipalities - Mayor and role of Elected Representative - CEO of Municipal Corporation PachayatiRaj: Functions PRI: Zila Panchayat, Elected officials and their roles, CEO Zila Panchayat: Block level Organizational Hierarchy - (Different departments), Village level - Role of Elected and Appointed officials - Importance of grass root democracy.

UNIT-V

Election Commission: Election Commission- Role of Chief Election Commissioner and Election Commissionerate State Election Commission, Functions of Commissions for the welfare of SC/ST/OBC and women.

Text Books:

1. Durga Das Basu, Introduction to the Constitution of India, Prentice – Hall of India Pvt. Ltd. New Delhi.
2. Subash Kashyap, Indian Constitution, National Book Trust.

Reference Books:

1. J.A. Siwach, Dynamics of Indian Government & Politics.
2. D.C. Gupta, Indian Government and Politics.
3. H.M.Sreevai, Constitutional Law of India, 4th edition in 3 volumes (Universal Law Publication).
4. J.C. Johari, Indian Government and Politics Hans.

Web Links:

1. nptel.ac.in/courses/109104074/8
2. nptel.ac.in/courses/109104045/
3. nptel.ac.in/courses/101104065/
4. www.hss.iitb.ac.in/en/lecture-details
5. www.iitb.ac.in/en/event/2nd-lecture-institute-lecture-series-indian-constitution

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