Centenary Celebrated Sharnbasveshwar Vidya Vardhak Sangha's

Sharnbasva University

ಶರಣಬಸವ ವಿಶ್ವವಿದ್ಯಾಲಯ

A Private University enacted by Govt. of Karnataka as "Sharnbasva University Act 2012"
Karnataka Act No. 17 of 2013. Notification No. ED 144 URC 2016 dated 29/07/2017

UGC Status: Enlisted by the University Grant Commission, New Delhi in the list of
Private Universities in India UGC New Delhi Status letter No. F.8-29/2017 (CPP-IPU), Dated 20th Dec. 2017

Kalaburagi-585 103 - Karnataka - India
www.sharnbasvauniversity.edu.in Email : sharnbasvauniversity@gmail.com

SYLLABUS

With effect from 2021-22

Faculty of Engineering & Technology

I & II Semester B.E/B.Tech

(Common to All Engineering Branches)

VISION

- Enhancing the horizon of world knowledge by promoting international understanding through imparting quality education and creating value added skill based human resource.
- We aspire to become top ranking National and International Centre of Excellence producting high caliber leaders and professionals par excellence.
- Inculcating the spirit of "Vasudaiva Kudumbakam" (The world is one family).
- "Sakala JeevathmarigeLesane Bayasuva" (Wishing the worldly good and betterment of all the living beings) is our moto.

MISSION

- Achieving academic excellence through innovatively designed, research intensive, industry oriented education.
- Imbibing the culture of Independent thinking, Independent writing, Independent speaking and Independent living among the students in all the activities.
- Foster the spirit of National development and develop global competencies. Nurture creativity and encourage enterpreneurship and provide an education with rigor and relevance.
- Provide academically excellent, time efficient, and cost effective higher education which enhances the ability of students to learn throughout their life.
- Ensure freedom of thought and expression in a campus without discrimination.
- Encourage the spirit of questioning and ensure close interrelationship between Teaching, Scholarship and Research.
- Develop and deliver distinctive and value driven academic programme that are flexible and responsible to Local, National and International needs.
- Cultivate academic, business and community driven partnership that positions the University as a leading choice for adult learners.
- To work effectively with other institutions and organisations, where such partnerships can lead to understanding research and teaching.

List of Courses run by Sharnbasva University, Kalaburgi

UG. Courses :

Faculty of Engg. & Technology

B.Tech. Programmes (Co-Ed)

1. Computer Science & Engg.
2. Electronics & Communication Engg.
3. Electrical & Electronics Engg.
4. Mechanical Engg.
5. Civil Engg.
6. Energy Engg.

B.Tech.(Exclusively for Women)

1. Computer Science & Engg.
2. Electronics & Communication Engg.
3. Electrical & Electronics Engg.
4. Civil Engg.
5. Artificial Intelligemce & Machine Learning

Faculty of Architecture

1. B. Arch.

Faculty of Business Studies (Co-Ed.)

1. Bachelor of Business Adminstration
2. BBA Logistics
3. BBM - Tourism & Travels

Faculty of Business Studies (Ex-Women)

1. Bachelor of Business Adminstration
2. BMS Aviation and Air Cargo Services

Faculty of Computer Application

1. BCA (Co-Ed)
2. BCA (Exclusively for Women)

P G. Courses :

Faculty of Engg. & Technology

M.Tech. Programmes

1. Computer Science & Engg.
2. Computer Network & Engg.
3. Digital Electronics
4. VLSI & Embedded Systems
5. Nano Technology
6. Machine Designe Engg.
7. Structural Engg.

M.Tech.(Exclusively for Women)

1. Computer Science & Engg.
2. Digital Comm. & Network
3. Artificial Intelligemce & Data Scince

Faculty of Business Studies (Exclusively for Women)

1. MBA (HR, Finance & Marketing)

Faculty of Business Studies

1. MBA (HR, Finance & Marketing)
2. MBA (Hospital Administration)
3. M.Com.
4. MBA (Travel & Tourism Management)

Faculty of Social Science

1. M.A. Journalism & Mass Communication

Faculty of Science & Technology

1. M.Sc. Physics
2. M.Sc. Mathematics
3. M.Sc. Zoology
4. M.Sc. Botany

Faculty of Computer Application

1. MCA Faculty of Education & Technology

Faculty of Fine Arts

1. M.A. Visual Arts (Exclusively for Women)

Faculty of Music

1. M.A. Music

Faculty of Languages

1. M.A. Kannada
2. M.A. English

PG Diploma in Data Sciences for Logistics

Certificate Courses

1. Fashion Designing
2. PG Diploma in Yoga
3. Cultural Event Courses

SYLLABUS OF I & II SEMESTERS B.TECH

Common to all Engineering
Branches (with effect from 2021-22)

SHARNBASVA UNIVERSITY
Kalaburagi
www.sharnbasvauniversity.edu.in

Published By :
Registrar
SHARNBASVA UNIVERSITY
Kalaburagi - 585
103 Karnataka -
India

SHARNBASVA UNIVERSITY

Regulations Governing the Degree of Bachelor of Engineering / Technology (B.Tech)

Under Outcome Based Education (OBE) and Choice Based Credit System (CBCS)

(Effective from the academic year 2021-22)

CONTENT

Year of Publicati

on

:

2021-22

Price

:

Rs.

50/-

SYLLABUS

SHARNBASVA UNIVERSITY REGULATIONS

FOR CHOICE BASED CREDIT SYSTEM (CBCS) FOR THE UNDERGRADUATE PROGRAMS, 2021 (B.E./B.Tech /B.Arc,BCA,BBM,BTTM)

1. TITLE AND COMMENCEMENT :

These Regulations shall be called "**SHARNBASVA UNIVERSITY REGULATIONS FOR CHOICE BASED CREDIT SYSTEM (CBCS) AND GRADING PATTERN FOR UNDERGRADUATE PROGRAMMES, 2021".** These Regulations shall come into force from the academic year 2021-22.

2. THE PROGRAMS :

i. The University shall offer different programs of study representing various Faculties, at Undergraduate, Postgraduate, Research, Integrated, Dual Degree Certificate, diploma and other non-degree programs. The minimum duration of various programs shall be specified in the guidelines governing the respective programs of study, from time to time. The maximum duration shall be twice the minimum duration.

ii. THE FOLLOWING ARE THE FACULTIES :

i. Faculty of Engineering & Technology
ii. Faculty of Architecture
iii. Faculty of Commerce and Management
iv. Faculty of Social Sciences
v. Faculty of Science and Technology
vi. Faculty of Health Sciences
vii. Faculty of Computer Applications
viii. Faculty of Agricultural Sciences and Technology
ix. Faculty of Architecture
x. Faculty of Fine Arts
xi. Faculty of Languages

3. DEFINITIONS OF KEY WORDS:

i. **"University"** means the Sharnbasva University, Kalaburagi;

ii. **"Academic Year"** is divided into three semesters viz; Two main semesters (Odd and Even Semesters) and One supplementary semester (also called Summer Semester).

iii. **"Semester"** Duration of each main semester will be 19 weeks and that of a supplementary semester will be 8 weeks. The activities in each semester shall include: (a) Registration of courses in the first week of semester, dropping the courses in the middle and withdrawal from courses towards the end by the students, under the advice of faculty, (b) Teaching, learning, examination and evaluation.

iv. **"Choice Based Credit System" (CBCS)** means Choice Based Credit System which provides choice for the students to select from prescribed courses (core, electives and foundation courses).

v. **"Credit Based Semester System" (CBSS)** Under the CBSS, the requirement for awarding a degree or certificate is prescribed in terms of number of credits to be earned by the students.

vi. **"Course"** Usually referred to, as 'paper' is a component of a programme. All courses need not carry the same weightage. The courses should define learning objectives and learning outcomes. A course may be designed to comprise lectures /discussion / writing/ studio work / case studies / library

events/ tutorials / laboratory work / field work / outreach activities / project work / internship training / viva / seminars / term papers/ assignments / presentations/ self-study etc. or a combination of some of these.

vii. **"CIE"** and **"SEE"** means respectively the Continuous Internal.

viii. **"First Attempt"** referred to a student who has completed all formalities and passed all the heads in SEE in single attempt, shall be considered as first attempt.

ix. **"Convocation"** means the convocation of the University, where the Degrees, Honorary Degrees, Diplomas, Academic Distinctions and Certificates are awarded as per the requirements of the University.

x. **"Letter Grade"** means an index of the performance of students in a said course. Grades are denoted by letters O, S,A, B,C,D,E&F.

xi. **"Grade Point"** means a numerical weight allotted to each letter grade on 10-point scale.

xii. **"Credit"** means a unit by which the course is measured. It determines the number of hours of instructions required per week. One credit is equivalent to one hour of teaching (lecture discussion/ writing / studio work / case studies / library events) or two hours of tutorial/practical work/field work per week.

xiii. **"Credit Point"** means the product of grade point and number of credits for a course.

xiv. **"Semester Grade Point Average" (SGPA):** It is a measure of academic performance of student/s in a semester. It is the ratio of total credit points secured by a student in various courses registered in a semester and the total course credits taken during that semester. It shall be expressed up to two decimal places.

xv. **"Cumulative Grade Point Average" (CGPA):** It is a measure of overall cumulative performance of a student over all semesters. The CGPA is the ratio of total credit points earned by a student in various courses in all semesters and the sumof the total credits of all courses in all the semesters. It is expressed up to two decimal places.

xvi. **"Programme"** means an educational programme leading to award of a degree or certificate.

xvii. **"Transcript or Grade Card or Certificate":** Based on the grades earned, a grade certificate shall be issued to all the registered students after every semester. The grade certificate will display the course details (code, title, number of credits, grade secured) along with SGPA of that semester and CGPA earned till that semester.

xviii. **"Notification"** means the notification of the University.

xix. **"Degree"** means a degree awarded by the University with or without specialization and/ or Minor.

xx. **"Students"** means a person admitted to and pursuing a specified programme of study in the University at any level UG / PG / Ph.D. etc.

xxi. **"Teacher", "Course Instructor"** means respectively a faculty member appointed for imparting instruction and research guidance to students in the University and the Teacher instructing a Course.

xxii. "**OBE**", means **Outcome Based Education.**

xxiii. "**AICTE**", means **All India Council for Technical Education**

xxiv. "**State Govt /Govt** ", means **Governament of karnataka**

xxv. "**UGC**", means **University Grants Commission**

xxvi. "**MHRD**", means **Ministry of Human Resource Development**

4. ACADEMIC YEAR:

i) The academic year is divided into three semesters viz; Two main semesters (Odd and Even Semesters) and One supplementary semester. Duration of each main semester will be 19 weeks and that of a supplementary semester will be 8 weeks.

ii) The activities in each semester shall include: (a) Registration of courses in the first week of semester, dropping the courses in the middle and withdrawal from courses towards the end by the students, under the advice of faculty, (b) Teaching, learning, examination and evaluation.

5. SEMESTER SYSTEM AND CHOICE BASED CREDIT SYSTEM:

i) Semester wise credit based system shall be followed in each program of study except in the case of certificate and non-degree programs.

ii) Every course offered shall have four components associated with the teaching-learning process, viz; Lecture -L ,Tutorial -T,
Laboratory –P and Self-study-S

iii) Credits shall be assigned to the each course in a programme of study is as follows: L- One hour lecture =One credit ; T- One Tutorial hours=One credit ; P- Two hours of laboratory /Seminar
= One credit ; S- Four hours of Self- study = One credit.

iv) Each course in a programme of study shall be represented as L-T- P-S-C , where L, T, P, S, and C means respectively, number of lecture hours per week , number of tutorial hours per week , number of laboratory /seminar hours per week , number of self- study hours per week, and the number of credits assigned to the course.

v) A course shall have either or all the four components. Consider the Following example; (1) A course may have only lecture component of minimum 3 hours per week, then it will be represented ,as 2:1:0:0:3 . (2) A course may have minimum 3 hours of lecture and one hour of tutorial, then it will be represented as 3:1:0:0:4. (3) If, the course, has only laboratory component of minimum 2 hours duration and one hour of tutorial, then it will be represented, as 0:1:2:0:2. (4) For Self-Study course of 4 hours
duration, then it will be repented as 0:0:0:4:1.

vi) The number of credits required to be earned for degree programme shall be calculated at an average of maximum **TWENTY** credits per main semester. For example, a **four** year degree programme shall comprise of **eight** main semesters and therefore require maximum of 160 credits, for three year degree programme shall comprise of **six** main semesters and therefore require maximum of 120 credits, and for degree programme of **five** years, the number of credits required to be earned shall be maximum of 200. For lateral entry, the number of credits required to be earned shall be maximum of 120 (for four year degree programme).

vii) A full time student shall normally register for a minimum of **18** credits and maximum of **22** credits.during main semester, whereas in supplementary semester a maximum of 12 credits.

viii) Every course in a programme of study normally runs for the full length of a semester.

6. ADMISSION:

Admission to the University shall normally be made at the commencement of each academic year for various programmes of study except research programmes. The date

for advertisement, entrance examination, if any, counseling, admission, registration, commencement of classes, and other details for the academic session shall be notified by the Registrar, from time to time.

7. ELIGIBILITY FOR ADMISSION:

The Admission of students to various programmes of studies offered by the University shall fulfill the minimum qualifications laid down by the University, Government of Karnataka, AICTE, NCTE and UGC / MHRD for the programme of study concerned, subject to Rules of reservation for candidates belonging to SC, ST, and other Backward Classes as laid down by the State Government from time to time.

8. ADMISSION PROCESS:

Admission process for various programmes shall be as follows: Admission to I year / I semester professional programmes (B.E/ B.Tech, B.Arch BCA, BBM/BTTM etc.) shall be open to the candidates who have passed the second year PUC or XII standard or Equivalent examination recognized by the University

NRI/PIO/FN seeking admission to above professional programmes shall apply separately with equivalency/ eligibility/migration certificate along with passport/visa/ clearance/NOC from concerned bodies to the Admission Committee. Only after the eligibility is ascertained, a NRI/ PIO/FN can appear for the entrance test conducted by the University.

A candidate seeking admission under the Government Quota shall follow the procedures of the Common Entrance Examination as notified by the Government of Karnataka from time to time, and NATA / JEE ranks for B.Arch.

A candidate seeking admission under the University Quota (Management Quota) shall appear for entrance test conducted by the University by submitting application form and paying the prescribed entrance test fee. However, the students who have cleared and obtained rank in KEA /CET/JEE paper I&II/NATA etc., need not write the University Entrance Exam.

Admission Committee shall prepare a merit list for each of the programme of study subject to a minimum performance criterion in the entrance test as prescribed by the admission committee from time to time, and the percentage of marks obtained in the qualifying examinations as prescribed by the Government of Karnataka for a time to time.

Merit list as prepared by Admission Committee shall be submitted to the Chancellor for his/her approval.

The Admission Committee shall issue a letter of admission to each selected candidate.

The selected candidates upon receiving the letter of admission shall complete the admission process by submitting the requisite forms

along with supporting documents, paying the prescribed fees and full filling any other requirements mentioned in the letter of admission.

Candidates who have passed a qualifying examinations not conducted by Government of Karnataka or this University shall submit the eligibility and migration certificate in original for admission to a programme of study.

Candidate shall be required to submit medical certificate and character certificate from the recognized Doctor and Head of the institution last attended respectively.

Admission to IInd year/ III Sem under lateral entry scheme shall be open to the candidates who have passed the three year diploma from the Karnataka state and secured not less than 45% marks in aggregate (considering the marks all six semester). In case of SC/ST and OBC students from Karnataka state the eligibility shall be 40%. However candidates who have passed diploma from other than the Karnataka state shall provide the equivalence/ eligibility certificate from the director of technical education, Bangalore. Also, the students who have passed B.Sc. Degree from the recognized university or equivalent qualification as recognized by university and secured not less the 45% marks in aggregate (considering the marks all six semester). In case of SC/ST and OBC students from Karnataka state the eligibility shall be 40%However candidates who have passed B.Sc. from other than the Karnataka state shall provide the equivalence/ eligibility certificate from the competent authority.

8.A Mandatory Induction Programme :

All the new entrants to the university shall attend Mandatory Induction Programme for duration of 3 weeks.

9. ATTENDANCE REQUIREMENT:

Each semester is considered as one unit and the student is required to have a minimum attendance of 85% in each course with a provision of condonation of 10% of attendance by the Vice- Chancellor on the specific recommendation of the Dean of the

Faculty, indicating reasonable cause, such as medical grounds, participation in University level sports, cultural programs, seminars, workshops, paper presentation, etc.

The calculation of the attendance shall be based on the number of hours prescribed by the University by its calendar of events. However, for first semester students, the same will be reckoned fromthe date of admission to the course as per KEA CET / Sharnbasva University, Kalaburagi allotment.

The shortage of attendance shall be informed to the students by the Dean/Chairperson/Teacher concerned periodically to be cautious and to make up the shortage. In case, a student's class attendance in a course is less than as stipulated by the University, the student is said to have dropped that course and the student has to re-register for the dropped course when the course is offered again by the Department if it is a hard core course. The student may choose the same or any alternate core/elective in case the dropped course is soft core/elective course.

Provided that mere omission by the university to inform the student about the shortage of attendance shall not entitle him to appear for examination. It is the responsbility of the students to attend the required number of classes on their own.

10. ASSESSMENT AND EVALUATION:

The assessment and evaluation of each student shall comprise of two components viz; Continuous Internal Evaluation (CIE) and Semester End Examination (SEE). Equal weightage shall be given for CIE and SEE (50 :50).

10.1. Continuous Internal Evaluation:

The CIE shall be conducted by the course teacher throughout the semester. The suggested components of CIE for Theory and Laboratory course are as depicted below in Table-I and Table-II respectively.

Table-I: Suggested components of CIE for Theory

Sl. No	Components	Marks
1	Internal Test-I*	15
2	Internal Test-II*	15
3	Internal Test-III*	15
4	Seminar/Assignment/Mock Evaluation	35

* Average of Best Two performances of the Internal Tests shall be considered for 15 Marks

Table-II: Suggested components of CIE for Laboratory

Sl. No	Components	Marks
1	Conduction of experiments / Design and fabrication of the system/ Project report	25
2	Evaluation of Lab/Project report / Internal test	15
3	Mock Evaluation	10

The suggested components of CIE for Seminar, Internship and Main Project course are as depicted below in Table-III, Table-IV and Table-V respectively.

Table-IV: Suggested components of CIE for Internship

Sl. No	Components	Marks
1	Midterm Presentation on Internship	25
2	Report on Internship	25

Table-V: Suggested components of CIE for Project

Sl. No	Components	Marks
1	Project Phase-I, Literature Survey / Visit to industries/R & D to finalize the project topic	50
2	Project Phase-II a) Design, Testing and Results analysis b) Report Writing	 30 20

Table-III: Suggested components of CIE for Seminar

Sl. No	Components	Marks
1	Identification of Seminar topic from referred Journals in relevant domain suggested by the guide	20
2	Report on Seminar and Evaluation	40
3	Presentation	40

10.1.1. Provision to Drop the Course:

In case a student secures less percentage of marks as prescribed in the course, the student is said to have **dropped** that course, and such a student is not allowed to write SEE in that course**.**

A student has to re-register for the **dropped** course when the course is offered again by the department if it is a hard core course. The student may choose the same or an alternate core/elective, in case the dropped course is soft core/elective course.

A student who is said to have dropped the Internship/project work has to re-register for the same subsequently within the stipulated period.

The details of any dropped course shall not appear in the Grade card.

10.1.2 Provision to withdraw course:

A student can withdraw any course within 10 days from the commencement of semester. Whenever a student withdraw a course, he/she has to register for the same course in case it is hard core course, the same course or an alternate course if it is soft core/open elective.

10.1.3 Provision for Appeal :

If a student is not satisfied with the evaluation of CIE, he/she can approach the Students Grievance Cell with the written submission together with all the facts, the assignments, test papers etc which were evaluated. This shall be done before the commencement to SEE. The Grievance cell shall look into the details and if necessary

take corrective measures.

10.2 Semester End Examination (SEE):

A student, who has complied with the minimum specified attendance in a programme and secured greater than or equal to 50% in CIE, shall register for SEE by paying the prescribed fees. The registration process may be online/offline as notified from time to time by the Registrar Evaluation. The registration of a student shall be liable to be cancelled by the office of Registrar Evaluation where disciplinary issues are raised by the concerned Dean of Faculty.

After the last date of registration for SEE, the list of students along with their registered courses shall be released by the office of Registrar Evaluation. A student shall verify the accuracy of his/ her particulars in the list and discrepancies, if any, shall be reported to office of Registrar Evaluation within Three days from the date of release.

The office of the Registrar Evaluation shall issue the Admit cards to eligible students based on the SEE list. The Admit card of a student shall be valid only for the SEE for which it is issued. The Admit card of a student shall include (i) recent photograph of the student and (ii) registered courses for SEE with subject codes.

With the specific approval of the Vice Chancellor, under extra ordinary circumstances, a student whose name does not find place in the student list may be permitted to appear for SEE. The result of such a student may be announced after due verification.

The Registrar Evaluation shall appoint Chief Superintendent and Deputy Chief Superintendent for the conduct of SEE as per the Time Table notified.

Theory Examination: The SEE shall be of three hours / four hours duration or as mentioned in the scheme. The evaluation for this component shall be 50% of the maximum marks.

Laboratory Examination: The SEE shall be of three hours duration or as mentioned in the scheme and shall comprise of Conduction of experiments / Design and fabrication of the system/ Project. The evaluation for this component shall be 50% of the maximum marks.

The SEE for Laboratory shall be held in batches over several days. There shall be one Internal and one External Examiner and the evaluation shall be based on experiment procedure write up, Demonstration, Result analysis / Graphs if any and Viva-voce.

Project Examination: The SEE for the Project/ Project shall be evaluated by two examiners jointly and the evaluation shall be based on various components such as, Writing of Abstract, Project report, Oral Presentation, Demonstration and Viva-voce.

Note: The distribution of marks for various components shall be made available to the Examiners by the Registrar Evaluation from time to time.

Question paper pattern: The question paper for theory courses consist of Five modules. In each module, there are two full questions. The Students are required to answer five full questions selecting one from each module.

Note:Some courses which include design, drawing and mandatory courses shall have their own pattern.

Valuation of Answer Scripts:

The Registrar Evaluation shall appoint Chief Coordinator and Deputy Chief Coordinators for the evaluation of SEE answer scripts. The Registrar Evaluation shall notify the guidelines for the evaluation of various subjects. The answer books of SEE may be coded before issuing for evaluation by the office of the Registrar Evaluation.

i) There shall be Revaluation of theory papers. The theory Answer booklets shall be valued independently by two examiners appointed by the University.

Revaluation of Answer scripts :

ii) If the difference between the marks awarded by the two Examiners is not more than 15 per cent of the maximum marks, the marks awarded to the candidate shall be the average of two evaluations.

iii) If the difference between the marks awarded by the two Examiners is more than 15 per cent of the maximum marks, the answer booklet shall be evaluated by a third Examiner appointed by the university. The average of the marks of nearest two valuations shall be considered as the marks secured by the candidate. In case, if one of the three marks falls exactly midway between the other two, then the highest two marks shall be taken for averaging.

11. ELIGIBILITY FOR PASSING:

The CIE and SEE have equal weightage and the student performance is judged by taking into accounts the results of CIE and SEE individually and also combined. The passing standards are as depicted in the Table-VI.

Table-VI. Eligibility for passing.

The student who passes a course of a semester shall not be allowed to appear for the same again, unless he/she opts for rejection of results as per the following:

i. A student may, at his/her desire, reject his/her total performance of SEE (including CIE marks) or he/she may reject the performance of SEE only. The rejection is permitted only once during the entire course of study.

ii. The student who desires to reject the performance as per 11(i) shall reject performance in all the courses of that semester, irrespective of whether the student has passed or failed in any course. However, the rejection of performance of Final year / semester project work shall not be permitted.

iii. A student who desires to reject the total performance of the semester (including CIE), has to take readmission for the relevant semester. Application for such readmission shall be sent to the Registrar through the Dean of faculty within 30 days from the date of announcement of the results. Late submission of application shall not be accepted for any reasons. Readmission to First semester in such cases shall not be considered as Fresh admission.

iv. The student, who desires to reject only the results of SEE of a semester and does not desire readmission, shall be permitted to reappear for examinations of all the courses of the semester in the subsequent examinations. However, the CIE marks obtained by the student in the rejected semester shall be retained. Application for such readmission shall be sent to the Registrar through the Dean of faculty within 30 days from the date of announcement of the results. Late submission of application shall not be accepted

for any reasons.

Grace Marks: Grace marks shall be awarded to the students in SEE for passing theory/ Laboratory and / or passing semester as per the following attributes:

i. Grace marks shall be awarded to theory / laboratory to a maximum of 2% of total SEE marks, if and only if the student clears that theory / laboratory with minimum prescribed marks.

ii. If a student failed in any one theory / laboratory, he/she is eligible for 3 grace marks, if and only if he/she passes the semester. However this is not applicable for supplementary or re-registered courses. A student is granted either 1 or 2 of the above, not both. The granted marks shall be documented in the records but not disclosed in the grade card.

MAKE UP EXAMINATION:

The Make Up examination shall be available to students who may have missed to attend the SEE of one or more courses in semester for valid reasons and given the 'I' grade. The students having 'X' grade shall also be eligible to take up Make Up examination. The Make Up examinations shall be held as per dates notified in the

Academic Calendar. The standard of the Make Up examination shall be the same as that of regular SEE for the courses.

12 ELIGIBILITY REQUIREMENTS FOR PROMOTION TO NEXT ACADEMIC YEAR :

i. There shall not be any restrictions for promoting from an ODD semester to the next EVEN semester, provided the student has fulfilled the attendance requirement.

ii. For vertical promotion in order to move from one academic year to next academic year i.e., from EVEN to ODD semester, a student can carry a maximum of five heads as 'F' grades not exceeding a maximum of 16 credits and he/she should maintain a CGPA of 4.

- To move from current academic year (i.e, 2nd year) to next academic year (i.e, 3rd year), a student is required to pass previous academic year (i.e, 1st year) and carry a maximum of '5' Heads as 'F' Grade, not exceeding a maximum of 16 credits, and also should maintain minimum CGPA of '4' in current academic year.

- To move from current academic year (i.e.3rd year) to next academic year (i.e, 4th year), a students is requied to pass all previous academic years (i.e,1st and 2nd year) and carry a maximum of '5' Heads as 'F' Grade, not exceeding a maximum of 16 credits, and also should maintain minimum CGPA of '4' in current academic year.

- To move from current academic year (i.e, 4th year) to next academic year (i.e, 5th year), a student is required to pass all previous academic years (i.e, 1st and 3rd year) carry a maximum of '5' Heads as 'F' Grade, not exceeding a maximum of 16 credits, and also should maintain minimum CGPA of '4' in current academic year.

iii. A student who has not obtained the eligibility even after **two/ three/ four** academic years for a programme of **three/ four / five** years respectively, from the date of admission to first semester **shall discontinue the programme or get readmitted** to first semester as a fresh admission.

iv. The mandatory non credit courses Additional mathematics I &II prescribed at 3rd & 4th semester respectively to lateral entry diploma holders admitted to 3rd semester of B.Tech programs, shall attend the classes during respective semester to complete CIE and attendance requirements and to appear SEE examination. In case any student fail to satisfy the course requirements he / she shall be deemed to have secure F grade. In such case, the student have to fulfill the requirements during subsequent semester/s to appear for SEE.

v. Completion of Additional Mathematics I and II, shall be mandatory for the award of B.Tech. degree.

vi Lateral entry students with B.Sc degree shall clear non credit courses such as Engineering Graphics, Elements of Civil Engineering etc. or as decided by BOS from time to time of the first year engineering programme for the award of degree.

vii. Completion of mandatory non credit courses (as mentioned in vi) shall be mandatory for the award of B.Tech. degree.

13. MAXIMUM DURATION FOR UG PROGRAM COMPLETION:

The student shall complete the UG program of **Three/Four/ Five** years within a maximum period of **Six/Eight/Ten** Academic years from the date of first admission, failing which he/she shall be declared as **Not Fit for Professional Education.**

14. TYPES OF COURSES:

The curriculum shall be designed based on the concept of **Outcome Based Education**.

The **CBCS** provides choice for the students, to select from the prescribed courses of the programme of study.

i) Different Courses to be offered in a programme of study shall be categorized into the following **SIX** types:

ii) **Humanities and Social sciences (HSS):** These courses enable the students to acquire the required skills and knowledge essential to pursue a given programme of study. These courses include communication, economics, environment, professional ethics, constitution of India etc;. These courses shall be in the range of 3- 6% of the total minimum credits for a programme of study.

iii) **Foundation Courses:** Foundation Courses are categorized in to Two parts, (1) Basic Sciences (BS) and (2) Engineering Sciences (ES). **BS** courses includes, physics, chemistry, maths, statistics and they are mandatory for all the engineering programme of study. **ES** Courses includes, elements of: civil, mechanical, electrical, electronic, engineering and computer programming skills, etc; and they are mandatory for all the engineering programme of study. These courses shall be in the range of 25-30% of the total minimum credits for a programme of study.

iv) **Core Courses:** Core Courses constitute the core of the programme of the study. The core courses of study are of Two types, VIZ; **(1) Hard Core Course (HCC) and (2) Soft Core Course (SCC). Hard Core Course(HCC):** The Hard Core Course is a core course in the main programme of study and the students have to study compulsorily. These courses shall be in the range of 25-30% of the total minimum credits for a programme of study.

Soft Core Course(SCC): A core course may be soft core if there is a choice for the student to choose a course from the

programme of study or from a sister/ related programme of study which supports the main programme of study. These courses shall be in the range of 2-3% of the total minimum credits for a programme of study.

v) **Elective Courses (EC):** Elective course is a course, which can be chosen from a pool of courses, and which may be very specific or specialized or advanced or supportive to the programme of study or which provides an extended scope or which enables an exposure to some other programme of study 4 or nurtures the students

proficiency . Elective courses may be offered by the main programme of study/ related programme of study/sister programme of study, which supports the main programme of study. These courses shall be in the range of 10-20% of the total minimum credits for a programme of study.

Open Elective Course (OEC): An elective course chosen generally from the other programme of study, with an intention to seek exposure is called an **open elective course.** These courses shall be in the range of 5-7% of the total minimum credits for a programme of study.

Self-Study Elective Course (SEC): An elective course designed to acquire an advanced knowledge to support a mini project work or major project work, and a student studies such a course on his own with an advisory support by a teacher is called a **self-study elective course.** These courses shall be in the range of 1-2% of the total minimum credits for a programme of study.

vi) **Audit Courses(AC):** A student may be permitted to take any number of audit courses over and above the graduation requirements for learning a subject.

vii) **Internship, Research or Seminar and Project Work (PW):** These are intended to enhance the student's practical knowledge and exposure to research and industry. The credits for this category shall not exceed 10-12% of the total minimum credits for a programme. Major project work shall normally be carried out in regular semesters.

Internship: The student of UG Programme shall undergo

Internship of 8 weeks, preferably, before the commencement of final academic year, whereas for PG Programme they shall undergo Internship of 16 weeks, preferably, at the beginning of third semester.

Project work: For UG programme, a batch of students not more than **four** , shall under take the innovative project preferably, in the final semester and execute in the same semester. For PG programme, project work shall be executed individually by the student in the final semester.

Seminar: Each student shall chose seminar topic on the emerging area only.

viii) **C**ertain programmes of study may have additional requirements such as apprenticeship and residency.

ix) An additional non-credit Summer Project of three weeks duration after the end of every academic year (preferably in the month of August) shall be carried out by all the students.

x) **Completion of all summer projects shall be mandatory for the award of B.Tech. degree.**

15. GRADING PATTERN:

i) The **SHARNBASVA UNIVERSITY** adopts absolute grading system wherein the marks are converted to grades and every *semeste*r results shall be given with ***Semester Grade Point Average*** **(SGPA)** and ***Cumulative Grade Point Average (CGPA).***

ii) The Grading pattern shall have the letter grade points, as per the following table:

Table –VII. Grades and Grade Points

Level	Out standing	Excel - lent	Very Good	Good	Above Average	Aver - age	Poor	Fail
Letter Grade	O	S	A	B	C	D	E	F
Grade Points	10	9	8	7	6	5	4	00

iii) A student shall be awarded Grade F if he/she either fails in the course or is absent for the SEE of that course and the student shall be required to reappear for the semester end examination. If the course is laboratory/practical component, the student shall re-appear both CIE and SEE. Absenting in any one or both of them shall result in award of F Grade.

Table-VIII. Grade Point Scale

iv. **W , X and I Grades:**

W Grade shall be awarded to a student who has withdrawn from a course. Further, this grade shall be recorded in the grade card. If the course is audit course, then there shall be no mention of course in the grade card.

X Grade shall be awarded to a student whose attendance is satisfactory and CIE rating (e" 60%) in a course, but SEE performance observed to be Poor, for such course X grade shall be awarded. The student shall be provided with an opportunity in the Make-Up examination; however the grades ('B'to'O') will be reduced to the next lower grade & the other grades remains same.

I Grade shall be awarded temporarily to a student who is unable to appear for **SEE** for one or more courses, with the permission of the Vice-Chancellor in response to a written appeal by the student, due to valid reasons such as medical emergency, calamity in the family or any other valid reason. For such a student, the I grade shall be converted in to one of the other letter grades as in the table after the completion of scheduled make up SEE. If the student does not appear to the make-up SEE, the I grade shall be converted to an F grade.

v. **AP and AF Grades:** A student shall be awarded either an **Audit Pass (AP) or Audit Fail (AF)** grade for an audit course. The Audit Pass *(AP*) grade shall be awarded if the student satisfies the attendance and performance criteria specified for the course by the concerned Faculty. Otherwise, an *AF* grade shall be awarded.

vi. **COMPUTATION OF SGPA and CGPA:**

COMPUTATION OF SGPA:

Illustration of Computation of SGPA and Format for Transcripts Computation of SGPA

Illustration No. 1

Course	Credit (C)	Letter Grade	Grade point (G)	Credit point (C X G)
Course 1	4	A	8	4X8=32
Course 2	4	C	6	4X6=24
Course 3	4	B	7	4X7=28
Course 4	3	O	10	3X10=30
Course 5	3	D	5	3X5=15
Course 6	1	C	6	1X6=06
Course 7	1	S	9	1X9=09
Course 8	1	C	6	1X6=06
	21			150

Thus. SGPA=150/21 =7.14

Illustration No. 2

Course	Credit (C)	Letter Grade	Grade point (G)	Credit point (C X G)
Course 1	4	A	8	4X8=32
Course 2	4	C	6	4X6=24
Course 3	4	B	7	4X7=28
Course 4	3	O	10	3X10=30
Course 5	3	F	0	3X0=0
Course 6	1	C	6	1X6=06
Course 7	1	S	9	1X9=09
Course 8	1	C	6	1X6=06
	21			135

Thus. SGPA=135/21= 6.43

Illustration No. 2(A)

CGPA after Final Semester

Thus. SGPA=156/21= 7.43

Illustration No. 3

Course	Credit (C)	Letter Grade	Grade point (G)	Credit point (C X G)
Course 1	4	A	8	4X8=32
Course 2	4	C	6	4X6=24
Course 3	4	B	7	4X7=28
Course 4	3	O	10	3X10=30
Course 5	3	S	9	3X9=27
Course 6	1	C	6	1X6=06
Course 7	1	S	9	1X9=09
Course 8	1	C	6	1X6=06
	21			162

Thus. SGPA=162/21= 7.71

CGPA=(21X7.14+21X7.43)/42 =7.28

Thus

,

CGP

A=

(21X7+21X8.5+21X9.2+21X6.86+21X8.18+21X7.73+17X8.68+ 17X9.4) 160 = 8.15

16. CONVERSION OF GRADES INTO PERCENTAGE: Conversion of GPA into Percentage is given below ***Percentage of Marks*= *(CGPA Earend-0.75)*10* CLASS/DIVISION DECLARATION:**

Equivalent Percentage	Class
>= 70%	First Class with Distinction
60% <= % < 70%	First Class
50% <= % < 60%	Second Class
45% <= % < 50%	Pass Class
< 45%	Fail

17. AWARD OF PRIZES, MEDALS AND RANKS:

i. For the award of *Prizes* and *Medals*, the conditions stipulated by the Donor shall be considered subject to the provisions of the statutes framed by the University for such awards.

ii. For award of rank in a specialization of B.Tech., B. Arch. BCA, BBM etc; the CGPA secured by the student from III to VIII semester is considered, for B.Arch. the CGPA of III to X semester shall be considered, for BCA and BBM all semesters CGPA shall

iii. A student shall eligible for a rank at the time of award of the degree of bachelor of engineering/ Technology, provided the student.

a) Has passed I to VIII semester in all courses in first attempt only in case of candidate admitted to I year.

b) Has passed I to VIII semester in all courses in first attempt only in case of candidate admitted under lateral entry scheme.

c) Has completed all the prescribed Audit/mandatory courses.

d) Is not repeated in any semester because of rejection of result of a semester/ shortage of attendance. Etc.

e) Has completed all the semester without any break/ discontinuity.

f) Has completed all the semester (I to last semester or III to last semester for lateral entry students) in SUK

g) Has not been transferred from autonomous institution affiliated to SUK or from any other University.

iv. Total number of ranks awarded shall be 10% of the total number of students appeared in final semester subject to the maximum of 10 ranks in a specialization.

v. For award the rank in specialization, a minimum of 10 students should have appeared in the final semester examination.

ILLUSTRATION.

a) If 1228 students appeared for the VIII semester in Electronics and Communication Engineering Programme, the number of ranks to be awarded for Electronics and Communication Engineering shall be 10.

b) If 90 students appeared for the VIII semester in Biomedical Engineering, the number of ranks to be awarded for Biomedical Engineering will be 9.

c) If 10 or less students appeared for the final semester of any degree, the number of ranks shall be awarded is one.

d) In case of fraction number of ranks, it is rounded to higher integer when the first decimal place value is greater than or equal to 5.

e) Ranks are awarded based on the merit of the students as determined CGPA. If two or more students get the same CGPA, the tie shall be resolved by considering the number of times student has obtained higher SGPA. If it is not resolved even at this stage, the number of times student has obtained higher grades like S, A, B, etc., shall be taken into account to decide the order of the rank.

18. APPLICABILITY AND POWER TO MODIFY:

i. The regulations governing the degree of Bachelor of Engineering / Technology of SUK shall be binding on all concerned

ii. Not withstanding anything contained in the foregoing, the university shall have the power to issue directions /orders to address any difficulty

iii. Nothing in the foregoing may be construed as limiting the power of the University to amend, modify or repeal any or all of the above

NEW GUIDELINES FOR TEACHING/LEARNING AND CONDUCT OF EXAMINATIONS.

The present situation demands tech mediated education syste hence new guidelines for teaching/learning and conduct of examinations have been amended for sustainable long-term-shift in education policy Following are the new guidelines .

A. TECHNOLOGY MEDIATED TEACHING LEARNING PROCESS

1. Online learning

It's not video lectures and e-books that convert class notes into PDF Creating high quality digitized learning content which makes learners interesting and engaging. 2. Subject matter covered in class room is to be delivered online. It shall

not be blind replication of the same.

3. Diverse learner groups: To handle diverse learner groups, it is easy to use classrooms teaching learning rather than online. However, institution have to spend more time on the context for the diverse

learner profiles as on the content and weave it into program design.

4. Create customized learning plans and methods by using newer

technologies like, AI and top learning methods.

5. After each learning modules the student will be able to apply the required knowledge in practical situations in the life profession workplace. Each faculty shall be massively trained for online T/L mode. Even though they are great classroom teachers they need to place equal

importance to learning science in digital mode. 6. Even in situations like post COVID-19 era, conventional education mode will not become absolute. Therefore hybrid learning (a combination of classroom and online modes) will be the norm. Institutions and faculties will blend the two judiciously to the context and the content. To adopt the online module successfully in education following transformation is must:

Futy should adopt change from clarom to online mode

specialities to train their faculties and re-design higher education for the newer online education world.

B. EXAMINATION RELATED GUIDELINES:

MCQ/OMR based CIE test and Semester End Examinations.

2 Open Book Examination.

3. Open Choices, Assignments/Presentation based Assessments.

4. Examination period may be reduced from 3 hrs to 2 hrs, without

compromising the quality of Questions and Evaluation procedure.

5. Presently, we are evaluating the students performance based CIE and SEE giving 50% weightage for both. In case, the situation arises like this, and if the performance of the students is known in CIE, then it shall be considered as 100%.

- in case, if the students are not assessed in both CIE and SEE, then the performance of the previous year shall used to promote to the higher semester or carry forward method should be employed.

- If student wish to improve the grade they have to write the examination during the next semester as special case.

C. ATTENDANCE :

Existing attendance guidelines may be followed. In case situations like COVID-19, then the lock period may be treated as deemed to be attended.

Sharnbasva University, Kalaburagi
Draft Scheme of Teaching and Examination 2021-22
Outcome Based Education(OBE) and Choice Based Credit System (CBCS)
(Effective from the academic year 2021-22)

I / II SEMESTER B.Tech (Physics Group)

Sl.No	Course Code	Course Title	Teaching Dept. & Paper Setting Board	Teaching Hours/week		Examination				Credits
				T	P	Duration in hours	CIE Marks	SEE Marks	Total Marks	
1	21MAT11/21	Engineering Mathematics-I/II	Mathematics	3		3	50	50	100	03
2	21PHY12/22	Engineering Physics	Physics	3		3	50	50	100	03
3	21CIV13/23	Elements of Civil Engineering	Civil Engineering	3		3	50	50	100	03
4	21MES14/24	Elements of Mechanical Engineering	Mechanical Engineering	3		3	50	50	100	03
5	21PPS15/25	Programming for Problem Solving	Computer Science & Engineering	3		3	50	50	100	03
6	21PHYL16/26	Engineering Physics Lab	Physics		2	3	50	50	100	01
7	21CPL17/27	Computer Programming Lab	Computer Science & Engineering		2	3	50	50	100	01
8	21PC18/28	Professional Communication Lab	Humanities		2	2	50	50	100	01
9	21PROJ19/29	Project	Any Department		2	2	50	50	100	01

		I/II								
10	21AEC10X/20X*	AEC- Ability Enhancement Courses*	Any Department		2	2	50	50	100	1
Total				**15**	**27**		**500**	**500**	**1000**	**20**

*AEC- Ability Enhancement Courses approved by various BOS are as follows. Every students has to study one course in each semester from the below

Course Code	Department Name	Course	Course Code	Course
21AEC101/201	Computer Science and Engineering	Networking	21AEC103/203	Welding Technology
21AEC102/202	Electrical Engineering	Electrical wiring lab	21AEC104/204	Plumbing
			21AEC105/205	Innovation and Design Thinking
			21NCC106/206	NCC Organization and National Integration

Sharnbasva University, Kalaburagi
Draft Scheme of Teaching and Examination 2021-22
Outcome Based Education(OBE) and Choice Based Credit System (CBCS)
(Effective from the academic year 2021-22)

I / II SEMESTER B.Tech (Chemistry Group)

Sl.No	Course Code	Course Title	Teaching Dept. & Paper Setting Board	Teaching Hours/week		Credits			
				T	Duration in hours	CIE Marks	SEE Marks	Total Marks	
1	21MAT11/21	Engineering Mathematics-I/II	Mathematics	3	3	50	50	100	03
2	21CHE12/22	Engineering Chemistry	Chemistry	3	3	50	50	100	03
3	21ELN13/23	Basic Electronics Engineering	Electronics & Communication Engineering	3	3	50	50	100	03

4	21ELE14/24	Basic Electrical Engineering	Electrical & Electronics Engineering	3	3	50	50	100	03
5	21CEDL15/25	Computer Aided Engineering Drawing	Mechanical Engineering	1	3	50	50	100	03
6	21CHEL16/26	Engineering Chemistry Lab	Chemistry		3	50	50	100	01
7	21EECL17/27	Electronics & Electrical Lab	Electronics & Communication Engineering		3	50	50	100	01
8	21ES18/28	Environmental Studies	Civil Engineering	1	1	50	50	100	1
9	21PROJ19/29	Project I/II	Any Department		2	50	50	100	01
10	21AEC10X/20X*	**AEC- Ability Enhancement Courses***	Any Department		2	50	50	100	1
Total				**14**	**12**	**500**	**1000**		**20**

* AEC- Ability Enhancement Courses approved by various BOS are as follows. Every students has to study one course in each semester from the belo

Course Code(X)	**Department Name**	**Course**	**Course Code(X)**	**Course**
21AEC107/207	Electronics and Communication Engg.	PA System and Maintenance	21AEC109/209	AutoCAD
21AEC108/208	Computer Science and Engineering	Web Development	21AEC110/210	Scientific Foundation of Health
			21NCC111/211	Personolity Development, Social Service And Community Development

ENGINEERING MATHEMATICS-I

(Common to all branches)
[As per Choice Based Credit System (CBCS) scheme] (Effective from the academic year 2021-22)

Course Code : 21MAT11 CIE Marks : 50 Teaching Hours/Week: 03 SEE Marks: 50
Total Teaching Hours: 40 Exam Hours:03
Semester : I Credits: 03

Course Learning Objectives:

This course Engineering Mathematics - I (21MAT11) will enable students:

1. To familiarize the importance of calculus and differential equations that are essential in all branches of engineering.
2. Application of first order first degree differential equation.
3. To enable students to apply the knowledge of mathematics in various engineering fields by making them to learn the double & Triple integrals & reduction formula.
4. To develop the knowledge of matrices and linear algebra in a comprehensive manner.

MODULE - 1

Differential Calculus - I

Successive Differentiation: Standard Forms of nth derivative(with proof), examples on standard functions, Leibnitz Theorem (without proof) examples, Taylor's and Maclaurin's series expansions for one variable (statements only), Indeterminate forms.

Self Study: Maximum and minima of one variable.

08 - Hours

MODULE - 2

Differential Calculus - II

Polar Curves: Expression for Angle between radius vector and tangent, length of perpendicular from pole to the tangent, angle between two polar curves, Pedal Equation of polar curves and problems.

Radius of Curvature: Radius of Curvature for Cartesian, parametric, polar form (Without proof) and problems.

Self Study: Enevelops and evaluate.

10 - Hours

MODULE - 3

Differential Calculus - III

Function of several variables, Definitions of Partial Differentiation, Direct and Indirect partial derivatives, Symmetric functions, Jacobian's and its properties, maxima and minima for functions of one and several variables

Differential Equation :preamble to differential equations, Exact and Reducible to exact differential equation, Bernoulli's linear differential equation. Applications of first order first degree differential equations: Newton's law of cooling, Law of decay and growth.

Self Study: Homogeneous function , Eulurs theorem reducible to exact type-2,type-3,type-4.

08 - Hours

MODULE - 4

Integral Calculus

Double and Triple integral examples, changing the order of integration, changing into polar form. Application of double and triple integrals to find area and volume.

Improper integrals: Beta and gamma functions and its properties and examples.

Self study: Evaluation of double integral over a specific region, path independence of line integral and definition of improper integral of I and II kind.

08 - Hours

MODULE - 5

Matrices

Preamble to matrices , Rank of matrix, Test of consistency of homogeneous and non- homogeneous system of equations by rank, trivial and non trivial solutions, solution of linear equations by Gauss Elimination method, Gauss-Seidal method, Eigen values and Eigen vector, Rayleigh's Power method .

Self Study: Orthogonal and unitary matrices Cayley- Hamilton theorem. 08 - Hours

Course Outcomes:

On completion of this course, students are able to:

CO1 Understand the concepts on limits of a function by expressing in terms of power series.

CO2 Learn the concepts based on calculus to solve problems on polar curves and its applications in determining the bendness of a curve.

CO3 Apply the notion of partial differentiation to calculate rates of change of multivariate functions

CO4 Analyze the integral terms by changing the order of integration and to evaluate multiple integrals and their applications in terms of area and volumes.

CO5 Make use of matrix theory for solving system of linear equations and compute Eigen values and Eigen vectors.

Question Paper Pattern:

The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.

The question paper will have ten full questions carrying equal marks.

Each full question carries 20 marks.

There will be two full questions (with a maximum of four sub questions) from each module

Each full question will have sub questions covering all the topics under a module.

5. The students will have to answer five full questions, selecting one full question from each module.

Text Books :

1. B.S. Grewal: Higher Engineering Mathematics, Khanna Publishers, 43rd Ed., 2015.

2. E. Kreyszig: Advanced Engineering Mathematics, John Wiley & Sons, 10th Ed.(Reprint), 2016.

Reference books:

1. C.Ray Wylie, Louis C.Barrett : "Advanced Engineering Mathematics", 6th Edition,

2. McGraw-Hill Book Co., New York, 1995.

2. James Stewart : “Calculus –Early Transcendentals”, Cengage Learning India Private Ltd., 2017.

3. B.V. Ramana: “Higher Engineering Mathematics” 11th Edition, Tata McGraw-Hill, 2010.

4. Srimanta Pal & Subobh C Bhunia: “Engineering Mathematics”, Oxford University Press,3rd Reprint, 2016.

5. Gupta C.B., Singh S.R. and Mukesh Kumar: “Engineering Mathematics for Semester I & II”, Mc-Graw Hill Education (India) Pvt.Ltd., 2015.

Web links and Video Lectures:

1. http://nptel.ac.in/courses.php?disciplineID=111
2. http://www.class-central.com/subject/math(MOOCs)
3. http://academicearth.org.

COURSE OUTCOME AND PROGRAMME OUTCOME MAPPING (1/2/3):

Note:1-Low, 2-Medium, 3-High

CO/PO	PO.1	PO.2	PO.3	PO.4	PO.5	PO.6	PO.7	PO.8	PO.9	PO.10	PO.11	PO.12
CO1	3	1										-
CO2	3	1										-
CO3	3	2										1
CO4	3	2										1
CO5	3	2										1

ENGINEERING PHYSICS

(Common to all Branches)

[As per Choice Based Credit System (CBCS) scheme]

(Effective from the academic year 2021-22)

Course Code : 21PHY12/22 CIE Marks : 50 Teaching Hours/Week: 03 SEE Marks: 50

Total Teaching Hours: 40 Exam Hours:03

Semester : I/II Credits: 03

Course Learning Objectives : This course (21PHY12/22) will enable students to

1 Gain knowledge of different types of oscillations and shockwaves, their generation and practical applications.

2.Develop comprehensive understanding of elastic properties of materials, their limitations and causes of elastic failure.

3.Gain a fundamental knowledge of dielectrics, quantum mechanics and their applications in Electromagnetic waves.

4.Acquire an understanding of free electron theory of metals, especially semiconductor & Nanomaterials.

5.Gain a fundamental understanding of lasers and Optical fibers and their applications in Engineering

MODULE - 1

Oscillations and Waves

Free Oscillations : Definition of SHM, derivation of eqn for SHM, Mechanical and electrical simple harmonic oscillators (mass suspended to spring oscillator with series and parallel combination).

Damped and forced oscillations : Differential equation of damped oscillations and mention its general solution : over damping, critical & under damping, quality factor. Theory of forced oscillations and resonance, sharpness of resonance.

Shock Waves : Mach number, Shock Waves. Statement of Laws of conservation of mass, energy and momentum. Construction and working of Reddy shock tube, characteristics of Reddy Shock tube, applications of shock waves. Numerical Problems. 08-Hours

MODULE - 2

Elastic Properties of Materials

Elasticity : Concept of elasticity, plasticity, stress, strain, tensile stress, shear stress, compressive stress, Hooke's Law, different elastic moduli, Poisson's ratio, Expression for Young's modulus (Y), Bulk modulus (K) &Rigidity modulus (n) in terms of α & β .

Bending of beams : Derivation of expression for bending moment. Single Cantilever, derivation of expression for Young's modulus.

Torsion of Cylinder : Expression for couple for unit twist of a solid cylinder (Derivition), Torsional pendulum – Expression for period of oscillation. Numerical Problems.

08 - Hours

MODULE – 3

Electromagnetism and Quantum Mechanics

Maxwell's equation : Fundamentals of vector calculus, divergence and curl of electric field & magnetic field (static), Gauss divergence theorem & Stoke's theorem..

Role of Dielectrics : Dielectrics, Mention of solid, liquid & gaseous dielectrics with one example each. Application of dielectrics in transformers.

Quantum Mechanics : Heisenberg uncertainty principle, applications (non-existence of electron in the nucleus), wave function, properties of wave function, time independent Schrodinger wave equation, particle in box, eigen values, eigen functions. **Numerical Problems. 08-Hours**

MODULE – 4

Material Science

Electrical Conductivity in Metals: Free electron concept (mean free path, mean collision time, drift velocity, relaxation time), assumptions of classical free electron theory, Mention the expression for electrical conductivity for classical free electron theory , failures of classical free electron theory, assumptions of quantum free electron theory, expression for electrical conductivity for quantum free electron theory, success of quantum free electron theory, Fermi energy, Fermi factor, dependence of Fermi factor on temperature.

Semiconductor Physics : expression for electrical conductivity in intrinsic semiconductor, Hall effect.

Nanomaterials : Introduction to nano materials& Quantum structures (0-D, 1-D, 2-D).

Characterisation technique: Principle , construction and working of X ray diffracto meter(XRD), Scanning electron microscopy(SEM).

Numerical Problems. 08-Hours

MODULE - 5

Lasers and Optical Fibers

Lasers : Principles of lasers, Einstein's coefficients (derivation of expression for energy density). Requisites of laser system. Conditions for laser action. Construction & working of CO_2 & Semiconductor laser. Applications of laser in defence (Laser range finder) & Engineering (data storage).

Optical Fibers : Propogation Mechanism, angle of acceptance. Numerical aperture. Modes of Propagation & types of optical fibers, attenuation mechanisms, attenuation coefficient (qualitative), discussion of block diagram of point to point of communication system.

Numerical Problems 08-Hours

Course Outcomes:

Upon completion of this course, students will be able to

CO1.Analyze the principles of oscillations and shock waves, their generation processes and t applications.

CO2. Examine the concepts of elasticity & properties of elastic materials

CO3. Describe the fundamentals of EM Waves, Dielectrics, Quantum mechanics and their re applications.

CO4. Provide concise overview of free electron theory,semiconductors & explain the differe Nanomaterials.

CO5. Describe the fundamental principles of lasers and Optical fibers, highlighting their prop world applications

Pedagogy (General Instructions) :

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1. Apart from conventional lecture methods various types of innovative teaching techniques through videos, animation films may be adopted so that the delivered lesson can progress the students in theoretical, applied and practical skills in physics.
2. State the necessity of physics in engineering studies and offer real life examples.
3. Seminars and Quizzes may be arranged for students in respective subjects to develop skills.
4. Encourage the students for group learning to improve their creativity and analytical skills.
5. While teaching show how every concepts can be applied to the real world. This helps the students to expand understanding level.

Text Books:

1. A Text book of Engineering Physics- M.N. Avadhanulu and P.G. Kshirsagar, 10th revised Ed, S. Chand & Company Ltd, New Delhi
2. Engineering Physics-Gaur and Gupta-Dhanpat Rai Publications- 2017
3. Concepts of Modern Physics-Arthur Beiser: 6 th Ed;Tata McGraw Hill Edu Pvt Ltd- New Delhi 2006
4. X-ray diffraction- B.E Warren published by Courier Corporation.
5. Nano Composite materials- Synthesis, properties and applications, CRC Press.

Reference books:

1. Introduction to Mechanics — MK Verma: 2nd Ed, University Press(India) Pvt Ltd, Hyderabad 2009
2. Lasers and Non Linear Optics – BB laud, 3rd Ed, New Age International Publishers 2011
3. Solid State Physics-S O Pillai, 8th Ed- New Age International Publishers-2018
4. Shock waves made simple- Chintoo S Kumar, K Takayama and KPJ Reddy: Willey India Pvt. Ltd. New Delhi 2014
5. Introduction to Electrodynamics- David Griffiths: 4th Ed, Cambridge University Press 2017.
6. Characterization of Materials- Mitra P.K. Prentice Hall India Learning Private Limited
7. Materials Characterization Techniques- Sam zhang, Lin Li, Ashok Kumar, CRC Press, First Edition, 2008.

Question paper pattern:

Note: -

- The SEE question paper will be set for 100 marks and the marks will be proportionately reduced to 50.
- The question paper will have ten full questions carrying equal marks.
- Each full question consisting of 20 marks.
- There will be two full questions (with a maximum of four sub questions) from each module.
- Each full question will have sub question covering all the topics under a module.
- The students will have to answer five full questions, selecting one full question from each module.

- **Web links and Video Lectures (e-Resources):**
  https://www.britannica.com/technology/laser,k
  https://nptel.ac.in/courses/115/102/115102124/
  https://nptel.ac.in/courses/115/104/115104096/
  http://hyperphysics.phy-astr.gsu.edu/hbase/hframe.html
  https://onlinecourses.nptel.ac.in/noc20_mm14/preview
- Activity Based Learning (Suggested Activities in Class)/ Practical Based learning http://nptel.ac.in https://swayam.gov.in
  https://www.vlab.co.in/participating-institute-amrita-vishwa-vidyapeetham

COURSE OUTCOME AND PROGRAMME OUTCOME MAPPING (1/2/3):
Note:1-Low, 2-Medium, 3-High

CO/PO	PO.1	PO.2	PO.3	PO.4	PO.5	PO.6	PO.7	PO.8	PO.9	PO.10	PO.11	PO.12
CO1	**3**	**2**										**1**
CO2	**3**	**2**										**1**
CO3	**3**	**2**										**1**
CO4	**3**	**2**										**1**
CO5	**3**	**2**										**1**

ENGINEERING CHEMISTRY

(Common to all Branches)

[As per Choice Based Credit System (CBCS) scheme] (Effective from the academic year 2021-22)

Course Code : 21CHE12/22 CIE Marks : 50 Teaching Hours/Week: 03 SEE Marks: 50

Total Teaching Hours: 40 Exam Hours:03

Semester : I/II Credits: 03

Course Learning Objectives:

This course (**21CHE12/22**) will enable students to

1. CLO1: Impart the basic knowledge of chemistry and its principles involved in electrochemistry, energy storage devices, and its commercial applications.
2. CLO2: Understand the basic principles of corrosion and its prevention, metal finishing, and its technological importance
3. CLO3: Master the knowledge of synthesis, properties, and utilization of engineering materials like polymer, lubricants, and refractories.
4. CLO4: To understand the importance of water chemistry and apply the knowledge of green chemistry principles for the production of chemical compounds.
5. CLO5: Understand the theory, basic principle, and applications of volumetric analysis and analytical instruments. understanding the concepts of synthesis and characterization of nanomaterials.
6. CLO1: Impart the basic knowledge of chemistry and its principles involved in electrochemistry, energy storage devices, and its commercial applications.
7. CLO2: Understand the basic principles of corrosion and its prevention, metal finishing, and its technological importance
8. CLO3: Master the knowledge of synthesis, properties, and utilization of engineering materials like
9. polymer, lubricants, and refractories.
10. CLO4: To understand the importance of water chemistry and apply the knowledge of green chemistry principles for the production of chemical compounds.
11. CLO5: Understand the theory, basic principle, and applications of volumetric analysis and analytical instruments. understanding the concepts of synthesis and characterization of nanomaterials.

Pedagogy (General Instructions):

These are sample Strategies; which teachers can use to accelerate the attainment of the various course outcomes.

1. Lecturer method (L) does not mean only the traditional lecture method, but a different type of teaching method may be adopted to develop the outcomes.
2. Show Video/animation films to explain methods of synthesis of nanomaterials.
3. Encourage collaborative (Group Learning) Learning in the class
4. Ask at least three HOTS (Higher-order Thinking) questions in the class, which promotes critical thinking
5. Adopt Problem Based Learning (PBL), which fosters students Analytical skills, develop thinking skills such as the ability to evaluate, generalize, and analyze information rather than simply recall it.
6. Topics will be introduced in multiple representations.
7. Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them.

8. Discuss how every concept can be applied to the real world and when that's possible, it helps improve the students' understanding.

MODULE - 1

Electrochemistry and Energy storage systems

Electrochemical Systems: Derivation of Nernst equation for single electrode potential. Reference electrodes: Introduction, construction, working and applications of Calomel electrode. Ion-selective electrode – Definition, construction and principle of Glass electrode, Electrolyte concentration cells, numerical problems.

Fuel Cells: Introduction, differences between conventional cell and fuel cell, limitations & advantages. Construction, working & applications of methanol-oxygen fuel cell with H_2SO_4 electrolyte,

Energy storage systems: Introduction, classification - primary, secondary and reserve batteries.Construction, working and applications of Ni-MH and Li-ion batteries. **08 - Hours**

MODULE - 2

Corrosion and Metal finishing

Corrosion: Introduction, Electrochemical theory of corrosion, Factors affecting the rate of corrosion: ratio of anodic to cathodic areas, nature of metal, nature of corrosion product, nature of medium – pH, conductivity and temperature. Types of corrosion - Differential metal and Differential aeration - pitting and water line). Corrosion control: Metal coatings - Galvanization and Tinning. Cathodic protection - sacrificial anode and impressed current methods.

Metal finishing: Introduction, Technological importance. Electroplating: Introduction, principles governing electroplating- Polarization, decomposition potential and overvoltage. electroplating of nickel (Watt's method). Electroless plating: Introduction, electroless plating of copper, distinction between electroplating and electroless plating processes. **08 – Hours**

MODULE - 3

Chemical Fuels, Solar energy and Polymers

Chemical Fuels: Introduction, classification, definitions of CV, LCV, and HCV, determination of calorific value of solid/liquid fuel using bomb calorimeter, numerical problems. Knocking of petrol engine – Definition, mechanism, ill effects and prevention. Power alcohol, unleaded petrol and biodiesel.

Solar Energy:Introduction ,construction ,workimg and applications of photovoltaic cell.

Polymers: Introduction ,addition and condensation, mechanism of polymerization- free radical mechanism taking vinyl chloride as an example. Synthesis, properties and applications of PMMA (plexi glass), Polymer composites: Introduction, synthesis, properties and applications of Kevlar. Conducting polymer: Introduction,synthesis of polyaniline with applications. 08 – Hours

MODULE - 4

Water Chemistry and Green Chemistry

Water Chemistry: Introduction**,** boiler feed water, boiler troubles with disadvantages -scale and sludge formation, boiler corrosion (due to dissolved O , CO and MgCl). sewage, definitions of biological oxygen demand (BOD) and chemical oxygen demand (COD), determination of COD, numerical problems on COD.

Sewage treatment: primary, secondary (activated sludge) and tertiary methods. Desalination of sea water by reverse osmosis.

Cement:Types of cement,hardening and setting,deterioration of cement.

Green chemistry: Introduction ,Principle and applications of green chemistry**.**

08 – Hours

MODULE - 5

Instrumental methods of analysis and Nanomaterials

Instrumental methods of analysis: Theory, Instrumentation and

applications of UV Spectro photometer, Chromatography (TLC) Flame Photometry, Potentiometry and Conductometry (Strong acid with a strong base)

Nanomaterials: Introduction, size dependent properties (Surface area, Electrical, Optical, Catalytic and Thermal properties). Synthesis of nanomaterials: Top down and bottom up approaches, Synthesis by Sol- gel, precipitation and chemical vapour deposition, Nanoscale materials: Fullerenes, Carbon nanotubes and Dendrimers – properties and applications. 08 – Hours

Course Outcomes:

At the end of the course the students are able to understand

CO 1 To have knowledge of interconversion of energy, electrochemistry in energy storage systems.

CO 2 To have Knowledge causes & effects of corrosion of metals and control of corrosion, modification of surface properties of metals by metal finishing technique.

CO 3 To have knowledge production and consumption of energy by chemical fuels and. synthesis, properties & applications of polymers.

CO 4 To have knowledge of water quality parameters and water chemistry and green chemistry.

CO 5 To have knowledge of different techniques of instrumental methods of analysis, fundamentals and synthesis of nanomaterials.

.

Question paper pattern:

Note:- The SEE question paper will be set for 100 marks and the marks will be proportionately reduced to 50.

1. The question paper will have **ten** full questions carrying equal marks.
2. Each full question carries **20** marks.
3. There will be **two** full questions (with a **maximum** of **three** sub questions) from each module.
4. Each full question will have sub question covering all the topics under a module.
5. The students will have to answer **five** full questions, selecting
   one full question from each module.

Text Books:

1. P.C. Jain & Monica Jain. **"Engineering Chemistry"**, Dhanpat Rai Publications, New Delhi (2015 Edition).
2. S. S. Dara, A textbook of Engineering Chemistry, 10th Edition, S Chand & Co., Ltd., New Delhi, 2014.
3. Physical Chemistry, by P. W. Atkins, Oxford Publications (Eighth edition-2006).

Reference books:

1. O.G. Palanna, **"Engineering Chemistry"**, Tata McGraw Hill Education Pvt. Ltd. New Delhi, Fourth Reprint (2015-Edition).
2. R.V. Gadag & A. Nityananda Shetty., **"Engineering Chemistry"**, I K International Publishing House Private Ltd. New Delhi (2015- Edition).
3. **"Wiley Engineering Chemistry"**, Wiley India Pvt. Ltd. New Delhi. Second Edition-2013.
4. B. Jaiprakash, R. Venugopal, Sivakumaraiah and Pushpa Iyengar, Chemistry for Engineering Students, Subhash Publications, Bengaluru, (2015- Edition).

Web links and Video Lectures (e-Resources):
https://www.youtube.com/watch?v=faESCxAWR9k
https://www.youtube.com/watch?v=TBqXMWaxZYM&list=PLyhmwFtznRhuz8L1bb3X-9IbHrDMjHWWh **https://www.youtube.com/watch?v=j5Hml6KN4TI** **https://www.youtube.com/watch?v=X9GHBdyYcyo** **https://www.youtube.com/watch?v=1xWBPZnEJk8** •**https://www.youtube.com/watch?v=wRAo-M8xBHM.**

- **Activity Based Learning (Suggested Activities in Class)/ Practical Based learning**

https://www.vlab.co.in/broad-area-chemical-sciences
https://demonstrations.wolfram.com/topics.php
https://interestingengineering.com/science

COURSE OUTCOME AND PROGRAMME OUTCOME MAPPING (1/2/3):
Note:1-Low, 2-Medium, 3-High

CO/PO	PO.1	PO.2	PO.3	PO.4	PO.5	PO.6	PO.7	PO.8	PO.9	PO.10	PO.11	PO.12
CO1	3	1	1				1					
CO2	2	1	1				1					
CO3	2	1	1				1					
CO4	2	1	1				1					
CO5	2	1	1				1					

ELEMENTS OF CIVIL ENGINEERING

[As per Choice Based Credit System (CBCS) scheme] (Effective from the academic year 2021-22)

Course Code : 21CIV13/23 CIE Marks : 50
Teaching Hours/Week: 03 SEE Marks: 50
Total Teaching Hours: 40 Exam Hours:03
Semester : I/II Credits: 03

Course Learning Objectives :

The objectives of this course are:

1. To make students to learn scope of various fields of civil Engineering. Basics of Civil engineering concepts and importance of infrastructure development.

2. To study the uses, sources, classifications and manufacture of various Building materials .

3. To develop students ability to analyze the problem involving Forces, Moments with their applications.

MODULE - 1
INTRODUCTION TO CIVIL ENGINEERING.

Introduction to Civil Engineering. Scope for different fields of Civil Engineering-Surveying, Building Materials, Construction Technology, Geotechnical Engineering, Structural Engineering, Hydraulics, Water Resource and Irrigation Engineering, Transportation Engineering and Environmental Engineering.

Infrastructure-Types of Infrastructure, Role of civil engineering in infrastructural development, Effect of Infrastructural facilities on socio economic development of country.

History of Civil Engineering. Some of important monuments and marvels and method of construction.

08-Hours

MODULE - 2
ROADS, BRIDGES & DAMS

Roads – Types, Classification of roads and their functions, components and comparison between flexible and rigid pavements (Advantages and Limitations).

Bridges – Types of Bridges and Culverts.

Dams – Classification of dams based on material, Structural behaviour and functionality with simple sketches.

06-Hours

MODULE - 3
BUILDING MATERIALS

Stones –Classification, sources, uses of stones.

Building Blocks- Composition of good brick, manufacturing of Bricks, solid earth brick classification, quality of good brick, uses.

Cement-Types of cement, Flow chart for manufacture of cement by wet process and dry process, chemical composition of cement.

Aggregate-Fine aggregate (Natural sand, M sand and Slag sand),Coarse aggregate (Natural and Artificial)

Building Blocks-Manufacturing of concrete blocks, solid blocks, aerated blocks.

Lime-Classification binding materials, sources, components, uses of lime.

08-Hours

MODULE - 4
FORCE AND FORCE SYSTEM

INTRODUCTION TO ENGINEERING MECHANICS

,BASIC CONCEPTS OF MECHANICS AND BASIC IDEALIZATIONS OF MECHANICS.

Force, Classification of force and Elements of force. Parallelogram law of forces, principle of transmissibility. Principle of physical independency of force and principal of superposition of force.
Moment

forces, Couple, Moment of couple, characteristics of couple, equivalent system, Resolution of force into force and a couple, Resolution of force, Numerical Problems on moment of force and couple.

ANALYSIS OF CONCURRENT FORCE SYSTEM

Definition of resultant, composition of coplanar concurrent force system, Principle of resolved parts Equilibrium of force and condition of equilibrium, Equilibrant, Lami's theorem, Concept of free body diagram Numerical problems on concurrent force system and String and body problems.

08-Hours

MODULE - 5

SUPPORT AND SUPPORT REACTION

Definition of support reaction ,types of beams, types of loads, types of supports and Numerical Problems on various types of loads UDL,UVL and Couple.

ANALYSIS OF NON CONCURRENT FORCE SYSTEM

Non-concurrent force system, Geometrical representation of Moment, Varignon's Principle and Numerical problems on coplanar non concurrent force system.

08-Hours

Course outcomes:

After a successful completion of the course, the student will be able to:

CO1 Mention the applications of various fields of Civil Engineering. CO2 To study the Classification,Functions and components of Roads,

Bridges and Dams

CO3 To study the Classification, uses, sources and manufacture of building materials

CO4 Compute the action of Forces ,Moments, Couples and resultant of

given force.system subjected to various loads.

CO5 To study about Various types of beams, loads and supports and calculate the .support reaction for different support conditions and loadings. Compute Resultant .of Non concurrent forces.

Question Paper Pattern:

The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.

The question paper will have ten full questions carrying equal marks.

Each full question carries 20 marks.

There will be two full questions (with a maximum of four sub questions) from each module

Each full question will have sub questions covering all the topics under a module.

The students will have to answer five full questions, selecting one full question from each module.

Text Books:

1. A Textbook on Elements of Civil Engineering and Mechanics" by B.K Kolhapure
2. Elements of Civil Engineering and Mechanics" by H J SAWANT and S P Nitsure
3. A Textbook on Elements of Civil Engineering and Mechanics" by S S Bhavikatti.

Reference books:

1. Engineering Mechanics by S.Timoshenko,D.H.Young, and J.V.Rao, TATA McGraw-Hill Book Company, New Delhi .
2. Beer FP and Johnson ER, "Mechanics for Engineers-Dynamics and Statics"- 3rd SI Metric edition, Tata McGraw Hill. - 2008

3. Elements of Civil Engineering and Engineering MechanicsbyM.N. Shesha Prakash and Ganesh. B. Mogaveer, PHI Learning, 3r Revised edition (2014)

4. Engineering Mechanics-Statics and Dynamics by A Nelson, Tata McGraw Hill Education Private Ltd, New Delhi, 2009.

COURSE OUTCOME AND PROGRAMME OUTCOME MAPPING (1/2/3):
Note:1-Low, 2-Medium, 3-High

CO/PO	PO.1	PO.2	PO.3	PO.4	PO.5	PO.6	PO.7	PO.8	PO.9	PO.10	PO.11	PO.12	PSO.1	PSO.2
CO1	3	3												
CO2	3	3												
CO3	3	3												
CO4	3	3		2										
CO5	3					3								

****
*

BASIC ELECTRONICS ENGINEERING

[As per Choice Based Credit System (CBCS) scheme] (Effective from the academic year 2021-22)

Course Code : 21ELN13/23 CIE Marks : 50
Teaching Hours/Week: 03 SEE Marks: 50
Total Teaching Hours: 40 Exam Hours:03
Semester : I/II Credits: 03

Course Objectives:

1. Understand characteristics operation and application of PN- Junction diode & Bipolar junction transistor.
2. To understand different number systems & working of fundamental building blocks of digital circuits.
3. To understand construction & operation of various special devices.
4. To understand the principle of basic communication system.

MODULE - 1

P-N junction diode: Characteristics and Parameters, Diode approximations.

Rectifiers : Working principle, Rectifier efficiency and ripple factor of Half-wave rectifier, Two-diode Full-wave rectifier & Bridge rectifier. Numerical examples as applicable.

- Hours

BJT configuration: BJT Operation, BJT voltage and current, BJT amplification, Common Base, Common Emitter, Common Collector Characteristics. Relation between and Numerical examples applicable.

06 - Hours

MODULE - 3

Digital Electronics and NumberSystems Digital Electronics:

Introduction, Switching and Logic Levels, Digital Waveform. Number Systems: Decimal Number System, Binary Number System, Octal Number System, Hexadecimal NumberSystem.

Number base conversions: Binary to Decimal, Decimal to Binary, Binary to Octal, Octal to Binary, Binary to Hexadecimal, Hexadecimal to Binary, Decimal to Octal, Octal to Decimal, Decimal to Hexadecimal, Hexadecimal to Decimal, Octal to Hexadecimal, Hexadecimal to octal. Complement of Binary Numbers, Binary addition, Binary subtraction. Boolean Algebra Theorems, De Morgan's theorem,.

Logic gates: Basic and Universal gates. Algebraic Simplification and Implementation of Digital circuits using Basic & Universal Gates.Half adder and Full adder Implementations.

10- Hours

MODULE - 4

Special Devices and Actuators

Construction and working principles of LED, Seven Segment Display, Photo conductive cells, Photo transistors, Opto couplers, Relays.

06 - Hours

MODULE - 5

Communication Systems

Introduction, Block diagram of communication system, Modulation, Need for Modulation, Demodulation, Different types of modulation (Only Definations).

06- Hours

Course Outcomes:
After studying this course, students will be able to:

Course Outcomes: After studying this course, students will be able to:

1.1. Design the application of diodes as rectifiers.
1.2. Analyze the transistor biasing circuits based on characteristics of various BJT configurations.
1.3. Simplify the Boolean expressions and design simple digital circuits using logic gates and implement simple logic functions using basic and universal gates.
1.4. Operate various special devices and /or actuators according to their applications.
1.5. Summarize the principles of communication system and various modulation techniques.

.

Question Paper Pattern:

1. The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.
2. The question paper will have ten full questions carrying equal marks.
3. Each full question carries 20 marks.
4. There will be two full questions (with a maximum of four sub questions) from each module
5. Each full question will have sub questions covering all the topics under a module.
6. The students will have to answer five full questions, selecting one full question from each module.

Text Books:

1. David A. Bell, "**Electronic Devices and Circuits**", Oxford University Press, 5th Edition, 2008.
2. D.P. Kothari, I. J. Nagrath, "**Basic Electronics**", McGraw Hill Education (India) Private Limited, 2014.
3. George Kenedy, Bernard Davis " **Electronics and Communication System",** 3rd edition.

COURSE OUTCOME AND PROGRAMME OUTCOME MAPPING (1/2/3):
Note:1-Low, 2-Medium, 3-High

CO/PO	PO.1	PO.2	PO.3	PO.4	PO.5	PO.6	
CO1	3	2	-	-	-	-	-
CO2	3	3	-	-	-	-	-
CO3	3	3	3	-	-	-	-
CO4	3	-	-	-	-	-	-
CO5	3	-	-	-	-	-	-

*****

ELEMENTS OF MECHANICAL ENGINEERING

[As per Choice Based Credit System (CBCS) scheme]
(Effective from the academic year 2021-22)

Course Code : 21MES14/24 CIE Marks : 50 Teaching Hours/Week: 03
SEE Marks: 50
Total Teaching Hours: 40 Exam Hours:03
Semester : I/II
Credits: 03

Course Learning Objectives:

Students belonging to all branches of Engineering are made to learn certain fundamental topics related to mechanical engineering so that they will have a minimum understanding of mechanical systems, equipment and process.

MODULE - 1

Steam Formation and Properties: Classification of boilers, Lancashire boiler, Babcock and Wilcox boiler, boiler mountings and its accessories. Basics of refrigeration and air conditioning. Working principle vapor compression and vapor absorption refrigeration systems and its applications.

08- Hours

MODULE - 2

Steam turbines: Classification of steam turbine, Principle of operation of Impulse and reaction turbines, Gas Turbines: Classification of gas turbine, working principles (Open cycle and closed cycle gas turbines). Water turbines: Classification of water turbine and their working principles. Internal Combustion Engines: Classification of IC engines, I.C. Engine terminologies, 2 Stroke and 4 stroke Petrol & diesel engines& simple numerical.

08 - Hours

MODULE - 3

Joining processes: Soldering, Brazing and Welding: Definitions, classification and method of soldering, Brazing and welding.

Machine Tools and Operations :Lathe , drilling and milling machines, Turning, facing, knurling, Thread cutting, Taper Turning methods, Drilling, Boring, Reaming, Tapping, Counter Sinking, Counter Boring, -Plane milling, End milling, Slot milling.

08 - Hours

MODULE - 4

Power Transmission: Belt Drives - Classification and applications. Gears - Definitions, Terminology, types and uses. Gear Drives and Gear Trains – Definitions and classifications, simple numerical

06- Hours

MODULE - 5

Energy Resources: Non-renewable and renewable energy resources, Petroleum based solid, liquid and gaseous fuels, Combustion and combustion products of fuels, Solar Power: Solar Radiation, Solar constant (definition only), Solar Thermal energy harvesting, solar photovoltaic principle. Wind Power: principle of operation of a typical windmill. Hydro Power: Principles of electric power generation from hydro power plants, Nuclear Power: Principles of Nuclear power plants, Bio Fuels: introduction to bio fuels.

08 - Hours

Course Outcome:

Students shall be able to,

CO.1 Acquire the knowledge of steam formation and its application. Also gain basic understanding of refrigeration systems.

CO.2 Understand and analyze the working principle, operation and application of prime movers.

CO.3 Demonstrate the methods and operations of metal removal process using Lathe, drilling, Milling.

CO.4 Design and analyze the power transmission systems along with its Implementations.

CO.5 Explore the knowledge of various Non-conventional Energy sources.

1. Explore the knowledge of Various Non-conventional Energy sources.

Question Paper Pattern:

5. The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.
6. The question paper will have ten full questions carrying equal marks.
7. Each full question carries 20 marks.
8. There will be two full questions (with a maximum of four sub questions) from each module
9. Each full question will have sub questions covering all the topics under a module.
10. The students will have to answer five full questions, selecting one full question from each module.

Text Books:

1. V.K.Manglik, "Elements of Mechanical Engineering", PHI Publications, 2013. (unit-1,2,4,5).
2. K.R.Gopalkrishna, "A text Book of Elements of Mechanical Engineering"- Subhash Publishers, Bangalore. (Unit -1,2,3,4,5)

Reference Books:

1. S.TrymbakaMurthy, "A Text Book of Elements of Mechanical Engineering", 4th Edition 2006, Universities Press (India) Pvt Ltd, Hyderabad.
2. K.P.Roy, S.K.HajraChoudhury, Nirjhar Roy, "Elements of Mechanical Engineering", Media Promoters & Publishers Pvt Ltd,Mumbai,7th Edition,2012

COURSE OUTCOME AND PROGRAMME OUTCOME MAPPING (1/2/3):

Note:1-Low, 2-Medium, 3-High

CO/PO	PO.1	PO.2	PO.3	PO.4	PO.5	PO.6	PO.7	PO.8	PO.9	PO.10	PO.11	PO.12	PSO.1	PSO.2
CO1	2												1	
CO2	2												1	
CO3	2												1	
CO4	2												1	
CO5	2												1	

*****

BASIC ELECTRICAL ENGINEERING

[As per Choice Based Credit System (CBCS) scheme] (Effective from the academic year 2021-22)

Course Code: 21ELE14/24 CIE Marks : 50 Teaching Hours/Week: 03 SEE Marks: 50

Total Teaching Hours: 40 Exam Hours:03

Semester : I/II

Credits: 03

Course Learning Objectives: The course will enable the students to:

- **Understand the analysis of simple circuits with DC excitation using Kirchhoff's Laws.**
- **Understand the analysis of simple series circuits with single phase AC excitation.**
- **Understand the generation of three-phase power and operation of three-phase circuits.**
- **Understand the Construction and Working of Single-phase Transformer.**
- **Understand the measurement of power and energy and alsopersonal safety measures.**

MODULE - 1

DC Circuits

Introduction to Electrical elements (Active elements and passive elements) ohms law, Kirchhoff current and Voltage laws, analysis of simple circuits with dc excitation, electrical power and energy

08 - Hours

MODULE - 2

Single phase AC Circuits

Generation of AC voltage, Representation of sinusoidal waveforms, peak, average value and rms values, phasor representation of alternating quantity, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC series circuts. Illustrative examples.

08- Hours

MODULE - 3

Three phase AC Circuits

Necessity and advantages of three phase systems, generation of three phase power. Definition of Phase sequence, balanced supply and balanced load. Relationship between line and phase values of balanced star and delta connections. Power in balanced three-phase circuits, measurement of power by two-wattmeter method. Illustrative examples.

06- Hours

MODULE - 4

Single Phase transformer

Necessity of transformer, Principle of operation and construction of single phase transformers (core and shell types). Emf equation, losses, efficiency, Condition for maximum efficiency, Voltage regulation. Illustrative problems on emf equation and efficiency only.

08- Hours

MODULE - 5

Measuring Instruments

Construction and working of wattmeter and single phase energy meter**.**

02 – Hours

<u>Domestic Wiring</u>

Service mains, meter board and distribution board. Brief discussion on concealed conduit wiring. Two way and three way control. Elementary discussion on Circuit protective devices: fuse and Miniature Circuit Breaker (MCB's). Electric shock, precautions against shock, Objectives of Earthing, types of earthing; pipe and plate earthing, Residual current circuit breaker (RCCB).

06 - Hours

Course Outcome:

On completion of this course the student will be able to:

CO1: Analyze simple circuits with DC excitation using Kirchhoff's Laws.
CO2: Analyze simple series circuits with single phase AC excitation.
CO3: Explain the generation of three-phase power and analyze three-phase circuits.
CO4: Explain the Construction and Working of Single-phase Transformer.
CO5: Explain measurement of power and energy and also personal safety measures.

Question Paper Pattern:

1. The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.
2. The question paper will have ten full questions carrying equal marks.
3. Each full question carries 20 marks.
4. There will be two full questions (with a maximum of four sub questions) from each module
5. Each full question will have sub questions covering all the topics under a module.
6. The students will have to answer five full questions, selecting one full question from each module.

Reference Books

1. D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2010.
2. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.
3. L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 2011.

4. E. Hughes, “Electrical and Electronics Technology”, Pearson, 2010.

5. V. D. Toro, “Electrical Engineering Fundamentals”, Prentice Hall India, 1989.

COURSE OUTCOME AND PROGRAMME OUTCOME MAPPING (1/2/3):
Note:1-Low, 2-Medium, 3-High

CO/PO	PO.1	PO.2	PO.3	PO.4	PO.5	PO.6
CO1	3	3				
CO2	3	3				
CO3	3	3				
CO4	3	3		2		
CO5	3					3

****
*

PROGRAMMING FOR PROBLEM SOLVING

[As per Choice Based Credit System (CBCS) scheme] (Effective from the academic year 2021-22)

Course Code : 21PPS15/25 CIE Marks : 50 Teaching Hours/Week: 03 SEE Marks: 50
Total Teaching Hours: 40 Exam Hours:03
Semester : I/II Credits: 03

Course Learning Objectives:

This course will enable students to

1. To familiarize with writing of algorithms, fundamentals of C and philosophy of problem solving.
2. To implement different programming constructs and decomposition of problems into functions.
3. To use and implement data structures like arrays and structures to obtain solutions.
4. To define and use of pointers with simple applications.

MODULE - 1

Introduction to computer Hardware and software:

Definition of Computer, Components of a computer System(input devices, output devices, memory, processor), Software, types of software, Computer Networks(LAN,MAN,WAN),

Overview of C:

Representation of Algorithm/Pseudo code and flowchart with examples, Basic Structure of C Program, C-tokens, variable and data types, Operators and expressions.

8 - Hours

MODULE - 2

Managing input output operations Conditional Branching Loops, and continue statements, Programming Examples.

7 - Hours

MODULE - 3

Arrays: Arrays (1-D, 2-D), Strings, Basic Algorithms: Searching and Sorting Algorithms (Linear Search, Binary Search, Bubble sort and Selection sort), Programming examples. **8 - Hours**

MODULE - 4

Functions: Definition of function, Elements of User Defined Functions, Parameter Passing techniques, Categories of functions, recursive function, programming examples. **7 - Hours**

MODULE - 5

Structures: Introduction to structures (Definition, Declaration, Initialization), reading and printing structures, Programming examples. **Pointers**: Introduction to pointers (Defining, Declaration, Initialization),

reading and printing using pointers, pointers to pointers.

Introduction to Data Structures: Definition and applications of Stacks, Queues & Linked Lists.

8 - Hours

Course Outcomes: The students shall able to:
To translate the algorithms to programs (in C language).

1. To test and execute the programs and correct syntax and logical errors
2. To implement conditional branching, iteration and recursion.
3. To decompose a problem into functions and synthesize a complete program using divide and conquer approach.
4. To use arrays, pointers and structures to formulate algorithms and programs.
5. To apply programming to solve matrix addition and multiplication problems and searching and sorting problems

6. To apply programming to solve simple numerical method problems, namely rot finding of function, differentiation of function and simple integration.

Question paper pattern:

1. The question paper will have ten questions. There will be 2 questions from each module.
2. Each question will have questions covering all the topics under a module.
3. The students will have to answer 5 full questions, selecting one full question from each module.

Text Books:

1. **Brian W. Kernighan and Dennis M. Ritchie:**
   The C Programming Language, Prentice Hall of India.
2. **E. Balaguruswamy:**
   Programming in ANSI C, 7th Edition, Tata McGraw-Hill

Reference Books:

1. **Vikas Gupta:**
   Computer Concepts & C Programming, Dreamtech Press 2013
2. **R S Bichkar:**
   Programming with C, University Press, 2012.
3. **Jacqueline Jones and Keith Harrow:**
   Problem Solving with C, 1st Edition, Person 2011.
4. **Behrouz A. Forouzan, Richard F. Gilberg**:
   Computer Science - A Structured Approach Using C, 3 rd Edition, Cengage Learning, 2007.

COURSE OUTCOME AND PROGRAMME OUTCOME MAPPING (1/2/3):

Note:1-Low, 2-Medium, 3-High

CO/PO	PO.1	PO.2	PO.3	PO.4	PO.5	PO.6	
CO1	3	3					
CO2	3	3					
CO3	3	3					
CO4	3	3		2			
CO5	3					3	

*****

COMPUTER AIDED ENGINEERING DRAWING

[As per Choice Based Credit System (CBCS) scheme] (Effective from the academic year 2021-22)

Course Code : 21CEDL15/25 CIE Marks : 50 Teaching Hours/Week: 03 SEE Marks: 50

Total Teaching Hours: 40 Exam Hours:03

Semester : I/II Credits: 03

Course Learning Objectives:

4. Engineering drawing is an important tool for all Engineers and for many others professionals.
5. It is the language of Engineers. Engineering Drawing communicates all needed information from the engineer who designed a part to the workers who will manufacture it.
6. The aim of the subject is to equip students with the fundamentals of Computer Aided Engineering Drawing and to further the ability to communicate information by graphical means.

MODULE -1

Introduction, Drawing Instruments and their uses, BIS conventions, Lettering, Selection of drawing size and scale Dimensioning and free hand practicing. Computer screen, layout of the software, standard tool bar/ menus and description of most commonly used tool bars, navigational tools. Various types/methods of projections, Definitions of HP, VP, RPP & LPP., First and Third angle systems of orthographic projections. Projection of Points in different quadrants. Projections of Straight Lines – parallel to one or both reference planes, contained by one or both planes, perpendicular to one of the planes, inclined to one plane but parallel to the other planes, inclined to both the planes, true length of a line and its inclination with reference planes, traces of a line.

10 - Hours

MODULE - 2

Projections of Planes – parallel to one reference plane, inclined to one plane but perpendicular to the other, inclined to both reference planes.

08 - Hours

MODULE - 3

Projections of Polyhedra Solids and Solids of Revolution - in simple positions with axis perpendicular to a plane, with axis parallel to one and inclined to other . axis inclined to both planes. Projections of of Prisms, Pyramids.

12 - Hours

MODULE - 4

Isometric views and isometric projections - introduction, isometric scale, Isometric views of plane figures, prisms, pyramids and cylinders. Free Hand Sketching - Orthographic Views from Isometric.

10 - Hours

MODULE - 5

Development of Lateral Surfaces of Solids: Development of lateral surfaces of above solids, their frustums and truncations. (No problems on lateral surfaces of trays, tetrahedrons, spheres and transition pieces).

10 - Hours

Course Outcome:

At the end of this course students are able to

CO.1	Students will be able to understand the basic principles and conventions of engineering drawing to Analyze and draw the projections of points & lines
CO.2	Students will be able to Analyze and draw the orthographic projection of planes
CO.3	Students will be able to understand the projection concepts in solids and apply concepts in the area of design
CO.4	Students will be able to visualize the components by isometric projection.
CO.5	Identify the interdisciplinary engineering component or systems through it graphical representation.

Mapping of course outcomes with program outcomes

21CEDL 15/25	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PS 01	PSO 2

CO.1	3	2	-	-	3	1	-	1	1	3	-	3	1
CO.2	3	2	-	-	3	1	-	1	1	3	-	3	1
CO.3	3	3	-	-	3	1	1	-	1	3	-	3	1
CO.4	3	2	-	-	3	-	-	-	1	3	-	3	1
CO.5	3	2	-	-	3	-	-	-	1	3	-	3	2

Question Paper Pattern:

1. The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.

2. The question paper for each batch of the students will be set separately and the answer sheets will have to be jointly evaluated by Internal and external examiners.

3. Student have to answer maximum of Three questions and questions will be set has per the following pattern.

Q. No.	From Modules	Marks allotted
1.	Module 1 or 2	30
2.	Module 3	40
3.	Module 4 or 5	30

Scheme of Evaluation

Q. No.	Solutions & Sketching on sketch book	Computer display and Printout	Total Marks
1	10 Marks	20 Marks	30
2	15 Marks	25 Marks	40
3	15 Marks	15 Marks	30
Total	40 Marks	60 Marks	100

Text Books:

1. Engineering Drawing - N.D. Bhatt & V.M. Panchal, 48th edition, 2005- Charotar Publishing House, Gujarat.
2. Engineering Graphics - K.R. Gopalakrishna, 32nd edition, 2005- Subash Publishers Bangalore
3. "Computer Aided Engineering Drawing" by Dr. M H Annaiah, Dr C N Chandrappa and Dr B Sudheer Premkumar Fifth edition, New Age International Publishers.

ENGINEERING PHYSICS LAB

[As per Choice Based Credit System (CBCS) scheme] (Effective from the academic year 2021-22)

Course Code : 21PHYL16/26	CIE Marks : 50
Teaching Hours/Week: 02	SEE Marks : 50
Total Teaching Hours: 38	Exams. Hours : 03
Semester : I/II	Credits : 01

Course Learning Objectives:

This course (21PHYL16/26) will enable students

1. To realize experimentally, the mechanical, electrical and thermal properties of materials, concept of waves and oscillations
2. Design simple circuits and hence study the characteristics of semiconductor devices

Experiment:

1. Determination of spring constants in Series and Parallel combination.

Reference Books:

1. Computer Aided Engineering Drawing - S. Trymbaka Murthy,- I.K. International Publishing House Pvt. Ltd., New Delhi, 3rd revised edition- 2006.
2. Fundamentals of Engineering Drawing with an Introduction to Interactive Computer Graphics for Design and Production- Luzadder Warren J., Duff John M., Eastern Economy Edition, 2005- Prentice-Hall of India Pvt. Ltd., New Delhi.

2. n & I by Torsional pendulum (radius of the wire, mass and dimensions of the regular bodies to be given). (In the examination either n or I to be asked).
3. Young's modulus of a beam by Single Cantilever experiment (breadth and thickness of the beam to be given)
4. Study of IV characteristics of Zener Diode and determine the knee voltage and break-down voltage.
5. Study Series and parallel LCR resonance and hence Calculate inductance, band width and quality factor using series LCR Resonance
6. Determine Acceptance angle and Numerical aperture of an optical fiber.

7. Determine Wavelength of semiconductor laser using Laser diffraction by calculating grating constant.
8. Estimation of Fermi Energy of Copper.
9. Study of input and output Transistor characteristics and hence calculate input resistance and output resistance.
10. Draw IV characteristics of photodiode and calculate power responsivity.
11. Calculation of Dielectric constant by RC charging and Discharging.
12. Stephan's law of radiation.
13. Young's modulus by uniform bending.
14. Determination of Planck's constant using Light Emitting Diodes.
15. Estimate the given metal in photocell
16. Scanning tunneling electron microscope.

Note :

Any10 experiments are mandatory. Student has to perform 2 experiments in the semester end examination

Course Outcomes :

Upon completion of this course, students will be able to

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

Suggested Learning Resources: Reference books.

1. Engineering Lab Manual by WBUT-New Age International Publishers.
2. Applied Physics Lab Manual by Anoop Sing Yadav.

Weblinks, Video lectures, and e-resources.
https://vlab.amrita.edu/?sub=1&brch=282&sim=1512&cnt=1
https://vlab.amrita.edu/?sub=1&brch=282&sim=879&cnt=1
https://vlab.amrita.edu/index.php?sub=1&brch=189&sim=343&cnt=1 https://bop-iitk.vlabs.ac.in/basics-of-physics/List%20of%20experiments.html
https://virtuallabs.merlot.org/vl_physics.html
https://phet.colorado.edu https://www.myphysicslab.com

COURSE OUTCOME AND PROGRAMME OUTCOME MAPPING (1/2/3):
Note:1-Low, 2-Medium, 3-High

CO/PO	PO.1	PO.2	PO.3	PO.4	PO.5	PO.6	PO.7	PO.8	PO.9	PO.10	PO.11	PO.12	PSO.1	PSO.2
CO1	3	3												
CO2	3	3												
CO3	3	3												
CO4	3	3		2										
CO5	3					3								

*****

ENGINEERING CHEMISTRY LAB

[As per Choice Based Credit System (CBCS) scheme] (Effective from the academic year 2021-22)

Course Code : 21CHEL16/26	CIE Marks : 50
Teaching Hours/Week: 02	SEE Marks : 50
Total Teaching Hours: 38	Exams. Hours : 03
Semester : I/II	Credits : 01

Course objectives :

To provide students with practical knowledge of

1. Quantitative analysis of materials by classical methods of analysis.
2. Instrumental methods for developing experimental skills in building technical competence.

Instrumental Experiments

1. Potentiometric estimation of FAS using standard $K_2Cr_2O_7$ solution.
2. Conductometric estimation of acid mixture.
3. Determination of Viscosity co-efficient of the given liquid using Ostwald's viscometer.
4. Colorimetric estimation of Copper.
5. Determination of P^{ka} of the given weak acid using pH meter.

Volumetric Experiments

1. Estimation of Total hardness of water by EDTA complexometric method.
2. Estimation of CaO in cement solution by rapid EDTA method.
3. Determination of percentage of Copper in brass using standard sodium thiosulphate solution.
4. Determination of COD of waste water.

5. Estimation of Iron in haematite ore solution using standard $K_2Cr_2O_7$ solution by external indicator method.

Demonstration Experiments

1. Synthesis of nano materials by precepetation method
2. Determinationof percentage of chlorine in bleaching powder by Iodometric method

Course outcomes: On completion of this course, students will have the knowledge in,

CO1 : Principles and procedure.(Knowledge)

CO2 : Understanding the reactions.(Comprehension)

CO3 :

Applications

CO 3: Handling different types of instruments for analysis of

materials using small quantities of materials involved for

quick and accurate results.(Analysis)

CO 4: Carrying out different types of titrations for estimation of concerned

in materials using comparatively more quantities of materials involved for good results.(Synthesis)

Conduction of Practical Examination:

a. Examination shall be conducted for 100 marks, later reduced to 50 marks.

b. All experiments are to be included for practical examination.

c. One instrumental and another volumetric experiment shall be set.

d. Different experiments shall be set under instrumental and a common experiment under volumetric.

Reference Books:

1. G.H. Jeffery, J. Bassett, J. Mendham and R.C. Denney, "Vogel's Text Book of Quantitative Chemical Analysis"
2. O.P. Vermani & Narula, "Theory and Practice in Applied Chemistry", New Age International Publishers.
3. Gary D. Christian, "Analytical chemistry", 6th Edition, Wiley India.
4. Vogel's A.I. A text book of quantitative analysis, 35th edition, 2012.
5. Willard, Merit, Dean and Settle, A text book of Instrumental analysis, 6th edition 2012.
6. T. Pradeep, A Text book of Nanoscience and Nanotechnology, McGraw Hill Education (India) Pvt., Ltd., 1st edition, 2015

COURSE OUTCOME AND PROGRAMME OUTCOME MAPPING (1/2/3):

Note:1-Low, 2-Medium, 3-High

CO/PO	PO.1	PO.2	PO.3	PO.4	PO.5	PO.6	
CO1	3	3					
CO2	3	3					
CO3	3	3					
CO4	3	3		2			
CO5	3					3	

COMPUTER PROGRAMMING LAB

[As per Choice Based Credit System (CBCS) scheme] (Effective from the academic year 2021-22)

Course Code : 21CPL17/27	CIE Marks : 50
Teaching Hours/Week: 02	SEE Marks : 50
Total Teaching Hours: 38	Exams. Hours : 03
Semester : I/II	Credits : 01

Course Learning Objectives:

This course will enable students to

* Familiarize to use word, excel and power point presentations.
* To practice writing flowcharts, algorithms and programs.
* To implement basics of C programming language.
* To provide solutions to the laboratory programs.
* To familiarize the processes of debugging and execution.

Descriptions (if any):

The laboratory should be preceded or followed by a tutorial to explain the algorithm and logical approach to be implemented for the problems given and real life application. Every experiment should have algorithm and flowchart be written before writing the program. Ensure that no built-in functions are used.

Code should be traced minimum two test cases which should be recorded.Students should have prerequisite knowledge of basic mathematics and vectors.

PART-A

1 Computer Office Applications Working with Access. Working with Excel / Spreadsheets. Working with Word document. Working with Powerpoint Presentation.

2. Familiarization with programming environment, concept of naming the program files, storing, compilation, execution and debugging. Taking any simple C- code.

3. Simple computational problems using arithmetic expressions and use of each operator leading to implementation of a Commercial calculator.

4. Problems involving if-then-else structures. Implement different ways of finding the largest of given three positive integers.

5. Problems Solving using looping statements.

PART-B

1. Introduce Iterative problem solving and implement Taylor series approximation to compute Sin(x) or polynomial.

2. Introduce 1D/2D Array manipulation and implement bubble sort technique.

3. Implement Matrix multiplication and ensure the rules of multiplication are checked.

4. Use functions to check whether the given string is a Palindrome. Convince the parameter passing techniques.

5. Implement structures to read, write, compute average-marks and the students scoring Above and below the average marks for a class of 60 students.

6. Implement addition of array elements using Pointers.

7. Implement Recursive functions, namely, GCD and Binary to Decimal Conversion.

8. Implement a C program to maintain a record of "n" student details using an array of structures with four fields (Roll number, Name, Marks, and Grade). Each field is of an appropriate data type. Print the marks of the student given student name as input.

Course Outcomes:

The students shall able to:
CO1 Demonstrate theoretical concepts of C language through
series of experiments
CO2 Develop the program using C constructs
CO3 Debug and troubleshoot software issues effectively
CO4 Analyze the data and interpret the results
CO5 Prepare a well-organized laboratory report

Question paper pattern:

1. All laboratory experiments are to be included for practical examination.
2. Part A – 20 Marks and Part B – 30 Marks.
3. Students are allowed to pick one experiment from part A and one experiment part B.
4. Strictly follow the instructions as printed on the cover page of answer script for breakup of marks.
5. Change of experiment is allowed only once and 15% Marks is deducted from the procedure part.

COURSE OUTCOME AND PROGRAMME OUTCOME MAPPING (1/2/3):
Note:1-Low, 2-Medium, 3-High

CO/PO	PO.1	PO.2	PO.3	PO.4	PO.5	PO.6
CO1	2	3				
CO2	2	2	3		1	
CO3		2			1	
CO4	2		2			
CO5	1					

ELECTRONICS AND ELECTRICAL LAB

[As per Choice Based Credit System (CBCS) scheme] (Effective from the academic year 2021-22)

Course Code : 21EECL17/27	CIE Marks : 50
Teaching Hours/Week: 02	SEE Marks : 50
Total Teaching Hours: 38	Exams. Hours : 03
Semester : I/II	Credits : 01

Course Learning Objectives:

1. To establish a broad concept of various types of electrical circuits tools and instrumentation.
2. To measure power & power factor measurement of different types of lamps.
3. To provide hands on experience with electrical circuits and electrical safety norms.

4. To train students to read and understand schematics so as to make electrical connections for different appliances.
5. To measure frequency, time & voltage levels of various waveforms.
6. To train the students to understand the truth table of various logic gates.

PART

Course Contents:

ELEC

LABORATORY

LIST OF EXPERIMENTS

1. To verify KCL and KVL

2. Measurement of current, power & power factor of In candescent lamp, Fluorescent lamp, CFL lamp & LED lamp.

3. Measurement of Energy by using 1-phase Energy meter & its calibration.

4. Two way & three way control of lamp.

5. Measurement of Power in 3-phase system using two-wattmeter methods.

Demonstration Experiments (for CIE only):

1. Wires & cables of different size and its current carrying capacity.
2. Electrical switch Gears MCCB, MCB, RCCB & Fuse.
3. Cutout sections of Electrical Machines, D.C Machine, Power Transformer, Induction motor (1-phase & 3-phase), Synchronous
4. machine.
5. Relate experimental results with theoretical analysis.
6. Demonstrate the ability to critically evaluate the performance of an electrical appliance.

PART –B

Course Contents : ELECTRONICS LABORATORY

CO/PO	PO.1	PO.2	PO.3	PO.4	PO.5	PO.6	PO.7	
CO1	3	3	2	2				
CO2	3	3	2	2				
CO3	3	3	2	2				
CO4	3	3	2	2				
CO5	3	3	2	2				

1. Measurement of the following using CRO.
   a) Frequency/ Time measurement of sine and square wave.
   b) AC and DC voltages
   c) Component testing(Diode & Transistor)
2. Study of characteristics of PN junction diode.
3. Implementation of half wave ,full wave and bridge rectifiers.
4. Study of CB, CE trans

istor characteristics.

5. Realization of logic gates using IC's.

Course Outcomes:

On completion of this course students will be able to:

1. Establish a broad concept of various types of electrical circuits, tools and instrumentation.
2 Measure power & power factor of different types of lamps.
3 Obtain the characteristics of PN junction diode, CB and CE transistors
4 Measure frequency, time and voltage levels of various waveforms.
5 Realize various logic gates using IC's.

COURSE OUTCOME AND PROGRAMME OUTCOME MAPPING (1/2/3):

Note: 1- Low, 2- Medium, 3- High

PROFESSIONAL COMMUNICATION LAB

[As per Choice Based Credit System (CBCS) scheme] (Effective from the academic year 2021-22)

Course Code : 21PCL18/28	CIE Marks : 50
Teaching Hours/Week: 02	SEE Marks : 50
Total Teaching Hours: 38	Exams. Hours : 03
Semester : I/II	Credits : 01

Course Learning Objectives:

The course (18PCL18) will enable the students ,

1. To impart basic English grammar and essentials of language skills
2. To train to identify the nuances of phonetics, intonation and enhance pronunciation skills
3. To enhance with English vocabulary and language proficie

Language Lab

For augment LSRW and GV skills (Listening, Speaking, Reading, Writing and Grammar, Vocabulary) through tests, activities, exercises etc., comprehensive web-based learning and assessment systems can be referred.

MODULE - 1

Introduction to Technical Communication

Fundamentals of Technical Communication Skills, Barriers to Effective Communication, Different styles in Technical Communication.

silent Letters, Homophones and Homonyms, Aspiration, Pronunciation of ' *The*', words ending ' *age'* , some plural forms. Articles: Use of Articles – Indefinite and Definite Articles.

08 - Hours

MODULE - 3

Developing Listening Skills (Phonetics and Vocabulary Building) - II

Speech Sounds: Vowels and Consonants - Exercises on it. Preposition, kinds of Preposition and Prepositions often Confused. Word Accent – Rules fo r Word Accent, Stress Shift, Question Tags, Question Tags for Assertive sentences (statements)- some exceptions in question tags and exercise in One Word Substitutes and Exercises.

Vocabulary – Synonyms and Antonyms, Exercises on it .

12 - Hours

Interpersonal Communication Skills, How to improve Interpersonal Communication Skills, Developing Interpersonal Skills.

Grammar : Basic English Grammar and Parts of Speech - Nouns, Pronouns, Adjectives, Verbs, Adverbs, Preposition, Articles, Conjunctions.

10 - Hours

MODULE - 2

Introduction to Listening Skills and Phonetics – I

Introduction to Phonetics, Sounds Mispronounced, Silent and Non

MODULE - 4

Speaking Skills (Grammar and Vocabulary) – I

Syllables, Structures, Strong and Weak forms of words, Words formation - Prefixes and Suffixes (Vocabulary), Contractions and Abbreviations.

Spelling Rules and Words often Misspelt – Exercises on it. Word Pairs (Minimal Pairs) – Exercises, The Sequence of Tenses (Rules in use of Tenses) and Exercises on it.

10 - Hours

MODULE - 5

Speaking Skills (Grammar and Vocabulary) – II

Extempore/Public c Speaking, Difference between Extempore/Public Speaking, and Guidelines for Practice.

Mother Tongue Influence(MTI) – South Indian Speaker s, Various Techniques for Neutralisation of Mother Tongue Influence – Exercises, Listening Com prehension – Exercises. Information Transfer : Oral Presentation - Examples. Common Errors in Pronunciation.

10 - Hours

Course Outcome:

On completion of the course, students will be able to,SSS

CO1 Use grammatical English and essentials of language skills and identify the nuances of phonetics, intonation and flawless pronunciation

CO2 Implement English vocabulary at command and language proficiency.

CO3 Identify common errors in spoken and written communication

CO4 Understand and improve the non verbal communication and kinesics

CO5 Perform well in campus recruitment, engineering and all other general competitive examinations

Question paper pattern

The SEE question paper will be set for 100 marks and the pattern of the question paper will be objective type (MCQ).

Text Books

4. **Communication Skills** by Sanjay Kumar and Pushp Lata, Oxford University Press - 2018. **Refer it's workbook** for activities and exercises – "Communication Skills – I (A Workbook)" published by Oxford University Press – 2018.

5. **English Language Communication Skills – Lab Manual cum Workbook,** Cengage learning India Pvt Limited [Latest Revised Edition] – 2018.

Reference Books

1. **Practical English Usage** by Michael Swan, Oxford University Press – 2016.

2. **High School English Grammar & Composition** by Wren and Martin, S Chandh & Company Ltd – 2015.

3. **English for Technical Communication** by N.P.Sudharshana and C.Savitha, Cambridge University Press – 2016.

4.. **Technical Communication** by Gajendra Singh Chauhan and Et al, Cengage learning India Pvt Limited [Latest Revised Edition] - 2018.

5. **Effective Technical Communication** – Second Edition by M. Ashraf Rizvi, McGraw Hill Education (India) Private Limited – 2018.

COURSE OUTCOME AND PROGRAMME OUTCOME MAPPING (1/2/3):
Note:1-Low, 2-Medium, 3-High

CO/PO	PO.1	PO.2	PO.3	PO.4	PO.5	PO.6	PO.7	PO.8	PO.9	PO.10	PO.11	PO.12
CO1								1	3	3		1
CO2								1	3	3		1
CO3								0	2	2		1
CO4								0	2	1		1
CO5								0	2	3		1

*****

ENVIRONMENTAL STUDIES

[As per Choice Based Credit System (CBCS) scheme] (Effective from the academic year 2021-22)

Course Code : 21ES18/28	CIE Marks : 50
Teaching Hours/Week: 02	SEE Marks : 50
Total Teaching Hours: 25	Exams. Hours : 01
Semester : I/II	Credits : 01

Course Learning Objectives:

1. To identify the major challenges in environmental issues and evaluate possible solutions.
2. Develop analytical skills, critical thinking and demonstrate socio- economic skills for sustainable development.
3. To analyze an overall impact of specific issues and develop environmental management plan.

MODULE - 1

Introduction: Environment - Components of Environment Ecosystem: Types & Structure of Ecosystem, Balanced ecosystem Human Activities – Food, Shelter, And Economic & Social Security.

Impacts of Agriculture & Housing Impacts of Industry, Mining & Transportation Environmental Impact Assessment, Sustainable Development.

5 Hours

Conventional sources of energy Solar energy, Hydro electric energy, Wind Energy, Nuclear energy, Biomass & Biogas Fossil Fuels, Hydrogen as an alternative energy.

5 Hours

MODULE - 4

Environmental Pollution – Water Pollution, Noise po llution, Land Pollution, Public Health Aspects.

Global Environmental Issues: Population Growth, Urbanization, Land Management, Water & Waste Water Management.

5 Hours

MODULE - 5

Air Pollution & Automobile Pollution: Definition, Effects – Global Warming, Acid rain &Ozone layer depletion, controlling measures.

Solid Waste Management, E - Waste Management & Biomedical Waste Management - Sources, Characteristics & Disposal methods.

5 Hours

Course Outcome:

Students will be able to,

1. Understand the principles of ecology and environmental issues that apply to air, land, and water issues on a global scale,
2. Develop critical thinking and/or observation skills, and apply them to the analysis of a problem or question related to the environment,

MODULE - 2

Natural Resources, Water resources – Availability & Quality aspects, Fluoride problem in drinking water Mineral resources, Forest Wealth Material Environmental Acts & Regulations, Role of government, Legal aspects, Role of Non-governmental Organizations (NGOs) , Environmental Education & Women Education.

5 Hours

MODULE - 3

Energy – Different types of energy, Conventional sources & Non

3. Demonstrate ecology knowledge of a complex relationship between biotic and abiotic components

4. Apply their ecological knowledge to illustrate and graph a problem and describe the realities that managers face when dealing with complex issues

Course Articulation Matrix / Course mapping:

CO#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	
CO1							2	
CO2							2	
CO3							2	
CO4							2	
CO5							2	2

Question paper pattern

The SEE question paper will be set for 100 marks and the pattern of the question paper will be objective type (MCQ).

Text Books:

1. Anil Kumar De and Arnab Kumar DE (2015) " Environmental Studies", New Age International Publication.
2. Benny Joseph (2005), "Environmental Studies", Tata McGraw – Hill Publishing Company Limited.
3. R.J.Ranjit Daniels and Jagadish Krishnaswamy, (2009), "Environmental Studies", Wiley India Private Ltd., New Delhi.

4. R Rajagopalan, "Environmental Studies – From Crisis to Cure", Oxford University Press, 2005,
5. Aloka Debi, "Environmental Science and Engineering", Universities Press (India) Pvt. Ltd. 2012.

Reference Books:

1. Raman Sivakumar, "Principals of Environmental Science and Engineering", Second Edition, Cengage learning Singapore, 2005.
2. P. Meenakshi, "Elements of Environmental Science and Engineering", Prentice Hall of India Private Limited, New Delhi, 2006.
3. S.M. Prakash, "Environmental Studies", Elite Publishers Mangalore, 2007.
4. Erach Bharucha, "Text Book of Environmental Studies", for UGC, University press, 2005.
5. G.Tyler Miller Jr., "Environmental Science – working with the Earth", Tenth Edition, Thomson Brooks /Cole, 2004
6. G.Tyler Miller Jr., "Environmental Science – working with the Earth", Eleventh Edition, Thomson Brooks /Cole, 2006
7. Dr.Pratiba Sing, Dr.AnoopSingh and Dr.Piyush Malaviya, "Text Book of Environmental and Ecology", Acme Learning Pvt. Ltd. New Delhi.

*
*
*
*
*

ENGINEERING MATHEMATICS - II

(Common to all branches)
[As per Choice Based Credit System (CBCS) scheme] (Effective from the academic year 2021-22)

Course Code : 21MAT21	CIE Marks : 50
Contact Hours/Week : 03	SEE Marks : 50
Total Teaching Hours: 40	Exams. Hours : 03
Semester : II	Credits : 03

Course Learning Objectives:

This course Engineering mathematics - II (21MAT21) aims to prepare the students :

1. To familiarize the important of linear and nonlinear ordinary differential equation, partial differential equations and how to find the general, singular and complete solution.
2. To apply the knowledge of vector calculus to find surface area and volume.
3. To familiarize the important of improper integrals and solution.
4. To familiarize the concept of complex valued function and properties and operations of vector and scalar valued function.

MODULE - 1

Differential Equation - I

Solution of non-linear differential equation of first order : Solvable for p, x , y and Clairaut's equation. Simultaneous differenetial equation, Solution of second and higher order Ordinary linear differential equation with constant co-efficients, Inverse Differential operator method, Applications of differential equations to LCR circuts.

Self study: Singular solution

08 - Hours

MODULE - 2

Differential Equations - II

Solution of second & higher order Ordinary linear differential equation with variable co-efficients: Cauchy Differential Equation and Legendre's Differential equation. Method of variation of parameters. Solution of homogeneous LDE by Power series solution Method.

Self study: Solution of second & higher order Ordinary differential equation, initial conditions(IC's) and initial value problems.(IVP's) 08-Hours

MODULE - 3

Partial Differential Equations(PDE's)

Solution of Non-homogeneous PDE by direct integration, Solution of homogeneous PDE with respect to one independent variable only, PDE of first order: Lagranges method and Charpits method. Derivation of one dimensional wave equation and heat equation and solution by methods of separation of variables.

Self study: Formation of PDE by eliminating arbitrary constants and functions, Classification of PDE.

08 - Hours

MODULE – 4

Complex Vairiables

Complex valued function, limit, continuity, differentiability, analytic functions. Cauchy-Riemann Equation in Cartesian, Polar form. Harmonic and orthogonal property and problems on construction of analytic function.

Self study: Complex trigonometry **08 - Hours**

MODULE – 5

Vector Calculus

Vector Differentiation: Scalar and Vector point functions, Gradient, Divergence, Curl, Laplacian operator and problems. Solenoidal, Irrotational vectors.

Vector integration, Vector Surface integral: Greens theorem, Stokes theorem. Volume Integral: Gauss divergence theorem(without proof), examples.

Self study: Geometrical and physical meaning of vector differential operator.

08 – Hours

Course Outcomes:

On completion of this course, students are able to:

CO 1	Evaluate various physical models through higher order differential equations and solve such linear ordinary differential equations.
CO 2	Apply the applications of Power series and obtain series solution of ordinary differential equations.
CO 3	To Create a variety of partial differential equations and solution by exact Methods / method of separation of variables.
CO 4	Understanding the definition of Analytic function and role of C-R equations in verifing the analyticity and construction of analytic function.
CO 5	Make the use of the multivariate calculus to understand the solenoidal and irrotational vectors and solving the system of equations by various methods.

Question Paper Pattern:

1. The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.
2. The question paper will have ten full questions carrying equal marks.
3. Each full question carries 20 marks.
4. There will be two full questions (with a maximum of four sub questions) from each module
5. Each full question will have sub questions covering all the topics under a module.
6. The students will have to answer five full questions, selecting one full question from each module.

Text Books:

1. B.S. Grewal: Higher Engineering Mathematics, Khanna Publishers, 43rd Ed., 2015.
2. E. Kreyszig: Advanced Engineering Mathematics, John Wiley & Sons, 10th Ed.(Reprint), 2016.

Reference books:

1. C.Ray Wylie, Louis C.Barrett : “Advanced Engineering Mathematics”, 6th Edition,
2. McGraw-Hill Book Co., New York, 1995. 2. James Stewart : “Calculus –Early Transcendentals”, Cengage Learning India Private Ltd., 2017.
3. B.V.Ramana: “Higher Engineering Mathematics” 11th Edition, Tata McGraw-Hill, 2010.
4. Srimanta pal & Subodh C Bhunia: “Engineering mathematics”, Oxford University Press,3rd Reprint,2016.
5. Gupta C.B., Singh S. R. and Mukesh kumar: “Engineering mathematics for Semester I & II”, Mc-Graw Hill Education (India) Pvt.Ltd., 2015.

Web links and Video Lectures:

1. http://nptel.ac.in/courses.php?disciplineID=111
2. http://www.class-central.com/subject/math(MOOCs)
3. http://academicearth.org/

CO#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1										-
CO2	3	1										-
CO3	3	2										1
CO4	3	2										1
CO5	3	2										1

*****

NETWORKING

[As per Choice Based Credit System (CBCS) scheme] (Effective from the academic year 2021-22

Course Code : 21AEC101/201	CIE Marks : 50
Teaching Hours/Week: 02	SEE Marks : 50
Total Teaching Hours: 24	Exams. Hours : 02
Semester : I/II	Credits : 01

Reference material information:

netacad.com

Course Objectives: This course will enable students to:

1. Design the network topologies
2. Configure Switch and Router
3. Implement LAN and Verify the connectivity
4. Troubleshoot issues with devices in the network

Laboratory Experiments

1. Study of networking devices.
2. Discuss the network representation and topologies.
3. Configure Switch using CLI
4. Crimping of UTP cable
5. Build LAN using Switch
6. Configure Router using CLI
7. Build Multiple LAN using router
8. Study of IPv4 submitting
9. Configure DHCP
10. Configure switches and routers with device hardening features to enhance security
11. Discuss troubleshoot issues with devices in the network

CoursCourse outcomes: After studying this course, students will be able to:

	Understand and Identify Networking Devices
CO1	
CO2	Design and Represent Network Topologies
CO3	Implement and Configure Network Hardware
CO4	Build and Secure LAN Environments
CO5	Develop Practical Networking Skills

*****

WEB DESIGN

[As per Choice Based Credit System (CBCS) scheme] (Effective from the academic year 2021-22)

Course Code : 21AEC102/202 CIE Marks : 50

CO#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1
CO1	3	2	1	-	1	-	-	-	1	1	-	1	1
CO2	3	2	2	2	2	-	-	-	2	2	1	2	1
CO3	3	1	2	1	2	-	-	-	2	2	2	3	1
CO4	3	1	2	2	1	1	1	1	2	1	2	1	1
CO5	3	2	1	1	2	1	1	1	2	1	1	2	1	2

Teaching Hours/Week: 02 SEE Marks : 50

Total Teaching Hours: 20 Exams. Hours : 02

Semester : I/II Credits : 01

Course objectives: This course will enable students to

- Provide fundamental concepts of Internet, Web Technology and Web Programming.

Module I: Overview of Internet and Intranet

Understanding internet and its need, concept of intranet, difference between internet and intranet, a brief history, internet applications, Internet Service Providers (ISP) concept of client and server, concept of a web browser and web server, communicating on the internet, concept of domain- Physical domain, virtual domain, registering a domain, need of IP addressing, process to assign IP addresses,

World Wide Web.

Module II: Introduction to HTML -1

HTML Tags: concept of Tag, types of HTML tags, structure of HTML program.

Text formatting through HTML: Paragraph breaks, line breaks, background and BGcolor attributes.

Emphasizing material in a web page: Heading styles, drawing lines, text styles.

Text styles and other text effects: centring, spacing, controlling font size & colour.

Lists: Using unordered, ordered, definition lists.

Adding Graphics to HTML Documents: Using Image tag, attributes of Image tag, changing width & height of image

Module III: Introduction to HTML -2

Handling Tables: To define header rows & data rows, use of table tag and its attributes.

Use of caption tag Linking Documents: Concept of hyperlink, types of hyperlinks, linking to the beginning of document, linking to a particular location in a document, Images as hyperlinks

Frames: Introduction To frames, using frames & frameset tags, named frames how to fix the size of a frame, targeting named frames.

Module IV: Introduction to Cascading Style Sheets (CSS)

Style Sheets: Definition, Importance, Different Approaches to Style Sheets, Using Multiple Approaches, Linking to Style Information to Separate File, setting up Style Information in Separate File, setting up Style Information, using <STYLE> Tag, Inline Style Information, CSS Advanced (Grouping, Dimension, Display, Positioning, Floating, Align, Pseudo class, Navigation Bar, Image Sprites, Attribute sector)

Module V: Web Publishing and Hosting

Web Publishing: Creating the Web Site, Saving the site, working on the web site,creating web site structure, Creating Titles for web pages

Web Hosting Basics: Types of Hosting Packages, registering domains, Defining Name Servers, Using Control Panel, Creating Emails in cPanel, Using FTP Client , Maintaining a Website

Course Outcomes

After studying this course, students will be able to:

CO1	Explain the need for the internet, differentiate between internet and intranet, and describe internet applications and services.
CO2	Develop structured HTML documents using basic tags and formatting tools.
CO3	Design web pages using HTML features such as images, tables, and lists. web pages effectively.
CO4	Apply CSS to enhance web page presentation using different styling methods.
CO5	Demonstrate the ability to create, publish, and maintain a basic website using web hosting tools.

SUGGESTED BOOKS:

- Web Enabled Commercial Application Development Using HTML, DHTML, JavaScript, Perl CGI by Ivan Bayross
- Thomas A, Powell, "1-ITML & CSS: The Complete Reference", McGraw Hill, Filth Edition, 2010, ISBN: 978-0-07-174170-5.
- Thomas A, Powell, "1-ITML & CSS: The Complete Reference", McGraw Hill, FilthEdition, 2010, ISBN: 978-0-07-174170-5.

*****

PA SYSTEM OPERATING AND MAINTENANCE

[As per Choice Based Credit System (CBCS) scheme] (Effective from the academic year 2021-22)

Course Code : 21AEC103/203	CIE Marks : 50
Teaching Hours/Week: 02	SEE Marks : 50
Total Teaching Hours: 20	Exams. Hours : 02
Semester : I/II	Credits : 01

Course Objectives: This course will enable students to:

1. Acquire the knowledge of operations of various subsystems of public addressing system.
2. Learn the installation procedures of PA system.
3. Learn the trouble shooting of various subsystems of PA system.

Acquire the necessary skills to become self employable.

Laboratory Experiments

1. Study the characteristics of various types of microphones.

2. Study the characteristics of various types of loud speakers and their applications.
3. Study of pre amplifiers and its control
4. Study of sound mixers
5. Study of Public addressing system and its installation
6. Troubleshooting of speakers
7. Trouble shooting the faults in public addressing amplifier system
8. Study of front panel control of an amplifiers
9. Study of speaker connections
10. Study of loud speaker phasing
11. Study of simple microphone amplifier circuit

Course Outcomes: After studying this course, students will be able to:

1. Explain the characteristics of various types of microphones.
2. Demonstrating the operation of mixer system.
3. Test the various subsystems of PA system and demonstrate the installation of PA system.
4. Trouble shooting the faults in the subsystems of PA system.
5. Become self employable.

Reference material information

Mai Maintenance handbook on Public Address System – RDSO https://rdso.indianrailways.gov.in

I Introduction to Networks:

Definition, Components, Network Representation and Topologies, Types of Networks, Internet, Network Characteristics and Architecture, Network Security, Packet Tracer

II Switch Configuration, Protocols, Ethernet Switching:

CISCO IOS Access, IOS Navigation, Command Structure, Basic Switch Configuration,
Overview of Protocol, Functions, Protocol Interaction, TCP/IP Protocol, OSI Reference Model, Data Encapsulation and data Access, Characteristics of Physical Layer, Media, Number System, Characteristics of Data Link Layer, Topologies, Data Link Frame Ethernet Switching: Ethernet Framing, Ethernet MAC Address

III Router Configuration, ARP:

Network Layer Characteristics, Routing, Address Resolution: ARP and IPv6 Neighbor Discovery, Basic Router Configuration, IPv4 and IPv6 addressing

Transport Layer Characteristics, TCP and UDP, DNS, DHCP

IV Network Security Fundamentals:

Types of threats and Vulnerabilities, Network Attacks, Device Security,

V Building Small Network:

Topologies, Redundancy, Network Growth, Network Utilization, Verify Connectivity, IP Configuration, Troubleshooting

CO#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												
CO4												
CO5												

*****

WELDING TECHNOLOGY LAB

[As per Choice Based Credit System (CBCS) scheme] (Effective from the academic year 2021-22)

Course Code : 21AEC104/204	CIE Marks : 50
Teaching Hours/Week: 02	SEE Marks : 50
Total Teaching Hours: 20	Exams. Hours : 02
Semester : I/II	Credits : 01

To impart knowledge and skill to use tools, machines, equipment, and welding instruments. educate students of Safe handling of machines and tools

PART A

1. Demonstration on use of Electric Welding Tools and Equipment's Arc Welding Machine, Gas welding Machine. Resistance welding machine
2. Demonstration on use of Soldering and Brazing Machine Tools and Equipment's -06 Hour -04 Hour

PART-B

Butt Joint, Lap 08 Hour

3. Welding models Study of electric arc welding tools & equipments, Models Joint, T joint & L-joint
4. Knowing Safety procedures and precautions in workshop.

-2 Hour

Course outcomes:

At the end of the course, the student will be able to

CO1.Understand the theoretical aspects of welding technology in depth.
CO2 Intelligently select the appropriate welding process for a particular application.
CO3.Describe the basic metallurgy of melted and HAZ of a metal or alloy. quality by inspection and testing methods.
CO4.Identify the cause of welding defects and avoid them.
CO5.Adjust welding parameters and techniques to optimize the weldment properties.

CO#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	-	-	-	-	-	-	-	-	-	-	-
CO2	1	-	-	-	-	-	-	-	-	-	-	-
CO3	1	-	-	-	-	-	-	-	-	-	-	-
CO4	1	-	-	2	2	-	-	-	-	-	-	-
CO5	1	-	-	-	1	-	-	-	-	-	-	1

PLUMBING

[As per Choice Based Credit System (CBCS) scheme] (Effective from the academic year 2021-22)

Course Code : 21AEC105/205	CIE Marks : 50
Teaching Hours/Week: 02	SEE Marks : 50
Total Teaching Hours: 20	Exams. Hours : 02
Semester : I/II	Credits : 01

Module 1

Introduction

Introduction to Plumbing. Plumbing and role of plumbing, plumbing cycle, need for plumbing. Plumbing and its importance, sanitary works.

Module 2

Pipes and pipes Fitting

Selection and use of different pipes like GI pipes, Plastic pipes, PVC pipes, HDFC pipes, Cast iron Pipes, Plumbing symbols, bends, elbows, sockets, tees, unions. Pipe cutting, pipe bending. pipe threading, pipe joints, pipe fitting, alignment of pipes, branching of pipes, safety

precautions, relavent IS codes.

Module 3

Water supply system

Source of water, rainwater harvesting. Water supply systems in a town, water distribution system, distribution reservoirs, pumps, valves, fire hydrants, storage of water in building, types of tanks, laying water supply pipe lines.

Module 4

Plumbing pipes are used in building construction

What is Plumbing System? Supply Pipes or Service Pipes Copper Pipes Galvanized Iron Pipes Polythene Pipes Lead Pipes Drain Pipes or Waste Disposal Pipes Soil Pipe Wastewater Pipe Rainwater Pipe Vent Pipe

- Anti-Siphonage Pipe Drainage Pipes Based on Material of Manufacturing Concrete Pipes Cast Iron Pipes Stoneware Pipes PVC Pipes
- Asbestos Cement Pipes

Module 5

Sanitary appliances

Introduction, Soil appliances remove different types of solid waste material, Flush toilet, squat toilet, wash basin, sink, floor trap, urinal, bathtub, showers, bidet, mixing tap, water efficient appliances.

CO#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												
CO4												
CO5												

****

AUTOCAD

[As per Choice Based Credit System (CBCS) scheme] (Effective from the academic year 2021-22)

Course Code : 21AEC106/206	CIE Marks : 50
Teaching Hours/Week: 02	SEE Marks : 50
Total Teaching Hours: 20	Exams. Hours : 02
Semester : I/II	Credits : 01

Module-1

Exam Hours

Introduction Basic introduction to AutoCAD, General features of CADD, CADD work station, Hardware and Software requirements, Advantages of using CADD, Starting up AutoCAD.

Module-2

Workspace: Understanding CADD Editor Screen- title bar, menu bar, ribbon, standard tool bar, drawing area, command prompt area, cross hair. File management- Create a new drawing, open a drawing, save a drawing, setting up units; Command Entry Options using -Command Line, Menus (File, Edit, View, Insert, Format, Tools, Draw, Dimension,

Modify, Window, Help), Understanding the use of CADD Menus and Tool Bars

Module-3

General commands in AutoCAD: Drawing Line using different coordinate Systems such as Absolute Cartesian

Coordinates, Relative Cartesian Coordinates, Absolute Polar coordinates, Relative Polar Coordinates, Direct distance

entry and line command, Picking coordinates on the screen. Draw commands- line, polyline, circle, arc

Module-4

Drawing commands in AutoCAD: Modify- Move, Copy, Stretch, Rotate, Mirror, Scale, Trim, Fillet, Array. Layer Creating new layer, Layers settings. Dimensions and dimension properties, creating blocks, hatching

Module-5

Simple Engineering Drawing with CAD Drawing tools: Draw Plan, Elevation and sectional view of single room building

CO1: To understand the Software working procedure & Features
CO2: To understand CADD Editor Screen Tilte bars
CO3: Setting the Scale factor, Draw lines using commands feautered in Software
CO4: To understand drawing the components of drawings in layers Modify Commands,
CO5: Drawing a Single room plans as per industry practice

CO #	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1
CO 1	1	1			3	3	2	1	1	2	1	2	3
CO 2			2	1	3	3	1	1	1			2	3
CO 3	1	1	2	2	3	3	1		1			2	3
CO 4	3	3	2	2					1			2	3
CO 5	3	3	2	2					1			2	3

*****

ELECTRICAL WIRING LAB

[As per Choice Based Credit System (CBCS) scheme] (Effective from the academic year 2021-22)

Course Code : 21AEC107/207 CIE Marks : 50
Teaching Hours/Week: 02 SEE Marks : 50
Total Teaching Hours: 20 Exams. Hours : 02
Semester : I/II Credits : 01

CREDITS-1

Course Objectives: This course will enable students:

To develop electrical wiring skills in students through systematic training that would enable the students to construct and test various electrical circuits using appropriate electrician tools, wires, protective devices and wiring accessories as per IS standards.

Part-A

1. Identify electrical symbols and various types of safety signs.
2. Identify various types of electrician tools and explain their functions.
3. Identify size and current capacity of various wires and cables.
4. Identify protective devices and explain their functions.
5. Differentiate various types of electrical wiring systems.

Part-B

6. Make simple straight twist and rat-tail joints in single strand conductors.
7. Prepare the following joints 'T' (Tee) joint, Britannia straight joint,
   western union joint.
8. Rig up a circuit to control a fan using electronic regulator.
9. Wire up a fluorescent tube fitting, connect and test it.
10. Rig up a calling bell circuit with indicator to be operated from two
    different places using push button switches.
11. Prepare a meter board for lightning installation using Energy meter, fuse, MCB, DP switch, ELCB and indicator.
12. Rig up a circuit to control 3 lamps in a) Series b) Parallel using
    one SP switch.
13. Measure Current, Voltage & Power consumption in a simple AC
    Circuit.

Course outcomes: At the end of the course the students will be able to:

CO1: Use approriate electritian tools, wires, protective devices, safty signs and wiring accessories.
CO2: Prepare different types of wiring joints.
CO3: Identify size and capacity of different wires and cables.
CO4: Apply standards for electrical wiring.
CO5: Rig up wiring circuits for various appliances.

CO#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2					3			1
CO2	3	3	2	2					3			1
CO3	3	3	2	2					3			1
CO4	3	3	2	2					3			1
CO5	3	3	2	2					3			1

*****

INNOVATION & DESIGN THINKING

[As per Choice Based Credit System (CBCS) scheme] (Effective from the academic year 2021-22)

Course Code : 21AEC108/208 CIE Marks : 50
Teaching Hours/Week: 02 SEE Marks : 50
Total Teaching Hours: 20 Exams. Hours : 02
Semester : I/II Credits : 01

Course Category:
Foundation Preamble:

This course provides an introduction to the basic concepts and techniques of engineering and reverses engineering, the process of design, analytical thinking and ideas, basics and development of engineering drawing, application of engineering drawing with computer aide.

Course objectives:

To explain the concept of design thinking for product and service development

To explain the fundamental concept of innovation and design thinking

To discuss the methods of implementing design thinking in the real world.

Teaching-Learning Process (General Instructions)
These are sample Strategies; which teachers can use to accelerate the attainment of the various course outcomes.

1. Lecturer method (L) does not mean only the traditional lecture method, but a different type of teaching method may be adopted to develop the outcomes.
2. Show Video/animation films to explain concepts
3. Encourage collaborative (Group Learning) Learning in the class
4. Ask at least three HOTS (Higher-order Thinking) questions in the class, which promotes critical thinking
5 Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develops thinking skills such as the ability to evaluate, generalize, and analyze information rather than simply recall it.
6. Topics will be introduced in multiple representations.
7. Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them.
8. Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding.

Module-1
PROCESS OF DESIGN
Understanding Design thinking
Shared model in team-based design – Theory and practice in Design thinking – Explore presentation signers across globe – MVP or Prototyping
TeachingLearning Process
Introduction about the design thinking: Chalk and Talk method
Theory and practice through presentation MVP and Prototyping through live examples and videos

Module-2
Tools for Design Thinking Real-Time design interaction capture and analysis – Enabling efficient collaboration in digital space – Empathy for design – Collaboration in distributed Design

TeachingLearning
Case studies on design thinking for real-time interaction and analysis Process Simulation exercises for collaborated enabled design thinking Live examples on the success of collaborated design thinking

Module-3
Design Thinking in IT
Design Thinking to Business Process modelling – Agile in Virtual collaboration environment – Scenario based Prototyping

TeachingLearning Process Case studies on design thinking and business acceptance of the design Simulation on the role of virtual eco-system for collaborated prototyping

Module-4
DT For strategic innovations

Growth – Story telling representation – Strategic Foresight - Change – Sense Making - Maintenance Relevance – Value redefinition - Extreme Competition – experience design - Standardization – Humanization - Creative Culture – Rapid prototyping, Strategy and Organization – Business Model design.

TeachingLearning Process Business model examples of successful designs Presentation by the students on the success of design Live project on design thinking in a group of 4 students

Module-5

Design thinking workshop

Design Thinking Work shop Empathize, Design, Ideate, Prototype and Test

Teaching Learning Process 8 hours design thinking workshop from the expect and then presentation by the students on the learning from the workshop

Course Outcomes: Upon the successful completion of the course, students will be able to: CO Nos.

Course Outcomes

Knowledge Level (Based on revised Bloom's Taxonomy)

CO1 Appreciate various design process procedure K2

CO2 Generate and develop design ideas through different technique

K2

CO3 Identify the significance of reverse Engineering to Understand

products K2

CO4 Draw technical drawing for design ideas K3

Assessment Details (both CIE and SEE)

(methods of CIE need to be defined topic wise i.e.- Tests, MCQ, Quizzes, Seminar or micro project/Course Project, Term Paper) The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The student has to obtain a minimum of 35% of maximum marks in SEE and a minimum of 40% of maximum marks in CIE. Semester End Exam (SEE) is conducted for 100 marks (3 hours' duration) and scaled down to 50 marks. Based on this grading will be awarded. The student has to score a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation:

Three Unit Tests each of 20 Marks (duration 01 hour)

1. First test at the end of 5th week of the semester
2. Second test at the end of the 10th week of the semester
3. Third test at the end of the 15th week of the semester (Preferred

pattern of the all test are similar to the SEE pattern, however;

teacher may follow the CIE test pattern of other engineering courses) Two assignments each of 10 Marks

4. First assignment at the end of 4th week of the semester
5. Second assignment at the end of 9th week of the semester

Report

writing /Group discussion/Seminar any one of three suitably

planned to attain the COs and POs for 20 Marks (duration 01

hours)At the end of the 13th week of the semester The sum of

three tests, two assignments, and quiz/seminar/group discussion

will be out of 100 marks and will be scaled down to 50 marks

CIE methods /question paper is designed to attain the different

levels of Bloom's taxonomy as per the outcome defined for the

course.

Semester End Examination: Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for subject SEE paper will be set for 50 questions of each of 01 marks. The pattern of the question paper is MCQ. The time allotted for SEE is 01 hours

Suggested Learning Resources: Text Books :

1. John.R.Karsnitz, Stephen O'Brien and John P. Hutchinson, "Engineering Design", Cengage learning (International edition) Second Edition, 2013.
2. Roger Martin, "The Design of Business: Why Design Thinking is the Next Competitive Advantage", Harvard Business Press , 2009.
3. Hasso Plattner, Christoph Meinel and Larry Leifer (eds), "Design Thinking: Understand – Improve – Apply", Springer, 2011
4. Idris Mootee, "Design Thinking for Strategic Innovation: What They Can't Teach You at Business or Design School", John Wiley & Sons 2013.
5. Yousef Haik and Tamer M.Shahin, "Engineering Design Process", Cengage Learning, Second Edition, 2011.
6. Book - Solving Problems with Design Thinking - Ten Stories of What Works (Columbia Business School Publishing) Hardcover – 20 Sep 2013 by Jeanne Liedtka (Author), Andrew King (Author), Kevin Bennett (Author).

Web links and Video Lectures (e-Resources):

1. www.tutor2u.net/business/presentations/. /productlifecycle/default.html
2. https://docs.oracle.com/cd/E11108_02/otn/pdf/. /E11087_01.pdf
3. www.bizfilings.com › Home › Marketing › Product Developmen
4. https://www.mindtools.com/brainstm.html
5. https://www.quicksprout.com/. /how-to-reverse-engineer-your-competit
6. www.vertabelo.com/blog/documentation/reverse-engineering https://support.microsoft.com/en-us/kb/273814
7. https://support.google.com/docs/answer/179740?hl=en
8. https://www.youtube.com/watch?v=2mjSDIBaUlM thevirtualinstructor.com/foreshortening.html .
9. https://dschool.stanford.edu/.../designresources/.../ModeGuideBOOTC_AMP2010L.pdf
10. https://www.interactiondesign.org/literature/article/5-stages-in-the- design-thinking-process
11. http://www.creativityatwork.com/design-thinking-strategy-for-innovation/ 49
12. https://www.nngroup.com/articles/design-thinking/
13. https://designthinkingforeducators.com/design-thinking/
14. www.designthinkingformobility.org/wpcontent/.../10/NapkinPitch_ Worksheet.pdf

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning http://dschool.stanford.edu/dgift//

CO#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												
CO4												
CO5												

*****

SCIENTIFIC FOUNDATIONS OF HEALTH

[As per Choice Based Credit System (CBCS) scheme] (Effective from the academic year 2021-22)

Course Code : 21AEC109/209	CIE Marks : 50
Teaching Hours/Week: 02	SEE Marks : 50
Total Teaching Hours: 20	Exams. Hours : 02
Semester : I/II	Credits : 01

Course objectives:

The course 21SFH29 will enable the students:

1. To know about Health and wellness (and its Beliefs)
2. To acquire Good Health & It's balance for positive mind-set
3. To Build the healthy lifestyles for good health for their better future
4. To Create of Healthy and caring relationships to meet the requirements of MNC and LPG world
5. To learn about Avoiding risks and harmful habits in their campus and outside the campus for their bright future
6. To Prevent and fight against harmful diseases for good health t hrough positive mindset

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

Teachers shall adopt suitable pedagogy for effective teaching - learning process. The pedagogy shall involve the combination of different methodologies which suit modern technological tools and software's to meet the present requirements of the Global employment market.

a.i. Direct instructional method (Low /Old Technology),
a.ii. Flipped classrooms (High/advanced Technological tools),
a.iii. Blended learning (combination of both),
a.iv. (iv) Enquiry and evaluation based learning,
a.v. (v) Personalized learning,
a.vi. (vi) Problems based learning through discussion,
a.vii. (vii) Following the method of expeditionary learning Tools and techniques,

7. Apart from conventional lecture methods, various types of innovative teaching techniques through videos, animation films may be adapted so that the delivered lesson can progress the students In theoretical applied and practical

skills in teaching of the concepts of Health and Wellness in general.

Module-1

Good Health and It's balance for positive mindset: What is Health, Why Health is very important Now? – What influences your Health?, Health and Behaviour, Health beliefs and advertisements, Advantages of good health (Short term and long term benefits), Health and Society, Health and family, Health and Personality - Profession. Health and behaviour, Disparities of health in different vulnerable groups. Health and psychology, Methods to improve good psychological health. Psychological disorders (Stress and Health - Stress management), how to maintain good health, Mindfulness for Spiritual and Intellectual health, Changing health habits for good health. Health and personality.

Teaching -Learning Process

Chalk and talk method, Power Point presentation and YouTube videos, Animation videos methods. creating real time stations in classroom discussions. Giving activities &assignments.

Module-2

Building of healthy lifestyles for better future: Developing a healthy diet for good health, Food and health, Nutritional guidelines for good health and well beingness, Obesity and overweight disorders and its management, Eating disorders - proper exercises for its maintenance (Physical activities for health), Fitness components for health, Wellness and physical function, How to avoid exercise injuries.

Teaching-Learning Process Chalk and talk method, PowerPoint presentation and YouTube videos, Animation

videos methods. creating real time stations in classroom discussions. Giving activities & assignments.

Module-3

Creation of Healthy and caring relationships : Building communication skills (Listening and speaking), Friends and friendship - education, the value of relationships and communication, Relationships for Better or worsening of life, understanding of basic instincts of life (more than a biology), Changing health behaviours through social engineering,

Teaching-Learning Process Chalk and talk method, PowerPoint presentation and Animation videos methods. creating real time stations in classroom discussions. Giving activities and assignments.

Module-4

Avoiding risks and harmful habits : Characteristics of health compromising behaviors, Recognizing and avoiding of addictions, How addiction develops and addictive behaviors, Types of addictions, influencing factors for addictions, Differences between addictive people and non addictive people and their behavior with society, Effects and health hazards from addictions Such as..., how to recovery from addictions.

Teaching-Learning Process Chalk and talk method, PowerPoint presentation and Animation videos methods. creating real time stations in classroom discussions. Giving activities and assignments.

Module-5

Preventing and fighting against diseases for good health : Process of infections and reasons for it, How to protect from different types of transmitted infections such as…., Current trends of socio economic impact of reducing your risk of disease, How to reduce risks for good health, Reducing risks and coping with chronic conditions, Management of chronic illness for Quality of life, Health and Wellness of youth : a challenge for the upcoming future Measuring of health and wealth status.

Teaching-Learning Process

Chalk and talk method, PowerPoint presentation and YouTube videos, Animation videos methods. creating real time stations in classroom discussions. Giving activities & assignments.

Course outcome (Course Skill Set) At the end of the course the student will be able :

CO 1: To understand Health and wellness (and its Beliefs)

CO 2: To acquire Good Health & It's balance for positive mindset

CO 3: To inculcate and develop the healthy lifestyle habits for good health.

CO 4: To Create of Healthy and caring relationships to meet the requirements of MNC and LPG world

CO 5: To adopt the innovative & positive methods to avoid risks from harmful habits in their campus & outside the campus.

CO 6: To positively fight against harmful diseases for good health through positive mindset.

Assessment Details (both CIE and SEE)

(methods of CIE need to be defined topic wise i.e.- Tests, MCQ, Quizzes, Seminar or micro project/Course Project, Term Paper)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%.

The student has to obtain a minimum of 35% of maximum marks in SEE and a minimum of 40% of maximum marks in CIE.

Semester End Exam (SEE) is conducted for 100 marks (3 hours' duration) and scaled down to 50 marks. Based on this grading will be awarded.

The student has to score a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation:

Three Unit Tests each of 20 Marks (duration 01 hour)

1. First test at the end of 5th week of the semester
2. Second test at the end of the 10th week of the semester
3. Third test at the end of the 15th week of the semester (All tests are similar to the SEE pattern i.e question paper pattern is MCQ)
4. Two assignments each of 10 Marks
5. First assignment at the end of 4th week of the semester
6. Second assignment at the end of 9th week of the semester Report writing /Group discussion/Seminar any one of three suitably planned to attain the COs and POs for 20 Marks (duration 01 hours)
7. At the end of the 13th week of the semester The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be scaled down to 50 marks CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for subject SEE paper will be set for 50 questions of each of 01 marks. The pattern of the question paper is MCQ. The time allotted for SEE is 01 hours

Suggested Learning Resources:

1. Health Psychology (Second edition) by Charles Abraham, Mark Conner, Fiona Jones and Daryl O'Connor – Published by Routledge 711 Third Avenue, New York, NY 10017.
2. Health Psychology - A Textbook, FOURTH EDITION by Jane Ogden McGraw Hill Education (India) Private Limited - Open University Press
3. HEALTH PSYCHOLOGY (Ninth Edition) by SHELLEY E. TAYLOR - University of California, Los Angeles, McGraw Hill Education (India) Private Limited - Open University Press
4. Scientific Foundations of Health (Health & Welness) - General Books published for university and colleges references by popular authors and published by the reputed publisher.
5. SWAYAM / NPTL/ MOOCS/ We blinks/ Internet sources/ YouTube videos and other materials / notes

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

1. Contents related activities (Activity-based discussions)
2. For active participation of students, instruct the students to prepare Flowcharts and Handouts
3. Organizing Group wise discussions and Health issues based activities
4. Quizzes and Discussions
5. Seminars and assignments

****

NATIONAL CADET CORPS(NCC)
NCC ORGANIZATION AND NATIONAL INTEGRATION

[As per Choice Based Credit System (CBCS) scheme] (Effective from the academic year 2021-22)

Course Code : 21AEC110/210	CIE Marks : 50
Teaching Hours/Week: 02	SEE Marks : 50
Total Teaching Hours: 20	Exams. Hours : 02
Semester : I/II	Credits : 01

Course Objectives:

Cadets will be able to: -

1. Know about the history of NCC, its organization, and incentives of NCC for their career prospects.
2. Acquire knowledge of duties and conduct of ncc cadets.
3. Understand about different NCC camps and their conducts.
4. Understand the concept of national integration and its importance.
5. Understand the concept of self-awareness and emotional intelligence.
6. Understand the concept of critical & creative thinking.
7. Understand the process of decision making & problem solving.
8. Understand the concept of team and its functioning.
9. Understand the concept and importance of Social service.

Expected Course Outcomes:

On the successful completion of the course, the cadets will be able to:

1. Imbibe the conduct of NCC cadets. K2
2. Respect the diversity of different Indian culture. K3
3. Practice togetherness and empathy in all walks of their life. K4
4. Do their own self analysis and will workout to overcome their weakness for better performance in all aspects of life. K4
5. Understand creative thinking & its components. K2
6. Think divergently and will try to break functional fixedness. K6
7. Make a team and will work together for achieving the common goals. K4
8. Do the social services on different occasions. K3

K1-Remember; K2-Understand; K3-Apply; K4-Analyze; K5-Evaluate; K6-Create

Course Content Part(I) Theory

Unit: 1

NCC General (N) 06 hours

Introduction of NCC, History, Aims, Objective of NCC & NCC as Organization, Incentives of NCC, Duties of NCC Cadet. NCC Camps: Types & Conduct.

Unit: 2

National Integration & Awareness (NI) 04 hours

National Integration: Importance & Necessity, Factors Affecting National Integration, Unity in Diversity & Role of NCC in Nation Building, Threats to National Security.

Unit: 3

Personality Development 03 hours Intra & Interpersonal skills - Self-Awareness & Analysis, Empathy, Critical & creative thinking, Decision making and problem solving.

Unit: 4

Social Service and Community Development 02 hours Basics of social service and its need, Types of social service activities, Objectives of rural development programs and its importance, NGO's and their contribution in social welfare, contribution of youth and NCC in Social welfare.

Course Content Part(II) Practical

Course Objectives : Cadets will be able to: -

1. Understand that drill as the foundation for discipline and to command a group for common goal.
2. Appreciate grace and dignity in the performance of foot drill.
3. Understand the importance of a weapon its detailed safety precautions necessary for prevention of accidents.
4. Develop awareness about different types of terrain and how it is used in battle craft.
5. Develop the concept of various markings on the map and how they are co-related to the ground features.
6. Understand the various social issues and their impact on social life
7. Develop the sense of self-less social service for better social & community life.

Expected Course Outcomes:

On the successful completion of the course, the cadets will be able to: 1 Perform foot drill and follow the different word of command. K3

2 Fire a weapon effectively with fair degree of marksmanship. K5

3 Undertake point to point navigation and take part in route marches by day and night. K4

4 Perform the social services on various occasions for better community & social life.

K1-Remember; K2-Understand; K3-Apply; K4-Analyze; K5-Evaluate; K6-Create

Course Content Part(II) Practical

Unit: 1

Drill 12 hours

Foot Drill- Drill ki Aam Hidayaten, Word ki Command, Savdhan, Vishram, Aram Se, Murdna, Kadvar Sizing, Teen Line Banana, Khuli Line, Nikat Line, Khade Khade Salute Karna Parade Par, Visarjan, Line Tod, Tej Chal, Tham aur Dhire Chal, Tham.

Unit: 2

Weapon Training (WT) 05 hours Introduction & Characteristics of .22 rifle, Handling of .22 rifle.

Unit: 3

Map Reading (MR) 03 hours

Definition of Map, Conventional signs, Scale and Grid System, Topographical forms and technical terms, Relief, Contours and gradients, Cardinal points and types of North, Magnetic Variation and Grid Convergence.

Unit: 4

Field Craft & Battle Craft (FC & BC) 03 hours Introduction of Field Craft & Battle craft, Judging Distance, Method of Judging Distance.

Unit: 5

Social Service and Community Development (SSCD) 07 hours

Cadets will participate in various activities throughout the semester e.g., Blood donation Camp, Swachhata Abhiyan, Constitution Day, Jan Jeevan Hariyali Abhiyan, Beti Bachao Beti Padhao etc.

Total hours :45 hours

Text Book(s)

1. National Cadet Corps : Senior Division and Senior Wing: Cadets Hand Book (Army) : Common Subjects: 2019
2. National Cadet Corps : Senior Division and Senior Wing: Cadets Hand Book (Army) : Specialised Subject: 2019

3. National Cadet Corps : Senior Division and Senior Wing: Cadets Hand Book (Air Force) : Specialised Subject: 2019
4. National Cadet Corps : Senior Division and Senior Wing: Cadets Hand Book (Navy) : Specialised Subject: 2019

Reference Books

Related Online Contents Director General NCC Website: https://indiancc.nic.in/ncc-general-elective-subject-course-design/

Course Designed by:
Policy : DG NCC, NCC Headquarters, New Delhi. Functionaries at Coimbatore NCC: Col LCS Naidu, Group Commander, NCC Gp Headquarters, Coimbatore. Lt Col JPS Chauhan, Commanding Officer, 4 (TN) Bn NCC, Coimbatore. Maj MD Kannan, Associate NCC Officer (ANO), HOD, Physics, PSG College of Technology, Coimbatore.

*****

NATIONAL CADET CORPS(NCC)
NCC PERSONALITY DEVELOPMENT, SOCIAL SERVICE AND COMMUNITY DEVELOPMENT
[As per Choice Based Credit System (CBCS) scheme]
(Effective from the academic year 2021-22)

Course Code : 21AEC111/211	CIE Marks : 50
Teaching Hours/Week: 02	SEE Marks : 50
Total Teaching Hours: 20	Exams. Hours : 02
Semester : I/II	Credits : 01

Course Objectives:
Cadets will be able to: -

1. Understand the thinking & reasoning process.
2. Understand the process to cope with Stress & emotions.
3. Understand the importance of improving communication skills.
4. Identify the leadership traits.
5. Admire the qualities of great leaders.
6. Know about different legal provisions for children & women safety and protection.
7. Understand the various rules & measures to be taken to ensure Road/Rail safety.
8. Understand & spread awareness about latest Government initiatives for welfare of citizens and contribute towards Nation building.
9. Understand concepts of cyber and mobile security.

Expected Course Outcomes:
On the successful completion of the course, the cadets will be able to:

1	Define thinking, reasoning, critical thinking and creative thinking K2
2	To think critically about different life related issues. K4
3	Think divergently and will try to break functional fixedness K6
4	Creatively in their real-life problems. K6
5	Understand the organizations related to disaster management and their functioning. K2
6	Appreciate the role of NCC cadets in disaster management. K3

Course Content Part(I) Theory
Unit: 1
Personality Development 05 hours
(i) Thinking- Meaning and Concept of thinking, Reasoning, Process of thinking.

(ii) Critical Thinking- Meaning & concept of critical thinking, Features of critical thinking, Process of critical thinking.

(iii) Creative thinking- Meaning & concept of creative thinking, Features of creative thinking, Process of creative thinking, levels of Creativity, Characteristics of creative person.

Unit: 2

Leadership Development 05 hours

(i) Leadership capsule.

(ii) Important Leadership traits, Indicators of leadership and evaluation.

(iii) Motivation- Meaning & concept, Types of motivation. Factors affecting motivation.

(iv) Ethics and Honor codes.

Unit: 3

i. Social Service and Community Development 05 hours
ii. Protection of Children & Women Safety.
iii. Road/Rail Safety.
iv. New Government Initiatives.
v. Cyber and mobile Security Awareness.

Course Content Part(II) Practical Course Objectives :
Cadets will be able to: -

1. Understand that drill as the foundation for discipline and to command a group for common goal.
2. Appreciate grace and dignity in the performance of foot drill.
3. Understand the importance of a weapon its detailed safety precautions necessary for prevention of accidents.
4. Use terrain effectively for concealment, camouflage, indicate landmarks and give field signals.

Expected Course Outcomes:

On the successful completion of the course, the cadets will be able to:

1. Perform foot drill gracefully. K3
2. Give and follow the different word of command. K3
3. Fire a weapon effectively with fair degree of marksmanship. K4
4. Use of bearing and service protractor and locate the places and objects on the ground. K4
5. Do the social service and feel connected with social problems. K5

Course Content Part (II) Practical

Unit: 1: Drill 12 hours

(i) Foot Drill Dahine, Baen, Aageaur Piche Kadam Lena.

(ii) Tej Chal se Murdna, Tej Chal se Salute Karna, Tej Kadam Taal aur Tham, Tej Kadam Taal se Kadam Badalna.

(iii) Teeno Teen se Ek File aur ek file se Teeno Teen Banana

Unit: 2 :Weapon Training (WT) 04 hours

(i) Range procedure & Theory of group.

(ii) Short Range firing.

Unit: 3 :Map Reading (MR) 05 hours

(i) Protractor Bearing and its conversion methods.

(ii) Service protractor and its uses

(iii) Prismatic compass and its uses and GPS.

(iv) Navigation by compass and GPS.

Unit: 4: Field Craft & Battle Craft (FC & BC) 04 hours (i) Indications of landmarks and Targets.

(ii) Intro, Definitions, Types of Ground, Indication of Landmarks, Methods of iden of targets, difficult targets.

Unit: 5:

Social Service and Community Development (SSCD) 05 hours Cadets will participate in various activities throughout the semester e.g., Blood donation Camp, Swachhata Abhiyan, Constitution Day, Jan Jeevan Hariyali Abhiyan, Beti Bachao

Beti Padhao etc. as per the requirement and similar announced days- National and state level.

Total hours :45 hours

Text Book(s)

National Cadet Corps : Senior Division and Senior Wing: Cadets Hand Book (Army) : Common Subjects: 2019

National Cadet Corps : Senior Division and Senior Wing: Cadets Hand Book (Army) : Specialised Subject: 2019

National Cadet Corps : Senior Division and Senior Wing: Cadets Hand Book (Air Force) : Specialised Subject: 2019

National Cadet Corps : Senior Division and Senior Wing: Cadets Hand Book (Navy) : Specialised Subject: 2019

Reference Books

Related Online Contents Director General NCC Website: https://indiancc.nic.in/ncc-general-elective-subject-course-design/

Course Designed by:

Policy : DG NCC, NCC Headquarters, New Delhi.

Functionaries at Coimbatore NCC: Col LCS Naidu, Group Commander, NCC Gp Headquarters, Coimbatore. Lt Col JPS Chauhan, Commanding Officer, 4 (TN) Bn NCC, Coimbatore. Maj MD Kannan, Associate NCC Officer (ANO), HOD, Physics, PSG College of Technology, Coimbatore.

*****