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, New Delhi, Approved by AICTE, New Delhi.

ಪಿ.ಇ.ಎಸ್. ತಾಂತ್ರಿಕ ಮಹಾವಿದ್ಯಾಲಯ

ಮಂಡ್ಯ–571 401, ಕರ್ನಾಟಕ

(ವಿ.ಟಿ.ಯು, ಬೆಳಗಾವಿ ಅಡಿಯಲ್ಲಿನ ಸ್ವಾಯತ್ತ ಸಂಸ್ಥೆ)

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P.E.S. COLLEGE OF ENGINEERING, MANDYA-571 401

[An Autonomous Institution affiliated to VTU, Belagavi,
Grant – in – Aid Institution (Government of Karnata ka), World Bank Funded College (TEQIP),
Accredited by NBA, New Delhi and Approved by AICTE, New Delhi]

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VISION

"PESCE shall be a leading institution imparting qua lity Engineering and Management education developing creative and socially responsible professionals."

MISSION

Provide state of the art infrastructure, motivate the faculty to be proficient in their field of specialization and adopt best teaching-learning practices.
Impart engineering and managerial skills through competent and committed faculty using outcome based educational curriculum.
Inculcate professional ethics, leadership qualities and entrepreneurial skills to meet the societal needs.
Promote research, product development and industry-institution interaction.

Quality Policy

Highly committed in providing quality, concurrent technical education and continuously striving to meet expectations of stake holders.

Core values

***P**rofessionalism*
***E**mpathy*
***S**ynergy*
***C**ommitment*
***E**thics*

P.E.S. COLLEGE OF ENGINEERING, MANDYA

(An Autonomous Institution)

Bachelor of Engineering

Scheme of Teaching and Examination [CBCS with OBE]

I – Semester [Physics Group]

Sl. No.	Course Code	Course Title	Teaching Department	Hrs / Week			Credits	Examination Marks		
				L	T	P		CIE	SEE	Total
1	P18MA11	Engineering Mathematics - I	MA	4	-	-	4	50	50	100
2	P18PH12	Engineering Physics	PH	4	-	-	4	50	50	100
3	P18CV13	Engineering Mechanics	CV	3	-	-	3(4)	50	50	100
4	P18ME14	Elements of Mechanical Engineering	ME	3	-	-	3	50	50	100
5	P18EE15	Basic Electrical Engineering	EE	3	-	-	3	50	50	100
6	P18MEL16	Basic Mechanical Engineering Science Laboratory	ME	-	-	3	1.5	50	50	100
7	P18PHL17	Engineering Physics Laboratory	PH	-	-	3	1.5	50	50	100
8	P18HU18	Effective Communication Development (ECD)	HM	-	2	-	1(nil)	50	50	100
9	P18HM19	#Indian Constitution, Human Rights & Professional Ethics (ICHRPE)	HM	2	-	-	-	(50)	-	-
		Total					**21**	**400**	**400**	**800**

MA : Mathematics;PH : Physics; CV :Civil Engg; ME : Mech, Engg; EE: E & E Engg; HM : Humanities;

#ICHRPE :- Students shall have to pass these Mandatory Learning Course/s before completion of IV Semester.

I – Semester [Chemistry Group]

Sl. No.	Course Code	Course Title	Teaching Department	Hrs / Week			Credits	Examination Marks		
				L	T	P		CIE	SEE	Total
1	P18MA11	Engineering Mathematics - I	MA	4	-	-	4	50	50	100
2	P18CH12	Engineering Chemistry	CH	4	-	-	4	50	50	100
3	P18CS13	C and Basics of Python programming	CS	3	-	-	3	50	50	100
4	P18MED14	Computer Aided Engineering Drawing	ME	1	-	4	3	50	50	100
5	P18EC15	Basic Electronics	EC	3	-	-	3	50	50	100
6	P18CSL16	C and Basics of Python programming Laboratory	CS	-	-	3	1.5	50	50	100
7	P18PCHL17	Engineering Chemistry Laboratory	CH	-	-	3	1.5	50	50	100
8	P18HU18	Effective Communication Development (ECD)	HM	-	2	-	1	50	50	100
9	P18EV19	#Environmental Studies	CV	2	-	-	-	(50)		-
10	P18HM110	#Language (Kan.)	HM	2	-	-	-	(50)		-
		Total					**21**	**400**	**400**	**800**

MA : Mathematics;CH : Chemistry; CV :Civil Engg; ME : Mech, Engg;CS : Comp. & Engg; EC: E & C Engg; HM : Humanities

#Env. Studies /Language (Kannada):- Students shall have to pass these Mandatory Learning Course/s before completion of IV- Semester

II – Semester [Physics Group]

Sl. No.	Course Code	Course Title	Teaching Department	Hrs / Week			Credits	Examination Marks		
				L	T	P		CIE	SEE	Total
1	P18MA21	Engineering Mathematics – II	MA	4	-	-	4	5 0	50	100
2	P18PH22	Engineering Physics	PH	4	-	-	4	50	50	100
3	P18CV23	Engineering Mechanics	CV	3	-	-	3	50	50	100
4	P18ME24	Elements of Mechanical Engineering	ME	3	-	-	3	50	50	100
5	P18EL25	Basic Electrical Engineering	EE	3	-	-	3	50	50	100
6	P18MEL26	Basic Mechanical Engineering Science Laboratory	ME	-	-	3	1.5	50	50	100
7	P18PHL27	Engineering Physics Laboratory	PH	-	-	3	1.5	50	50	100
8	P18HU28	Professional Communication Development (PCD)	HM	-	2	-	1	50	50	100
9	P18HM29	#Indian Constitution, Human Rights & Professional Ethics(ICHRPE)	HM	2	-	-	-	(50)	-	-
		Total					**21**	**400**	**400**	**800**

MA : Mathematics; PH : Physics; CV :Civil Engg; ME : Mech, Engg; EE: E & E Engg; HM : Humanities;

#ICHRPE :- Students shall have to pass these Mandatory Learning Course/s before completion of IV Semester.

II – Semester [Chemistry Group]

Sl. No.	Course Code	Course Title	Teaching Department	Hrs / Week			Credits	Examination Marks		
				L	T	P		CIE	SEE	Total
1	P18MA21	Engineering Mathematics – II	MA	4	-	-	4	5 0	50	100
2	P18CH22	Engineering Chemistry	CH	4	-	-	4	50	50	100
3	P18CS23	C and Basics of Python programming	CS	3	-	-	3	50	50	100
4	P18MED24	Computer Aided Engineering Drawing	ME	1	-	4	3	50	50	100
5	P18EC25	Basic Electronics	EC	3	-	-	3	50	50	100
6	P18CSL26	C and Basics of Python programming Laboratory	CS	-	-	3	1.5	50	50	100
7	P18PCHL27	Engineering Chemistry Laboratory	CH	-	-	3	1.5	50	50	100
8	P18HU28	Professional Communication Development	HM	-	2	-	1	50	50	100
9	P18EV29	#Environmental Studies	CV	2	-	-	-	(50)	-	-
10	P18HM210	#Language (Kannada)	HM	2	-	-	-	(50)	-	-
		Total					**21**	**400**	**400**	**800**

MA : Mathematics;CH : Chemistry; CV :Civil Engg; ME : Mech, Engg;CS : Comp. & Engg; EC: E & C Engg; HM : Humanities

#Env. Studies /Language (Kannada):- Students shall have to pass these Mandatory Learning Course/s before completion of IV- Semester

III – Semester

Sl. No.	Course Code	Course Title	Teaching Department	Hrs / Week			Credits	Examination Marks		
				L	T	P		CIE	SEE	Total
1	P18MA31	+/++ Engineering Mathematics - III	MA	4	-	-	4	50	50	100
2	P18XX32	Core Course - I	XX	4	-	-	4	50	50	100
3	P18XX33	Core Course - II	XX	4	-	-	4	50	50	100
4	P18XX34	Core Course - III	XX	4	-		4	50	50	100
5	P18XX35	Foundation Course - I	XX	2	2	-	3	50	50	100
6	P18XXX36	Laboratory - I	XXX	-	-	3	1.5	50	50	100
7	P18XXX37	Laboratory - II	XXX	-	-	3	1.5	50	50	100
8	P18HU38	#Aptitude and Reasoning Development - Basics (ARDB)	HM	2	-	-	-	50	-	-
9	***P18HUDIP39***	****Comprehensive Communication Development (CCD)***	***HM***	***2***	-	-	***[2]***	***[50]***	***[50]***	***[100]***
10	*P18HUDIP310*	**Indian Constitution, Human Rights & Professional Ethics (ICHRPF)*	*HM*	*2*	-	-	-	*(50)*	-	-
11	*P18MADIP31*	**Additional Mathematics - I*	*MA*	*4*	-	-		*(50)*	-	-
		Total					**22** ***[24]***	**350** ***[400]***	**350** ***[400]***	**700** ***[800]***

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

#ARDB: <u>All students</u> 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

Sl. No.	Course Code	Course Title	Teaching Department	Hrs / Week			Credits	Examination Marks		
				L	T	P		CIE	SEE	Total
1	P18MAAC41 /P18MAES41	+/++ Engineering Mathematics - IV	MA	4	-	-	4	50	50	100
2	P18XX42	Core Course - I	XX	4	-	-	4	50	50	100
3	P18XX43	Core Course - II	XX	4	-	-	4	50	50	100
4	P18XX44	Core Course - III	XX	4	-	-	4	50	50	100
5	P18XX45	Foundation Course - II	XX	2	2	-	3	50	50	100
6	P18XXX46	Laboratory - I	XXX	-	-	3	1.5	50	50	100
7	P18XXX47	Laboratory - II	XXX	-	-	3	1.5	50	50	100
8	P18HU48	Aptitude and Reasoning Development - Intermediate (ARDI)	HM	2	-	-	1	50	50	100
9	*P18EVDIP49*	**Environmental Studies*	*HM*	*2*	-	-	-	*(50)*	-	-
10	*P17MADIP41*	**Additional Mathematics - II*	*MA*	*4*	-	-		*(50)*		
		Total					**23**	**400**	**400**	**800**

**** Additional Mathematics-II & Environmental Studies: <u>Lateral entry</u> (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

Sl. No.	Course Code	Course Title	Teaching Department	Hrs / Week			Credits	Examination Marks		
				L	T	P		CIE	SEE	Total
1	P18XX51	Management and Entrepreneurship (The course must be related to Management and Entrepreneurship. However, the title and syllabus content can be as per the programme requirement).	XX	4	-	-	4	50	50	100
2	P18XX52	Core Course - I	XX	4	-	-	4	50	50	100
3	P18XX53	Core Course - II	XX	4	-	-	4	50	50	100
4	P18XX54	Core Course - III	XX	4	-	-	4	50	50	100
5	P18XX55X	Professional Elective - I	XX	2	2	-	3	50	50	100
6	P18XXX56	Laboratory - I	XXX	-	-	3	1.5	50	50	100
7	P18XXX57	Laboratory - II	XXX	-	-	3	1.5	50	50	100
8	P18XXX58	Skill Oriented Laboratory - I	XXX	-	-	2	1	50	50	100
9	P18HU59	Aptitude and Reasoning Development - Advance (ARDI)	HM	-	2	-	1	50	50	100
10	P18XX510	Technical Skills - I	XX	-	2	-	1	50	50	100
		Total					**25**	**500**	**500**	**1000**

Professional Elective - I

Sl. No	Course Code	Course title
1.	P18XX551	
2.	P18XX552	
3.	P18XX553	
4.	P18XX554	

VI – Semester

Sl. No.	Course Code	Course Title	Teaching Department	Hrs / Week L	T	P	Credits	Examination Marks CIE	SEE	Total
1	P18XX61	Core Course - I	XX	4	-	-	4	50	50	100
2	P18XX62	Core Course - II	XX	4	-	-	4	50	50	100
3	P18XX63	Core Course - III	XX	4	-	-	4	50	50	100
4	P18XX64X	Professional Elective - II	XX	2	2	-	3	50	50	100
5	P18XX65X	Open Elective-I	XX	3	-	-	3	50	50	100
6	P18XXX66	Laboratory - I	XXX	-	-	3	1.5	50	50	100
7	P18XXX67	Laboratory - II	XXX	-	-	3	1.5	50	50	100
8	P18XXX68	Skill Oriented Laboratory	XXX	-	-	2	1	50	50	100
9	P18XX69	Technical Skills - II	XX	2	-	-	1	50	50	100
Total							**23**	**450**	**450**	**900**

List of Electives

Professional Elective - II			Open Elective – I		
Sl. No	**Course Code**	**Course title**	**Sl. No.**	**Course Code**	**Course title**
1.	P18XX641		1.	P18XX651	
2.	P18XX642		2.	P18XX652	
3.	P18XX643		3.	P18XX653	
4.	P18XX644		4.	P18XX654	

VII – Semester

Sl. No.	Course Code	Course Title	Teaching Department	Hrs / Week L	T	P	Credits	Examination Marks CIE	SEE	Total
1	P18XX71	Core Course - I	XX	4	-	-	4	50	50	100
2	P18XX72	Core Course - II	XX	4	-	-	4	50	50	100
3	P18XX73	Core Course - III	XX	4	-	-	4	50	50	100
4	P18XX74X	Professional Elective - III	XX	2	1	-	3	50	50	100
5	P18XX75X	Open Elective - II	XX	3	-	-	3	50	50	100
6	P18XXX76	Laboratory - I	XXX	-	-	3	1.5	50	50	100
7	P18XXX77	Laboratory - II	XXX	-	-	3	1.5	50	50	100
8	P18XX78	Project Work Phase – I and Project semina r	XXX	-	-	4	2	100	-	100
Total							**23**	**450**	**350**	**800**

List of Electives

Professional Elective - III			Open Elective – II		
Sl. No	**Course Code**	**Course title**	**Sl. No.**	**Course Code**	**Course title**
1.	P18XX741		1.	P18XX751	
2.	P18XX742		2.	P18XX752	
3.	P18XX743		3.	P18XX753	
4.	P18XX744		4.	P18XX754	

VIII – Semester

Sl. No.	Course Code	Course Title	Teaching Department	Hrs / Week L	T	P	Credits	Examination Marks CIE	SEE	Total
1	P18XX81	Core Course	XXX	4	-	-	4	50	50	100
2	P18XX82X	Professional Elective - IV	XXX	2	1	-	3	50	50	100
3	P18XX83	Internship	XXX			-	2	50	-	50
4	P18XX84	Project Work Phase – II	XXX	-	-	-	6	100	100	200
5	P18XX85	Self study course & Seminar	XXX	-	-	4	2	50	-	50
Total							**17**	**300**	**200**	**500**

Professional Elective - IV		
Sl. No	**Course Code**	**Course title**
1.	P18XX821	
2.	P18XX822	
3.	P18XX823	
4.	P18XX824	

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. Internship is of minimum eight weeks duration and to be completed between the vacation period of VI – VII semester and 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 Internship).

III. The Department/college shall nominate staff member/s to facilitate, guide and supervise students under internship.

IV. The Internal Guide has to visit place of internship at least once during the student's internship.

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

VI. After the completion of Internship, students shall submit a report with completion and attendance certificates to the Head of the Department with the approval of both internal and external guides.

VII. There will be 50 marks for CIE (Seminar: 20, Internship report: 20 and Viva – Voce: 10 marks). The minimum requirement of CIE marks shall be 50% of the maximum marks.

VIII. The Assessment marks (CIE) in the case of Internship, shall be based on the evaluation 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. The Internship may be evaluated by the committee for award of Assessment marks (CIE) based on a Internship Report, Presentation and Viva-Voce.

IX. The students are permitted to carry out the internship anywhere in India or abroad. The Institution will not provide any kind of financial assistance to any student for carrying out the Internship.

X. **Failing to undergo Internship:** Internship is one of the head of passing. Completion of internship is mandatory. If any student fails to undergo /complete the internship, he/she shall be considered as failed in that Course. The reappearance shall be considered as an attempt.

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 evalua tion. 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 proj ect, 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 30 marks from 35 marks and the remaining 5 marks shall be part of the self-study component.

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			
Course Code:P18MA11	**Sem: I**	**L-T-P-H: 4-0-0-4**	**Credits - 4**
Contact Period: Lecture: 52Hrs., Exam: 3 Hrs		**Weightage: CIE:50%; SEE:50%**	

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 n^{th} derivative of standard functions and Leibnitz's rule.

UNIT-II

Lagrange's and Cauchy's mean value theorem. (statem ents only) - Illustrative examples, Taylor's theorem for a function of single variable and Maclaurin's series expansion (statements only) – Illustr ative

examples. Indeterminate forms -L'Hospital's rule(wi thout proof), $0\times\infty$, $\infty-\infty$, 0^0, ∞^0 and 1^∞.

05+05=10 Hrs

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

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) **06+06=12 Hrs**

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

UNIT-IV

Reduction formulae for $\int\cos^n x$, $\int\sin^n x$, $\int\sin^m x\cos^n x$, 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 **05+05=10 Hrs Self study component-** Tracing of the curves – Astroid, Witch of agnesi, Strophoid, Lemniscate of Bernoulli.

UNIT-V

Introduction to ordinary differential equations (ODE's)-solutions of first order and first degree differential equations: exact, linear differential equations of order one and, equations reducible two above types (weightage for reducibility). Applications of first order and first degree ODE's - orthogonal trajectories of Cartesian and polar curves. Newton's law of cooling, simple R-L circuits and, Laws of decay and growth - Illustrative examples from engineering field. **06+04=10 Hrs**

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

Text Books:

1. B. S. Grewal: Higher Engineering Mathematics, 43rd Edition- 2015, Khanna Publishers, New Delhi.
2. Engineering Mathematics: N. P. Bali and Manish Goyal, Laxmi Publications, 7th Edition 2007.

Reference Books:

1. Advanced Engineering Mathematics: E. Kreyszig, John Wiley & Sons, 9th Ed. 2011.
2. G. B. Thomas and R. L. Finney, Calculus and analytic geometry. 9th edition, Pearson reprint, 2002.
3. Calculus- Early Transcendentals, James Stewart, 7th Edition, Cengage, 2012.

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 equipments. 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: 8 hr + 2T hr = 10 hrs

a) Modern Physics: Black body radiation spectrum. Statements of Wien's law, Rayleigh-Jean's law, Stefan-Boltzmann's law and Planck's law (Qualitativ e). Wave-Particle duality, deBroglie concept of matter waves and their characteristic properties, definitions of Phase velocity, group velocity and Particle velocity; Relation between them. Expression for deBroglie wavelength using group velocity concept. Numerical Problems.

b) Quantum Mechanics: Heisenberg's uncertainty principle and its applications (Non-existence of electrons in the nucleus). Wave function, properties, Physical significance of wave function and Normalization. Time-independent one dimensional Schrodinger's wave equation. Eigen functions and Eigen values. Applications of Schrodinger wave equation: 1. Free Particle and 2. Particle in one dimensional potential well of infinite height and finite width. Numerical Problems.
Self study component: Reduction of Rayleigh-Jeans law and Wein's law from Planck's law.

Unit – II: Elastic and Dielectric properties of Ma terials: 8 hr + 2T hr = 10 hrs

a) Elastic properties of Materials: Concept of stress, strain, tensile stress, shear stress, compressive stress, concept of elasticity, plasticity, strain hardening and strain softening, Hooke's law, different elastic moduli: Poisson's ratio and its limits. Expression for bending moment of a beam with rectangular cross section. Young's modulus (Y), Bulk modulus (K) and Rigidity modulus (n) in terms of α and β (Mention the expressions). Relation between Y, n, K and σ; Applications: I-shaped girders and Twisting Couple. Numerical problems.

b) Dielectric properties of Materials: Electric dipole, dipole moment, Dielectric constant and polarization of dielectric materials. Four types of polarization. Polar and non-polar dielectrics. Expression for internal fields in solids (one dimension). Expression for Clausius-Mossotti equation. Mention of solid, liquid and gaseous dielectrics with one example each. Applications of dielectrics in transformers. Numerical Problems.
Self study component: Rigidity modulus by torsional pendulum

Unit – III: Electrical Conductivity in Metals and S emiconductors: 8 hr + 2T hr = 10 hrs

a) Electrical Conductivity in Metals: Failures of classical free electron theory. Quantum free electron theory – Assumptions, Fermi Dirac Statisti cs (qualitative), Fermi level, Fermi temperature, Fermi velocity and Fermi factor. Variation of Fermi factor with Energy and temperature, Expression for density of states. Expression for Fermi energy. Merits of quantum free-electron theory. Numerical Problems.

b) Semiconductors: Classification of Semiconductors, Fermi level in intrinsic and extrinsic semiconductors. Expression for electron concentration in conduction band and Mention the expression for hole concentration in valance band of an intrinsic semiconductor. Relation between E_F and E_g. Expression for intrinsic carrier concentration and conductivity of an intrinsic semiconductor. Numerical Problems.
Self study component: Expression for energy gap of an intrinsic semiconductor by variation of resistivity with temperature.

Unit – IV: Lasers and Optical Fibers: 8 hr + 2T hr = 10 hrs

a) Lasers: Review of absorption, spontaneous and stimulated emission of radiation, Expression for energy density in terms of Einstein coefficients. Requisites of a Laser system: laser cavity, active medium and excitation source. Conditions for laser action: metastable state, population inversion and pumping process. Principle, Construction and Working of CO_2 and Semiconductor Lasers. Application of Lasers in range finder, data storage, welding and cutting. Numerical problems.

b) Optical fibers: Propagation mechanism. Expression for angle of acceptance and Numerical

aperture. Fractional index change, V number and number of modes. Types of optical fibers. Attenuation: Causes of attenuation. Expression for attenuation coefficient. Application of optical fibers in communication system. Numerical problems.

Self study component: Measurement of pollutants in the atmosphere using LASER.

Unit – V: Superconductivity and Theory of Sound: 8 hr + 2T hr = 10 hrs

a) Superconductivity: Temperature dependence of resistivity in superconductors. Meissner's effect, BCS theory. Types of Superconductors (Type-I and Type-II). High temperature superconductors. Applications of superconductivity – i) Superconduct ing magnets, ii) Maglev vehicle and iii) SQUIDS.

b) Theory of Sound:

Vibrations: Equation of motion for free vibrations, Theory of damped vibrations: overdamping, critical and under damping, quality factor. Theory of forced vibrations and resonance, Sharpness of resonance.

Acoustics: Absorption, reverberation and time of reverberation, Sabine's formula (Mention the expression), Basic requirements of the acoustically auditorium.

Ultrasonics: Non-destructive method of testing the materials. Measurement of ultrasonic velocity in solids and liquids. Applications of ultrasonics. Numerical Problems.

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

Text Books

1. John Wiley & Sons: Engineering Physics - Wiley India Pvt. Ltd, New Delhi.
2. R.K. Gaur, S. L. Gupta ; Engineering Physics – Dhan pat Rai Publications; 2011 Edition

References

1. S. O. Pillai : Solid State Physics, (New Revised Sixth Edition) – New Age International (P) Limited, Publishers, New Delhi.
2. N.H. Ayachit, P. K. Mittal: Engineering Physics – I. K. International Publishin g House Pvt. Ltd. New Delhi.
3. M.N. Avadhanulu and P.G. Kshirsagar; Engineering Physics – S Chand & Company Ltd., Ram Nagar, New Delhi.
4. D. R. Khanna, R. S. Bedi : A Text Book of Sound – Published by Atma Ram & Sons – 1981.

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 de partment 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			
Course Code: P18CH12/22	**Sem: I / II**	**L-T-P-H: 4-0-0-4**	**Credits: 4**
Contact Period: Lecture: 52 Hr, Exam: 3 Hrs.		**Weight age: CIE:50; SEE:50**	

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 te chnology is useless and technology without science is blind". Therefore the knowledge of scien ce is very essential for engineering students.

Course Content (CC)

Unit – I: Chemical fuels and Alternate fuels: 8 + 2 hrs

Chemical Energy: Introduction, Fuels-Definition, classification. Calorific value -definition, Gross and Net calorific values. Determination of calorific value of solid and liquid fuels by Bomb calorimeter and gaseous fuel using Buoy's calorimeter, numerical problems. Cracking -fluidized bed catalytic cracking, Reformation of petrol. Knocking-mechanism, ill effects, prevention of knocking, anti-knocking agents, leaded and unleaded petrol, Octane and Cetane number, synthetic petrol by Bergius method.

Alternate fuels: Power alcohol, bio-diesel, and solar energy: photovoltaic cells, Introduction, definition, importance, working of PV cell, and production of solar grade silicon by puller technique method. Applications of solar energy.

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

Unit – II: Electrochemistry and Battery Technology : 8 + 2 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 H_2- O_2 and CH_3OH- O_2 fuel cells.

Battery Technology: Basic concepts, characteristics, Classification -primary, secondary and reserve batteries. Construction, working and applications of Ag_2O-Zn, Zinc air, Li-MnO_2, 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: 8 + 2 hrs

Corrosion: Introduction, Electro Chemical theory of corrosion, Types - Differential metal corrosion, Differential aeration corrosion - pitting corrosion and Stress corrosion- Caustic embritlement. Factors affecting the rate of corrosion-Nature of metal, Nature of corrosion product, anodic and cathodic areas, pH and temperature.

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: 8 + 2 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.

Cement: Introduction, types, mixing of additives to cement and properties of cement-quality, shrinkage, soundness, setting time, strength and color. Testing of cement. Determination of CaO in cement solution by rapid EDTA method.

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 Te chnology and Pollution: 10+2hrs

Liquid Crystals: Introduction, Classification- Thermo-tropic and Lyo-tropic with examples and differences. Types of meso-phases -nematic, chiral nematic (cholesteric), smectic and columnar. Applications of liquid crystals in electronic instruments and thermography.

Nano-Chemistry: Introduction, size dependent properties. Bottom up and top down approach. Distinction between molecules, nano-particles and bulk materials. nano-particles, nano-rod, nano-tubes and nano-wires, properties and applications. Synthesis of nano – materials by chemical vapour deposition.

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.

Water pollution: Introduction, sources and ill effects. Chemical Oxygen Demand and Biochemical Oxygen Demand. Determination of COD of industrial waste water. Numerical problems on COD. Determination of total hardness of water. Sewage treatment-primary, secondary and tertiary.

Self-study component: Sound pollution and Air pollution. Sources and ill effects of CO, CO_2 and particulate matters.

Text books:

1. Uppal. M.M. Engineering Chemistry Khanna Publishers, 36Edition, 2017.
2. Jain and Jain, A text Book of Engineering Chemistry by Dhanapatrai Publications, New Delhi, 25st Edition, 2017.

References books:

1. Gray.G.W and Winsor.PA, Liquid crystals and plastic crystal, Vol-I, edited by, Ellis Horwood series in Physical Chemistry, New York. (P.No. 106-142) 12th Edition 2017.
2. B. K. Sharma. A Text Book of Environmental Chemistry and Industrial Chemistry by, Goel Publishing House, Meerut, 13th Edition 2017.
3. Murthy B.S, Shankar. P and Raju. B. A Text book of Nano-science and Nano- technology by Goel Publishing House, Meerut, 14th Edition 2017.
4. Wiley Engineering Chemistry and Engineering Chemistry by Dr. K. Pushpalatha, Wiley Publication, India, 3rd Edition 2017.

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.

Department of Civil Engineering

Course Title : Engineering Mechanics			
Course Code: P18CV13/23	**Semester : I/II**	**L-T-P-H: 3 – 0 – 0 - 3**	**Credits: 3**
Contact Period : Lecture :42 Hr, Exam: 3Hr		**Weightage :CIE:50% SEE:50%**	

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, equilibriant, 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 *Self-Learning***: Numerical problems on support reaction of beams loaded with trapezoidal loads, Support reactions for Compound beams and wedge friction - numerical problems.

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

MOMENT OF INERTIA: Introduction, radius of gyration, parallel axis theorem, perpendicular axis theorem, polar moment of inertia, moment of inertia of standard geometrical figures by first principles. Numerical problems on moment of inertia of composite sections. **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 – n umerical problems. **8 Hrs *Self-Learning***: Concept of motion with varying acceleration. Collision of elastic bodies.

TEXT BOOKS:

1. S.S Bhavikatti, A text on elements of Civil Engineering and mechanics, New age international publishers, 2015.
2. R.S. Khurmi, A text book of Engineering mechanics, S. CHAND & COMPANY LTD.

REFERENCE BOOKS:

1. Ramamrutham S: A text book of Applied mechanics, Dhanpatrai and sons
2. S. Rajashekaran, G Shankar Subramanian: Engineering Mechanics- Statics and Dynamics, Vikas Publishing House 1999.
3. Ferdinand Beer and Johnson F.R (Jr) Mechanics for Engineers, Tata Mc Graw-hill Publishing comp. Ltd New Delhi.

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			
Course Code:P18CS13/23	**Sem: I/II**	**L-T-P-H: 3-0-0-3**	**Credits: 3**
Contact Period: Lecture:42 Hrs, Exam: 3Hr		**Weightage: CIE:50%; SEE:50%**	

Course Content

Unit -1

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

Decision Making and Looping: The while statement, The do-while statement, The for statement, Programming examples.

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:

1. Programming in ANSI C, E. Balagurusamy, Tata McGraw Hill – 5 th Edition.
2. Python Programming Using Problem Solving Approach by Reema Thareja, Oxford University Press 2017.

References Books:

1. Behrouz A. Forouzan, Richard F. Gilberg: Computer Science – A Structured Approach Using C, 3rd Edition, Cengage Learning, 2007.
2. Programming with C, R.S Bichkar, University press.
3. Fundamentals of Programming by Richard L. Halterman, Southern Adventist University 2018.

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

Course Title: Elements of Mechanical Engineering			
Course Code: P18ME14/24	**Sem: I / II**	**L-T-P-H : 3-0-0-3**	**Credits: 3**
Contact Period: 52 Hr; Exam: 3 Hrs.		**Weightage: CIE:50%; SEE:50%**	

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.

.Course Content

Unit – 1

Steam formation and Turbines: Classification of boilers and their application. Steam formation, Definitions of specific volume, enthalpy, internal energy and Dryness fraction. Description of pressure-temperature diagram, Temperature-volume diagram and Temperature-enthalpy diagram. Steam turbines: Classification, principle and operation of impulse and reaction steam turbines. Gas turbines: Classification of gas turbines. Working principle of open cycle and closed cycle gas turbine. **11 Hrs**

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

Hydraulic Pumps: Introduction, Classification of Pumps, Positive displacement pumps**,** Working principle of single acting and double acting Reciprocating Pumps**,** advantage, disadvantages and applications of Reciprocating Pumps. **Centrifugal Pumps** :Introduction**,** Working principle, advantages, disadvantage and applications of Centrifugal Pumps, Difference between Reciprocating pump & centrifugal Pump, **Refrigeration & Air Conditioning:** Refrigeration, Refrigerants and

properties of refrigerants, Vapour Compression Refrigeration, Vapour Absorption Refrigeration, Room air conditioner. **11 Hrs**

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

Unit – 4

Lathe: Introduction, Specifications of lathe, Principle of working of a center lathe, major parts of a lathe, Lathe operations: cylindrical turning, facing, thread cutting, Taper turning: **Drilling machine**: Principle of working of Radial drilling machine, Twist drill and its nomenclature. Drilling machine operations: drilling, boring, reaming, tapping. **Milling machine:** Principle of milling: Up milling and down milling methods, Horizontal and vertical milling machines. Milling operations: slab milling, end, slot milling. **Grinding machine**: Types of grinding machines: cylindrical and centerless grinding machine. **10 Hrs Self Learning Component:** Super finishing operations- lapping and honing.

Unit – 5

Joining process: Soldering, Brazing and welding. Principle of soldering, types and properties of solders, applications of soldering. Principle of Brazing and its applications. Welding: classification of welding process, principle of electric arc welding, Oxy- acetylene gas welding, types of flames. Applications of welding. Comparison between soldering, brazing and welding. **Power transmission by belt Drives:** Types of belts, open and crossed belt drive, velocity ratio of pulleys, Length of belt. Numerical problems. **10 Hrs**

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

Text books

1. V. K. Manglik, **"Elements of Mechanical Engineering,"** PHI Learning Pvt Ltd. 2013, ISBN: 978-8120346291.
2. **Kestoor Praveen and Ramesh M R, "A Text Book of Ele ments of Mechanical Engineering," Interline Publishing Ltd., Bangalore, 2nd edition, 2006, ISBN:** 1234567157184**.**

References

1 K. R. Gopalakrishna, **"A Text Book of Mechanical Engineering Science,** " Subhash Publications, Bangalore, 15th edition, 1999, ISBN: 9789383214075.
2 S. K. H. Chouadhury, A.K.H. Chouadhury, Nirjhar Roy, **"The Elements of Workshop Technology. Vol-1**," Media Promoters and Publishers, 2008, ISBN: 978- 8185099149.
3 S. K. Chouadhury, S. K. Chouadhury, S. K. Hajra Chouadhury, Hajra Chouadhury, **"The Elements of Workshop Technology. Vol-2**," Media Promoters and Publishers, 2010, ISBN: 978-8185099156.
4 K.V.A. Balaji and K. Rama Sastry, **"Elements of Mechanical Engineering Sciences,** " Sanguine Technical Publishers, 2006.

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. **09hrs**

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. **15hrs**

Unit – IV

Projections of Solids: Projections of cube, right regular prisms, cylinders, pyramids and cones. **21hrs**

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. **18hrs**

Text books

1 K.R. Gopalakrishna, **"Engineering Graphics,"** Subhas Publications Bangalore, 32nd edition, 2005, ISBN: 5551234018854.

2 N.D. Bhatt & V.M. Panchal, **"Engineering Drawing,"** Charotar Publishing House, Gujarat, 48th edition, 2005, ISBN: 978-93-80358-96-3.

References

1 S. Trymbaka Murthy, **"Computer Aided Engineering Drawing,"** I.K. International Publishing House Pvt. Ltd., New Delhi, 3rd revised edition, 2006, ISBN: 9788188237944.

2 Luzadder Warren J., Duff John M., **"Fundamentals of Engineering Drawing with an Introduction to Interactive Computer Graphics for Design and Production,"** Prentice Hall of India Pvt. Ltd., Eastern Economy Edition, 2005, ISBN: 9788188237944.

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				
Scheme	**Weightage**	**Marks**	**Event Break Up**	
CIE	50%	50	**Test**	**Submission**
Unit I & II to be evaluated only through CIE			20	30
SEE	50%	50	**Questions to be Set: 06**	**Questions to Answer: 03**

Scheme for Semester End Examination	
One out of two Questions from unit III	15 Marks
One out of two Questions from unit IV	20 Marks
One out of two Questions from unit V	15 Marks
Total	**50 Marks**

Department of Electrical & Electronics Engineering

Course Title: Basic Electrical Engineering			
Course Code: P18EE15/25	**Semester: I/II**	**L:T:P:H-3:1:0:4**	**Credits:3**
Contact period : Lecture: 40 Hrs., Exam 3 Hrs.		**Weightage : CIE:50; SEE:50**	

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. **08Hrs**

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 Precauti on 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 **08Hrs**

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 **08Hrs**

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 **08Hrs**

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 **08Hrs**

TEXT BOOKS:

1. B.L. Theraja, A.K. TherajaA Textbook of Electrical Technology, Vol. 2, 23rd Edition, Publisher: S Chand & Co Ltd
2. M V Rao, "Basic Electrical Engineering", Publisher: Subhas Stores, 2015

REFERENCES:

1. Rajendra Prasad, "Fundamentals of Electrical Engine ering", 3 rd Edition, Prentice hall of India Pvt, Ltd, 2014
2. V N Mittle and ArvindMittle, "Basic Electrical Engi neering" 2 nd Edition, Tata McGraw Hill Publications,2005

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

Diode Applications: Introduction, Load Line Analysis, Series Diode Configurations, Parallel and Series – Parallel Configurations, Sinusoidal in puts; Half-Wave Rectification, Full wave Rectification, Zener Diodes, **Power Supplies:** Introduction, General Filter Considerations, Capacitor Filters, IR Emitters, Liquid Crystal Displays, Solar Cells. **08 Hrs**

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). 09 Hrs 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

Operational Amplifiers: Introduction, Op-Amp Basics, Practical Op Amp Circuits, Op Amp Specifications-DC Offset Parameters, Op-Amp Specifications-Frequency Parameters, Differential and Common Mode Operation, **Op-Amp Applications:** Constant Gain Multiplier, Voltage Summing, Voltage Buffer, Controlled Sources, Active Filters (**Only First order LPF & HPF filters)** .

08 Hrs

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

Digital Electronics: Introduction**,** Number Systems, Binary number Systems, Number Conversion, Binary Arithmetic, Signed Numbers, Hexadecimal number Systems, Hexadecimal to Binary and Binary to Hexadecimal conversion, Hexadecimal Arithmetic, Switching and Logic Levels, Digital Waveforms, Characteristics Digital ICs, Boolean Algebra Theorems, Examples of Combinational Circuits, Multiplexers, Decoders, Logic Gates, Algebraic Simplification, NAND and NOR Implementation. **08 Hrs**

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

Communication Engineering: Introduction, Elements of Communication Systems, Modulation, Amplitude Modulation, Frequency (FM) and Phase (PM) Modulation, Transmitter, Automatic Gain control (AGC) circuit, Digital Communication, Multiplexing, Pulse Demodulation, The Telephone Systems, Data transmission, Digital Modulation, Multiplexing and Multi-Access, Transmission lines, radio waves, Antennas, Television, Satellite Communication, Principle of Operations of Mobile Phone, FAX, ISDN, Microwave Communication, Optical Fibre Communication (**Excluding** : Amplitude Modulation circuit)

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:

1)"Electronic Devices and Circuit Theory", Robert L . Boylestad andLouisNashelsky,10th Edition, Prentice Hall , 2009.
2) "Basic Electronics", D P Kothari, I J Nagrath ,M cGraw Hill Education,2014.

REFERENCE BOOKS:

1) "Electronic Devices and Circuits", David A. Bell. P rentice Hall, New Delhi, 2004.
2) "Electronic Principles", Albert Malvino, David J Ba tes, 7th Edition, McGraw Hill Education,2007.
3) "Digital Logic and Computer Design", M.MorrisManno, 4th Edition, Prentice Hall, 2013.
4) "Principles of Electronic Communication Systems", L ouis E Frenzel, 6th Edition, McGraw Hill Education, 2012.

c) Course Outcomes (CO)

After learning all the units of the course, the student is able to

Course Title: Basic Electronics		
CO #	**Course Outcome**	**Program Outcome Addressed (PO #) with BTL**
CO1	Apply knowledge of physics and mathematics to understand operation of PN diodes, Zener diodes MOSFET, solar cells, LCD, CRT, Transducers, modulation techniques and Opamps,	PO1 [L1]
CO2	Analyze circuits built with diodes, Zener diodes, MOSFET and Opamp	PO2[L2]
CO3	Design simple circuit to perform rectification, voltage regulation, Opamp based amplifier, summer and filter, MOSFET based amplifier, digital circuit	PO2[L2], PO3[L3]
CO4	Analyze and implement basic Digital Electronic circuits for a given application using knowledge of Boolean Algebra and Basic gates.	PO2 [L3]
CO5	Discuss different modulation techniques and communication systems.	PO2 [L3]

Department of Mechanical Engineering

Course Title: Basic Mechanical Engineering Science Lab			
Course Code: P18MEL16/26	**Sem:01/02**	**L-T-P-H : 0-0-3-3**	**Credits:1.5**
Contact Period: Practicals: 39 Hrs; Exam: 3 Hrs.		**Weightage: CIE:50; SEE:50**	

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

1 Hazara Choudhry **, "Workshop Technology: vol 2,"** Media promoters and publishers pvt ltd., 2010, ISBN: 978-8185099156.

2 *J K Gupta & R S Khurmi, "A Textbook of Workshop Technology," S. Chand Pu blishing company, ISBN: 9788121908689.*

3 K. R. Gopalakrishna, **"A Text Book of Mechanical Engineering Science,** " Subhash Publications, Bangalore, 15th edition, 1999, ISBN: 9789383214075.

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

Scheme	Weightage	Marks	Event Break Up	
			Test	Record
CIE	50%	50	20	30
SEE	50%	50		

Scheme for Semester End Examination	
Part –A One Question from Fitting or Development Model One Question from Welding or Drilling/Tapping	 20 Marks 10 Marks
One Question from Part -B	10 Marks
Viva – Voice	10 Marks
Total	**50 Marks**

Department of Computer Science & Engineering

Course Title: C and Basics of Python programming Laboratory			
Course Code:P18CSL16/26	**Sem: I/II**	**L-T-P-H : 0-0-3-3**	**Credits:1.5**
Contact Period:Lecture:39 Hr Exam: 3Hr		**Weightage: CIE:50;SEE:50**	

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

1. Accept two numbers and perform basic arithmetic operations like +, -, *, / and %
2. Solve equations using mathematic 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

Gross Salary	Tax Rate
Gross<=2000	No tax
2000 < Gross <= 4000	3%
4000 < Gross <= 5000	5%
Gross > 5000	8%

   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>B ? B<<2 : B>>2
   - 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 a nd 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 libra ry function.
8. Write a program by reading ‘N’ integer numbers a nd perform binary search.
9. Write a program to read ‘N’ names and sort the n ames using bubble sort.
10. Write a program to find the product of two matrixes.
11. Write a program using functions
    i) To read an array of ‘N’ integer data
    ii) Search an key 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
    i) To check whether the given number is positive, negative or zero.

ii) 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			
Course Code: P18PHL17/27	**Sem:** I/II	**L-T-P-H :** 0-0-3-3	**Credits:**1.5
Contact Period: Lecture : 39 Hrs**., Exam:** 3Hr	**Weightage: CIE:** 50% **; SEE:** 50**% Marks**		

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 4 th 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:

1. Laboratory Manual for Engineering Physics Lab.

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, Su has 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)				
Scheme	**Weightage**	**Marks allotted**	**Event Break Up**	**Distribution of Marks**
CIE	50%	50	1. Performance of each experiment conducted is evaluated for 20 marks and average is taken for all the experiments.	20
			2. Each experiment in the record is evaluated for 10 marks and average is taken for all the experiments.	10
			3. A test is conducted and evaluated at the end of the semester.	20
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)					
Scheme	**Weightage**	**Marks allotted**	**Event Break Up**	**Distribution of Marks**	
				Part (A+B)	**Total**
SEE	50%	50	1. Experimental write-up work	05 + 05	10
			2. Set-up/Circuit connections, conduction of experiments and taking readings	10 + 10	20
			3. Calculations, Graph and Results	05 + 05	10
			4. Viva-Voce	05 + 05	10
Total SEE shall be calculated by adding above four components:					**50**

Note: *i) **S**emester **E**nd **E**xamination (SEE) is 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 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 ($Na_2S_2O_3$) 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 Conducto metric 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

1. Vogel's A.I. A text book of quantitative analysis, 35th edition, 2017.
2. Willard and others. A text book of Instrumental analysis, 6th edition 2017.

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.

Evaluation Scheme for CIE and SEE.

1. Continuous Internal Evaluation (CIE) Scheme:

Scheme	Weightage	Marks allotted	Event Break Up	Distribution of Marks
CIE	50%	50	1. Performance of each experiment conducted will be evaluated for 20 marks and average will be taken for all the experiments.	20
			2. Each experiment which is written in the record will be evaluated for 10 marks and average is taken for all the experiments.	10
			3. A test will be conducted and evaluated at the end of the semester.	20
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	
				Part (A+B)	Total
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) **S**emester **E**nd **E**xamination (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)			
Course Code :P18HU18	**Semester : I**	**L - T – P-H-0:2:0 :2**	**Credits-1**
Contact Period: Lecture: 32Hrs, Exam: 3 Hrs		**Weightage: CIE:50; SEE:50**	

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 **6 Hrs.**

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

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 **8 Hrs.**

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

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

UNIT-IV

Writing Skills 1: Sentence Formation, Punctuation, Avoiding Cliché, Different Types of Writing Formats, Importance of Writing Skills, Formal and Informal Style of Writing. **4 Hrs.**

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

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', Understand ing 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. Bas ic writing skills. Manners – what to do and what not. Procrastination.

Reference Books

1. "Word Power Made Easy New Revised and Expanded Ed ition", First Edition, Norman Lewis, Goyal Publisher.
2. "Essential English Grammar", Raymond Murphy, Camb ridge University Press, new edition

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.

1. Protection of human rights and protection of human rights act - 1993
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 Ecos ystem, Human activities – Food Shelter, Economic and Social Security. Transportation activities, Environmental impact Assessment, Sustainable Development. **6 Hrs.**

Unit – II

Natural Resources – Water resources – Availability and Quality aspects, Mineral Resources, Forest Wealth, Material Cycles – (Carbon, Nitrogen and Sulphur Cycles) Water borne diseases, water induced diseases, Fluoride problem in drinking water. 5**Hrs.**

Unit – III

Energy – Different types of energy, Conventional an d Non-Conventional sources – Hydro Electric, Fossil fuel based, Nuclear, Solar, geothermal, tidal, wind, Biomass and Bio-gas. Hydrogen as an alternative future source of energy. **5 Hrs.**

Unit – IV

Environmental Pollution and their effects. Water pollution, Land pollution, Noise pollution Public Health aspects. Current Environmental issues of importance: Population Growth Climate change and Global warming – Effect, Urbaniz ations industrialization. **5 Hrs.**

Unit –V

Acid Rain, Ozone layer depletion, Animal Husbandry. Environmental protection – Role Government, Legal aspects, initiatives by Non-Governmental Organizations (NGO Environmental Education, Women Education. **5 Hrs.**

Text Book:

1) Environmental Studies – Benny Joseph – Tata McGraw Hill – 2005

References:

1) Principles of Environmental Science and Engineering – .VenugopalaRao P, Prentice Hall 2005
2) Elements of Environmental Science and Engineering – Meenakshi P, Prentice Hall of India, 2
3) Environmental Studies – Anil Kumar D.C, New age Int ernational Publishers, 2007

Department of Kannada

Course Title : Kannada Kali			
Course Code: P18HM110/210	**Semester : I/II**	**L-T-P-H: 2–0-0-2**	**Credits:NA**
Contact Period : Lecture :26 Hr	**Weightage :CIE:100% - [P/NP]**		

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

Course Title: Engineering Mathematics-II			
Course Code:P18MA21	**Sem:** II	L-T-P-H: 4-0-0-4	**Credits:** 4
Contact Period: Lecture: 52Hrs**, Exam:** 3 Hrs		**Weightage: CIE:50%; SEE:50%**	

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

Unit – I

Linear Algebra-I: Introduction - Rank of matrix by elementary row operations - Echelon form of a matrix. Consistency of a system of linear equations: Gauss elimination method. Gauss - Jordan and LU decomposition methods. Eigen values and Eigen vectors of a square matrix. Similarity of matrices and diagonlisation of matrices (For 2×2 real matric es only). Quadratic forms: Reduction to canonical form by orthogonal transformation. **10 Hrs Self study component**- Review of elementary properties of matrices.

Unit – II

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* $V(x) = x^n$

Unit – III

Laplace Transforms: Definition – Transforms of elementary functions. T ransforms of derivatives and integrals, Transforms of periodic function, unit step function (All results without proof)-Problems only. Inverse Laplace transforms: Definition – Eval uation of inverse transforms by standard methods. Convolution theorem - Problems only, solutions of second order linear differential equations using Laplace transforms method. **12 Hrs Self study component**-Problems on Laplace transform - unit impulse function. Solution of Simultaneous ODE by Laplace method. Vibration of strings, deflection of beams and L-R-C circuits.

Unit – IV

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 p roof)-Illustrated examples. Orthogonal curvilinear coordinates (OCC). **10 Hrs Self study component**-Errors and approximations Expressions for gradϕ, div $\bar{A}$, curl $\bar{A}$ and Laplacian of ϕ in OCC.

Unit –V

Multiple Integrals – Double and triple integrals-region of integratio n. Evaluation of double integrals by changing of order of integration. Application of multiple integrals: Change of variables and applications to area and volume. Beta and Gamma functions: Definition, relationship between Beta and Gamma function (No derivation)-Simple problems only.

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**.** **10 Hrs**

Text Books:

1. B.S. Grewal: Higher Engineering Mathematics, 43nu Edition- 2015, Khanna Publishers, New Delhi.
2. Engineering Mathematics: N. P. Bali and Manish Goyal, Laxmi Publications, 7th Edn., 2007.

Reference Books:

1. Advanced Engineering Mathematics: - E. Kreyszig, John Wiley & Sons, 9th Ed. 2011.
2. G.B. Thomas and R.L. Finney. Calculus and analytic geometry. 9th editions, Pearson reprint, 2002. 3."Calculus- Early Transendentals", James Stewart:7 th Edition , Cengage, 2012.

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-2:Solve linear second order differential equations. Evaluate Laplace transformsand inverse Laplace transforms.

CO-3:Evaluate the Jacobeans, and the Taylors series expansion. and find the extreme value. Analys 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

Course Title: Professional Communication Development. (PCD)			
Course Code : P18HU28	**Semester : 2**	**L - T – P-H: 0 - 2 –0-2**	**Credits:1**
Contact Period: Lecture: 32Hrs, Exam: 3 Hr		**Weightage: CIE:50%; SEE:50%**	

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 **6Hrs 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. **8Hrs 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 de scribe 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, en ergy, honesty, mental keenness, bravery, charm, sophistication, etc. **6Hrs 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 **4Hrs Self-study component:** Basics of paragraph writing, punctuations.

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

1."Word Power Made Easy New Revised and Expanded Edit ion", First Edition, Norman Lewis, Goyal Publisher.

2."Essential English Grammar" by Raymond Murphy, publ ished by Cambridge University Press.

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.
4. Write Emails, Letters and Creative passages.
5. Apply the knowledge of vocabulary in his speaking and writing