# ACADEMIC REGULATIONS & CURRICULUM

**Applicable to the students admitted from the Academic Year 2019-2020**

# CIVIL ENGINEERING

**(B.Tech. Programme)**

## MAHARAJ VIJAYARAM GAJAPATHI RAJ COLLEGE OF ENGINEERING
## (Autonomous)

(Approved by AICTE, New Delhi, and permanently affiliated to JNTUK, Kakinada)

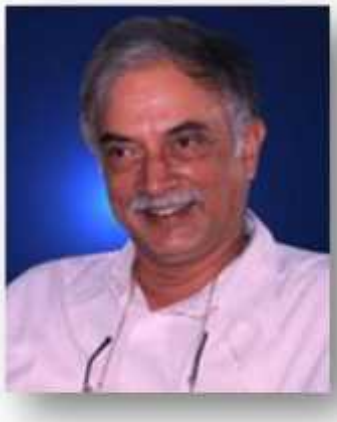
Listed u/s 2(f) & 12(B) of UGC Act 1956.

Vijayaram Nagar Campus, Chintalavalasa,Vizianagaram-535005, Andhra Pradesh

# The visionaries

**Late Dr. P V G Raju**
Raja Saheb of Vizianagaram
Founder Chairman-MANSAS
Ex-Minister for Education and Health, Govt. of AP
Ex Member of Parliament

**Late Dr. P. Anand Gajapathi Raju**
**Ex-Chairman-MANSAS**
Ex-Minister for Education and Health
Govt. of AP
Ex Member of Parliament



**P. Ashok Gajapathi Raju**
**Chairman-MANSAS**
Ex-Union Minister for Civil Aviation,
Govt. of India
Ex-Minister for Finance, Govt. of AP

# Vision

Maharaj Vijayaram Gajapathi Raj College of Engineering strives to become a centre par excellence for technical education where aspiring students can be transformed into skilled and well-rounded professionals with strong understanding of fundamentals, a flair for responsible innovation in engineering practical solutions applying the fundamentals, and confidence and poise to meet the challenges in their chosen professional spheres.

# Mission

The management believes imparting quality education in an atmosphere that motivates learning as a social obligation which we owe to the students, their parents/guardians and society at large and hence the effort is to leave no stone unturned in providing the same with all sincerity. Towards that end, the management believes special focus has to be on the following areas:

M1: Have on-board staff with high quality experience and continuously updating themselves with latest research developments and sharing that knowledge with students.

M2: Having a well stream-lined teaching learning process that is continuously assessed for effectiveness and fine-tuned for improvement.

M3: Having state-of-the-art lab and general infrastructure that gives students the necessary tools and means to enhance their knowledge and understanding.

M4: Having a centralized department focused on improving placement opportunities for our students directly on campus and coordinating the training programs for students to complement the curriculum and enhance their career opportunities.

M5: Having advanced research facilities and more importantly atmosphere to encourage students to pursue self-learning on advanced topics and conduct research.

**ABOUT THE INSTITUTION:**

Maharajah Alak Narayan Society of Arts and Science (MANSAS) is an Educational Trust founded by Dr. (late) P.V.G Raju, Raja Saheb of Vizianagaram in the hallowed memory of his father Maharajah Alak Narayan Gajapati with a view to confound socio-economic inequalities in the Vizianagaram principality executing a trust deed on 12-11-1958 duly established Maharajah's College and other educational institutions in and around Vizianagaram. The Trust is a charitable one published under Section 6 a (1) of A.P Charitable and Hindu Religious Institutions and Endowment Act 30 of 1987.

The object of the Trust is to manage the properties of educational institutions under it and to promote and advance the cause of education in general, besides awarding scholarships to deserving students enabling them to undergo special training in science and industries in and out of India. The Trust has made an uncompromising contribution to the nation by presenting the stalwarts.

Trust offers KG to PhD level education in Arts, Sciences, Law, Pharmacy, Humanities Education, Engineering and Management and presently houses 13 Educational Institutions. MVGR College of Engineering is one of the 13 Institutes.

## Other Institutions under MANSAS

1. M.R. HIGH SCHOOL 1857
2. M.R COLLEGE **(NAAC ACCREDITED)** 1879
3. M.R. COLLEGE OF EDUCATION 1950
4. M.R. WOMENS COLLEGE **(NAAC ACCREDITED)** 1962
5. M.R. GIRLS HIGH SCHOOL 1974
6. M.R. MODEL HIGH SCHOOL 1974
7. M.R. ENGLISH MEDIUM SCHOOL 1979
8. M.R.V.R.G.R LAW COLLEGE 1987
9. M.R. P.G. COLLEGE **(NAAC ACCREDITED)** 1987
10. M.R.SCHOOL OF MANAGEMENT STUDIES 1994
11. M.R.V.R.G.R – II MEMORIAL JR. COLLEGE 1994
12. M.R. COLLEGE OF PHARMACY 2004

Maharaj Vijayaram Gajapathi Raj (MVGR) College of Engineering was established in the year 1997 by Maharaj Alak Narayan Society for Arts and Sciences (MANSAS) to impart quality technical education. The Institution is located in lush green, serene and pollution free environment spread over 60 acres of land in Chintalavalasa village situated in the outskirts of Vizianagaram, a fort city in the north coastal region of Andhra Pradesh.

Institution at a glance:

- MVGR is a 22 years old institution, established in 1997
- All eligible UG Programs (CHEMICAL, CIV, CSE, ECE, EEE, IT & MECHANICAL) were reaccredited by NBA.
- MBA program was also re-accredited by NBA.
- Had been re-accredited with Grade 'A' by NAAC of UGC
- Has Permanent affiliation with JN Technological University-Kakinada
- Listed under sections 2(f) & 12(b) of UGC act 1956.
- Approved by AICTE-New Delhi
- EIGHT departments are recognized as RESEARCH CENTERS by JNTU-K
- Granted Autonomy by UGC in 2015
- Campus of 60 acre
- Offering 7 UG and 5 M.Tech., and 1 MBA program
- About 250 faculty of which 84 Ph.D. Degree holders
- 83 Laboratories with an investment of about 13 Crores
- Total built up area of about 7 Lakh Sft
- About 42,000 volumes and Access to 8 international online journal packages like IEEE, SPRINGER, etc.
- 1420 Systems & 395 Mbps band width internet facility
- About Rs. 4 Crore worth of on-going R&D projects
- Actively involved in civil engineering consultancy work as Third Party Quality Auditor for Vizianagaram Municipality
- WIPRO Recognized technology learning center and MISSION 10X partner institution
- Recognized National Instruments Academy for Training in LabView
- SIRO Recognition by DSIR
- Recognized PTC Centre of Excellence for Creo Training
- Identified by MSME as Business Incubation Centre
- APSSDC-Siemens Technical Skill Development Institute
- Recognized CMs SKILL EXCELLENCY CENTER (SEC)
- Microsoft Ed-vantage Platinum Partner
- Institutional member of IUCEE
- Institutional Member of CII
- Member, Chamber of Commerce, Vizianagaram
- Green Campus award by Govt. of AP

MVGR College of Engineering is rated as one among the best engineering colleges in the state of Andhra Pradesh as it set up highest standards in all areas of curricular, co-curricular and extra-curricular activities and in students' placements. Based on industry and expert's feedback, the college is updating the curriculum from time to time. The college offers many value added add-on courses students and conducts training programs to meet the industries' requirements.

# Academic Regulations for B.Tech., Program

Applicable to the students admitted from the Academic year 2019-2020 onwards.

## 1. PROGRAM STRUCTURE:

**B.Tech.:**

| Sl. No | Category | Credits |
|---|---|---|
| 1 | Humanities and Social Sciences including Management courses | 12 |
| 2 | Basic Science courses | 25 |
| 3 | Engineering Science courses including workshop, drawing, basics of electrical/mechanical/computer etc. | 26 |
| 4 | Professional core courses | 54 |
| 5 | Professional Elective courses relevant to chosen specialization/branch | 18 |
| 6 | Open subjects – Electives from other technical and /or emerging subjects | 12 |
| 7 | Project work, seminar and internship in industry or elsewhere | 13 |
| 8 | Mandatory Courses [Environmental Sciences, Induction training, Indian Constitution, Essence of Indian Traditional Knowledge] | 0 |
| | **Total** | 160 |

- Open electives offered by the parent department are listed in the course structure and are offered to students of other programs. The students of parent departments may also opt the course, provided it shall not be listed in the curriculum.
- For audit course a student is deemed to satisfy the minimum contact hours, as prescribed by the department and shall also comply with the requirements for submission of assignments/projects. A student shall also opt for MOOCs and submit the certificate.

| 1. HSS Courses | | |
|---|---|---|
| Sl. No. | Subject | Credits |
| 1 | English -1 | 3 |
| 2 | English -2 (Technical English) | 3 |
| 3 | Elective-1 (Management Related course (MEFA or MS or Operations Research) | 3 |
| 4 | Elective-2 (Professional Ethics and Human Values) | 3 |
| | Total | **12** |

| 2. Basic Science Courses | | |
|---|---|---|
| Sl. No. | Subject | Credits |
| 1 | Mathematics-I | 3 |
| 2 | Mathematics-II | 3 |
| 3 | Mathematics-III | 3 |
| 4 | Mathematics-IV | 3 |
| 5 | Applied / Engineering Physics (Theory + Lab) | 5 |
| 6 | Engineering Chemistry (Theory + Lab) | 5 |
| 7 | Biology for Engineers | 3 |
| | Total | **25** |

| 3. Engineering Science Courses | | |
|---|---|---|
| Sl. No. | Subject | Credits |
| 1 | Programming for Problem Solving (Theory + Lab) | 5 |
| 2 | Internet of Things (IOT) | 3 |
| 3 | Computer aided Engineering Graphics | 3 |
| 4 | Basic Electrical Engineering (Theory + Lab) | 5 |
| 5 | Department wise Engineering Science Course-I (AI Tools , Techniques & Applications) | 5 |
| 6 | Department wise Engineering Science Course-II (Design thinking and Product Innovation) | 3 |
| 7 | Workshop (Department Specific) | **2** |
| | Total | **26** |

| | Subjects | Credits |
|---|---|---|
| **4** | **Professional Core Courses** | 54 |
| **5** | **Professional Elective Courses Relevant to Chosen Specialization/Branch** | 18 |
| **6** | **Open Subjects – Electives from other Technical and / or Emerging Subjects** | 12 |
| | | **84** |

| 7. Project | | |
|---|---|---|
| Sl. No. | Subject | Credits |
| 1 | Socially Relevant Project | 1 |
| 2 | Mini Project | 2 |
| 3 | Project Phase - I | 2 |
| 4 | Project Phase - II | 8 |
| | Total | **13** |

| 8. Audit Courses (Non Credit Course) | | |
|---|---|---|
| Sl. No. | Subject | |
| 1 | Induction Program | |
| 2 | Constitution of India | |
| 3 | Indian Traditional Knowledge | |
| 4 | Environmental Science | |

BOS Chairman shall notify the list of MOOCs offered (Open Elective & Professional Elective) in the beginning of the semester.

## 2. PROGRAM PATTERN:

**B.Tech.:** The program is for 4 academic years / 8 semesters.

**B.Tech. (Lateral Entry):** The program is for 3 academic years / 6 semesters.

## 3. AWARD OF DEGREE:

**B.TECH:**

A student will be declared eligible for the award of degree if he/she fulfills the following academic regulations.

a) A student shall be declared eligible for the award of degree, if he/she pursues a course of study for not less than four academic years and not more than eight academic years from the date of admission.

b) The student shall register for **160** credits and secure all **160** credits.

c) A student shall also register and successfully complete audit programs (Non-credit) as recommended by Academic Council.

d) A student on completing 1$^{st}$ year class work may opt for a break of 1 year which shall be deemed as GAP year, as recommended by APSCHE, for undertaking successful entrepreneurial ventures.

e) Students who fail to complete Four Years Course of study within 8 years shall forfeit their seat and their admission shall stand cancelled.

**B.TECH (Lateral Entry):**

A student will be declared eligible for the award of degree on fulfilling the following academic requirements.

a) A student shall be declared eligible for the award of the degree, if he/she pursues a course of study for not less than three academic years and not more than six academic years.

b) The student shall register for **126** credits and secure all **126** credits.

c) A student shall also register and successfully complete audit programs (Non-credit) as recommended by Academic Council.

d) Students who fail to complete their three Years Course of study within 6 years shall forfeit their seat and their admission shall stand cancelled.

e) Student shall register for bridge programs, if any, as administered by the respective departments at the beginning of 2nd year and successfully complete as per the guidelines of the Institution.

## 4. CERTIFICATION PROGRAMS:

| Sl. No. | Dept. | Name of the Program |
|---|---|---|
| 1 | MECH | Windchill 10.2 PDM by Adroitec Engineering Solutions Pvt. Ltd., Hyderabad |
| 2 | MECH | Creo 2.0 by PTC |
| 3 | MECH | Edgecam by Verosoft, UK |
| 4 | MECH | ANSYS Training and Certification by Mechanical Department |
| 5 | MECH | AUTOCAD Training and Certification by Mechanical Department |
| 6 | MECH | Catia by APSSDC-Dassault Systems, CM's Center of Excellence |
| 7 | MECH | Delmia by APSSDC-Dassault Systems, CM's Center of Excellence |
| 8 | MECH | Simulia by APSSDC-Dassault Systems, CM's Center of Excellence |
| 9 | MECH | 2-Wheeler Automobile Certification by APSSDC-SIEMENS |
| 10 | MECH | 4-Wheeler Automobile Certification by APSSDC-SIEMENS |
| 11 | MECH | Welding Certification by APSSDC-SIEMENS |
| 12 | MECH | CNC Certification by APSSDC-SIEMENS |
| 13 | MECH | Commercial Electrical Certification by APSSDC-SIEMENS |
| 14 | MECH | Solid Edge Certification by APSSDC-SIEMENS |
| 15 | CHEM | Chemical Process Design and Simulation by Simtech Simulations, Hyderabad |
| 16 | ECE | Embedded Systems by Think LABS, Mumbai |
| 17 | ECE | Labview by National Instruments Systems India Pvt. Ltd. |
| 18 | ECE | Unified Technology Learning Program (UTLP) by Wipro Mission 10X |
| 19 | CSE, IT | PEGA by Virtusa Corporation |
| 20 | CSE, IT | Microsoft technologies by Microsoft Corp. |
| 21 | CSE, IT | Ethical Hacking by EC-Council Academia |
| 22 | CSE, IT | Java and C by Talent Sprint |
| 23 | CSE, IT | Network Analyst (CCNA) by Cisco Systems Inc |
| 24 | CSE, IT | Java Programming (OCJP) and DBMS by Oracle |
| 25 | EEE | PLC, Drives and Automation by Siemens |
| 26 | EEE | PLC by New Dawn Automation |
| 27 | EEE | Home Electrical Certification by APSSDC-SIEMENS |
| 28 | Civil | Remote Sensing and GIS by Indian Institute of Remote Sensing |

a) The Institution shall offer the certification programs by itself or in collaboration with industry/such other Institutions deemed to have specialized expertise in the proposed area of training.
b) Only students of the Institution shall be eligible to register on payment of prescribed fee.
c) However, subject to availability of resources and the demand the Institution may offer the program to external candidates meeting the pre-qualification requirements and in the order of the merit.
d) The duration of the course and design of the content shall be done by the respective departments of the Institution by themselves or in collaboration with industry/such other institutions deemed to have specialized expertise in the proposed area of training.
e) If the duration of the course is less than or equal to 40 hours, it can be completed in one semester, otherwise, it can suitably distributed over a number of semesters.
f) Mere enrolment/registration for the program shall not entitle any claim for award of certificate.
g) A candidate shall be deemed eligible for the award of the certificate if he/she
   - Attends at least 75% of scheduled training sessions
   - Complies to all the requirements of submission of the assignments, presentations, seminars, projects, etc., and also appears for periodic tests.
   - Shall attain minimum levels of performance in tests as prescribed.
   - Shall remit such fee as deemed fit for the certification
   - A candidate registered and failed to meet the requirements shall be permitted to repeat the said training one another time after remitting 25% of the fee fixed for the program as re-registration fee.

If the student is absent for the periodic tests, the test shall be re-conducted on payment of 10% of fee.

## 5. COURSES OFFERED:

| Name of the Program | Degree |
|---|---|
| UG Programs (Engineering & Technology) | B.Tech. (Civil)<br>B.Tech. (EEE)<br>B.Tech. (Mech.)<br>B.Tech. (ECE)<br>B.Tech. (CSE)<br>B.Tech. (CHEM)<br>B.Tech. (IT) |
| PG Programs (Engineering & Technology) | M.Tech. (Structural Engineering)<br>M.Tech. (Power Systems)<br>M.Tech. (PDM)<br>M.Tech. (VLSI)<br>M.Tech. (CN&IS) |
| Other PG Programs | MBA |
| Research Programs | Ph.D. in Civil, EEE, MECH, ECE, CSE, CHEM, MBA and MATHS |

## 6. DISTRIBUTION AND WEIGHTAGE OF MARKS:

**B.Tech.:**

a). All Theory courses will have 5 units and assessed for 100 marks, of which, 40 marks for internal assessment and 60 marks for semester end external examination.

**Internal Assessment:**

| | |
|---|---|
| Subjective tests | - 20 Marks |
| Objective tests | - 10 Marks |
| Assignments | - 10 Marks |

- Two subjective tests shall be conducted each for 20 Marks.
- Each subjective test shall be conducted for 90 Minutes and have 3 questions each for 10 marks (No choice) and the same can be scaled down to 20 Marks.
- Average of two subjective tests shall be considered.
- Two objective tests shall be conducted and assessed for 10 Marks.
- A student shall submit 5 assignments and assessed for 10 marks.

**External Assessment:**

- External examination is for 60 marks (180 min). Question paper contains 5 questions (1 from each unit with internal choice). Each question carries 12 marks. A student shall answer all 5 questions.

b). **Laboratory/Practice:**

All Laboratory/Practice courses are assessed for 100 marks, of which, 40 marks for internal assessment and 60 marks for semester end external examination.

**Internal Assessment : (40 Marks)**

| | |
|---|---|
| Continuous assessment | : 15 Marks |
| Project based learning | : 15 Marks |
| Internal test | : 10 Marks |

- Continuous assessment for 15 marks for each experimental session finally averaged to 15 marks.
- Project based learning shall be assessed for 15 Marks.
- In Project based learning, a student has to identify a problem such that at least 3 or 4 modular learning of experiments shall be integrated and submit comprehensive report with solution at the end of the semester.
- An internal assessment test conducted at the end of the semester shall be assessed for 10 marks.

**Semester End Assessment:**

- Semester end examination is for 60 marks (180 min) conducted and assessed by both external and internal examiners.
- Both internal and external examination shall include assessment of the student on
    a) Knowledge of principles/concepts involved
    b) Experimental design
    c) Result interpretation and analysis
    d) Experimental report

c). **Drawing/Design/Estimation:**

**i) Computer Aided Engineering Graphics:**

**Evaluation Procedure:**

The course will have 5 units and assessed for 100 marks, of which, 40 marks for internal assessment and 60 marks for semester end external examination.

**Internal Assessment : (40 Marks)**

| | |
|---|---|
| Continuous assessment | : 15 Marks |
| Project based learning | : 15 Marks |
| Internal test | : 10 Marks |

**Semester End Assessment:**

- Semester end examination is for 60 marks (180 min) conducted and assessed by both external and internal examiners.
- Question paper contains 3 questions (with internal choice). **E**ach question carries 20 marks (5 marks for free hand drawing and list of commands & 15 marks for final drawing prepared in AUTOCAD). A Student shall answer all questions.

**ii) Modeling and Assembly of Mechanical Elements:**

**Evaluation Procedure:**

The course will have 5 units and assessed for 100 marks, of which, 40 marks for internal assessment and 60 marks for semester end external examination.

**Internal Assessment : (40 Marks)**

| | |
|---|---|
| Continuous assessment | : 15 Marks |
| Project based learning | : 15 Marks |
| Internal test | : 10 Marks |

**Semester End Assessment:**

- Semester end examination is for 60 marks (180 min) conducted and assessed by both external and internal examiners.
- Semester End Examination shall include assessment of the student on Final drawings like modeling, assembly and drafting.
- Student is expected to execute one exercise.
- Final drawings like modeling, assembly and drafting hard copies shall be evaluated by both internal and external examiners

**Integrated Course (Theory + Lab):**

**Theory and Lab shall be assessed for 200 Marks (Each 100 marks)**

- For Integrated course, the theory shall be assessed for 100 marks, of which 40 marks for internal assessment and 60 marks for semester end external examination.
- The Lab shall be assessed for 100 marks , of which, 40 marks for internal assessment and 60 marks for semester end external examination

**Socially Relevant Project:**

- A student shall identify and provide a solution to the problem relevant to society/Profession/Industry.
- A student shall engage at least 15 hours on socially relevant project. Socially relevant project shall be evaluated internally for 50 marks by Project Review Committee (PRC). PRC comprising of HoD, department Academic Coordinator, R&D member of the department, one senior faculty and guide shall review the progress.

**Mini Project:**

- A student shall undergo internship for a period of 4 weeks/provide solution to the problem relevant to Industry/ Modern tool during the vacation after VI semester and submit comprehensive report.
  - Mini project shall be evaluated internally for 50 marks by Project Review Committee (PRC).
  - PRC shall prepare rubrics for assessment.

**Project Evaluation**:

Project is divided into 2 phases – Phase I & Phase II

- Evaluation shall comprise of internal and external assessment.
  Internal: 110 (Phase I 50 marks, Phase II 60 Marks)
  External: 90
- A project Review committee (PRC) comprising of HoD, department Academic Coordinator, R&D member of the department, one senior faculty and guide shall review the progress once in four weeks.

**Project Phase I:**

- Project Phase I shall be evaluated internally by PRC for 50 Marks.
- A student shall undertake project phase I during the VII semester.
- A student shall report to the guide/external supervisor and work under his supervision at least 2 hours per week.
- Assessment shall be on
  - Literature review
  - Identification and statement of the Problem

**Project Phase II:**

- A student shall undertake project phase II during the VIII semester.
- A student shall report to the guide/external supervisor and work under his supervision at least 8 hours per week.
- Internal evaluation shall be done by HoD, department Academic Coordinator, R&D member of the department, one senior faculty and guide for 60 marks.
- External evaluation shall be done by HoD, Guide/Internal Examiner and External Examiner for 90 marks.
- Assessment shall be on
  a) Review on fundamental knowledge involved
  b) Inter disciplinary aspect
  c) Experimental/methodology design
  d) Result analysis and interpretations
  e) Report writing
  f) Team work
  g) Presentation
  h) Viva-voce

**B.Tech. (Lateral Entry):**

The rules and regulations for candidates admitted under lateral entry category for $2^{nd}$, $3^{rd}$ and $4^{th}$ years of study shall be same as applicable to regular B.Tech students.

## 7. ATTENDANCE REGULATIONS:

**B.Tech.:**

I. A student shall be eligible to appear for end semester examinations, if he or she acquires a minimum of 75% of attendance in aggregate of all the subjects (Theory & Lab.) for the semester.
II. Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in each semester may be granted by the college academic committee.
III. Shortage of attendance below 65% in aggregate of all the subjects (Theory & Lab) for the semester shall not be Condoned.
IV. Detained student shall seek re- admission for that semester when offered within 4 weeks from the date of commencement of class work.

**PROMOTION RULE (Based on attendance):**

- A Student shall be promoted to the next semester on fulfillment of minimum attendance requirement (75%) of current semester.

**PROMOTION RULE (Based on credits):**

- A student shall be promoted from IV semester to V semester if he fulfills the minimum attendance requirement (75%) and academic requirement of 40% of credits up to IV semester from the following examinations irrespective of whether the candidate takes the examination or not.
    - Two regular and Two supplementary examinations of I semester
    - Two regular and One supplementary examinations of II semester
    - One regular examination and One supplementary examination of III semester
    - One regular examination of IV semester.

- A student shall be promoted from VI semester to VII semester if he fulfills the minimum attendance requirement (75%) and academic requirement of 40% of credits up to IV semester from the following examinations irrespective of whether the candidate takes the examination or not.
    - Three regular and Three supplementary examinations of I semester
    - Three regular and Two supplementary examinations of II semester
    - Two regular and Two supplementary examinations of III semester
    - Two regular and One supplementary examinations of IV semester
    - One regular and One supplementary examination of V semester
    - One regular examination of VI semester.

**B.TECH (Lateral Entry):**

**PROMOTION RULE (Based on attendance):**

A Student shall be promoted to the next semester on fulfillment of minimum attendance requirement of current semester.

**PROMOTION RULE (Based on credits):**

A student shall be promoted from VI semester to VII semester if he fulfills the minimum attendance requirement (75%) and academic requirement of 40% of credits up to VI semester from the following examinations irrespective of whether the candidate takes the examination or not.

- Two regular and Two supplementary examinations of III semester
- Two regular and one supplementary examinations of IV semester
- One regular and One supplementary examinations of V semester
- One regular examination of VI semester.

## B.Tech. (Lateral Entry):

The rules and regulations for candidates admitted under lateral entry category for 2nd, 3rd and 4th years of study shall be same as applicable to regular B.Tech students.

## 8. MINIMUM ACADEMIC REQUIREMENTS:

**B.Tech.: (Theory/Lab)**

i. A student is deemed to have satisfied the minimum academic requirements for a course on securing at least 24 marks out of 60 marks at semester end examination and overall minimum of 40 marks out of 100 marks including internal assessment.

ii. **Integrated Course (Theory + Lab):**

- The student shall secure at least 24 marks out of 60 marks at semester end examination and overall 40 marks out of 100 marks put together both internal and semester end examinations independently for Theory and Laboratory course. Otherwise the student has to appear for supplementary examination of the both theory and lab.
- The assessment shall be done independently for both theory and laboratory courses and final marks shall be calculated on weighted average method for converting marks into grade points.

  **Sample calculation:**

  Integrated course-5 credits. Theory is for 3 credits and laboratory is for 2 credits.

  Total Marks obtained in theory: 70 out of 100 (3 Credits)

  Total Marks obtained in Lab : 90 out of 100 (2 Credits)

  Final marks of the integrated course is

  (70X3 + 90X2) / 5 = 78 Marks

**B.Tech. (Lateral Entry):**

The rules and regulations for candidates admitted under lateral entry category for $2^{nd}$, $3^{rd}$ and $4^{th}$ years of study shall be same as applicable to regular B.Tech students.

**9. GRADING SYSTEM:**

**B.Tech. / B.Tech. (Lateral Entry)**

Semester Grade Point Average (SGPA) for the current semester which is calculated on the basis of grade points obtained in all courses, except audit courses and courses in which satisfactory or course continuation has been awarded,

SGPA= Σ (course credits earned x Grade points) /
Σ (Total course credits in the semester.

**CGPA= Σ (course credits earned x Grade points) up to successfully completed semesters / Σ (Total course credits up to successfully completed.**

The UGC recommends a 10-point grading system with the following letter grades as given below:

| | | |
|---|---|---|
| O | (Outstanding) | 10 |
| A+ | (Excellent) | 9 |
| A | (Very Good) | 8 |
| B+ | (Good) | 7 |
| B | (Above Average) | 6 |
| C | (Average) | 5 |
| P | (Pass) | 4 |
| F | (Fail) | 0 |
| Ab | (Absent) | 0 |

- iii. A student obtaining Grade F shall be considered failed and will be required to reappear in the examination.

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

Computation of SGPA and CGPA

**Illustration for SGPA**

| Course | Credit | Grade Letter | Grade point | Credit Point (Credit x Grade) |
|---|---|---|---|---|
| Course 1 | 3 | A | 8 | 3 X 8 = 24 |
| Course 2 | 4 | B+ | 7 | 4 X 7 = 28 |
| Course 3 | 3 | B | 6 | 3 X 6 = 18 |
| Course 4 | 3 | O | 10 | 3 X10 = 30 |
| Course 5 | 3 | C | 5 | 3 X 5 = 15 |
| Course 6 | 4 | B | 6 | 4 X 6 = 24 |
| | **20** | | | **139** |

Thus, **SGPA** =139/20 = 6.95

**Illustration for CGPA**

| Semester 1 | Semester 2 | Semester 3 | Semester 4 | Semester 5 | Semester 6 |
|---|---|---|---|---|---|
| Credits: 16 | Credits: 18 | Credits: 25 | Credits: 21 | Credits: 23 | Credits: 22 |
| SGPA: 7.9 | SGPA: 7.8 | SGPA: 7.6 | SGPA: 8.0 | SGPA: 8.3 | SGPA: 8.6 |

| Semester 7 | Semester 8 |
|---|---|
| Credits: 21 | Credits:14 |
| SGPA: 8.2 | SGPA: 8.5 |

Thus,

**CGPA**= $\frac{16x7.9 + 18x7.8 + 25x7.6 + 21x8.0 + 23x8.3 + 22x8.6 + 21x8.2 + 14x8.5}{160}$ = **8.1**

## 10. ELIGIBILITY FOR AWARD OF DEGREE:

**B.Tech:**

A student shall be eligible for award of the degree if he/she fulfills the following conditions:

1) Successfully completes all the courses prescribed for the Program.
2) CGPA greater than or equal to 4.5(Minimum requirement for Pass),

## 11. AWARD OF CLASS:

**B.Tech:**

Eligible Candidates for the award of B.Tech., Degree shall be placed in one of the following Classes based on CGPA.

| Class | CGPA |
|---|---|
| Distinction | ≥ 7.5 |
| First Class | ≥ 6.5 |
| Second Class | ≥ 5.5 |
| Pass class | ≥ 4.5 |

## 12. INSTRUCTION DAYS:

A semester shall have a minimum of 90 clear instruction days (including internal examinations).

**13. Transfers from other Institutions shall not be permitted**.

**14. SUPPLEMENTARY EXAMINATIONS:**

Supplementary examinations shall be conducted within 4 weeks from the date of announcement of results of regular examinations.

**15. WITHHOLDING OF RESULTS:** The result of a student shall be withheld

- If the student has not paid the dues, if any, to the institution
- If any case of pending disciplinary action ,
- Involvement in any sort of malpractices etc.
- Involvement in ragging.

**16. TRANSITORY REGULATIONS:**

A Candidate shall be readmitted from University regulations to A1 regulations or from A1 regulations to A2 regulations as per the guide lines of JNTUK.

**17. AMENDMENTS TO REGULATIONS:**

The Academic Council of MVGR College of Engineering (Autonomous) reserves the right to revise, amend, change or nullify the Regulations, Schemes of Examinations, and/ or Syllabi or any other such matter relating to the requirements of the program which are compatible to the contemporary/emerging trends effectively meeting the needs of society/industry/stake holding groups.

## 18. Regulations for MALPRACTICES during the conduct of examinations

| | Nature of Malpractices/Improper conduct | Punishment |
|---|---|---|
| 1 (a) | If the candidate 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) | Expulsion from the examination hall and cancellation of the performance in that subject only. * |
| (b) | If the candidate 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. | 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. * |

| | | |
|---|---|---|
| 2 | If the candidate 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. | 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.<br>The Hall Ticket of the candidate is to be cancelled.<br>* |
| 3 | If the candidate impersonates any other candidate in connection with the examination. | 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/candidate not on rolls, he will be handed over to the police and a case is registered against him.<br>* |
| 4 | If the candidate mishandles the Answer book or additional sheet 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.<br>Also if the answer script is mutilated / damaged disturbing the shape, of the script, answers, the bar code intentionally. | 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. He shall be debarred from class work and all examinations and be allowed to reregistered for the next subsequent odd or even semester only. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.* |

| | | |
|---|---|---|
| 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. | The same should be brought to the notice of CE who in turn in consultation with malpractice committee makes decision for cancellation of the performance in that subject.<br>* |
| 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. | 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. 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.<br>* |
| 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. | 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. * |
| 8. | Possess any lethal weapon or firearm in 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. 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 colleges 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. The candidate is also debarred and forfeits the seat.<br>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. * |
| 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.* |

*

**19. General :**

- Wherever the words “he”, “him”, “his”, occur in the regulations, they include “she”, “her”, “hers”.
- The academic regulation should be read as a whole for the purpose of any interpretation.
- In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Vice-Chancellor is final.
- The University 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 University.

* * *

# Ragging

## Prohibition of ragging in educational institutions Act 26 of 1997

### Salient Features

- Ragging within or outside any educational institution is prohibited.
- Ragging means doing an act which causes or is likely to cause Insult or Annoyance of Fear or Apprehension or Threat or Intimidation or outrage of modesty or Injury to a student

| | Imprisonment upto | | Fine Upto |
|---|---|---|---|
| Teasing, Embarrassing and Humiliation | 6 Months | + | Rs. 1,000/- |
| Assaulting or Using Criminal force or Criminal intimidation |  1 Year | + | Rs. 2,000/- |
| Wrongfully restraining or confining or causing hurt |  2 Years | + | Rs. 5,000/- |
| Causing grievous hurt, kidnapping or Abducts or rape or committing unnatural offence |  5 Years | + | Rs. 10,000/- |
| Causing death or abetting suicide |  10 Months | + | Rs. 50,000/- |

**In Case of Emergency CALL TOLL FREE NO. : 1800 - 425 - 1288**

**LET US MAKE MVGR A RAGGING FREE CAMPUS**

# Ragging

## ABSOLUTELY NO TO RAGGING

1. **Ragging is prohibited as per Act 26 of A.P. Legislative Assembly, 1997.**
2. **Ragging entails heavy fines and/or imprisonment.**
3. **Ragging invokes suspension and dismissal from the College.**
4. **Outsiders are prohibited from entering the College and Hostel without permission.**
5. **Girl students must be in their hostel rooms by 7.00 p.m.**
6. **All the students must carry their Identity Cards and show them when demanded**
7. **The Principal and the Wardens may visit the Hostels and inspect the rooms any time.**

## PROGRAM STRUCTURE

## B.TECH (CIVIL ENGINEERING)

| SEMESTER - I | | | | | | |
|---|---|---|---|---|---|---|
| S. No | Course Code | Course Title | L | T | P | Credits |
| 1 | A2MAT101 | Mathematics-I | 3 | - | - | 3 |
| 2 | A2CYI101 | Engineering Chemistry (Theory + Lab) | 3 | - | 3 | 5 |
| 3 | A2EEI201 | Basic Electrical Engineering (Theory + Lab) | 3 | - | 3 | 5 |
| 4 | A2CEW201 | Work Shop | - | - | 4 | 2 |
| 5 | A2EHA701 | Constitution of India | 2 | - | - | 0 |
| Total Number of Credits | | | | | | **15** |

| SEMESTER - II | | | | | | |
|---|---|---|---|---|---|---|
| S. No | Course Code | Course Title | L | T | P | Credits |
| 1 | A2MAT102 | Mathematics-II | 3 | - | - | 3 |
| 2 | A2PYI101 | Engineering Physics (Theory + Lab) | 3 | - | 3 | 5 |
| 3 | A2CII201 | Programming for Problem Solving (Theory + Lab) | 3 | - | 3 | 5 |
| 4 | A2MED201 | Computer Aided Engineering Graphics | 1 | - | 4 | 3 |
| 5 | A2EHL001 | English-I | 1 | - | 3 | 3 |
| Total Number of Credits | | | | | | **19** |

| SEMESTER - III | | | | | | |
|---|---|---|---|---|---|---|
| S. No | Course Code | Course Title | L | T | P | Credits |
| 1 | A2EHL002 | English-II (Technical English) | 2 | - | 2 | 3 |
| 2 | A2MAT106 | Mathematics-III | 3 | - | - | 3 |
| 3 | A2CEI201 | AI Tools, Techniques & Applications | 2 | - | 3 | 5 |
| 4 | A2CET201 | Internet of Things (IOT) | 2 | - | 2 | 3 |
| 5 | A2CET301 | Engineering Mechanics | 3 | - | - | 3 |
| 6 | A2CEI301 | Fluid Mechanics | 3 | - | 3 | 4.5 |
| 7 | A2CEI302 | Surveying & Geometrics | 2 | - | 2 | 3 |
| 8 | A2EHA701 | Environmental Science | 2 | - | - | 0 |
| Total Number of Credits | | | | | | **24.5** |

| SEMESTER - IV | | | | | | |
|---|---|---|---|---|---|---|
| S. No | Course Code | Course Title | L | T | P | Credits |
| 1 | A2MAT110 | Mathematics-IV | 3 | - | - | 3 |
| 2 | A2XXT1XX | Biology for Engineers | 3 | - | - | 3 |
| 3 | A2CET202 | Design Thinking and Product Innovation | 2 | - | 2 | 3 |
| 4 | A2CEL301 | Computer Aided Civil Engineering Drawing | - | - | 3 | 1.5 |
| 5 | A2CEI303 | Strength of Materials | 3 | - | 3 | 4.5 |
| 6 | A2CET302 | Project Planning Management | 2 | - | - | 2 |
| 7 | A2CEI304 | Material Testing and Evaluation | 3 | - | 3 | 4.5 |
| 8 | A2EHA702 | Indian Traditional Knowledge | 2 | - | - | 0 |
| Total Number of Credits | | | | | | **21.5** |

| SEMESTER - V | | | | | | |
|---|---|---|---|---|---|---|
| S. No | Course Code | Course Title | L | T | P | Credits |
| 1 | A2CEI305 | Structural Analysis (Including STAAD. Pro.) | 3 | - | 2 | 4 |
| 2 | A2CEI306 | Soil Mechanics | 3 | - | 3 | 4.5 |
| 3 | A2CET303 | Basic Reinforced Concrete Design | 3 | - | - | 3 |
| 4 | A2CET401<br>A2CET402<br>A2CET403<br>A2CET404<br>A2CET405 | **Professional Elective-1**<br>Advanced Concrete Technology<br>Channels and River hydraulics<br>Civil Infrastructure for Smart City Development<br>Advanced Surveying<br>MOOCs | 3 | - | - | 3 |
| 5 | A2CET501 | Open Elective – I /MOOCs | 3 | - | - | 3 |
| 6 | A2CET502 | Open Elective – II/MOOCs | 3 | - | - | 3 |
| 7 | A2CEP602 | Mini Project | - | - | - | 2 |
| Total Number of Credits | | | | | | **22.5** |

| SEMESTER - VI | | | | | | |
|---|---|---|---|---|---|---|
| S. No | Course Code | Course Title | L | T | P | Credits |
| 1 | A2MST001 | Managerial Economics & Financial Analysis | 3 | | | 3 |
| 2 | A2CEI307 | Environmental Engineering | 3 | | 3 | 4.5 |
| 3 | A2CET304 | Design of Steel Structures | 3 | | | 3 |
| 4 | A2CET305 | Highway Engineering | 3 | | | 3 |
| 5 | A2CET306 | Irrigation and Water Resources Engineering | 3 | | | 3 |
| 6 | A2CET406<br>A2CET407<br>A2CET408<br>A2CET409<br>A2CET410 | **Professional Elective-II**<br>Repair and Rehabilitation of Structures<br>Remote Sensing and GIS<br>Reinforced Soil Structures<br>Engineering Geology<br>MOOCs | 3 | | | 3 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 7 | A2CET411<br>A2CET412<br>A2CET413<br>A2CET414<br>A2CET415 | **Professional Elective-III**<br>Advanced Reinforced Concrete Design<br>Ground Improvement Techniques<br>Advanced Fluid Mechanics<br>Disaster Management<br>MOOCs | 3 | | | 3 |
| Total Number of Credits | | | | | | **22.5** |

| **SEMESTER - VII** | | | | | | |
|---|---|---|---|---|---|---|
| S. No | Course Code | Course Title | L | T | P | Credits |
| 1 | A2EHT001 | Professional Ethics and Human Values | 3 | - | - | 3 |
| 2 | A2CET307 | Estimation & Costing | 3 | - | - | 3 |
| 3 | A2CET308 | Foundation Engineering | 3 | - | - | 3 |
| 4 | A2CET416<br>A2CET417<br>A2CET418<br>A2CET419<br>A2CET420 | **Professional Elective – IV**<br>Matrix Methods of Structural Analysis<br>Air pollution Engineering<br>Railways, Airports and Harbours<br>Advanced Environmental Engineering<br>MOOCs | 3 | - | - | 3 |
| 5 | A2CET421<br>A2CET422<br>A2CET423<br>A2CET424<br>A2CET425 | **Professional Elective - V**<br>Environmental Impact Assessment<br>Environmental Economics<br>Traffic Engineering and Transport Planning<br>Ground Water Development and Management<br>MOOCs | 3 | - | - | 3 |
| 6 | A2CET426<br>A2CET427<br>A2CET428<br>A2CET429<br>A2CET430 | **Professional Elective – VI**<br>Finite Element Method<br>Building Construction and Services<br>Water Resource System Planning and Management<br>Advanced Water Resources Engineering<br>MOOCs | 3 | - | - | 3 |
| 7 | A2CEP601 | Socially Relevant Project | | | | 1 |
| 8 | A2CEP603 | Project Phase - I | | | | 2 |
| Total Number of Credits | | | | | | **21** |

| **SEMESTER - VIII** | | | | | | |
|---|---|---|---|---|---|---|
| S. No | Course Code | Course Title | L | T | P | Credits |
| 1 | A2CET503 | Open Elective – III/ MOOCs | 3 | - | - | 3 |
| 2 | A2CET504 | Open Elective – IV / MOOCs | 3 | - | - | 3 |
| 3 | A2CEP604 | Project Phase - II | | | | 8 |
| Total Number of Credits | | | | | | **14** |

## PROFESSIONAL ELECTIVE COURSES OFFERED BY THE DEPARTMENT OF CIVIL ENGINERING

| Professional Elective-1 | Professional Elective -2 | Professional Elective -3 | Professional Elective -4 | Professional Elective -5 | Professional Elective -6 |
|---|---|---|---|---|---|
| Advanced Concrete Technology | Repair and rehabilitation of structures | Advanced Reinforced Concrete Design | Matrix Methods of Structural Analysis | Environmental Impact Assessment | Finite Element Method |
| Channels and River hydraulics | Remote sensing and GIS | Ground improvement techniques | Air pollution Engineering | Environmental Economics | Building construction and services |
| Civil infrastructure for smart city development | Reinforced soil structures | Advanced Fluid mechanics | Railways, Airports and Harbours | Traffic Engineering and Transport Planning | Water resource system planning and management |
| Advanced surveying | Engineering Geology | Disaster Management | Advanced Environmental Engineering | Ground Water Development and Management | Advanced water resources Engineering |

## OPEN ELECTIVE COURSES OFFERED BY THE DEPARTMENT OF CIVIL ENGINEERING

1. Remote sensing and GIS
2. Project Planning and Management
3. Road safety Engineering
4. Geomatics
5. Building services
6. Water Power Engineering
7. Solid waste management
8. Technology in Rural development

| A2MAT101 | SEMESTER - I | L | T | P | C |
|---|---|---|---|---|---|
| | MATHEMATICS – I<br>(COMMON TO ALL BRANCHES) | 3 | 0 | - | 3 |
| | Total Contact Hours – 48 | | | | |

## SYLLABUS

### UNIT-I: LINEAR ALGEBRA-1

Rank of a matrix: Elementary row and column transformations, equivalent matrices, Echelon form of a matrix, calculation of rank by reducing the matrix to Echelon form. System of equations: Linear system of equations, homogeneous and non-homogeneous system of equations, consistency criteria, trivial and non-trivial solutions, solving system of equations by Rank method; Eigenvalues and Eigenvectors: Finding Eigenvalues and Eigenvectors, properties of Eigenvalues and Eigenvectors (statements) including spectral mapping theorem.

### UNIT- II: LINEAR ALGEBRA-2

Cayley-Hamilton Theorem: Statement of the theorem and its verification. Applications: Finding higher powers of a matrix, finding matrix polynomials, finding inverse of matrix. Diagonal form of a matrix: Reduction to diagonal form, spectral and modal matrices, finding higher powers of a matrix using diagonalisation, Quadratic forms: Matrix form of quadratic forms, orthogonal transformation, canonical form, reduction of quadratic form to canonical form by orthogonal transformation method, rank, index, signature and nature (definiteness) of a quadratic form.

### UNIT-III: FIRST ORDER DIFFERENTIAL EQUATIONS & APPLICATIONS

Outlines: Differential Equations(DEs), Order and degree of a DE, Formation of DEs, general solutions of a DE; Solving first order and first degree DEs: linear DEs, Bernoulli's DEs (reducible to linear), exact DEs, integrating factors, non-exact DEs (reducible to exact).

Applications to real world problems: Newton's law of cooling, laws of growth and decay, family of curves, orthogonality of families curves, orthogonal trajectories (Cartesian and polar curves).

### UNIT-IV: HIGHER ORDER DIFFERENTIAL EQUATIONS

Differential equations of higher order: Linear differential equations of higher order, its operator form. Solution concepts: General (complete) solution, particular solution. Solution of linear differential equations of higher order: Auxiliary equations, rules for finding complementary functions, rules for finding particular integrals (general and special methods).

### UNIT-V: LAPLACE TRANSFORMS

Laplace transformation: Laplace transformation of elementary functions, Properties: Linearity, change of scale, first shifting properties, finding Laplace transformations using properties, Advanced properties: Laplace transformations of derivatives and integrals, multiplication by $t^n$, division by t (statements), finding Laplace transformations

using advanced properties; Inverse Laplace transformations: Finding inverse Laplace transformations using partial fractions, statement of Convolution theorem, finding inverse Laplace transformations by Convolution theorem; Applications: Solving Initial Value Problems by using Laplace transformations.

//Topics prefixed with 'Outlines' are not for assessment//

**TEXT BOOKS:**


1. B.S. Grewal, Higher Engineering Mathematics, 44/e, Khanna Publishers, 2017
2. T.K.V. Iyengar et al, Engineering Mathematics, S. Chand Publishers, Revised edition


**REFERENCE BOOKS:**


1. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons, 2011
2. B.V. Ramana, Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010
3. T. Veerarajan, Higher Engineering Mathematics, Tata McGraw-Hill, 2008


**COURSE OUTCOMES:** Learners at the end of this course will be able to

| | | |
|---|---|---|
| CO 1 | KO#1 | Recall the concepts of Linear Systems of Equations, Eigenvalues, Eigenvectors, Cayley-Hamilton Theorem, Diagonalization and Quadratic Forms |
| CO 2 | KO#2 | Recall the concepts of First Order Differential Equations and their solution methods |
| CO 3 | KO#3 | Recognize the methods of solving higher order DEs and also the methods to find Laplace transforms |
| CO 4 | UO#1 | Understand the concepts of Linear Systems of Equations, Eigenvalues, Eigenvectors, Cayley-Hamilton Theorem, Diagonalization and Quadratic Forms to solve problems in linear algebra |
| CO 5 | UO#2 | Interpret the concepts of first order Differential Equations and their solution methods so as to solve real world problems governed by the laws of cooling, growth, decay and OTs |
| CO 6 | UO#3 | Summarize the methods of solving higher order DEs and also the methods to find Laplace transforms to find solutions to initial value problems |
| CO 7 | AO#1 | Apply the concepts of linear algebra, differential equations and Laplace transformation to model and solve real world problems |

CO/PO Mapping

| Course Title: | Mathematics-I (Common to ALL Branches) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Course Code: | A2MAT101 | | | | | | | | | | | | | |
| Course Designed by | Dept. of Mathematics | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| CO1 | 3 | 3 | | 2 | | | | | | | 2 | | | |
| CO2 | 3 | 3 | | 2 | | | | | | | 2 | | | |
| CO3 | 3 | 3 | | 2 | | | | | | | 2 | | | |
| CO4 | 3 | 3 | | 2 | | | | | | | 2 | | | |
| CO5 | 3 | 3 | | 2 | | | | | | | 2 | | | |
| CO6 | 3 | 3 | | 2 | | | | | | | 2 | | | |
| CO7 | 3 | 3 | | 2 | | | | | | | 2 | | | |

| | |
|---|---|
| Course designed by | DEPARTMENT OF MATHEMATICS |
| Approval | Approved by: Meeting of Board of Studies held on 06.07.2019 |
| | Ratified by: 5th Meeting of Academic Council, 13-07-2019. |

| A2CYI101 | SEMESTER - I | L | T | P | C |
|---|---|---|---|---|---|
| | ENGINEERING CHEMISTRY (COMMON TO CE, EEE & ME) | 3 | -- | 2 | 5 |
| | Total Contact Hours – 48 | | | | |

## SYLLABUS

### UNIT 1: WATER TECHNOLOGY

Introduction –Soft Water and hardness of water, Estimation of hardness by EDTA Method - Boiler troubles - Industrial water treatment – specifications for drinking water, Bureau of Indian Standards(BIS) and World health organization(WHO) standards, zeolite and ion-exchange processes - desalination of brackish water, reverse osmosis (RO) and electro dialysis.

### UNIT 2: POLYMERS

Introduction to polymers, functionality of monomers, addition and condensation polymerization, copolymerization, stereospecific polymerization with specific examples. Thermoplastics and Thermo-sets – their differences.

Elastomers – applications with specific examples- Preparation, properties and uses of PVC, Bakelite, Teflon and Nylon-6, 6, Buna-S and Thiokol rubber- Fibre reinforced plastics – carbon fibre, glass fibre and aramids.

### UNIT 3: ELECTROCHEMISTRY AND APPLICATIONS

Electrodes – concepts, electrochemical cell, Nernst equation, cell potential calculations.
Primary cells –dry cell- Secondary cells – lead acid, nickel-cadmium and lithium ion batteries- working of the batteries including cell reactions- Fuel cells, hydrogen-oxygen, and methanol fuel cells – working of the cells.
Corrosion: Introduction to corrosion, mechanism of dry and wet corrosion, Pilling Bedworth ratios and uses, Types of corrosion – Differential aeration corrosion, galvanic corrosion, pitting corrosion, waterline corrosion and stress corrosion, Factors affecting the rate of corrosion – metal based factors and environmental based factors, protection techniques – metal coatings – galvanization and tinning, cathodic protection, inhibitors – cathodic and anodic, organic coatings – paints – constituents and their functions.

### UNIT-4: CHEMISTRY OF ADVANCED MATERIALS

**NANOMATERIALS:** introduction- synthesis of Nano material by sol gel method- CVD- engineering applications of Nano materials

**CEMENT**: Introduction to ordinary Portland cement- manufacturing of OPC- setting and hardening of cement- decay of cement.

**FUELS**: Introduction- classification- liquid fuels- cracking- knocking- octane number and cetane number; Lubricants- definition- mechanism and properties of lubricants

### UNIT 5: INSTRUMENTAL METHODS AND APPLICATIONS

Electromagnetic spectrum. Absorption of radiation: Beer-Lambert's law. Principle, instrumentation (Block diagram and working), applications of UV, IR and NMR spectroscopic methods. Chromatography- introduction- Ion exchange chromatography- applications

## COURSE OUTCOMES:

**CO1:** The student will have the ability to describe softening methods and desalination processes. He/ She will be able to explain various types of polymers; preparation, properties and engineering applications of thermoplastic, thermosetting plastics, rubbers and FRP's.

**CO2:** The student will have the ability to describe electrochemical reactions, principles of batteries, fuel cell and corrosion.

**CO3:** The student will have the ability to outline electromagnetic spectrum and explain the working principles of IR, UV, NMR and chromatographic techniques. The student describes the synthesis, properties and applications of nanomaterials, cement. HE/ She Outlines the cracking methods, knocking of fuels.

**CO4:** The student will have the ability to differentiate between hard and soft water, demineralization and deionization processes and thermosetting – thermoplastic materials.

**CO5:** The students will have the ability to give examples on primary and secondary batteries, various types of corrosion, methods of corrosion prevention.

**CO6:** The student will have the ability to draw inferences on the principles and applications of various instrumental methods and also can compare and contrast between cracking methods.

**CO7:** The student will have the ability to analyze water samples and validate the results obtained.

*Text books:*


1. Jain and Jain, Engineering Chemistry, 16/e, Dhanpat Rai, 2013.
2. Skoog and West, Principles of Instrumental Analysis, 6/e, Thomson, 2007.


*Reference books:*


1. H.F.W. Taylor, Cement Chemistry, 2/e, Thomas Telford Publications, 1997.
2. H.Kaur, Instrumental Methods of chemical analysis, Pragathi Prakashan, 2012.
3. Chemistry for Engineers, Teh Fu Yen, Imperial college press, London

CO/PO Mapping

| Course Title: | Engineering Chemistry | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Course Code: | A2CYI101 | | | | | | | | | | | | | |
| Course Designed by | Dept. of Chemistry | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| CO1 | | | | | | | | | | | | | | |
| CO2 | | | | | | | | | | | | | | |
| CO3 | | | | | | | | | | | | | | |
| CO4 | | | | | | | | | | | | | | |
| CO5 | | | | | | | | | | | | | | |
| CO6 | | | | | | | | | | | | | | |
| CO7 | | | | | | | | | | | | | | |

| Course designed by | DEPARTMENT OF CHEMISTRY |
|---|---|
| Approval | Approved by: Meeting of Board of Studies held on 29.06.2019 |
| | Ratified by: 5th Meeting of Academic Council, 13-07-2019. |

# Engineering Chemistry - Laboratory

**List of Experiments:**

1. Determination of HCl using sodium carbonate
2. Determination of Hardness of a groundwater sample.
3. pH metric titration of strong acid vs. strong base
4. Condcutometric titration of Strong acid VS Strong base
5. Condcutometric titration of Weak acid VS strong base
6. Potentiometric titration of Fe(II) with potassium dichromate
7. Determination of Strength of an acid in Pb-Acid battery
8. Preparation of a polymer
9. Determination of viscosity of polymer solution using survismeter
10. Determination of percentage of Iron in Cement sample by colorimetry
11. Estimation of Calcium oxide in port land Cement
12. Preparation of Nanomaterials (ex: Fe/ Zn/ Ferrite)
13. Adsorption of acetic acid by charcoal
14. Determination of acid value and saponification value of a given lubricant
15. Project based learning (Mandatory for all students)

## Course Outcomes:

**CO1:** The student will be able to determine total hardness, strength of acid in a lead acid battery, calcium in Portland cement using volumetric analysis

**CO2:** The student will be able to explain condcutometric, potentiometric, pH metric titrations and colorimetric determination.

**CO3:** The student will be able to explain the synthesis of a polymer, nanomaterials

CO/PO Mapping

| Course Title: | Engineering Chemistry | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Course Code: | A2CYI101 | | | | | | | | | | | | | |
| Course Designed by | Dept. of Chemistry | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| CO1 | 3 | | 1 | | | 1 | | | | 1 | 1 | 2 | | |
| CO2 | 3 | | 1 | | | 1 | | | | 1 | 1 | 1 | | |
| CO3 | 3 | | 1 | | | | | | | 1 | 1 | 1 | | |

| | |
|---|---|
| Course designed by | DEPARTMENT OF CHEMISTRY |
| Approval | Approved by: Meeting of Board of Studies held on 29.06.2019 |
| | Ratified by: 5th Meeting of Academic Council, 13-07-2019. |

| A2EEI201 | SEMESTER – I | L | T | P | C |
|---|---|---|---|---|---|
| | **Basic Electrical Engineering** (COMMON TO CE, EEE & ME) | 3 | 1 | 2 | 5 |
| | **Total Contact Hours – 50** | | | | |

## SYLLABUS

### UNIT 1: D.C. CIRCUITS

Electrical circuit elements (R, L and C), voltage and current sources, Kirchhoff's current and voltage laws, Analysis of simple circuits with DC excitation, Superposition, Thevenin's and Norton's Theorems, Time-domain analysis of first-order RL and RC circuits.

### UNIT 2: A.C. CIRCUITS

Representation of sinusoidal waveforms, Average and RMS values, phasor representation, real power, reactive power, apparent power, power factor, Analysis of single-phase AC circuits (Series & Parallel), Resonance, Three-phase balanced circuits, voltage and current relations in star and delta configurations.

### UNIT 3: DC & AC MACHINES [ELEMENTARY TREATMENT ONLY]

Principle and operation of DC Generator - EMF equation – open circuit characteristic of DC shunt generator – principle and operation of DC Motor – Types of DC Motors – Performance Characteristics of DC Motor - Speed control of DC Motor – Principle and operation of single-phase Transformer - OC and SC tests on transformer - principle and operation of single phase & Three phase Induction Motors, construction and working of synchronous motors

### UNIT 4: BASICS OF POWER SYSTEMS:

Layout & operation of Hydro, Thermal, Nuclear Stations - Solar & wind generating stations – Typical AC Power Supply scheme – Elements of Transmission line – Types of Distribution systems: Primary & Secondary distribution systems.

### UNIT 5: ELECTRICAL INSTALLATIONS

Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing, Types of Batteries, Characteristics of Batteries. Elementary calculations for energy consumption, power factor improvement, battery backup.

### TEXT BOOK/ REFERENCES:


1. D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2010
2. E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.
3. Vincent Del Toro, "Electrical Engineering Fundamentals", Pearson, 2015.

**COURSE OUTCOMES:**

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

CO1. To recall fundamental concepts of electrical circuits such as charge, voltage, current and power.
CO2. Describe the principle of operation of D.C. & A.C. machines.
CO3. Outline the working operation of various generating stations.
CO4. Explain the procedure for solving circuits with A.C and D.C. Excitation
CO5. Summarize the performance characteristics of different machines.
CO6. Explain about different equipment used in power industry
CO7. Apply the fundamental laws, associated with Basic Electrical Engineering to solve real world problems in the field of Engineering

CO/PO Mapping

| CO / PO mapping | Program Outcomes | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | PSO1 | PSO2 |
| To recall fundamental concepts of electrical circuits such as charge, voltage, current and power. | 3 | 3 | 1 | 1 | | | 3 | | | 1 | | | 1 | 1 |
| Describe the principle of operation of D.C. & A.C. machines. | 3 | 2 | 2 | 2 | 2 | | | | | 1 | | | 1 | 1 |
| Outline the working operation of various generating stations. | 3 | 3 | 3 | 1 | 1 | | 1 | | | 1 | | | 1 | 1 |
| Explain the procedure for solving circuits with A.C and D.C. Excitation | 3 | 3 | 2 | 1 | 1 | | 2 | | | 1 | | | 1 | 1 |
| Summarize the performance characteristics of different machines. | 3 | 3 | 2 | 1 | 1 | 3 | 1 | | | 1 | | | 1 | 1 |
| Explain about different equipment used in power industry | 3 | 3 | 2 | 1 | | 2 | 2 | | | 1 | | 1 | 3 | 2 |
| Apply the fundamental laws, associated with Basic Electrical Engineering to solve real world problems in the field of Engineering | 3 | 3 | 3 | 3 | 3 | 2 | 2 | | | 2 | | 3 | 3 | 3 |

| | |
|---|---|
| Course designed by | Department of Electrical & Electronics Engineering |
| Approval | Approved by: Meeting of Board of Studies held on 29.06.19 |
| | Ratified by: 5th Meeting of Academic Council, 13-07-2019. |

## Basic Electrical Engineering Laboratory

LIST OF EXPERIMENTS

Basic safety precautions, Introduction and use of measuring instruments – voltmeter, ammeter, multi-meter, oscilloscope, resistors, capacitors and inductors.

1. Verification of Kirchhoff laws.
2. Verification of Network Theorems.
3. Magnetization characteristics of a DC Shunt Generator.
4. Speed control of DC Shunt Motor.
5. Predetermination of performance parameters of 1 – Phase Transformer.
6. I – V Characteristics of Solar PV cell
7. Brake test on DC Shunt Motor.
8. Measurement of earth resistance.
9. Measurement of reactive power in three phase balanced circuit.
10. Measurement of Choke coil parameters
11. Brake test on 3 - Phase Induction Motor.
12. Determination of AC quantities using CRO/DSO.
13. I – V characteristics of battery.

**COURSE OUTCOMES:**

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

CO 1. Identify common electrical equipment used in laboratory.(L1)

CO 2. Estimate the ratings of different equipment used to perform an experiment. (L2)

CO 3. Demonstrate the usage of various electrical measuring instruments.(L3)

CO 4. Analyze the characteristics of rotating & stationery electrical machines (L4).

CO 5. Interpret the characteristics of PV cell and Battery.(L5)

CO/PO Mapping

| CO / PO Mapping | Program Outcomes | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | PSO1 | PSO2 |
| Identify common electrical equipment used in laboratory. | 3 | | 1 | 1 | 3 | 1 | | | 3 | 2 | 2 | 2 | 2 | 1 |
| Estimate the ratings of different equipment used to perform an experiment. | 3 | 2 | 3 | 3 | 3 | 2 | 1 | | 3 | 3 | 2 | 2 | 2 | 3 |
| Demonstrate the usage of various electrical measuring instruments. | 2 | 2 | 2 | 2 | 3 | 1 | | | 3 | 3 | 1 | 2 | 2 | 1 |
| Analyze the characteristics of rotating & stationery electrical machines. | 3 | 3 | 3 | 3 | 2 | | | | 3 | 3 | | 2 | 3 | 2 |
| Interpret the characteristics of PV cell and Battery. | 3 | 3 | 3 | 3 | 3 | | 1 | | 3 | 3 | 2 | 2 | 3 | 3 |

| | |
|---|---|
| Course designed by | Department of Electrical & Electronics Engineering |
| Approval | Approved by: Meeting of Board of Studies held on 29.06.19 |
| | Ratified by: 5th Meeting of Academic Council, 13-07-2019. |

| A2CEW201 | SEMESTER - I | L | T | P | C |
|---|---|---|---|---|---|
| | WORKSHOP | 0 | 0 | 4 | 2 |
| | **Total Contact Hours – 48** | | | | |

| COURSE OBJECTIVES | |
|---|---|
| 1. | To outline the process of identification of various building components and their estimation |
| 2. | To provide knowledge on operation of the various survey instruments used for linear and angular measurements. |
| 3. | To explain the concepts of identification of minerals and rocks |
| 4. | To explain the concept of measurement of discharge and velocity in a pipe and density of water |
| 5. | To demonstrate automatic weather station |

**SYLLABUS**

**LIST OF EXPERIMENTS**

1. Demonstration on usage of chain
2. Ranging – offsets - chainage
3. To find the area of an irregular polygon using chain by using horizontal measurements
4. Determination of bearings and included angles with prismatic compass.
5. Demonstration on various Building materials used in construction
6. Estimation of quantity of bricks, concrete, wood, paint for the given single room building
7. Masonry work hands – on practice work deferent types of bonds in brick masonry
8. Identification of quality of cement through physical tests
9. Identification of quality of brick through physical tests
10. Identification of soil based on their physical properties
11. Setting out of building : The student is required to set out a building (Single room only) as per the given building plan using tape and cross staff.
12. Identification of Rocks – Igneous, Sedimentary, Metamorphic rocks
13. Identification of rock / ore forming minerals.
14. Demonstration on Installation of simple sanitary fittings and fixtures like Tap, T-joint, Elbow, bend, threading etc.
15. Finding the discharge velocity in a water pipe line also find density of water
16. Demonstration on Automatic weather station for measuring different climatic parameters like Temperature, humidity, rainfall, evaporation etc.,
17. Computation of centre of gravity and moment of inertial of (i) I-section and (ii) Channel section.
18. Welding (arc welding and gas welding)
19. Carpentry
20. Indentify deferent types of roads in the campus and write the physical characteristics of layers
21. Demonstration on making of cement mortar/concrete for the given nominal mix
22. Study of given Toposheet

**REFERENCE BOOKS**


1. Laboratory manual for Basic civil Engineering workshop compiled by Department of Civil Engineering MVGR College of Engineering (A)

**COURSE OUTCOMES:**

**Learners at the end of this Laboratory course will be able to**

1. Identify various components of a building and give lump-sum estimate.
2. Determine distances and irregular areas using conventional survey instruments like chain, tape, cross-staff and compass
3. Identify different soils, minerals and rocks.
4. Know various traffic signs & signals
5. Determine centre of gravity and moment of inertia of channel and I-sections.
6. Set out a signal room building as per given plan
7. Know to observe various climatic parameters using AWS
8. Install simple sanitary filling and find discharge / velocity in a water pipe line as density of water
9. Know to the process of making cement mortar / concrete for nominal mix

| A2CEW201- WORKSHOP | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO/ PO** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **PSO-1** | **PSO-2** |
| COs | | | | √ | | | | | √ | | | √ | √ | √ |

| A2CEW201 WORKSHOP | |
|---|---|
| Course Designed by | Department of Civil Engineering |
| Approval | Approved by: Meeting of Board of Studies held on 09.07.2019 |
| | Ratified by: Meeting of Academic Council, held on |

| A2EHA701 | SEMESTER - I | L | T | P | C |
|---|---|---|---|---|---|
| | CONSTITUTION OF INDIA | 2 | - | - | 0 |
| | Total Contact Hours – 30 | | | | |

**SYLLABUS**

**UNIT – I: HISTORY OF MAKING OF THE INDIAN CONSTITUTION**

History - Drafting Committee, (Composition & Working)

**UNIT – II: PHILOSOPHY OF THE INDIAN CONSTITUTION:** Preamble - Salient Features

**UNIT-III: CONTOURS OF CONSTITUTIONAL RIGHTS & DUTIES:** Fundamental Rights -Right to Equality -Right to Freedom -Right against Exploitation -Right to Freedom of Religion -Cultural and Educational Rights -Right to Constitutional Remedies ; Directive Principles of State Policy ; Fundamental Duties.

**UNIT-IV: ORGANS OF GOVERNANCE:** Parliament -Composition - Qualifications and Disqualifications - Powers and Functions - Executive - President - Governor - Council of Ministers; Judiciary, Appointment and Transfer of Judges, Qualifications.

**UNIT – V: LOCAL ADMINISTRATION:** District's Administration head: Role and Importance, Municipalities: Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation. Panchayati raj: Introduction, PRI: Zila Panchayat. Elected officials and their roles, CEO Zila Panchayat : Position and role. Block level: Organizational Hierarchy (Different departments), Village level: Role of Elected and Appointed officials, Importance of grass root democracy

**TEXT BOOK:**
Reference Source compilation

**REFERENCES:**
**1.** The Constitution of India, 1950 (Bare Act), Government Publication.
2. Dr. S. N. Busi, Dr. B. R. Ambedkar framing of Indian Constitution, 1st Edition, 2015.
3. M. P. Jain, Indian Constitution Law, 7th Edn., Lexis Nexis, 2014.

**COURSE OUTCOMES:**

| | |
|---|---|
| CO1. | Students will be able to discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics. |
| CO2. | Students will be able discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India. |
| CO3. | Students will be able to discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP]under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution. |
| CO4. | Students will be able to discuss the passage of the Hindu Code Bill of 1956. |
| CO5. | Students will be able to discuss the powers of Executive, Judiciary and Legislature. |

CO/PO Mapping

| Course Title: | Constitution of India (Common to ALL Branches) |
|---|---|
| Course Code: | A2EHA701 |
| Course Designed by | Dept. of English & Humanities |

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | | | | | | 2 | | | | | | | | |
| CO2 | | | | | | 2 | | | | | | | | |
| CO3 | | | | | | 2 | | | | | | | | |
| CO4 | | | | | | 2 | | | | | | | | |
| CO5 | | | | | | 2 | | | | | | | | |

| | |
|---|---|
| Course designed by | DEPARTMENT OF ENGLISH & HUMANITIES |
| Approval | Approved by: Meeting of Board of Studies held on 23.06.15 |
| | Ratified by: 5th Meeting of Academic Council, 13-07-2019. |

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