College Calendar 2021-22
Do you know in how many ways the ‘Knowledge’ serves his master? Like mother it protects, like father it teaches and guides, like wife, provides all kinds of happiness after destroying all sorrows, it brings wealth from every corner and spreads the fame in all direction. Like ‘Kalpalatha’ knowledge offers everything to human being whatever he wishes.
COLLEGE CALENDAR
2021-22
(I & II Semester)
Vision Statement

Pursuing Excellence, Empowering people, Partnering in Community Development

Mission Statement

To develop N.M.A.M. Institute of Technology, Nitte, as Centre of Excellence by imparting Quality Education to generate competent, Skilled and Humane Manpower to face emerging Scientific, Technological, Managerial and Social Challenges with Credibility, Integrity, Ethics and Social Concern.
In Memorium

Late Nitte Mahalinga Adayanthaya
Our Founder

Late Justice K. S. Hegde
1909-1990
B. E. SYLLABUS

2021 – 2022

I & II SEMESTER

With

Scheme of Teaching

& Examination
Sl.No. | Name of the Faculty                              | Designation
------|-----------------------------------------------|------------------
1.    | Dr. Niranjan N. Chiplunkar                   | Principal        
2.    | Mr. Yogeesh Hegde                           | Registrar        
3.    | Dr. Shrinivasa Rao B. R.                     | Vice Principal / Controller of Examinations / Professor 
4.    | Dr. I. Ramesh Mithanthaya                   | Vice Principal / Dean (Academics)/ Professor 
5.    | Dr. Sudesh Bekal                            | Dean (R&D)/Professor 
6.    | Dr. Rajesh Shetty K.                         | Dean (Admissions) / Professor 
7.    | Dr. Subrahmanya Bhat K.                      | Dean (Student Welfare) / Professor 
8.    | Dr. Nagesh Prabhu                           | PG Coordinator / Professor 
9.    | Dr. Srinath Shetty K.                        | Resident Engineer / Professor 

HEADS OF DEPARTMENTS

1. Prof. Shalini K. Sharma  Counseling, Welfare, Training & Placement
2. Dr. Arun Kumar Bhat  Civil Engg.
3. Dr. Jyothi Shetty  Computer Science & Engg.
5. Dr. Srinivas Pai P.  Mechanical Engg.
6. Dr. KV SSSS Sairam  Electronics & Communication Engg.
7. Dr. Suryanarayana K.  Electrical & Electronics Engg.
8. Dr. Ujwal P.  Biotechnology Engg.
10. Dr. Sharada Uday Shenoy  Artificial Intelligence & Machine Learning Engg.
12. Dr. Kumudakshi  Mathematics
13. Dr. Shobha R. Prabhu  Physics
14. Dr. Shivaprasad Shetty M.  Chemistry
15. Mrs. Rashmi D. Hegde  Humanities
16. Dr. Surendra Shetty  MCA

INCHARGE OF INSTITUTION'S RESPONSIBILITIES

1. Dr. Gururaj Upadhyaya  Workshop Supdt.
2. Dr. Narasimha Bailkeri  1<sup>st</sup> year Coordinator
3. Dr. Venkatesh Kamath  Deputy Controller of Examination
4. Dr. Janardhan Nayak  Co-ordinator, Red Cross Unit
5. Mr. Srinivas Nekkar  NSS Co-ordinator
6. Mr. Krishnaraja Joisa  Public Relations Officer
7. Dr. Jnaneswar Pai Maroor  Co-ordinator, Alumni
8. Sri. Shekar Poojari  Student Welfare Officer
9. Dr. Shivaprasad Shetty M.  NCC Officer

ENTREPRENEURSHIP DEVELOPMENT CELL

1. Dr. Ramakrishna B.  Professor / EDC- Incharge
2. Mrs. Geetha Poojarthi  Co-ordinator
DEPARTMENT OF TRAINING & PLACEMENT
1. Mr. Bharath G. Kumar  Lead Placements

DEPARTMENT OF MATHEMATICS
1. Dr. Shashirekha B. Rai  Professor
2. Dr. P. Shankaran  Professor
3. Dr. Kumudakshi  Asso. Professor/ HoD
4. Dr. Sharad M. Hegde  Asst. Professor Gd III
5. Dr. Vasanth K. R.  Asst. Professor Gd III
6. Mrs. Ambika N. Asst. Professor Gd I
7. Mrs. Vinaya Acharya  Asst. Professor Gd I
8. Mrs. Anitha D. Bayar  Asst. Professor
9. Mrs. Bhavya K.  Asst. Professor
10. Ms. Chaithra K.  Asst. Professor
11. Mrs. Bhavya D.  Asst. Professor
12. Mrs. Sharmila  Asst. Professor
13. Mrs. Anjana Pai K.  Asst. Professor
14. Mrs. Soumya  Asst. Professor
15. Mrs. Smitha G. V.  Asst. Professor

DEPARTMENT OF PHYSICS
1. Dr. K. B. Vijaya Kumar  Professor
2. Dr. Sathyajith K. T.  Asso. Professor
3. Dr. Manjunath K. B.  Asso. Professor
4. Dr. Shobha R. Prabhu  Asso. Professor / HoD
5. Dr. Nagaraja B. S.  Asst. Professor Gd III
6. Dr. Raghavendra Bairy  Asst. Professor Gd III
7. Dr. Shyam Prasad K.  Asst. Professor Gd III

DEPARTMENT OF CHEMISTRY
1. Dr. Janardhana Nayak  Professor
2. Dr. Ramesh Bhat  Asso. Professor
3. Dr. Shivaprasad Shetty M.  Asst. Professor Gd III/HoD
4. Dr. Aarti S. Bhat  Asst. Professor Gd III
5. Dr. Subrahmanya Ishwar Bhat  Asst. Professor Gd III
6. Mr. Sarvajith M. S.  Asst. Professor

DEPARTMENT OF HUMANITIES
1. Dr. Ramakrishna B.  Professor
2. Mrs. Rashmi D. Hegde  Asso. Professor/HoD
3. Dr. Vishwanatha  Asso. Professor
4. Dr. Jnaneshwar Pai Maroor  Asst. Professor Gd III
5. Dr. Joy Elvine Martis  Asst. Professor Gd III
6. Mrs. Shyla D. Mendonca  Asst. Professor Gd II
7. Ms. Sonia Lobo  Asst. Professor Gd I
8. Mr. Srinivas Nekkar  Asst. Professor
9. Mrs. Sudeeksha S. Pai  Asst. Professor
10. Mr. Namiraj  Asst. Professor
### OFFICE SECTION HEADS

1. Mr. Keshava Mugeraya  
   Sr. Supdt., Academic Section/ 
   Purchase In-Charge
2. Mrs. Suneetha R. Shetty  
   Sr. Supdt., Administrative Section
3. Mr. Suresh Achar  
   Sr. Supdt., Stores
4. Mrs. Jayashree  
   Sr. Programmer
5. Mrs. Shailaja V. Shetty  
   Supdt., Accounts Section
6. Sri. Sudhakar K.  
   Incharge Librarian

### SECURITY DEPARTMENT

1. Mr. Hirianna Suvarna S.  
   Security Supervisor

### SPORTS DEPARTMENT

1. Sri. Shyam Sundar M.  
   P.E.D
2. Sri. Ganesh Poojary  
   P.E.D
3. Ms. Sowjanya M.  
   P.E.I
4. Mr. Ravi Prakash C. Anpur  
   Basket Ball Coach

### HOSTEL WARDENS

1. Dr. Veena Devi S.V  
   Chief Warden, NET Ladies Hostels, Nitte
2. Dr. Vishwanatha  
   Chief Warden, NET Gents Hostels, Nitte

### HOSTEL SUPERINTENDENT / MANAGER

1. Mr. John D’Souza  
   Sr. Manager, Gents Main Hostel
2. Mr. Francis D’Souza  
   Hostel Manager, Gents Main Hostel
3. Mr. Rajesh Ballal  
   Supervisor, Gents PG Hostel
4. Mrs. Gayathri Kamath  
   Supdt. Ladies PG Hostel
5. Mrs. Chethana Sharma  
   Supdt.Ladies Main Hostel
6. Mrs. Hema S. Hegde  
   Supdt., Hostel Office
REGULATIONS
2021-22
(Applicable for admission batch 2021-22 onwards)

COMMON TO ALL B.E. (CREDIT SYSTEM)
DEGREE PROGRAMMES
CONTENTS

REGULATIONS

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2. DEGREE PROGRAMMES
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4. ADD/DROP/AUDIT OPTIONS
5. COURSE STRUCTURE
6. ATTENDANCE REQUIREMENT
7. WITHDRAWAL FROM THE PROGRAMME
8. EVALUATION SYSTEM
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10. COMMUNICATION OF GRADES
11. VERTICAL PROGRESSION
12. AWARD OF CLASS
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14. AWARD OF DEGREE
15. GRADUATION REQUIREMENTS AND CONVOCATION
16. AWARD OF PRIZES, MEDALS, CLASS AND RANKS
17. CONDUCT AND DISCIPLINE
18. EARNING OF ACTIVITY POINTS FOR THE AWARD OF DEGREE
19. LISTS OF MAJOR SCHOLARSHIPS
REGULATIONS COMMON TO ALL B.E. (CREDIT SYSTEM) DEGREE PROGRAMMES OF
NMAM INSTITUTE OF TECHNOLOGY, NITTE
Karkala, Udupi Dist., Karnataka

1. INTRODUCTION

1.1 The general regulations are common to all B.E. (Credit System) Degree Programmes
carried out at the NMAMIT, Nitte Campus and shall be called “NMAMIT Regulations”.

1.2 The provisions contained in this set of regulations govern the policies and procedures
on the Registration of students, imparting Instructions of course, conduct of the
examination and evaluation and certification of student's performance and all
amendments related to the said Degree programme(s).

1.3 This set of Regulations, on approval by the Academic Council and Governing Council, shall
supersede all the corresponding earlier sets of regulations of the BE Degree program (of
VTU) along with all the amendments thereto, and shall be binding on all students
undergoing the Graduate Degree Programme(s) (Credit System) conducted at the
NMAMIT, Nitte with effect from its date of approval. **This set of Regulations, may evolve
and get modified or changed through appropriate approvals from the Academic
Council / Governing Council from time to time, and shall be binding on all stake
holders (The Students, Faculty, Staff of Departments of NMAMIT, Nitte). The
decision of the Academic Council/ Governing Council shall be final and binding.**

1.4 In order to guarantee fairness and justice to the parties concerned in view of the periodic
 evolutionary refinements, any specific issues or matters of concern shall be addressed
separately, by the appropriate authorities, as and when found necessary.

1.5 The Academic Council may consider any issues or matters of Concern relating to any or all
the academic activities of NMAMIT courses for appropriate action, irrespective of whether a
reference is made here in this set of Regulations or otherwise.

1.6 The course shall be called **Bachelor of Engineering** course abbreviated as B.E.
(Subject of specialization) – Credit System.

1.7 DURATION OF THE COURSE

(a) The course shall extend over a period of total duration of 4 years.

(b) Each year shall have the following schedule with 5 ½ days a week.
Suggested Break down of Academic Year into Semesters

| 1. No. of Semesters / Year | Three; Two being Main semesters (odd, even) and one being a
|                           | supplementary semester; after 2 main semesters.
|                           | (Note: Supplementary semester is primarily to assist weak and / or
|                           | failed students through make up courses. However, Autonomous
|                           | Colleges may use this semester to arrange Add-On courses for other
|                           | students and / or for deputing them for practical training elsewhere.)
| 2. Semester Duration     | Main semester (odd, even) each 19 Weeks;
<p>|                           | Supplementary Semester 8 Weeks |</p>
<table>
<thead>
<tr>
<th>3. Academic Activities</th>
<th>Main Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Weeks):</td>
<td></td>
</tr>
<tr>
<td>Registration of Courses &amp; Course Work (16.0)</td>
<td></td>
</tr>
<tr>
<td>Examination Preparation and Examination (3.0)</td>
<td></td>
</tr>
<tr>
<td>Total (19)</td>
<td></td>
</tr>
<tr>
<td>Supplementary Semester</td>
<td></td>
</tr>
<tr>
<td>Registration of Courses &amp; Course Work (5.0)</td>
<td></td>
</tr>
<tr>
<td>Examination Preparation and Examination (3.0)</td>
<td></td>
</tr>
<tr>
<td>Total (8)</td>
<td></td>
</tr>
<tr>
<td>Declaration of results: 2 weeks from the date of last examination</td>
<td></td>
</tr>
<tr>
<td>Inter- Semester Recess:</td>
<td></td>
</tr>
<tr>
<td>After each Main Semester (2)</td>
<td></td>
</tr>
<tr>
<td>Total Vacation: 10 weeks (for those who do not register for supplementary semester) and 4 weeks (for those who register for supplementary semester)</td>
<td></td>
</tr>
</tbody>
</table>

(Note: In each semester, there will be provision for students for Registration of courses at the beginning, dropping of courses in the middle and withdrawal from courses towards the end, under the advice of faculty member. These facilities are expected to enhance the learning capabilities of students, minimizing their chances of failure in courses registered and also ensure their better monitoring by Faculty Advisors).

A candidate shall be allowed a maximum duration of eight years from the first semester of admission to become eligible for the award of Bachelor Degree.

The calendar of events in respect of the course shall be fixed by the Senate from time to time, but preferably in line with the academic calendar of the VTU.

2. DEGREE PROGRAMMES

2.1 Undergraduate B.E. Degree Programmes are offered in the following disciplines by the respective programme hosting departments listed below:

i) Biotechnology Engineering (BT)  
ii) Civil Engineering (CV)  
iii) Computer Science & Engineering (CS)  
iv) Electronics & Communications Engineering (EC)  
v) Electrical & Electronics Engineering (EE)  
vi) Information Science & Engineering (IS)  
vii) Mechanical Engineering (ME)  
viii) Artificial Intelligence and Machine Learning Engg. (AM)  
ix) Computer and communication Engineering (CC)  
x) Robotics and Artificial Intelligence Engineering (RA)  

Other teaching departments are –

i) Mathematics (MA)  
ii) Physics (PH)  
iii) Chemistry (CY)  
iv) Humanities, Social Sciences and Management (HU)  

2.2 The provisions of these Regulations shall be applicable to any new discipline* that may be introduced from time to time and appended to the above list.

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*Note: The term "discipline" refers to the specific field of study or subject matter that is taught within a higher education institution.
3. REGISTRATION

3.1 Every student after consulting his Faculty Advisor in parent department shall register approved courses (core and elective) to earn credits for meeting the requirements of degree program at the commencement of each Semester on the days fixed for such registration and notified in the academic calendar. Students who fail to register on or before the specified date will have to pay a late fee. Such courses together with their grade and credits earned will be included in the grade card issued by the college at the end of each semester, like odd, even, supplementary and it forms the basis for determining the student's performance in that semester.

3.2 Lower and Upper Limits for Course Credits Registered in a Semester

Course Credit Assignment

All courses comprise of specific Lecture/Tutorial/Practical (L-T-P) schedule. The course credits are fixed based on the following norms.

Lecture / Tutorials / Practical:

i) One hour Lecture per week is assigned one Credit.

ii) 2-hour Tutorial session per week is assigned 1.0 Credit.

iii) 2-hour Lab. session per week is assigned 1.0 credit.

For example, a theory course with L-T-P schedule of 3-2-0 hours will be assigned 4.0 credits.

A laboratory practical course with L-T-P schedule of 0-0-2 hours will be assigned 1.0 credit.

Calculation of Contact Hours / Week – A Typical Example

A student must register, as advised by Faculty Advisor, between a minimum of 15 credits and up to a Maximum of 25 credits.

3.3 Mandatory Pre-Registration for higher semester

In order to facilitate proper planning of the academic activities of the Semester, it is necessary for the students to declare their intention to register for courses of higher semesters (3rd and above) at least two weeks before the end of the current semester choosing the courses offered by each department in the next higher semester which is displayed on the Department Notice Board at least 4 weeks prior to the last working day of the semester.

Registration to a higher semester is allowed only if the student fulfills the following conditions -

i) satisfied all the academic requirements to continue with the programme of studies without termination

ii) cleared all Institute, hostel and library dues and fines, if any, of the previous semester

iii) paid all required advance payments of the Institute and the hostel for the current semester

iv) has not been debarred from registering on any specific grounds by the Institute.

4. ADD / DROP / AUDIT options

4.1 Registration of courses

Each student shall have to register for course work at the beginning of a semester within 2 to 3 days of commencement after discussing with subject teacher and under faculty advice. The permissible course load to be either average credits (=20) or to be within the limits of minimum (=15) and maximum (=25) credits.

4.2 DROP-option

During a specified period at the middle of a semester student's performance in CIE is reviewed by the faculty advisor. Following poor performance by a student he/she can be facilitated to drop identified course(s) (up to the minimum credits specified for the semester). Such course(s) will
not be mentioned in the Grade card. Such courses to be re-registered by these students and taken up for study at a later time.

4.3 Withdrawal from courses
During a specific period specified towards the end of the semester, student's performance in CIE is reviewed by the Faculty advisors. Following poor performance by a student in identified course(s) he/she is advised to withdraw from such course(s) (up to the minimum credits specified for the semester) with mention in the Grade card (Grade ‘W’). Such courses to be re-registered by these students and taken up for study at a later time.

4.4 AUDIT-option
A student can register for courses for audit only, with a view to supplement his/her knowledge and/or skills. The student's grades in such course(s) will have to be reflected in the grade card. However, CORE courses shall not be made available for audit. But these shall not be taken into account in determining the student's academic performance in the semester. ‘U’ grade is awarded to such courses on satisfying the attendance requirements and CIE requirements. The candidate need not appear for SEE in such courses.

5. COURSE STRUCTURE:
5.1 Typical Breakdown for the B.E. Degree Curriculum:

<table>
<thead>
<tr>
<th>No.</th>
<th>Course Category</th>
<th>Credit Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Basic Science Courses</td>
<td>20-25</td>
</tr>
<tr>
<td>2.</td>
<td>Engineering Science Courses</td>
<td>18-22</td>
</tr>
<tr>
<td>3.</td>
<td>Humanity, Social Science and Management</td>
<td>8-12</td>
</tr>
<tr>
<td>4.</td>
<td>Ability Enhancement Courses</td>
<td>10-14</td>
</tr>
<tr>
<td>5.</td>
<td>Professional Core Courses (PCC)</td>
<td>40-45</td>
</tr>
<tr>
<td>6.</td>
<td>Professional Elective Courses (PEC)</td>
<td>8-12</td>
</tr>
<tr>
<td>7.</td>
<td>Open Elective Courses (OE)</td>
<td>8-12</td>
</tr>
<tr>
<td>8.</td>
<td>Skill Courses (Project Work / Internship / Seminar)</td>
<td>28-36</td>
</tr>
<tr>
<td>9.</td>
<td>Mandatory courses</td>
<td>2</td>
</tr>
</tbody>
</table>

Note: Student can register between 15 to 25 credits per semester
Total Credits to be earned : 160

5.2 The Department Undergraduate Committee (DUGC) will discuss and recommend the exact credits offered for the programme for the above components, the semester wise distribution among them, as well as the syllabi of all undergraduate courses offered by the department from time to time before sending the same to the Board of Studies (BOS). The BOS will consider the proposals from the departments and make recommendations to the senate for consideration and approval.

5.3 The earned Credit Requirement for the B.E. Degree is 160.
Degree is awarded by prescribing the total number of credits to be earned, rather than by using the program duration, giving flexibility to student to plan their career.

5.4 Mandatory Learning Courses
These are courses that must be completed by the student at appropriate time or at his convenience. The ‘PP’ grade is awarded for a Pass in the course and ‘NP’ grade is awarded for a Fail in the course. In case ‘NP’ grade is awarded, the student has to re-register for the same
course wherein he has no alternative options. However, he/she can opt for other courses if he/she has been provided with multiple options.

The ‘PP’ and ‘NP’ grades do not carry grade points and hence not included in the Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA) computations. However such non-credit mandatory courses are required to be included in the students’ performance record (transcript) with Pass or Fail (PP or NP).

Courses that come under this category are the following.

Moral and Ethical Values, Communication skills, Entrepreneurship Development Programme, Environmental issues, Proficiency in a Language etc.

Such courses will not carry any credits for the award of degree, but a pass in each of such course during the programme shall be a necessary requirement for the student to qualify for degree award.

5.5 PROJECT

i) Project work at 7th semester shall be completed batch wise. The batch shall consist of a maximum of 4 students.

ii) Project viva-voce examination shall be conducted individually.

5.6 ELECTIVES

i) A candidate shall take electives in each semester from groups of electives, commencing from 6th semester.

ii) The minimum number of students to be registered for any Elective offered shall not be less than ten.

iii) A candidate shall opt for his/her choice of electives and register for the same if pre-registration is not done, at the beginning of each of 6th & 7th semesters. The candidate is permitted to opt for change of elective within 15 days from the date of commencement of the semester as per the academic calendar of the college.

6. ATTENDANCE REQUIREMENT:

6.1 Each semester is considered as a unit and the candidate has to put in a minimum attendance of 85% in each subject with a provision of condoning 10% of the attendance by Principal for reasons such as medical grounds, participation in University level sports, cultural activities, seminars, workshops and paper presentation.

6.2 The basis for the calculation of the attendance shall be the period of term prescribed by the College by its calendar of events. For the first semester students, the same is reckoned from the date of admission to the course (as per CET/COMED-K or Management allotment).

6.3 The students shall be informed about their attendance position in the first week of every month by the College so that the students shall be cautioned to make up the shortage.

6.4 A candidate having shortage of attendance (<75%) in any course(s) registered shall not be allowed to appear for SEE of such course(s). Such students will be awarded ‘N’ grade in these courses.

He/she shall have to repeat those course(s). Such students shall re-register for the same course(s) core or elective, as the case may be when the particular course is offered next either in a main (odd/even) or supplementary semester.

6.5 Attendance in CIE and SEE: Attendance at all examinations both CIE and SEE of each course registered shall be compulsory and there shall not be any provision for re-examinations. Any student against whom any disciplinary action is pending shall not be permitted to attend any SEE in that semester.
7. WITHDRAWAL FROM THE PROGRAMME

7.1 Temporary Withdrawal

a) A student who has been admitted to a degree programme of the college may be permitted once during the course to withdraw temporarily, for a period of one semester, on the grounds of prolonged illness or grave calamity in the family etc., provided –

i) The student applies to the College within 6 weeks of the commencement of the college stating fully the reasons for withdrawal together with supporting documents and endorsement from his parent/guardian.

ii) The College is satisfied about the genuineness of the case and that even by taking into account the expected period of withdrawal, the student has the possibility to complete the programme requirements (160 credits) within the time limits specified by the university.

iii) The student does not have any dues or demands at the College / University including tuition and other fees as well as library material.

iv) A student availing of temporary withdrawal shall be required to pay such fees and/or charges as may be fixed by the college until such time as his/her name appears on the Student's roll list. The fees/charges once paid shall not be refunded.

v) A student will be entitled to avail the temporary withdrawal facility only once during his/her studentship. However, any other concession for the concerned student shall have to be approved by the academic council.

7.2 Permanent Withdrawal

Any student who withdraws admission before the closing date of admission for the Academic Session is eligible for the refund of the deposits only. Fees once paid will not be refunded on any account.

Once the admission for the year is closed, the following conditions govern withdrawal of admissions.

(a) A student who wants to leave the College for good, will be permitted to do so (and take Transfer Certificate from the College, if needed), only after remitting the Tuition fees as applicable for all the remaining semesters and clearing all other dues if any.

(b) Those students who have received any scholarship, stipend or other forms of assistance from the College shall repay all such amounts.

(c) The decision of the Principal of the College regarding withdrawal of a student is final and binding.

8. EVALUATION SYSTEM

8.1 The Academic Performance Evaluation of a student shall be according to a Letter Grading System, based on the Class Performance Distribution.

8.2 The Letter grades S, A, B, C, D, E, F indicate the level of academic achievement, assessed on a decimal (0-10) scale.

8.3 The Letter grade awarded to a student in a course, for which he has registered shall be based on his performance in quizzes, tutorials, assignments etc., as applicable, in addition to two mid-semester examinations and one semester end examination. The distribution of weightage among these components may be as follows.

<table>
<thead>
<tr>
<th>Component</th>
<th>Weightage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semester End Examination (SEE)</td>
<td>50% (50 marks)</td>
</tr>
<tr>
<td>Continuous Internal Evaluation (CIE)</td>
<td>50% (50 marks)</td>
</tr>
<tr>
<td>Quizzes, Tutorials, Assignments,</td>
<td>10 marks</td>
</tr>
<tr>
<td>Seminars, mini projects, tutorials</td>
<td></td>
</tr>
<tr>
<td>etc.</td>
<td></td>
</tr>
<tr>
<td>Mid-semester Examination</td>
<td>40 marks</td>
</tr>
</tbody>
</table>
Any variation, other than the above distribution, requires the approval of the pertinent DUGC and Academic Council.

8.4 The letter grade awarded to a student in a 0-0-P (Practical) course, is based on an appropriate continuous evaluation scheme that the course instructor shall evolve, with the approval of the pertinent DUGC and the performance in SEE held on specified period in a semester.

8.5 The course Instructor shall announce in the class and/or display at the Faculty door/website the details of the Evaluation Scheme, including the distribution of the weightage for each of the components and method of conversion from the raw scores to the letter-grades within the first week of the semester in which the course is offered, so that there are no ambiguities in communicating the same to all the students concerned.

8.6 Passing standards

<table>
<thead>
<tr>
<th>Evaluation Method</th>
<th>Passing Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sessional (CIE)</td>
<td>Score: ≥40% (≥20 marks)</td>
</tr>
<tr>
<td>Terminal (SEE)</td>
<td>Score: ≥40% (≥20 marks)</td>
</tr>
</tbody>
</table>

i) Project work evaluation: The evaluation of CIE of the project work shall be based on the progress of the student in the work assigned by the project supervisor, periodically evaluated by him/her together with a Department committee constituted for this purpose. Seminar presentation, project report and final oral examination conducted by project evaluation committee at the department level shall form the SEE of the project work.

ii) In the case of other requirements, such as, seminar, industrial internship, field work, comprehensive viva voce, if any, the assessment shall be made as laid down by the Academic council.

iii) There shall be no re-examination for any course in the credit system. However, students

- who have abstained from attending CIE or SEE without valid reasons (‘N’ grade), or
- who have failed (‘F’ grade) to meet the minimum passing standards prescribed for CIE and/or SEE, or
- who have been detained for want of attendance, or
- who have withdrawn (‘W’ grade),
- who have dropped any course

shall be required to re-register for such course(s) and go through CIE and SEE again and obtain a grade equal to or better than E in each case. While such students should re-register for same course(s) if core, they can re-register for alternative course(s) from among the elective courses, as the case may be. The re-registration shall be possible when the particular course is offered again either in a main (Odd/Even) or a supplementary semester.

8.7

i) Grade point scale for absolute grading

<table>
<thead>
<tr>
<th>Level</th>
<th>Out Standing</th>
<th>Excellent</th>
<th>Very Good</th>
<th>Good</th>
<th>Average</th>
<th>Poor</th>
<th>Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade Points</td>
<td>10</td>
<td>09</td>
<td>08</td>
<td>07</td>
<td>06</td>
<td>04</td>
<td>00</td>
</tr>
<tr>
<td>Score (Marks)</td>
<td>≥ 90</td>
<td>&lt; 90 - ≥80</td>
<td>&lt; 80 - ≥70</td>
<td>&lt; 70 - ≥60</td>
<td>&lt; 60 - ≥50</td>
<td>&lt; 50 - ≥40</td>
<td>&lt; 40</td>
</tr>
</tbody>
</table>

ii) The grade points given above help in the evaluation of credit points earned by the student in a course as the credit points are equal to the number of credits assigned to the course multiplied by the grade points awarded to the student in that course. This shall be used in
arriving at the credit index of the student for that semester, as it is the sum total of all the credit points earned by the student for all the courses registered in that semester.

8.8 Earning of Credits
A student shall be considered to have completed a course successfully and earned the credits if he/she secures an acceptable letter grade in the range S-E. Letter grade ‘F’ in any course implies failure of the student in that course and no credits earned.

8.9 The Transitional Grades ‘I’, ‘W’ and ‘X’ would be awarded by the teachers in the following cases. These would be converted into one or the other of the letter grades (S-F) after the student completes the course requirements.

♦ Grade ‘I’: To a student having satisfactory attendance at classes and meeting the passing standard at CIE, but remained absent from SEE for valid & convincing reasons acceptable to the College, like:
  i) Illness or accident, which disabled him/her from attending SEE;
  ii) A calamity in the family at the time of SEE, which required the student to be away from the College;
♦ Students who remain absent for Semester End Examinations due to valid reasons and those who are absent due to health reasons are required to submit the necessary documents along with their request to the Controller of Examinations to write Make up Examinations within 2 working days of that particular examination for which he or she is absent, failing which they will not be given permission. This is admissible only for students who have more than 4S CIE marks.
♦ Grade ‘W’: To a student having satisfactory attendance at classes, but withdrawing from that course before the prescribed date in a semester under Faculty Advice
♦ Grade ‘X’: To a student having attendance ≥85% and CIE rating (90%), in a course but SEE performance observed to be poor, which could result in a F grade in the course. (No ‘F’ grade awarded in this case but student’s performance record maintained separately).

8.10 Grade Card
Each student shall be issued a Grade Card at the end of each semester. This will have a list of all the courses registered by a student in the semester, together with their credits, the letter grades with grade points awarded. Only those courses registered for credit and having grade points shall be included in the computation of the students performance like SGPA and CGPA and the courses taken for audit will not form part of this computation. The results of mandatory courses, which are of the non-credit type shall also be reflected in the Grade card as PP (for Passed) or NP (for not passed). Each UG student shall have to obtain the grade PP in each mandatory course to qualify for the Degree awarded by the university.

8.11 The Make Up Examination
The Make Up Examination facility would be available to students who may have missed to attend the SEE of one or more course(s) in a semester for valid reasons and given the ‘I’ grade; Also, students having the ‘X’ grade shall be eligible to take advantage of this facility. The makeup examination would be held as per dates notified in the Academic Calendar. However, it would be possible to hold a makeup examination at any other time in the semester with the permission of the Academic Council of the College. In all these cases, the standard of makeup examinations shall be same as the regular SEE for the course(s).

a) All the ‘I’ and ‘X’ grades awarded to the students would be converted to appropriate letter grades after the make-up examinations. Any outstanding ‘I’ and ‘X’ grades after the last scheduled make-up examinations shall be automatically converted to ‘F’ grade.

b) All the ‘W’ grades awarded to the students would be eligible for conversion to the appropriate letter grades only after the concerned students re-register for these courses in a main/ supplementary semester and fulfill the passing standards for their CIE and (CIE+SEE).
9. **EVALUATION OF PERFORMANCE**
The overall performance of a student will be indicated by two indices:

SGPA; which is the Semester Grade Point Average, and CGPA which is the Cumulative Grade Point Average.

SGPA for a semester is computed as follows.

\[
SGPA = \frac{\sum (course\ credit) \times (Grade\ point))}{\sum (course\ credits)}
\]

CGPA is computed as follows:

\[
CGPA = \frac{\sum (course\ credits) \times (Grade\ points))}{\sum (course\ credits)}
\]

10. **COMMUNICATION OF GRADES**
The SGPA and CGPA respectively, facilitate the declaration of academic performance of a student at the end of a semester and at the end of successive semesters. Both of them would be normally calculated to the second decimal position.

11. **VERTICAL PROGRESSION (PROMOTION / ELIGIBILITY TO HIGHER SEMESTERS)**
11.1 There shall be no restriction for promotion from an odd semester to the next even semester, provided the student has fulfilled the attendance requirement.

11.2 A Student shall be declared fail if he / she
   (i) Has not satisfied the CIE requirements of any Course/s.
   (ii) Has not registered for the SEE even after satisfying the attendance and CIE requirements.

11.3 (A) Vertical Progression in case of students admitted to First year:
   (a) Students having not more than four F grades in the two semesters of first year of the Programme shall be eligible to move to second year.
   (a.1) Students having not more than four F grades in the four semesters of I and II year shall be eligible to move to III year.
   (a.2) Students who have earned all the prescribed credits of I year, and having not more than four F grades in the four semesters of II and III year shall be eligible to move to IV year.

(B) Vertical Progression in case of Diploma students admitted to Second year  (lateral entry):
   (a) Students having not more than four F grades (excluding the Fail or pass status of Additional Mathematics I and II) in the two semesters of II year of the Programme shall be eligible to move to III Year.
   (a.1) Students having not more than four F grades (excluding the Fail or pass status of Additional Mathematics I and II, if any) in the four semesters of II and III year shall be eligible to move to IV year.

(b) The mandatory non-credit Courses Additional Mathematics I and II prescribed at III and IV semesters respectively, to lateral entry Diploma holders admitted to III semester of B.E/B.Tech. Programmes shall attend the classes during the respective semesters to satisfy attendance and CIE requirements and to appear for the University examinations.
(b.1) In case, any student fails to satisfy the attendance requirement of the Courses Additional Mathematics I and II, he/she shall not be eligible to appear for the Semester End Examinations of that semester and shall not be permitted to take admission to next higher semester. The candidate shall be required to repeat that semester during the subsequent year.

(b.2) Students who have satisfied the attendance requirement but not the CIE requirements of the Courses Additional Mathematics I and II shall be permitted to register afresh and appear for SEE after satisfying the CIE requirements in the same Course/s (with or without satisfying the attendance requirement) when offered during subsequent semester/s.

(c) Completion of Additional Mathematics I and II shall be mandatory for the award of degree.

(C) Vertical Progression in case of B.Sc students admitted to Second year (Lateral entry):

(a) Students having not more than four F grades (excluding the Fail or pass status of Engineering Graphics and Elements of Civil Engineering and Mechanics of First Year Engineering Programme) in the two semesters of II year of the Programme shall be eligible to move to III year.

(a.1) Students having not more than four F grades (excluding the Fail or pass status of Engineering Graphics and Elements of Civil Engineering and Mechanics of First Year Engineering Programme, if any) in the four semesters of II and III year shall be eligible to move to IV year.

(b) The prescribed mandatory non-credit Courses Engineering Graphics and Elements of Civil Engineering and Mechanics of First Year Engineering Programme to lateral entry B. Sc holders admitted to III semester of B.E/B. Tech Programmes, shall attend the classes during the respective semesters to complete CIE and attendance requirements and to appear for the University examinations.

(b.1) In case, any student fails to satisfy the attendance requirement of the above said Courses; he/she shall not be eligible to appear for the Semester End Examinations of that semester and shall not be permitted to take admission to next higher semester. The candidate shall be required to repeat that semester during the subsequent year.

(b.2) Students who have satisfied the attendance requirement but not the CIE requirements of the above said Courses, shall be permitted to register afresh and appear for SEE after satisfying the CIE requirements in the same Course/s (with or without satisfying the attendance requirement) when offered during subsequent semester/s.

(c) Completion of Engineering Graphics and Elements of Civil Engineering and Mechanics shall be mandatory for the award of degree.

The Principal of each college shall make suitable arrangements in the timetable to facilitate the B. Sc students to attend the above mentioned courses to satisfy the CIE and attendance requirements and to appear for the University examinations.

11.4 Termination from the programme
A student shall be required to withdraw (discontinue) from the programme and leave the college on the following grounds.

i) Failure to secure a CGPA = 5.0 on three consecutive occasions.

ii) Failure to earn a credit of 160 (120 for lateral entry students) in 8 years (6 years for lateral entry students) of duration from the year of admission including the duration of temporary withdrawal (leave of absence).

iii) Absence from classes for more than six weeks at a time in a semester without leave of absence being granted by competent authorities.

iv) Failure to meet the standards of discipline as prescribed by the college from time to time.

12. AWARD OF CLASS
Sometimes, it would be necessary to provide equivalence of these averages, viz., SGPA and CGPA with the percentages and/or Class awarded as in the conventional system of declaring the results of University examinations. This can be done by prescribing certain specific thresholds in these averages for Distinction, First Class and Second Class. This can be seen from the following Table.
13. **APEAL FOR REVIEW OF GRADES**
   
a. The entire process of evaluation shall be made transparent and the course instructor shall explain to a student why he/she gets whatever grade he/she is awarded, if and when required. A mechanism for review of grade is incorporated in the evaluation system. However, before appealing for such review, a student shall first approach the concerned course instructor and then the concerned DUGC, with the request to do the needful; and only in situations where satisfactory remedial measures have not been taken, the student may then appeal to the Department Academic Appeals Boards (DAAB) before the date specified in Academic Calendar, by paying the prescribed fees.
   
b. The fee for such an appeal will be decided by the Senate from time to time. If the appeal is upheld by DAAB, then the fee amount will be refunded to the student.

14. **AWARD OF DEGREE**

14.1 (1) **B.E. Degree**
   
a) Students shall be declared to have completed the Programme of B.E./B.Tech. degree and is eligible for the award of degree, provided the students have undergone the stipulated Course work of all the semesters under the Scheme of Teaching and Examinations and has earned the prescribed number of credits (160 credits for regular students registered for 4 year degree programmes & 120 for lateral entry students).
   
b) For the award of degree, a CGPA≥5.00 at the end of Programme shall be mandatory.
   
c) Completion of Additional Mathematics I and II, shall be mandatory for the award of degree to lateral entry diploma students.
   
d) Completion of Engineering Graphics and Elements of Civil Engineering and Mechanics of First Year Engineering Programme shall be mandatory for the award of degree to lateral entry B.Sc. graduates.
   
e) (i) Over and above the academic credits, every Day College regular student admitted to the 4 years Degree Programme and every student entering 4 years Degree Programme through lateral entry, shall earn 100 and 75 Activity Points respectively through AICTE Activity Point Programme for the award of degree. Students transferred from other Universities/Autonomous colleges under VTU to fifth semester are required to earn 50 Activity Points from the year of entry to VTU. The Activity Points earned shall be reflected on the student’s eight semester Grade Card.
   
(ii) Activity Points (non-credit) have no effect on SGPA/CGPA and shall not be considered for vertical progression.
   
In case students fail to earn the prescribed activity Points before the commencement of 8th semester examinations, eighth semester Grade Card shall be issued only after earning the required activity Points. Students shall be admitted for the award of degree only after the release of the Eighth semester Grade Card.

(2) **B.E. (Honors) Degree**

VTU, Belagavi has framed the guidelines for applying for the award of Bachelor of Engineering (Honors) degree.

**These Regulations are applicable for the following students:**

1. Admitted to **I semester** / I year from the academic year **2018-19** (i.e. USN XXX18XXXXX)
2. Admitted to **III semester** / II year from the academic year **2019-20** (i.e. USN XXX19XX4XX)
3. These Regulations are uniformly applicable to Affiliated, Autonomous and Constituent Colleges under VTU.
Eligibility criterion

(i) Students have to earn 18 or more additional credits through MOOCs.
(ii) Students shall register for this course from fifth semester onwards.
(iii) Students shall obtain a grade $\geq$ D in all the courses in first attempt only in all the semesters till 5th.
(iv) Students shall obtain CGPA of 8.5 and above at the end of fourth semester.
(v) For Diploma students, they shall complete Additional Mathematics I and II during 3rd and 4th semesters in first attempt only.

Requirements:

(i) Students shall maintain a grade $\geq$ D in all courses from 5th to 8th semester in ‘first attempt’ only.
(ii) Students not having CGPA greater than or equal to 8.5 at the end of the B.E. programme shall not be eligible for the award of Honors degree, even if they have satisfied the requirement of additional credits.
(iii) Students shall take up additional course work, other than the regular courses prescribed by the University from 5th to 8th semester from NPTEL and other platforms notified by the University and complete the same in any number of attempts with a final score (online assignments: 25 % + Proctored examination: 75 %) leading to the following certificates – ELITE (60 to 75 %) or ELITE + SILVER (76 to 89 %) or ELITE + GOLD (≥ 90 %) before closure of eighth semester as per the academic calendar.
(iv) Students shall be permitted to drop the registered course work (s) and select alternative course work (s) in case they cannot give proctored examination.
(v) Students have to take courses from the list of MOOCs approved by the University, which can be from NPTEL / SWAYAM / other platforms.
(vi) Students shall select courses in consultation with their Class Advisor, such that the content / syllabus of them are not similar to that of the core courses, professional electives or open electives, which the students may chose in the program.
(vii) Students shall earn the additional credits for these courses through MOOCs, by only appearing in person to the proctored examinations conducted by NPTEL / SWAYAM / other platform. The method of assessment shall be as per NPTEL online platform.
(viii) The Credit equivalence shall be as follows - 4 weeks of online course duration – 1 credit, 8 weeks of online course duration – 2 credits and 12 weeks of online course duration – 3 credits.

Registration:

(i) Any student meeting the eligibility criteria and interested to register for Honors degree qualification shall apply to the University through the Principal in the prescribed form along with the prescribed application fees within 15 working days after notification by the University.
(ii) The Registrar shall notify the registration of the student and it will be notified to the student and the student shall pay a one-time, non-refundable registration fees as prescribed by the University to confirm the registration.

Award of Honors Qualification:

(i) Students who successfully complete the MOOCs prescribed by the University and submit their E-certificates to the University through the Principal against the notification issued by the Registrar in time before the closure of eighth semester, as per the academic calendar shall be eligible for B.E. (Honors) degree. If a student does not submit the certificates in time on or before the last date, their request shall not be considered, even if they have earned the requisite number of credits.
(ii) The Honors degree shall be awarded only if the CGPA at the end of the B.E. programme is equal to or greater than 8.5.
(iii) A student who has earned the requisite number of credits and who has submitted the certificates in time and has been accepted by the University will get B.E. degree with Honors suffixed indicating recognition of higher achievement by the student concerned.
(iv) Further students fulfilling all the above requirements shall be entitled to receive their transcripts indicating both the achievement of the student concerned.
(v) The award of the Honors degree shall be recommended by the Academic Senate and approved by the Executive Council of the University.
14.2 (1) Noncompliance of CGPA ≥ 5.00 at the end of the Programme
   (a) Students, who have completed all the courses of the Programme but not having a CGPA ≥ 5.00 at the end of the Programme, shall not be eligible for the award of the degree.
   (b) In the cases of 14.2 (1) a, students shall be permitted to appear again for SEE in course/s (other than Internship, Technical seminar, Project (Mini and Main), and Laboratories) of any Semester/s without the rejection of CIE marks for any number of times, subject to the provision of maximum duration of the Programme to make up the CGPA equal to or greater than 5.00 for the award of the Degree.
   (c) In case, the students earn improved grade/s in all the reappeared course/s, the CGPA shall be calculated considering the improved grade/s. If it is ≥5.00, the students shall become eligible for the award of the degree. If CGPA <5.00, the students shall follow the procedure laid in 14.2 (1) b
   (d) In case, the students earn improved grade/s in some course/s and the same or lesser than the previously earned pass grade/s in the other reappeared course/s, the CGPA shall be calculated considering the improved grade/s and the pass grades earned before the reappearance. If it is ≥5.00, the students shall become eligible for the award of the degree. If CGPA <5.00, the students shall follow the procedure laid in 14.2 (1) b
   (e) In case, the students earn improved grade/s in some courses and fail in the other reappeared course/s, the CGPA shall be calculated by considering the improved grade/s and the previously earned pass grade/s of the reappeared course/s in which the students have failed. If it is ≥5.00, the students shall become eligible for the award of the degree. If CGPA <5.00, the students shall follow the procedure laid in 14.2 (1) b
   (f) In case, the students fail (i.e., earns F grade) in all the reappeared course/s, pass grade/s of the course/s earned by the students before reappearance shall be retained. In such cases, the students shall follow the procedure laid in 14.2 (1) b
   (g) Students shall obtain written permission from the Registrar (Evaluation) to reappear in SEE to make up the CGPA equal to or greater than 5.00.

(2) Noncompliance of Mini-project
   (a) The mini-project shall be considered as a head of passing and shall be considered for the award of degree. Those, who do not take-up/complete the mini-project shall be declared fail in that course and shall have to complete the same during subsequent University examinations after satisfying the Mini-project requirements. Also, mini-project shall be considered for eligibility to VII semester.

(3) Noncompliance of Internship
   (a) All the students of B.E/B.Tech shall have to undergo mandatory internship of 4 weeks during the vacation. A University examination shall be conducted during VIII semester. Internship shall be considered as a head of passing and shall be considered for the award of degree. Those, who do not take-up/complete the internship shall be declared fail in that Course and shall have to complete the same during subsequent University examinations after satisfy the internship requirements.

14.3 The maximum duration for a student for complying to the Degree requirements is 16 – semesters from the date of first registration for his first semester (8 years from the date of admission to first year, (12 semesters / 6 years from the date of admission for lateral entry student)).

15 GRADUATION REQUIREMENTS AND CONVOCATION

15.1 A student shall be declared to be eligible for the award of the degree if he/she has
   a) Fulfilled “Award of Degree” Requirements
   b) No Dues to the College, Departments, Hostels, Library, Central Computer Centre and any other centres
   c) No disciplinary action pending against him/her.

15.2 The award of the degree must be recommended by the Senate
15.3 Convocation
Degree will be awarded for the students who have graduated during the preceding academic year. Students are required to apply for the Convocation along with the prescribed fees, after having satisfactorily completed all the degree requirements (refer ‘Award of Degree’) within the specified date in order to arrange for the award of the degree during convocation.

16 AWARD OF PRIZES, MEDALS, CLASS & RANKS
For the award of Prizes and Medals, the conditions stipulated by the Donor may be considered as per the statutes framed by the College for such awards.

Sometimes, it would be necessary to provide equivalence of these averages, viz., SGPA and CGPA with the percentages and/or Class awarded as in the conventional system of declaring the results of University examinations. This can be done by prescribing certain specific thresholds in these averages for Distinction, First Class and Second Class as described in 12.

17 CONDUCT AND DISCIPLINE
17.1 Students shall conduct themselves within and outside the premises of the College in a manner befitting the students of an Institution of National Importance.

17.2 As per the order of Honorable Supreme Court of India, ragging in any form is considered as a criminal offence and is banned. Any form of ragging will be severely dealt with.

17.3 The following acts of omission/ or commission shall constitute gross violation of the Code of Conduct and are liable to invoke disciplinary measures:
   a) Ragging.
   b) Lack of courtesy and decorum; indecent behaviour anywhere within or outside the campus.
   c) Willful damage or stealthy removal of any property/belongings of the College/Hostel or of fellow students/citizens.
   d) Possession, consumption or distribution of alcoholic drinks or any kind of hallucinogenic drugs.
   e) Mutilation or unauthorized possession of Library books.
   f) Noisy and unseemly behaviour, disturbing studies of fellow students.
   g) Hacking in computer systems (such as entering into other Person’s area without prior permission, manipulation and/or Damage of computer hardware and software or any other Cyber crime etc.).
   h) Plagiarism of any nature.
   i) Any other act of gross indiscipline as decided by the Senate from time to time.
   j) Use of Mobile in the college Academic area.
   k) Smoking in College Campus and supari chewing.
   l) Unauthorized fund raising and promoting sales.
Commensurate with the gravity of offence the punishment may be: reprimand, expulsion from the hostel, debarring from an examination, disallowing the use of certain facilities of the College, rustication for a specified period or even outright expulsion from the College, or even handing over the case to appropriate law enforcement authorities or the judiciary, as required by the circumstances.

17.4 For an offence committed in (i) a hostel (ii) a department or in a class room and (iii) elsewhere, the Chief Warden, the Head of the Department and the Dean (Academics), respectively, shall have the authority to reprimand or impose fine.

17.5 All cases involving punishment other than reprimand shall be reported to the Principal.

17.6 Cases of adoption of unfair means and/or any malpractice in an examination shall be reported to the Controller of Examinations for taking appropriate action.
18. **EARNING OF ACTIVITY POINTS FOR THE AWARD OF DEGREE**

18.1 As per VTU guidelines, every student entering 4 year degree programme should earn 100 activity points & every students entering 4 year degree programme through Lateral Entry should earn 75 activity points for the award of the Engineering Degree.

18.2 The Activity Points earned will be reflected on the student’s eighth semester Grade Card.

18.3 The activities can be spread over the years (duration of the programme) any time during the semester weekends and holidays, as per the interest & convenience of the students from the year of entry to the programme.

18.4 Activity Points (non-credit) have no effect on SGPA/CGPA point.

18.5 In case students fail to earn the prescribed Activity Points, Eighth semester Grade Card shall be issued only after earning the required Activity Points.

**Note:** Students are required to be inside the examination hall 20 minutes before the commencement of examination. This is applicable for all examinations (Semester end/Supplementary/make up) henceforth. Students will not be allowed inside the examination hall after the commencement, under any circumstances.

**********
**LIST OF MAJOR SCHOLARSHIPS**

<table>
<thead>
<tr>
<th>Applicable to</th>
<th>Types of scholarship</th>
<th>Method</th>
<th>Website</th>
</tr>
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<tbody>
<tr>
<td><strong>For SC/ST Students</strong></td>
<td>Income : Below Rs.2,50,000/-</td>
<td>Online application</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Income : Above Rs.2,50,000/- to Rs.10,00,000/-</td>
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<tr>
<td><strong>For Others</strong></td>
<td>Category I :</td>
<td>Online application</td>
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<td>Category 2A, 3A, 3B,&amp; GM Income Below Rs.1,00,000/-</td>
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<td>Minority students Income Below Rs.2,50,000/-</td>
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<td>NSP &amp; SSP</td>
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<td><strong>Parents must have Beedi Id. Card</strong></td>
<td>Beedi Scholarship</td>
<td>Online application</td>
<td>scholarships.gov.in or nsp.gov.in</td>
</tr>
<tr>
<td><strong>1st year Students</strong></td>
<td>Central Sector Scholarship (MHRD)</td>
<td>Online application</td>
<td>scholarships.gov.in or nsp.gov.in</td>
</tr>
<tr>
<td><strong>1st year Students</strong></td>
<td>AICTE-Pragati.etc</td>
<td>Online application</td>
<td><a href="http://www.aicte-india.org">www.aicte-india.org</a></td>
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1. Scholarship details will be published in the notice board near College Academic Section. Students must see the notice board and submit the application before due dates.

2. All SC/ST and Category I students who have not paid any fee in CET must apply for Fee concession or Scholarship. Otherwise they must pay the tuition fee and college fee.

3. The students, who are applying for any of the above scholarship through online, must submit the hardcopy with supporting documents (with attestation) to the academic section in time.
# Syllabus of I & II Semester 2021

**N.M.A.M. Institute of Technology, Nitte**  
**B.E.**  
**Scheme of Teaching and Examination**  
**Outcome-Based Education (OBE) and Choice Based Credit System (CBCS)**  
**(Academic Year 2021-22)**

## I SEMESTER (PHYSICS)

<table>
<thead>
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<th>Sl. No.</th>
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<th>Course Title</th>
<th>Teaching Hours /Week</th>
<th>Examination</th>
<th>Credits</th>
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<td>9</td>
<td>BSC 21PH109</td>
<td>Engineering Physics Laboratory</td>
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**Note:**
- **BSC**: Basic Science Course, **ESC**: Engineering Science Course, **HSMC**: Humanity and Social Science & Management Courses, **AEC**: Ability Enhancement Courses
## I SEMESTER (CHEMISTRY)

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<th>Sl. No.</th>
<th>Course and Course Code</th>
<th>Course Title</th>
<th>Teaching Hours /Week</th>
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**TOTAL** | | | | | | | **450** | **450** | **900** | **20** |

**Note:**
- **BSC**: Basic Science Course
- **ESC**: Engineering Science Course
- **HSMC**: Humanity and Social Science & Management Courses
- **AEC**: Ability Enhancement Courses
### II SEMESTER (PHYSICS)

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**Note:**
- **BSC:** Basic Science Course, **ESC:** Engineering Science Course, **HSMC:** Humanity and Social Science & Management Courses, **AEC** – Ability Enhancement Courses
N.M.A.M. Institute of Technology, Nitte  
B.E. 
Scheme of Teaching and Examination 
Outcome-Based Education(OBE) and Choice Based Credit System(CBCS)  
(Academic Year 2021-22) 

II SEMESTER (CHEMISTRY)  

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Note:  
BSC: Basic Science Course, ESC: Engineering Science Course, HSMC: Humanity and Social Science & Management Courses, AEC – Ability Enhancement Courses
Note–At the end of the second-semester summer internship shall be carried out–based on inter/intra institutional activities credited in the third semester.

Summer Internship - I: All the students admitted shall have to undergo a mandatory summer internship of 03 weeks during the vacation of II semesters. Summer Internship may be on Model Making using wood/metal/plastic/pipes etc. Electrical or Electronic hobby projects may also be made. Software projects are not allowed.

University Viva-voce examination shall be conducted during III semesters and the prescribed credit shall be included in III semesters. The internship shall be considered as a head of passing and shall be considered for the award of degree. Those, who do not take up / complete the internship shall be declared fail and shall have to complete during subsequent University examination after satisfying the internship requirements.
ENGINEERING MATHEMATICS - I

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Course Learning Objectives:

This course will enable the students to master the basic tools of differential calculus, infinite series, elementary linear algebra, partial differentiation, multivariable calculus and become skilled for solving problems in science and engineering.

UNIT - I

MATRICES
Elementary transformation of a matrix, Echelon form and rank of a matrix. Consistency and solution of system of linear equations; Gauss elimination method and approximate solution by Gauss Seidel method. Eigen values and eigen vectors of square matrices, Rayleigh's power method to find the largest eigen values and eigen vectors of square matrices. (CO1)

SEQUENCES AND SERIES
Convergence and divergence of infinite series. Tests for convergence of positive term series - comparison test, D-Alembert's ratio test and Cauchy's root test. Power series - Taylor's theorem for a function of single variable with remainder(without proof), expansion of functions into Taylor's and Maclaurin's series. (CO2)

14 Hours

UNIT - II

DIFFERENTIAL CALCULUS
Polar curves, Angle between the radius vector and the tangent. Angle between two curves. Derivatives of arcs and radius of curvature - Cartesian, parametric and polar forms. Rolle’s Theorem (without proof) Mean value theorems and applications to simple problems. (CO3)

PARTIAL DIFFERENTIATION
Partial derivatives of simple functions, Total differentiation - differentiation of composite and implicit functions, Jacobians, errors and approximations. Taylor’s theorem for functions of two variables, maxima and minima for functions of two variables, Lagrange’s method of undetermined multipliers (with one subsidiary condition). (CO4)

14 Hours

UNIT - III

MULTIVARIABLE CALCULUS: INTEGRATION
Multiple integrals: Double integrals and triple integrals, change of order of integration in double integrals, change of variables (cartesian to polar). Applications: areas/volumes by double/triple integration. Beta and Gamma functions and their properties. (CO5)

11 Hours

NOTE: There will be 8 questions of 20 marks each in the question paper divided into 3 Units as per the syllabi & contact hours and the student will have to answer 5 full questions, selecting 2 full questions from Unit - I & Unit – II and 1 full question from Unit – III.
Course Outcomes:
On completion of this course, students are able to
- Solve the system of linear equations and to find of eigen values and eigen vectors to the given matrix.
- Develop the power series of the given function and understand the concept of convergence and divergence of series.
- To apply the concept of radius of curvature and mean value theorems.
- To learn the concept of partial differentiation of a function of two or more independent variables and apply them to solve engineering problems. Examine the given function for its extrema.
- Apply the notion of multiple integrals to find areas and volumes.

Mapping of POs & COs:

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TEXTBOOKS:

REFERENCE BOOKS:

WEB LINKS/VIDEO LECTURES
1. http://nptel.ac.in/courses/III07108/
2. http://nptel.ac.in/courses/III05035/
3. http://nptel.ac.in/courses/III04092/

**************

ENGINEERING PHYSICS

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Course Learning Objectives:
1. To introduce the concepts of wave mechanics to study the properties of sub-atomic particles.
2. To study the concepts of crystalline solids and X-rays.
3. To explain the concepts of semiconductors, semiconductor devices and superconductors.
4. To explain the principle, working and applications of lasers & optical fibers.
UNIT - I

Wave mechanics and Crystallography & X-rays


Crystallography: Introduction to crystallography - space lattice, unit cell, primitive cell, lattice parameters. Crystal systems and Bravais lattice. Direction and planes in a crystal, Miller indices – method of finding the Miller indices. Interplanar spacing – derivation. Co-ordination number, number of atoms per unit cell and atomic packing factor-simple cubic, body centered cubic and face centered cubic lattices (qualitative).Crystal structures of NaCl and ZnS.


15 Hours

UNIT - II

Semiconductors and Superconductors


Superconductors: Introduction to superconductors, characteristic properties. Type-I and Type-II superconductors. BCS theory (qualitative).Applications of superconductors (qualitative).Numerical examples.

15 Hours

UNIT - III

Lasers and optical fibers


9 Hours

Course Outcomes:
At the end of the course the students are able to
1. Comprehend various properties of sub-atomic particles on the basis of wave mechanics.
2. Understand the concepts of crystalline solids, various crystal structures and X-rays.
3. Understand the concepts of semiconductors and working of semiconductor devices.
4. Understand the behaviour of superconductors and its applications.
5. Understand the principle, working and applications of lasers & optical fibers.
**CO-PO Mapping**

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**TEXTBOOKS:**

2) **S. P. Basavaraju**, Engineering Physics, Subhas Stores, Bangalore, latest editions.

**REFERENCE BOOKS:**


**E-resources**

2) [http://nptel.ac.in/courses/122101002/23](http://nptel.ac.in/courses/122101002/23)
3) [http://nptel.ac.in/courses/113106039/1](http://nptel.ac.in/courses/113106039/1)
4) [http://nptel.ac.in/courses/115106061/](http://nptel.ac.in/courses/115106061/)

**Scheme:**

There will be **08** questions of **20** marks each in the question paper, divided into **3** units as per the syllabi & contact hours and the student will have to answer **2** full questions from unit-I and unit-II and **one full** question from unit-III.

*************
**Prerequisites:**
This subject requires the student to know about Basic Mechanics of forces.

**Course Learning Objectives:**
At the end of the course the student will be able to:

1. **Understand** the importance of Civil Engineering and **develop** the analytical skills to solve coplanar concurrent force system
2. **Solve** non – concurrent force system and **analyze** cylinders and strings using equilibrium conditions.
3. **Identify** different types of supports, loadings and **analyze** determinate beams
4. **Understand** static friction and **analyze** block friction and ladder friction
5. **Understand** centroid and moment of inertia of typical sections

**UNIT - I**

*Scope and importance of different fields of Civil Engineering-Surveying, Building Materials, Construction Technology, Geotechnical Engineering, Structural Engineering, Hydraulics, Water Resources and Irrigation Engineering, Transportation Engineering, Environmental Engineering

Introduction to Engineering Mechanics: Basic idealizations -; Definition of force, Characteristics of a force, Force systems and classification; Principle of transmissibility. Resolution of forces, Composition of forces - Definition of Resultant; Resultant of coplanar concurrent force system.

6 hours

Moment of a force, couple, characteristics of couple, Equivalent force - couple system; Varignon's theorem, Resultant of coplanar - non-concurrent force system.

Equilibrium of forces - *Definition of Equilibrant; Conditions of static equilibrium for different force systems. Particle equilibrium in 2-D & 3-D, Concept of free body diagram, Equilibrium of coplanar concurrent force system.

9 hours

**UNIT - II**

Support Reactions –Types of beams, types of loads and supports, statically determinate beams, numerical problems on support reactions for statically determinate beams with point load (normal and inclined), uniformly distributed load, uniformly varying loads and moments

7 hours

Friction – Theory of friction, types of friction, Coulumb’s laws of friction, limiting friction, angle of friction, block friction and ladder friction

7 hours
UNIT – III

Center of Gravity- Centroid of plane figures, locating the centroid of rectangular, triangular and sector of a circular areas using method of integration, Centroid of simple composite area (consisting of three components).

5 hours

*Moment of inertia of an area, polar moment of inertia, Radius of gyration, Perpendicular axis theorem and Parallel axis theorem; Moment of Inertia of rectangular, triangular, semicircular, quarter of a circular area and sector of a circular areas from the method of integration; Moment of inertia of composite areas (consisting of three components).

5 hours

10 Hours

Note: There will be 8 questions of 20 marks each in the question paper divided into 3 Units as per the syllabi & contact hours and the student will have to answer 5 full questions, selecting 2 full questions from Unit - I & Unit – II and 1 full question from Unit – III.

Course Outcomes:
At the end of the course the student will be able to
1. List and explain the scope of Civil Engineering and solve resultant of coplanar concurrent force system.
2. Determine the resultant of coplanar non-concurrent force system by applying Varignon’s Theorem and solve for unknown forces in the cylinders and strings using equilibrium conditions.
3. Explain the types of beams, supports, loadings and find the support reactions for determinate beams.
4. Find the static frictional force in blocks and ladder
5. Determine the centroid and moment of inertia of composite area about the reference axes.

Mapping of POs & COs:

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Note: 1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High)

TEXTBOOKS:

REFERENCE BOOKS:
### BASIC ELECTRICAL ENGINEERING

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**Course Learning Objectives:**

1. To familiarize the student with the DC circuit analyses.
2. To analyze single and three-phase AC circuits.
3. To understand the working principle of electrical machines.
4. To introduce the concept of electrical wiring protective devices and safety measures.

**UNIT - I**

**Circuit Fundamentals:** Basic nodal and mesh analysis excited by independent DC voltage sources, Power and Energy. Generation of sinusoidal voltage, frequency of generated voltage, definition and numerical values of average value, root mean square value, form factor and peak factor of sinusoidally varying voltage and current, phasor representation of alternating quantities.


7 Hours

**UNIT - II**


6 Hours

**DC Machines:** Constructional details, Principle of operation of generator and motor, Expression for back emf, Types of dc motors, Characteristic of dc motors (shunt and series motors only) and Applications.

4 Hours

**Three Phase Synchronous Machines:** Basic parts, Principle of operation, Synchronous speed, Frequency of generated voltage, Emf equation. Concept of winding factor (excluding the derivation of distribution and pitch factors). Principle of operation of Synchronous Motor. Applications.

4 Hours

**UNIT - III**


9 Hours
Course Outcomes:
At the end of the course student will be able to
1. Analyze the DC Circuits using mesh & node methods and describe AC fundamentals.
2. Analyze voltage & current phasor relationships in single phase & three phase AC circuits and compute complex power.
3. Summarize the fundamentals of electromagnetism and apply principle of single-phase transformer to compute transformer efficiency.
4. Describe the construction, operating principle of DC & synchronous machines and analyze their performance characteristics.
5. Describe the working principle, starting process, performance characteristics & applications of Induction motor and domestic wiring & protective schemes.

<table>
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<th>Course Outcomes Mapping with Program Outcomes</th>
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<tr>
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<td>21EE104.1</td>
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</table>

1: Low 2: Medium 3: High

Question Paper Pattern:
- There will be 8 questions of 20 marks each in the question paper categorized into 3 Units as per the syllabi & contact hours. The student will have to answer 5 full questions, selecting 2 full questions each from Unit - I & Unit – II and 1 full question from Unit – III.

TEXTBOOKS:
3. Lecture Notes on Basic Electrical Engineering, Department of E&E, NMAMIT, Nitte

REFERENCE BOOKS:
3. Basic Electrical Engineering by A. Mittle and V. N. Mittle, Tata McGraw Hill, 2005
4. Basic Electrical Engineering, Dr. Debashisha Jena, Wiley India Private Limited, 2012

E Books / MOOC / NPTEL
1. http://nptel.ac.in/downloads/108105053/
3. Basic Electrical Technology Lectures by Dr. L Umanand Department of Power Electronics Group, CEDT IISC Bangalore available at http://www.nptelvideos.in/2012/11/basic-electrical-technology.html

***************

TECHNICAL ENGLISH - I

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<tr>
<td>Total Hours</td>
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<td>Credits</td>
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</table>

Prerequisites:
Students must have essential knowledge of English language communication.
**Course Learning Objectives:**

**By the end of the course, students should be able to:**
1. Identify the nuances of Phonetics, Intonation and enhance pronunciation skills
2. Understand Technical Communication along with the barriers and application of effective Interpersonal Communication Skills
3. Enhance basic English grammar and essentials of language skills
4. Improve sentence structure with the help of cohesive devices
5. Develop/apply paragraph writing

---

**Course Content: Technical English I**

<table>
<thead>
<tr>
<th>Unit</th>
<th>Topic</th>
<th>No of Hours</th>
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<tbody>
<tr>
<td>I</td>
<td><strong>Phonetics &amp; Pronunciation</strong></td>
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<td></td>
<td>Introduction to Phonetics; Word Stress, Rhythm and Intonation; Weak Forms and Strong Forms</td>
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<td><strong>Communication Skills</strong></td>
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<td>Introduction to Communication, Greeting and Introducing, Making Requests, asking for and Giving Permission, Offering Help</td>
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<td>II</td>
<td><strong>Language Skills</strong></td>
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<td>Basic English Grammar and Parts of Speech, Ability to identify, analyse, interpret and describe the critical ideas, values, and themes through poems and prose</td>
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<td><strong>Grammar Skills</strong></td>
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<td>Article, Tense, Prepositions, Parts of Speech and their application (from the prose and poem)</td>
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<td>III</td>
<td><strong>Writing Skills</strong></td>
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<td></td>
<td>Paragraph writing, Refutations, Linkers</td>
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**Course Outcomes:**

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**Course Outcomes (CO):**

**By the end of the course, students will be able to:**

CO 1 - Identify the nuances of phonetics, intonation and pronunciation to appreciate and incorporate Received Pronunciation
CO 2 – Interpret and assess nuances of oral communication skills and the non-verbal communication for professional usage
CO 3 - Identify, interpret and describe the critical ideas, values, and themes to appreciate literary pieces for its language and social interpretations
CO 4 - Implement English vocabulary at command and language proficiency in personal and professional life
CO5 –Develop effective writing skills for incorporating them in different forms of writing

---

**TEXTBOOK:**

1. Subhashini, Customised Text Book
REFERENCE BOOKS:
1. English Pronunciation Dictionary, Daniel Jones
2. A Remedial English Grammar for Foreign Students, Woods
3. Communication Skills, Sanjay Kumar, Oxford University Press.
5. Exercises in Spoken English Part II - CIEFL, Hyderabad, Oxford University Press.
7. On Writing Well, William Zinsser
8. Practical English Usage, Swan, Oxford University Press.

***************

ELEMENTS OF MECHANICAL ENGINEERING

<table>
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<th>Course Code</th>
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<th>CIE Marks</th>
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<tr>
<td>Total Hours</td>
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<td>Credits</td>
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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.

This Course will enable students to,

1. Understand the principles of energy sources, laws of thermodynamics and formation of steam.
2. Know the working principles of boilers, turbines, pumps and compressors.
3. Understand basic principles of I.C. Engines, Refrigeration and Airconditioning.
4. Understand the basic principles of power transmission, engineering materials and metal joining processes.
5. Understand the different machining operations, automation and robotics.

UNIT – I

Sources of energy: Introduction to Fossil fuels, Classification of different sources of energy. Environmental issues like global warming-Climate change, ozone depletion, Introduction to disaster management (including COVID-19), importance of sustainability.

2 Hours


5 Hours

Boilers: Definition and function of boilers, Classification of boilers, Details of Cochran boiler, Babcock & Wilcox boiler with mountings and accessories

3 Hours

Turbines: Working principles of Impulse and reaction steam turbines, Water turbines, Gas turbine cycles

3 Hours

Pumps and compressors: Introduction, Working principles of centrifugal pump and single stage reciprocating compressor.

2 Hours

UNIT – II


Vehicle classification based on prime mover (I.C Engine, Hybrid, Electric).
Off-highway equipment classification (Only brief introduction of Agriculture, construction, mining,
earthmoving, defence, railway equipment).
Stages of On-highway and off highway emission standards (in brief).

### Refrigeration and Air conditioning:
Properties of refrigerants, Refrigeration – Definitions – Principle and working of vapor compression refrigeration system and air conditioners. Brief discussion on inverter type AC and Vapor absorption compression systems.

5 Hours

### Power Transmission:

5 Hours

### Engineering materials:
Ferrous and non-ferrous metals, composite materials and plastics.

1 Hours

### Welding and Soldering:
Basic principles of Arc welding, gas welding and soldering.

2 Hours

### UNIT – III

#### Machine Tools:
Introduction, types of machine tools and its applications.
Lathe operations - Turning, facing, Taper Turning using swiveling compound rest and thread cutting
Drilling operations - drilling and tapping
Milling operations - Plane milling, End milling
Grinding operations - Surface grinding, cylindrical grinding

4 Hours

#### Mechatronics and Automation:
Open and closed loop mechatronic systems. Fixed, Programmable & Flexible automation, CNC machines: Basic elements with simple block diagrams, applications.
Robotics: Introduction, Robot anatomy, classification based on robot configuration Applications of robots

4 Hours

### Course Outcomes (CO):

<table>
<thead>
<tr>
<th>CO 1</th>
<th>Explain the sources of energy, basics of thermodynamics and steam formation.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO 2</td>
<td>Discuss the working principles of boilers, turbines, pumps and compressors.</td>
</tr>
<tr>
<td>CO 3</td>
<td>Explain the basic principles of I.C. Engines, Refrigeration and Airconditioning.</td>
</tr>
<tr>
<td>CO 4</td>
<td>Discuss the basic principles of power transmission, engineering materials and metal joining processes.</td>
</tr>
<tr>
<td>CO 5</td>
<td>Discuss the importance of different machining operations, mechatronics, automation and robotics systems. Explain the features of modern machining processes</td>
</tr>
</tbody>
</table>

### TEXTBOOKS:


### REFERENCE BOOKS:


### MOOC/NPTEL Resources:

1. [https://nidm.gov.in/iec.asp](https://nidm.gov.in/iec.asp) (Study material of National Institute of Disaster management)
Course Articulation Matrix:

<table>
<thead>
<tr>
<th>Course Outcomes (CO)</th>
<th>Program Outcomes (PO) and Program Specific Outcomes (PSO)</th>
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<tbody>
<tr>
<td></td>
<td>PO1</td>
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<tr>
<td>CO 1</td>
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<tr>
<td>CO 2</td>
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<td>CO 3</td>
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<td>CO 4</td>
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</tr>
<tr>
<td>CO 5</td>
<td>3</td>
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</tbody>
</table>

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

**Scheme of SEE Question Paper**

There will be 8 questions of 20 marks each in the question paper divided into 3 Units as per the syllabi & contact hours and the student will have to answer 5 full questions, selecting 2 full questions from Unit - I & Unit – II and 1 full question from Unit – III.

***************

**ENGINEERING SKILL DEVELOPMENT PRACTICE**

<table>
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<tr>
<th>Course Code</th>
<th>21ME107</th>
<th>CIE Marks</th>
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<tr>
<td>Total Hours</td>
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<td>Credits</td>
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</table>

**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.

**This Course will enable students to,**

1. Understand the different machining operations, automation using pneumatics and robotics, different modern welding processes, Electro discharge machining processes. Calculate velocity ratio of belt drives. Assembling and disassembly of door lock and machine vice.

2. Prepare fitting models by using workshop hand tools.

3. Prepare sheet metal models using the required tools and soldering process.

**UNIT - I**

(Active Learning/Demonstration)

1. Assembling of Machine vice and Deadbolt door lock on a wooden block, Measuring speed ratio in the case of belt and gear drives of lathe/ drilling machines, Demonstration of basic operations of Machine tools, Foundry and forging operations.

   4 Hours

2. IC engines, Automobile/parts, Mechatronics/ Automation and Hybrid and Electrical Vehicles.

   2 Hours

3. Introduction to Robotics

   2 Hours

4. Introduction to Welding processes

   2 Hours

5. Introduction to Additive manufacturing, 3D printing, Electro Discharge Machining (EDM) wire cut and drilling.

   2 Hours

(Total Demonstration/ Active learning sessions - 12 Hours)
UNIT - II
(Hands-on)

1. **Fitting Shop:**
   Study and use of engineering steel rule, height gauge, caliper, micrometer, files, chisels, hacksaw, hammers, drill bit, taps etc.
   Models: Preparation of fitting models by making use of filing, sawing, chipping, drilling and tapping.
   
   **10 Hours**

2. **Sheet Metal and Soldering:**
   Study the use of sheet metal work and soldering tools. Study the development of surfaces of simple solids like prism, cylinder and cone.
   Models: Preparation of sheet metal models of prism (square and rectangle), cylinder and frustum of cone.
   
   **4 Hours**
   (Total Hands-on - 14 hours)

**Course Outcomes (CO):**
At the end of the course the student will be able to,

<table>
<thead>
<tr>
<th>CO 1</th>
<th>Prepare fitting models by using required tools and fitting operations according to the given dimensions.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO 2</td>
<td>Draw the development and prepare sheet metal models of prisms, cylinder and frustum of a cone using the required tools and soldering process.</td>
</tr>
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</table>

**TEXTBOOKS:**

**REFERENCE BOOKS:**

**Course Articulation Matrix:**

<table>
<thead>
<tr>
<th>Course Outcomes (CO)</th>
<th>Program Outcomes (PO) and Program Specific Outcomes (PSO)</th>
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<td>CO 1</td>
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<tr>
<td>CO 2</td>
<td>3</td>
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1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

**Evaluation Scheme/ Course Assessment Plan**

**CIE Scheme**

<table>
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<th>Assessment</th>
<th>Weightage in marks</th>
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<tr>
<td>Viva Voce</td>
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<td>TOTAL</td>
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**SEE Scheme**

<table>
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<th>Assessment</th>
<th>Weightage in marks</th>
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<tbody>
<tr>
<td>Fitting Model</td>
<td>30 marks</td>
</tr>
<tr>
<td>Sheet metal model</td>
<td>10 marks</td>
</tr>
<tr>
<td>Viva Voce</td>
<td>10 marks</td>
</tr>
<tr>
<td>TOTAL</td>
<td>50 marks</td>
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***************
**BASIC ELECTRICAL ENGINEERING LABORATORY**

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<tr>
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<td>Credits</td>
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</table>

**List of experiments**
1. Verification of KVL and KCL for DC circuits.
2. Measurement of current, power and power factor of incandescent lamp, fluorescent lamp, CFL and LED lamp.
4. Load test on a single-phase Transformer.
5. Voltage and Current relationships of three phase star/delta circuits.
7. Speed load characteristic of a 3-phase Induction Motor.
8. Two-way and Three-way Control of lamp and formation of truth table.

**Demonstration Experiments (for CIE only):**
1. Demonstration of fuse, MCB by creating a fault.
2. Demonstration of cut out sections of electrical machines (DC machines, Induction machines and Synchronous machines).

**Course Outcomes:**
At the end of the course student will be able to
1. Prove experimentally the applications of KVL and KCL.
2. Analyse the power consumed by different lights and Build two way and Three-way control of lamp.
3. Analyse voltage current relationships in RLC circuit to calculate circuit impedance.
4. Observe the performance of transformer and induction machine subjected to loading.
5. Verify line & phase values of voltage & current in a star / delta connected 3 phase circuit and measure power using two wattmeters.

**Course Outcomes Mapping with Program Outcomes**

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</table>

1: Low 2: Medium 3: High

**REFERENCE BOOK:**
1. Basic Electrical Engineering Laboratory Manual, Department of E&E, NMAMIT, Nitte

***************
ENGINEERING PHYSICS LABORATORY

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</table>

Course Learning Objectives:

1. To provide hands-on laboratory experience and training to plan and perform experiments.
2. To relate theory and experimental results through analysis.
3. Making them familiar with various measuring instruments and measurement techniques.

List of experiments:

1. Photo electric effect – Determination of the work function of the emitter of a photo cell.
2. Zener diode characteristics – study of current-voltage characteristics
4. Velocity of ultrasonic waves using ultrasonic interferometer.
5. Hall effect – Determination of the carrier concentration in a semiconductor.
7. Charging and discharging of a capacitor – Determination of capacitance value, half time and time constant.
8. Transistor characteristics – Common emitter mode.
10. Semiconductor laser - Determination of wavelength by diffraction.
11. LED characteristics.

Course Outcomes:
At the end of the course the students are able to

- Perform the experiments to obtain reasonably correct data.
- Understand theoretical concepts of the experiments.
- Familiarize with proper handling and use of measuring instruments.

CO-PO Mapping

<table>
<thead>
<tr>
<th>CO</th>
<th>PO1</th>
<th>PO2</th>
<th>PO3</th>
<th>PO4</th>
<th>PO5</th>
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REFERENCE BOOKS:

2) B. Basavaraju and P. Sadashiva: A Laboratory Manual in Engineering Physics, Omkar Publications.

Justification:
Most of the experiments included in the syllabus are having theoretical back up in Engineering Physics.

Scheme:
Any ten experiments are to be performed. Student will have to perform two experiments in semester end examination.

*******************
Syllabus of I & II Semester 2021

ENGINEERING CHEMISTRY

<table>
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<td>50</td>
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<td>03</td>
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</table>

Teaching Hours/Week (L:T:P) 3:0:0

Total Hours 39

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

1. a) Know the basics of electrochemistry and its usage in the working of fuel cells and modern-day batteries.
   b) Gain knowledge of the harmful effects of corrosion on metal and techniques used in preventing it, including metal finishing.

2. a) Get acquainted with the different types of industrially important polymers along with their characteristic properties.
   b) Know the requirements of boiler feed water.
   c) Understand the different routes of nonmaterial synthesis.

3. a) Get the knowledge on the different chemical fuels and related parameters.
   b) Know the basics of liquid crystals.

UNIT – I

ELECTROCHEMICAL CELLS & BATTERY TECHNOLOGY

4 Hours

Introduction to battery, battery characteristics, Classification of batteries – primary, secondary, and reserve batteries. Construction, working, and applications Nickel-Metal hydride, Lithium-ion battery, and Flow batteries- Construction, working and applications of Vanadium flow battery.

Fuel cells- Introduction, construction, working, and uses of Methanol-Oxygen fuel cells.

4 Hours

CORROSION SCIENCE & METAL FINISHING

4 Hours

Introduction to metal finishing, Polarization, decomposition potential, and over-voltage. Mechanism of electroplating, effect of plating variables on the nature of electro deposit, Electroplating of Chromium, Electroless plating - advantages, Electroless plating of copper on PCB.

3 Hours

UNIT - II

POLYMERS

7 Hours

WATER CHEMISTRY

6 Hours

NANOMATERIALS

2 Hours

CHEMICAL FUELS

6 Hours

LIQUID CRYSTALS

6 Hours

Course Outcomes:
At the end of the course, the student will be able to
1. a. Understand the basic components of electrochemical cells and thereby relate their principles to modern batteries and fuel cells.
   b. Identify the different types of corrosion, techniques generally used for its prevention, and understand the metal surface modification techniques like electroplating and electroless plating.
2. a. Analyze the different types of polymers, their synthetic routes, and applications.
   b. Understand the prime problems faced in boiler feed water, subsequent remedial measures undertaken and analyze the quality of water.
   c. Identify the synthetic approaches undertaken for designing nanomaterials.
3. a. Identify the methodologies used to analyze as well as improvise on chemical fuels.
   b. Understand the applications of liquid crystals in display systems.

TEXTBOOKS:

REFERENCE BOOKS:
Links and Video Lectures:
2. https://www.youtube.com/watch?v=Fnl0V7B7nKo
3. https://www.youtube.com/watch?v=6_mBPyruNQ
4. https://www.ttu.ee/public/m/Mehaanikateaduskond/Instituudid/Materjalitehnika_
   instituut/MTX9100/Lecture11_Synthesis.pdf.

***********

C PROGRAMMING FOR PROBLEM SOLVING

<table>
<thead>
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<th>21CS111</th>
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<tr>
<td>Total Hours</td>
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<td>Credits</td>
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</table>

Course Learning Objectives:
This Course will enable students to:

1. **Make** students learn basic principles of Problem solving, implementing through C programming language and to design & develop programming skills
2. **Outline** the structure of C, keywords, basic data types, using operators and writing expressions in C.
3. **Apply** the concepts of decision making and looping in problem solving and learn to initialize and declare arrays, strings and demonstrate its usage using simple programs.
4. **Apply** the concepts of arrays, strings, and user-defined functions. And demonstrate its usage using simple programs.

**Demonstrate** the use of Structures, Pointers and file handling mechanism that are essential for understanding the concepts in database management systems and code reusability in problem solving along with parameter passing and returning with the help of user defined functions.

UNIT – I

**Introduction to Computer System**
Introduction to Computer System and problem solving, Program Development steps, Introduction to Programming Languages.

**Introduction to C Programming Language**
Evolution & Characteristics of C Language, Structure of a C Program, C Compilation Model. Characters set, C tokens, Keywords and identifiers, Constants, Variables, Data Types, and Declaration of Variables.

**Operators and Expressions**
Arithmetic operators, Relational operators, Logical operators, Assignment operators, Increment, Decrement operators, conditional operator, Bitwise operators, Special Operators.

Arithmetic expressions, Evaluation of expressions, Precedence of Arithmetic operators, Type conversions in expressions, Operator precedence and associativity.

**Managing Input and Output Operations**
Reading a character, Writing a Character, Formatted Input and Formatted Output. 14 Hours
UNIT – II

Decision making and Branching
Decision making with if statement, Simple if Statement, the if…else statement, Nesting of if…else statements, The else…if ladder, The switch statement, The ternary operator, The goto statement, break and continue statements.

Decision making and Looping
The while statement, the do…while statement, the for statement, Jumps in Loops.

Arrays
Arrays (1-D, 2-D) Initialization and Declaration. Examples for one dimensional and two dimensional arrays.

Strings
Declaring Initializing, Printing and reading strings, string manipulation functions, String input and output functions.

User-defined Functions
Need for the User-defined Functions, Element of User-defined Functions, Definition of Functions, Argument Passing – call by value, call by reference. Return Values and their Types, Function Calls, Function Declaration, Category of Functions.

UNIT – III

Structures
Defining a Structure, Declaration and Accessing the Structured Variable. Copying and Comparing structured Variable, Simple Programs on Structures.

Pointers
Introduction, Understanding Pointers, Accessing the address of Variables, Declaration pointer variable, Simple programs using Pointers.

File handling
Opening/Closing of files, Reading/Writing from/to Sequential files.

Course Outcomes:
At the end of the course the student will be able to:

1. **Describe** the basics of computer, and the process of problem-solving aspects using algorithmic solution for a given problem.
2. **Apply** the knowledge of C tokens, data types and input/output to **develop** a C program to evaluate simple expressions and logical operations.
3. **Develop** the C program using control statements such as branching and looping constructs for a given problem.
4. **Apply** the knowledge of code re-usability, parameter passing and returning values to develop a maintainable C program using these concepts including arrays and strings.

**Identify and describe** the use of structures, pointers and file handing mechanisms in a C program.

<table>
<thead>
<tr>
<th>Course Outcomes (COs)</th>
<th>Program Outcomes (POs) Addressed</th>
<th>Performance Indicators (PI)</th>
<th>Bloom's Taxonomy Level (BTL)</th>
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<td>L3</td>
</tr>
<tr>
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<td>1,2,3</td>
<td>1.4.1, 2.1.2, 3.4.2</td>
<td>L3</td>
</tr>
<tr>
<td>CO5</td>
<td>1,2</td>
<td>1.4.1, 2.1.2</td>
<td>L2</td>
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</table>

Table-1: Mapping of COs to PIs, POs and BTL
Table-2: Mapping Levels of COs to POs / PSOs

<table>
<thead>
<tr>
<th>COs</th>
<th>Program Outcomes (POs)</th>
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<tr>
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<td>CO3</td>
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<td>3</td>
</tr>
<tr>
<td>CO4</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>CO5</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

3: Substantial (High)  2: Moderate (Medium)  1: Poor (Low)

TEXTBOOKS:

REFERENCE BOOKS:

E-Books / Online Resources:

MOOCs:
1. http://nptel.ac.in/courses/106105085/4
2. https://www.lynda.com/C-training-tutorials/1249-0.html

NOTE: There will be 8 questions of 20 marks each in the question paper divided into 3 Units as per the syllabi & contact hours and the student will have to answer 5 full questions, selecting 2 full questions from Unit - I & Unit – II and 1 full question from Unit – III.

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BASIC ELECTRONICS

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</thead>
<tbody>
<tr>
<td>2:2:0</td>
<td>03</td>
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</tbody>
</table>

Course Learning Objectives:

This course will enable the students to:
1. Understand the working of Semiconductor Diodes, Zener Diodes and its applications.
2. Understand the working of Transistors and Oscillators.
3. Understand the Construction, characteristics and working of FETs and SCR.
4. Understand the working of OPAMPs and their applications.
5. Understand basics of number systems and Digital Electronic Fundamentals.

UNIT – I

SEMICONDUCTOR DIODES AND APPLICATIONS:
p-n junction diode, Equivalent circuit of a diode, DC load line analysis, Zener diode, Zener diode as a voltage regulator, Rectification - Half wave rectifier, Full wave rectifier, Bridge rectifier, capacitor and choke filter circuit (only qualitative approach) Photo diode, LED, Photo coupler, 78XX based Fixed IC voltage regulator.
BJT AND APPLICATIONS:
BJT construction, Common Base and Common Emitter characteristics (overview), BJT as an amplifier, DC load line analysis for CE amplifier, RC coupled amplifier (frequency response excluded), BJT as a switch, Transistor switch circuit to switch ON/OFF an LED.

UNIT – II

FET AND OTHER COMPONENTS:
Field Effect Transistor (FET)– n-channel JFET – Construction, Operation and drain characteristics, n- channel Enhancement type Metal oxide Semiconductor (E-MOSFET), Complementary Metal oxide Semiconductor (CMOS).
Silicon Controlled Rectifier (SCR) – Two-transistor model, Switching action, Characteristics.

OPERATIONAL AMPLIFIERS AND APPLICATIONS:

Applications – Inverting / Non-inverting amplifier, Inverting / Non-inverting summer, Voltage follower, Integrator, Differentiator, Comparator.
Oscillator using IC 555 (Astable operation only)

UNIT – III

DIGITAL ELECTRONICS FUNDAMENTALS:
Difference between analog and digital signals, Number system – Binary, Octal and Hexadecimal. Conversion – between Decimal, Binary, Octal and Hexadecimal number systems, Binary addition.
Boolean algebra, De Morgan’s theorem, Simplification of Boolean expressions, Basic and Universal gates, Realization of Boolean expressions using basic and universal gates.
Half adder, Full adder, Multiplexer(2:1, 4:1), Decoder(1:2, 2:4), D-flip-flop and D- latch using NAND gates only.

Course Outcomes:
At the end of the course, the student will be able to:
1. Describe the characteristics of p-n junction/Zener diode Explain the operation of half/full wave rectifier without and with capacitor/choke filter, 78XX based Fixed IC voltage regulator, photodiode/ LED/ photocoupler Design Zener diode based voltage regulator.
2. Describe the construction, input/output characteristics of BJT in CB/CE configurations, operation of BJT CE-RC coupled amplifier, BJT switch, the principle of feedback amplifiers, Barkhausen’s criterion for sustained oscillations, operation of RC-phase shift/ Hartley/ Colpitts oscillator. Explain the impact of negative feedback on gain.
3. Describe the drain characteristics of n-channel FET/ n-channel E-MOSFET/SCR, Explain CMOS inverter.
5. Explain different number systems and their conversions, Solve Boolean expressions using De’ Morgan’s theorem; Design simple combinational logic circuits/Half adder/Full adder/ Multiplexer/ Decoder/ D-Latch/D-Flip flop using basic and universal gates.
CO-PO Mapping

<table>
<thead>
<tr>
<th>CO</th>
<th>PO1</th>
<th>PO2</th>
<th>PO3</th>
<th>PO4</th>
<th>PO5</th>
<th>PO6</th>
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<th>PO9</th>
<th>PO10</th>
<th>PO11</th>
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</table>

**TEXTBOOKS:**

**REFERENCE BOOKS:**

**MOOCs Link:** https://www.coursera.org/learn/electronics#syllabus

**NPTEL Link:**
1. http://nptel.ac.in/courses/117103063/
2. http://nptel.ac.in/courses/122104013/12

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**ENGINEERING CHEMISTRY LABORATORY**

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<th>Course Code</th>
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<td></td>
<td>50</td>
<td>50</td>
<td>36</td>
<td>01</td>
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</table>

**Course Learning Objectives:**
1. To provide students with practical knowledge of quantitative analysis of materials by classical methods.
2. Familiarize with the practical knowledge of chemistry enabling their skill development by instrumental methods of analysis.

**PART – A**

**VOLUMETRIC ANALYSIS**
1. Determination of Total Hardness of a sample of water using disodium salt of EDTA.
2. Determination of percentage of Copper in brass using standard sodium thiosulphate solution.
5. Determination of Chemical Oxygen Demand (COD) of the given industrial waste Water sample.
6. Determination of nitrogen ammonia in a given sample of fertilizer using a standard hydrochloric acid solution.

**PART – B**

**INSTRUMENTAL ANALYSIS**
1. Potentiometric estimation of FAS using standard $K_2Cr_2O_7$ solution.
2. Colorimetric determination of iron.
5. Determination of the viscosity coefficient of a given liquid using Ostwald’s viscometer.
6. Flame photometric estimation of sodium in the given sample of water.

Course Outcomes:
At the end of the course, the student will be able to
1. Understand the different types of volumetric titrations for the estimation of composition in materials for accurate results.
2. Handling different types of instruments for analysis of materials using small quantities involved for quick and accurate results.

REFERENCE BOOKS:

Scheme of Examination
1) One experiment from Part-A and other from Part-B shall be set.
2) In a given batch, one common experiment shall be set from Part-A; and anyone experiment from Part-B.

*********

BIOLOGY FOR ENGINEERS

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<th>Credits</th>
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<tbody>
<tr>
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</table>

Prerequisites: Nil
Corequisites: Nil

Course Learning Objectives:
To understand and integrate unique biological principles in engineering to improve present technologies. Apply biologically inspired principles and designs to develop solutions for engineering problems.

UNIT – I

MEMBRANE BIOLOGY AND ENGINEERING PRINCIPLES

7 Hours

UNIT – II

ADOPTION OF ANATOMICAL PRINCIPLES FOR ENGINEERING DESIGN
Sliding filament theory of muscle contraction is analogous to sliding plates in machinery. Information theory and biology. Analogy between bird’s flight and airplane design. Analogy between dragon fly flight and helicopter design. Analogy between whale body contour and submarine body design Generation of electrical impulse for heart muscle contraction by natural pacemaker in the heart, artificial pacemaker. Mechanism of

**Course Outcomes:**
At the end of the course the student will be able to
1. Draw inspirations from biological principles to solve engineering problems.
2. Appraise concept of energy and energy conservation through biological system and apply it to engineering systems.
3. Apply biomechanics biological designs to develop engineering technologies.

**Mapping of POs & COs:**

<table>
<thead>
<tr>
<th>PO</th>
<th>CO</th>
<th>1</th>
<th>2</th>
<th>3</th>
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**REFERENCE BOOKS:**

**SEE Question Paper Pattern:**
Multiple choice questions: 100 questions, conducted online via Moodle LMS.

**COMPUSER AIDED ENGINEERING GRAPHICS**

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<tr>
<th>Course Code</th>
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<th>CIE Marks</th>
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<td>Total Hours</td>
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<td>Credits</td>
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</tbody>
</table>

**Course Learning Objectives:**
This Course will enable students to,
1. To impart and inculcate understanding of the theory of projection and concepts like dimensioning, conventions and projection of points and lines in different quadrants of projection system.
2. To know and understand the projection of different plane surfaces.
3. To impart the knowledge on understanding and drawing of different solid objects in different positions.
4. To develop the lateral surfaces of solid objects and its use in sheet metal development

**UNIT – I**

**Orthographic Projection**
Orthographic Projection: Planes of Projection, First angle projection, reference line. Conventions employed for drawing. Projection of points located in first, second, third and fourth quadrants, Projection of Lines (First
### UNIT – II

**Projection of Plane surfaces**

12 Hours

Projection of plane surface: Triangle, Square, Rectangle, Pentagon, Hexagon and Circle in different positions.

### UNIT – III

**Projection of Solids**

16 Hours

Projection of right regular solids: Prisms, Pyramids, Cones and Cylinders in different positions.

### UNIT - IV

**Development of Lateral surfaces of solids**

12 Hours

Development of lateral surfaces of: Right regular Prisms, Pyramids, Cylinders and cones and their frustums.

**Isometric projection and Isometric view**

10 Hours

Isometric scale, Difference between Isometric projection and isometric view: To draw Isometric views of simple solids and machine components using their orthographic projections.

### Course Outcomes (CO):

<table>
<thead>
<tr>
<th>Course Outcomes (CO):</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CO 1</strong></td>
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<td><strong>CO 2</strong></td>
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<tr>
<td><strong>CO 3</strong></td>
</tr>
<tr>
<td><strong>CO 4</strong></td>
</tr>
</tbody>
</table>

### TEXTBOOKS:


### REFERENCE BOOKS:

3. A Primer on computer aided Engineering Drawing, Published by VTU, Belgaum, 8th edition, 2011.
7. Publications of Bureau of Indian Standards
   b) IS 9609 (Parts 0 & 1) – 2001: Technical products documentation – Lettering.
Course Articulation Matrix

<table>
<thead>
<tr>
<th>Course Outcomes (CO)</th>
<th>Program Outcomes (PO)</th>
<th>PSO</th>
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</table>

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

SCHEME OF EXAMINATION

1. Question paper consists of 4 units with two questions in each unit.
2. Students are expected to answer Four full questions choosing at least ONE question from each unit.

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COMPUTER PROGRAMMING LABORATORY

<table>
<thead>
<tr>
<th>Course Code</th>
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<th>CIE Marks</th>
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Course Learning Objectives:

This Course will enable students to:
1. Make students learn basic principles of Problem solving, implementing through C programming language and to design & develop programming skills
2. Outline the structure of C, keywords, basic data types, using operators and writing expressions in C.
3. Apply the concepts of decision making and looping in problem solving and learn to initialize and declare arrays, strings and demonstrate its usage using simple programs.
4. Apply the concepts of arrays, strings, and user-defined functions. And demonstrate its usage using simple programs.
5. Demonstrate the use of Structures, Pointers and file handling mechanism and code reusability in problem solving along with parameter passing and returning with the help of user defined functions.

PART A
1. Write a C program to find the roots of a quadratic equation ax^2+bx+c=0.
2. Write a C program to find the sum of all the digits and occurrence of a digit in the number.
3. Write a C program to find the GCD and LCM of given two numbers using Euclid’s method.
4. Write a C program to print the prime numbers in a given range.
5. Write a C program to find if a given string is a palindrome or not.
6. Write a C program to input N real numbers in 1-D array. Compute mean, variance and Standard Deviation.
   \[\text{Mean}= \text{sum}/N, \text{Variance}= \Sigma (\text{Xi}-\text{mean})^2 /N, \text{STD Deviation}= \sqrt{\text{variance}}.\]
7. Write a C program to read N integers into an array A and find the sum of elements using pointers.
8. Write a C program to copy contents of one file to another file.
PART B

9 Write a C program to perform a binary search for a given key integer in a single dimensional array of numbers in ascending order and report success or failure in the form of a suitable message.

10 Write a C program to input N integer numbers into a single dimension array, sort them in to ascending order using selection sort technique, and then to print both the given array and the sorted array with suitable headings.

11 Write a C program to transpose a matrix of order M x N and find the trace of the resultant matrix.

12 Write a C program using functions to read two matrices A (M x N) and B (P x Q) and to compute the product of A and B if the matrices are compatible for multiplication.

13 Write a C program using functions readmat( ), rowsum ( ), colsum ( ), totsum ( ) and printmat( ) to read the values into a two dimensional array A, find the sum of all the elements of a row, sum of all the elements of a column, find the total sum of all the elements of the two dimensional array A and print the results.

14 Write a C program to perform a linear search for a given key integer in a single dimensional array of numbers and report success or failure in the form of a suitable message using functions.

15 Write a C program to enter the information like name, register number, marks in 6 subjects of N students into an array of structures, and find the average & display grade based on average for each student.

<table>
<thead>
<tr>
<th>Average</th>
<th>Grade</th>
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<tbody>
<tr>
<td>80-100</td>
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<tr>
<td>60-79</td>
<td>First Class</td>
</tr>
<tr>
<td>40-59</td>
<td>Second Class</td>
</tr>
<tr>
<td>&lt;40</td>
<td>Fail</td>
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</tbody>
</table>

16 Write a C program, to implement a bubble sort technique using function to sort given N integers in ascending/ descending order as per user’s preference.

Course Outcomes:
At the end of the course the student will be able to:
1. Develop and implement programs using the concept of decision-making statements and arrays.
2. Implement programs using arrays, code re-usability, parameter passing and returning values.
3. Design and implement programs that can perform operations on matrices using arrays.
4. Implement simple algorithms like sorting and searching using programming concepts.
5. Develop and experiment programs using concepts of pointers, files and structures.

Table:Mapping Levels of COs to POs / PSOs

<table>
<thead>
<tr>
<th>COs</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
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</table>

3: Substantial (High)  2: Moderate (Medium)  1: Poor (Low)

NOTE: Students shall implement the programs using C programming language on Windows / Linux Platform. For evaluation in SEE, student must write one program in Part-A and one in Part-B which carries 20 marks each and 10 marks for viva-voce.
ENGINEERING MATHEMATICS - II

<table>
<thead>
<tr>
<th>Course Code</th>
<th>21MA201</th>
<th>CIE Marks</th>
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<tr>
<td>Teaching Hours/Week (L:T:P)</td>
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</tr>
<tr>
<td>Total Hours</td>
<td>39</td>
<td>Credits</td>
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</table>

**Course Learning Objectives:**
This course will enable the students to master the basic tools of Laplace transforms, differential equations, partial differential equations and become skilled for solving problems in science and engineering.

**UNIT - I**

**FIRST ORDER ORDINARY DIFFERENTIAL EQUATIONS**
Exact, Linear and Bernoulli's equations. Orthogonal trajectories of cartesian and polar curves. Applications to simple engineering problems. Non linear differential equations (first order and higher degree) equations solvable for p, equations solvable for y and equations solvable for x. General and singular solutions of Clairaut’s equations. (CO1)

**ORDINARY DIFFERENTIAL EQUATIONS OF HIGHER ORDER**
Second and higher order linear differential equation with constant coefficients, solution by inverse differential operator, method of variation of parameters, linear differential equation with variable coefficients- Cauchy's linear differential equation. Applications to engineering problems. (CO2)

15 Hours

**UNIT - II**

**LAPLACE TRANSFORMS**
Definitions, transforms of elementary functions, transforms of derivatives and integrals- properties. Periodic functions, Unit step functions and Unit impulse functions. (CO3)

**INVERSE LAPLACE TRANSFORMS**
Inverse Transforms and properties, convolution theorem. Initial & Final value theorems. Applications to engineering problems. (CO4)

15 Hours

**UNIT - III**

**FIRST AND HIGHER ORDER PARTIAL DIFFERENTIAL EQUATIONS**

9 Hours

**NOTE:** There will be 8 questions of 20 marks each in the question paper divided into 3 units as per the syllabi & contact hours and the student will have to answer 5 full questions, selecting two full question from unit I and Unit II each and one full question from unit III

**Course Outcomes:**
On completion of this course, students are able to
1. Solve first order ordinary differential equations.
2. Solve linear ordinary differential equations of higher order.
3. Understand the concept of Laplace Transform and apply it to solve engineering problems
4. Make use of Laplace transform method to solve linear ordinary differential equations with constant coefficients
5. Understand the derivation of one dimensional heat and wave equations and solve partial differential equations.
Syllabus of I & II Semester 2021

Mapping of POs & COs:

<table>
<thead>
<tr>
<th>POs</th>
<th>COs</th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
<th>f</th>
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</tbody>
</table>

TEXTBOOKS:
   1) (Reprint), 2016.

REFERENCE BOOKS:

WEB LINKS/VIDEO LECTURES
1. http://nptel.ac.in/courses/IIII04085/
2. http://nptel.ac.in/courses/IIII06100/
3. http://nptel.ac.in/courses/IIII01003/

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TECHNICAL ENGLISH - II

<table>
<thead>
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<th>CIE Marks</th>
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<tr>
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<td>SEE Marks</td>
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</tr>
<tr>
<td>Total Hours</td>
<td>39</td>
<td>Credits</td>
<td>02</td>
</tr>
</tbody>
</table>

Prerequisites:
Students must have essential knowledge of English language communication and Phonetics.

Course Learning Objectives:
By the end of the course, students should be able to:
1. Identify the role of IPA in various accents and usages
2. Understand Telephonic Communication along with the barriers and application of effective Communication Skills
3. Enhance basic English grammar and essentials of language skills
4. Identify and use subject-verb agreement and question tags
5. Improve formal writing proficiency

Course Outcomes (CO):
By the end of the course, students will be able to:
CO 1 - Incorporate the knowledge of different pronunciations in workplace
CO 2 – Interpret and assess nuances of telephone communication skills for professional usage
CO 3 - Identify, interpret and describe the critical ideas, values, and themes to appreciate literary pieces for its language and social interpretations
CO 4 - Implement English Grammar at command and language proficiency in personal and professional life
CO5 – Develop effective and analytical communicative writing skills for incorporating them in different forms of writing
Course Content

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<thead>
<tr>
<th>Unit</th>
<th>Topic</th>
<th>No of Hours</th>
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<tr>
<td>I</td>
<td><strong>Phonetics &amp; Pronunciation</strong></td>
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<tr>
<td></td>
<td>Introduction to Phonetics, Role of IPA in past tense and plural forms of words, Awareness of Different Accents</td>
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<td><strong>Communication Skills</strong></td>
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<td>Understanding Telephone Communication, Handling Calls, asking for and Giving Information, Telephone Etiquette, Short Formal Speech</td>
<td>17</td>
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<tr>
<td>II</td>
<td><strong>Language Skills</strong></td>
<td>15</td>
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<td>Basic English Grammar and Parts of Speech, Ability to identify, analyse, interpret and describe the critical ideas, values, and themes through poems and prose</td>
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<td><strong>Grammar Skills</strong></td>
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<td>Question tags, Forms of verbs, Subject verb agreement</td>
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<tr>
<td>III</td>
<td><strong>Writing Skills</strong></td>
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<td>Resume and Cover letter, Essays</td>
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Course Outcomes:

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<th>Program Outcomes →</th>
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</table>

TEXTBOOK:
1. Subhashini, Customised Text Book

REFERENCE BOOKS:
1. English Pronunciation Dictionary, Daniel Jones
2. A Remedial English Grammar for Foreign Students, Woods
3. Communication Skills, Sanjay Kumar, Oxford University Press.
5. Exercises in Spoken English Part II - CIEFL, Hyderabad, Oxford University Press.
7. On Writing Well, William Zinsser
8. Practical English Usage, Swan, Oxford University Press.

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