ACADEMIC REGULATIONS

COURSE STRUCTURE AND DETAILED SYLLABUS

FOR

BIO MEDICAL ENGINEERING

For B.TECH. FOUR YEAR DEGREE COURSE

(Applicable for the batches admitted from 2012-2013)

REGULATION : R12

J.B.INSTITUTE OF ENGINEERING & TECHNOLOGY

(Autonomous)

Yenkapally, Moinabad Mandal, P.O.Himayath Nagar, R.R.Dist, Hyderabad-500 075

Fax&Phone No.910-8413-235753, Tel:08413-235755,201301

Website:www.jbiet.edu.in ; e-mail:principal@jbiet.edu.in
1. **Award of B.Tech. Degree**
   A student will be declared eligible for the award of the B. Tech. Degree if he fulfils the following academic regulations:
   
i. **Pursued a course of study for not less than four academic years and not more than eight academic years.**
   
ii. **Register for 200 credits and secure 200 credits**

2. Students, who fail to fulfill all the academic requirements for the award of the degree within eight academic years from the year of their admission, shall forfeit their seat in B.Tech course.

3. **Courses of study**
   The following courses of study are offered at present for specialization for the B. Tech. Course:

<table>
<thead>
<tr>
<th>Branch Code</th>
<th>Branch</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Civil Engineering</td>
</tr>
<tr>
<td>02</td>
<td>Electrical and Electronics Engineering</td>
</tr>
<tr>
<td>03</td>
<td>Mechanical Engineering</td>
</tr>
<tr>
<td>04</td>
<td>Electronics and Communication Engineering</td>
</tr>
<tr>
<td>05</td>
<td>Computer Science and Engineering</td>
</tr>
<tr>
<td>11</td>
<td>Bio-Medical Engineering</td>
</tr>
<tr>
<td>12</td>
<td>Information Technology</td>
</tr>
<tr>
<td>25</td>
<td>Mining Engineering</td>
</tr>
</tbody>
</table>

and any other course as approved by the authorities of the JBIET from time to time.

4. **Credits**

<table>
<thead>
<tr>
<th></th>
<th>I Year Periods / Week</th>
<th>Credit</th>
<th>Semester Periods / Week</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory</td>
<td>03</td>
<td>06</td>
<td>03</td>
<td>03</td>
</tr>
<tr>
<td></td>
<td>02</td>
<td>04</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Practical</td>
<td>03</td>
<td>04</td>
<td>03</td>
<td>02</td>
</tr>
<tr>
<td>Drawing</td>
<td>02T/03D</td>
<td>04</td>
<td>03</td>
<td>02</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>06</td>
<td>04</td>
</tr>
<tr>
<td>Mini Project</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>02</td>
</tr>
<tr>
<td>Comprehensive Viva Voce</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>02</td>
</tr>
<tr>
<td>Seminar</td>
<td>--</td>
<td>--</td>
<td>6</td>
<td>02</td>
</tr>
<tr>
<td>Project</td>
<td>--</td>
<td>--</td>
<td>15</td>
<td>10</td>
</tr>
</tbody>
</table>
5. Distribution and Weightage of Marks
   
i. The performance of a student in each semester / I year shall be evaluated subject-wise with a maximum of 100 marks for theory and 75 marks for practical subject. In addition, Industry oriented mini-project, seminar and project work shall be evaluated for 50, 50 and 200 marks respectively.
   
ii. For theory subjects the distribution shall be 25 marks for Internal Evaluation and 75 marks for the End-Examination.
   
iii. For the subject having design and / or drawing, (such as Engineering Graphics, Engineering Drawing, Machine Drawing) and estimation, the distribution shall be 25 marks for internal evaluation (15 marks for day-to-day work and 10 marks for subjective paper) and 75 marks for end examination. There shall be two internal tests in a Semester.

For theory subjects, the distribution shall be 25 marks for internal evaluation (Midterm exams (20marks) + Assignment (5marks)) and 75 marks for end examination. There shall be altogether four assignments (Each assignment consisting of 6 questions from every two units of syllabus) set by the teacher from the whole syllabus of the subject.

The pattern of question paper shall consist of two parts namely Part-A and Part-B out of which the candidate has to answer Part-A compulsorily and from Part-B, the candidate has to answer three questions out of five questions given. The Part-A i.e. question no.1 consists of sub questions, which are based on fundamentals and concept testing nature. These questions may of the following type:

a. Short answer questions for which answer is two to three sentences
b. Multiple choice questions
c. Fill in the blanks
d. True/False type

Any sub question may carry a maximum of 1 or 2 marks. Altogether candidate has to answer 4 questions out of 6 questions but question no.1 of Part-A is compulsory. The time allocated for the mid term examination is 2 hours. There shall be 2 Mid Term Examinations( 1st Mid shall be from 1-4 Units and 2nd Mid shall be from 5-8 Units)

The Internal Evaluation is for 25 marks (20 for Mid term Examination and 5 Marks for Assignment), the average of these two shall be considered as the final marks for Internal Evaluation secured by the candidate.

However, for **first year**, there shall be 3 mid term examinations (Each for 20 Marks) and 3 Assignments (Each for 5 Marks), [1st mid shall be from 1-2 units, 2nd mid from 3-5 units and 3rd mid shall be from 6-8 units]. There shall be altogether six assignments (Each assignment consisting of 6 questions from every unit of syllabus) set by the teacher from the whole syllabus of the subject.

The Internal Evaluation is for 25 marks (20 for Mid term Examination and 5 Marks for Assignment), the average of these three shall be considered as the final marks for Internal Evaluation secured by the candidate.
The question paper shall contain 6 questions, 1 in Part-A and 5 in Part-B. The candidate shall have to answer Part-A compulsorily and shall have to answer any three questions from remaining five questions of Part-B. The Part-A i.e. question no.1 consists of sub questions, which are based on fundamentals and concept testing nature. These questions may of the following type:

a. Short answer questions for which answer is two to three sentences
b. Multiple choice questions
c. Fill in the blanks
d. True/False type

Any sub question may carry a maximum of 1 or 2 marks. Altogether candidate has to answer 4 questions out of 6 questions.

iv. For practical subjects there shall be a continuous evaluation during the semester for 25 sessional marks and 50 end examination marks. Out of the 25 marks for internal, day-to-day work in the laboratory shall be evaluated for 15 marks and internal examination for practical shall be evaluated for 10 marks conducted by the concerned laboratory teacher. The end examination shall be conducted with external examiner and laboratory teacher. The external examiner shall be appointed by the Chief Controller of Examinations.

v. For the subject having design and / or drawing, (such as Engineering Graphics, Engineering Drawing, Machine Drawing) and estimation, the distribution shall be 25 marks for internal evaluation (15 marks for day-to-day work and 10 marks for subjective paper) and 75 marks for end examination. There shall be two internal tests in a Semester and average of the two shall be considered for the award of marks for internal tests. However in the I year class, there shall be three tests and the average of the three mid term examinations will be taken into consideration.

vi. There shall be an industry-oriented mini-Project, in collaboration with an industry of their specialization, to be taken up during the vacation after III year II Semester examination. However, the mini project and its report shall be evaluated with the project work in IV year II Semester. The industry oriented mini project shall be submitted in report form and should be presented before the committee, which shall be evaluated for 50 marks. The committee consists of an external examiner, head of the department, the supervisor of mini project and a senior faculty member of the department. There shall be no internal marks for industry oriented mini project.

vii. There shall be a seminar presentation in IV year II Semester. For the seminar, the student shall collect the information on a specialized topic and prepare a technical report, showing his understanding over the topic, and submit to the department, which shall be evaluated by the Departmental committee consisting of Head of the department, seminar supervisor and a senior faculty member. The seminar report shall be evaluated for 50 marks. There shall be no external examination for seminar.

viii. There shall be a Comprehensive Viva-Voce in IV year II semester. The Comprehensive Viva-Voce will be conducted by a Committee consisting of (i) Head of the Department (ii) two Senior Faculty members of the Department. The Comprehensive Viva-Voce is aimed to assess the students’ understanding in various subjects he / she studied during the B.Tech course of study. The Comprehensive Viva-Voce is evaluated for 100 marks by the Committee. There are no internal marks for the Comprehensive viva-voce.

ix. Out of a total of 200 marks for the project work, 50 marks shall be for Internal Evaluation and 150 marks for the End Semester Examination. The End Semester Examination (viva-voce)
shall be conducted by the same committee appointed for industry oriented mini project. In addition the project supervisor shall also be included in the committee. The topics for industry oriented mini project, seminar and project work shall be different from each other. The evaluation of project work shall be conducted at the end of the IV year. The Internal Evaluation shall be on the basis of two seminars given by each student on the topic of his project.

6. Attendance Requirements:
   i. A student shall be eligible to appear for College End examinations if he acquires a minimum of 75% of attendance in aggregate of all the subjects.
   ii. Shortage of Attendance below 65% in aggregate shall in NO case be condoned.
   iii. Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in each semester or I year may be granted by the College Academic Committee.
   iv. A student will not be promoted to the next semester unless he satisfies the attendance requirement of the present semester / I year, as applicable. They may seek re-admission for that semester / I year when offered next.
   v. Students whose shortage of attendance is not condoned in any semester / I year are not eligible to take their end examination of that class and their registration shall stand cancelled.
   vi. A stipulated fee shall be payable towards condonation of shortage of attendance.

7. Minimum Academic Requirements:
The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in item no.6
   i. A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory or practical design or drawing subject or project if he secures not less than 35% of marks in the end examination and a minimum of 40% of marks in the sum total of the internal evaluation and end examination taken together.
   ii. A student shall be promoted from II to III year only if he fulfils the academic requirement of 37 credits from one regular and one supplementary examinations of I year, and one regular examination of II year I semester irrespective of whether the candidate takes the examination or not.
   iii. A student shall be promoted from third year to fourth year only if he fulfils the academic requirements of total 62 credits from the following examinations, whether the candidate takes the examinations or not.
      a. Two regular and two supplementary examinations of I year.
      b. Two regular and one supplementary examinations of II year I semester.
      c. One regular and one supplementary examinations of II year II semester.
      d. One regular examination of III year I semester.
   iv. A student shall register and put up minimum attendance in all 200 credits and earn the 200 credits. Marks obtained in all 200 credits shall be considered for the calculation of percentage of marks.
   v. Students who fail to earn 200 credits as indicated in the course structure within eight academic years from the year of their admission shall forfeit their seat in B.Tech course and their admission shall stand cancelled.

8. Course pattern:
i. The entire course of study is of four academic years. The first year shall be on yearly pattern and the second, third and fourth years on semester pattern.

ii. A student eligible to appear for the end examination in a subject, but absent at it or has failed in the end examination may appear for that subject at the supplementary examination.

iii. When a student is detained due to lack of credits / shortage of attendance he may be readmitted when the semester / year is offered after fulfilment of academic regulations, whereas the academic regulations hold good with the regulations he was first admitted.

9. **Award of Class:**

After a student has satisfied the requirements prescribed for the completion of the program and is eligible for the award of B. Tech. Degree he shall be placed in one of the following four classes:

<table>
<thead>
<tr>
<th>Class Awarded</th>
<th>% of marks to be secured</th>
<th>From the aggregate marks secured for the best 200 Credits.</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Class with Distinction</td>
<td>70% and above</td>
<td></td>
</tr>
<tr>
<td>First Class</td>
<td>Below 70% but not less than 60%</td>
<td></td>
</tr>
<tr>
<td>Second Class</td>
<td>Below 60% but not less than 50%</td>
<td></td>
</tr>
<tr>
<td>Pass Class</td>
<td>Below 50% but not less than 40%</td>
<td></td>
</tr>
</tbody>
</table>

(The marks in internal evaluation and end examination shall be shown separately in the marks memorandum)

10. **Minimum Instruction Days:**

The minimum instruction days for each semester / I year shall be 90/180 clear instruction days.

11. There shall be no branch transfers after the completion of admission process.

12. **General:**

i. Where the words “he”, “him”, “his”, occur in the regulations, they include “she”, “her”, “hers”.

ii. The academic regulation should be read as a whole for the purpose of any interpretation.

iii. In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the JBIET is final.

iv. The JBIET may change or amend the academic regulations or syllabi at any time and the changes or amendments made shall be applicable to all the students with effect from the dates notified by the JBIET.

_*_*_*_
**Academic Regulations for B. Tech. (Lateral Entry Scheme)**
(Effective for the students getting admitted into II year from the Academic Year 2011-2012 and onwards)

1. The Students have to acquire 150 credits from II to IV year of B.Tech. Program (Regular) for the award of the degree.
   Register for 150 credits and secure 150 credits.

2. Students, who fail to fulfil the requirement for the award of the degree in 6 consecutive academic years from the year of admission, shall forfeit their seat.

3. The same attendance regulations are to be adopted as that of B. Tech. (Regular).

4. **Promotion Rule:**
   A student shall be promoted from third year to fourth year only if he fulfils the academic requirements of 37 credits from the examinations.
   a. Two regular and one supplementary examinations of II year I semester.
   b. One regular and one supplementary examinations of II year II semester.
   c. One regular examination of III year I semester.

5. **Award of Class:**
   After a student has satisfied the requirements prescribed for the completion of the program and is eligible for the award of B. Tech. Degree he shall be placed in one of the following four classes:
   
<table>
<thead>
<tr>
<th>Class</th>
<th>Marks</th>
<th>From the aggregate marks secured for 150 Credits. (i.e. II year to IV year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Class with Distinction</td>
<td>70% and above</td>
<td></td>
</tr>
<tr>
<td>First Class</td>
<td>Below 70% but not less than 60%</td>
<td></td>
</tr>
<tr>
<td>Second Class</td>
<td>Below 60% but not less than 50%</td>
<td></td>
</tr>
<tr>
<td>Pass Class</td>
<td>Below 50% but not less than 40%</td>
<td></td>
</tr>
</tbody>
</table>
   
   (The marks in internal evaluation and end examination shall be shown separately in the marks memorandum)

6. All other regulations as applicable for B. Tech. Four-year degree course (Regular) will hold good for B. Tech. (Lateral Entry Scheme)
MALPRACTICES RULES

DISCIPLINARY ACTION FOR / IMPROPER CONDUCT IN EXAMINATIONS

<table>
<thead>
<tr>
<th>Nature of Malpractices/Improper conduct</th>
<th>Punishment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>If the candidate:</strong></td>
<td></td>
</tr>
<tr>
<td>1. (a) Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the subject of the examination)</td>
<td>Expulsion from the examination hall and cancellation of the performance in that subject only.</td>
</tr>
<tr>
<td>(b) Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the exam hall in respect of any matter.</td>
<td>Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. In case of an outsider, he will be handed over to the police and a case is registered against him.</td>
</tr>
<tr>
<td>2. Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing.</td>
<td>Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that Semester/year. The Hall Ticket of the candidate is to be cancelled and sent to the University.</td>
</tr>
<tr>
<td>3. Impersonates any other candidate in connection with the examination.</td>
<td>The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred and forfeits the seat. The performance of the original candidate who has been impersonated, shall be cancelled in all the subjects of the examination (including practicals and project work) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the imposter is an outsider, he will be handed over to the police and a case is registered against him.</td>
</tr>
<tr>
<td>4. Smuggles in the Answer book or additional sheet</td>
<td>Expulsion from the examination hall and</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.</td>
<td>cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.</td>
</tr>
<tr>
<td>5. Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.</td>
<td>Cancellation of the performance in that subject.</td>
</tr>
<tr>
<td>6. Refuses to obey the orders of the Chief Superintendent/Assistant – Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in-charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer-in-charge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.</td>
<td>In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The candidates also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.</td>
</tr>
<tr>
<td>7. Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.</td>
<td>Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.</td>
</tr>
<tr>
<td>8. Possess any lethal weapon or firearm in the examination hall.</td>
<td>Expulsion from the examination hall and cancellation of the performance in that subject</td>
</tr>
</tbody>
</table>
and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat.

9. If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8. Student of the college’s expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat.

Person(s) who do not belong to the College will be handed over to police and, a police case will be registered against them.

10. Comes in a drunken condition to the examination hall. Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year.

11. Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny. Cancellation of the performance in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester/year examinations.

12. If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the University for further action to award suitable punishment.

**Malpractices identified by squad or special invigilators**

1. Punishments to the candidates as per the above guidelines.
2. Punishment for institutions : (if the squad reports that the college is also involved in encouraging malpractices)
   (i) A show cause notice shall be issued to the college.
   (ii) Impose a suitable fine on the college.
   (iii) Shifting the examination centre from the college to another college for a specific period of not less than one year.
## I YEAR

### COURSE STRUCTURE

<table>
<thead>
<tr>
<th>Code</th>
<th>Subject</th>
<th>L</th>
<th>T/P/D</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>6751001</td>
<td>English</td>
<td>2</td>
<td>-</td>
<td>4</td>
</tr>
<tr>
<td>6751002</td>
<td>Mathematics - I</td>
<td>3</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>6751008</td>
<td>Mathematical Methods</td>
<td>3</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>6751004</td>
<td>Engineering Physics</td>
<td>2</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>6751005</td>
<td>Engineering Chemistry</td>
<td>2</td>
<td>-</td>
<td>4</td>
</tr>
<tr>
<td>6751006</td>
<td>Computer Programming &amp; Data Structures</td>
<td>3</td>
<td>-</td>
<td>6</td>
</tr>
<tr>
<td>6751007</td>
<td>Engineering Drawing</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>6751628</td>
<td>Computer Programming Lab.</td>
<td></td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>6751629</td>
<td>Engineering Physics / Engineering Chemistry Lab.</td>
<td></td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>6751630</td>
<td>English Language Communication Skills Lab.</td>
<td></td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>17</td>
<td>18</td>
<td>50</td>
</tr>
</tbody>
</table>

### II YEAR I SEMESTER

### COURSE STRUCTURE

<table>
<thead>
<tr>
<th>Code</th>
<th>Subject</th>
<th>L</th>
<th>T/P/D</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>6753033</td>
<td>Applied Biochemistry</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>6753009</td>
<td>Electronic Devices &amp; Circuits</td>
<td>4</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>6753030</td>
<td>Fundamental of Electrical Engineering</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>6753021</td>
<td>Signals and Systems</td>
<td>4</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>6753034</td>
<td>Anatomy and Physiology</td>
<td>4</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>6753035</td>
<td>Bioelectricity and Electrodes</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>6753614</td>
<td>Electronic Devices and Circuits Lab</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>6753615</td>
<td>Medical Sciences Lab</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>21</td>
<td>11</td>
<td>25</td>
</tr>
</tbody>
</table>

### II YEAR II SEMESTER

### COURSE STRUCTURE

<table>
<thead>
<tr>
<th>Code</th>
<th>Subject</th>
<th>L</th>
<th>T/P/D</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>6754004</td>
<td>Environmental Studies</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>6754010</td>
<td>Switching Theory and Logic Design</td>
<td>4</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>6754021</td>
<td>Pulse and Digital Circuits</td>
<td>4</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>6754026</td>
<td>Basic Clinical Sciences I</td>
<td>4</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>6754027</td>
<td>Biotransducers and Applications</td>
<td>4</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>6754615</td>
<td>Pulse and Digital Circuits Lab</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>6754616</td>
<td>Transducers Lab</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>6754617</td>
<td>Basic Simulation Lab</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>19</td>
<td>13</td>
<td>25</td>
</tr>
</tbody>
</table>
# J.B. INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

**B. TECH. BIOMEDICAL ENGINEERING**

## III YEAR I SEMESTER

<table>
<thead>
<tr>
<th>Code</th>
<th>Subject</th>
<th>L</th>
<th>T/P/D</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>6755015</td>
<td>Managerial Economics and Financial Analysis</td>
<td>4</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>6755047</td>
<td>Principles of Communications</td>
<td>4</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>6755048</td>
<td>Digital Signal Processing</td>
<td>4</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>6755043</td>
<td>Analog and Digital IC Applications</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>6755049</td>
<td>Basic Clinical Sciences – II</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>6755050</td>
<td>Biofluids and Mechanics</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>6755617</td>
<td>Advanced English Communication Skills Lab</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>6755618</td>
<td>Analog and Digital IC Applications Lab</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>21</strong></td>
<td><strong>11</strong></td>
<td><strong>25</strong></td>
</tr>
</tbody>
</table>

## III YEAR II SEMESTER

<table>
<thead>
<tr>
<th>Code</th>
<th>Subject</th>
<th>L</th>
<th>T/P/D</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>6756046</td>
<td>Open Elective</td>
<td>4</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>6756051</td>
<td>Hospital System Management</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>6756014</td>
<td>Intellectual Property Rights</td>
<td>4</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>6756047</td>
<td>Biomedical Equipment</td>
<td>4</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>6756049</td>
<td>Medical Imaging Techniques</td>
<td>4</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>6756050</td>
<td>Biomedical Equipment</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>6756617</td>
<td>Biomedical Signal Processing Lab</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>6756619</td>
<td>Medical Imaging Techniques Lab</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>19</strong></td>
<td><strong>13</strong></td>
<td><strong>25</strong></td>
</tr>
</tbody>
</table>

## IV YEAR I SEMESTER

<table>
<thead>
<tr>
<th>Code</th>
<th>Subject</th>
<th>L</th>
<th>T/P/D</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>6757078</td>
<td>Image Processing and Pattern Recognition</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>6757079</td>
<td>Rehabilitation Engineering</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>6757039</td>
<td>Computer Networks</td>
<td>4</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>6757080</td>
<td>Microprocessors and Microcontrollers</td>
<td>4</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td><strong>Elective – I</strong></td>
<td></td>
<td><strong>3</strong></td>
<td><strong>1</strong></td>
<td><strong>3</strong></td>
</tr>
<tr>
<td>6757081</td>
<td>Artificial Intelligence</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>6757082</td>
<td>Artificial Neural Networks</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>6757083</td>
<td>Telemedicine</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td><strong>Elective – II</strong></td>
<td></td>
<td><strong>4</strong></td>
<td><strong>1</strong></td>
<td><strong>4</strong></td>
</tr>
<tr>
<td>6757045</td>
<td>Embedded &amp; Real Time Systems</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>6757084</td>
<td>VLSI Design</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>6757041</td>
<td>DSP Processors &amp; Architecture</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>6757614</td>
<td>Microprocessors and Microcontrollers Lab</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>6757615</td>
<td>Image Processing Lab</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>21</strong></td>
<td><strong>11</strong></td>
<td><strong>25</strong></td>
</tr>
<tr>
<td>Code</td>
<td>Subject</td>
<td>L</td>
<td>T/P/D</td>
<td>C</td>
</tr>
<tr>
<td>---------</td>
<td>----------------------------------</td>
<td>---</td>
<td>-------</td>
<td>---</td>
</tr>
<tr>
<td>6758058</td>
<td>Elective – III</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>6758059</td>
<td>Biomaterials</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6758060</td>
<td>Transportation Phenomena in living systems</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Physiological Systems Modeling</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6758061</td>
<td>Elective – IV</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>6758062</td>
<td>Robotics and Automation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6758063</td>
<td>Medical Informatics</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Quantitative Engineering Physiology</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6758019</td>
<td>Reliability Engineering</td>
<td>3</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>6758628</td>
<td>Industry Oriented Mini Project</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>6758629</td>
<td>Seminar</td>
<td>0</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>6758630</td>
<td>Major Project</td>
<td>0</td>
<td>15</td>
<td>10</td>
</tr>
<tr>
<td>6758631</td>
<td>Comprehensive Viva</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>9</td>
<td>23</td>
<td><strong>25</strong></td>
</tr>
</tbody>
</table>

**Note:** All End Examinations (Theory and Practical) are of three hours duration.

T - Tutorial   L – Theory   P – Practical   C – Credits
1. INTRODUCTION:

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire communicative competence, the syllabus has been designed to develop linguistic and communicative competence of Engineering students. The prescribed books and the exercises are meant to serve broadly as students’ handbooks. In the English classes, the focus should be on the skills of reading, writing, listening and speaking and for this the teachers should use the text prescribed for detailed study. For example, the students should be encouraged to read the texts/selected paragraphs silently. The teachers can ask comprehension questions to stimulate discussion and based on the discussions students can be made to write short paragraphs/essays etc.

The text for non-detailed study is for extensive reading/reading for pleasure by the students. Hence, it is suggested that they read it on their own with topics selected for discussion in the class. The time should be utilized for working out the exercises given after each section, as also for supplementing the exercises with authentic materials of a similar kind for example, from newspaper articles, advertisements, promotional material etc. However, the stress in this syllabus is on skill development and practice of language skills.

2. OBJECTIVES:

a. To improve the language proficiency of the students in English with emphasis on LSRW skills.
b. To equip the students to study academic subjects with greater facility through the theoretical and practical components of the English syllabus.
c. To develop the study skills and communication skills in formal and informal situations.

3. SYLLABUS:

Listening Skills:
Objectives
1. To enable students to develop their listening skill so that they may appreciate its role in the LSRW skills approach to language and improve their pronunciation
2. To equip students with necessary training in listening so that they can comprehend the speech of people of different backgrounds and regions

Students should be given practice in listening to the sounds of the language to be able to recognise them, to distinguish between them to mark stress and recognise and use the right intonation in sentences.

• Listening for general content
• Listening to fill up information
• Intensive listening
• Listening for specific information

Speaking Skills:
Objectives
1. To make students aware of the role of speaking in English and its contribution to their success.
2. To enable students to express themselves fluently and appropriately in social and professional contexts.

• Oral practice
• Describing objects/situations/people
• Role play – Individual/Group activities (Using exercises from all the nine units of the prescribed text: Learning English: A Communicative Approach.)
• Just A Minute(JAM) Sessions.

Reading Skills:
Objectives
1. To develop an awareness in the students about the significance of silent reading and comprehension.
2. To develop the ability of students to guess the meanings of words from context and grasp the overall message of the text, draw inferences etc.
• Skimming the text
• Understanding the gist of an argument
• Identifying the topic sentence
• Inferring lexical and contextual meaning
• Understanding discourse features
• Recognizing coherence/sequencing of sentences

NOTE: The students will be trained in reading skills using the prescribed text for detailed study. They will be examined in reading and answering questions using ‘unseen’ passages which may be taken from the non-detailed text or other authentic texts, such as magazines/newspaper articles.

Writing Skills:
Objectives
1. To develop an awareness in the students about writing as an exact and formal skill
2. To equip them with the components of different forms of writing, beginning with the lower order ones.

• Writing sentences
• Use of appropriate vocabulary
• Paragraph writing
• Coherence and cohesiveness
• Narration / description
• Note Making
• Formal and informal letter writing
• Editing a passage

4. TEXTBOOKS PRESCRIBED:
In order to improve the proficiency of the student in the acquisition of the four skills mentioned above, the following texts and course content, divided into Eight Units, are prescribed:

For Detailed study

1. First Text book entitled “Enjoying Everyday English”, Published by Sangam Books, Hyderabad

For Non-detailed study
1. Second text book “Inspiring Speeches and Lives”, Published by Maruthi Publications, Guntur

A. STUDY MATERIAL:
UNIT-I
a. Sir C.V. Raman (Detail) A pathbreaker in the saga of Indian Science. (Detail)
   b. Leading a team and Work brings Solace (from Wings of Fire)
      --University Press

UNIT-II
a. The Connoisseur (Detail)
   b. Mother Theresa (Non-detail)

UNIT-III
a. Kalpana Chawla “Inspiration” (Detail)
   b. Sam Pitroda (Non-detail)

UNIT-IV
a. Bubbling Well Road (Detail)
   b. I have a dream-Martin Luther king(Non-detail)

UNIT-V
a. The Cuddalore Experience(Detail)
   b. Amartya kumar Sen(Non-detail)
UNIT-VI

a. Youth, Awake, Arise- STOP NOT TILL

Swami Vivekananda Institute of Human Excellence,

b. John F. Kennedy (Non-detail)

UNIT-VII

Exercises on;
Reading & Writing Skills
Reading Comprehension
Letter Writing
Essay Writing

UNIT-VIII

Exercises on Remedial Grammar;
Common errors in English
Subject-Verb agreement
Tense aspect

Vocabulary development-Synonyms, Antonyms, One word substitutes, Prefixes-Suffixes, Idioms, Phrases, Words often confused

REFERENCES :
1. Innovate with English: A Course in English for Engineering Students, edited by T Samson, Foundation Books
2. English Grammar Practice, Raj N Bakshi, Orient Longman.
3. Effective English, edited by E Suresh Kumar, A RamaKrisha Rao, P Sreehari, Published by Pearson
6. Technical Communication, Meenakshi Raman, Oxford University Press
7. Objective English Edgar Thorpe & Showick Thorpe. Pearson Education
9. Murphy’s English Grammar with CD, Murphy, Cambridge University Press.
10. Everyday Dialogues in English, Robert J. Dixson, Prentice Hall India Pvt Ltd.,
12. Basic Vocabulary Edgar Thorpe & Showick Thorpe. Pearson Education
16. Enrich your English, Thakur K B P Sinha, Vijay Nicole Imprints Pvt Ltd.,
J.B. INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

1 Year B.Tech. BME
6751002

MATHEMATICS – I

UNIT-I: Sequences - Series
Basic definitions of Sequences and Series – Convergence and divergence – Ratio test – Comparison test – Integral test – Cauchy’s root test – Raabe’s test – Absolute and conditional convergence

UNIT-II: Differential equations of first order and their applications
Overview of differential equations – exact, linear and Bernoulli. Applications to Newton’s Law of cooling, Law natural growth and decay, orthogonal trajectories and geometrical applications.

UNIT-III: Higher Order Linear differential equations and their applications
Linear differential equations of second and higher order with constant coefficients, RHS term of the f(X)=e^{ax}, Cos ax, and x^n, e^{ax} V(x), x^n V(x) method of variation of parameters. Applications bending of beams, Electrical circuits, simple harmonic motion.

UNIT-IV: Laplace transform and its application to Ordinary differential equations

UNIT-V: Function of Single Variable
Rolle’s Theorem – Lagrange’s Mean Value Theorem – Cauchy’s mean value Theorem – Generalized mean value theorem (all theorems without proof) Functions of several variables – Functional dependence – Jacobian – Maxima and Minima of functions of two variables with constraints and without constraints.

UNIT-VI: Application of Single variable
Radius, Centre and Circle of Curvature-Evolutes and Envelopes Curve tracing – Cartesian, polar and parametric curves.

UNIT-VII: Integration & its applications
Riemann Sums, integral Representation for lengths, Areas, Volumes and Surface areas in Cartesian and polar coordinates, multiple integrals – double and triple integrals – change of order of integration – change of variable.

UNIT-VIII: Vector Calculus

TEXT BOOKS:
1. Engineering Mathematics by B.V.Ramana
2. Engineering Mathematics-I by T.K.V. Iyanar & B.Krishna Gandhi & Others, S.Chand

REFERENCES:
J.B.INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

I Year B.Tech. BME
6751008

MATHEMATICAL METHODS

UNIT-I : Solution for linear systems

UNIT-II : Eigen values & Eigen Vectors

UNIT-III : Linear Transformations

UNIT-IV : Solution of Non-linear Systems

Interpolation:

UNIT-V : Curve fitting & Numerical Integration

UNIT-VI : Numerical solution of IVP’s in ODE

UNIT-VII : Fourier Series-Fourier Transform

UNIT-VIII : Z-Transform & Partial differential equations
Z-Transform-Properties-Damping rule-shifting rule-Initial & Final value theorems-convolution theorem –solution of difference equation by Z-transform -Introduction and Formation of partial equation by elimination of arbitrary constants and arbitrary functions, solutions of first order linear (Lagrange) equation and nonlinear (Standard type) equations.

TEXT BOOKS:
1. Engineering Mathematics by B.V.Ramana

REFERENCES:
1. Introductory Methods by Numerical Analysis by S.S. Sastry, PHI Learning Pvt. Ltd.
4. A text Book of KREYSZIG’S Mathematical Methods, Dr.A.Ramakrishna Prasad, WILEY Publications.
ENGINEERING PHYSICS

UNIT-I Physical Optics:
1. Interference: Types of Interferences, Interference in thin films (reflected light) - Newton's rings.
2. Diffraction: Types of diffraction, Frouhoffer’s Diffraction at a single slit, double slit and diffraction grating (N-slits).
3. Polarization: Introduction to polarization, Malus law, double refraction, Nicol's prism, Brewster’s law
Applications of Interference, Diffraction & Polarization in industry.

UNIT-II Crystallography –XRD methods

UNIT-III Defects in Crystals & Principles of Quantum Mechanics
6. Defects in Crystals: Point Defects: Vacancies, Substitution, Interstitial, Frenkel and Schottky Defects, Concentration of vacancies at given temperature, concentration of Schottky & Frenkel defects, Qualitative treatment of line (Edge and Screw Dislocations) Defects, Burger’s Vector, Surface Defects and Volume Defects. (Qualitative treatment)

UNIT-IV Band Theory of Solids

UNIT-V Acoustics of Building & Acoustic Quieting and Ultrasonics

Ultrasonics:
Concept of ultrasonics wave generation, Different methods of generation of Ultrasonic’s (Piezostriction and Magnetostriiction) , concept of NDT & Applications.

UNIT-VI Dielectric and Magnetic Properties
UNIT-VII Lasers and Fiber Optics

UNIT-VIII Nanotechnology

TEXT BOOKS:
7. Engineering Physics – Adeel Ahmad & B S Bellubbi (Florence Publication , Hyd)

REFERENCES:
1. Solid state physics -- M.Arumugam
2. Applied physics – Mani naidu
UNIT I:

UNIT II:

UNIT III:

UNIT IV:

UNIT V:

UNIT VI:

UNIT VII:
Phase rule: Definitions: phase, component, degree of freedom, phase rule equitation. Phase diagrams - one component system: water system. Two component system lead- silver system, heat treatment based on iron-carbon phase diagram, hardening, annealing.

UNIT VIII:
TEXT BOOKS:

REFERENCE BOOKS
J.B.INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

1 Year B.Tech.BME
6751006

COMPUTER PROGRAMMING AND DATA STRUCTURES

UNIT - I

UNIT - II
Selection Statements – if and switch statements, Repetition statements – while, for, do-while statements, Loop examples, other statements related to looping – break, continue, goto, Simple C Programming examples.

UNIT - III
Designing Structured Programmes, Functions, basics, user defined functions, inter function communication, Standard functions, Scope, Storage classes-auto, register, static, extern, scope rules, type qualifiers, recursion- recursive functions, Preprocessor commands, example C programmes
Arrays – Concepts, using arrays in C, inter function communication, array applications, two – dimensional arrays, multidimensional arrays, C programme examples.

UNIT - IV
Pointers – Introduction (Basic Concepts), Pointers for inter function communication, pointers to pointers, compatibility, memory allocation functions, array of pointers, programming applications, pointers to void, pointers to functions, command –line arguments.
Strings – Concepts, C Strings, String Input / Output functions, arrays of strings, string manipulation functions, string / data conversion, C programme examples.

UNIT - V
Derived types – Structures – Declaration, definition and initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self referential structures, unions, typedef, bit fields, enumerated types, C programming examples.

UNIT - VI
Input and Output – Concept of a file, streams, standard input / output functions, formatted input / output functions, text files and binary files, file input / output operations, file status functions (error handling), C programme examples.

UNIT – VII
Searching and Sorting – Sorting- selection sort, bubble sort, insertion sort, quick sort, merge sort, Searching-linear and binary search methods.

UNIT - VIII
Data Structures – Introduction to Data Structures, abstract data types, Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, Stacks-Operations, array and linked representations of stacks, stack application-infix to postfix conversion, postfix expression evaluation, recursion implementation, Queues-operations, array and linked representations.

TEXT BOOKS :

REFERENCES:
2. The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI/Pearson Education
7. C Programming & Data Structures, E. Balagurusamy, TMH.
8. C Programming & Data Structures, P. Dey, M Ghosh R Thereja, Oxford University Press
J.B. INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

I Year B.Tech.
6751007

ENGINEERING DRAWING

UNIT – I

a) Conic Sections including the Rectangular Hyperbola – General method only.
b) Cycloid, Epicycloid and Hypocycloid
c) Involute.
d) Scales: Different types of Scales, Plain scales comparative scales, scales of chords.

UNIT – II
DRAWING OF PROJECTIONS OR VIEWS ORTHOGRAPHIC PROJECTION IN FIRST ANGLE

PROJECTION: Principles of Orthographic Projections – Conventions – First and Third Angle, Projections of Points and Lines inclined to both planes, True lengths, traces.

UNIT – III
PROJECTIONS OF PLANES & SOLIDS: Projections of regular Planes, auxiliary planes and Auxiliary projection inclined to both planes. Projections of Regular Solids inclined to both planes – Auxiliary Views.

UNIT – IV
SECTIONS AND SECTIONAL VIEWS:- Right Regular Solids – Prism, Cylinder, Pyramid, Cone – Auxiliary views.

DEVELOPMENT AND INTERPENETRATION OF SOLIDS: Development of Surfaces of Right, Regular Solids – Prisms, Cylinder, Pyramid Cone and their parts. Interpenetration of Right Regular Solids

UNIT – V
INTERSECTION OF SOLIDS:- Intersection of Cylinder Vs Cylinder, Cylinder Vs Prism, Cylinder Vs Cone.

UNIT – VI

UNIT – VII
TRANSFORMATION OF PROJECTIONS: Conversion of Isometric Views to Orthographic Views – Conventions.

UNIT – VIII
PERSPECTIVE PROJECTIONS: Perspective View: Points, Lines, Plane Figures and Simple Solids, Vanishing Point Methods (General Method only).

TEXT BOOK:
1. Engineering Drawing, N.D. Bhat / Charotar
3. Engineering Drawing – Basant Agrawal, TMH

REFERENCES:
COMPUTER PROGRAMMING LAB

Objectives:
- To make the student learn a programming language.
- To teach the student to write programs in C to solve the problems.
- To Introduce the student to simple linear data structures such as lists, stacks, queues.

Recommended Systems/Software Requirements:
- Intel based desktop PC
- ANSI C Compiler with Supporting Editors

Week 1.
- a) Write a C program to find the sum of individual digits of a positive integer.
- b) A Fibonacci Sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
- c) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

Week 2.
- a) Write a C program to calculate the following Sum:
  \[ \text{Sum}=1-x^2/2!+x^4/4!-x^6/6!+x^8/8!-x^{10}/10! \]
- b) Write a C program to find the roots of a quadratic equation.

Week 3
- a) Write C programs that use both recursive and non-recursive functions
  - i) To find the factorial of a given integer.
  - ii) To find the GCD (greatest common divisor) of two given integers.
  - iii) To solve Towers of Hanoi problem.

Week 4
- a) The total distance travelled by vehicle in ‘t’ seconds is given by distance \( d = ut + 1/2at^2 \) where ‘u’ and ‘a’ are the initial velocity (m/sec.) and acceleration (m/sec\(^2\)). Write C program to find the distance travelled at regular intervals of time given the values of ‘u’ and ‘a’. The program should provide the flexibility to the user to select his own time intervals and repeat the calculations for different values of ‘u’ and ‘a’.
- b) Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)

Week 5
- a) Write a C program to find both the largest and smallest number in a list of integers.
- b) Write a C program that uses functions to perform the following:
  - i) Addition of Two Matrices
  - ii) Multiplication of Two Matrices

Week 6
- a) Write a C program that uses functions to perform the following operations:
  - i) To insert a sub-string in to a given main string from a given position.
  - ii) To delete n Characters from a given position in a given string.
- b) Write a C program to determine if the given string is a palindrome or not

Week 7
- a) Write a C program that displays the position or index in the string S where the string T begins, or –1 if S doesn’t contain T.
- b) Write a C program to count the lines, words and characters in a given text.
Week 8
a) Write a C program to generate Pascal’s triangle.
b) Write a C program to construct a pyramid of numbers.

Week 9
Write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression:
\[1+x+x^2+x^3+\ldots+x^n\]
For example: if n is 3 and x is 5, then the program computes 1+5+25+125.
Print x, n, the sum
Perform error checking. For example, the formula does not make sense for negative exponents – if n is less than 0. Have your program print an error message if n<0, then go back and read in the next pair of numbers of without computing the sum. Are any values of x also illegal? If so, test for them too.

Week 10
a) 2’s complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2’s complement of 11100 is 00100. Write a C program to find the 2’s complement of a binary number.
b) Write a C program to convert a Roman numeral to its decimal equivalent.

Week 11
Write a C program that uses functions to perform the following operations:
- i) Reading a complex number
- ii) Writing a complex number
- iii) Addition of two complex numbers
- iv) Multiplication of two complex numbers
(Note: represent complex number using a structure.)

Week 12
a) Write a C program which copies one file to another.
b) Write a C program to reverse the first n characters in a file.
(Note: The file name and n are specified on the command line.)

Week 13
a) Write a C programme to display the contents of a file.
b) Write a C programme to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file)

Week 14
Write a C program that uses functions to perform the following operations on singly linked list:
- i) Creation ii) Insertion iii) Deletion iv) Traversal

Week 15
Write C programs that implement stack (its operations) using
- i) Arrays ii) Pointers

Week 16
Write C programs that implement Queue (its operations) using
- i) Arrays ii) Pointers

Week 17
Write a C program that uses Stack operations to perform the following:
- i) Converting infix expression into postfix expression
- ii) Evaluating the postfix expression

Week 18
Write a C program that implements the following sorting methods to sort a given list of integers in ascending order
- i) Bubble sort
- ii) Selection sort
Week 19
Write C programs that use both recursive and non-recursive functions to perform the following searching operations for a Key value in a given list of integers:
   i) Linear search  ii) Binary search

Week 20
Write C programs that implement the following sorting method to sort a given list of integers in ascending order:
   i) Quick sort

Week 21
Write C programs that implement the following sorting method to sort a given list of integers in ascending order:
   i) Merge sort

Week 22
Write C programs to implement the Lagrange interpolation and Newton-Gregory forward interpolation.

Week 23
Write C programs to implement the linear regression and polynomial regression algorithms.

Week 24
Write C programs to implement Trapezoidal and Simpson methods.

Text Books
4. Practical C Programming, Steve Oualline, O’Reilly, SPD. TMH publications.
J.B.INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

1 Year B.Tech. BME.

6751629

ENGINEERING PHYSICS / ENGINEERING CHEMISTRY LAB

ENGINEERING PHYSICS LAB
(Any twelve experiments compulsory)

1. Dispersive power of the material of a prism – Spectrometer
5. Time constant of an R-C circuit.
6. L-C-R circuit.
7. Magnetic field along the axis of current carrying coil – Stewart and Gees method.
8. Study the characteristics of LED and LASER sources.
9. Study the characteristics of p-i-n and avalanche photodiode detectors.
11. Evaluation of numerical aperture of given fibre.
12. Energy gap of a material of p-n junction.
13. Thermo electric effect – Seebeck effect and Peltier effect.
14. Torsional pendulum.

ENGINEERING CHEMISTRY LAB
List of Experiments (Any 12 of the following):

Titrimetry:
   a. Estimation of hardness of water by EDTA method. (or)
   Estimation of calcium in limestone by Permanganometry.

Mineral Analysis:
   2 Determination of percentage of copper in brass
   3 Estimation of manganese dioxide in pyrolusite.

Instrumental Methods:
4. Colorimetry:
   Determination of ferrous iron in cement by colorimetric method.
   (Or) Estimation of Copper by Colorimetric method.

5. Conductometry:
   Conductometric titration of strong acid Vs strong base.
   (or) Conductometric titration of mixture of acids Vs strong base.

6. Potentiometry:
   Titration of strong acid Vs strong base by potentiometry.
   (or) Titration of weak acid Vs strong base by potentiometry.
Physical Properties:
7. Determination of viscosity of sample oil by redwood/oswald’s viscometer
8. Determination Surface Tension of lubricants.

Identification and Preparations:
9. Identification of functional groups present in organic compounds.
10. Preparation of organic compounds
    Asprin (or) Benzimidazole

Kinetics:
11. To determine the rate constant of hydrolysis of methyl acetate catalysed by an acid and also the energy of activation. (or) To study the kinetics of reaction between K$_2$S$_2$O$_8$ and KI.
12. Demonstration Experiments (Any One of the following):
    a. Determination of dissociation constant of weak acid by pH metry
    b. Preparation of Thiokol rubber
    c. Adsorption on Charcoal
    d. Heat of reaction

TEXT BOOKS:
2. Inorganic quantitative analysis, Vogel.

REFERENCE BOOKS:
1. Text Book of engineering chemistry by R. N. Goyal and Harmandra Goel.
ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

The Language Lab focuses on the production and practice of sounds of language and familiarises the students with the use of English in everyday situations and contexts.

Objectives:
1. To expose the students to a variety of self-instructional, learner-friendly modes of language learning.
2. To help the students cultivate the habit of reading passages from the computer monitor, thus providing them with the required facility to face computer-based competitive exams such GRE, TOEFL, GMAT etc.
3. To enable them to learn better pronunciation through stress on word accent, intonation, and rhythm.
4. To train them to use language effectively to face interviews, group discussions, public speaking.
5. To initiate them into greater use of the computer in resume preparation, report writing, format-making etc.

SYLLABUS:
The following course content is prescribed for the English Language Laboratory sessions:
1. Introduction to the Sounds of English- Vowels, Diphthongs & Consonants.
2. Introduction to Stress and Intonation.
3. Situational Dialogues / Role Play.
5. ‘Just A Minute’ Sessions (JAM).
6. Describing Objects / Situations / People.
7. Information Transfer
8. Debate
10. Giving Directions.

Minimum Requirement:
The English Language Lab shall have two parts:

i) The Computer aided Language Lab for 60 students with 60 systems, one master console, LAN facility and English language software for self-study by learners.

ii) The Communication Skills Lab with movable chairs and audio-visual aids with a P.A System, a T. V., a digital stereo-audio & video system and camcorder etc.

System Requirement (Hardware component):

Computer network with Lan with minimum 60 multimedia systems with the following specifications:

i) P – IV Processor
   a) Speed – 2.8 GHZ
   b) RAM – 512 MB Minimum
   c) Hard Disk – 80 GB

ii) Headphones of High quality
Suggested Software:
• Cambridge Advanced Learners’ English Dictionary with CD.
• The Rosetta Stone English Library.
• Clarity Pronunciation Power – Part I.
• Mastering English in Vocabulary, Grammar, Spellings, Composition
• Dorling Kindersley series of Grammar, Punctuation, Composition etc.
• Language in Use, Foundation Books Pvt Ltd with CD.
• Oxford Advanced Learner’s Compass, 7th Edition.
• Learning to Speak English - 4 CDs.
• Vocabulary in Use, Michael McCarthy, Felicity O’Den, Cambridge.
• Murphy’s English Grammar, Cambridge with CD.
• English in Mind, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge

Books Suggested for English Language Lab Library (to be located within the lab in addition to the CDs of the text book which are loaded on the systems):
1. A Handbook for English Language Laboratories – Prof. E. Suresh Kumar, P. Sreehari, Foundation Books.
3. English Conversation Practice by Grant Taylor, Tata McGraw Hill.
5. Communicate or Collapse: A Handbook of Effective Public Speaking, Group Discussions and Interviews, by Pushpa Lata & Kumar, Prentice-Hall of India.
7. Spoken English by R. K. Bansal & J. B. Harrison, Orient Longman.
8. English Language Communication: A Reader cum Lab Manual Dr A Ramakrishna Rao, Dr. G. Natanam & Prof. S. A. Sankaranarayanan, Anuradha Publications, Chennai.
12. Spoken English: A foundation Course, Parts 1 & 2, Kamlesh Sadanand and Susheela punitha, Orient Longman

DISTRIBUTION AND WEIGHTAGE OF MARKS

English Language Laboratory Practical Paper:
1. The practical examinations for the English Language Laboratory shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2. For the Language lab sessions, there shall be a continuous evaluation during the year for 25 sessional marks and 50 year-end Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The year-end Examination shall be conducted by an external examiner/ or the teacher concerned with the help of another member of the staff of the same department of the same institution.
IT WORKSHOP/ENGINEERING WORKSHOP

Objectives:
The IT Workshop for engineers is a training lab course spread over 54 hours. The modules include training on PC Hardware, Internet & World Wide Web and Productivity tools including Word, Excel and Power Point.

PC Hardware introduces the students to a personal computer and its basic peripherals, the process of assembling a personal computer, installation of system software like MS Windows, Linux and the required device drivers. In addition hardware and software level troubleshooting process, tips and tricks would be covered. The students should work on working PC to disassemble and assemble to working condition and install Windows and Linux on the same PC. Students are suggested to work similar tasks in the Laptop scenario wherever possible.

Internet & World Wide Web module introduces the different ways of hooking the PC on to the internet from home and workplace and effectively usage of the internet. Usage of web browsers, email, newsgroups and discussion forums would be covered. In addition, awareness of cyber hygiene, i.e., protecting the personal computer from getting infected with the viruses, worms and other cyber attacks would be introduced.

Productivity tools module would enable the students in crafting professional word documents, excel spread sheets and power point presentations using the Microsoft suite of office tools and LaTeX. (Recommended to use Microsoft office 2007 in place of MS Office 2003)

PC Hardware
Week 1 – Task 1: Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

Week 2 – Task 2: Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC. A video would be given as part of the course content.

Week 3 – Task 3: Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.

Week 4 – Task 4: Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot with both windows and Linux. Lab instructors should verify the installation and follow it up with a Viva.

Week 5 – Task 5: Hardware Troubleshooting: Students have to be given a PC which does not boot due to improper assembly or defective peripherals. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva.

Week 6 – Task 6: Software Troubleshooting: Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva.

Internet & World Wide Web
Week 7 - Task 1: Orientation & Connectivity Boot Camp: Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.

Week 8 - Task 2: Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.
**Week 9 - Task 3 : Search Engines & Netiquette** : Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated to the instructors by the student.

**Week 10 - Task 4 : Cyber Hygiene** : Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to first install an anti virus software, configure their personal firewall and windows update on their computer. Then they need to customize their browsers to block pop ups, block active x downloads to avoid viruses and/or worms.

**Productivity tools**

**LaTeX and Word**

**Week 11 – Word Orientation** : The mentor needs to give an overview of LaTeX and Microsoft (MS) office 2007/ equivalent (FOSS) tool word: Importance of LaTeX and MS office 2007/ equivalent (FOSS) tool Word as word Processors, Details of the three tasks and features that would be covered in each, using LaTeX and word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter.

**Task 1 : Using LaTeX and Word** to create project certificate. Features to be covered:- Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both LaTeX and Word.

**Week 12 - Task 2 : Creating project abstract** Features to be covered:- Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

**Week 13 - Task 3 : Creating a Newsletter** : Features to be covered:- Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.

**Excel**

**Week 14 - Excel Orientation** : The mentor needs to tell the importance of MS office 2007/ equivalent (FOSS) tool Excel as a Spreadsheet tool, give the details of the two tasks and features that would be covered in each. Using Excel – Accessing, overview of toolbars, saving excel files, Using help and resources.

**Task 1: Creating a Scheduler** - Features to be covered:- Gridlines, Format Cells, Summation, auto fill, Formatting Text

**Week 15 - Task 2 : Calculating GPA** - Features to be covered:- Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, LOOKUP/VLOOKUP, Sorting, Conditional formatting

**LaTeX and MS/equivalent (FOSS) tool Power Point**

**Week 16 - Task1 : Students will be working on basic power point utilities and tools which help them create basic power point presentation. Topic covered during this week includes :- PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in both LaTeX and Power point. Students will be given model power point presentation which needs to be replicated (exactly how it’s asked).**

**Week 17- Task 2 : Second week helps students in making their presentations interactive. Topic covered during this week includes : Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts**

**Week 18 - Task 3 : Concentrating on the in and out of Microsoft power point and presentations in LaTeX. Helps them learn best practices in designing and preparing power point presentation. Topic covered during this week includes :- Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), Inserting – Background, textures, Design Templates, Hidden slides.**

**REFERENCES :**

1. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
2. LaTeX Companion – Leslie Lamport, PHI/Pearson.
3. Introduction to Computers, Peter Norton, 6/e Mc Graw Hill
4. Upgrading and Repairing, PC’s 18th e, Scott Muller QUE, Pearson Education
5. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dreamtech
7. PC Hardware and A+Handbook – Kate J. Chase PHI (Microsoft)

ENGINEERING WORKSHOP

1. TRADES FOR EXERCISES:
   At least two exercises from each trade:
   1. House Wiring
   2. Carpentry
   3. Tin-Smithy and Development of jobs carried out and soldering.
   4. Fitting

2. TRADES FOR DEMONSTRATION & EXPOSURE:
   1. Metal Cutting (Water Plasma)
   2 Power Tools in Construction, wood working, Electrical Engineering and Mechanical Engineering

TEXT BOOK:
2. Workshop Manual by Venkat Reddy
UNIT-I

UNIT-II

UNIT-III

UNIT-IV
Chemical nature of Enzymes - study of the Properties of Enzymes and kinetics by Spectrophotometer. Diagnostic and therapeutic uses of Enzymes.

UNIT-V
Carbohydrate metabolism: respiration-types, glycolysis and kreb’s cycle and energetics involved, Protein & Lipid metabolism (Briefly).

UNIT-VI
Nucleic Acid chemistry: Protein synthesis. Transcription and Translation, Replication, Polymerase Chain Reaction(PCR) Immunological Techniques or Immunoassay – Radio Immuno Assay (RIA), Enzyme- Linked Immunosorbent Assay (ELISA), Chemiluminescence.

UNIT-VII
Blood Chemistry: Chemical Composition of Blood, Separation of Serum Proteins and lipoproteins by Electrophoresis and Ultracentrifugation Acid Base Balance and Biochemical Measurements of Acid-Base and Electrolyte status of the patients, Urine Analysis.

UNIT-VIII
General methods of biochemical analysis carried out in the estimation of blood constituents, such as glucose etc. Principles and different methods of chromatography – fluorometry, flame photometry, Automation and Biochemical Analysis. Applications of isotopes in biochemistry.

TEXT BOOKS

REFERENCE
J.B.INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

II Year B.Tech. BME – I Sem
6753009

ELECTRONIC DEVICES AND CIRCUITS

UNIT I: p-n Junction Diode
Qualitative Theory of p-n Junction, p-n Junction as a Diode, Diode Equation, Volt-Ampere Characteristics, Temperature dependence of VI characteristic, Ideal versus Practical – Resistance levels (Static and Dynamic), Transition and Diffusion Capacitances, Diode Equivalent Circuits, Load Line Analysis, Breakdown Mechanisms in Semiconductor Diodes, Zener Diode Characteristics.

UNIT II: Rectifiers and Filters
The p-n junction as a Rectifier, Half wave Rectifier, Full wave Rectifier, Bridge Rectifier, Harmonic components in a Rectifier Circuit, Inductor Filters, Capacitor Filters, L-Section Filters, π-Section Filters, Comparison of Filters, Voltage Regulation using Zener Diode.

UNIT III: Bipolar Junction Transistor

UNIT IV: Transistor Biasing and Stabilization
Operating Point, The DC and AC Load lines, Need for Biasing, Fixed Bias, Collector Feedback Bias, Emitter Feedback Bias, Collector - Emitter Feedback Bias, Voltage Divider Bias, Bias Stability, Stabilization Factors, Stabilization against variations in VBE and β, Bias Compensation using Diodes and Transistors, Thermal Runaway, Thermal Stability.

UNIT V: Small Signal Low Frequency BJT Models
BJT Hybrid Model, Determination of h-parameters from Transistor Characteristics, Analysis of a Transistor Amplifier Circuit using h-Parameters, Comparison of CB, CE, and CC Amplifier Configurations.

UNIT VI: Field Effect Transistor

UNIT VII: FET Amplifiers
FET Common Source Amplifier, Common Drain Amplifier, Generalized FET Amplifier, Biasing FET, FET as Voltage Variable Resistor, Comparison of BJT and FET.

UNIT VIII: INDUSTRIAL ELECTRONIC DEVICES & APPLICATIONS:
Negative resistance Devices, Uni junction Transistor(UJT), UJT Relaxation Oscillator, Programmable UJT(PUT), Silicon Controlled Rectifier(SCR), Transient Effect in SCR, Light Activated SCR(LASCR), SILICON Controlled Switch(SCS), Schottky Barrier Diode, DIAC, TRIAC Diodes & Their characteristics.

TEXT BOOKS
3. Introduction to Electronic Devices and Circuits - Rober T. Paynter, PE.

REFERENCES
J.B.INSTITUTE OF ENGINEERING & TECHNOLOGY  
(AUTONOMOUS)

II Year B.Tech. BME – I Sem  
6753030  
L T/P/D C  
3 1/-/ 3  
FUNDAMENTALS OF ELECTRICAL ENGINEERING

Objective:
This course introduces the basic concepts of circuit analysis which is the foundation for all subjects of the Electrical Engineering discipline. The emphasis of this course is laid on the basic analysis of circuits which includes Single phase circuits, magnetic circuits, theorems, transient analysis and network topology.

UNIT – I Introduction to Electrical Circuits

UNIT – II Magnetic Circuits

UNIT – III Single Phase A.C Circuits

UNIT – V Three Phase Circuits
Three phase circuits: Phase sequence – Star and delta connection – Relation between line and phase voltages and currents in balanced systems – Analysis of balanced and Unbalanced 3 phase circuits – Measurement of active and reactive power.

UNIT – VI Network theorems (without proofs)
Tellegen’s, Superposition, Reciprocity, Thevenin’s, Norton’s, Maximum Power Transfer, Millman’s and Compensation theorems for d.c. and a.c. excitations.

UNIT – VII Dc Machine- Principle & operation of DC Generators and DC Motors, Different types of generator and motors, characteristics of generator and motor, simple problems.

UNIT – VIII AC machines

TEXT BOOKS:
2. Electrical Engineering Fundamental by Vincent Dertoro. PHI.  
3. Electrical Circuits by Chakravathi, Dhanapat Rai & son.  

REFERENCE BOOKS:
1. Network Analysis by Vanvalkenburg, PHI.  
2. Network Analysis GK Mithal, Khanna Publishers  
J.B.INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

II Year B.Tech. BME – I Sem

SIGNALS AND SYSTEMS

Unit I : Signal Analysis
Analogy between Vectors and Signals, Orthogonal Signal Space, Signal approximation using Orthogonal functions, Mean Square Error, Closed or complete set of Orthogonal functions, Orthogonality in Complex functions, Exponential and Sinusoidal signals, Concepts of Impulse function, Unit Step function, Signum function.

Unit II : Fourier Series Representation of Periodic Signals
Representation of Fourier series, Continuous time periodic signals, Properties of Fourier Series, Dirichlet’s conditions, Trigonometric Fourier Series and Exponential Fourier Series, Complex Fourier spectrum.

Unit III : Fourier Transforms

Unit IV : Signal Transmission Through Linear Systems
Linear System, Impulse response, Response of a Linear System, Linear Time Invariant (LTI) System, Linear Time Variant (LTV) System, Transfer function of a LTI system, Filter characteristics of Linear Systems, Distortion less transmission through a system, Signal bandwidth, System bandwidth, Ideal LPF, HPF and BPF characteristics, Causality and Paley-Wiener criterion for physical realization, Relationship between Bandwidth and Rise time.

Unit V : Convolution and Correlation of Signals
Concept of convolution in Time domain and Frequency domain, Graphical representation of Convolution, Convolution property of Fourier Transforms, Cross Correlation and Auto Correlation of functions, Properties of Correlation function, Energy density spectrum, Parseval’s Theorem, Power density spectrum, Relation between Auto Correlation function and Energy/Power spectral density function, Relation between Convolution and Correlation, Detection of periodic signals in the presence of Noise by Correlation, Extraction of signal from noise by filtering.

Unit VI : Sampling
Sampling theorem – Graphical and analytical proof for Band Limited Signals, Impulse Sampling, Natural and Flat top Sampling, Reconstruction of signal from its samples, Effect of under sampling – Aliasing, Introduction to Band Pass sampling.

Unit VII : Laplace Transforms

Unit VIII : Z-Transforms
Fundamental difference between Continuous and Discrete time signals, Discrete time signal representation using Complex exponential and Sinusoidal components, Periodicity of Discrete time signal using complex exponential signal, Concept of Z- Transform of a Discrete Sequence, Distinction between Laplace, Fourier and Z Transforms, Region of Convergence in Z-Transform, Constraints on ROC for various classes of signals, Inverse Z-transform, Properties of Z-transforms.

TEXT BOOKS:
1. Signals, Systems & Communications - B.P. Lathi, 2009, BSP.

REFERENCES:
ANATOMY AND PHYSIOLOGY

UNIT-I

UNIT-II
Nervous system and special senses: Brain and spinal cord, Peripheral and Autonomic Nervous System, nerve physiology, Electroencephalogram and Electrocorticogram.
Anatomy and physiology of Eye and Ear.

UNIT-III
Cardiovascular system: heart, arterial and venous system, Performance Characteristics of Heart and Major Blood Vessels, Electrocardiography

UNIT-IV
Respiratory system: Trachea and Lungs. Respiratory Physiology.

UNIT-V
Endocrine System: Endocrine Glands, Physiology of Endocrine Regulatory System.

UNIT-VI
Digestive System: Oesophagus, Stomach, Intestines, Liver, Gall Bladder and Pancreas

UNIT-VII
Lymphatic system: Spleen, glands and Lymph nodes

UNIT-VIII
Reproductive and Urinary Systems: Male and Female. Counter Current Concept and its Application of Concentration Of Urine

TEXT BOOKS

REFERENCE:
2. C. Tandan & Dr. Chandhramoli; Textbook of physiology for Dental studies. Dorpan Publications.
BIOELECTRICITY AND ELECTRODES

UNIT-I
Bioelectricity generation at the cellular & sub cellular level. Different biopotentials and their characteristics.

UNIT-II

UNIT-III

UNIT-IV

UNIT-V
Biopotential electrodes: classification & characteristics. Electrode-Electrolyte- Tissue Interface, Equivalent Circuit Properties of Needle & Micro Electrodes

UNIT-VI
Electrodes for surgery, physiotherapy and Analytical Instruments, Ion-sensitive electrodes used in Biochemistry analysers.

UNIT-VII

UNIT-VIII

TEXT BOOKS

REFERENCE
PART A: (Only for Viva-voce Examination)

ELECTRONIC WORKSHOP PRACTICE (in 3 lab sessions):

1. Identification, Specifications, Testing of R, L, C Components (Color Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Boards, PCB’s.
2. Identification, Specifications and Testing of Active Devices, Diodes, BJT’s, Low power JFET’s, MOSFET’s, Power Transistors, LED’s, LCD’s, SCR, UJT.
3. Study and operation of
   • Multimeters (Analog and Digital)
   • Function Generator
   • Regulated Power Supplies
   • CRO.

PART B: (For Laboratory Examination – Minimum of 10 experiments)

1. Forward & Reverse Bias Characteristics of PN Junction Diode.
2. Zener diode characteristics and Zener as voltage Regulator.
3. Input & Output Characteristics of Transistor in CB Configuration.
4. Input & Output Characteristics of Transistor in CE Configuration.
5. Half Wave Rectifier with & without filters
6. Full Wave Rectifier with & without filters
7. FET characteristics
8. Measurement of h parameters of transistor in CB, CE, CC configurations
9. Frequency Response of CE Amplifier
10. Frequency Response of Common Source FET amplifier
11. SCR characteristics.
12. UJT Characteristics
13. Triac Characteristics

PART C:

Equipment required for Laboratories:

1. Regulated Power supplies (RPS) - 0-30 V
2. CRO’s - 0-20 MHz.
3. Function Generators - 0-1 MHz.
4. Multimeters
5. Decade Resistance Boxes/Rheostats
6. Decade Capacitance Boxes
7. Ammeters (Analog or Digital) - 0-20 µA, 0-50µA, 0-100µA, 0-200µA, 0-10 mA.
8. Voltmeters (Analog or Digital) - 0-50V, 0-100V, 0-250V
9. Electronic Components - Resistors, Capacitors, BJTs, LCDs, SCRs, UJTs, FETs, LEDs, MOSFETs, diodes Ge& Si type, Transistors – npn,pnp type)
MEDICAL SCIENCES LAB

1. Histology Practicals. Showing the slides of Primary tissues.
2. Recording of B. P. and Effects of Physical Exertion and Posture on this Parameter.
3. Demonstration of Dissecting Upper limbs, Lower limbs, Pelvis and Pelvic Organs Abdomen and Abdominal Organs.
4. Demonstration of Dissecting thorax – showing heart & major blood vessels, lungs and respiratory system.
5. Recording Mechanical Response of the Muscle on Application of Induced Electric Signal,
6. Study of Rate of Conduction of Nerve Impulse.
7. Quantitative estimation of glucose, Urea and creatinine.
8. Quantitative estimation of Serum proteins, A/G Ratio
9. Test for presence of (a) Reducing Sugars (b) Proteins. (c) Ketone Bodies.
10. Test for presence of (a) Blood. (b) Bile Salts. (c) Bile Pigments.
11. Analysis of Na and K in an unknown sample (Demonstration).

**Equipment required**

1. microscope
2. sphygmomanometer
3. stethoscope
4. kymograph
5. flame photometer
6. Tuning Forks of different resonant frequencies
7. poly graph
8. Electrophoresis apparatus
9. Chromatograph
11. Spectrophotometer.
12. pH meter
13. Flame photometer
UNIT-I: ECOSYSTEMS: Definition, Scope and Importance of ecosystem, Concept of ecosystem, Classification of ecosystems, Structure and Structural Components of an ecosystem, Functions of ecosystem, Food chains, food webs and ecological pyramids. Flow of energy, Biogeochemical cycles, Homeostasis / Cybernetics, Food chain concentration, Biomagnification, ecosystems value, services and carrying capacity.

UNIT-II: NATURAL RESOURCES: Classification of Resources: Living and Non-Living resources, Renewable and non-renewable resources. Water resources: use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. Mineral resources: use and exploitation, environmental effects of extracting and using mineral resources – case studies. Energy resources: growing energy needs, renewable and non renewable energy sources, use of alternate energy sources – case studies. Land resources: land as a resource, land degradation, man induced landslides and land use / land cover mapping.


SUGGESTED TEXT BOOKS:
1. Environmental studies, From crisis to cure by R.Rajagopalan, 2005

REFERENCE BOOKS:
SWITCHING THEORY AND LOGIC DESIGN

UNIT I
Number Systems & Codes: Philosophy of Number Systems, Complement Representation of Negative Numbers, Binary Arithmetic, Binary Codes, Error Detecting & Error Correcting Codes, Hamming codes.

UNIT II

UNIT III

UNIT IV
Combinational Logic Design
Design using conventional logic gates, Encoder, Decoder, Multiplexer, De-Multiplexer, Modular design using IC chips, MUX Realization of switching functions Parity bit generator, Code-converters, Hazards and Hazard free Realizations.

UNIT V
Programmable Logic Devices & Threshold Logic: Basic PLD’s- ROM, PROM, PLA, PAL, Realization of Switching functions using PLD’s, Capabilities and Limitations of Threshold gate, Synthesis of Threshold functions, Multigate Synthesis.

UNIT VI
Sequential Circuits - I: Classification of sequential circuits (Synchronous, Asynchronous, Pulse mode, Level mode with examples), Basic Flip-Flops, Triggering and Excitation tables, Steps in Synchronous Sequential Circuit Design, Design of modulo-N Ring & Shift counters, Serial binary adder, Sequence detector.

UNIT VII
Sequential Circuits - II: Finite State Machine-Capabilities and Limitations, Mealy and Moore models, Minimization of Completely Specified and Incompletely Specified Sequential Machines, Partition Techniques and Merger chart methods, Concept of Minimal cover table.

UNIT VIII
Algorithmic State Machines: Salient features of the ASM chart, Simple examples, System design using data path and control subsystems, Control implementations, Examples of Weighing Machine and Binary multiplier.

TEXTBOOKS:

REFERENCES:
1. An Engineering Approach to Digital Design – Fletcher, PHI.
PULSE AND DIGITAL CIRCUITS

Unit-I

Unit-II
Non-Linear Wave Shaping: Diode clippers, Transistor clippers, Clipping at two independent levels, Comparators, Applications of Voltage comparators. Clamping Operation, Clamping circuit taking Source and Diode resistances into account, Clamping Circuit Theorem, Practical Clamping Circuits, Effect of Diode Characteristics on Clamping Voltage, Synchronized Clamping.

Unit-III
Switching Characteristics of Devices: Diode as a Switch, Piecewise Linear Diode Characteristics, Diode Switching times, Transistor as a Switch, Break down voltages, Transistor in Saturation, Temperature variation of Saturation Parameters, Transistor-switching times, Silicon-controlled-switch circuits.

Unit-IV

Unit-V

Unit-VI
Sampling Gates: Basic operating principles of Sampling Gates, Unidirectional and Bi-directional Sampling Gates, Four Diode Sampling Gate, Reduction of pedestal in gate Circuits, Six Diode Gate, Application of Sampling Gates.

Unit-VII
Synchronization and Frequency Division: Pulse Synchronization of Relaxation Devices, Frequency division in Sweep Circuit, Stability of Relaxation Devices, Astable Relaxation Circuits, Monostable Relaxation Circuits, Synchronization of a Sweep Circuit with Symmetrical Signals, Sinewave frequency division with a Sweep Circuit, A Sinusoidal Divider using Regeneration and Modulation.

Unit-VIII
Realization of Logic Gates Using Diodes & Transistors: AND, OR and NOT Gates using Diodes and Transistors, DCTL, RTL, DTL, TTL and CML Logic Families and its Comparison.

TEXT BOOKS:
2. Solid State Pulse circuits –David A. Bell, 4 ed., 2002 PHI.

REFERENCES:
1. Pulse and Digital Circuits – A. Anand Kumar, 2005, PHI.
J.B.INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

II Year B.Tech. BME-II Sem
6754026

BASIC CLINICAL SCIENCES-I

UNIT-I

UNIT-III
NEUROLOGY: Diseases of nervous system, spinal cord lesions, motor nervous disease, Prolapsed intravertebral disc, Neuropathies, Myasthenia gravis, Diseases of muscle.

UNIT-IV

UNIT-V

UNIT-VI

UNIT-VII
GENERAL SURGERY: Surgical patient. Clinically significant investigations, Pre operative preparation. Study and operation of surgical equipment. laproscopy and its use in various surgeries.

UNIT-VIII
GASTROENTROLOGY: Anatomy and physiology of G.I.T. clinically significant symptoms, signs and diseases. Nutritional support and parenteral therapy. Height and weight estimations according to age. Intravenous cannulae, I. V Sets, Infusion pumps, stomach wash tubes. Various endoscopic procedures, liver biopsy etc.

TEXT BOOKS:

REFERENCES:
J.B.INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

II Year B.Tech. BME - II Sem

6754027

L         T/P/D       C

4         1/-/-      4

BIOTRANSDUCERS AND APPLICATIONS

UNIT-I
INTRODUCTION: Classification, Basic requirements of bio transducers, Quasi state effects (linearity, Hysterisis), Amplitude distortion, Phase distortion, Sampling errors, Input and Output impedance effects, Factors influencing the choice and design of the transducer in Measuring the Physiological Parameters.

UNIT-II
TEMPERATURE TRANSDUCERS (Measurement Principle, Design and Applications): Thermo resistive, Thermo electric, PN junction diode-Thermometers, frequency change temperature Transducers, Chemical Thermometry, Radiation Thermometry.

UNIT-III

UNIT-IV
FORCE & VELOCITY TRANSDUCERS: Differentiation and Integration methods, Doppler system. Methods based on the mass bauer effect, Electro magnetic methods. Acceleration transducers: Piezo electric transducers

UNIT-V

UNIT-VI

UNIT-VII
Bioelectric Amplifiers - Different types of Bioelectric amplifiers, Principle of Operational Amplifier, Instrumentation Amplifier characteristics, Integrator, Differentiator, Log Amplifier and Antilog Amplifier. Signal Conditioning

UNIT-VIII

TEXT BOOKS:

REFERENCE:
1. Richard. S. C.Cobbold; Transducers for Biomedical Measurements- principles and application; Krieger pub Co.
Minimum Twelve experiments to be conducted:

1. Linear wave shaping.
2. Non Linear wave shaping – Clippers.
3. Non Linear wave shaping – Clampers.
4. Transistor as a switch.
5. Study of Logic Gates & some applications.
6. Study of Flip-Flops & some applications.
7. Sampling Gates.
8. Astable Multivibrator.
12. UJT Relaxation Oscillator.

Equipment required for Laboratories:

1. Regulated Power Supply - 0 – 30 V
2. CRO - 0 – 20 M Hz.
3. Function Generators - 0 – 1 M Hz
4. Components
5. Multi Meters
J.B.INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

II Year B.Tech. BME - II Sem

6754616

L T/P/D C
0 -/-3/- 2

TRANSDUCERS LAB

1. L.V.D.T & STRAIN GAUGE Designing of Oscillator & proportional amplifier
2. Resistance Thermometry (R. T. D)
3. Thermister & Thermocouple Designing of Bridge Circuit & Reference Junction Compensation Circuit
4. Photo Sensors: Photo Diode, Solar Cell, and Photo Transistor
5. pH Measurement
6. Pressure Measurement Designing of Instrumentation Amp With Different Gains
7. Level Measurement
9. Op-Amp As Adder Subtractor Designing of Adder & Subtractor Using Components
10. Speed Measurement
11. L. D. R & Piezo Electric Transducers
12. Inductive & Capacitive Pickup

The transducers/equipment required to do the above experiments
 1. L.V.D.T
 2. STRAIN GAUGE (cantilever strain gauge)
 3. Resistance Thermometry (R. T. D)
 4. Thermister
 5. Thermocouple
 6. Photo Sensors: Photo Diode, Solar Cell, and Photo Transistor, L. D. R
 7. pH Meter
 8. Sealed pressure transducer for Pressure Measurement
 9. Micro controller based Level Measurement system
10. P. I. D setup
11. Electric pickup and magnetic pickup for Speed Measurement
12. Piezo Electric Transducer
13. Inductive & Capacitive Pickup
14. Signal generators
15. C.R.O
16. Digital storage C.R.O
17. Multimeter
BASIC SIMULATION LAB

List of Experiments:

1. Basic Operations on Matrices.
2. Generation of Various Signals and Sequences (Periodic and Aperiodic), such as Unit Impulse, Unit Step, Square, Saw tooth, Triangular, Sinusoidal, Ramp, Sinc.
3. Operations on Signals and Sequences such as Addition, Multiplication, Scaling, Shifting, Folding, Computation of Energy and Average Power.
4. Finding the Even and Odd parts of Signal/Sequence and Real and Imaginary parts of Signal.
5. Convolution between Signals and sequences.
6. Auto Correlation and Cross Correlation between Signals and Sequences.
8. Computation of unit sample, unit step and sinusoidal responses of the given LTI system and verifying its physical realizability and stability properties.
9. Gibbs Phenomenon
10. Finding the Fourier Transform of a given signal and plotting its magnitude and phase spectrum.
12. Locating the Zeros and Poles and plotting the Pole-Zero maps in S-plane and Z-Plane for the given transfer function.
17. Verification of Weiner-Khinchine Relations.
J.B.INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

III Year B.Tech. BME I-Sem  L T/P/D C
6755015  4 -/-  4

MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Unit I Introduction to Managerial Economics:

Unit II Elasticity of Demand: Definition, Types, Measurement and Significance of Elasticity of Demand. Demand Forecasting, Factors governing demand forecasting, methods of demand forecasting (survey methods, statistical methods, expert opinion method, test marketing, controlled experiments, judgmental approach to demand forecasting)

Cost Analysis: Cost concepts, Opportunity cost, Fixed vs. Variable costs, Explicit costs Vs. Implicit costs, Out of pocket costs vs. Imputed costs. Break-even Analysis (BEA)-Determination of Break-Even Point (simple problems)- Managerial Significance and limitations of BEA.

Unit IV Introduction to Markets & Pricing Policies:
Market structures: Types of competition, Features of Perfect competition, Monopoly and Monopolistic Competition. Price-Output Determination in case of Perfect Competition and Monopoly.


Unit VI Capital and Capital Budgeting: Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising finance.
Nature and scope of capital budgeting, features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (simple problems)


Unit VIII Financial Analysis through ratios: Computation, Analysis and Interpretation of Liquidity Ratios (Current Ratio and quick ratio), Activity Ratios (Inventory turnover ratio and Debtor Turnover ratio), Capital structure Ratios (Debt- Equity ratio, Interest Coverage ratio), and Profitability ratios (Gross Profit Ratio, Net Profit ratio, Operating Profit Ratio, P/E Ratio and EPS).

TEXT BOOKS:

REFERENCES:

Prerequisites: Nil
Objective: To explain the basic principles of managerial economics, accounting and current business environment underlying business decision making.

Codes/Tables: Present Value Tables need to be permitted into the examinations Hall.

Question Paper Pattern: 5 Questions to be answered out of 8 questions .Out of eight questions 4 questions will be theory questions and 4 questions should be problems.
Each question should not have more than 3 bits.
## PRINCIPLES OF COMMUNICATIONS

### UNIT I
Introduction: Block diagram of Electrical communication system, Radio communication: Types of communications, Analog, pulse and digital Types of signals, Fourier Transform for various signals, Fourier Spectrum, Power spectral density, Autocorrelation, correlation, convolution.

### UNIT II

### UNIT III
Angle Modulation: Frequency & Phase modulations, advantages of FM over AM, Bandwidth consideration, Narrow band and Wide band FM, Comparison of FM & PM.

### UNIT IV
Pulse Modulations: Sampling, Nyquist rate of sampling, Sampling theorem for Band limited signals, PAM, regeneration of base band signal, PWM and PPM, Time Division Multiplexing, Frequency Division Multiplexing, Asynchronous Multiplexing.

### UNIT V
Digital Communication: Advantages, Block diagram of PCM, Quantization, effect of quantization, quantization error, Base band digital signal, DM, ADM, ADPCM and comparison.

### UNIT VI
Digital Modulation: ASK, FSK, PSK, DPSK, QPSK demodulation, coherent and incoherent reception, Modems.

### UNIT VII
Information Theory: Concept of information, rate of information and entropy, Source coding for optimum rate of information, Coding efficiency, Shannon-Fano and Huffman coding.

### UNIT VIII
Error control coding: Introduction, Error detection and correction codes, block codes, convolution codes.

### TEXT BOOKS:

### REFERENCES:
J.B.INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

III Year B.Tech. BME I-Sem
6755048
L T/P/D C
4 1/- 4

DIGITAL SIGNAL PROCESSING

Unit I
**Introduction:** Introduction to Digital Signal Processing: Discrete time signals & sequences, linear shift invariant systems, stability, and causality. Linear constant coefficient difference equations, Frequency domain representation of discrete time signals and systems.

Unit II

Unit III
**Fast Fourier Transforms:** Fast Fourier transforms (FFT) - Radix-2 decimation-in-time and decimation-in-frequency FFT Algorithms, Inverse FFT, and FFT with general Radix-N.

Unit IV

Unit V
**IIR Digital Filters:** Analog filter approximations – Butterworth and Chebyshev, Design of IIR Digital filters from analog filters, Step and Impulse invariant techniques, Bilinear transformation method, Spectral transformations.

Unit VI
**FIR Digital Filters:** Characteristics of FIR Digital Filters, Frequency response, Design of FIR Filters: Fourier Method, Digital Filters using Window Techniques, Frequency Sampling technique, Comparison of IIR & FIR filters.

Unit VII
**Multirate Digital Signal Processing:** Introduction, Down sampling, Decimation, Upsampling, interpolation, Sampling Rate Conversion, conversion of band pass signals, Concept of resampling, Applications of multi rate signal processing.

Unit VIII
**Finite Word Length Effects:** Limit cycles, Overflow oscillations, Round-off noise in IIR digital filters, Computational output round off noise, Methods to prevent overflow, Trade off between round off and overflow noise, Measurement of coefficient quantization effects through pole-zero movement, Dead band effects.

TEXT BOOKS:

REFERENCE BOOKS:
UNIT I 
INTEGRATED CIRCUITS: Classification, chip size and circuit complexity, basic information of Opamp, ideal and practical Op-amp, internal circuits, Op-amp characteristics, DC and AC characteristics, 741 op-amp and its features, modes of operation-inverting, non-inverting, differential.

UNIT II 
OP-AMP APPLICATIONS: Basic application of Op-amp, instrumentation amplifier, ac amplifier, V to I and I to V converters, sample & hold circuits, multipliers and dividers, Differentiators and Integrators, Comparators, Schmitt trigger, Multivibrators, introduction to voltage regulators, features of 723.

UNIT III 
ACTIVE FILTERS & OSCILLATORS: Introduction, 1st order LPF, HPF filters. Band pass, Band reject and all pass filters. Oscillator types and principle of operation – RC, Wien and quadrature type, waveform generators – triangular, sawtooth, square wave and VCO.

UNIT IV 
TIMERS & PHASE LOCKED LOOPS: Introduction to 555 timer, functional diagram, monostable and astable operations and applications, Schmitt Trigger. PLL - introduction, block schematic, principles and description of individual blocks of 565.

UNIT V 

UNIT VI 
Classification of Integrated circuits, comparison of various logic families, standard TTL NAND Gate. Analysis & characteristics, TTL open collector O/Ps, Tristate TTL, MOS & CMOS open drain and tristate outputs, CMOS transmission gate, IC interfacing - TTL driving CMOS & CMOS driving TTL.

UNIT VII 
Design using TTL-74XX & CMOS 40XX series, code converters, decoders, Demultiplexers, decoders & drives for LED & LCD display, Encoder, priority Encoder, multiplexers & their applications, priority generators/checker circuits. Digital arithmetic circuits-parallel binary adder/subtractor circuits using 2’s, Complement system. Digital comparator circuits.

UNIT VIII 

Memories: ROM architecture, types & applications, RAM architecture, Static & Dynamic RAMs, synchronous DRAMs.

TEXT BOOKS:

REFERENCES:
2. Operational Amplifiers & Linear Integrated Circuits: Theory & Applications –Denton J. Daibey, TMH.
BASIC CLINICAL SCIENCES -II

UNIT-I
Orthopaedics: classification of joints, reduction replacements

UNIT-II

UNIT-III

UNIT-IV

UNIT-V

UNIT-VI

UNIT-VII
Nuclear medicine: determination of distribution of radioactive material within the body. Organ imaging procedures: central nervous system, cardiovascular system, respiratory system, thyroid, liver, spleen, pancreas, kidney.

UNIT-VIII

TEXT BOOKS:

REFERENCE:
BIOFLUIDS AND MECHANICS

UNIT-I
BIO-FLUID MECHANICS: Newton’s laws, Stress, Strain, Elasticity, Hooke’s-law, viscosity, Newtonian fluid, Non-Newtonian fluid, Viscoplastic fluids, vascular tree, Relationship between diameter, velocity and Pressure of blood flow, Resistance against flow.

UNIT-II

UNIT-III
RHEOLOGY OF BLOOD IN MICROVESSELS: Fahraeus-Lindqvist effect and inverse effect, distribution of suspended particles in a narrow rigid tube. Nature of red cells in tightly fitting tubes, hematocrit in very narrow tube

UNIT-IV

UNIT-V

UNIT-VI

UNIT-VII

UNIT-VIII
ORTHOPEDIC MECHANICS: Mechanical properties of Cartilage, Diffusion properties of Articular cartilage, Mechanical properties of Bone, Kinetics and Kinematics of joints, Lubrication of Joints.

TEXT BOOKS:

REFERENCES:
2. Biomechanics by Nihat ozkaya and Margareta Nordin
ADVANCED ENGLISH COMMUNICATION SKILLS LAB

1. Introduction
The introduction of the English Language Lab is considered essential at 3rd year level. At this stage the students need to prepare themselves for their careers which may require them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalised context.

The proposed course should be an integrated theory and lab course to enable students to use ‘good’ English and perform the following:

- Gather ideas and information, to organise ideas relevantly and coherently.
- Engage in debates.
- Participate in group discussions.
- Face interviews.
- Write project/research reports/technical reports.
- Make oral presentations.
- Write formal letters.
- Transfer information from non-verbal to verbal texts and vice versa.
- To take part in social and professional communication.

2. Objectives:
This Lab focuses on using computer-aided multimedia instruction for language development to meet the following targets:

- To improve the students’ fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.
- Further, they would be required to communicate their ideas relevantly and coherently in writing.

3. Syllabus:
The following course content is prescribed for the Advanced Communication Skills Lab:

- **Functional English** – starting a conversation – responding appropriately and relevantly – using the right body language – role play in different situations.

- **Vocabulary Building** – synonyms and antonyms, word roots, one-word substitutes, prefixes and suffixes, study of word origin, analogy, idioms and phrases.

- **Reading Comprehension** – reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, Critical reading.

- **Writing Skills** – structure and presentation of different types of writing – Resume writing / e-correspondence / Technical report writing / Portfolio writing – planning for writing – research abilities / data collection / organizing data / tools / analysis – improving one’s writing.

- **Group Discussion** – dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and coherence.

- **Presentation Skills** – Oral presentations (individual and group) through JAM sessions / seminars and written presentations through posters / projects / reports / PPTs / e-mails / assignments etc.

- **Interview Skills** – concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele and video-conferencing.

4. Minimum Requirement:
The English Language Lab shall have two parts:

i) **The Computer aided Language Lab** for 60 students with 60 systems, one master console, LAN facility and English language software for self-study by learners.

ii) **The Communication Skills Lab** with movable chairs and audio-visual aids with a P.A. System, a T. V., a digital stereo – audio & video system and camcorder etc.

**System Requirement (Hardware component):**

- **Computer network with Lan with minimum 60 multimedia systems with the following specifications:**

  - **P – IV Processor**
    - Speed – 2.8 GHz
  - **RAM – 512 MB Minimum**
  - **Hard Disk – 80 GB**

- **iv) Headphones of High quality**

5. Suggested Software:
The software consisting of the prescribed topics elaborated above should be procured and used.
Suggested Software:
- Clarity Pronunciation Power – part II
- Oxford Advanced Learner’s Compass, 7th Edition
- DELTA’s key to the Next Generation TOEFL Test: Advanced Skill Practice.
- Lingua TOEFL CBT Insider, by Dreamtech
- TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
- The following software from ‘train2success.com’
  - Preparing for being Interviewed,
  - Positive Thinking,
  - Interviewing Skills,
  - Telephone Skills,
  - Time Management
  - Team Building,
  - Decision making
- English in Mind, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge

6. Books Recommended:

DISTRIBUTION AND WEIGHTAGE OF MARKS:
Advanced Communication Skills Lab Practicals:
1. The practical examinations for the English Language Laboratory practice shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2. For the English Language lab sessions, there shall be a continuous evaluation during the year for 25 sessional marks and 50 End Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The End Examination shall be conducted by the teacher concerned with the help of another member of the staff of the same department of the same institution.
J.B.INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

III Year B.Tech. BME I-Sem
6755618

L T/P/D C
0 -3/- 2

ANALOG AND DIGITAL IC APPLICATIONS LAB

Note: Minimum of 12 experiments have to be conducted (Six from each part):

List of Experiments:

**Part-I**

**Linear IC Experiments**
1. OP AMP Applications – Adder, Subtractor, Comparator Circuits.
2. Integrator and Differentiator Circuits using IC 741.
3. Active Filter Applications – LPF, HPF (first order)
4. IC 741 Oscillator Circuits – Phase Shift and Wien Bridge Oscillators.
5. IC 555 Timer – Monostable Operation Circuit.
6. Schmitt Trigger Circuits – using IC 741
7. IC 565 – PLL Applications.

**Part-II**

**Digital IC Applications**
1. D, J K Flip Flops 7474, 7483.
2. Decade counter 7490.
3. UP/DOWN counter 74163
5. 3-8 decoder -74138
6. 4-bit comparator 7485.
7. 8*1 Multiplexer-74151 and 2*4 Demultiplexer-74155.
8. RAM (16*4)- 74189 (Read and Write operations).
J.B.INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
III Year B.Tech. BME II-Sem
6756046

HOSPITAL SYSTEM MANAGEMENT
(OPEN ELECTIVE)

UNIT-I
Classification of Hospital Systems: General, Specialist, Teaching and Research Hospitals, Primary Health Centre Their role, Functions. Role of Biomedical Engineers

UNIT-II
Aspects of Hospital Services: Outpatient, Inpatient, supportive, emergency, drug and medical supply. Nursing Services, Dietary services, Transport services.

UNIT-III
Hospital Planning: Location, Orientation, budgeting, communication both with in and outside the hospital. Electric power supply for various Theatres and Rooms, Diesel Generator, stand by power supply.

UNIT-IV
Air conditioning of important theatres and equipment housings, water supply requirements and management, lifts, fire fighting and equipments. Sanitation with in the hospitals, laundry services.

UNIT-V
Computer and Information Management in Hospitals: Registration, Administration, Discharge records of patient’s. Patients billing, Maintenance of patients records, Maintenance of inventory of medicines and drugs.

UNIT-VI
Electrical Factors in Hospital Design, voltage stabilizer, uninterrupted power supply for intensive care units and computerised monitoring units, safety precautions.

UNIT-VII
Electrical factors associated with equipment: interference of systems, protection, grounding of ECG, EEG, EMG and other therapeutic equipments.

UNIT-VIII
Biomedical equipment services, purchase, servicing and maintenance, Management of condemned equipment, Training of men on medical equipments, preventive and periodical maintenance procedures.

TEXT BOOKS
2. Principles of Hospital Administration and Management by Ravi Bindra, Adroit publishers, 2004

REFERENCE:
J.B.INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

III Year B.Tech. BME II-Sem
6756051

INTELLECTUAL PROPERTY RIGHTS
(OPEN ELECTIVE)

UNIT – I
Introduction to Intellectual property: Introduction, types of intellectual property, international organizations, agencies and treaties, importance of intellectual property rights.

UNIT – II
Trade Marks : Purpose and function of trade marks, acquisition of trade mark rights, protectable matter, selecting and evaluating trade mark, trade mark registration processes.

UNIT – III
Law of copy rights : Fundamental of copy right law, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, copy right registration, notice of copy right, international copy right law.

UNIT – IV
Law of patents : Foundation of patent law, patent searching process, ownership rights and transfer

UNIT – V
Trade Secrets : Trade secrete law, determination of trade secrete status, liability for misappropriations of trade secrets, protection for submission, trade secrete litigation.

UNIT – VI
Unfair competition : Misappropriation right of publicity, False advertising.

UNIT – VII
New development of intellectual property: new developments in trade mark law ; copy right law, patent law, intellectual property audits.

UNIT – VIII
International overview on intellectual property, international – trade mark law, copy right law, international patent law, international development in trade secrets law.

References & Text Books :
1. Intellectual property right, Deborah. E. Bouchoux, cengage learing.
2. Intellectual property right – nleashmy the knowledge economy, prabuddha ganguli, Tate Mc Graw Hill Publishing company ltd.,
J.B.INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

III Year B.Tech. BME II-Sem
6756014

NANO TECHNOLOGY
(OPEN ELECTIVE)

Unit-I:
Introduction to nanotechnology:
Importance of nanoscale, Nanostructure types, electronic, magnetic, optical Properties of Nanomaterials, top-down and bottom-up approach to nanostructures.

Unit-II:
Quantum Mechanical phenomenon in nanostructures:
Quantum confinement of electrons in semiconductor Nano structures, one dimensional confinement (Quantum wires), two dimensional confinements (Quantum Wells), three dimensional confinements (Quantum dots).

Unit-III
Carbon Nano Structures:
Carbon nanotubes (CNTs), Fullerenes, C60, C80 and C240 Nanostructures, Properties (mechanical, optical and electrical) and applications.

Unit-IV
Fabrication of Nanomaterials:
Physical Methods: Inert gas condensation, Arc discharge, RFplasma, Plasma arc technique, Ion sputtering, Laser ablation, Laser pyrolysis, Molecular beam epitaxy, Chemical vapour deposition method.

Unit-V
Nano scale characterization techniques:
Scanning probe techniques (AFM, MFM, STM, SEM, TEM), XRD

Unit-VI
Nanodevices and Nanomedicine:
Lab on chip for bioanalysis, Core/shell Nanoparticles in drug delivery systems (site specific and targeted drug delivery), cancer treatment, and bone tissue treatment.

Unit-VII
Nano and molecular electronics:
Resonant-Tunneling structures, single electron tunneling, Single Electron transistors, coulomb blockade, giant magneto resistance, tunneling magneto resistance.

Unit-VIII
nanolithography and nanomanipulation:

TEXT BOOKS:
1. Charles.p.pode, Introduction to nanotechnology, springer publications
2. Springer Handbook of Nanotechnology - Bharat Bhusan
3. Phani kumar, principles of nanotechnology, scitech publications

REFERENCES BOOKS:
4. Encyclopaedia of Nanotechnology- Hari Singh Nalwa
BIOLOGICAL CONTROL SYSTEMS

UNIT-I

UNIT-II
Principles and General Engineering Techniques of Feedback Control. Basic Closed Loop Relation. Closed Loop Dynamics of First Order and Second Order.

UNIT-III

UNIT-IV

UNIT-V

UNIT-VI
Respiration Models and Controls. Cardiovascular Control Systems.

UNIT-VII
Sugar Level Control Mechanism. Endocrine Control System. Excretion Control.

UNIT-VIII

TEXT BOOKS

REFERENCE:
J.B.INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

III Year B.Tech. BME II-Sem

L T/P/D C
6756048 4 1/-/- 4

BIOMEDICAL SIGNAL PROCESSING

UNIT-I
Discrete and continuous Random variables, Probability distribution and density functions. Gaussian and Rayleigh density functions, Correlation between random variables.

UNIT-II
Stationary random process, Ergodicity, Power spectral density and autocorrelation function of random processes. Noise power spectral density analysis, Noise bandwidth, Noise figure of systems.

UNIT-III
Data Compression Techniques: Lossy and Lossless data reduction Algorithms. ECG data compression using Turning point, AZTEC, CORTES, Huffman coding, vector quantization, DCT and the K L transform.

UNIT-IV

UNIT-V

UNIT-VI
Signal Averaging, polishing–mean and trend removal, linear prediction. Yule–walker(Y–W) equations. Their applications in ECG and EEG.

UNIT-VII

UNIT-VIII

TEXT BOOKS
3. Biomedical Digital Signal Processing, Willis J.Tompkins, PHI,

REFERENCE:
III Year B.Tech. BME II-Sem

6756049

MEDICAL IMAGING TECHNIQUES

UNIT-I

UNIT-II

UNIT-III

UNIT-IV

UNIT-V

UNIT-VI
Ultrasonic Diagnostic Methods: Pulse-Echo Systems, Transmission Methods, Doppler Methods, Duplex Methods, Duplex Imaging. Biological effects due to Ultrasound.

UNIT-VII

UNIT-VIII

TEXT BOOK

REFERENCE:
1. Avinash C. Kak, Principles of Computerised Tomographic Imaging. IEEE PRESS
UNIT-I
Bio Amplifiers and signal conditioning circuits.


UNIT-II

UNIT-III

UNIT-IV

UNIT-V
THERAPEUTIC EQUIPMENT:-
Infusion pumps, Suction Apparatus.

UNIT-VI
Heamo dialyser, Qualitative requirements, General scheme of operation, Types of exchangers, Block diagram, Electronic control and monitoring systems. Heart Lang machine: Governing principle, Qualitative Requirements, Functional details of thin film membrane type blood oxygenerators. Intra Aortic Balloon Pump principle and application.

UNIT-VII

UNIT-VIII
Patient Electrical Safety, Types of Hazards, Natural protective Mechanism, Leakage current, Patient Isolation, Hazards in operation rooms. Grounding conditions in Hospital Environment.

TEXT BOOKS

REFERENCE:
STUDY, OPERATION AND TROUBLE SHOOTING OF:
1. ECG Recorder and Monitor
2. EEG, EMG Recorder
3. Pace Maker
4. DC Defibrillator
5. Short Wave Diathermy Unit
6. Ultrasound Diathermy Unit
7. Safety Evaluation Circuits
8. Audiometer
9. Hearing Aids
10. Pneumo tachograph and signal conditioners (PFT)
11. Ultra Sound Scanner

Equipment required to do the above experiments

1. ECG simulator, amplifier, Monitor
2. EEG simulator, amplifier
3. EMG simulator, amplifier.
4. Arrhythmia simulator, Pace Maker
5. Arrhythmia simulator, DC Defibrillator
6. Short Wave Diathermy
7. Ultrasound Diathermy
8. Safety analyzer
9. Audiometer
10. Hearing Aids
11. Pneumo tachograph and signal conditioners (PFT)
12. Ultra Sound Scanner
14. C.R.O
15. Digital storage C.R.O
16. Multimeter
BIOMEDICAL SIGNAL PROCESSING LAB

2. Analog and Digital Signal Conditioning.
5. Exponential Averaging.
7. Design of IIR Filter.
9. PSD Estimation.
10. Data Compression Techniques: AZTEC. TP.
11. Data Compression Technique: CORTES.
15. QRS Detections and HRV Analysis.

Using Matlab and signal processing toolbox. (20 keys / 60 intake)
MEDICAL IMAGING TECHNIQUES LAB

Implementation of the below Algorithms.
1. Algorithms for Low Pas filter, High Pass Filter, Median Filter
2. Prewitt Edge, Quick Edge Detector
3. Miller’s Algorithm
4. Cooley -Turkey Algorithm
5. Numerical Implementation of the Two Dimensional F. F. T.
6. Reconstruction Algorithm for Parallel Projections.
7. Reconstruction Algorithm for Fan Beam Projections
8. Re-Sorting Algorithm
11. S. A. R. T.
12. S. I. R T (Simultaneous Iterative Reconstruction Technique)

Additional requirements along with the computer facilities
C compiler
Matlab with signal processing and image processing toolboxes. (20 keys / 60 intake)
J.B.INSTITUTE OF ENGINEERING & TECHNOLOGY  
(AUTONOMOUS)  

IV Year B.Tech. BME I-Sem  
6757078  
L  T/P/D  C  
3  1/-/  3  

IMAGE PROCESSING AND PATTERN RECOGNITION

UNIT-I  

UNIT – II:  

UNIT – III:  
Baye’s classifier: Baye’s classified decision function for Baye’s classifier, Baye’s Classifier for normal patterns. Trainable pattern classifiers – deterministic approach, perception, approach - reward – punishment concept.

UNIT – IV:  
Gradient approach, Gradient Descent algorithms, LMSE Algorithms, Multi category classification.

UNIT – V:  

UNIT – VI:  

UNIT – VII:  
Image enhancement: Spatial domain, frequency domain methods, Histogram equalization, Modification techniques: Image Smoothing, image sharpening.

UNIT – VIII:  

TEXT BOOKS:  

REFERENCE:  
REHABILITATION ENGINEERING

UNIT-I

UNIT-II

UNIT-III
Engineering concepts in sensory rehabilitation Engineering. Sensory augmentation and substitution: Visual system, Visual augmentation, Tactual vision substitution, and Auditory vision substitution. Auditory system: Auditory augmentation, Audiometer. Hearing aids, cochlear implantation, visual auditory substitution, tactual auditory substitution, Tactual system: Tactual augmentation, Tactual substitution,

UNIT-IV

UNIT-V

UNIT-VI
Active Prostheses: Active above knee prostheses. Myoelectric Hand and Arm Prostheses: different types block diagram, signal flow diagram and functions. The MARCUS intelligent Hand prostheses

UNIT-VII
Robotic Manipulation Aids: Modes of operation and control.
Environmental control systems: Environmental control and Access to computers.

UNIT-VIII
Computer applications in Rehabilitation engineering: Interfaces in compensation for visual perception. Improvement of orientation and mobility, Computer assisted lip reading, Brain computer interface.

TEXTBOOKS:

REFERENCE:
2. Etienne Grandjean, Harold Oldroyd, Fitting the task to the man, Taylor & Francis,1988.
UNIT I
Introduction to networks, internet, protocols and standards, the OSI model, layers in OSI model, TCP/IP suite, Addressing. Analog and digital signals.

UNIT II

UNIT III
Data link layer: Introduction, Block coding, cyclic codes, checksum, framing, flow and error control, Noiseless channels, noisy channels, HDLC, point to point protocols

UNIT IV
Medium Access sub layer: Random access, controlled access, channelization, IEEE standards, Ethernet, Fast Ethernet, Giga-Bit Ethernet, wireless LANs.

UNIT V
Connecting LANs, backbone networks and virtual LANs, Wireless WANs, SONET, frame relay and ATM.

UNIT VI
Network Layer: Logical addressing, internetworking, tunneling, address mapping, ICMP, IGMP, forwarding, uni-cast routing protocols, multicast routing protocols.

UNIT VII
Transport Layer: Process to process delivery, UDP and TCP protocols, SCTP, data traffic, congestion, congestion control, QoS, integrated services, differentiated services, QoS in switched networks.

UNIT VIII
Application Layer – Domain name space, DNS in internet, electronic mail, FTP, WWW, HTTP, SNMP, multi-media, network security

TEXT BOOKS:

REFERENCE BOOKS:
3. Computer and Communication Networks ,Nader F. Mir, Pearson Education
6. Data communications and computer Networks, P.C.Gupta,PHI.
J.B.INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

IV Year B.Tech. BME I-Sem
6757080

MICROPROCESSORS AND MICROCONTROLLERS

UNIT-I

UNIT-II
Instruction Set and Assembly Language Programming of 8086: Instruction formats, addressing modes, instruction set, assembler directives, macros, simple programs involving logical, branch and call instructions, sorting, evaluating arithmetic expressions, string manipulations.

UNIT-III
I/O Interface: 8255 PPI, various modes of operation and interfacing to 8086, interfacing keyboard, display, stepper motor interfacing, D/A and A/D converter.

UNIT -IV
Interfacing with advanced devices: Memory interfacing to 8086, Interrupt structure of 8086, Vector interrupt table, Interrupt service routine, Introduction to DOS and BIOS interrupts, Interfacing Interrupt Controller 8259 DMA Controller 8257 to 8086.

UNIT -V

UNIT -VI
Introduction to Microcontrollers: Overview of 8051 microcontroller, Architecture, I/O Ports, Memory organization, addressing modes and instruction set of 8051, simple programs

UNIT- VII
8051 Real Time Control: Interrupts, timer/ Counter and serial communication, programming Timer Interrupts, programming external hardware interrupts, programming the serial communication interrupts, programming 8051 timers and counters

UNIT -VIII
RISC architecture: Introduction, Family architecture, Register File, The ALU, Memory access and Instruction execution, I/O memory, EEPROM, I/O ports, Timers, UART, Interrupt Structure

TEXT BOOKS:

REFERENCES:
4. Microcontrollers and application, Ajay. V. Deshmukh, TMGH, 2005
5. The 8085 Microprocessor: Architecture, programming and Interfacing – K.Uday Kumar, B.S.Umashankar, 2008, Pearson
UNIT I
Introduction: AI problems, foundations of AI, History of AI. Intelligent agents – Agents and Environments. The concept of rationality, the nature of environments, structure of agents.

UNIT II

UNIT III

UNIT IV

UNIT V

UNIT VI

UNIT VII

UNIT VIII

TEXT BOOK:

REFERENCE BOOKS:
ARTIFICIAL NEURAL NETWORKS
(ELECTIVE-I)

UNIT I
Introduction - what is a neural network? Human Brain, Models of a Neuron, Neural networks viewed as Directed Graphs, Network Architectures, Knowledge Representation, Artificial Intelligence and Neural Networks

UNIT II
Learning Process – Error Correction learning, Memory based learning, Hebbian learning, Competitive, Boltzmann learning, Credit Assignment Problem, Memory, Adaptation, Statistical nature of the learning process

UNIT III
Single layer perceptrons – Adaptive filtering problem, Unconstrained Organization Techniques, Linear least square filters, least mean square algorithm, learning curves, Learning rate annealing techniques, perceptron –convergence theorem, Relation between perceptron and Bayes classifier for a Gaussian Environment

UNIT IV
Multilayer Perceptron – Back propagation algorithm XOR problem, Heuristics, Output representation and decision rule, Computer experiment, feature detection

UNIT V

UNIT VI
Self Organization Maps – Two basic feature mapping models, Self organization map, SOM algorithm, properties of feature map, computer simulations, learning vector quantization, Adaptive pattern classification

UNIT VII
Neuro Dynamics – Dynamical systems, stability of equilibrium states, attractors, neurodynamical models, manipulation of attractors as a recurrent network paradigm

UNIT VIII
Hopfield Models – Hopfield models, computer experiment

TEXT BOOK:

REFERENCES:
1. Artificial neural networks - B.Vegnanarayana Prentice Hall of India P Ltd 2005
2. Neural networks in Computer intelligence, Li Min Fu TMH 2003
J.B.INSTITUTE OF ENGINEERING & TECHNOLOGY  
(AUTONOMOUS)

IV Year B.Tech. BME I-Sem  
6757083

TELEMEDICINE  
(Elective-I)

Unit I:  
History of telemedicine, Block diagram of telemedicine system, Definition of telemedicine, Tele health, Tele care, organs of telemedicine, scope, Benefits, and limitations of telemedicine.

Unit II:  
Type of information; Audio, Video, Still images, Text and data, fax, type of communications and network, PSTN, POTS, ANT, ISDN, Internet, Air/ wireless communications: GSM satellite, and Micro wave. Different Modulation techniques. Types of antennas depending on requirements, Integration and operational issues: - system integration, store –and –forward operation, Real-time Telemedicine.

Unit –III:  

Unit –VI:  

Unit – V:  
Ethical and legal aspects of Telemedicine: Confidentiality, and the law, patient rights and consent, access to medical Records, Consent treatment, jurisdictional Issues, Intellectual property rights.

Unit – VI:  
Tele radiology: Definition, Basic parts of Tele-radiology system: Image Acquisition system Display system, Communication network, Interpretation section. Tele pathology: multimedia databases, color images of sufficient resolution: Dynamic range, spatial resolution, compression methods, Interactive control of color, Controlled sampling security and confidentiality tools.

Unit – VII  
And Tele-Cardiology Tele-Oncology, Tele-Surgery.

Unit – VIII  
Applications of Tele-Surgery

TEXTBOOKS:  
2. A.C. Norris, Essentials of Telemedicine and Telecare John Sons & Ltd, 2002

REFERENCES  
1 .Biomedical Telemetry by Mackay,Stuart R, John Wiley.
**J.B.INSTITUTE OF ENGINEERING & TECHNOLOGY**  
*(AUTONOMOUS)*

IV Year B.Tech. BME I-Sem  
6757045  

<table>
<thead>
<tr>
<th>L</th>
<th>T/P/D</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>1/-/-</td>
<td>4</td>
</tr>
</tbody>
</table>

**EMBEDDED AND REAL TIME SYSTEMS**  
*(ELECTIVE – II)*

**UNIT I : INTRODUCTION**  
Embedded systems overview, design challenge, processor technology, IC technology, Design Technology, Trade-offs. Single purpose processors RT-level combinational logic, sequential logic (RT-level), custom single purpose processor design (RT-level), optimizing custom single purpose processors.

**UNIT II: GENERAL PURPOSE PROCESSORS**  
Basic architecture, operation, Pipelining, Programmer’s view, development environment, Application Specific Instruction-Set Processors (ASIPs) – Micro Controllers and Digital Signal Processors.

**UNIT III : STATE MACHINE AND CONCURRENT PROCESS MODELS**  
Introduction, models Vs. languages, finite state machines with data path model (FSMD), using state machines, program state machine model (PSM), concurrent process model, concurrent processes, communication among processes, synchronization among processes, implementation, data flow model, real-time systems.

**UNIT IV: COMMUNICATION INTERFACE**  
Need for communication interfaces, RS232 / UART, RS422 / RS485, USB, Infrared, IEEE 1394 Firewire, Ethernet, IEEE 802.11, Blue tooth.

**UNIT - V**  
**Introduction to Real – Time Operating Systems** : Tasks and Task States, Tasks and Data, Semaphores, and Shared Data; Message Queues, Mailboxes and Pipes, Timer Functions, Events, Memory Management, Interrupt Routines in an RTOS Environment.  
(Chapter 6 and 7 from Text Book 3, Simon).

**UNIT - VI**  

**UNIT - VII**  
**Introduction to advanced architectures** : ARM and SHARC, Processor and memory organization and Instruction level parallelism; Networked embedded systems: Bus protocols, I2C bus and CAN bus; Internet-Enabled Systems, Design Example-Elevator Controller.  
(Chapter 8 from Text Book 1, Wolf).

**UNIT VIII: DESIGN TECHNOLOGY**  

**TEXT BOOKS:**  
3. Computers and Components, Wayne Wolf, Elsevier,

**REFERENCES :**  
J.B.INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

IV Year B.Tech. BME I-Sem
6757084

VLSI DESIGN
(ELECTIVE-II)

Unit I
Introduction: Introduction to IC Technology – MOS, PMOS, NMOS, CMOS & BiCMOS Technologies; Oxidation, Lithography, Diffusion, Ion implantation, Metallization, Encapsulation, Probe testing, Integrated Resistors and Capacitors, CMOS Nanotechnology

Unit II
Basic Electrical Properties: Basic Electrical Properties of MOS and BiCMOS Circuits: \( I_{ds} - V_{ds} \) relationships, MOS transistor threshold Voltage, \( g_m, \frac{g_m}{d_{ss}} \), Figure of merit \( \omega_0 \); Pass transistor, NMOS Inverter, Various pull ups, CMOS Inverter analysis and design, Bi-CMOS Inverters.

Unit III

Unit IV

Unit V:
Data Path Subsystems: Subsystem Design, Shifters, Adders, ALUs, Multipliers, Parity generators, Comparators, Zero/One Detectors, Counters.

Unit VI:
Array Subsystems: SRAM, DRAM, ROM, Serial Access Memories, Content Addressable Memory.

Unit VII:
Semiconductor Integrated Circuit Design: PLAs, FPGAs, CPLDs, Standard Cells, Programmable Array Logic, Design Approach, Parameters influencing low power design.

Unit VIII

TEXT BOOKS:

REFERENCES:
4. Introduction to VLSI – Mead & Convey, BS Publications, 2010
UNIT I
INTRODUCTION TO DIGITAL SIGNAL PROCESSING: Introduction, A Digital signal-processing system, The sampling process, Discrete time sequences. Discrete Fourier Transform (DFT) and Fast Fourier Transform (FFT), Linear time-invariant systems, Digital filters, Decimation and interpolation.

UNIT II
COMPUTATIONAL ACCURACY IN DSP IMPLEMENTATIONS: Number formats for signals and coefficients in DSP systems, Dynamic Range and Precision, Sources of error in DSP implementations, A/D Conversion errors, DSP Computational errors, D/A Conversion Errors, Compensating filter.

UNIT III
ARCHITECTURES FOR PROGRAMMABLE DSP DEVICES: Basic Architectural features, DSP Computational Building Blocks, Bus Architecture and Memory, Data Addressing Capabilities, Address Generation Unit, Programmability and Program Execution, Speed Issues, Features for External interfacing.

UNIT IV
EXECUTION CONTROL AND PIPELINING: Hardware looping, Interrupts, Stacks, Relative Branch support, Pipelining and Performance, Pipeline Depth, Interlocking, Branching effects, Interrupt effects.

UNIT V
PROGRAMMABLE DIGITAL SIGNAL PROCESSORS: Commercial Digital signal-processing Devices, Data Addressing modes of TMS320C54XX DSPs, Data Addressing modes of TMS320C54XX Processors, Memory space of TMS320C54XX Processors, Program Control, TMS320C54XX instructions and Programming, On-Chip Peripherals, Interrupts of TMS320C54XX processors, Pipeline Operation of TMS320C54XX Processors.

UNIT VI
IMPLEMENTATIONS OF BASIC DSP ALGORITHMS: The Q-notation, FIR Filters, IIR Filters, Interpolation Filters, Decimation Filters, 2D Signal processing.

UNIT VII
IMPLEMENTATION OF FFT ALGORITHMS: An FFT Algorithm for DFT Computation, A Butterfly Computation, Overflow and scaling, Bit-Reversed index generation, An 8-Point FFT implementation on the TMS320C54XX, Computation of the signal spectrum.

UNIT VIII
INTERFACING MEMORY AND I/O PERIPHERALS TO PROGRAMMABLE DSP DEVICES: Memory space organization, External bus interfacing signals, Memory interface, Parallel I/O interface, Programmed I/O, Interrupts and I/O, Direct memory access (DMA), A Multichannel buffered serial port (McBSP), McBSP Programming, a CODEC interface circuit, CODEC programming, A CODEC-DSP interface example.

TEXT BOOKS:

REFERENCES:
List of Experiments:

The Following programs/experiments are to be written for assembler and execute the same with 8086 and 8051 kits.

1. Programs for 16 bit arithmetic operations for 8086 (using Various Addressing Modes).
2. Program for sorting an array for 8086.
3. Program for searching for a number or character in a string for 8086.
4. Program for string manipulations for 8086.
5. Program for digital clock design using 8086.
6. Interfacing ADC and DAC to 8086.
7. Parallel communication between two microprocessors using 8255.
8. Serial communication between two microprocessor kits using 8251.
9. Interfacing to 8086 and programming to control stepper motor.
10. Program and verify Timer/ Counter in 8051.
11. Program and verify Interrupt handling in 8051.
12. UART Operation in 8051.
13. Communication between 8051 kit and PC.
15. Interfacing Matrix/ Keyboard to 8051.
16. Data Transfer from Peripheral to Memory through DMA controller 8237 / 8257.
17. Touch screen interface to ARM Processor.
18. Temperature control soldering session- ARM Processor based

Note:

- Minimum of 12 experiments to be conducted.
- Atleast 2 experiments from microcontrollers are compulsory.
IMAGE PROCESSING LAB

1. Image data Compression
4. Gradient descent algorithm.
5. LMSE algorithm.
8. Image Sharpening.
9. Masks.
10. Point Detection.
11. Line Detection.
12. Edge Detection.

Additional requirements along with the computer facilities
Using Matlab with signal processing and image processing toolboxes. (20 keys / 60 intake)
UNIT I

UNIT-II

UNIT-III

UNIT-IV

UNIT-V

UNIT-VI

UNIT-VII

UNIT-VIII

TEXT BOOKS:

REFERENCE:
TRANSPORTATION PHENOMENA IN LIVING SYSTEMS (ELECTIVE – III)

UNIT-I
Heat Transport: Body temperature regulation modes of heat transfer, processes of Head loss and heat gain from the human body.

UNIT-II
Heat transportation in Tissues, Muscles, Skin and other Organs in different environmental temperatures.

UNIT-III
Models of heat transfer in the body.

UNIT-IV

UNIT-V
Processes of mass transfer Diffusion, Osmosis, Electro Osmosis. Ultra filtration. Reverse Osmosis through natural Membrane systems, Reverse Osmosis through artificial synthetic Membranes.

UNIT-VI
Mass Transport and Biochemical Interactions, Oxygen Transport from the Lungs to the Tissues.

UNIT-VII
Mass transfer: Mass transfer in Kidney, Skeletal, Nervous, G. I. system, Cardio Pulmonary system.

UNIT-VIII
Mass transfer in Dialysers and Oxygenators.

TEXT BOOK

REFERENCE:
2. Medical physiology by Ganong
3. Physiology by Best and Taylor
UNIT-I
The problem of system modeling in Physiology. Types of Nonlinear models of physiological systems. Deductive and Inductive modeling.

UNIT-II

UNIT-III

UNIT-IV

UNIT-V
Applications: Neurosensory systems/Cardiovascular system, Renal system, Metabolic-Endocrine system.

UNIT-VI
Modeling of multiinput/multioutput systems: The Two-input case. Applications of Two-input modeling to physiological systems. The Multiinput case spatiotemporal and spectrotemporal modeling.

UNIT-VII

UNIT-VIII
Modeling of Closed-loop systems: Autoregressive form of Closed-loop model, Network model form of Closed-loop systems.

TEXT BOOK

REFERENCE:
J.B.INSTITUTE OF ENGINEERING & TECHNOLOGY  
(AUTONOMOUS)

IV Year B.Tech. BME II-Sem  
6758061

ROBOTICS AND AUTOMATION  
(ELECTIVE-IV)

UNIT – I  

UNIT – II  

UNIT – III  
MANIPULATORS: Construction of Manipulators, Manipulator Dynamic and Force Control, Electronic and Pneumatic manipulators.

UNIT – IV  

UNIT – V  

UNIT VI  

UNIT VII  
PATH PLANNING: Trajectory planning and avoidance of obstacles, path planning, Slew motion, joint integrated motion – straight line motion – Robot programming, languages and software packages

UNIT VIII  

TEXT BOOKS:
2. Introduction to Robotics, Analysis, Systems, Applications by Saeed B.Niku – PHI

REFERENCES:
2. Industrial Robotics / Groover M P /Pearson Edu.  
3. Robotics and Control / Mittal R K & Nagrath I J / TMH.  
5. Robotic Engineering / Richard D. Klafter, Prentice Hall  
6. Robot Analysis and Intelligence / Asada and Slow time / Wiley Inter-Science  
8. Robot Dynamics and Control by Mark W. Spong and M. Vidyasagar, John Wiley & So
MEDICAL INFORMATICS
(EFFECTIVE-IV)

UNIT-I
Introduction and Overview of hospital information system. Patient history taking mechanisms.

UNIT-II
Patient Data Processing, Database Management, Communication of Medical data across different hospital units. Networking and Integration of patient data.

UNIT-III
Data from Patients, Coding and Classification , The Patient Record, Biosignal Analysis, Medical Imaging, Image Processing and Analysis.

UNIT-IV
Patient-Centered Information Systems ,Primary Care, Clinical Departmental Systems, Clinical Support Systems, Nursing Information Systems.

UNIT-V

UNIT-VI

UNIT-VII
Methodology for Information Processing , Logical Operations, Biostatistical Methods, Biosignal Processing Methods, Pattern Recognition, Modeling for Decision Support, Structuring the Computer-based Patient Record, Evaluation of Clinical Information Systems.

UNIT-VIII
Methodology for Information Systems: Human-Computer Interaction in Health Care ,Costs and Benefits of Information Systems, Security in Medical Information Systems, Standards in Health-care Informatics and Telematics, Project Management,

TEXT BOOK

REFERENCES:
J.B.INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

IV Year B.Tech. BME II-Sem
6758063

QUANTITATIVE ENGINEERING PHYSIOLOGY
(ELECTIVE-IV)

UNIT-I - Cellular Physiology

UNIT-II
Review of Cellular Physiology, Cellular Metabolism and Kinetics, Membrane Dynamics.

UNIT-III

UNIT-IV
Regulation of Cell Function and Cell Cycle Detailed aspects of Neoplasia, Uses of DNA Micro-Arrays,

UNIT-V - Neuromuscular Physiology

UNIT-VI
Skeletal Muscle, Neuromuscular Junction and Synaptic Transmission, Smooth Muscle, study of Demyelinating Diseases.

UNIT-VII - Cardiovascular Physiology
Review of Cardiovascular Physiology, The ECG, causes and classification of Arrhythmias, characteristics of Defibrillation phenomena.

UNIT-VIII
Pressure Volume Relationships, Models of Circulation, Cardiac Output, Cardiac Regulation, Physiological aspects of Myocardial infarction.

TEXT BOOKS:
1. Text Book of Physiology by Guyton.
2. Text Book of Physiology by West & Todd

REFERENCE:
1. Text Book of Physiology by Choudary.
RELIABILITY ENGINEERING

UNIT – I: Basics of Probability theory & Distribution

UNIT – II: Network Modeling and evaluation

UNIT – III: Reliability functions
Reliability functions f(t), F(t), R(t), h(t) and their relationships – exponential distribution – Expected value and standard deviation of exponential distribution – Bath tub curve – reliability analysis of series parallel networks using exponential distribution.

UNIT – IV: Reliability Evaluation

UNIT – V: Reliability Testing
Life Test Objectives, Types of Reliability, Test Specifications, Tolerance Test Conditions, Tolerance of Instruments, Specifications.

UNIT – VI: Accelerated Life Testing
Methods for ALT Data Quantifications, Temperature Stress And Failures Rates, Stress Combinations in ALT, ALT on Sub-Assemblies, Limitations, Accelerated Test for Evaluation Life, Compressed Time Testing, Cumulative Damage Model.

UNIT – VII: Data Analysis and Estimations
Graphical Representation of Statistical Data. Point and Interval Estimation, Goodness of Fit Test, Moment, Maximum, Likelihood and Least Square Estimators

UNIT – VIII: Monte Carlo Simulation
Random variates, Simulation output, Application of MCS Techniques: Tossing a coin, Throwing a die, Simulating a two component system, Time Depended Reliability Assessment. Two component non-repairable system. Reliability, Availability of Repairable and standby systems, Number of Simulations.

TEXT BOOKS:
<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>L</th>
<th>T/P/D</th>
</tr>
</thead>
<tbody>
<tr>
<td>INDUSTRY ORIENTED MINI PROJECT</td>
<td>2</td>
<td>0</td>
<td>-/3/-</td>
</tr>
<tr>
<td>SEMINAR</td>
<td>2</td>
<td>0</td>
<td>-/6/-</td>
</tr>
<tr>
<td>PROJECT WORK</td>
<td>10</td>
<td>0</td>
<td>-/15/-</td>
</tr>
<tr>
<td>COMPREHENSIVE VIVA</td>
<td>2</td>
<td>0</td>
<td>-/3/-</td>
</tr>
</tbody>
</table>