

S-25 March, 2013 AC after Circulars from Circular No.153 &amp; onwards

- 63 -

**DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY****CIRCULAR NO. ACAD / NP / B.E.[ T.Y.] /Syllabi/187/2013**

It is hereby informed to all concerned that, the syllabus prepared by the Boards of Studies, Ad-hoc Board, Committees and recommended by the Faculty of Engineering and Technology, the Hon'ble Vice-Chancellor has accepted the following **"Revised Syllabi for all Braches of T.Y. [B.E.]"** on behalf of the **Academic Council Under Section-14(7) of the Maharashtra Universities Act, 1994** as appended herewith :-

Sr. No.	Revised Syllabi
[1]	<b>Third Year B.E. [ CIVIL ENGINEERING ],</b>
[2]	<b>Third Year B.E. [ MECHANICAL ENGINEERING ],</b>
[3]	<b>Third Year B.E. [ ELECTRICAL ENGINEERING/ EEP/EE/EEE ],</b>
[4]	<b>Third Year B.E. [ COMPUTER SCIENCE &amp; ENGINEERING ],</b>
[5]	<b>Third Year B.E. [ INFORMATION TECHNOLOGY ],</b>
[6]	<b>Third Year B.E. [ ECT/EC/E &amp; C/ IE ],</b>
[7]	<b>Third Year B.E. [ INSTRUMENTATION ],</b>
[8]	<b>Third Year B.E. [ BIOTECHNOLOGY ],</b>
[9]	<b>Third Year B.E. [ CHEMICAL ENGINEERING ].</b>

This is effective from the Academic Year 2013-2014 and onwards.

All concerned are requested to note the contents of this circular and bring the notice to the students, teachers and staff for their information and necessary action.

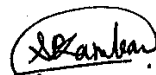
University Campus,  
Aurangabad-431 004.  
REF.NO. ACAD/ NP/ T.Y.B.E/  
SYLLABI / 2013/14140-69

**V.C.14[7] A-07.**

Date:- 15-06-2013.

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**Director,**  
**Board of College and**  
**University Development.**

S-25 March, 2013 AC after Circulars from Circular No.153 & onwards

- 64 -

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**Copy forwarded with compliments to :-**

- 1] The Principals, affiliated concerned Colleges,  
Dr. Babasaheb Ambedkar Marathwada University.
- 2] The Director, University Network & Information Centre, UNIC, with  
**a request to upload the above all syllabi on University Website**  
**[www.bamu.net].**

**Copy to :-**

- 1] The Controller of Examinations,
- 2] The Superintendent, [ Engineering Unit ],
- 3] The Programmer [Computer Unit-1] Examinations,
- 4] The Programmer [Computer Unit-2] Examinations,
- 5] The Superintendent, [ Eligibility Unit ],
- 6] The Director, [E-Suvidha Kendra], in-front of Registrar's Quarter,  
Dr. Babasaheb Ambedkar Marathwada University,
- 7] The Record Keeper,  
Dr. Babasaheb Ambedkar Marathwada University.

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**S\*/150613/-**

**D R. BABASAHEB AMBEDKAR  
MARATHWADA UNIVERSITY,  
AURANGABAD.**



Revised Syllabus of

T.E.

ECT/EC/E&C/IE

*[ Effective from the Academic Year 2013-14 & onwards ]*

### **THIRD YEAR DEGREE COURSE IN ENGINEERING (REVISED)**

**(Applicable from the Academic Year 2013- 2014)**

1. All the Rules and Regulations, hereinafter specified shall be read as a whole for the purpose of interpretation.

#### **ADMISSION**

1. Admission to third year engineering shall be carried out as per the rules and regulations prescribed by the competent authority as appointed by the Government of Maharashtra and Dr. Babasaheb Ambedkar Marathwada University, Aurangabad, from time to time.

#### **DURATION AND COURSES OF STUDY**

1. The duration of the course is four years. Each of the four academic years shall be divided into two semesters herein after referred to as the semester I and semester II in chronological order. Each semester shall comprise

Instructions ..... 15 weeks

Preparation holiday ..... 2 weeks or 15 days

(Includes practical exams)

2. **Candidate who fails to fulfill all the requirements for the award of the degree as specified hereinafter within eight academic years from the time of admission, will forfeit his/her seat in the course and his/her admission will stand cancelled.**

#### **RULES AND REGULATION OF ATTENDANCE**

1. Candidates admitted to a particular course of study are required to pursue a "Regular course of study" as prescribed by the University before they are permitted to appear for the University Examination.
2. "A regular course of study" means putting in attendance not less than 75% for individual subject.
3. a) In special cases and for sufficient causes shown, the Principal of the institute may, on the specific recommendation the Head of the Department, condone the deficiency in attendance to the extent of 15 % on medical ground subject to submission of medical certificate.  
  
b) However, in respect of women candidates who seek condonation of attendance due to pregnancy, the Principal may condone the deficiency in attendance to the extent of 25 % (as against 15 % Condonation for other) on medical grounds subject to submission of medical certificate to this effect. Such condonation be availed twice during the entire course of study leading to degree in Engineering and Technology.

4. "Active Participation in N.C.C/N.S.S. Camps or Inter collegiate or Inter University or Inter State or International matches or debates of Educational Excursions or such other Inter University activities as approved by the authorities involving journeys outside the city in which the college is situated will not be counted as absence. However, such 'absence shall not exceed (4) weeks per semester of the total period of instructions. Such leave should not be availed more than twice during the entire course of study.
5. The attendance shall be calculated on individual papers/subjects from the date of commencement of the semester.
6. In case of the candidates who fail to put in the required attendance in a course of study, he/she shall be detained in the same class and will not be recommended to appear for the University examination.
7. A candidate detained in semester I should take readmission in next academic year as a regular student and shall have to complete all the theory and practicals as a regular student.
8. In case a candidate is detained in semester II, he/she should take admission to Semester II of next academic year and complete all the theory and practicals as a regular student of semester II
9. In case of change of syllabus the candidate even if detained in semester II should take readmission in next academic year for Semester I and II as a regular student and complete all the theory and practical's as a regular student.

#### **SCHEME OF INSTRUCTIONS AND EXAMINATION**

1. Instructions about the curriculum in the various subjects in each semester of all the four years shall be provided by the University.
2. The details of instruction period, examination schedule, vacations etc. shall be notified by the Principal of the College as per the University academic calendar
3. The medium of instruction and examination shall be English.
4. At the end of each semester, University examinations shall be held as prescribed in the respective schemes of examination.

5. The examinations prescribed may include written papers, practical and oral, tests, inspection of certified sessional work in Drawing and Laboratories and work done by students in each practical examination, along with other materials prepared or collected as part of Lab work/Project.
6. All the rules for examinations prescribed by the University from time to time shall be adhered to.
7. A candidate shall be deemed to have fully passed the Examination of a semester, if he/she secures not less than the minimum marks/grade as prescribed.
8. Institutions will be encouraged to adopt modern tools in classroom/labs to deliver the course contents.
9. Institutions will be encouraged to conduct online class tests.

**Q.874**

The Third Year Examination in Engineering will be held in two parts T.E. semester-I and T. E. semester- II. No candidate will be admitted to T.E. semester-I examination unless he/she produce testimonials of having kept one term, for the subject under S.E. semester-I and II satisfactorily in a college of engineering affiliated to this University after passing the Second year examination of engineering other examination recognized as equivalent thereto as per the admission rules to Third year engineering prescribed by the Government of Maharashtra and Dr. B.A.M.University from time to time.

**R.1861**

- i. In case a candidate fails in one or more heads of passing at the T.E. semester-I Examination after taking that examination at the end of first term as a regular student, he/she will be allowed to appear again for only those heads of passing in which he/she has failed at his/her immediately subsequent semester-I examination.
- ii. That the marks obtained by the candidate at semester-I Examination shall be carried forward unless the candidate desires to appear for a paper in which he has failed and then gracing of marks should be done as a whole for semester-I and semester-II examination taken together.

**R.1862**

- a) Candidates who secure 45% or more but less than 50% marks in the aggregate and pass the examination will be declared to have passed the examination in Pass Division.
- b) Candidates who secure 50% or more but less than 60% marks in the aggregate and pass the examination will be declared to have passed the examination in Second Division.
- c) Candidates who secure 60% or more but less than 66% marks in the aggregate and pass the examination will be declared to have passed the examination in first Division.
- d) Candidates who secure 66% or more marks in the aggregate and pass the examination will be declared to have passed the examination in First Division with Distinction.
- e) For calculating the percentage for the purpose of giving weightage while awarding division in

Final Examination to the students admitted to first year engineering, the maximum marks prescribed and the marks obtained by the examinee in the particular examinations shall be taken into consideration with the following weightages.

**F.E. - 10%,  
S.E. - 10%,  
T.E. - 40% ,  
B. E. - 40%**

This shall be applicable for the students admitted in first year from academic year 2011-2012 onwards.

- f) In case of the students directly admitted to the second year, the weightage while awarding Division in Final Examination the maximum marks prescribed and the marks obtained by the Examinee in the particular examinations shall be taken in to consideration

**S.E. - 20%,  
T.E. - 40%  
B. E. - 40%**

This shall be applicable for the students admitted in second year from academic year 2012-2013 onwards.

### **R.1863**

In case a candidate fails in the examination but desires to appear again thereat.

- a) He may, at his option, claim exemption from appearing in the head or heads of passing in which he has passed.
- b) Such exemption, if claimed, shall cover all the heads of passing- in which it can be claimed.
- c) Such exemption, if not availed of at the immediately subsequent appearance of the candidate at the examination, shall be deemed to have lapsed.
- d) He /She may, at his option claim exemption from appearing in head or heads of passing of his choice and appear in the remaining head or head/s of passing to make-up the deficiency in the aggregate, if he has passed in all the heads of passing but has failed to secure a minimum of 45% of the aggregate marks.
- e) The Marks obtained by a candidate for such term work as separately assessed will be carried over unless fresh term work is presented by him. A candidate whose marks are thus carried over shall be eligible for a division provided he/she does not avail himself of exemption in any head of passing excepting term work.
- f) For the purpose of deciding whether a candidate claiming exemption in accordance with (a), (b), (c) above or (d) and (e) above has as required by R.260 secures 45% of the total marks obtainable in the whole examination the marks at his/ her previous examination/examination in the head or heads of passing in which he/she is exempted will be carried over. Candidates passing the examination in this manner shall not be eligible for a division or prizes or scholarships at the

examination.

**R.1864**

**RULE FOR COMBINED PASSING**

1) To pass the examination a candidate must obtain minimum 40% of Marks in each Theory Paper & class test taken together however the candidate must obtain minimum 35% of Marks at the University theory Examination. The candidate must obtain a minimum aggregate of 45% of the total Marks obtainable at the T.E. Semester -I & II Examination taken together.

To pass a subject where there is no provision of class test, the candidate must obtain 40% of Marks in the University Examination.

Gracing should be done for the performance at University Examination or University Examination and class test taken together.

Minimum two-class tests should be conducted in a semester for the theory subject if provided. The average performance of the Two-class tests should be forwarded to the University by the college along with the term work marks.

If candidate fails to secure 40% of marks at university theory examination and class test taken together at the regular semester examination, then he/she shall have to appear for university examination from subsequent examination onwards and secure 40% of marks at university examination and earlier obtained class test marks taken together. The improved performance at the university examination should not be considered for the Merit/Medal/Prize etc.

If the candidate remains absent for the class-test, his performance should be treated as 'Zero' Marks.

Minimum marks required for passing in term work and practical shall be 40%. If a candidate secures less than 40% in any of the term work or fails to submit term work shall be detained in the same class.

**RULE FOR A T K T**

**For securing ATKT at Third Year Engineering Course candidate should clear (pass) as per the provision of R.1864(A) in at least 13 heads of passing out of 17 heads of passing.**

**R.1865**

**GENERAL RULES OF EXAMINATION**

1. Application for permission to appear at every examination shall be made in the prescribed format



accompanied by one passport size full face photograph (not profile) along with the necessary certificates and the prescribed fee, should be submitted to the Principal of the institute on or before the date fixed for this purpose.

2. When a candidate's application is found in order and he/she is eligible to appear at an Examination, the Principal of the institute is empowered to furnish him/her with a Hall-Ticket with the photograph affixed to it, enabling the candidate to appear in the Examination, and this Hall-Ticket shall have to be produced by the Candidate before he/she is admitted to the premises where the Examination is being held.
3. A Candidate who does not present himself/herself for the examination for any reason whatsoever, excepting shortage of attendance, shall not be entitled to claim refund of the whole or part of the examination fee, for subsequent Examination(s).
4. As engineering is a full time course, no candidate shall be allowed to put in attendance for a course or appear at examinations for different degrees and different faculties at one and the same time.
5. Students who have appeared once at any examination of the course need not put in fresh attendance, if they wish to reappear at the corresponding examination, notwithstanding the fact that the College may have introduced new subject. They will, however, have to appear at the examinations according to the scheme of examination and syllabi in force

### **R.1866**

#### **EQUIVALENCE OF THE SUBJECTS**

Whenever a course or scheme of instruction is changed in a particular year, three more examinations immediately following thereafter shall be conducted according to the old syllabi/regulations. Also candidates not appearing at the examinations or failing in them shall take the examination subsequently according to the changed syllabi/ regulations as per the equivalence of the subjects as prescribed by the University.

#### **Proposed Coding System of Subject/Paper**

##### **Six digit code for a subject (UG course)**

<b>Batch</b>	<b>Year</b>	<b>Subject no</b>
CED	1. First Year UG	<b>Semester-I</b> 1-20 Theory 21-30 practical 31-40 Service Courses 41-49 Electives
MED	2. Second Year UG	
EEP	3. Third Year UG	
ECE	4. Fourth Year UG	
EXE	5. Fifth Year UG	
ETC		<b>Semester-II</b> 51-70 Theory
IEX		
PED		
CSE		
CTD		
COE		

ITD		71-80 Practical
EED		81-90 Service Courses
EEE		
ARH		91-99 Electives
BSH		
BTD		

**Structure of syllabus of subject**

<b>Code No:</b>	<b>Title: Teaching</b>
<b>Scheme</b>	<b>Examination Scheme</b>
<b>Theory: hours/week</b>	<b>Class Test: Marks</b>
<b>Tutorial: hours/week</b>	<b>Theory examination: Maximum hours</b>
<b>Practical/ TermWork : hours/week</b>	<b>Theory examination: Maximum Marks</b>
	<b>Practical/ Oral examination: Maximum Marks</b>
<b>Objectives: 1</b>	
2	
3	
<b>Unit 1:</b>	
<b>Unit 2:</b>	
<b>Unit 3:</b>	
<b>Unit 4:</b>	
<b>Unit 5:</b>	
<b>Unit 6:</b>	
<b>Text Books: 1</b>	
2	
<b>Reference Books: 1</b>	
2	
3	
4	

**Pattern of Question Paper:**

The six units in the syllabus shall be divided in two equal parts i.e 3 units respectively. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

**For 80 marks Paper:**

1. Minimum ten questions
2. Five questions in each section
3. Question no 1 from section A and Question no 6 from section B be made compulsory and should have at least eight bits of two marks out of which five to be solved
4. Two questions from remaining questions from each section A and B be asked to solve having weightage of 15 marks

**For 40 marks Paper:**

1. Minimum eight questions
2. Four questions in each section

3. Question no 1 from section A and Question no 5 from section B be made compulsory and should have at least five bits of two marks out of which three to be solved.
4. Two questions from remaining questions from each section be asked to solve having weightage of 7 marks.

**0.95 G R A C E MARKS FOR PASSING IN EACH HEAD OF PASSING (THEORY / PRACTICAL / ORAL / SESSIONAL) (EXTERNAL / INTERNAL)**

The examinee shall be given the benefit of grace marks only for passing in each head of passing (Theory/practical/Oral/ Sessional) in external or Internal examination as follows:-

Head of passing	Grace Marks upto
Up to 50	2
051 to 100	3
101 to 150	4
151 to 200	5
201 to 250	6
251 to 300	7
301 to 350	8
351 to 400	9
And 401 and above	10

Provided that the benefit of such gracing marks given in different heads of passing shall not exceed 01 (one) percent of the aggregate marks in that examination.

Provided, further that the benefit of gracing of marks under this ordinance shall be applicable only if the candidate passes the entire examination of semester/year.

Provided further that this gracing is concurrent with the rules and guidelines of professional statutory bodies at the All India level such as AICTE, MCI, Bar Council, CCIM, CCIH, NCTE, UGC etc.

**0.96 GRACE MARKS FOR GETTING HIGHER CLASS**

A candidate who passes in all the subjects and heads of passing in the examination without the benefit of either gracing is condonation rules and whose total number of marks falls short for securing Second Class/Higher Second class of First Class by marks not more than 01 percent of the aggregate marks of that examination or up to 10 marks, whichever is less, shall be given the required marks to get the next higher class or grade as the case may be.

Provided that benefit of the above mentioned grace marks shall not be given, if the candidate fails to secure necessary passing marks in the aggregate head of passing also, if prescribed in the examination concerned.

Provided further that this gracing is concurrent with the rules and guidelines of professional statutory bodies at the All India level such as AICTE, MCI, Bar Council, CCIM, CCIH, NCTE etc.

**0.97 GRACE MARKS FOR GETTING DISTINCTION IN THE SUBJECT ONLY.**

A candidate who passes in all the subject/heads of passing in the examination without benefit of either

gracing or condonation rules and whose total number of marks in the subject/s falls short by not more than three marks for getting distinction in the subject/s shall be given necessary grace marks up to three in maximum two subjects, subject to maximum 01(one) percent of the total marks of that head of passing whichever is more, in a given examination.

Provided that benefit of the above mentioned grace marks shall be given to the candidate only for such examination/s of which provision for distinction in a subject has been prescribed.

Provided further that this gracing is concurrent with the rules and guidelines of professional statutory bodies at the All India level such as AICTE, MCI, Bar council, CCIM, CCIH, NCTE etc.

#### **0.98 CONDONATION**

If a candidate fails in only one head of passing, having passed in all other heads of passing, his/her deficiency of marks in such head of passing may be condoned by not more than 01 percent of the aggregate marks of the examination or 10 percent of the total number of marks of the head of passing in which he/she is failing, whichever is less. However, condonation, whether in one head of passing or aggregate head of passing be restricted to maximum upto 10 marks only.

Condonation of deficiency of marks be shown in the statement of marks in the form of asterisk and ordinance number.

Provided that this condonation of marks is concurrent with the rules and guidelines of

Professional statutory bodies at the all india level such as AICTE, MCI, Bar council, CCIM, CCIH, NCTE etc.

#### **0.106 (A) UNFAIR MEANS COMMITTED BY THE STUDENT**

1. The Board of Examinations shall be the competent authority to take disciplinary action against a student for his misconduct due to his unfair means committed by him at the examination conducted by the University.
2. The Principal, of the college or Head of the recognized Institution shall be the competent authority to take disciplinary action against a student for his misconduct due to his unfair means committed by him at the examination conducted by the University, recognized Institution of behalf of the University.
3. Definition- Unless the context otherwise requires
  - (a) Student means and includes a person who is enrolled as such by the University/college/Institution for receiving instruction qualifying for any degree, diploma or certificate awarded by the University. It includes ex-student and student registered as candidate (examinee) for any of the Degree, Diploma or Certificate examinations.
  - (b) Unfair Means includes one or more of the following acts or omissions on the part of student/s during the examination period.
    - i. Possessing unfair means material and or copying there from.

- ii. Transcribing any unauthorized material or any other use thereof.
  - iii. Intimidating or using obscene language or threatening or use of violence against invigilator or person on duty for the conduct of examination or man-handling him/her or leaving the examination hall without permission of the supervisor or causing disturbances in any manner in the examination proceedings.
  - iv. Unauthorized communicating with other examinees or any one else inside or out side the examination hall.
  - v. Mutual/Mass copying
  - vi. Smuggling out, either blank or written or smuggling in of answer books as copying material.
  - vii. Smuggling in blank or written answer book, forging and forging signature of the Jr. Supervisor therein.
  - viii. Interfering with or counterfeiting of University/College Institution seal or answer books or office stationary used in the examination.
  - ix. Impersonation at the University/college/Institution examination.
  - x. Revealing identity in any form in the answer written or in any other part of the answer book by the student at the University or College or Institution examination.
  - xi. Or any other similar act/s omission/s which may be considered as unfair means by the competent authority.
- (c) "Unfair means relating to examination" means and includes directly or indirectly communicating or attempting to commit or threatening to commit any act or coercion, undue influence or fraud or malpractice with a view to obtaining wrongful gain to him or to any other person or causing wrongful loss to other person/s.
- (d) "Unfair means material" means and includes any material whatsoever, related to the subject of the examination, printed, typed, handwritten or otherwise on the person or on clothes, or body of the student (examinee) or on wood or other material, in any manner or in the form of chart, diagram, map or drawing or electronic aid etc. which is not allowed in the examination hall.
- (e) "Possession of unfair means material by a student" means having any unauthorized material on his/her person or desk or chair or table or at any place within his/ her reach, in the examination centre and its environs or premises at any time from the commencement of the examination till its conclusion.
- (f) " Student found in possession" means a student reported in writing as having been found in possession of unfair means material by Jr. Supervisor, Sr. Supervisor, member of the Vigilance committee or Examination squad or any other person authorized for this purpose in this behalf, even if the unfair means material is not produced as evidence because of its being reported as swallowed or destroyed or snatched away or otherwise taken away or spoiled by

the student or by any other person acting on his behalf to such an extent that it has become illegible.

Provided that report to that effect is submitted by the Sr. Supervisor or chief Conductor or any other authorized person to the Controller of Examinations, Principal or Head of the Institutions concerned or any officer authorized in this behalf.

- (g) Material related to the subject of Examination means and includes, if the material is produced as evidence any material certified as related to the subject of examination by a competent person and if the material is not produced as evidence or has become illegible for any of the reasons referred to in clause (f) above, the presumption shall be that the material did relate to the subject of the examination.
- (h) "Chief Conductor", means and includes, Principal of the College concerned, or Head of the recognized institution concerned where concerned examination is being conducted and any other person duly authorized by him or person appointed as In charge of examination, by the authority competent to make appointment to such post.
4. Where the examination of the University courses are conducted by the constituent college/recognized Institute on behalf of the University, the Principal/Head of the concerned college/recognized Institution on receipt of a report regarding use of unfair means by any student at any such examination including breach of the rules laid down by the Management council or by the College/recognized institution for proper conduct of examination, shall have power at any time to institute inquiry and to punish such unfair means or breach of any of the rules by exclusion of such a student from any such examination or any University course in any college/Institution either permanently or for a specified period or by cancellation of the result of the student in the college/recognized Institution examination for which he/she appeared or by deprivation of any college/Institution scholarship or by cancellation of the award of any college/Institution prize or medal to him/her or by imposition of fine not exceeding Rs.300/- or in any two or more of the aforesaid ways.
5. During examination, examinees and other students shall be under disciplinary control of the Chief Conductors.
6. Chief Conductor/s of the examination centre shall in the case of unfair means, follow the procedure as under:-
- (a) The student shall be called upon to surrender to the Chief Conductor, the unfair means material found in his or her possession, if any, and his/her answer-book.
- (b) Signature of the concerned student shall be obtained on the relevant materials and list thereon. Concerned Senior Supervisor and the Chief Conductor shall also sign on all the relevant materials and documents.
- (c) Statement of the student and his undertaking in the prescribed format and the statement of the concerned Jr. Supervisor and Sr. Supervisor shall be recorded in writing by the Chief Conductor (Appendix-III). If the student refuses to make statement or to give undertaking the concerned Sr. Supervisor and / or Chief Conductor shall record accordingly under their signature.

- (d) Chief Conductor shall take one or more of the following decisions depending upon seriousness/gravity of the case:-
- i) In the case of impersonation or violence, expel the concerned student from the examination and not allow him/her to appear for remaining examination.
  - ii) Obtain undertaking from the student to the effect that the decision of the concerned competent authority in his/her case shall be final and binding and allow him/ her to continue with his/ her examination.
  - iii) May report the case to the concerned Police Station as per the provision of Maharashtra Act No. XXXI 1982 – An act to provide for preventing Malpractice's at University Board and other specified examinations (Appendix-III) (Performa A& B).
  - iv) Confiscate his / her answer books, mark it as suspected unfair means case and issue him/her fresh answer books duly marked.
  - v) All the material and list of material mentioned in sub-clause (a) and the undertaking with the statement of the student and that of the Jr. Supervisor as mentioned in clause no. (b) & (c) and the answer-book/s shall be forwarded by the Chief conductor along with his report to the concerned Controller of Examinations/Principal/Head of the Institution, as the case may be, in a separate and confidential sealed envelope marked " suspected unfair means case"
  - vi) In case of unfair means of oral type, the Jr. Supervisor and the Sr. Supervisor or concerned authorized person shall record the facts in writing and shall report the same to the concerned Controller of Examinations/Principal/Head of the Institutions, as the case may be.

### **PUNISHMENT**

The competent authority concerned i.e. the Board of Examinations in the case of University examination, the concerned Principal in the case of college examinations held by the recognized Institutions, after

taking into consideration the report of the committee shall pass such orders as it deem fit including granting the student benefit of doubt, issuing warning or exonerating him/her from the charges and shall impose any one or more of the following punishment on the student/s found guilty of using unfair means:-

- (a) Annulment of performance of the student in full or in part in the examination he/she has appeared for.
- (b) Debarring student from appearing for any examination of the University or college Institution for a stipulated period not exceeding five year.
- (c) Debarring student from appearing for any examination of the University or college Institution for a stipulated period not exceeding five year.
- (d) Cancellation of the University or College or Institution scholarship/s or award/s prize or medal etc. awarded to him/her in that examination.

- (e) In addition to the above mentioned punishment, the competent authority may impose a fine not exceeding Rs.300/- on the student declared guilty. If the student concerned fails to pay the fine within a stipulated period, the competent authority may impose on such a student additional punishment/penalty as it may deem fit.
- (f) The student concerned be informed of the punishment finally imposed on him/her in writing by the competent authority or by the officer authorized by it in this behalf, under intimation to the College/Institution he/ she belongs to.
- (g) An appeal against the findings of the committee shall lie with the concerned competent authority whose decision shall be final and binding.
- (h) An appeal made in writing within a period of 30 days from the date imposition of the punishment shall be considered by the competent authority on merit and shall be decided on the basis of the evidence available in the case and shall be heard in person in deserving cases, if the competent authority finds substance in the appeal, the competent authority shall supply a typed copy of the relevant extract of fact-finding report of the inquiry committee, as well as documents relied upon (if not strictly confidential). Decision in the appeal shall be informed to the student concerned accordingly.
- (i) The court matters in respect of the unfair means cases should be dealt with by the respective competent authority.
- (j) As far as possible the quantum of punishment should be as prescribed (Category-wise in Appendix-I

#### APPENDIX-I

THE BROAD CATEGORIES OF UNFAIR MEANS ADOPTED BY STUDENTS AT THE UNIVERSITY/ COLLEGE/ INSTITUTION EXAMINATION AND THE QUANTUM OF PUNISHMENT FOR EACH CATEGORY THEREOF.

Sr. No.	Nature of Malpractices	Quantum of Punishment
1.	Possession of copying material	(Note:- This quantum of punishment Shall apply also of the following categories of malpractices at Sr. No. 2, to Sr. No.12 in addition to the Punishment prescribed thereat)
2.	Actual copying from the copying material	Exclusion of the student from university or College or Institution examination for one additional examination.
3.	Possession of another students Answer Book	Exclusion of the student from University or College or Institution examination for one additional examination (Both the students)



4.	Possession of another students Answer book+ actual evidence of Copying	Exclusion of the student from University or College or Institution examination for two additional examination (Both the Students)
5.	Mutual / Mass copying.	Exclusion of the student from University or College or Institution examination for two additional examinations.
6 (a)	Smuggling out or smuggling in of Answer book as copying material.	Exclusion of the student from University or College or Institution examination for two additional examinations.
(b)	Smuggling in of written answer book based on the question paper set at the examination	Exclusion of the student from University or College or Institution examination for three additional examinations
(c)	(c) Smuggling in of written answer book and forging signature of Jt, Supervisor thereon	Exclusion of the student from University or College or Institution. Examination for four additional examinations.

7.	Attempt to forge the signature of the Jr. Supervisor on the answer book or Supplement.	Exclusion of the student from the University or College or Institution examination for four additional examinations.
8	Interfering with or counterfeiting of University / College/ Institution seal or Answer books or office stationary used in the examination	Exclusion of the student from University or College or Institution examination for four additional examinations.
9.	Answer book main or supplement written outside the examination hall or any other insertion in answer book.	Exclusion of the student from University or College or Institution examination for four additional examinations.
10.	Insertion of currency notes/to bribe or attempting to bribe any of the persons/s connected with the conduct of Examination	Exclusion of the student from University or College or Institution Examination for four additional examinations. (Note:- This money shall be created to the Vice-Chancellor's Fund)
11.	Using obscene language/violence/ threat at the examination centre by a student at the University/ College / Institution Examination to Jr./ Sr. Supervisor/ Chief Conductor or Examiners.	Exclusion of the student from University or College or Institution examination for four additional Examinations.

12.(a)	Impersonation at the University/ College / Institution examination	Exclusion of the Student from University or College or Institution examination for five additional examinations, (Both the students if impersonator is University or College or Institute student)
(b)	Impersonation by a University/ College/ Institute student at S.S.C./ H.S.C./ any other Examinations.	Exclusion of the Student from University or College or Institution examination for five additional examinations
13.	Revealing identity in any form in the answer written or in any other part of the Answer book by the student at the University or College or Institution Examination	Annulment of the performance of the student at the University or College or Institution Examination in full.
14.	Student found having written on palms or on the Body, or on the clothes while in the	Annulment of the performance of the student at University or College or

	Examination	Institution Examination in full.
15.	All other mal-practices not covered in the aforesaid categories.	Annulment of the performance of the student at the University or college or Institution Examination in full and severe punishment depending upon the gravity or the offence.
16.	If on previous occasion a disciplinary action was taken against a student for malpractice used at examination and he/she is caught 'again for malpractices used at the examinations, in this event he/she shall be dealt with severely. Enhanced punishment can be imposed on such student. This enhanced punishment may extend to double the punishment provided for the offence when committed at the second or subsequent examination.	
17.	<b>PRACTICAL/DISSERTATION/PROJECT REPORT EXAMS.</b>	
	Student involved in malpractices at practical/ dissertation/ project report examination shall be dealt with as per the punishment provided for the theory examination.	
18.	The competent authority in addition to the above mentioned punishments may impose a fine not exceeding Rs. 300/- on the student declared guilty. Note:- The term annulment of performance in full' includes performance of the student of the theory as well as annual practical examination, but does not include performance at term work, project work and dissertation examination unless malpractice used thereat.	

Dr. Babasaheb Ambedkar Marathwada University Aurangabad  
Faculty of Engineering & Technology  
Tentative structure of Third Year (ECT/EC/E&C/IE)

Sr.No.	Semester - I	Contact Hrs/Week				Examination Scheme (Marks)					Durati on of Theory Exam.
		L	T	P	Total	CT	TH	TW	PR	Total	
Sub Code	Subject										
<b>Part- I</b>											
EXD301	Digital Signal Processing	4	-	-	4	20	80	-	-	100	3 hrs.
EXD302	Electromagnetic Engineering	4	-	-	4	20	80	-	-	100	3 hrs.
EXD303	Microprocessors and Peripheral	4	-	-	4	20	80	-	-	100	3 hrs.
EXD304	Digital Communication	4	-	-	4	20	80	-	-	100	3 hrs.
EXD305	Analog Integrated Circuit and Applications	4	-	-	4	20	80	-	-	100	3 hrs.
EXD321	Lab-1- Digital Signal Processing	-	-	2	2	-	-	50		50	
EXD322	Lab-2- Microprocessors and Peripheral	-	-	2	2	-	-	-	50	50	
EXD323	Lab-3- Digital Communication	-	-	2	2	-	-	-	50	50	
EXD324	Lab-4- Analog Integrated Circuit and Applications	-	-	2	2	-	-	-	50	50	
BSH331	Lab-5 –Communication Skills –II	-	-	2	2	-	-	-	50	50	
Total of Part-I		20		10	30	100	400	50	200	750	
<b>Part- II</b>											
EXD351	Power Electronics	4	-	-	4	20	80	-	-	100	3 hrs.
EXD352(a)	Signal Coding & Estimation Theory (EC/ECT/E&C)	4	-	-	4	20	80	-	-	100	3 hrs.
EXD353	Advanced Processors & Microcontroller	4	-	-	4	20	80	-	-	100	3 hrs.
EXD354	Feedback Control System	4	-	-	4	20	80	-	-	100	3 hrs.
EXD352(b)	Industrial Drives & Control (IE)	4	-		4	20	80	-	-	100	3 hrs.
EXD355	Electronic System Design	4	-		4	20	80	-		100	3 hrs.
EXD371	Lab 1- Power Electronics	-	-	2	2	-	-	-	50	50	4 hrs.
EXD372	Lab 2 -Advanced Processors & Microcontroller	-	-	2	2	-	-	-	50	50	
EXD373	Lab 3-Feedback Control System	-	-	2	2	-	-	-	50	50	
EXD374	Lab 4- Electronic System Design	-	-	2	2	-	-	50	-	50	
EXD375	Seminar	-	-	2	2	-	-	50		50	
Total of Part-II		20	-	10	30	100	400	100	150	750	
<b>Total of Part-I &amp; II</b>		<b>40</b>		<b>20</b>	<b>60</b>	<b>200</b>	<b>800</b>	<b>150</b>	<b>350</b>	<b>1500</b>	

**Note:** 1. Minimum two tests should be conducted for each theory subject and average of best two tests should be considered.  
2. If feasible, all the students shall undergo In-plant Training of two to four weeks in concerned Industry, during summer vacation. They should submit a report and give presentation on the same during Final Year.

**L:**Lecture hrs/ week, **T:** Tutorial hrs/ week, **P:**Practical hrs/ week, **TH:** University Theory Exam, **TW :** Term Work, **PR:** Practical or Oral Exam.

**Dr. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD**  
**FACULTY OF ENGINEERING AND TECHNOLOGY**  
**THIRD YEAR (EC/ECT/E&C/IE) ENGINEERING**

<b>SEMESTER-I</b>	
<b>EXD-301 – Digital Signal Processing</b>	
<b>Teaching Scheme: 4Hrs/week</b> <b>Practical: 2Hrs/week</b>	<b>Examination Scheme</b> <b>Theory Examination : 80 Marks</b> <b>Class Test : 20 Marks</b> <b>Practical/Oral : ---</b> <b>Term Work: 50 Marks</b>
<b>Objective:</b> 1. To study & classify different signals. 2. To analyze LTI system in the z-domain 3. To study LTI discrete system in the transform-domain 4. To design IIR filter & FIR filters & FIR filters	
<b>Unit-1</b>	
<b>Overview</b> <b>Elementary Discrete-Time Signals:</b> Unit sample sequence, Unit step signals, Unit ramp signal, and exponential signal. Overview of signals and systems, Fourier signals and Fourier transform of discrete time signals, convolution, and correlation. Applications of DSP, Limitations of DSP.	04
<b>Unit-2</b>	
<b>The Z- Transform:</b> The direct Z -transform , the inverse Z -Transform, properties of the Z- transform, Rational Z -transforms , inversion of the Z- transform , stability in Z –domain , the one sided Z- transform. Relation between Laplace Transform and Z –transform, Relation between Fourier transform and Z-transform.	08
<b>Unit-3</b>	
<b>The Discrete Fourier Transforms (DFT) and Fast Fourier Transform (FFT):</b> Frequency domain sampling, the Discrete Fourier Transforms (DFT), The DFT as a linear transformation, properties of the DFT , circular convolution, linear convolution vs. circular convolution. <b>FFT Algorithms:</b> Decimation-in –time (DIT) algorithm , Decimation –in-frequency (DIF) algorithm ,computation of inverse DFT using FFT, <b>fast convolution techniques:</b> Overlap- add method, overlap-save method.	08
<b>Unit-4</b>	
<b>Infinite Impulse Response Filters:</b> IIR filter designed by approximation of derivatives, impulse invariant transformation, Bilinear transformation, Butterworth filters, design of digital Butterworth filters, Determination of the filter parameters, parameters for Butterworth filter, Butterworth filter using the bilinear transformation and impulse invariant transformation, Introduction to Chebyshev and Elliptic filters , frequency transformation, structures for realization of IIR systems.	08

<b>Unit-5</b>	
<b>Finite Impulse Response Filters:</b> Ideal filter requirements, Gibbs phenomenon, magnitude and phase response of digital filters, frequency response of linear phase FIR filters, <b>Design techniques for FIR filters:</b> Fourier series method, frequency sampling method, and window techniques, , structures for realization of FIR systems.	08
<b>Unit-6</b>	
<b>Finite Word Length Effect in Digital Filters:</b> Quantization by truncation and rounding, quantization of input data, quantization of filter co-efficients, product quantization error, limit cycles in recursive systems, quantization error in computation of DFT.	04
<b>Reference Books:</b> <ol style="list-style-type: none"> <li>1. Sanjit K. Mitra, "Digital Signal Processing", Tata Mc Graw- Hill.</li> <li>2. S. Salivahanan and C Gnanapriya, "Digital Signal Processing", Tata Mc Graw- Hill</li> <li>3. N. Nagoor Kani, "Digital Signal Processing", Tata Mc Graw- Hill</li> <li>4. John G.Proakis, and Dimitris G. Manolakis, "Digital Signal Processing Principales, Algorithms and Applications", P H I Publication.</li> <li>5. A.V.Oppenheim, R.W.Schaffeur, "Discrete- Time Signal Processing Principles, Alogorithms and applications", P H I Publication.</li> <li>6. Johnny R. Johnson, " Introduction to Digital Signal Processing", P H I Publication.</li> <li>7. Shilla D.Apte, " Digital Signal Processing", Wiley India.</li> <li>8. Thomas J. Cavicchi, " Digital Signal Processing", Wiley India.</li> </ol>	
<b>EXD321 - List of Experiment:</b> <ol style="list-style-type: none"> <li>1. Zero – pole analysis using transfer function, zero – pole – gain</li> <li>2. Partial fraction expansion and second order sections and convolution matrix</li> <li>3. Spectral analysis</li> <li>4. FFT based time frequency analysis</li> <li>5. IIR filter design Butterworth and chebyshev type I and type II</li> <li>6. FIR filters design linear phase and windows.</li> </ol> <p style="text-align: center;">Any other experiments based on the above Syllabus.</p>	
<b>Section A: Unit 1, 2, 3</b> <b>Section B: Unit 4,5,6</b> <b>PATTERN OF QUESTION PAPER</b> Six units in the syllabus shall be divided into equal parts i.e. three units in each part. Question paper shall be set having two sections A and B, as per weightage of units. Section A question shall be set on first part and section B on second part. Question paper should cover entire syllabus. <b>For 80 Marks papers:</b> <ol style="list-style-type: none"> <li>1) Section A &amp; Section B should be of 40 marks each.</li> <li>2) Five questions in each section.</li> <li>3) Out of five four questions asked should be of 15 Marks &amp; one question asked should be 10 Marks.</li> <li>4) 10 marks question will be compulsory.</li> </ol>	

**Dr. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD**  
**FACULTY OF ENGINEERING AND TECHNOLOGY**  
**THIRD YEAR (EC/ECT/E&C/IE) ENGINEERING**

<b>SEMESTER-I</b>	
<b>EXD302 - Electromagnetic Engineering</b>	
<b>Teaching Scheme: 4Hrs/week</b> <b>Practical: NA</b>	<b>Examination Scheme</b> <b>Theory Examination : 80 Mark</b> <b>Class Test : 20 Marks</b> <b>Practical/Oral : ---</b> <b>Term Work: ----</b>
<b>Objective:</b> 1. To train the students with different laws, equations & electric field intensity related to electromagnetic engineering. 2. To study energy & potential in an electric field. 3. To study conductors, dielectric & capacitance of a material. 4. To study magnetic forces, material & inductance. 5. To analyze wave propagation in an uniform plane.	
<p style="text-align: center;"><b>Unit-1</b></p> <b>Vector Analysis and Coordinate systems:</b> Scalars and Vectors, Vector Algebra, Cartesian, Cylindrical and Spherical Coordinate System, Conversion of vectors between the coordinate systems, Differential length, Area and Volume.	4
<p style="text-align: center;"><b>Unit-2</b></p> <b>Electrostatics:</b> Coulombs Law, Electric Field Intensity Field due to a continuous volume charge distribution Field of a Line Charge, Field of a sheet charge, Electric Flux Density, Gauss' Law, Applications of Gauss' Law to symmetrical charge distribution and differential volume Element, Divergence and divergence theorem. Maxwell's First law.	8
<p style="text-align: center;"><b>Unit-3</b></p> <b>Energy, Potential, Conductors, Dielectrics, and Capacitance:</b> Energy and potential in a moving point charge in an electric field, Potential difference and potential, Potential field of a point charge, Potential gradient, dipole and energy density in the electric field, Current and Current Density, Continuity of current, Metallic Conductors, Conductor properties and boundary conditions, Dielectric materials, Boundary conditions for perfect dielectric materials, Capacitance.	8
<p style="text-align: center;"><b>Unit-4</b></p> <b>The Steady Magnetic Field Magnetic Forces, Materials and Inductance:</b> Biot-Savart Law Amperes Circuital Law, Curl, Stokes theorem, Magnetic flux and Magnetic flux density. Force on a Moving Charge and Differential Current Element, Force and Torque on a Closed Circuit, Magnetic Materials, Magnetization and Permeability, Magnetic Boundary Conditions. The Magnetic Circuit, Potential Energy and Forces on Magnetic Materials, Inductance and Mutual Inductance.	10

<b>Unit-5</b>	
<b>Time-Varying Fields and Maxwell's equations:</b> Faraday's Law, Displacement Current, Maxwell's Equations in point form and integral form	4
<b>Unit-6</b>	
<b>The Uniform Plane Wave:</b> Wave Propagation in Free Space, dielectrics, Good conductors, Skin effect, Poynting Vector and power considerations, Reflection of Uniform Plane Waves at normal incidence Standing wave ratio.	6
<b>Text Books:</b>	
1)Engineering Electromagnetics W H Hayt,J A Buck Tata Mc Graw Hill	
2)Problems and Solutions in Electromagnetics W H Hayt,J A Buck Tata Mc Graw Hill	
3)Principles of Electromagnetics R G Kaduskar Wiley India	
<b>Reference Books:</b>	
1)Introduction to Electrodynamics 3 <sup>rd</sup> Edition : David J. Griffiths PHI Learning	
2) Electromagnetic Field Theory and Transmission Lines G S N Raju Pearson Education	
3)Electromagnetic Field Theory and Transmission Lines G S Rao Wiley India Ltd	
<b>List of Experiment: N.A</b>	
<b>Section A: Unit 1, 2, 3</b>	
<b>Section B: Unit 4, 5, 6</b>	
<b>PATTERN OF QUESTION PAPER</b>	
Six units in the syllabus shall be divided in to equal parts i.e. three units in each part. Question paper shall be set having two sections A and B, as per weightage of units. Section A question shall be set on first part and section B on second part. Question paper should cover entire syllabus.	
<b>For 80 Marks papers:</b>	
1) Section A & Section B should be of 40 marks each.	
2) Five questions in each section.	
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4) 10 marks question will be compulsory.	

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<b>SEMESTER-I</b>	
<b>EXD303- Microprocessor and Peripherals</b>	
<b>Teaching Scheme: 4Hrs/week</b>  <b>Practical: 2Hrs/week</b>	<b>Examination Scheme</b> <b>Theory Examination : 80 Mark</b> <b>Class Test : 20 Marks</b> <b>Practical/Oral : 50 Marks</b> <b>Term Work: ---</b>
<b>Objective:</b> 1. To train the students on fundamentals of Microprocessor 8085. 2. To train the students on basic design issues of processors. 3. To study Assembly Language Programming and newer technology in Microprocessors. 4. To interface ADC, DAC, Memory. 5. Develop the small module with 8085 Microprocessor.	
<b>Unit-1</b> <b>Introduction to Microprocessor:</b> Overview of Microprocessor architecture and its operation, Classification of computers, Microprocessor evolution, Programming Development Tools.	03
<b>Unit-2</b> <b>Microprocessor 8085:</b> Pin diagram, Architecture, Addressing Modes, Timing diagram, Instruction Set, Programming Techniques, different programs.	08
<b>Unit-3</b> Counters & time delays, stack & subroutines, Interrupt structure, Different data transfer schemes, need of I/O Ports, memory mapping, memory mapped I/O & I/O mapped I/O memory types, memory organization , use of memory , exhaustive & partial decoding, design examples.	09
<b>Unit-4</b> <b>Microprocessor System Peripheral and Interface :</b> Introduction to 8155,8255,8355, Interfacing of LED's, 7 Segment display, ADC/DAC, Stepper motor & keys with 8255	08
<b>Unit-5</b> <b>Peripherals:</b> USART8251,Programmeable Interval Timer 8253,Programmeable Interrupt Controller 8259 interfacing with 8085	08
<b>Unit-6</b> <b>Applications:</b> measurement of voltage /current, frequency time control, speed control, of DC motor, digital IC tester, logic Analyzer.	04



**Reference Books:**

1. Microprocessor, Architecture, Programming and Application- Ramesh Gaonkar, Willey Eastern Ltd,
2. 0000 to 8085- Shridhar Ghosh, Prentice Hall India
3. Fundamentals of Microprocessor and Microcomputer- B. Ram, Dhanpat Rai and Sons, New Delhi.
4. Microprocessor and Programming Logic- K.L. Short, Prentice-Hall India Pvt. Ltd.
5. Advanced Microprocessors and Peripherals- Ray & Bhurchandi, Tata McGraw Hill
6. Microprocessors and Interfacing- D. Hall, Tata McGraw Hill  
The Intel Microprocessors
7. Architecture, Programming & Interfacing- Berry Bray,C.R.Sharma , Pearson Education
8. Microprocessor and Microcomputer Based System Design- Mohammad Raffiquazaman, Universal Book Stall, New Delhi

**EXD322- List of Experiment:**

1. Study of 8085 Microprocessor Kit used in laboratory.
2. Write a program to transfer a block of 10 bytes.
3. Write a program to add two 8- bit and 16 bit number using 8085.
4. Write a program to subtract two 8- bit and 16 bit number using 8085.
5. Write a program to multiply two 8- bit numbers.
6. Study of 8255, 8259, 8253 study card using a 8 bit Microprocessor.
7. Study of interfacing cards of LED, A/D and D/A converter.

**Section A: Unit 1, 2, 3****Section B: Unit 4, 5, 6****PATTERN OF QUESTION PAPER**

Six units in the syllabus shall be divided in to equal parts i.e. three units in each part. Question paper shall be set having two sections A and B, as per weightage of units. Section A question shall be set on first part and section B on second part. Question paper should cover entire syllabus.

**For 80 Marks papers:**

- 1) Section A & Section B should be of 40 marks each.
- 2) Five questions in each section.
- 3) Out of five four questions asked should be of 15 Marks & one question asked should be 10 Marks.
- 4) 10 marks question will be compulsory.

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<b>SEMESTER-I</b>	
<b>EXD304 - Digital Communication</b>	
<b>Teaching Scheme: 4Hrs/week</b> <b>Practical: 2Hrs/week</b>	<b>Examination Scheme</b> <b>Theory Examination : 80 Mark</b> <b>Class Test : 20 Marks</b> <b>Practical/Oral : 50 Mark</b> <b>Term Work: ---</b>
<b>Objective:</b> 1. To classify different types of communication system. 2. To learn how to transmit, analog signal via digital system. 3. To study PCM transmission reception techniques. 4. To analyze performance parameters of digital communication system. 5. To classify digital modulation techniques.	
<p style="text-align: center;"><b>Unit-1</b></p> <b>Introduction to Digital Communication System</b> Block diagram of digital communication system, Bandwidth requirement of digital modulation system, comparison of digital and analog communication system, advantages, disadvantages of digital communication system, review of pulse modulation technique such as PAM, PWM, PPM, and PCM, Review of random variables and stochastic processes	04
<p style="text-align: center;"><b>Unit-2</b></p> <b>Digital Transmission of Analog Signals</b> Introduction, sampling theorem, proof of sampling theorem, nyquist criteria, Signal reconstruction; the interpolation formula, aliasing, effect of under sampling, sampling of band pass signals, sampling techniques, ideal sampling or instantaneous sampling, natural sampling, flat top sampling or rectangular sampling, performance and comparison of various sampling techniques, practical sampling, The aperture effect, reconstruction methods of sampling for low pass and band pass signals	08
<p style="text-align: center;"><b>Unit-3</b></p> <b>Introduction to Waveform Coding Techniques</b> Introduction to quantization process, types of quantization, PCM transmitter and receiver, concept of companding technique, $\mu$ law, A law companding, effect of companding application of PCM, advantages and salient features of PCM, drawbacks of PCM	08
<p style="text-align: center;"><b>Unit-4</b></p> <b>Performance Analysis of Digital Communication System</b> Study of modulation techniques such as delta modulation, adaptive delta modulation, introduction to noise, White Gaussian noise, optimum linear detector for binary polar signaling, general binary signaling, Gaussian noise and its PDF, Effect of noise on transmitted signals and their detection, introduction to optimum filter and matched filter	08

<b>Unit-5</b>	
<b>Digital Modulation Techniques</b> Introduction to inter symbol interference, ideal solution, raised cosine spectrum, ASK, FSK, PSK, QPSK, MSK generation and detection method	08
<b>Unit-6</b>	
<b>Spread Spectrum Techniques</b> A model of spread spectrum communication system, Direct sequence, frequency hopped SS techniques, slow and fast frequency hopping	04
<b>Reference Books:</b>	
<ol style="list-style-type: none"> <li>1. An introduction to analog and digital communication – S. Haykin, John-Wiley</li> <li>2. Digital and Analog communication systems- K. S. Shanmugham, John-Wiley</li> <li>3. Digital communications, 4<sup>th</sup> Ed, John G Proakis, McGraw Hill</li> <li>4. Digital communications, Simon Haykin, John-Wiley, 1998</li> <li>5. Principles of communication systems, 2/e, Taub Schilling, TMH</li> <li>6. Communication systems (Analog and Digital)- Dr. Sanjay Sharma, S. K. Kataria &amp; sons, New Delhi</li> </ol>	
<b>EXD323- List of Experiments:</b>	
<ol style="list-style-type: none"> <li>1. Verification of sampling theorem using flat top sampling</li> <li>2. ASK generation and detection</li> <li>3. FSK generation and detection</li> <li>4. PSK generation and detection</li> <li>5. DPSK generation and detection</li> <li>6. QPSK generation and detection</li> <li>7. Study of PCM generation and detection</li> <li>8. Study of delta modulation</li> </ol>	
<b>Section A: Unit 1, 2, 3</b>	
<b>Section B: Unit 4,5,6</b>	
<b>PATTERN OF QUESTION PAPER</b>	
Six units in the syllabus shall be divided in to equal parts i.e. three units in each part. Question paper shall be set having two sections A and B, as per weightage of units. Section A question shall be set on first part and section B on second part. Question paper should cover entire syllabus.	
<b>For 80 Marks papers:</b>	
<ol style="list-style-type: none"> <li>1) Section A &amp; Section B should be of 40 marks each.</li> <li>2) Five questions in each section.</li> <li>3) Out of five four questions asked should be of 15 Marks &amp; one question asked should be 10 Marks.</li> <li>4) 10 marks question will be compulsory.</li> </ol>	

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 THIRD YEAR (EC/ECT/E&C/IE) ENGINEERING**

<b>SEMESTER-I</b>	
<b>EXD-305 Analog Integrated Circuits &amp; Applications</b>	
<b>Teaching Scheme: 4Hrs/week</b> <b>Practical: 2Hrs/week</b>	<b>Examination Scheme</b> <b>Theory Examination : 80 Marks</b> <b>Class Test : 20 Marks</b> <b>Practical/Oral : 50 Marks</b> <b>Term Work: ---</b>
<b>Objective:</b> 1. Describe working principal of Op amp & its characteristics. 2. Design electronic circuit using Op-amp for various applications. 3. Design active filter of 1 <sup>st</sup> order & 2 <sup>nd</sup> order. 4. Design fixed & variable voltage regulators. 5. Analyze the response of frequency selective circuit such as PLL with respect to the incoming signal.	
<b>Unit-1</b>	<b>04</b>
<b>Operational Amplifier:</b> Introduction, block diagram of Op-amp ,Op Amp (IC 741), specifications, packaging, characteristics, ac and dc parameters and their measurements , noise and frequency compensation. Ideal and Practical Op- amp comparison, concept of virtual short and ground, Op Amp technologies and comparison-Bipolar and BICMOS	
<b>Unit-2</b>	<b>12</b>
<b>Op- Amp Linear Applications :</b> Inverting and non-inverting amplifiers, Voltage follower, summing amplifier, differential amplifier, instrumentation amplifier and its applications, voltage to current converters and current to voltage converters, analog multipliers, low voltage ac and dc voltmeter <b>Op- Amp Non Linear Applications:</b> Differentiator, integrator, comparator and its characteristics, Zero cross detector, Schmitt trigger, Schmitt trigger IC LM339, window detector, peak detector, sample & hold circuit, precision half wave & full wave rectifier, log and antilog amplifier.	
<b>Unit-3</b>	<b>04</b>
<b>Waveform Generators:</b> Square wave, triangular wave and saw tooth wave generator, phase shift and Wein bridge Oscillators and its design, Function Generator using ICL 8038. Multi-vibrators using timer IC-555	

<b>Unit-4</b>	
<p><b>Active Filter Design:</b> Introduction, comparison between active &amp; passive network design, transfer function, first order low pass active filters, standard second order low pass &amp; high pass Butterworth filters, KRC filters, multiple feedback filters, state variable &amp; bi quad filter, band pass, band reject, all pass filters, active filter performance considerations, switched capacitor filter (first &amp; second order), Tow-thomas filters, filters using MATLAB</p>	08
<b>Unit-5</b>	
<p><b>Phase Lock Loop:</b> Basic Phase lock loop principle, transient response of PLL, linear model of PLL, Major building blocks of PLL, analog &amp; digital phase detector, VCO. Applications of PLL, Monolithic PLL, IC LM 565 &amp; CD4046 CMOS PLL</p>	08
<b>Unit-6</b>	
<p><b>Voltage Regulators:</b> Introduction, Basics of voltage regulator, linear voltage regulator using Op Amp, single polarity linear voltage regulator, IC voltage regulators-IC 723, General purpose regulator, Switching regulator IC78s40 &amp; its applications</p>	04
<p><b>Text Books:</b></p> <ol style="list-style-type: none"> <li>1. Coughlin, Driscoll, Operational amplifiers &amp; Linear Integrated Circuits, PHF, Fourth Ed</li> <li>2. Ramakant Gaikwad, 'Op-Amp &amp; integrated circuits, PHI.</li> <li>3. linear integrated circuits b.somanathan nair wiley precise textbook.</li> <li>4. G.B.Clayton, Operational Amplifiers 'ELBS Edition.</li> <li>5. Integrated Circuits by K.R.Botkar, 9/e, Khanna Publishers.</li> <li>6. Seryio Franco /Operational Amplifiers &amp; Analog Integrated Circuits' 3/e, TMH</li> <li>7. D.ROY Choudhary shail Jain, Linear Integrated Circuits ', New Age international, 2006</li> </ol>	
<p><b>Reference Books:</b></p> <ol style="list-style-type: none"> <li>1. Govind Daryananj, 'Principles of Active Network Synthesis &amp; Design, John Wiley &amp; sons.</li> <li>2. 'Analog Integrated Circuits Design' by David Johns &amp; Ken Martin, Wiley Publication.</li> </ol>	
<p><b>EXD324-List of Experiment:</b></p> <ol style="list-style-type: none"> <li>1. Op-amp parameters measurements - off set voltage, Bias current, CMRR, Slew-rate output resistance.</li> <li>2. Op-amp applications -I: Integrator &amp; Instrumentation amplifier.</li> <li>3. Op-amp applications -II: Comparator, Schmitt trigger.</li> <li>4. Design, simulate, build &amp; test active filters.</li> <li>5. Design, build &amp; test a square wave generators using op-amp.</li> <li>6. To study the operation of IC-565 as PLL.</li> <li>7. Implementation of IC-723 as basic high/low voltage regulators.</li> <li>8. To verify precision rectifier using op-amp</li> </ol>	

**Section A: Unit 1, 2, 3**

**Section B: Unit 4,5,6**

**PATTERN OF QUESTION PAPER**

Six units in the syllabus shall be divided in to equal parts i.e. three units in each part.

Question

paper shall be set having two sections A and B, as per weightage of units. Section A question Shall be set on first part and section B on second part. Question paper should cover entire syllabus.

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<b>SEMESTER-I</b>	
<b>BSH331:Communication skills-II</b>	
<b>Teaching Scheme</b> Practical: 2Hrs/week	<b>Examination Scheme</b> Online Exam. : 50 Marks Duration of paper: 01 Hr
<b>Unit-I</b>	
<ul style="list-style-type: none"> <li>• Fast calculation techniques, Number system, ratio ,proportion, variations averages,</li> <li>• Simple interest ,compound interest, profit, loss</li> <li>• Work and time speed and distance</li> <li>• Set theory and venn diagram, permutation and combination</li> <li>• Probability, alphanumeric series, logical deduction, reasoning, coding and decoding and blood relation</li> <li>• Data interpretation</li> </ul>	
<b>Unit-II</b>	
<ul style="list-style-type: none"> <li>• The key components of non verbal communication i.e. eye contacts, body language, vocal tone and volume.</li> <li>• Team work and team bulding, The basics of team intelligence, Divesity awareness, Gender issues</li> <li>• Group discussion, unstructured group discussions and actual group discussions</li> <li>• Presentation skills ,self confidence and decision making</li> </ul>	
<b>Unit-III</b>	
<ul style="list-style-type: none"> <li>• Adapting to corporate life</li> <li>• Phone etiquettes, Email etiquettes, clothing etiquettes, Dinning table etiquettes</li> <li>• Getting ready for an interviews, corporate dressing, writing reports and proposals, minutes writing,</li> </ul>	
<b>Reference books</b>	
<ol style="list-style-type: none"> <li>1. Gopal Swamy Ramesh, Mahadevan Ramesh ,”The Ace of soft skills” Pearson publication</li> <li>2. Bansal Harison, ”Spoken English”</li> <li>3. Orientblackswan, “English for Engineers and Technologist”</li> <li>4. Jerry Wiessman , “Presenting to Win” Pretince Hall publications</li> <li>5. Willium sanborn Pfeiffer, T. V. S, Padamaja, “Technical Communication”</li> <li>6. M. Tyra, “Magical book on Quikermaths” BSC publishing co. pvt. ltd.</li> </ol>	

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<b>SEMESTER-II</b>	
<b>EXD351 Power Electronics</b>	
<b>Teaching Scheme: 4Hrs/week</b> <b>Practical: 2Hrs/week</b>	<b>Examination Scheme</b> <b>Theory Examination : 80 Marks</b> <b>Class Test : 20 Marks</b> <b>Practical/Oral : -50 Marks</b> <b>Term Work: ---</b>
<b>Objective:</b> 1. To classify power devices their firing circuits & commutation circuits. 2. To describe 1- $\phi$ & 3- $\phi$ power converters. 3. To study AC voltage converters. 4. To study D.C. to A.C conversion techniques. 5. To learn D.C to D.C control technique.	
<b>Unit-1</b> <b>Power Semiconductor Devices:</b> Principle of operation, construction, characteristics, ratings and applications of: Power Diodes, Power BJT, Power MOSFET, SCR, IGBT, TRIAC, DIAC and GTO. Triggering circuits(R, R-C and UJT), Gate drive circuits, and commutation circuits for SCRs.	08
<b>Unit-2</b> <b>Power Converters:</b> Single phase and three phase Converters with R and R-L loads. Continuous and discontinuous current mode operation. Dual converters, p.f. Improvement, effect of source inductance, performance parameters.	08
<b>Unit-3</b> <b>A. C. Voltage controllers:</b> ON-OFF control and phase angle control ,single phase A.C. Voltage controller with R, R-L loads. cycloconverter types.	04
<b>Unit-4</b> <b>Inverters:</b> Single phase series and parallel inverters their analysis and design,1- $\phi$ bridge inverter.3- $\phi$ inverters, 120 $^{\circ}$ mode and 180 $^{\circ}$ mode operation and design. voltage control techniques.	08
<b>Unit-5</b> <b>Chopper:</b> Step-down chopper, types, analysis of class A Chopper. Four quadrant chopper, voltage commutated and current commutated chopper. Step-up chopper source filter.	08
<b>Unit-6</b> <b>Power Electronics Applications:</b> Flasher circuits, Ring counter, Time delay circuits, servo controlled stabilizer temperature controller, HF heating. power Electronics modules.	04



**Reference books:**

1. M.H.Rashid,"Power Electronics",John Wiley & sons
2. M.D.Singh and K.B.Khanchandani,"Power Electronics" Tata McGraw Hill.
3. General Electric,"SCR Manual".
4. B.K.Bose,"Power Electronics & A.C.Drives",PHI.

**EXD371-List of Experiments: (Any eight of the following)**

1. Study of characteristics of any two devices SCR, IGBT TRIAC Power MOSFET.
2. Study of R,R-C firing circuits.
3. Study of line synchronized UJT firing circuit.
4. A.C. Voltage controller.
5. 1-  $\phi$  full bridge converter with R, R-L load, with & without FWD.
6. 3-  $\phi$  Converter.
7. Study of 1-  $\phi$  inverter (series/parallel).
8. Study of chopper.
9. Study of time delay circuits.
10. Study of ring counter.
11. Study of HF heating.

**Section A: Unit 1, 2, 3****Section B: Unit 4,5,6****PATTERN OF QUESTION PAPER**

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**For 80 Marks papers:**

- 1) Section A & Section B should be of 40 marks each.
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<b>SEMESTER - II</b>	
<b>EXD 352(a) - Signal Coding &amp; Estimation Theory</b>	
<b>Teaching Scheme: 4Hrs/week</b>  <b>Practical: NA</b>	<b>Examination Scheme</b> <b>Theory Examination : 80 Marks</b> <b>Class Test : 20 Marks</b> <b>Practical/Oral : ---</b> <b>Term Work: ---</b>
<b>Objective:</b> 1.To study different coding for communication 2. To study channel capacity & related theorems. 3. To study encoding theorems/algorithms. 4. To study estimation theory.	
<p style="text-align: center;"><b>Unit 1</b></p> <b>Information Theory:</b> Measure of information, Entropy and properties, conditional and joint entropies, Mutual information & properties, Information rate, Extension of memory less source, Average information content of symbols in long dependent sequences, Mark-off model.	07
<p style="text-align: center;"><b>Unit 2</b></p> <b>Channel Capacity:</b> Channel Capacity, Symmetric Channel, Binary Symmetric Channel, Binary Erasure Channel, Cascaded Channel, lossless Channel, Channel coding theorem, Channel capacity theorem, The Shannon's limit.	06
<p style="text-align: center;"><b>Unit 3</b></p> <b>Source Coding:</b> Encoding Methods, Kraft's inequality, Coding efficiency & redundancy, Source coding theorem, Huffman Coding, Shannon-Fanon algorithms, Arithmetic Coding, LZW algorithm, Run length Coding.	07
<p style="text-align: center;"><b>Unit 4</b></p> <b>Linear Block Codes:</b> Matrix description, Generation & parity check matrices, syndrome & error correction, Hamming weight, Hamming distance, Error Correction & Error detection capabilities, Perfect codes, Hamming codes, Optimal linear code, Equivalent codes and maximum distance separable codes.	06
<p style="text-align: center;"><b>Unit 5</b></p> <b>Cyclic Codes:</b> Generation polynomial, Matrix description, Encoding of cyclic codes, Syndrome computation & error detection, Detection of cyclic codes, Fire Codes, Goley codes, BCH codes, CRC, RS Codes, Nested Codes.	06
<p style="text-align: center;"><b>Unit 6</b></p> <b>Convolution Codes:</b> Time domain approach, Transform domain approach, State diagram, Tree diagram, Trellis diagram, Matrix description convolution codes, Polynomial description of convolution codes, Viterbi algorithm, Turbo coding & decoding, Mapping by set partitioning, Performance evolution of AWGN channel,	08

TCM for fading channel.	
<b>Estimation Theory:</b> Maximum likely hood estimation, Maximum a prior estimation, Least square estimation.	
<b>Text Books:</b> 1) "Information Theory Coding and Cryptography", Ranjan Boss' TMH 2007 2) "Multimedia communication : Application, Networks protocols and standards", Fred Halsall, person education asia, 2002. 3) "Digital Communication", Siman Haykin, John wiley, 2003. 4) "Digital and analog Communication System", K. Sam Shanmugam, john wiley, 1996. 5) "Random Process, filtering estimation & detection" Lomie C. Ludeman.	
<b>Reference Books:</b> 1) N. Abramsan – Infromation & Coding, Mc-Graw Hill 2) M. Mansor Por – Introduction to information theory, Mc-Graq Hill, 1987. 3) Digital Coomuniations – Glover and Grant, pearson B d. 2 <sup>nd</sup> Ed 2003. 4) Amitabha Bhattacharya, "Digital Communication" TMH 2006.	
<b>List of Practical's: NA</b>	
<b>Section A: Unit 1, 2, 3</b> <b>Section B: Unit 4,5,6</b> <b>PATTERN OF QUESTION PAPER</b> Six units in the syllabus shall be divided into two parts i.e. three units in Section A and three units in Section B part. Question paper shall be set having two sections A and B, as per weight age of units. Section A question shall be set on first part and section B on second part. Question paper should cover entire syllabus. <b>For 80 Marks papers:</b> 1) Section A & Section B should be of 40 marks each. 2) Five questions in each section. 3) Out of five four questions asked should be of 15 Marks & one question asked should be 10 Marks. 4) 10 marks question will be compulsory.	

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<b>SEMESTER-II</b>	
<b>EXD 353- Microcontrollers and Advanced Processors</b>	
<b>Teaching Scheme: 4Hrs/week Practical: 2Hrs/week</b>	<b>Examination Scheme Theory Examination : 80 Marks Class Test : 20 Marks Practical/Oral : 50 Marks Term Work: -----</b>
<b>Objective:</b> 1. To Describe detail functions of each block of 8086 processor. 2. To learn assembly language programs of 8086. 3. To study interface I/O's & memory with 8086. 4. To Describe detail functions of each block of 8051 microcontroller.	
<b>Unit -1</b> <b>8086 Introduction:</b> Functional diagram. Register Organization, Memory Segmentation. Programming Model, memory organization. Architecture of 8086, signal descriptions of 8086- common function signals. Minimum and Maximum mode signals, Interrupts of 8086.	05
<b>Unit 2:</b> <b>Instruction Set and Programming of 8086:</b> Instruction formats, addressing modes, instruction set, assembler directives, simple programs involving logical, branch and call instructions, sorting, evaluating arithmetic expressions, string manipulations.	10
<b>Unit-3</b> <b>I/O &amp; Memory Interface :</b> Interfacing of 8255 with 8086. Interfacing keyboard, display, stepper motor interfacing, D/A and A/D converter. Interfacing with RAMs, ROMs, Minimum mode configuration, Maximum mode configuration.	05
<b>Unit-4</b> <b>Advanced Processors:</b> 80286 Microprocessor-features, internal architecture, pin description Real address and protected virtual address mode ,80386 architecture, hardware features, 80486, Pentium family architecture and features.	04
<b>Unit -5</b> <b>Introduction to 8051 Microcontroller:</b> Introduction, evolution, architecture and comparison with microprocessor. Features of MCS 51 family, 8051 Architecture, pin detail, programming model, addressing modes and i/o ports, Memory organization, instruction set and programming.	08
<b>Unit-6</b> <b>8051 Microcontroller Interfacing:</b> I/O port programming, interrupts, Timer/ Counter Programming, Serial Communication Interfacing of LED, LCD ADC, DAC, Stepper Motor, keyboard, external program and data memory.	08

**References Books:**

1. Microprocessor and Programming Logic , K.L. Short , Prentice-Hall India Pvt. Ltd. 2nd Edition
2. Advanced Microprocessors and Peripherals , Ray & Bhurchandi, Tata McGraw Hill 2nd Edition
3. Microprocessors and Interfacing, D. Hall, Tata McGraw Hill, Revised 2nd Edition
4. Microprocessor and Microcomputer Based System Design, Mohammad Raffiquazaman
5. Microcontrollers, Ajay Deshmukh, TMH
6. The 8051 Microcontroller and Embedded systems 3<sup>rd</sup> Indian reprint Pearson Education.

**EXD372-List of Experiments:**

1. Any four programs of 8086 (DEBUG/MASAM)
2. 8051 Assembler and simulator.
3. Examining Flags and stacks.
4. Simulating I/O ports
5. Data transfer: ( program to transfer data from ROM to RAM and Ram to ROM)
6. Arithmetic operation- I( Hex and BCD addition and subtraction)
7. Arithmetic operation- II ( Division and Multiplication)
8. Testing the 8051 I/O ports.
9. The 8051 serial interface.
10. Interfacing DAC and ADC to the 8051.
11. Interfacing step motor.

Any 08 experiments should be conducted based on the list given above :  
Four Experiments based on 8086 and Four Experiments based on 8051.

**Section A: Unit 1, 2, 3****Section B: Unit 4,5,6****PATTERN OF QUESTION PAPER**

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**Question**

paper shall be set having two sections A and B, as per weightage of units. Section A question shall be set on first part and section B on second part. Question paper should cover entire syllabus.

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<b>SEMESTER-II</b>	
<b>EXD354- Feedback Control System</b>	
<b>Teaching Scheme: 4Hrs/week</b>  <b>Practical: 2Hrs/week</b>	<b>Examination Scheme:</b> <b>Theory Examination : 80 Marks</b> <b>Class Test : 20 Marks</b> <b>Practical/Oral : 50 Marks</b> <b>Term Work: ---</b>
<b>Objective:</b> 1. To classify control system 2. To study rules of transfer function of a system 3. To analyze to 1 <sup>st</sup> order 2 <sup>nd</sup> order system in time domain 4. To analyze stability of a system on s-plane 5. To analyze system in frequency domain & to design state models.	
<b>Unit: 1</b> <b>Introduction:</b> Definition of control system, Open loop and closed loop system, Examples on control system, Feedback and Feed forward control system, Mathematical modeling of a physical system, Differential equations of physical system, Laplace Transform, Z-transform, concept of transfer function.	6
<b>Unit: 2</b> <b>Transfer function representation:</b> Block diagram representation of control system, rules and reduction techniques, signal flow graph, Mason's gain formula and its applications to block diagram reduction, Hydraulic, pneumatic and thermal system, transfer function of DC servo motor AC servo motor, Synchro transmitter and receiver, Potentiometer as a error detector, Stepper motor and regenerative feedback .	8
<b>Unit: 3</b> <b>Time domain analysis:</b> Standard test signals, Time response of first order system, Time response of second order system, Steady state error and error constant, Design specification of second order system, Design consideration of higher order system, Effects of proportional derivative, Proportional integral, and PID control system.	6
<b>Unit: 4</b> <b>Stability Analysis:</b> Concept of stability conditions, Characteristics equation, Relative stability, Routh Hurwitz criterion, Root locus techniques, Addition of Poles and Zeros on root locus.	6
<b>Unit: 5</b> <b>Frequency Response Analysis:</b> Introduction , Correlation between time domain and frequency domain, Frequency domain specification , Polar plots , Bode plots, Phase and Gain margin, Stability analysis using Bode Plot, Nyquist Stability criterion.	8

<b>Unit: 6</b>	
<p><b>State variable Analysis and Design:</b>                  Concept of state, State variable, And state model solution of state equations, concept of controllability and observability, Study of programmable logic controllers, Concept of fuzzy logic, Neural based control system, sensors, electronic controllers, relays.</p>	6
<p><b>Test Books</b></p> <ol style="list-style-type: none"> <li>1. Nagrath I J and M. Gopal- <i>Control system Engineering</i>, 5<sup>th</sup> edition, new age international.</li> <li>2. Norman S. Nise - <i>Control system Engineering</i> . 5<sup>th</sup> edition, Wiley publication.</li> <li>3. S. K. Bhattacharya – <i>Control system Engineering</i>, Pearson education</li> </ol>	
<p><b>Reference books</b></p> <ol style="list-style-type: none"> <li>1. K. Ogata – <i>Modern control system</i> , 4<sup>th</sup> edition, Eastern economy.</li> <li>2. B. C. Kuo <i>Automatic control system</i>, 7<sup>th</sup> edition, Prentice hall of India 2000</li> <li>3. Naredra Singh Beniwal, Ruby Beniwal, <i>Automatic control system with MATLAB programming</i>, University Science Press</li> <li>4. D Roy Chudhary <i>Modern control Engineering</i> PHI.</li> <li>5. S Palani <i>Control System engineering</i> McGraw Hill.</li> </ol>	
<p><b>EXD373-List of Experiment:</b></p> <ol style="list-style-type: none"> <li>1) Study of potentiometer as a Error detector.</li> <li>2) Study of Synctro Machines</li> <li>3) Study of AC/DC Position servo system.</li> <li>4) Study of PLC</li> <li>5) Transient response of second order system for a step input.</li> <li>6) Response of PID controller.</li> </ol> <p><b>Software based experiments using MATLAB.</b></p> <ol style="list-style-type: none"> <li>1) Transient response of second order system by using standard test signals.</li> <li>2) Draw a root locus of any system.</li> <li>3) Draw a Bode plots.</li> <li>4) Draw a polar plots.</li> <li>5) Draw a Nyquist plots.</li> <li>6) Check the controllability and observability of system</li> </ol> <p>Minimum 4 Experiments from hardware based practicals and 4 experiments from software based practicals.</p>	

**Section A: Unit 1, 2, 3**

**Section B: Unit 4,5,6**

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<b>SEMESTER-II</b>	
<b>EXD -352(b) – Industrial Drives and Control</b>	
<b>Teaching Scheme: 4Hrs/week</b> <b>Practical: 2Hrs/week</b>	<b>Examination Scheme</b> <b>Theory Examination : 80 Marks</b> <b>Class Test : 20 Marks</b> <b>Practical/Oral : --</b> <b>Term Work: ---</b>
<b>Objective:</b> 1. To study basics of AC, DC drives. 2. To study synchro & stepper motor drives. 3. To study electrical traction drives.	
<b>Unit-1</b> <b>DC Motor Drives:</b> Basic characteristics of DC motor, single phase drives, single phase half wave converter drives, single phase full wave converter drives, single phase dual converter drives, three phase drives, three phase half wave converter drives, three phase full wave converter drives.	08
<b>Unit-2</b> <b>Chopper Based DC Motor Drives:</b> Introduction to chopper, first, second, four quadrant choppers, continuous & discontinuous current mode, step up & step down choppers. Control techniques for choppers-PWM, constant pulse width & variable frequency, CLC.	06
<b>Unit-3</b> <b>AC Motor Drives:</b> Performance characteristics, circuit for speed control, control techniques & their analysis, close loop & open loop operation. Current source inverter, drives, voltage source inverter drives.	06
<b>Unit-4</b> <b>Synchronous Motor Drives:</b> Types of synchronous motors- wound field cylindrical rotor motor, permanent magnet synchronous motor, operation, equivalent circuits & speed control techniques, stepper motor drives.	08
<b>Unit-5</b> <b>Electrical Drives:</b> Dynamics of electrical drives, four quadrant operation, component & classification of load torques, steady state stability.	06
<b>Unit-6</b> <b>Traction Drives:</b> Traction Drives circuit for main line trains, trolleys, electrical buses traction load, braking, DC traction drives with resistive control, DC traction semiconductor chopper drives, AC motor drives.	06

**Text Books:**

1. AC, DC Drives – B.K.Bose.
2. AC,DC Drives- P.C.Sen, TMH
3. Power Electronics- M.H.Rashid
4. First course on Electrical Drives- S.K. Pillai

**Reference Books:**

1. Electrical drives concepts and applications- Subrahmany, A.M. Vedam, TMH
2. An Introduction to thyristors and application- M.Ramamorthy

**Section A: Unit 1, 2, 3****Section B: Unit 4,5,6****PATTERN OF QUESTION PAPER**

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<b>SEMESTER-II</b>	
<b>EXD-355 – Electronic System Design</b>	
<b>Teaching Scheme: 4Hrs/week</b> <b>Practical: 2Hrs/week</b>	<b>Examination Scheme</b> <b>Theory Examination : 80 Marks</b> <b>Class Test : 20 Marks</b> <b>Practical/Oral : ---</b> <b>Term Work: 50 Marks</b>
<b>Objective:</b> 1. To study different circuit designs. 2. To study different aspect of Op-Amp. 3. To study measurement of different physical or analog quantities. 4. To study electronics & digital system design.	
<b>Unit-1</b>	
<b>Design of regulated DC Power Supply:</b> transformer, fuse, filter capacitor, diodes, fixed voltage regulators,(IC 78XX ,IC79XX) ,adjustable voltage regulators (LM 317, LM337),high current regulator, over current and over voltage protection ,Design of switching regulator using IC 78S40.	06
<b>Unit-2</b>	
<b>Design Of Analog Hardware:</b> Resistors ,capacitors ,inductors: Types, values ,selection criteria, Diodes and transistors: Types, specifications and selection criteria, OPAMP: types, specifications, characteristics, selection criteria , Inverting and non inverting amplifier, voltage to current amplifier , current to voltage amplifier, instrumentation amplifier(three OPAMP configuration), differentiator, integrator, Schmitt trigger, sample and hold ,active tone control circuit, AM detector	10
<b>Unit-3</b>	
<b>Measurements And Signal Conditioning :</b> Measurement of temperature by thermistors and IC temperature sensor, Measurement of light level by photo diodes and photo transistors, Measurement of strain by strain gauge	04
<b>Unit-4</b>	
<b>Design using Specialized IC :</b> IC 555 (Astable and monostable multivibrator) , LM 380 / LM 386 (audio amplifier) , IC 7106/7107 (DC voltmeter) , ICL 8038(function generator), LM 565(PLL).	04
<b>Unit-5</b>	
<b>Design of Digital Systems:</b> CMOS and TTL logic interfacing, input and output characteristics of TTL and CMOS ,driving digital logic from comparators and OPAMPS, driving external digital loads from CMOS and TTL ,interfacing single digit, multiplexed seven segment display ,opt coupler and relay. Introduction to Finite State Machines, State diagrams; Design of Mealy FSM; Design of Moore FSM, Design of IC based counter circuits using 7490,7492,74192,74190 , Multiplexers, De- multiplexer trees.	08

<b>Unit-6</b>	
<p><b>Electronics System Design Considerations:</b> Reliability engineering, exponential law of reliability, quality, failure or defect, maintainability, MTTR, MTBF, MTTF, Noise in electronic circuits, grounding, shielding, guarding, enclosure sizing, selection of material for enclosure, heat transfer fundamentals, thermal calculations, thermal time constants, heat sinks, PCB Design Rules: Power and ground traces routing, PCB design rules for digital circuits, Noise due to ground and supply line, grounds, returns, shields, PCB design rules for analog circuits,</p>	08
<p><b>Reference Books:</b>  R.G.Kaduskar, V.B.Baru, Electronic Product Design, Wiley India  Paul Horowitz, Winfield Hill Art of Electronics, Cambridge University Press  Ramakant Gaikwad, "Op-amps and Linear integrated circuits", PHI  K. R. Botkar, "Linear Integrated Circuits", Khanna Publication, New Delhi  Waller C. Bosshart, "PCB Design &amp; Technology", TMH  William Flether, "An Engineering Approach to Digital Design", PHI  Linear Design Handbook :www.analog.com  N C Goyal, R K Khetan: Monograph On Electronics Design Principles Khanna Publishers</p>	
<p><b>EXD374 -List of Experiments</b>  01 Design of Regulated Power Supplies: Fixed and variable  02 Design of a variable gain instrumentation amplifier ( 3 OPAMP configuration)  03 Design of active tone control circuit  04 Design an audio power amplifier using LM380  05 Design of AM detector  06 Design of Mealy FSM/ Moore FSM  07 Design of IC based counter circuits using IC  08 Design of Data Acquisition System for parameters like : Temperature, Pressure, Light  09 A mini project based on real time application along with - Product brief, Design methodology, total circuit design, fabrication of the circuit on PCB, testing and demonstration of the mini- project</p>	
<p><b>Section A: Unit 1, 2, 3</b>  <b>Section B: Unit 4,5,6</b>  <b>PATTERN OF QUESTION PAPER</b>  Six units in the syllabus shall be divided in to equal parts i.e. three units in each part. Question paper shall be set having two sections A and B, as per weightage of units. Section A question shall be set on first part and section B on second part. Question paper should cover entire syllabus.  <b>For 80 Marks papers:</b>  1) Section A &amp; Section B should be of 40 marks each.  2) Five questions in each section.  3) Out of five four questions asked should be of 15 Marks &amp; one question asked should be 10 Marks.  4) 10 marks question will be compulsory.</p>	

**Dr. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD  
FACULTY OF ENGINEERING AND TECHNOLOGY  
THIRD YEAR (EC/ECT/E&C/IE) ENGINEERING**

<b>SEMESTER-II</b>	
<b>EXD375- Seminar</b>	
<b>Teaching Scheme: NA</b>  <b>Practical: 2Hrs/week</b>	<b>Examination Scheme:</b> <b>Theory Examination : NA</b> <b>Class Test : NA</b> <b>Practical/Oral : NA</b> <b>Term Work: 50 Marks</b>
<b>Topics &amp; Contents</b>	
<p>The students shall study in group of two or three members on some special topic beyond the scope of the syllabus under the subjects of Electronics, Electronics and Telecommunication, Electronics and Communication and Industrial electronics or inter discipline branch from current literature, by referring the current technical journal or reference books, under the guidance of the teacher.</p> <p>The students shall prepare his report together with design computation, Circuit/block diagram etc, if any, and deliver talk on the topic for other students of his class in the presence of his guide and internal examiner. The student is permitted to use audio-visual aids or any other such teaching aids.</p> <p><b>Term Work:</b></p> <p>The term work for this head will consists of the report written in a technical reporting manner and presentation of the talk on the subject and will be assessed by the two internal examiners appointed by the HOD of concern department of the institution one of whom will be his guide and the other internal teacher of the concerned branch.</p>	