Scheme and Syllabus (1st year)
(Common to all Branches)
(With effect from 2018-19 Academic Year)

Bachelor Degree in Engineering
Out Come Based Education
with
Choice Based Credit System

P.E.S. College of Engineering, Mandya - 571 401, Karnataka
(An Autonomous Institution Affiliated to VTU, Belagavi)
Grant -in- Aid Institution (Government of Karnataka)
World Bank Funded College (TEQIP), Accredited by NBA, NAAC & Approved by AICTE, New Delhi.

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Phone : +91-8232-220043/238042/220120/238330/238683
Fax : 08232 – 222075

e-mail : principal@pesce.ac.in; Web : www.pescemandya.org, www.pesce.ac.in
## Scheme of Teaching and Examination [CBCS with OBE]

### I – Semester [ Physics Group ]

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**Total**: 21 400 400 800

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**Total**: 21 400 400 800

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**Env. Studies /Language (Kannada)**: Students shall have to pass these Mandatory Learning Courses before completion of IV Semester.

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**ICHRPE**: Students shall have to pass these Mandatory Learning Courses before completion of IV Semester.

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**II – Semester [ Chemistry Group ]**: Students shall have to pass these Mandatory Learning Courses before completion of IV Semester.
### III– Semester

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**Total**

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* ECD / ICHRPF / Additional Mathematics - I: Lateral entry (i.e. Diploma) students shall have to pass these mandatory learning courses before completion of VI- Semester. CIE only for 50 marks.

**ARDB: All students shall have to pass this mandatory learning courses before completion of VI- Semester**

**Common to BE (AU, CV, ME and I&PE)**

**Common to BE (CS, EC, E&E and IS&E)**

### IV– Semester

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**Total**

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* Additional Mathematics –II & Environmental Studies: Lateral entry (i.e. Diploma) students shall have to pass these mandatory learning courses before completion of VI- Semester. CIE only for 50 marks.

**Common to BE (AU, CV, ME and I&PE)**

**Common to BE (CS, EC, E&E and IS&E)**

### V– Semester

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**Professional Elective - I**

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Professional Elective - II  Open Elective –I  Technical Skills-II

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Total: 23 450 350 800

List of Electives

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Total: 17 300 250 550
Category of Courses & Components:

1. **Core Courses**: The Core courses constitute the core of the programme of study. Core courses are to be compulsorily studied by a student and are mandatory to complete them to fulfill the requirements of a programme.

2. **Foundation Courses**: Foundation courses constitute the fundamental learning of a given programme of study. Generally, they comprise courses such as basic & life sciences, logic & mathematics, statistics & analytics, basic engineering, technical arts and computer programming skills.

3. **Professional Electives**: Professional Elective courses offer a choice of advanced or specialized courses related to the programme of study. They enable students to specialize in a domain of interest or tune their learning to suit career needs and current trends.

4. **Open Electives**: The course offered by a competent department/discipline of specialization in order to help a candidate of any other discipline to gain knowledge and reasonable extent of expertise in an area, wherein the student wishes to acquire some support for development in either of his own academic or research interests, etc.

**Note to Students:**

I. All B.E Program students should study one Open elective each in the VI and VII Semester as a part of their Programme.

II. Students should register for the Open elective in the beginning of the VI/VII semester in the department, where the elective is offered. An Open elective is not offered in a department if the registered student's strength is less than 20.

III. All Open electives are offered to students of all B.E Programmes (branches) of engineering in general. However, if a student of a particular Programme has already studied going to study, in higher semester a similar Core course with majority of topics same as that of a particular Open elective, then that Open elective is not offered to that student. In which case, the student has to select an alternative Open elective.

IV. Having studied/selected a particular Open Elective, a student is not eligible to take a Professional elective of his/her Programme in the higher semesters / same semester which will have majority of topics same as that of the Open elective studied / selected. In which case, the student has to select an alternative Professional elective.

V. Students are advised to select an Open elective of their interest and if they have a pre requisite knowledge to study that particular open elective.

**Note to Departments:**

I. Above conditions are to be monitored by an Open elective coordinator of the department to which the student belongs to and the Course coordinator of the department where the student registers for the Open elective in the beginning of the VII / VIII semester.

II. The Teaching department(s) for Open Elective is not restricted to only those departments(s) indicated in the list. Any other department faculty who has the requisite expertise to teach a particular Open elective can also teach it.

III. Offering department indicated in the list of Open electives is the department which is responsible to set the Syllabus and Question paper for the particular Open elective.

5. **Self-Study Course and Seminar**: The courses related to the program discipline which is studied by the students with her/his own efforts under the guidance of a Course Instructor/Project guide, using study materials available in open sources i.e. Massive Open Online Course (MOOC) NPTEL Courses. The intention of the course is to encourage the habit of self-learning. Such courses may be devised with the guidance of Course Instructor/Project guide and introduced during 8th Semesters of Bachelors of Engineering program. It shall carry two credits.

The Assessment marks (CIE) shall be based on the evaluation during 8th semester by a committee consisting of Head of the concerned department, two senior faculty members of the department, one of them may be the internal guide. The work may be evaluated by the committee for award of Assessment marks (CIE) based on a Report, presentation and viva voce.

6. **Internship**: The Internship shall be completed during the period specified in the Scheme of Teaching and Examination.

   I. The students admitted for the Academic Year 2017-18 shall undergo **EIGHT weeks Internship** or **FOUR weeks Internship along with minimum EIGHT weeks NPTEL Course during the vacation period of V-VI semester and / or VI-VII Semester and / or VII-VIII Semester.**

   II. The internship can be carried out in any Industry / R & D Organization / Research institute / Educational institute of repute / Internshala (AICTE MoU Internships / Hands-on-Training by the concerned department or by the Training & Placement Cell.

   III. The Department shall nominate staff members to facilitate guide and supervise students for internship.

   IV. The Internal Guide has to visit place of internship at least once during the student’s Internship to assess the progress of work.

   OR

The students shall report the progress of the internship to the guide in regular intervals and seek his / her advice.

V. After the completion of Internship the students shall submit a report in **VIII semester** to the Head of the Department with the approval of their guide.
VI. There will be 50 marks of CIE(Seminars: 25, Internship report: 25) and 50 marks for Viva Voce conducted during Semester End Examination (SEE) of VIII Semester. For the conduction of Internship Semester End Examination following instructions are issued:

a. The semester End Examination (SEE) for 50 marks shall be conducted similar to final semester project work / lab examinations.

b. Internal and External Examiners shall be appointed by the BOE Chairman in consultation with HOD and approval of the same by the Principal and Controller of Examination.

c. External Examiner may be from the industry.

d. If the External Examiner from the industry is not available, alternative arrangements shall be made by the BOE Chairman by appointing a faculty from out of the faculty of the department, wherein the student is studying.

VII. The students are permitted to carry out the internship anywhere in India.

VIII. Failing to undergo Internship: Internship is one of the head for obtaining degree, therefore completion of internship is mandatory.

7. Project Work: The Project Work (Phase I + Phase II) carries 8 credits (2 credits+6 credits) and spreads over TWO semesters, i.e. during 7th and 8th semesters.

I. Project Phase – I and Project seminar Comprises of Literature Survey, Problem identification, Objectives and Methodology. CIE marks shall be based on the report covering Literature Survey, Problem identification, Objectives and Methodology and seminar presentation skill.

II. The Assessment marks (CIE) in the case of Project Work - Phase I, shall be based on the evaluation at the end of the 7th semester by a committee consisting of Head of the concerned department, two senior faculty members of the department, one of them may be the internal guide. The work may be evaluated by the committee for award of Assessment marks (CIE) based on a Report [comprising of synopsis, Introduction, Literature survey, Objective and Methodology], presentation and viva voce.

III. The project work shall be carried out by candidate(s) independently/in a group (maximum of four) during the seventh and eighth semester under the guidance of one of the faculty members of the Department of study. If the project work is of inter-disciplinary nature, a co-guide shall be taken from the same or any other relevant Department. If a project work has to be carried out in any industry / factory / organization, outside the campus, the permission for the same and the name of co-guide at any of these organizations shall be intimated to the authorities at the beginning of seventh semester by the Head of the Department.

IV. The weekly progress of the Project work shall be monitored and reviewed by the Project Guide assigned by DUGC. The method of evaluation, including intermediate assessment shall be evolved by the pertinent DUGC.

V. A candidate shall submit N+3 (No. of candidates+3) copies of the Report of the Project Work to Head, DUGC on or before the specified date. The report shall be in the format prescribed by the Institute. The candidate shall submit a report of the project work (dissertation) duly approved by the guide and co-guide. The project report shall be countersigned by the guide, co-guide (if any) and the Head of the Department.

VI. The last date for the submission of Report shall be Two weeks before the closure of the semester in which the project work credits have been registered for and is expected to be completed or as announced by the COE.

The date of submission of the dissertation may be extended up to a maximum of eight academic years, from the date of commencement of the first semester in which the candidate has taken admission to the course.

VII. The final evaluation (CIE & SEE) for Project Work - Phase II is done by a Project Work Evaluation Committee (PWEC) constituted by the pertinent DUGC. There shall be an open seminar followed by a viva – voce examination as part of the final evaluation. After the final evaluation, appropriate letter grade is awarded.

VIII. If in the opinion of the PWEC, the Project Report is acceptable with minor modifications for the minimum passing grade ‘E’(Fair) in the case of project, the PWEC shall value and instruct the candidate suitably to incorporate the necessary modifications and to resubmit it to the Chairman, PWEC. After such resubmission, the Chairman, PWEC will certify that the necessary modification has been incorporated.

IX. The Assessment marks in case of Project Work - Phase II and seminar shall be based on the evaluation, as per the guidelines, at the end of the 8th semester by a committee consisting of Head of the concerned department, two senior faculty members of the department (one of them may be the internal guide).

X. The Assessment marks sheet shall bear the signature of all those concerned, along with the date and seal of the Principal.

8. Non-credit courses: A few courses may not be assigned credits. Such courses shall be referred to as non-credit (NC) courses, and may be mandatory in a programme of study. Certain programmes of study may have additional requirements such as apprenticeship and residency.

9. Self-study component: Self-study component shall be the additional part of each unit and must not be included in the actual content of five unit’s syllabus.

I. Assignment shall be reduced to 5 marks from 10 marks and the remaining 5 marks shall be part of the self-study component.
10. Technical Skills & Skill Oriented Laboratory:

To enhance student’s abilities to employment and/or self-employment opportunities etc. a credit course of Technical Skills & Skill Oriented Laboratory are introduced.

Technical Skills:
- Technical Skills is a ONE credit course which consists of 2 hours per week per semester tutorial sessions.
- The Continuous Internal Evaluation (CIE) shall be conducted by the course teacher for 50 Marks; which shall include two written tests and two events such as quiz, assignments, problem solving, group discussions etc. The student shall secure a minimum of 40% of the total marks prescribed for the CIE in each course to become eligible for SEE.
- Semester-End Examination (SEE) shall be conducted by the course teacher for 50 Marks at the end of a semester, on dates fixed by the Controller of Examinations office during the regular SEEs. The question paper for SEE is comprises of Multiple Choice Questions (MCQ).

Skill Oriented Laboratory
- Skill Oriented Laboratory is a ONE credit course which consists of 2 hours per week per semester practical sessions.
- The CIE shall be conducted by the course teacher for 50 Marks and shall be assessed by continuous internal evaluation, followed by a laboratory test by concerned course teacher. The student shall secure a minimum of 40% of the total marks prescribed for the CIE in each course to become eligible for SEE.
- Semester-End Examination (SEE) shall be conducted by the course teacher for 50 Marks at the end of a semester, on dates fixed by the Controller of Examinations office during the regular SEEs. The conduction process is similar to normal laboratory courses.
First and Second Semester Syllabus
Academic Year 2018-19

Department of Mathematics

About the Department:
The Department was started in the year 1962. Currently the Department has 09 teaching faculty and 01 supporting staff. It has an established research centre under University of Mysore and VTU, Belagavi with 02 research guides and presently there are 09 research scholars. So far 07 candidates have been awarded Ph. D. degree. During the last five years, the Department has published 50 papers in international and 24 papers in national journals. The Department’s prides itself in hosting 02 national seminars/ workshops. The Department has good supporting Non-teaching staff. There is good synergy between the teaching and non-teaching faculty.

Vision:- Department of high repute to develop innovative and humane engineers by imparting mathematical proficiency to address scientific and engineering challenges.

Mission:- Committed to
• Develop competent faculty towards conveying best in class teaching and learning.
• Facilitate inter disciplinary faculty development and research.
• Nurture qualities of computation and mathematical skills for solving engineering and technological problems.
• Mould students with value based education to improve their intrinsic standards

Short Term Goals:
• To apply for research projects under UGC/DST grants.
• To host a national conference on ‘Recent Trends in Applied Mathematics’.
• To conduct a training programme for faculty of Mathematics in PU level Institutions and Engineering college.

Mid Term Goals:
• To establish Numerical Mathematical Lab for M.Tech/Research students.
• To cater needs of UG/PG and research students by providing required elective courses.

Long Term Goals:
• To host a international conference on Mathematical Applications in Engineering and Technology.
• To undertake curriculum revision for UG/PG programmes, periodically.

Course Title: Engineering Mathematics-I

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Relevance of the Course
Engineering Mathematics- I is a fundamental course for all branches in BE program, that builds knowledge in understanding the allied engineering courses such as applied mechanics, electronic fundamentals, elements of electrical/mechanical engineering science etc., by applying appropriate mathematical concepts of differentiation, integration, vector differentiation and first order differential equations.

Course Content
UNIT-I

Review of differential calculus. Polar curves - angle between the radius vector and the tangent, angle of intersection. Pedal equation (for polar curves)-problems only. Derivatives of arcs, curvature and radius of curvature- Cartesian, parametric, polar and pedal forms (No derivation)-Problems only. Center and circle of curvature: Applications to evolutes and involutes. 05+05=10 Hrs

Self-Study component - Calculation of nth derivative of standard functions and Leibnitz’s rule.
UNIT-II
Lagrange’s and Cauchy’s mean value theorem. (statements only) - Illustrative examples, Taylor’s theorem for a function of single variable and Maclaurin’s series expansion (statements only) – Illustrative examples. Indeterminate forms - L’Hospital’s rule(without proof), 0×∞ , ∞-∞, 0^0, ∞^0 and 1^∞.

Self-study component- Rolle’s Theorem & indeterminate forms 0/0 and ∞/∞.

05+05=10 Hrs

UNIT-III
Partial differentiation - Introduction and Problem. Euler’s theorem for homogeneous functions of two variables (No proof-problems only). Total derivatives-differentiation of composite and implicit functions- Problems. Vector differentiation: Differentiation of vector/scalar point functions. Velocity and acceleration of a particle moving on a space curve. Gradient of a scalar point function, directional derivative - Problems only. Divergence and curl, solenoidal and irrotational vector fields- Problems only. Vector identities (No proof)

Self-study component- Euler’s extension theorem and related problems, vector identities. Introduction and elementary problems of partial differentiation.

06+06=12 Hrs

UNIT-IV
Reduction formulae for ∫cos^n x, ∫sin^n x, ∫sin^m xcos^n x, and evaluation of these with standard limits. Differentiation under integral sign (integrals with constant limits). Tracing of curves and its applications connected with standard curves viz., Cissiod, Cycloid and Cardioid. Applications of integration to area, length of a given curve, volume and surface area of solids of revolution (Standard curves)

Self-study component- Tracing of the curves – Astroid, Witch of agnesi, Strophoid, Lemniscate of Bernoulli.

05+05=10 Hrs

UNIT-V

Self-study component- Solution of ODE by Variable separable and homogeneous types –Simple problems.

Text Books:

Reference Books:

Course Outcomes (CO’s)
After learning all the units of the course, the student is able to;

CO1: Apply the knowledge of calculus to solve problems related to polar curves and its applications in determining the bentness of a curve.

CO2: Explain mean value theorems and evaluate the indeterminate form and power series using Taylors and Maclaurin’s series.

CO3: Differentiate the function of several variables differentiate the composite function. Evaluate the vector differentiation.

CO4: Evaluate some standard integrals by applying reduction formula and solve application problems. Solve differential equations of first order and solve application problems in engineering field.
Department of Physics

About the department
Physics department is one of the oldest departments of PES College of Engineering, Mandya, established in the year 1962. It is located in the first floor of the Administrative Block. The department has very good infrastructure with a carpet area of 320 sq.m consisting of two spacious laboratories, HOD’s chamber, two staff rooms, a departmental library, an internet room and a store room. The entire department is newly renovated with modern amenities and the laboratories are well established with latest & modern equipment’s. The department offers Engineering Physics Theory and Laboratory courses for the First year B.E students of all branches. The Department has been getting excellent results both in theory and practical examinations.

The department has five faculty, out of which one Professor, one Associate Professor and three Assistant Professors, among them two faculties have Ph.D. in different fields. The department is recognized for research in Physics under PET research center affiliated to University of Mysore, Mysore and VTU Belagavi. Dr. Shivalinge Gowda, Dr. T. S. Shashikumar are involved in research activities and Mr. B.M. Thammanna is pursuing Ph.D.

The department has good supporting Non-teaching staffs with one Assistant Instructor and three Helpers. There is good synergy between the teaching and non-teaching faculty.

Vision:
Department of excellence imparting strong foundation in Applied Physics for developing competent technocrats.

Mission:
Committed to:
1) Develop competent and committed faculty in the light of outcome based education.
2) Motivate and encourage the students to gain scientific temperament and creativity through interactions among faculty and students.
3) Provide strong theoretical foundation complemented with extensive practical training to achieve excellence.

Short Term Goals:
☆ Academic performance excellence in basic sciences
☆ Guest lecturers/seminars from eminent faculty
☆ Faculty development programmes
☆ Project proposals and fund raising

Mid Term Goals:
• Modernization of Physics labs
• Conducting National conferences
• Establishment of research centre

Long Term Goals:
◆ Inter disciplinary research activities
◆ Establishing centre of excellence

Course Title: Engineering Physics
Course Code: P18PH12/22 | Sem: I/II | L-T-P-H: 4 - 0 - 0 - 4 | Credits: 4
Contact Period: Lecture: 52 Hr, Exam: 3 Hrs. | Weightage: CIE: 50%; SEE: 50% Marks

The student should have acquire knowledge of Basic laws, principles, theories, phenomenon, definitions, expressions, applications, advanced research information and techniques required to work with materials and material sciences. Engineering Physics combines basic engineering classes with fundamental physics courses. The course provides a more thorough founding in applied physics of an area related to engineering filed chosen by the student.
Course Content

Unit – I: Modern Physics and Quantum Mechanics: 10 hrs


**Self study component:** Reduction of Rayleigh-Jeans law and Wein’s law from Planck’s law.

Unit – II: Elastic and Dielectric properties of Materials: 10 hrs


**Self-study component:** Rigidity modulus by torsional pendulum

Unit – III: Electrical Conductivity in Metals and Semiconductors: 10 hrs


**Self-study component:** Expression for energy gap of an intrinsic semiconductor by variation of resistivity with temperature.

Unit – IV: Lasers and Optical Fibers: 10 hrs


**Self-study component:** Measurement of pollutants in the atmosphere using LASER.
Unit – V: Superconductivity and Theory of Sound: 10 hrs


Self-study component: Sound absorbing materials and factors affecting acoustics of buildings.

Text Books

References

D. Course Outcomes (COs)
At the end of the course, the students should be able to:

CO1 - Understand the basic concepts and principles of Physics describing the phenomena associated with Engineering field.

CO2 - Explain/Describe the properties of various materials, light and sound related to Engineering applications.

CO3 - Formulate/Derive the Expressions for the concepts of Physics pertaining to Engineering field.

CO4 - Apply the knowledge of Physics to analyze/solve the numerical problems allied to Engineering field.
Department of Chemistry

About the Department:
Department of Chemistry was established during the year 1962 and staff pattern of Department of Chemistry consists of one Professor, one Associated Professor and three Assistant professors are working in the Department. Among them three staff members got Ph.D. degree and other two are having M.Sc. degree. Non–teaching faculty of the department consists of one Asst. instructor, one mechanic and three helpers. Department of Chemistry have well equipped laboratory with area of about 4500 sq. ft. In this laboratory 30-35 students are accommodated per batch. The laboratory consists of one preparation room, one store room, one instrument room and four staff rooms. Department of Chemistry has been conducted one AICTE short–term course for engineering college staff members on Energy systems during the year 1999. Department of Chemistry has been upgraded as per autonomous syllabus under VTU and research lab by the help of AICTE grant of Rs. 7.0 lakhs. It has been recognized as research center by University of Mysore, Mysore and VTU Belagavi. The staff members are guiding the students of B.E and M. Tech, for project and research works. Staff members have been published 37 research papers at National and International Journals and also presented 50 research papers at National and International Conferences/Symposia. One Ph. D degree is awarded in Chemistry on corrosion science from the University of Mysore, Mysore during the year 2016 under the guidance of Dr. H. Ramachandra Professor and Head. Six candidates are doing research work under the guidance of staff members. Also the Department has provided necessary Library, computers with internet facilities.

Vision
Foundation of excellence imparting best teaching-learning solutions in Engineering Chemistry towards developing competent professionals.

Mission
Committed to:
1. Develop competent and committed faculty in the light of outcome based education.
2. Motivate and encourage the students to gain scientific knowledge and creativity in Engineering Chemistry.
3. Provide strong theoretical foundation complemented with extensive practical training.

Short Term Goals:
- Academic performance excellence in basic sciences
- Guest lecturers/seminars from eminent faculty
- Faculty development programmes
- Project proposals and fund raising

Mid Term Goals:
- Modernization of Chemistry lab
- Conducting National conference
- Establishment of research centre

Long Term Goals:
- Inter disciplinary research activities
- Establishing centre of excellence

Course Title: Engineering Chemistry

<table>
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<tr>
<th>Course Code: P18CH12/22</th>
<th>Sem: I / II</th>
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<td>Weight age: CIE:50; SEE:50</td>
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Prerequisites
Chemistry is one of the vital branches of science without which life does not exist. The student should have acquire knowledge of basic laws, theories, phenomenon, definitions expressions, advanced research information’s and techniques are required to work with material sciences. Engineering is the application of basic sciences and it may be noted that all engineering branches originated from basic sciences. “Science without technology is useless and technology without science is blind”. Therefore the knowledge of science is very essential for engineering students.
Course Content (CC)

Unit – I: Chemical fuels and Alternate fuels: 10 hrs


Self-study component:- Nuclear, Wind, Ocean energies, Tidal energy and Bio fuels

Unit – II: Electrochemistry and Battery Technology:- 10 hrs

Electrode; Standard electrode potential, Derivation of Nernst equation, Numerical problems. Types of electrodes- Primary reference electrode-limitations and secondary reference Electrodes: Construction, working and applications of Calomel electrode and Glass electrode. Determination of pH and pKa value of a solution using glass electrode and calomel electrode.

Electrochemical Cells:- Introduction, EMF of a cell, notation and sign conventions and numerical problems. Types of Electrochemical cells. Galvanic cell- Classification -primary and secondary cells. Fuel cells:- Introduction, construction, working and applications of H2- O2 and CH3OH- O2 fuel cells. Battery Technology:- Basic concepts, characteristics, Classification -primary, secondary and reserve batteries. Construction, working and applications of Ag2O-Zn, Zine air, Li-MnO2, Ni-Metal hydride and Li-ion batteries.

Self-study component:- Construction, working and applications of lead-acid battery and types of fuel cells based on electrolyte used.

Unit – III: Corrosion Science and Metal Finishing:- 10 hrs


Corrosion control:- Selection of materials and Proper designing, Cathodic protection. Corrosion Inhibitors. Metal coating - Galvanization and Tinning.

Metal finishing:- Introduction, Technological importance of metal finishing, Objectives of electro plating. Factors affecting the nature of electro-deposit. Electroplating of Au by cyanide process only neutral medium and Cr by Sulphate method. Differences between electro plating and Electro-less plating. Advantages of electro-less plating. Electro-less plating of Cu on PCB and Ni with applications.

Self-study component:- Water line corrosion, Anodizing, phosphate, chromate coatings and Determination of metal ions concentration like Cu^{2+} and Fe^{3+} by colorimetric method.

Unit – IV: Material Science and Technology:- 10 hrs

High Polymers:- Introduction, Engineering Plastics. Glass transition temperature (Tg), Factors affecting on Tg and its significance. Synthesis and applications of PMMA, polyurethane, poly carbonate, urea formaldehyde resins, and Kevlar.

Elastomers:- Synthesis and applications of silicon rubber, Butyl rubber, Thiokol and Nitrile rubber. Vulcanization and compounding of rubber

Adhesives:- Synthesis and applications of Araldite (Epoxy resin).

Conducting polymer:- Introduction, synthesis and applications of conducting poly-acetylene.

Lubricants:- Introduction, Functions, types, properties - viscosity, volatility, pour point, cloud point, flash point, oiliness and coke point. Applications of lubricants.

Self-study component:- Number average molecular mass and weight average molecular mass with problems.

**Unit –V: Liquid Crystals, Nano-Chemistry, Water Technology and Pollution:-**

12hrs


Water Technology:- Introduction, Impurities of water, International standards of drinking water, formation of scale and sludge, boiler scales and its ill effects. Treatment of boiler feed water by internal and external methods - ion exchange process. Desalination of water by Electro-dialysis and reverse osmosis processes. Purification of water for municipal supply.


Self-study component:- Sound pollution and Air pollution. Sources and ill effects of CO, CO2 and particulate matters.

Text books:-


References books:-


**D. Course Outcomes (Course Learning Outcomes) (COs)**

At the end of the course the students should be able to:

**CO1** - Aware and Recognize the importance of Chemical fuels and Alternate fuels.

**CO2** - Describe the construction, working and applications of electrodes, cells, and batteries.

**CO3** - Apply the knowledge of Chemistry to understand the mechanism and prevention of corrosion. Engineering applications of electro-plating and electro-less plating.

**CO4** – Synthesis of various polymers and study their applications. Use of cement and lubricants in the field of engineering. Acquiring the knowledge of liquid crystals, nano science, water technology and water pollution.
Course Title: Engineering Mechanics

<table>
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Course Content

UNIT – I
INTRODUCTION: Basic idealization of mechanics, particle, rigid body, mass, time, continuum, force, force system, system of units, principle of transmissibility of forces, principle of superposition.

COPLANAR CONCURRENT FORCE SYSTEM: Resultant of forces. Resolution of forces, composition of coplanar concurrent, parallel and non-concurrent forces, Moment of a force, Varignon’s theorem, free body diagram, equilibrant, equilibrium of particles and rigid bodies.

9 Hrs

Self-Learning: Application of triangle and polygon Law, vector method of resolution and composition of forces.

UNIT – II
SUPPORT REACTIONS: Types of loads and types of supports, statically determinant beams, numerical problems on support reactions for beams with point loads(normal and inclined), uniformly distributed load, uniformly varying load and moment.

FRICTION: Introduction, types of friction, laws of friction, angle of friction, angle of repose , cone of friction, characteristics of dry friction, application –body on horizontal plane and inclined plane and ladder friction.

9 Hrs


UNIT – III
CENTROID AND CENTRE OF GRAVITY: Introduction to centroid and centre of gravity, Centroid of rectangular, triangular, circle, semicircle, quarter circle lamina and sector from first principles. Numerical problems on Centroid of composite lamina.

8 Hrs

Self-Learning: Determining Centroid for Composite Lamina with openings.

UNIT – IV

8 Hrs

Self-Learning: Determining moment of Inertia of Composite sections with reference to given axis.

UNIT – V
DYNAMICS: Introduction to dynamics, Classification, linear and curvilinear motion- projectiles, centripetal and centrifugal forces, banking/superelevation. Introduction to work, power and energy, impulse – numerical problems.

8 Hrs

Self-Learning: Concept of motion with varying acceleration. Collision of elastic bodies.

TEXT BOOKS:

REFERENCE BOOKS:
1. Ramamrutham S: A text book of Applied mechanics, Dhanpatrai and sons
Course Outcome (CO)
After learning all the units of the course, the student is able to
1. Apply the knowledge of basic science and mathematics to classify the force systems and compute its resultant.
2. Analyse the system of forces in equilibrium with or without frictional forces.
3. Locate the centroid and composite moment of inertia of irregular and built up sections.
4. Analyse the problems with respect to linear motion, curvilinear motion and energy.

Department of Computer Science & Engineering

Course Title: C and Basics of Python programming

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Course Content

Unit - I
Program design – Algorithms: characteristics, advantages and disadvantages. Flowcharts: Symbols, advantages and disadvantages. Writing an algorithm and flowchart for the given problem.

Constants, Variables and Data Types: Importance of C, Basic structure of C program, Characters set, C tokens - Keywords, Identifiers, Constants, Variables, Data types, Declaration of variables.

Operators and Expressions: Arithmetic operators, Relational operators, Logical operators, Assignment operators, Increment and Decrement operators, Conditional operator, Bitwise operators, Special operators, Arithmetic expressions, Evaluation of expressions, Precedence of Arithmetic operators, Type conversions in expressions, Operator precedence and associativity. 9 Hours

Unit – II
Managing Input and Output Functions: Formatted Input and Output statements.

Decision Making and Branching: Decision making and branching - Simple if statement, if...else statement, Nested if...else statements, The else ... if ladder, The switch statement, The ternary operator, Unconditional branching statements – goto, break, continue, return, Programming examples. 8 Hours

Unit – III

Arrays: Introduction, One dimensional array - Declaration and Initialization of one dimensional array, Two dimensional arrays - Declaration and Initialization of two dimensional arrays, Programs on one-dimensional and two dimensional arrays, Sorting - Bubble sort, Selection sort, Searching - Linear search, Binary search. 8 Hours

Unit - IV
Strings: Definition, Declaration, Initialization of string, String input and output functions, String handling functions.

User defined functions: Need for User-defined Function, Elements of user defined functions, Actual parameter and formal parameter, Category of Functions, Local and global variables.

Structures: Structure definition, Structure declaration and initialization, Accessing structures, Array of structures.

Unions: Union definition, Differences between structure and union. 8 Hours

Unit – V
Basics of Python Programming
Features and History of python, Future of python, Literal constants, Data Types, Input Operation, Comments, Reserved Words, Operators and Expressions, Expressions in Python, Operations on Strings, Other Data Types, Type Conversion.

Decision Control Statements
Introduction, Selection/Conditional Branching Statements, Basic Loop Structures/ Iterative Statements, Nested Loops, The pass Statement, The else Statement used with Loops. 9 Hours
Text Books:

References Books:

Course Outcomes:
At the end of the course a student should able to,
1. Understand and Apply the knowledge of program construct in solving a problem.
2. Analyze the given scenario and write the suitable psudo code.
3. Design and Develop solution to a real time problem.

Department of Mechanical Engineering

<table>
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<td>Course Code: P18ME14/24</td>
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<tr>
<td>Contact Period: 52 Hr;</td>
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Course Content

Unit – 1

Relevance of the course: This course provides the essential basic knowledge of some of the commonly used mechanical systems to all the students belonging to different disciplines of Engineering.

Unit – 1


Self Learning Component: Renewable and nonrenewable energy resources comparison.

Unit – 2

I.C. Engines: Classification, Working principle of two stroke and four stroke petrol engines and four stroke diesel engines. Comparison between petrol and diesel engines and two stroke and four stroke engines. Simple problems based on indicated power, brake power, indicated thermal efficiency, brake thermal efficiency and Mechanical efficiency. 10 Hrs

Self Learning Component: Working principle of MPFI and CRDI systems.

Unit – 3

Self Learning Component: Priming of pump, Split Air conditioner and centralized air condition system.

Unit – 4

Self Learning Component: Super finishing operations- lapping and honing.

Unit – 5

Self Learning Component: Bearings and lubrication- types of bearings, types and properties of lubricants.

Text books

References

Course Outcomes
At the end of the course the students should be able to:
1 Explain the formation of steam and working principle of steam and gas turbines.
2 Classify and Explain the working principles of different types of IC engines and calculate some of their performance parameters.
3 Classify different types of lathes and drilling machines and explain their working principles and different operations performed by them.
4 Classify different types of Milling and Grinding machines and explain their working principles and different operations performed by them.
5 Explain the working principles of different joining processes like welding, brazing and soldering. Identify different types of belt drives.
Course Title: Computer Aided Engineering Drawing

Course Code: P18MED14/24   Sem: I/II   L-T-P-H: 1-0-4-5   Credits: 3

Contact Period: 65 Hr; Exam: 3 Hrs.   Weightage: CIE:50; SEE:50

Relevance of the course: The course aims at empowering the students with drafting skills and enhancing their visualization capacity in order to draw different views of the given object.

COURSE CONTENT

Unit – I
Orthographic Projections of Points: Introduction to Drawing Standards, Creation of 2D environment using CAD software, Principles of Orthographic projections, Projections of points in all the four quadrants. 09 Hrs

Unit – II
Orthographic Projections of Lines: Projections of straight lines using first angle projection, true and apparent lengths, true and apparent inclinations with reference planes. 15hrs

Unit – III
Orthographic Projections of Plane Surfaces: Triangle, square, rectangle, pentagon, hexagon and circular plates in different positions by change of position method only. 15 Hrs

Unit – IV
Projections of Solids: Projections of cube, right regular prisms, cylinders, pyramids and cones. 21 Hrs

Unit – V
Isometric Projections: Introduction to Isometric scale, Isometric projection of simple Planes, cube, right regular prisms, pyramids, cylinders, cones and frustums of cones and pyramids in simple positions, combination of two solids. 18 Hrs

Text books

References

Course Outcomes
At the end of the course the students should be able to:
1 Use computer tools to create simple geometries.
2 Recognize the location of the object with respect to the reference planes and draw its orthographic views.
3 Create simple two dimensional and three dimensional objects, draw their orthographic views and show the dimensions.
4 Draw the development of surfaces of regular solids.
5 Draw the isometric projection of regular solids.

A. Evaluation Scheme

<table>
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<th>Scheme</th>
<th>Weightage</th>
<th>Marks</th>
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Scheme for Semester End Examination

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## Course Title: Basic Electrical Engineering

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### Course Content

#### Unit – I

**Single Phase AC circuits:** Generation of sinusoidal AC voltage, definition of Average value, RMS value, Form factor and peak factor of sinusoidally varying voltage and current, meaning of lagging and leading of sinusoidal wave, Real power, Reactive power, Apparent power and Power factor, Analysis of R, L & C circuits, series & parallel Circuits.

**Self-Study:** Analysis of series - parallel circuits.

#### Unit – II

**Three Phase AC circuits:** EMF Generation, Necessity and advantages of three phase system, Phase sequence, balanced supply and load, relationship between line and phase values for balanced star and delta connections.

**Domestic wiring and Measuring Instruments:** Two-way and Three way control of a lamps, Electrical Safety – Electric shock and its Precaution Protection – Fuses, Necessity and types of Earthling. Construction and working of Single phase induction type energy meter (problems excluded)

**Self-Study:** Different types of Wiring, advantages and disadvantages

#### Unit – III

**DC Machines:** Types of Induced EMF: Statically & Dynamically induced EMF’s, Working principle of DC machine as generator and motor, constructional features, EMF equation of generator, types of armature winding, types of DC generators, problems on EMF equation, Back EMF and its significance, types of DC motors, torque equation of DC motor.

**Synchronous Generators:** Principle of operation. Types and constructional features, Concept of winding factor, EMF equation(Illustrative examples on emf equation excluding calculation of kd&kp)

**Self-Study:** Applications of DC Motors

#### Unit – IV

**Transformers:** Concept of Self Inductance, Mutual Inductance. Principle of operation and construction of single phase transformers (core and shell type), EMF equation. Transformer on no-load, power losses, efficiency, illustrative problems on EMF equation and efficiency only.

**Three phase induction motors:** Concept of rotating magnetic field, principle of operation, types and constructional features, Slip and its significance, Necessity of a starter, Illustrative examples

**Self-Study:** Applications of transformers & Induction Motors

#### Unit – V

**Special Machines:** Construction, working and applications of Brush Less DC motor (BLDC), Capacitor start capacitor run single phase Induction motor, Stepper motor, Servo motor.

**Self-Study:** Applications of Permanent magnetic DC motor

### TEXT BOOKS:


### REFERENCES:

Course Outcomes

After learning all the units of the course, the student is able to
CO1: Analyze single phase and three phase AC circuits.
CO2: Demonstrate their understanding about earthing and different types of wiring.
CO3: Demonstrate their understanding about different types of measuring instruments and their usage.
CO4: Identify and analyse the parts of DC machines, Transformers, alternators and Induction machines.
CO5: To get an overview of special electrical machines.

Department of Electronics and Communication Engineering

Course Title : Basic Electronics
Course Code: P18EC15/25 | Semester : I/II | L-T-P-H: 3 – 0 – 0-3 | Credits:03
Contact Period : Lecture :42 Hrs, Exam: 3Hrs | Weightage :CIE:50% SEE:50%

Course Content

UNIT-I


Text-1: 2.1, 2.2, 2.3, 2.4, 2.6, 2.7, 2.10, 15.1, 15.2, 15.3, 16.8, 16.9, 16.10
Self -Study Component: Voltage Multiplier Circuit, IC Voltage Regulator

UNIT II

Field Effect Transistors: Depletion-type MOSFET, Enhancement type MOSFET, MOSFET Handling, VMOS, CMOS, MESFETs, FET Biasing (only Voltage divider method): Depletion-type MOSFET’s, Enhancement-type MOSFET’s,
FET Amplifiers: Depletion-type MOSFET, Enhancement-type MOSFET, E-MOSFET Voltage Divider Configuration, Feedback and Oscillator circuits: Feedback Amplifier-Phase and Frequency Considerations, Oscillator Operation, Phase Shift Oscillator (only FET version).

Text-1: 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 7.7, 7.8, 8.8, 8.9, 8.11, 14.4, 14.5, 14.6
Self -Study Component: MOSFET Relay Driver, Fixed Biasing Circuit using DMOSFET and Feedback Biasing Circuit using EMOSFET

UNIT-III


Text-1: 10.1, 10.4, 10.5, 10.6, 10.7, 10.9, 11.1, 11.2, 11.3, 11.4, 11.6
Self - Study Component: Instrumentation Amplifier, AC and DC Mili-Voltmeter using OP-AMP

UNIT-IV


Text-2: 9.2, 9.3, 9.4, 9.5, 10.1, 10.2, 10.3, 10.4.2, 10.4.3, 10.4.4, 11.2, 11.2.1, 11.2.2, 11.2.3, 11.4, 11.4.1, 11.4.2, 11.7, 11.8
Self - Study Component: Code Converters using Gates, 1Bit and 2Bit comparators using gates
UNIT-V


Transducers: Introduction, Mechanical Transducers, Passive Electrical Transducers, Active Electrical Transducers. 09 Hrs

Text-2: 15.1 - 15.4, 18.1 - 18.22

Self Study Component: Any two practical Applications of Transducers, Satellite launching vehicles GSLV from ISRO (Only Block Diagram and Principle of operation)

TEXT BOOKS:

REFERENCE BOOKS:

c) Course Outcomes (CO)

<table>
<thead>
<tr>
<th>Course Title: Basic Electronics</th>
<th>Program Outcome Addressed (PO #) with BTL</th>
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<tbody>
<tr>
<td>CO #</td>
<td>Course Outcome</td>
</tr>
<tr>
<td>CO1</td>
<td>Apply knowledge of physics and mathematics to understand operation of PN diodes, Zener diodes MOSFET, solar cells, LCD, CRT, Transducers, modulation techniques and Opamps.</td>
</tr>
<tr>
<td>CO2</td>
<td>Analyze circuits built with diodes, Zener diodes, MOSFET and Opamp</td>
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<tr>
<td>CO3</td>
<td>Design simple circuit to perform rectification, voltage regulation, Opamp based amplifier, summer and filter, MOSFET based amplifier, digital circuit</td>
</tr>
<tr>
<td>CO4</td>
<td>Analyze and implement basic Digital Electronic circuits for a given application using knowledge of Boolean Algebra and Basic gates.</td>
</tr>
<tr>
<td>CO5</td>
<td>Discuss different modulation techniques and communication systems.</td>
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Department of Mechanical Engineering

Course Title: Basic Mechanical Engineering Science Lab

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Relevance of the course: The course aims at making the students to understand the use of common workshop tools and develop skills of creating physical models using these tools. To provide basic knowledge on some of the commonly used mechanical systems to the entire students belonging to different disciplines of Engineering.

**COURSE CONTENT**

**PART-A**

1. **Introduction to Fitting:** Study of fitting tools, operations and joints- One Model. 9 hrs
2. **Development of surfaces & sheet metal work**—Development of lateral surfaces of square prism, cylinder, frustum of cone. Sheet metal models of square prism, cylinder and frustum of cone. Mechanical joint and Soldering Joint. 9 hrs
3. **Arc Welding models:** study of electric arc welding equipments and preparation of butt joint, lap joint and T-joint. 3 hrs
4. **Drilling and tapping:** Study of drill tool and preparation of model using drilling and tapping operations. 3 hrs
5. **Demonstration:** Demo on casting process, lathe/CNC machine operations. 3 hrs

**PART-B**

6. **Calibrations:** Calibration of pressure gauge and thermocouple. 3 hrs
7. **Fuel Testing:** Determination of flash and fire point of lubricating oils. 3 hrs
8. **Study Experiments:** Vapour Compression Refrigeration and determination of its COP. 3 hrs
9. **Demonstration:** Demo on hydraulic pump, two stroke and four stroke engine. 3 hrs

**References**


**Course Outcomes**

At the end of the course the students should be able to:

1. **Recognize** the different types of tools used in fitting, arc welding, drilling and tapping operations and **create** their simple models.
2. **Draw** development of lateral surface of simple solids and **create** simple sheet metal models.
3. **Calibrate** pressure gauge and thermocouple.
4. **Determine** flash and fire points of lubricating oil.
5. **Demonstrate** the casting process, Lathe/CNC machine operation and working principle of hydraulic pump, two stroke and four stroke I C engines.

**A. Evaluation Scheme**

<table>
<thead>
<tr>
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<td>CIE</td>
<td>50%</td>
<td>50</td>
<td>Test: 20; Record: 30</td>
</tr>
<tr>
<td>SEE</td>
<td>50%</td>
<td>50</td>
<td></td>
</tr>
</tbody>
</table>

**Scheme for Semester End Examination**

<table>
<thead>
<tr>
<th>Part –A</th>
<th></th>
<th>20 Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>One Question from Fitting or Development Model</td>
<td></td>
<td>10 Marks</td>
</tr>
<tr>
<td>One Question from Welding or Drilling/Tapping</td>
<td></td>
<td>10 Marks</td>
</tr>
<tr>
<td>One Question from Part -B</td>
<td></td>
<td>10 Marks</td>
</tr>
<tr>
<td>Viva – Voice</td>
<td></td>
<td>10 Marks</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>50 Marks</strong></td>
</tr>
</tbody>
</table>
Department of Computer Science & Engineering

Course Title: C and Basics of Python programming Laboratory

<table>
<thead>
<tr>
<th>Course Code: P18CSC16/26</th>
<th>Sem: I/II</th>
<th>L-T-P-H: 0-0-3-3</th>
<th>Credits: 1.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact Period: Lecture: 39 Hr Exam: 3 Hr</td>
<td>Weightage: CIE: 50; SEE: 50</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

****Before start the Lab programs, execute these simple programs****

1. Accept two numbers and perform basic arithmetic operations like +, -, *, / and %
2. Solve equations using mathematical built-in functions (sqrt, abs, fabs, pow)
3. To find area/volume of geometric shapes (circle, square, rectangle, triangle).
4. To convert temperature between Fahrenheit and Celsius.
5. Compute simple and compound interest.
6. To print the size of various data types in C.
7. To check if given number is even or odd using conditional statements.
8. To print the numbers from 1 to 10, 10 to 1, 1 to N using for, while and do-while.

List of Lab Programs

1. Write a program that reads the basic pay of an employee and compute the net salary. House rent allowance is 25% of basic pay and the tax rate is as in the table below.

<table>
<thead>
<tr>
<th>Gross Salary</th>
<th>Tax Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross &lt;= 2000</td>
<td>No tax</td>
</tr>
<tr>
<td>2000 &lt; Gross &lt;= 4000</td>
<td>3%</td>
</tr>
<tr>
<td>4000 &lt; Gross &lt;= 5000</td>
<td>5%</td>
</tr>
<tr>
<td>Gross &gt; 5000</td>
<td>8%</td>
</tr>
</tbody>
</table>

Gross pay is calculated as sum of basic pay and house rent allowance and net salary is the difference of gross with income tax. (use else-if ladder statement)

2. As per the user choice evaluate the expression after reading necessary values using simple if statement
   - A + 2 > B || !C && A == D || A - 2 <= E
   - A - = (A--) + (A--) – (A--)

3. Write a program to find the roots of a quadratic equation using switch statement.

4. Given the 3 digit register number along with marks of 5 subjects for 100 marks of a student, write a program using switch statement to display the grade of the student according to the following condition.
   - Minimum passing marks is 35 in all subjects
   - Average Score >= 35 and < 50 no grade “Pass”
   - Average Score of 50 to 60 percent is grade ‘D’
   - Average Score > 60 and <= 70 percent is grade ‘C’
   - Average Score > 70 and <= 80 percent is grade ‘B’
   - Average Score > 80 and <= 90 percent is grade ‘A’
   - Average Score > 90 grade ‘S’

5. Write a program to reverse 6 digit integer number and check whether that number is palindrome or not.

6. Write a program to print ‘N’ Fibonacci numbers and find their sum.

7. Write a program to find the value of Sin(x) using the series \( x - x^3/3! + x^5/5! - x^7/7! \) Up to ‘N’ terms and also print sin(x) values using library function.

8. Write a program by reading ‘N’ integer numbers and perform binary search.

9. Write a program to read ‘N’ names and sort the names using bubble sort.

10. Write a program to find the product of two matrixes.

11. Write a program using functions
    - To read an array of ‘N’ integer data
    - Search an element in an array using linear search (Pass parameters and use local variables)

12. Write a function to find mean, variance and deviation for a set of N elements (type int) in array. (Declare variables globally)

13. Write a program to add two complex numbers using structures.

14. Write a python program
    - To check whether the given number is positive, negative or zero.
    - To display all the prime numbers within an interval

15. Write a python program
i) To make a simple calculator that can add, subtract, multiply and divide any two numbers based on user choice.
ii) To find the sum of natural numbers up to n where n is provided by user.

**Course Outcomes**

**At the end of the course, student will be able**
Design and Implement programs using C language and Python

---

**Department of Physics**

**Course Title: Engineering Physics Lab**

<table>
<thead>
<tr>
<th>Course Code: P18PHL17/27</th>
<th>Sem: I/II</th>
<th>L-T-P-H : 0-0-3-3</th>
<th>Credits:1.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact Period: Lecture : 39 Hrs., Exam: 3Hr</td>
<td>Weightage: CIE: 50% ; SEE: 50% Marks</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Prerequisites:**

Introduce the basic concepts and principles of physics as fundamental. In the laboratory, the students will carry out the experiments on basic electrical circuits, properties of matter, laser optics and sound related to engineering applications. The students are able to gain the knowledge about set up and conduct the experiments to get good results with better accuracy. The course provides more experimental skills in understanding the applications of physics used in the experiments pertaining to the field of engineering chosen by the students.

**Course Content**

**PART – A**

1. **Newton’s ring** - Determination of wavelength of the given monochromatic source using plano-convex lens.
2. **Uniform bending** - Determination of the Young’s modulus of the given material by uniform bending method.
3. **Diffraction grating** - Determination of wavelength of the given LASER source.
4. **Torsional pendulum** - Determination of rigidity modulus of the given material by torsional pendulum method.
5. **Spring Constant** – Verification of Hooke’s law and determination of spring constant.
6. **Ultrasonic Interferometer** - Determination of velocity of ultrasonic’s and compressibility of liquid.
7. **Optical fiber** - Determination of acceptance angle and numerical aperture of optical fiber.

**PART – B**

8. **Transistor**- Draw the output characteristics of a transistor in CE-Mode and hence find output resistance, current gain and current amplification factor.
9. **Dielectric constant**- Determination of the dielectric constant of a capacitor by charging and discharging method.
10. **Fermi energy**- Determination of the Fermi energy and Fermi temperature of a given coil.
11. **Black body**- Verification of Stefan’s law and Stefan’s 4th power law of radiation.
12. **Planck’s constant**- Determination of wavelengths of different LED’s and verification of Planck’s constant.
13. **LCR resonance circuit**- Determination of self inductance and quality factor of a coil by series and parallel resonance method.
14. **Semiconductor** - Determination of energy gap of a given semiconductor by four probe method.

**Text Book:**

**Reference Book:**
1. Practical Physics – Harnam Singh and Dr. P.S. Hemne – S Chand and Co.Ltd.
2. Engineering Physics lab manual – B. N. Subbarao, Suhas publication

**Course Outcomes (Course Learning Outcomes) (COs)**

At the end of the course the students should be able to:

CO1. Develop the skills for setting and conduct the experiments relevant to basic concepts, theories and phenomenon of Physics pertaining to Engineering field.

CO2. Develop the knowledge to take readings in different measuring tools and instruments while conducting the experiments and calculation of errors.
### Evaluation Scheme for CIE and SEE.

#### I. CIE Scheme: Continuous Internal Evaluation (CIE)

<table>
<thead>
<tr>
<th>Scheme</th>
<th>Weightage</th>
<th>Marks allotted</th>
<th>Event Break Up</th>
<th>Distribution of Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIE</td>
<td>50%</td>
<td>50</td>
<td>1. Performance of each experiment conducted is evaluated for 20 marks and average is taken for all the experiments.</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2. Each experiment in the record is evaluated for 10 marks and average is taken for all the experiments.</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3. A test is conducted and evaluated at the end of the semester.</td>
<td>20</td>
</tr>
</tbody>
</table>

Total CIE shall be calculated by adding above three components: 50

*Note*: A student must secure 40% or 20 marks in CIE to eligible for SEE.

#### II. SEE Scheme: Semester End Examination (SEE)

<table>
<thead>
<tr>
<th>Scheme</th>
<th>Weightage</th>
<th>Marks allotted</th>
<th>Event Break Up</th>
<th>Distribution of Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEE</td>
<td>50%</td>
<td>50</td>
<td>1. Experimental write-up work</td>
<td>05 + 05</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2. Set-up/Circuit connections, conduction of experiments and taking readings</td>
<td>10 + 10</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3. Calculations, Graph and Results</td>
<td>05 + 05</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4. Viva-Voce</td>
<td>05 + 05</td>
</tr>
</tbody>
</table>

Total SEE shall be calculated by adding above four components: 50

*Note*: i) Semester End Examination (SEE) is conducted for 50 marks in 3 hrs.

  ii) A student must do two experiments; one from Part-A and one from Part-B

  iii) Each experiment carries 25 marks

  iv) For change of experiment 10 mark is deducted out of 25 marks

  v) A student must secure 40% or 20 marks in SEE to Pass that course.

### Department of Chemistry

**Course Title**: Engineering Chemistry lab

**Course Code**: P18CHL17/27  | **Sem**: I/II  | **L-T-P-H**: 0-0-3-3  | **Credits**: 1.5

**Contact Period**: Lecture: 39 Hr, Exam: 3 Hr  | **Weightage**: CIE:50; SEE:50

Pre-requisites:-

1. Engineering Chemistry lab plays an important role to develop the skill in engineering and medical fields.
2. In this lab the students are well trained to identify the quality and quantity of many engineering materials.
3. The lab is useful for analyses of water pollution.
4. Chemistry lab is also useful to check the purity of metals and alloys which are used as engineering materials.
5. The lab is also useful in the determination of metal ion in the body fluid which plays an important role in identification of diseases.

Program objective:-

Engineering Chemistry lab is the basic subject for all Engineering disciplines. It gives the various information of all basic analysis of compounds and elements, laws and applications in the field of Engineering.

**Course Content**:-

#### Part-A: Volumetric analysis

1. Estimation of hypo \((\text{Na}_2\text{S}_2\text{O}_3)\) using Potassium dichromate crystals.
2. Determination of Total hardness of water by EDTA method.
3. Determination of Chemical Oxygen Demand of industrial waste water.
4. Determination of Percentage of Copper in Brass.
5. Determination of Percentage of Iron in hematite ore solution.
6. Determination of Percentage of Calcium oxide in Cement solution.
7. Determination of Total alkalinity of given water sample. (Demonstration only)
**Part- B: Instrumental analysis**

8  Determination of pKa value of a weak acid using pH meter.
9  Determination of viscosity coefficient of a liquid using Ostwald’s Viscometer.
10 Estimation of FAS or Mohr’s salt by Potentiometric method.
11 Estimation of acid mixture by Conductometric method.
12 Estimation of copper by Colorimetric method.
13 Estimation of iron by Colorimetric method.
14 Flame photometric determination of sodium in a fluid. (Demonstration only)

**Text Books**

**Examination:**

Part – A:- Common experiment for all students

Part – B:- Different experiments shall be set up for the students.

program outcome:- With the knowledge of Engineering Chemistry lab, the students become quite competent in tackling various problems in their Engineering career.

**Course Outcomes (Course Learning Outcomes) (COs)**

At the end of the course the students should be able to:

**CO1 Understand and Conduct** the experiments.

**CO2 Determine** quality and quantity of materials.

<table>
<thead>
<tr>
<th>Evaluation Scheme for CIE and SEE.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Continuous Internal Evaluation (CIE) Scheme:</strong></td>
</tr>
<tr>
<td>Scheme</td>
</tr>
<tr>
<td>CIE</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

Total CIE shall be calculated by adding above three components 50

*Note: A student must secure 40% or 20 marks in CIE to eligible for SEE*

| **2. Semester End Examination (SEE) Scheme:** |
| Scheme  | Weightage | Marks allotted | Event Break Up | Distribution of Marks |
| SEE     | 50%       | 50             | 1. Procedure writing | 05 + 05 10 |
|         |           |                | 2. Conduction of experiments and taking values. | 12 + 12 24 |
|         |           |                | 3. Calculations, Graph and Results | 05 + 05 10 |
|         |           |                | 4. Viva-Voce | 03 + 03 06 |

Total SEE shall be calculated by adding above four components 25 + 25 50

*Note: i) Semester End Examination (SEE) shall be conducted for 50 marks in 3 hrs.
  ii) A students must do two experiments; one from Part-A and one from Part-B
  iii) Each experiment carries 25 marks
  iv) For change of experiment 5 mark will be deducted out of 25 marks only in Part – B
  v) A student must secure 40% or 20 marks in SEE to Pass that course*
Training and Placement

Course Title: Effective Communication Development. (ECD)

<table>
<thead>
<tr>
<th>Course Code : P18HU18</th>
<th>Semester : I</th>
<th>L - T – P-H-0:2:0:2</th>
<th>Credits</th>
<th>Weightage: CIE:50; SEE:50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact Period: Lecture: 32Hrs, Exam: 3 Hrs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Course Content

#### Unit – I

**Subject Verb Agreement:** Basic rules of sentence structure, Usage of singular and plural, Usage of appropriate verb, Introduction to phrases, Construction of Simple sentences and Compound Sentences, Introduction to parts of speech

**Self-study component:** Basics of verbal. Parts of speech, usage of parts of speech.  

6 Hrs.

#### UNIT-II

**Tenses:** Identification of tenses, Past tense, Present tense, Future tense, Indicators of tenses, Introduction to verb tenses, Past perfect, Past progressive, Past perfect progressive, Present perfect progressive, Future perfect, Future progressive

**Articles:** Introduction to articles, Exploring the usage of ‘a’, ‘an’ and ‘the’, Golden rules of articles, Differentiating between definite and indefinite articles, Understanding the exceptions of definite and indefinite articles

**Self-study component:** Basic knowledge of the three tenses.

8 Hrs.

#### UNIT-III

**Vocabulary builder - Getting off a good start:** How to test your present vocabulary, how to start building your vocabulary, how to talk about personality types, how to talk about doctors, how to talk about various practitioners, how to talk about science and scientists, how to talk about liars and liars. Each of these sessions includes origin of words and related words, Etymology, tools to assess and follow up the progress.

**Self-study component:** Importance of building vocabulary, Basic words, Usage of simple words at the right Context.

8 Hrs.

#### UNIT-IV

**Writing Skills 1:** Sentence Formation, Punctuation, Avoiding Cliche, Different Types of Writing Formats, Importance of Writing Skills, Formal and Informal Style of Writing.

**Self-study component:** Basic formation of sentences, usage of punctuations.

4 Hrs.

#### UNIT-V

**SWOT:** Identifying the individual’s Strengths, Weakness, Opportunities and Threats by using SWOT Matrix, Difference between internal and external factors, Aids on utilizing strengths to maximum effect for both personal and professional growth, Aids to identify the origin of the weakness and take corrective measures, Aids to use one’s strengths to identify and maximize both personal and professional opportunities, Identifying the external factors/change in the external environment that can pose threats, Tackling threats appropriately.

**Goal Setting:** Understanding of the meaning of ‘Goals’, Understanding the importance of goals, Necessity of goals, 5 myths of goals, Long term and Short term goals, SMART goal setting technique.

**Resume Building:** Meaning of Resume, Difference between Resume, Curriculum Vitae and Bio-data, Difference between creating a resume and building a resume, Importance of resume, Importance of Academic achievements, Importance of extracurricular achievements, Importance of striking a balance between curricular and co-curricular activities, Value of an all-rounder, Structure of a resume, Importance of building resume from 1st Year Engineering

**Etiquettes:** What are Etiquettes, Importance of Professional Etiquettes, Importance of First Impression, Professional presence, Importance of Formal dressing, Decoding the formal dress code, Professional body language, Importance of Microsoft PowerPoint in professional circuits

**Watch the Time:** Organizing Yourself, Time Saving Techniques, Understanding Priorities Based Time Roles, Procrastination, Different Methods of Splitting Time, Efficient Time Utilization, Value of Time, Streamlining Daily Routine, Big rock theory, Spent time matrix, Urgency vs Importance, Time bound goal management, 10 time management mistakes, Essential habits for better time management.

6 Hrs.
Self-study component: Looking within one’s self, setting one’s goals. Basic writing skills. Manners – what to do and what not. Procrastination.

Reference Books

Course Outcomes
After learning all the units of the course, the student is able to;
1. Rectify Indianism and have better ability to frame grammatically correct sentences.
2. Exhibit knowledge of correct pronunciation of words.
3. Exhibit amplified level of confidence to express themselves in English.
4. Reflect elevated standard of learning through the implementation of creative cognitive techniques.
5. Understand the correct usage of Tenses and Articles.

Course Title: Indian Constitution, Human Rights and Professional Ethics
Course Code: P18HM19/29 | Semester: I | L-T-P-H: 2-0-0-0-2 | Credits: NA
Contact Period: Lecture: 26 Hr | Weightage: CIE: 100% - [P/NP]

Course Content

I. Indian Constitution:
1. Introductory Part - The preamble, Fundamental rights
2. Directive principles of state policy - and fundamental duties
3. The union executive, union legislature and the union judiciary
4. The state executive, state legislature and the high court in the states
5. Special provision for scheduled caste and scheduled tribes
6. Election commission - Functions - Emergency provisions and amendment of the constitution

II. Human rights:
Aims and objectives to create responsible citizenship with awareness of human rights and latest development.
2. Human right - with related to rights of women, children disabled, tribal's, aged and minorities

III. Professional Ethics:
1. Aims, objects - advantages with national and international, recent development.
Department of Environmental Engineering

Course Title: Environmental Studies

Course Code: P18HM19/29  |  Semester: I/II  |  L-T-P-H: 2–0–0-2  |  Credits: NA

Contact Period: Lecture: 26 Hr  |  Weightage: CIE: 100% - [P/NP]

Prerequisites:
The student should have undergone the course on Environmental Studies (Code: P17EV19/29)

a) Course Learning Objectives (CLO):  
At the end of the course the students should be able to:
1. Explain the need for Environmental Management
2. Implement standard data like water, wastewater and air pollution.
3. Demonstrate the use of standard data to compare with the field data.
4. Choose appropriate data to protect environmental.
5. Design environmental amenities based on the needs.

b) Relevance of the Course  
Environmental Studies is a foundation course in BE (Environmental Engineering) program, that builds the program design and implementation competence in student through choice of appropriate areas.
The course aims at developing the understanding variations in water, wastewater and air pollution and also the ability to build new ideas.

Course Content  

Unit – I  
Environment – Definition, Ecosystem – Balanced Ecosystem, Human activities – Food Shelter, Economic and Social Security. Transportation activities, Environmental impact Assessment, Sustainable Development.  

6 Hrs.

Unit – II  

5 Hrs.

Unit – III  

5 Hrs.

Unit – IV  

5 Hrs.

Unit – V  

5 Hrs.

Text Book:  

References:  
2) Elements of Environmental Science and Engineering – Meenakshi P, Prentice Hall of India, 2005
Department of Kannada

<table>
<thead>
<tr>
<th>Course Title : Kannada Kali</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Code: P18HM110/210</td>
</tr>
<tr>
<td>Contact Period : Lecture : 26 Hr</td>
</tr>
</tbody>
</table>

Lesson 1 : Introducing each other – 1.
Personal Pronouns, Possessive forms, Interrogative words.

Lesson 2 : Introducing each other – 2.
Personal Pronouns, Possessive forms, Yes/No Type Interrogation.

Lesson 3 : About Ramayana.
Possessive forms of nouns, dubitive question, Relative nouns.

Lesson 4 : Enquiring about a room for rent.
Qualitative and quantitative adjectives.

Lesson 5 : Enquiring about the college.
Predicative forms, locative case.

Lesson 6 : In a hotel.
Dative case defective verbs.

Lesson 7 : Vegetable market.
Numeral, plurals.

Lesson 8 : Planning for a picnic.
Imperative, Permissive, hortative.

Lesson 9 : Conversation between Doctor and the patient.
Verb-iru, negation – illa, non – past tense.

Lesson 10: Doctors advise to Patient.
Potential forms, no – past continuous.

Lesson 11: Discussing about a film.
Past tense, negation.

Lesson 12: About Brindavan Garden.
Past tense negation.

Lesson 13: About routine activities of a student.
Verbal participle, reflexive form, negation.

Lesson 14: Telephone conversation.
Past and present perfect past continuous and their negation.

Lesson 15: About Halebeedu, Belur.
Relative participle, negation.

Lesson 16: Discussing about examination and future plan.
Simple conditional and negative.

Lesson 17: Karnataka (Lesson for reading).

Lesson 18: Kannada Bhaashe (Lesson for reading).

Lesson 19: ManataruvaSangatialla (Lesson for reading).

Lesson 20: BekuBedagalu (Lesson for reading).


## II Semester

### Department of Mathematics

<table>
<thead>
<tr>
<th>Course Title: Engineering Mathematics-II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Code: P18MA21</td>
</tr>
<tr>
<td>Contact Period: Lecture: 52 Hrs, Exam: 3 Hrs</td>
</tr>
</tbody>
</table>

### Relevance of the Course

Engineering Mathematics-II is another fundamental course for all branches in BE program, that assemble the awareness in understanding inter-linked relevant engineering courses such as control theory, mechanical systems, linear systems, eigen value problems etc., by applying appropriate mathematical tools of partial differentiation, multiple integration, vector integration, ordinary differential equations and Laplace transforms.

### Course Content


| Self study component- Review of elementary properties of matrices. |

#### Linear Differential equations of second and higher order equations with constant coefficients: Homogeneous/non-homogeneous equations. Inverse Differential operators, \( f(D)y = R(x) \) where \( R(x) = e^{ax}, \sin ax/\cos ax \) and Polynomial in \( x \). Solutions of initial value problems. Method of undetermined coefficients. Method of variation of parameters, Solution of Cauchy’s and Legendre’s linear differential equations. 10 Hrs

| Self study component- Review of linear \( f(D)y = R(x) \) where \( R(x) = e^{ax} V(x) \) Where \( V(x) = x^n \) |


#### Applications of partial differentiation to Jacobians, Taylor's theorem for a function of two variables (without proof), Maxima and Minima for a function of two variables. Illustrative examples with applications. Lagranges’ method of undetermined multipliers with one subsidiary condition. Vector integration- Integration of vector functions. Line integrals, surface and volume integrals. Green’s, Stoke’s and Gauss’s divergence theorem/s (without proof)-Illustrated examples. Orthogonal curvilinear coordinates (OCC). 10 Hrs

| Self study component- Errors and approximations Expressions for \( \nabla \phi \), div \( \bar{A} \), curl \( \bar{A} \) and Laplacian of \( \phi \) in OCC. |


| Self study component- Applications of double and triple integrals- Calculation of mass, centre of gravity, centre of pressure and moment of inertia. Duplication formula for beta and gamma functions. |

### Text Books:


Reference Books:

Course Outcomes
After learning all the units of the course, the student is able to:
CO-1. Explain linear system of equations, Eigen values/vectors similarity and diagonalisation of matrices.
CO-3: Evaluate the Jacobean, and the Taylors series expansion. and find the extreme value. Analyse the vector integration to use in the study of line integrals.
CO-4: Evaluate the multiple integrals and Evaluate application oriented problems.

Training and Placement

<table>
<thead>
<tr>
<th>Course Title: Professional Communication Development. (PCD)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Course Code</strong>: P18HU28</td>
</tr>
<tr>
<td><strong>Contact Period</strong>: Lecture: 32Hrs, Exam: 3 Hr</td>
</tr>
</tbody>
</table>

Course Content

**Unit – I**

**Sentences**: Introduction to simple and compound sentences, Techniques to build simple and compound sentences, Rules for constructing a complex sentence, Introduction to punctuation, Introduction to active and passive voice

6 Hrs

**Self-study component**: Knowledge about basic words, parts of speech. Building simple sentences.

**UNIT-II**

**Preposition**: Introduction to prepositions, Importance of usage of prepositions, Rectifying common errors in context to using preposition, Right usage of common prepositions like in, on, under, behind, below etc.

**Conjunctions**: Introduction to conjunctions, Under-standing the importance of usage of conjunctions, Usage of different conjunctions in a compound sentence, Understanding the meaning of conjunction like yet, since, until, however, but etc.

8 Hrs

**Self-study component**: Applications of previously learnt parts of speech into sentences. Identifying the different parts of speech in a sentence.

**UNIT-III**

**Vocabulary builder - Gaining increased momentum**

How to talk about actions– Verbs that accurately describe human activities, excursions into expressive terms good and evil, doing saying, wishing and pleasing, how to talk about various speech habits–words that explore in depth all the degrees and kinds of talk and silence, how to insult your enemies– terms for describing a disciplinarian, toady, dabbler, provocative woman, flag-waver, possessor of a one track mind, free thinker, sufferer from imaginary ailments, various manias and phobias, how to flatter your friends– terms for describing friendliness, energy, honesty, mental keenness, bravery, charm, sophistication, etc.

6 Hrs

**Self-study component**: Application of the previous session on vocabulary builder.
UNIT-IV

**Writing Skills 2:** Format for e-mail writing. Format for Letter Writing. Some common errors. Creative Writing. Blog Writing  
**Self-study component:** Basics of paragraph writing, punctuations.  
**4Hrs**

UNIT-V

**Vocabulary builder** - Finishing with a feeling of complete success.  
**How to talk about common phenomena and occurrences**– Words for poverty and wealth, direct and indirect emotions, not calling spade a spade, banter and other light talk, animal-like contentment, homesickness and different kind of secrecy. Excursions into terms expressive of goodness, of hackneyed phraseology, of human similarity to various animals, of kinds of sound, etc. How to react to the new words you meet in your reading.  
**How to talk about what goes on** - Verbs that show exhaustion, criticism, self-sacrifice, repetition, mental stagnation, hinting, soothing, sympathizing, indecision, etc. How you can increase your vocabulary by picking your friends brains.  
**How to talk about a variety of personal characteristics:** Adjectives that describe insincere humility, dissatisfaction, snobbery, courtesy to women, financial embarrassment, sadness, etc. How increasing your vocabulary has begun to change the intellectual cli- mate of life.  
**Self-study component:** Applications of the basic and intermediate level of vocabulary sessions.  

**Reference Books**  

**Course Outcomes**  
After learning all the units of the course, the student is able to:  
1. Amplified level of confidence to express themselves in English.  
2. Elevated standard of learning through the implementation of creative cognitive techniques.  
3. Understand the correct usage of Prepositions and Conjunctions.  
5. Apply the knowledge of vocabulary in his speaking and writing
### 3 – Week Induction Programme Modules and Activities will conducted at Two Stages

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<th>Sl. No.</th>
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| 1       | Induction & Orientation Programmes                                      | • Inauguration of Induction & Orientation day Programmes  
|         |                                                                         | • Brief Introduction on Institution  
|         |                                                                         | • Brief introduction on Induction Programme  
|         |                                                                         | • Visit to the departments by Students  
|         |                                                                         | • Interaction with the Parents  
| 2       | Know your department                                                    | • Registration in the department  
|         |                                                                         | • Know your department & Laboratories  
|         |                                                                         | • Know your faculties & their status  
|         |                                                                         | • Visit the centre of Excellences of the departments  
| 3       | Visiting other departments                                              | • Visit the other departments of the institution  
|         |                                                                         | • Known other department & Laboratory facilities  
|         |                                                                         | • Known other department centre of excellence  
| 4       | Common Facilities                                                       | • Visit & Know about Sports facilities  
|         |                                                                         | • Visit & know about Library & Information Centre  
|         |                                                                         | • Visit & Know about Hostel facilities  
| 5       | Universal Human Values, Professional Ethics & Proficiency               | • Talk on Universal Human Values by Experts  
|         |                                                                         | • Talk on Professional Ethics by Experts  
|         |                                                                         | • Talk on Proficiency by Experts  
| 6       | Health related activities                                               | • Lecture on Health & habits  
|         |                                                                         | • Health checkup by the organization  
|         |                                                                         | • Organizing a Blood donation camp  
| 7       | Social responsible Activities                                           | • Awareness on Swachh Bharat Abhiyan  
|         |                                                                         | • Awareness on Red Cross & NSS Activities  
|         |                                                                         | • Awareness on Social Responsibilities & Traffic Rules  
| 8       | Interactions with Expert personalities                                  | • Interaction with Industry Peoples  
|         |                                                                         | • Interaction with Placement & Training Officers  
|         |                                                                         | • Interactions with Alimonies  
| 9       | Physical Activities & Responsibilities                                  | • Improve the health by Physical Activities  
|         |                                                                         | • Improve the health by Yoga  
|         |                                                                         | • Improve the health by Regular Exercise  
| 10      | Creative Arts & Cultural Programmes, Visit to local area                | • Involvement in Creative arts  
|         |                                                                         | • Involvement in Cultural programmes  
|         |                                                                         | • Visit to Local Area  
| 11      | Innovations & Best Practices                                            | • Create interest in Research & Innovations  
|         |                                                                         | • Create interest in Project works  
|         |                                                                         | • Create interest in Best Practices  
| 12      | Valedictory function                                                    | • Induction Programme Valedictory function  
|         |                                                                         | • Interaction between Students & Teacher on Induction Programme  
|         |                                                                         | • Feed Back from the Students  

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Note: Professional Communication Development classes will be conducted in Training & Placement Center and MBA block.
# CHEMISTRY CYCLE (ODD SEMESTER)

## Time Table for AY 2019-20

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Sl. No. | Course Code | Course Title | Sl. No. | Course Code | Course Title |
---|-------------|--------------|---|-------------|--------------|
1 | P18MA11 | Engg. Maths | 6 | P18CSL16 | Programming Lab |
2 | P18CH12 | Engg. Chemistry | 7 | P18CH17 | Chemistry Lab |
3 | P18CS13 | C-Programming | 8 | P18HU18 | Profess. Comm. Development |
4 | P18MED14 | CAED | 9 | P18EV19 | Environmental Studies |
5 | P18EC15 | Basic Electronics | 10 | P18HM110 | Language (Kan) (2 Hrs) |

Note: Professional Communication Development classes will be conducted in Training & Placement Center and MBA block.