ISO 9001:2015 AICTE-CII: GOLD Category Institute NAAC-'A' Grade Institute (CGPA: 3.21)

Estd: 1980
KITSW

KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE

Opp : Yerragattu Gutta, Hasanparthy (Mandal), WARANGAL - 506 015, Telangana, INDIA.

काकतीय प्रैद्योगिकी एवं विज्ञान संस्थान, वरंगल - ५०६ ०१५ तेलंगाना, भारत

కాకతీయ సాంకేతిక విజ్ఞాన శాస్త్ర విద్యాలయం, వరంగల్ - ౫౦౬ ౦౧౫ తెలంగాణ, భారతదేశము

(An Autonomous Institute under Kakatiya University, Warangal)

(Approved by AICTE, New Delhi; Recognised by UGC under 2(f) & 12(B); Sponsored by EKASILA EDUCATION SOCIETY)

website: www.kitsw.ac.in E-mail: principal@kitsw.ac.in : +91 9392055211, +91 7382564888

B.TECH. - COMPUTER SCIENCE & ENGINEERING (DATA SCIENCE)

RULES & REGULATIONS FOR UNDERGRADUATE PROGRAMME
B.TECH. 4-YEAR DEGREE PROGRAMME (URR-18R22)

(Applicable from the Academic Year 2023 - 24)

Choice Based Credit System (CBCS)

SYLLABI (I to II Semesters)

ISO 9001:2015 AICTE-CII: GOLD Category Institute NAAC-'A' Grade Institute (CGPA: 3.21)

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• B.Tech. •

COMPUTER SCIENCE AND ENGINEERING (DATA SCIENCE)

Rules & Regulations for undergraduate Programme
B.Tech. 4-Year Degree Programme (URR-18R22)

(Applicable from the Academic Year 2023-24)

SYLLABI (I to II SEMESTERS)

KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE
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VISION OF THE INSTITUTE

- *To make our students technologically superior and ethically strong by providing quality education with the help of our dedicated faculty and staff and thus improve the quality of human life*

MISSION OF THE INSTITUTE

- *To provide latest technical knowledge, analytical and practical skills, managerial competence and interactive abilities to students, so that their employability is enhanced*
- *To provide a strong human resource base for catering to the changing needs of the Industry and Commerce*
- *To inculcate a sense of brotherhood and national integrity*

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING (DATA SCIENCE)

VISION OF THE DEPARTMENT

- *Attaining centre of excellence status in various fields of Computer Science and Engineering by offering worthful education, training and research to improve quality of software services for ever growing needs of the industry and society.*

MISSION OF THE DEPARTMENT

- *Practice qualitative approach and standards to provide students better understanding and profound knowledge in the fundamentals and concepts of computer science with its allied disciplines*
- *Motivate students in continuous learning to enhance their technical, communicational, and managerial skills to make them competent and cope with the latest trends, technologies, and improvements in computer science to have a successful career with professional ethics.*
- *Involve students in analyze, design and experimenting with contemporary research problems in computer science to impact socio-economic, political and environmental aspects of the globe.*

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)	
UG- COMPUTER SCIENCE & ENGINEERING (DATA SCIENCE)	
PROGRAM EDUCATIONAL OBJECTIVES (PEOs)	*Within first few years after graduation, the* ***COMPUTER SCIENCE AND ENGINEERING (DATA SCIENCE)*** *graduates will be able to.....*
PEO1: ***Technical Expertise***	*Demonstrate adept application of core computer science and data science knowledge to create impactful and transformative software solutions*
PEO2: ***Successful Career***	*Attain excellence in the fields of software and data science, achieving success in one's profession, higher education, and entrepreneurship while staying up-to-date with the latest technologies*
PEO3: ***Soft Skills and Life Long Learning***	*Exhibit professional ethics, effective communication and team work in solving contemporary knowledge engineering problems and to excel in social innovations.*

PROGRAM OUTCOMES (POs) & PROGRAM SPECIFIC OUTCOMES (PSOs)	
UG - COMPUTER SCIENCE & ENGINEERING (DATA SCIENCE)	
PROGRAM OUTCOMES (POs)	***At the time of graduation, the COMPUTER SCIENCE AND ENGINEERING (NETWORKS)*** *graduates will be able to …*
PO1: ***Engineering knowledge***	*apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems*
PO2: ***Problem analysis***	*identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences*
PO3: ***Design development of solutions***	*design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental Considerations*
PO4: ***Conduct investigations of complex problems***	*use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions*
PO5: ***Modern tool usage***	*create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations*

PO6: ***The engineer and society***	*apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice*
PO7: ***Environment and sustainability***	*understand the impact of the professional engineering solutions in societal and environmental contexts, demonstrate the knowledge of, and need for sustainable development*
PO8: ***Ethics***	*apply ethical principles and commit to professional ethics, responsibilities, and norms of the engineering practice*
PO9: ***Individual and team work***	*function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings*
PO10: ***Communication***	*communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions*
PO11 ***Project management and finance***	*demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments*
PO12: ***Life-long learning***	*recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change*

PROGRAM OUTCOMES (POs) & PROGRAM SPECIFIC OUTCOMES (PSOs)	
UG- COMPUTER SCIENCE & ENGINEERING (DATA SCIENCE)	
PSO1: ***Software Development and Quality Assurance***	*Utilize foundational knowledge in computer science and engineering and data science techniques to develop efficient computing solutions for complex real world engineering problems.*
PSO2: ***Maintenance***	*Design and implement solutions for diverse data science systems and cognitive applications, leveraging modern hardware and software tools for enhanced performance and efficiency*
PSO3: ***Immediate Professional Practice***	*Create efficient data science applications that enhance the effectiveness of existing data processing systems through continuous adaptation and incorporation of emerging updates*

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (DATA SCIENCE)
KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE, WARANGAL – 15
(An Autonomous Institute under Kakatiya University, Warangal)
SCHEME OF INSTRUCTION & EVALUATION
I-SEMESTER OF 4-YEAR B. TECH DEGREE PROGRAM

URR-18R22

[5Th+2P+3MC]

Sl. No	Category	Course Code	Course Title	Periods/week			Credits	Evaluation scheme				
				L	T	P	C	CIE			ESE	Total Marks
								TA	MSE	Total		
1	BSC	U18MH101	Engineering Mathematics – I	3	1	-	4	10	30	40	60	100
2	ESC	U18CS102	Programming for Problem Solving using C	3	-	-	3	10	30	40	60	100
3	BSC	U18CH103	Engineering Chemistry	3	1	-	4	10	30	40	60	100
4	ESC	U18ME104	Engineering Drawing	2	-	4	4	10	30	40	60	100
5	ESC	U18CE105	Engineering Mechanics	3	1	-	4	10	30	40	60	100
6	ESC	U18CS107	Programming for Problem Solving using C Laboratory	-	-	2	1	40	-	40	60	100
7	BSC	U18CH108	Engineering Chemistry Laboratory	-	-	2	1	40	-	40	60	100
8	MC	U18CH109	Environmental Studies	2	-	-	-	10	30	40	60	100
9	MC	U18EA110	EAA *: Sports/Yoga/NSS	-	-	2	-	100	-	100	-	100
10	MC	U18EA111	Universal Human Value-I (*Induction Programme*)	-	-	-	-	-	-	-	-	-
			Total:	16	3	10	21	240	180	420	480	900

[L= Lecture, T = Tutorials, P = Practicals & C = Credits] EAA: Extra Academic Activity * indicates mandatory non-credit course

Total Contact Periods/Week: 29 Total Credits: 21

Stream-I: ME, CSE, IT, CSN,CSE(IOT) Stream-II: CE, EIE, EEE, ECE, ECI,CSE(AI&ML)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (DATA SCIENCE)
KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE, WARANGAL – 15
(An Autonomous Institute under Kakatiya University, Warangal)

URR-18R22

SCHEME OF INSTRUCTION & EVALUATION
II-SEMESTER OF 4-YEAR B. TECH DEGREE PROGRAM

[5Th+4P+1MC]

Sl. No	Category	Course Code	Course Title	Periods/week			Credits	Evaluation scheme				
				L	T	P	C	CIE			ESE	Total Marks
								TA	MSE	Total		
1	BSC	U18MH201	Engineering Mathematics – II	3	1	-	4	10	30	40	60	100
2	ESC	U18CS202R1	Data Structures through C	3	-	-	3	10	30	40	60	100
3	BSC	U18PH203	Engineering Physics	3	1	-	4	10	30	40	60	100
4	HSMC	U18MH204	English for Communication	2	-	2	3	10	30	40	60	100
5	ESC	U18EE205	Basic Electrical Engineering	3	1	_	4	10	30	40	60	100
6	ESC	U18EE206	Basic Electrical Engineering Laboratory	-	-	2	1	40	-	40	60	100
7	ESC	U18CS207R1	Data Structures through C Laboratory	-	-	2	1	40	-	40	60	100
8	BSC	U18PH208	Engineering Physics Laboratory	_	_	2	1	40	-	40	60	100
9	ESC	U18ME209	Workshop Practice	-	_	2	1	40	-	40	60	100
10	MC	U18EA210	EAA: Sports/Yoga/NSS*	-	-	2	-	100	-	100	-	100
Total:				14	3	12	22	310	150	460	540	1000

[L= Lecture, T = Tutorials, P = Practicals & C = Credits] EAA: Extra Academic Activity * indicates mandatory non-credit course

Total Contact Periods/Week: 29
Total Credits: 22
Stream-I: ME, CSE, IT, CSN,CSE(IOT)
Stream-II: CE, EIE, EEE, ECE, ECI,CSE(AI&ML)

Internships: All students should plan for mandatory 6-8 weeks internship, from end of II semester to commencement of VII semester at industry/R&D organizations/industries of national importance (IITs/IIITs/NITs). As part of Internship Evaluation in VII Semester, students are expected to submit a well-documented internship report and give an informative ppt presentation in VII semester.

Industry-relevant curriculum is in process under the guidance of ***four renowned industry experts*** and ***two academic experts*** from IIT/NIT

ISO 9001:2015 AICTE-CII: GOLD Category Institute NAAC-'A' Grade Institute (CGPA: 3.21) NIRF-2020 Rank Band: 201-250

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RULES AND REGULATIONS FOR UNDERGRADUATE PROGRAMME
B.TECH 4-YEAR DEGREE PROGRAMME (URR-18)
CHOICE BASED CREDIT SYSTEM (CBCS)
(Applicable from the academic year 2018-19)

1. INTRODUCTION

1.1 Kakatiya Institute of Technology & Science, Warangal (KITSW) is a UGC autonomous institute under Kakatiya University (KU) Warangal. The institute offers 4 year (8 semesters) Bachelor of Technology (B.Tech) degree programme, under Choice Based Credit System (CBCS) with effect from the academic year (A.Y) 2018-19.

1.2 The provisions contained in these regulations given the conditions for imparting course of instructions, conducting examinations and evaluation of students' performance leading to B.Tech. 4-year degree programme to be offered by the Kakatiya Institute of Technology & Science, Warangal and awarded by Kakatiya University, Warangal.

1.3 These regulations shall be called the ***Kakatiya Institute of Technology & Science, Warangal (KITSW) regulations for the award of B.Tech 4-year degree programme*** *by Kakatiya University, Warangal.*

1.4 They shall come into effect from the date of getting approval from the Academic Council of the Kakatiya Institute of Technology & Science, Warangal

1.5 They shall be applicable for all students enrolling for B.Tech 4-year degree programme at the Kakatiya Institute of Technology & Science, Warangal from the academic year 2018-19.

2. DEFINITIONS

2.1 ***"B.Tech."*** means Bachelor of Technology, an Under Graduate Degree awarded from the Kakatiya University, Warangal

2.2 ***"University"*** means Kakatiya University, Warangal

2.3 ***"Institute"*** means Kakatiya Institute of Technology & Science, Warangal

2.4 ***"UGC"*** means University Grants Commission, New Delhi

2.5 ***"AICTE"*** means All India Council for Technical Education, New Delhi

2.6 ***"MHRD"*** means Ministry of Human Resource & Development, Govt. of India, New Delhi

2.7 ***"TSCHE"*** means Telangana State Council for Higher Education, Govt. of Telangana, Hyderabad

2.8 ***"GB"*** means Governing Body of the Institute

2.9 ***"AC"*** means Administrative Committee of the Institute

2.10 ***"FC"*** means Finance Committee of the Institute

2.11 ***"Academic Council"*** means Academic Council of the Institute

2.12 ***"Principal"*** means Principal of the Institute

2.13 ***"Dean"*** means Dean of specific affairs of the Institute

2.14 ***"HoD"*** means Head of the Department of specific programme offered by the Institute

2.15 ***"BoS"*** means Board of Studies in the engineering of a specific programme offered by the Institute

2.16 ***"CoE"*** means Controller of Examinations of the Institute.

3. UNDER GRADUATE PROGRAMMES

3.1 The Institute shall offer the following Under Graduate Programmes under CBCS:

1. B.Tech Civil Engineering (CE)
2. B.Tech Mechanical Engineering (ME)
3. B.Tech Electronics & Instrumentation Engineering (EIE)
4. B.Tech Electrical & Electronics Engineering (EEE)
5. B.Tech Computer Science & Engineering (CSE)

6. B.Tech Information Technology (IT)
7. B.Tech Electronics & Communication Engineering (ECE)
8. B.Tech Computer Science & Engineering (Networks) (CSN)
9. B.Tech Electronics Communication & Instrumentation Engineering (ECI)
10. B.Tech Computer Science & Engineering (Artificial Intelligence & Machine Learning)
11. B.Tech Computer Science & Engineering (IoT)
12. B.Tech Computer Science & Engineering (Data Science)

3.2 The provisions of these regulations shall also be applicable to any new undergraduate programmes that are introduced from time to time with approval from appropriate bodies such as MHRD / AICTE / UGC, etc.

4. ADMISSION

4.1 a) Candidates seeking admission to 1st year of the Four Year B.Tech. degree programme shall have passed the Intermediate Examination of the Board of Intermediate Education, Telangana with Mathematics and Physical Sciences (Physics and Chemistry) as optional subjects or any other examination recognized by the University as equivalent to it.

b) **Lateral Entry:** Candidates seeking admission directly into 2nd year of 4-year B.Tech. degree programme as **"Lateral Entry"** student shall have passed 3 year full time Diploma (after 10th Std) offered by State Board of Technical Education and Training, Telangana or any other examination recognized by the University as its equivalent.

4.2 The Admissions shall be made in accordance with the guidelines issued by TSCHE.

4.3 **Change of Branch:** There is a provision for change of branch in B.Tech. III semester level only in accordance with guidelines provided by Commissioner of Technical Education, Govt. of Telangana State. Branch change shall be strictly according to the merit list prepared by the Institute from the regular students on the basis of total marks obtained by the student in I and II semester examinations put together. Only those students who have passed in all the subjects in single attempt shall be eligible to apply for change in branch, provided there is a clear vacancy in a particular branch limited to prescribed / approved intake by AICTE in the previous academic session when the students were admitted at I semester level.

Vacancy in a particular branch

= Approved intake – (No. of regular students + No. of repeaters)

5. ACADEMIC SESSION

5.1 Each academic session is divided into two semesters (odd and even), each of 16 weeks including two Mid Semester Examinations (MSE).

a) **Odd Semester**: From June/July to October/November of academic year. However, academic session of the first semester will be decided based on counseling schedule declared by the TSCHE.

b) **Even Semester**: From November/December to March/April of academic year.

5.2 The Institute shall announce the schedule for all the academic activities well before the commencement of the academic year and take all the necessary steps to follow them scrupulously.

5.3 The academic activities in a semester normally include registration, course work, Continuous Internal Evaluation (CIE), End Semester Examination (ESE) and declaration of results.

6. REGISTRATION

6.1 All the students are required to register in person at the beginning of each academic year on the dates specified in the academic calendar (almanac).

6.2 The sole responsibility for registration rests with the student concerned.

6.3 Registration of students will be centrally organized by the Academic section.

6.4 The Registration procedure involves:

a) Filling of the prescribed registration form

b) Payment of fees and clearance of outstanding dues (if any)

c) Signing undertakings (undertaking for regular attendance, discipline and against ragging) along with the parents

6.5 If for any compelling reasons like illness, etc., a student is unable to register on the announced day of registration, he/she can register within 12 working days from the beginning of the academic year on payment of an additional late fee as prescribed by the Institute.

6.6 **No late registration shall be permitted after 12th working day** from the scheduled date of commencement of class work for that academic year.

6.7 Only those students will be permitted to register who have

a) cleared all institute and hostel dues of previous semesters
b) paid all required prescribed fees for the current academic year
c) not been debarred / detained from registering for a specified period on disciplinary or any other grounds
d) cleared the minimum academic requirement as detailed in Regulation No. 15

7. CURRICULUM

7.1 The Model curriculum/ Course structure as suggested by AICTE, New Delhi; CBCS and Credit Based Semester System (CBSS) as denoted by UGC, New Delhi is followed for all UG programmes.

7.2 a) The duration of the programme leading to B.Tech degree will be 8 semesters (4 academic years)
b) However, for the lateral entry students, the duration of the program leading to B.Tech degree will be 6 semesters (3 academic years)

7.3 The curricula for different degree programmes as proposed by the department and recommended by the BoS shall have the approval of the Academic Council.

7.4 As suggested by AICTE, the courses offered for UG programme are broadly classified as: Basic Science Courses (BSC), Engineering Science Courses (ESC), Humanities and Social Sciences including Management Courses (HSMC), Professional Core Courses (PCC), Professional Elective (PE) courses, Open Elective (OE) courses, Mandatory Courses (MC) and Project (PROJ) based courses

7.5 The courses offered would have a ***Lecture – Tutorial – Practical (L-T-P)*** component to indicate contact hours. Separate laboratory (practical) course may exist (0-0-P) in certain cases as decided.

7.6 The academic programmes of the Institute follow the credit system.

7.7 Each course shall have credits(C), which reflects its weightage. The number of credits of a course in a semester shall ordinarily be calculated as under:

$$\textit{Number of credits of a course, } C = L + T + (P/2)$$

where ***L, T, P*** represent the No. of Lecture, Tutorial and Practical hours / week

7.8 The students admitted for B.Tech. programme under Lateral Entry scheme have to be offered a mandatory course on "Environmental Studies" in the 4th semester of B.Tech. programme.

7.9 **Course Code:** Each course offered in the Undergraduate (B.Tech.) curriculum at this institute shall be listed by using a total of 8 digits, as follows:

Ex: **U18CE106**

a) The first letter, to represent the **U**nder Graduate Programme
Ex. U for Undergraduate Course
b) The next two numbers, to represent the year in which the syllabus is proposed / revised.
Ex. 18 for the year 2018 from which syllabus is applicable for the batches admitted from academic year 2018-19
c) The next two letters, to represent the concerned department offering that course.
Ex. CE for Civil Engineering
d) The last three numbers, to represent the course number and semester in which it is being offered.
Ex. XYZ; X - Semester number ; YZ – Course number
106 represents course number 06 offered in first semester

In general, a **course code** "**U18CE106**" represents an **Undergraduate Course number-06 for the batches admitted from the year 2018 offered by the Department of Civil Engineering in first semester.**

7.10 The syllabus of each course in the B.Tech. curriculum shall be divided into four (4) units.

8. ATTENDANCE

8.1 All the students are normally required to have 100% attendance in aggregate. However, condonation for shortage of attendance upto 25% may be granted by the principal based on recommendation of HoD concerned.

8.2 The condonation for shortage of attendance upto 25% (as mentioned in Regulation No. 8.1) shall be taken up only when the student takes prior permission for his absence stating fully the genuine reasons along with supporting documents to the HoD concerned.

8.3 Hence, students not having the mandatory requirement of minimum 75% of attendance in aggregate shall be detained and shall not be permitted to appear for the MSE-II & ESE of that semester.

8.4 All such students who are detained have to repeat the entire semester when it is offered, by following the due registration procedure.

8.5 Attendance of all courses shall be entered before the end of each working day by the faculty concerned through the College Management System (CMS) portal of the institute website. Students are advised to monitor the status of their attendance through this CMS portal.

9. CONDUCT AND DISCIPLINE

9.1 All students shall be required to conduct themselves in a manner befitting the reputation of the institution, within and outside the premises of the Institute; and are expected to complete their studies without any break.

9.2 As per the order of Hon'ble Supreme Court of India, ragging in any form is strictly banned. Involvement of a student in ragging will be considered as a gross indiscipline and may lead to his / her expulsion from the Institute.

9.3 Detailed rules regarding the conduct and discipline (code of conduct) are made available on Institute website.

10. EVALUATION PROCEDURE

10.1 The evaluation of students in every course of 4-year B.Tech. programme (8 semesters) and Lateral Entry students of B.Tech. programme (6 semesters), is a continuous process and is based on their performance in different examinations as mentioned below:

a) Sessional, involving **Continuous Internal Evaluation (CIE)** conducted all through the semester which includes **Teachers Assessment (TA)** through assignments and **Mid-Semester Examinations (MSE)**

b) Terminal, often designated as **End Semester Examination (ESE)** which includes written examination for theory courses and practical/ design/ drawing examination with built-in oral part for laboratory/ design / drawing courses.

10.2 A student's performance in a course (subject) shall be judged by taking into account the result of CIE and ESE together.

10.3 CIE and ESE shall have 40:60 weightage i.e. CIE carrying 40% weightage and ESE carrying 60% weightage.

10.4 **Continuous Internal Evaluation (CIE) for Theory Course**:

10.4.1 CIE throughout the semester shall consist of TA and MSE.

10.4.2 The distribution given to each component of CIE for a theory course is given below:

S. No.	Particulars	Weightage
1.	Teacher's Assessment (TA) (**Assignments**)	10%
2.	Mid Semester Examination (MSE**) (MSE-I & MSE-II**)	30%
	Total Weightage	**40%**

10.4.3 **TA**:

a) There shall be 2 Assignments and 2 Minor exams (Quiz/Slip test, etc.) for each course at regular intervals of time

b) Minor-I shall be based on Unit-I syllabus, Minor-II shall be based on Unit-III syllabus, Assignment-I shall be based on Unit-I & Unit-II syllabi and to be submitted before MSE-I, Assignment-II shall be based on Unit-III & Unit-IV syllabi and to be submitted before MSE-II.

c) Average of Assignment-I, Assignment-II, Minor-I and Minor-II marks shall be taken under TA

10.4.4 **MSE**:

a) There shall be two mid semester examinations (MSE-I and MSE-II) of two-hour duration each.

b) It is mandatory for the student to take both MSEs

c) MSE evaluation shall be done as given below:
MSE marks awarded = (70% of the best of MSE-I & MSE-II marks)
+ (30% of the other MSE marks)

Ex: A student secured following marks
MSE-I marks = 10 out of 30
MSE-II marks = 20 out of 30
The MSE marks awarded will be = (70% of 20) + (30% of 10) = 14 + 3 =17

10.4.5 The marks obtained by the students in MSE must be submitted to the Controller of Examination (CoE) by the teachers within 1 week from the date of conduct of the examination.

10.4.6 The dates for MSE and ESE will be declared by the CoE in consultation with the Dean, Academic Affairs.

10.5 **End Semester Examination (ESE) for Theory Course**:
There shall be an End Semester Examination (ESE) at the end of each semester for three hour duration for each course.

10.6 **Continuous Internal Evaluation (CIE) for Practical (Laboratory) Course:**

10.6.1 CIE for practical course shall carry 40% weightage.

10.6.2 CIE throughout the semester shall consist of the following:

Assessment	Weightage
Regular Experimentation / Job work and Viva-voce	20%
Regular submission of record	10%
Quiz / Skill test / Viva-voce at the end of semester	10%
Total Weightage	**40%**

10.7 **End Semester Examination (ESE) for Practical (Laboratory) Course:**

10.7.1 There shall be an ESE at the end of each semester for three hour duration for each practical course.

10.7.2 The ESE for practical course shall carry 60% weightage.

10.7.3 The marks distribution at ESE shall be as follows:

Assessment	Weightage
Procedure / Experimentation / Tabulation / Result, as applicable …	45%
Viva-voce	15%
Total Weightage	**60%**

10.8 **Continuous Internal Evaluation (CIE) for Seminar & Mini Project :**

10.8.1 **Seminar**:

d) The HoD shall constitute a *Department Seminar Evaluation Committee (DSEC)*

e) *DSEC* shall allot a faculty supervisor to each student for guiding on (i) selection of topic (ii) literature survey and work to be carried out (iii) preparing a report in proper format and (iv) effective seminar presentation

f) There shall be only continuous Internal Evaluation (CIE) for seminar

g) The CIE for seminar is as follows:

Assessment	Weightage
Seminar Supervisor Assessment	20%
Seminar Report	30%
Seminar Paper	20%
DSEC Assessment: *Oral presentation with PPT and viva-voce*	30%
Total Weightage:	**100%**

Note: It is mandatory for the candidate to appear for oral presentation and Viva-voce to qualify for course evaluation.

h) **Seminar Topic**: The topic should be interesting and conducive to discussion. Topics may be found by looking through recent issues of peer reviewed Journals / Technical Magazines on the topics of potential interest

i) **Report:** Each student is required to submit a well-documented report on the chosen seminar topic as per the format specified by *DSEC.*

j) **Anti-Plagiarism Check:** The seminar report should clear plagiarism check as per the Anti-Plagiarism policy of the institute.

k) **Presentation:** Each student should prepare PPT with informative slides and make an effective oral presentation before the *DSEC* as per the schedule notified by the department

l) The candidate has to register the Seminar as supplementary examination in the following cases:
   (i) student is absent for oral presentation and viva-voce
   (ii) student fails to submit the report in prescribed format
   (iii) student fails to fulfil the requirements of seminar evaluation as per specified guidelines

m) Supplementary examination for seminar
   (i) The CoE shall send a list of candidates registered for supplementary to the HoD concerned
   (ii) The *DSEC*, duly constituted by the HoD, shall conduct seminar evaluation and send the award list to the CoE within the stipulated time

10.8.2 **Mini Project**:

a) The HoD shall constitute a *Departmental Mini Project Evaluation Committee (DMPEC)*

b) Every student shall take up independent Mini project on innovative ideas. However, wherever not feasible a group of 2 to 4 students shall be allowed to take up mini project. The *DMPEC* shall take a decision on number of students in a group.

c) *DMPEC* shall allot a faculty supervisor to each student for guiding on (i) selection of topic (ii) literature survey and work to be carried out (iii) preparing a report in proper format and (iv) effective mini project oral presentation

d) There shall be only Continuous Internal Evaluation (CIE) for mini project

e) The CIE for mini project is as follows:

Assessment	**Weightage**
Mini Project Supervisor Assessment	20%
Working model / process / software package / system developed	20%
Mini Project report	20%
Mini Project paper	10%
Video pitch	10%
DMPEC Assessment: *Oral presentation with PPT and viva-voce*	20%
Total Weightage:	**100%**

Note: It is mandatory for the candidate to appear for oral presentation and Viva- voce to qualify for course evaluation.

i) **Mini Project Topic**: The topic should be interesting and conducive to discussion. Topics may be found by looking through recent issues of peer reviewed Journals/ Technical Magazines on the topics of potential interest

ii) **Working Model**: Each student is required to develop a working model/ process/ system on the chosen work and demonstrate before the *DMPEC* as per the dates specified by *DMPEC*

iii) **Report:** Each student is required to submit a well-documented report on the chosen seminar topic as per the format specified by *DMPEC*

iv) **Anti-Plagiarism Check:** The seminar report should clear plagiarism check as per the Anti-Plagiarism policy of the institute

v) **Presentation:** Each student should prepare PPT with informative slides and make an effective oral presentation before the *DMPEC* as per the schedule notified by the department

vi) **Video Pitch:** Each student should create a pitch video, which is a video presentation on his/ her mini project. Video pitch should be no longer than 5 minutes by keeping the pitch concise and to the point, which shall also include key points about his/ her business idea / plan (*if any*) and social impact

f) The candidate has to register the Mini project as supplementary examination in the following cases:
   (i) Student is absent for oral presentation and viva-voce
   (ii) Student fails to submit the report in prescribed format

(iii) Student fails to fulfill the requirements of Mini project evaluation as per specified guidelines.

g) Supplementary examination for mini project
   (i) The CoE shall send a list of candidates registered for supplementary to the HoD concerned
   (ii) The *DMPEC,* duly constituted by the HoD, shall conduct Mini project evaluation and send the award list to the CoE within the stipulated time.

10.9 **Evaluation for Major Project Work:**

10.9.1 Final year major project work is a team work and represents the culmination of study towards the B. Tech degree. **Major project offers an opportunity to integrate the knowledge acquired from various courses and apply it to solve real-world complex engineering problems**. The **Student Learning Assessment Process** (SLAP) shall include good number of presentations, demonstration of work undertaken, submission of a project report, writing project paper in scientific journal style & format, preparing project poster and creating video pitch on the complete project work.

10.9.2 Activities of major project SLAP shall be planned in such a way to ensure that the students acquire the essential Knowledge, Skills and Qualities (KSQ) of a professional engineer.

10.9.3 Major project work shall be normally conducted in two stages: Major project work. *Phase-I* in seventh semester and Major project work *Phase-II* in eighth semester. Nearly 50 - 75% of the proposed work to be completed in 7th semester as *Phase-I* and the remaining work to be continued and completed in 8th semester as *Phase-II*

10.9.4 **Major Project *Phase-I*:**

a) Every student is expected to put approximately **72 hours of work** into the major project *phase-I* course over the 12 weeks of 7th semester

b) The HoD shall constitute a *Departmental Project Evaluation Committee (DPEC)*

c) The convener DPEC shall allot faculty supervisors to all project teams for guiding on (i) project objectives and expected deliverables (ii) plan their project work and timeline (iii) enough resources for successful project completion (iv) Knowledge, Skills and Qualities (KSQ) to be acquired to propose solutions to the identified real-world problem for the project work (v) preparing a well-documented report in proper format and (iv) effective major project oral presentation

d) The project supervisors shall ensure students focus on the project objectives, expected deliverables and students have sufficient resources for successful project completion

e) The project supervisors are also expected to continuously emphasize and guide the students on following project timeline, meeting cadence, activity journaling in project log book

f) There shall be only Continuous Internal Evaluation (CIE) for Major Project *Phase-I*

g) CIE for the Major Project *Phase-I* in seventh semester is as follows:

Major project work Phase-I Assessment *(7th semester)*	**Weightage**
A. Supervisor Assessment	**20%**
B. DPEC Assessment *(i) Registration Presentation (10%)* *(ii) Progress Presentation-I (20%)* *(iii) Project progress*: Part of working model/ process/software package/system developed (30%)* *(iii) Well-documented Progress Report on Phase-I work (10%)* *(iv) Video pitch on Phase-I (10%)*	**80%**
Total Weightage	**100 %**

** Students are advised to complete major part of the project in phase-I only*

g) **Working Model:** Every project team shall be required to develop a working model/ process/software package/system, on the chosen work. The progress made in this shall be demonstrated during progress presentation-I at the end of *phase-I* and the completed working model/ process/software package/system before the DPEC as per the dates specified by DPEC at the end of *phase-II*.

h) **Progress Report on *phase-I*:** Every project team shall be required to submit a well-documented progress report on dissertation phase-I as per format specified by DPEC.

i) **Video pitch on *phase-I*:** Every project team shall be required to create a pitch video, which is a video presentation on their major project work *phase-I*. It should be 3 to 5-minute-long video (no longer than 5 minutes), highlight the progress made at various stages during *phase-I* project implementation

j) A student shall register for supplementary examination for the Major project work *phase-I* in the following cases:
   (i) Student is absent for oral presentation and viva-voce as part of progress presentation-I
   (ii) Project team fails to submit the progress report on *phase-I* in prescribed format
   (iii) Project team fails to submit the video pitch on the progress made during the *phase-I* period.
   (iv) Student fails to fulfill the requirements of major project work *phase-I* evaluation as per specified guidelines

k) Supplementary examination for major project work *phase-I*
   (i) The CoE shall send the list of students, registered for supplementary examination, to the HoDs concerned
   (ii) The DPEC shall conduct major project *phase-I* supplementary exam and send the award list to the CoE within the stipulated time

10.9.5 **Major Project *Phase-II*:**

a) All the major project teams shall take the *phase -I* work forward and complete the remaining work as *Phase-II* in the 8th semester.

b) Every student is expected to put approximately 168 hours of work into the major project *phase-II* course over the 12 weeks of 8th semester

c) The project supervisors are expected to guide the students to systematically continue the *phase-I* work, useful work during inter-semester break, meeting the deadlines as proposed in project timeline

d) The project supervisors shall ensure students focus on the project objectives and expected deliverables and ensure students have sufficient resources for successful project completion

e) The project supervisors are also expected to continuously emphasize and guide the students on following project timeline, meeting cadence, activity journaling in project log book.

f) The evaluation for Major Project work *Phase-II:* There shall be Continuous Internal Evaluation (CIE) and End Semester Examination (ESE). The evaluation for *phase-II* shall be as given below:

Assessment	Weightage
A. CIE **(i) Supervisor Assessment (10%)** **(ii) DPEC Assessment (50%)** *(a) Progress presentation-II (10%)* *(b) Final presentation (10%)* *(c) Working model / process / software package / system developed (20%)* *(d) Project video pitch (5%)* (e) *Project paper (5%)*	**60%**
B. ESE *(i) Well-documented project report (15%)* *(ii) Oral presentation with PPTs and viva-voce (15%)* (iii) *Project poster (5%)*	**40%**
Total Weightage	**100%**

g) **Working Model:** Every project team shall be required to develop a working model/ process/software package/system, on the chosen work. The completed working model/ process/software package/system shall be demonstrated during final presentation at the end of *phase-II*.

h) **Video pitch**: Every project team shall be required to create a pitch video, which is a video presentation on their major project work *phase-I & phase-II*. The project team shall present the produced video pitch during Final presentation

i) **Project poster**: At the end, the project teams shall present their project in the form of posters (A2 size). The teams shall have to present their work during the poster presentation session scheduled at the end of the 8th semester, at the time of demonstration of complete porotype / working model / software package / system developed.

j) **Well-documented plagiarism-cleared project report**: Every project team shall be required to submit a well-documented project report on the work carried out, as per the format specified by the DPEC. The report should clear plagiarism check as per the anti-plagiarism policy-2020 of the institute.

k) A student shall register for supplementary examination for the Major project work *phase-II* in the following cases:
   (i) Student is absent for oral presentation and viva-voce as part of ESE presentation
   (ii) Student fails to fulfill the requirements of major project work *phase-II* evaluation as per specified guidelines

l) Supplementary examination for major project work *phase-II*
   (i) The CoE shall send the list of students, registered for supplementary examination, to the HoDs concerned
   (ii) The DPEC, duly constituted by the HoD, shall conduct major project *phase-II* supplementary exam and send the award list to the CoE within the stipulated time

10.10 **Evaluation for Internship:**

10.10.1 The students shall undergo 6-8 weeks internship during summer/winter vacation at industry/R&D organization / Academic Institutes like IITs, IIITs & NITs.

10.10.2 The students preferably shall undergo internship at one organization only. In case of any difficulty, the stipulated period of internship shall be completed at different organizations with minimum of one week internship at every stage.

10.10.3 The internship evaluation shall be done in the VII semester of study and hence the students shall complete the prescribed period of internship before start of VII semester (from end of II semester to commencement of VII semester).

10.10.4 The internship evaluation shall be done by ***Department Internship Evaluation Committee* (DIEC)** based on the submitted report by student and oral presentation.

10.10.5 There shall be only Continuous Internal Evaluation (CIE) for internship evaluation.

10.10.6 The CIE for the Internship evaluation in VII semester shall be as below:

Internship evaluation	**Weightage**
A. **Internship Supervisor's Assessment** *(i) Feedback from the internship supervisor* *- on completion of internship assignment / work (20%)* *(ii) Feedback from the internship supervisor* *- on quality of work in internship assignment / work (10%)* *(iii) Feedback from the internship supervisor* *- internship log book (10%)* *(iv) Feedback from the internship supervisor* *- on attendance, punctuality and work hours (10%)*	**50%**
B. DIEC Assessment *(i) Internship duration (8 /6 weeks) (15% / 10%)* *(ii) Internship Report (20%)* *(iii) Oral Presentation (with PPT) and viva voce (15%)*	**50%**
Total Weightage:	**100%**

Note: *It is mandatory for the student to appear for oral presentation (with PPT) and viva voce to qualify for course evaluation*

(a) **Internship Report:** Each student is required to submit a well-documented internship report (both *soft copy and softbound hard copy*) as per format specified by DIEC

(b) A student shall register for supplementary examination for the internship evaluation in the following cases:
   (i) absent for oral presentation and viva-voce
   (ii) fails to submit the internship report in prescribed format
   (iii) fails to fulfill the requirements of internship evaluation as per specified guidelines

(c) Supplementary examination for internship evaluation
   (i) The CoE shall send the list of students, registered for supplementary examination, to the HoDs concerned
   (ii) The DIEC, duly constituted by the HoD, shall conduct internship evaluation supplementary exam and send the award list to the CoE within the stipulated time

10.11 **Evaluation of MOOCs:**

10.11.1 a) **SWAYAM-MOOCs:** Massive Open Online Courses (MOOCs) are such online courses which are developed as per the pedagogy and made available on the SWAYAM (Study Web of Active-learning by Young and Aspiring Minds) platform of *Government of India*

b) **SWAYAM** shall notify to all Institutions, on 1st June, 1st November every year, the list of online learning courses going to be offered in the forth coming semester.

10.11.2 a) The student shall be allowed to register for MOOCs courses for the designated Professional electives and Open electives mentioned in the curriculum.

b) The student shall select a relevant MOOCs course carrying 3 credits.

10.11.3 The Institutional MOOCs coordinator with the help of departmental MOOCs coordinator shall guide the students throughout the course.

10.11.4 **Evaluation and Certification of MOOCs**:

a) The Principal Investigator (PI) shall be a Subject Matter Expert (SME) belonging to a reputed educational institution, called Host Institution

b) The host Institution and PI shall be responsible for evaluating the registered students for MOOCs course

c) After conduct of examination and completion of the evaluation, the PI through host institution shall award Marks/Grade as per the evaluation scheme announced.

10.11.5 **Credit Mobility of MOOCs**:

a) Institution shall allow the credit mobility for the courses earned through MOOCs.

b) A certificate regarding successful completion of the MOOCs courses shall be issued through host Institution and sent to the parent institution.

c) The parent institution shall give equivalent credit weightage to the students for the credits earned through online learning courses through SWAYAM platform in the credit plan of the programme.

10.11.6 In case the student is unable to complete the MOOCs course, he/she shall be allowed to select one of courses listed under respective PE/OE offered at institute/department concerned and appear for supplementary examination. In such case, the student is deemed to have passed the course, if he/she scores minimum 35% of maximum marks allotted to the course in the registered supplementary ESE only (i.e. 35 marks out of 60 in ESE).

11. MINIMUM REQUIREMENT FOR PASSING A COURSE

11.1 **Theory Course**: A student is deemed to have passed in a theory course, if he / she secures

a) 35 percent of marks assigned to End Semester Examination (ESE) **and**

b) 35 percent of marks assigned to the Mid Semester Examination (MSE) & End Semester Examination (ESE) of the course taken together **and**

c) 35 percent of marks assigned to Teacher's Assessment (TA), Mid Semester Examination (MSE) and End Semester Examination (ESE) of the course taken together.

11.2 The marks assigned to MSE will be considered as per the Regulation no. 10.4.4

11.3 **Laboratory Course**: A student is deemed to have passed in a laboratory course, if he/she secures
a) 35 percent of marks assigned to End Semester Examination (ESE) **and**
b) 35 percent of marks assigned to the Teacher's Assessment (TA) and End Semester Examination (ESE) of the laboratory course taken together.

12. GRADING SYSTEM

12.1 At the end of the semester a student is awarded a letter grade in each of his / her courses taking into account the total marks secured (X) in that course

where, X = Marks secured in CIE + Marks secured in ESE

12.2 For arriving at a grade obtained by a student in a particular course (subject), initially numeric marks obtained by the student out of 100 are to be determined. Once a numeric mark is obtained, the same is to be converted to a letter grade following the guidelines given in 12.3 below.

12.3 The Institute shall follow absolute grading system. The grades will be awarded to each course as under:

Grade	Total Marks Secured (X)
S	$X \geq 90$
A	$80 \leq X < 90$
B	$70 \leq X < 80$
C	$60 \leq X < 70$
D	$45 \leq X < 60$
P	$35 \leq X < 45$
F	$X < 35$

12.4 The typical grades and their numerical equivalents on 10-point scale (called Grade Points) are as follows:

Performance	Letter Grade	Grade Points (G_i)
Superior	S	10
Excellent	A	9
Very Good	B	8
Good	C	7
Average	D	6
Pass	P	4
Fail	F	0

12.5 **F-Grade** is a Fail Grade. The course in which the student has earned F-Grade will be termed as backlog course.

12.6 In addition, there shall be a transitional **M-Grade.** M-Grade for "Debarred" due to indiscipline / malpractice during examination.

12.7 A Semester Grade Point Average (SGPA) will be computed for each semester. The SGPA will be calculated as follows:

$$SGPA = \sum_{i=1}^{n} C_i G_i \Big/ \sum_{i=1}^{n} C_i$$

where 'n' is the no. of courses (subjects) offered (excluding mandatory non-credit courses) for the semester, 'C_i' is the credits allotted to a particular course, 'G_i' is the grade-points carried by the letter corresponding to the grade awarded to the student for the course as illustrated in 12.4.

12.8 The SGPA would indicate the performance of the student in the semester to which it refers. SGPA will be rounded off to the second place of decimal and recorded as such.

12.9 Starting from the second semester, at the end of each semester, a Cumulative Grade Point Average (CGPA) will be computed for every student as follows:

$$CGPA = \sum_{i=1}^{m} C_i G_i \Big/ \sum_{i=1}^{m} C_i$$

where 'm' is the total number of courses (subjects) the student has been offered from the first semester onwards upto and including the present semester, 'C_i 'and 'G_i' are as explained in 12.7.

12.10 The CGPA would indicate the cumulative performance of the student from the first semester up to the end of the semester to which it refers. CGPA will be rounded off to the second place of decimal and recorded as such.

12.11 SGPA and CGPA are calculated in consideration of only credits cleared, i.e. F-Grade credits are not included for calculation.

13. SUPPLEMENTARY EXAMINATIONS

13.1 A student who obtained the F-Grade in a course (theory or practical) can appear in a subsequent End Semester Examination (ESE) in the same course as supplementary candidate.

13.2 However the marks secured in Continuous Internal Evaluation (CIE) by the student in that course during the semester study shall remain unaltered.

13.3 The students those who have passed in the supplementary examination will be awarded grade with **'*'** marked on the courses passed in the supplementary.

13.4 **Makeup Examination for VIII semester courses:**
Makeup Examination for the students having backlog courses at VIII semester of 4th year B.Tech. programme shall be conducted immediately after the release of VIII semester regular examinations result.

14. REVALUATION

a) Revaluation is allowed for only theory courses.

b) If the award of the revaluator varies from the original award by less than or equal to 20% of maximum marks prescribed for the course, the original award shall be taken as final.

c) If the award of the revaluator varies from the original award by more than 20% of the maximum marks prescribed for the course, the answer script will be examined by the second revaluator. If the award ofthe bothrevaluators is more than 20% of the maximum marks prescribed for the course, then average of the two revaluated awards thus available shall be taken as final. Otherwise, the original award shall be taken as final.

15. CONDITIONS FOR PROMOTION

15.1 A student shall have to satisfy the attendance requirements for the semester (as per the Regulation No. 8) for promotion to the next higher semester. In addition,

a) for promotion to the fifth semester, a student should not have more than four backlogs in the first and second semesters taken together.

b) for promotion to the seventh semester, a student should not have more than four backlogs in the courses of first to fourth semester taken together.

c) the grade (marks) secured in mandatory non-credit courses will not be counted for the purpose of backlogs. However, a minimum P-Grade is compulsory in those courses for the award of the degree.

16. IMPROVEMENT EXAMINATION

16.1 Students who wish to improve their SGPA / CGPA are permitted for SGPA / CGPA improvement only for theory courses. The student may opt to re-appear all the courses of a semester at the immediately succeeding End Semester Examination (ESE) for improving his / her grades. However, the students should clear all the courses of a particular semester in which he / she intends to take an improvement examination.

16.2 Further, when once the student appears for the improvement examination, he / she shall forego the grades secured in the earlier End Semester Examination (ESE) in the whole set of courses prescribed for that semester. However, the marks secured in Continuous Internal Evaluation (CIE) by the student in those courses during the semester study shall remain unaltered.

16.3 Students those who have re-appeared for improvement will be awarded grade with **'$'** marked on the courses appeared for improvement examination. **'$'** will state the grade improvement. Such improved grades will not be counted for the award of Prizes, Medals and Rank.

16.4 However, the students who register for improvement examinations and wish to drop from appearing the examinations, by written application to the CoE, before commencement of examinations, shall be permitted to retain their earlier grades.

17. GRADUATION REQUIREMENT

17.1 A student shall be declared to be eligible for award of the B.Tech. degree, if he / she has registered and completed all the courses with a minimum P-grade scored in every course and secured a total of stipulated 160 credits.

17.2 Normally a student should complete all the requirements consecutively in 8 semesters (4 academic years) for the award of B.Tech. degree. However, the students who fail to fulfill all the requirements for the award of B.Tech. degree within a period of 16 consecutive semesters (8 academic years from the registration in 1st semester) shall forfeit his / her enrolment to the program.

17.3 The students admitted in the lateral entry scheme should complete all the requirements consecutively in 6 semesters (3 academic years) for award of B.Tech. degree. However, the students who fail to fulfill all the requirements for the award of B.Tech. degree within a period of 12 consecutive semesters (6 academic years from the registration in 3rd semester) shall forfeit his / her enrolment to the program.

17.4 a) **CGPA to Percentage conversion**: As per UGC and AICTE guidelines, the CGPA will be converted to percentage of marks as below:

Percentage of marks = (CGPA – 0. 50) x 10

Ex: If CGPA is 6.75, the equivalent Percentage of marks = (6.75-0.50) x 10 = 62.5%

b) CGPA to Class conversion:

S. No.	Division	Eligibility Criteria
1	First Division with Distinction	a) Student should secure CGPA≥8.0 b) Student should pass all the courses along with the batch of students admitted with him/her within 8 consecutive semesters (6 consecutive semesters for lateral entry students) c) Student who appeared for improvement examination upto 6th semester will also be considered d) Student who have cleared any course in supplementary examination shall not be awarded Distinction
2	First Division	a) Student should secure CGPA, which is 6.50 ≤ CGPA < 8.0 within the time frame of the programme i.e. 16 semesters (12 semesters in case of lateral entry students) b) Student who have cleared any course in supplementary examination and secured CGPA≥6.50
3	Second Division	Student should secure CGPA, which is 5.50 ≤ CGPA < 6.50 within the time frame of the programme i.e. 16 semesters (12 semesters in case of lateral entry students)
4.	Pass Division	Student should secure CGPA, which is 4.0 ≤ CGPA < 5.50 within the time frame of the programme i.e. 16 semesters (12 semesters in case of lateral entry students)
5.	Fail	Student with CGPA < 4.0 will not be eligible for award of degree

17.5 **Honours / Minor in Engineering can be conferred as per AICTE guidelines and Model curriculum January 2018**

A student will be conferred with Under Graduate degree as "*Bachelor of Technology in XXX Engineering/Technology, with Honours*" (or) "*Bachelor of Technology in XXX Engineering/Technology, with Minor in YYY Engineering/Technology*", if he/she completes an additional 20 credits. These additional 20 credits could be acquired through SWAYAM-NPTEL MOOCs / other MOOCs such as Coursera, Udemy, IITB spoken tutorials. These additional 20 credits earned through SWAYAM-NPTEL MOOCs /other MOOCs should be in addition to the credits acquired through SWAYAM - MOOCs offered in the curriculum as part of Professional Electives/ Open Electives. The University will award degrees to the students who are evaluated and recommended by the Institute.

17.5.1 **Honours:** Honours is an additional credential a student may earn, if he/she does additional learning for 20 credits *in his/her own discipline* of B.Tech programme. These additional credits shall be acquired through MOOCs from the *list of courses for Honours,* prescribed by the respective departments. These courses shall mostly be advanced courses (or) courses designed to give more exposure to different areas of one's own discipline. On

successful accumulation of these additional credits, at the time of graduation, it shall be mentioned in the degree certificate as "*Bachelor of Technology in XXX Engineering / Technology, with Honours*".

17.5.2 **Minor in Engineering:** A minor in engineering is an additional credential a student may earn, if he/she does additional learning for 20 credits *in a discipline other than his/her major discipline* of B.Tech programme. These additional credits shall be acquired through MOOCs from the *list of courses for a Minor Engineering* prescribed by the respective departments. On successful accumulation of these additional credits, at the time of graduation, it shall be mentioned in the degree certificate as "*Bachelor of Technology in XXX Engineering / Technology, with Minor in YYY Engineering/Technology*".

17.5.3 A student shall be eligible to register for a Honours in the same discipline of his/her study, and/or a Minor in Engineering offered by other department.

17.5.4 A student can register for both Honours in the same discipline and also a Minor in Engineering in other discipline. On successful accumulation of prescribed credits for Honours and also prescribed credits for Minor in Engineering, at the time of graduation, it shall be mentioned in the degree certificate as "*Bachelor of Technology in XXX Engineering / Technology, with Honours and Minor in YYY Engineering/Technology*".

17.5.5 Student who has completed B.Tech. IV semester in his/ her regular B.Tech. programme without any standing backlogs and with a minimum CGPA of 8.0 shall be allowed to register for Honours and/or Minor in Engineering.

17.5.6 Student who wants to register for Honours and/or Minor in Engineering shall opt for registration at the end of IV semester of his/ her B.Tech. programme, subject to the conditions prescribed by the AAC from time to time.

17.5.7 Student registered for Honours and/or Minor in Engineering shall ensure the following in his/her regular B.Tech programme

(i) student should maintain a minimum SGPA of 7.0 from V semester to VIII semester of regular B.Tech programme and

(ii) student should maintain a CGPA of 8.0 at the end of VIII semester of regular B.Tech programme

If the student fails to meet the above criteria, his/her registration for Honours and/or Minor in Engineering shall stand cancelled and he/she will be awarded only regular B.Tech degree.

17.5.8 A student may withdraw from Honours/Minor in Engineering at any time before graduating. Such students shall submit an application for withdrawal to the Dean AA, before start of any semester. The Dean AA, shall communicate the list of such students to the HoDs concerned (parent-department /minor-department) with a copy to the CoE.

17.5.9 During the curriculum revision, the HoDs in coordination with their Department Academic Advisory Committee (DAAC) shall identify the list of courses to be offered by the department under Honours curricula/ Minor in Engineering curricula and forward the same to the office of the Dean AA.

17.5.10 Student shall be permitted to take a maximum of 2 theory courses and one laboratory course during any semester for additional learning towards Honours curricula/ Minor in Engineering curricula.

17.5.11 Student shall take laboratory courses, listed under Honours curricula/Minor in Engineering curricula, in the parent-department/minor-department during inter-semester break and complete the course with a course project.

17.5.12 Office of the Dean AA shall compile and release list of courses under Honours curricula/ Minor in Engineering curricula for different departments/ programmes/disciplines, highlighting the importance of each discipline.

17.5.13 By the end of April of every academic year, the Dean AA in coordination with HoDs shall notify the department wise list of equivalent courses in MOOCs/ SWAYAM-NPTEL MOOCs against the list of courses notified under Honours curricula/ Minor in Engineering curricula, by respective departments.

17.5.14 Office of the Dean AA shall release registration notification for Honours/ Minor in Engineering, during even semester of every academic year inviting interested students of B.Tech IV semester to apply.

17.5.15 Interested students shall submit three (03) copies of applications in the prescribed format, *notified by the Dean AA*, along with supporting documents to the concerned HoD in the parent-department. The HoD in coordination with DAAC shall scrutinize the submitted applications and forward the consolidated list of registered students along with two sets of applications to the Dean AA.

17.5.16 The Dean AA shall notify, in coordination with the CoE, the list of eligible students towards **Honours** and forward this list to the **parent-department**. These notified students shall be allowed to do additional learning towards Honours in Engineering from V semester onwards.

17.5.17 The Dean AA shall notify, in coordination with the CoE, the list of eligible students towards Minor in Engineering and forward this list to the minor-department in which student opted to gain prescribed credits for Minor in Engineering along with one set of application. These notified students shall be allowed to do additional learning towards Minor in Engineering from V semester onwards.

17.5.18 In the process of additional learning towards Honours/ Minor in Engineering, the student shall exercise carefully all options to ensure the following:

(i) The credits earned in a course studied in regular curriculum towards fulfilment of basic degree, shall not be claimed under credits for additional learning towards Honours/ Minor in Engineering and vice versa

(ii) A course once studied in regular curriculum, shall not be taken again for additional learning towards Honours/ Minor in Engineering

17.5.19 The HoD in coordination with department MOOCs coordinator and faculty counsellor concerned, shall monitor progress of the registered student during the semester for successful completion of registered courses of Honours curricula.

17.5.20 The minor-department HoD in coordination with minor-department MOOCs coordinator and faculty counsellor concerned, shall monitor progress of the registered student during the semester for successful completion of registered courses of Minor in Engineering curricula.

17.5.21 On successful completion of registered courses, the student shall submit the course completion details in "Semester wise progress report (*for additional learning towards Honours/Minor in Engineering*)" in the prescribed format notified by the Dean, AA along with Certificate/ Grade sheet/ Mark sheet (indicating credits of the course) to the HoDs concerned (parent-department /minor-department).

17.5.22 The HoDs shall consolidate "Semester wise progress report (*for additional learning towards Honours/Minor in Engineering*)" of all the students registered for *Honours/Minor in Engineering* in their departments and forward the same to the Dean AA.

17.5.23 The Dean AA shall ensure genuineness of the submitted certificates, of registered students, with the help of the Institute MOOCs coordinator and forward the semester wise progress of registered students to the CoE.

17.5.24 The CoE shall ensure for reflecting the earned credits for additional learning towards Honours/Minor in Engineering in corresponding student semester grade sheet, subsequently in consolidated grade sheet and transcripts.

17.5.25 Separate CGPA for Honours and/or Minor in Engineering shall be mentioned in the consolidated grade sheet.

17.5.26 The students who have registered for Honours/ Minor in Engineering but unable to accumulate the 20 credits prescribed towards Honours/ Minor in Engineering at the time of graduation, he/she shall be awarded the Degree in his/her discipline without any mention about Honours/ Minor in Engineering.

17.6 The University will award degrees to the students who are evaluated and recommended by the Institute.

18. MALPRACTICE IN EXAMINATION

18.1 Malpractice in examination is an illegal activity and is prohibited.

18.2 Mobile phones are strictly prohibited in the examination hall.

18.3 Exchange of question paper and material like pen, pencil, sharpener, eraser, scale, calculator, etc., during examination is strictly prohibited.

18.4 Malpractice in examination is viewed very seriously. Malpractice includes oral communication between candidates, possessing forbidden material, mobile phones (switched off/on) etc.

18.5 Any malpractice or engaging in any improper conduct and violation of the examination code by the student during examinations is liable for the punishment as given below:

S. No	Nature of Malpractice	S. No	Punishment
1.	Taking help from others, consulting and or helping other examinees during the examination period inside the examination hall or outside it, with or without their consent or helping other candidates to receive help from anyone else	a)	Cancelling the examination of the paper in which he / she indulged in malpractices
2	If the examinee attempts to disclose his / her identity to the valuer by writing his / her Hall-Ticket Number at a place other than the place prescribed for it or any coded message including his / her name or addressing the valuer in any manner in the answer book		Cancelling the examination of the paper in which he / she indulged in malpractices
3.	Candidate is found in possession of forbidden material; relevant or not relevant but not used	b)	Cancellation of the result of (i) all examinations taken including current examination in that session (or) (ii) current examination and proposed examinations to be taken during that session (or) (iii) current examination
4.	Destroying the material found in his / her possession or acting in any other manner with a view to destroying evidence	c)	Cancellation of the result of all examinations taken or proposed to be taken during that session and prohibiting his/her admission to or continuation in any course of the Institute for a period of one year. The student will be eligible to appear for the next corresponding semester/year examination in the succeeding academic year
5.	Smuggling main answer book / additional answer book / question paper / matter in to or out of the examination hall & Conspiring to interchange Hall Ticket Numbers		-do-
6.	Candidate is found in possession of forbidden material, relevant or not relevant but used		-do-
7.	In case of (i) impersonation, (ii) misbehavior with the invigilators/any person related to examination work, (iii) insertion of written sheets in different hand writing in the main/additional answer book, and (iv) creation of disturbance in and around the examination hall during or before the examination	d)	Cancellation of the result of all examinations taken or proposed to be taken during that session and prohibiting his/her admission in to or continuation in any course of the Institute for a period of two years. Further, the candidate shall not be allowed to appear for any examination during the period of punishment
8.	If a candidate is found guilty of malpractice in the improvement examination (after completion of course)	e)	Punishment will be awarded subject to the above rules and further, he/she will not be permitted to appear for further improvement examination

19. ROLL NUMBER ALLOTMENT

The Roll Number given to the student shall have a total 8 digits as follows:

Ex: **B18CE108**

a) The first letter, to represent Bachelors (B.Tech.) degree programme.
   Ex: B for **B**.Tech. programme
b) The next two numbers, to represent the year in which the student admitted into I semester.
   Ex: 18 for 20**18**
c) The next two letters, to represent the concerned department to which the student belongs.
   Ex: CE for **C**ivil **E**ngineering
d) The last three numbers, to represent the three - digit roll number of the student.

In general, a **student with roll number** "**B18CE108**" represents a **B.**Tech. student admitted in 20**18** in **C**ivil **E**ngineering bearing a roll number **108.**

20. AMENDMENTS

Notwithstanding anything contained in this manual, the Academic Council of the Institute reserves the right to modify / amend the curricula, requirements and rules & regulations pertaining to its undergraduate programmes, without any further notice.

KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE
Opp : Yerragattu Gutta, Hasanparthy (Mandal), WARANGAL - 506 015, TELANGANA, INDIA
काकतीय प्रैद्योगिकी एवं विज्ञान संस्थान, वरंगल - ५०६ ०१५ तेलंगाना, भारत
కాకతీయ సాంకేతిక విజ్ఞాన శాస్త్ర విద్యాలయం, వరంగల్ - ౫౦౬ ౦౧౫ తెలంగాణ, భారతదేశము
(An Autonomous Institute under Kakatiya University, Warangal)
(Approved by AICTE, New Delhi; Recognised by UGC under 2(f) & 12(B); Sponsored by EKASILA EDUCATION SOCIETY)
website: www.kitsw.ac.in | E-mail: principal@kitsw.ac.in | : +91 9392055211, +91 7382564888

URR-18R22

Syllabi of B.Tech. (I & II semesters)

Common for all Branches

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (DATA SCIENCE)
KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE, WARANGAL – 15
(An Autonomous Institute under Kakatiya University, Warangal)

URR-18R22

SCHEME OF INSTRUCTION & EVALUATION

I-SEMESTER OF 4-YEAR B. TECH DEGREE PROGRAM

[5Th+2P+3MC]

Sl. No	Category	Course Code	Course Title	Periods/week			Credits	Evaluation scheme				
								CIE			ESE	Total Marks
				L	T	P	C	TA	MSE	Total		
1	BSC	U18MH101	Engineering Mathematics – I	3	1	-	4	10	30	40	60	100
2	ESC	U18CS102	Programming for Problem Solving using C	3	-	-	3	10	30	40	60	100
3	BSC	U18CH103	Engineering Chemistry	3	1	-	4	10	30	40	60	100
4	ESC	U18ME104	Engineering Drawing	2	-	4	4	10	30	40	60	100
5	ESC	U18CE105	Engineering Mechanics	3	1	-	4	10	30	40	60	100
6	ESC	U18CS107	Programming for Problem Solving using C Laboratory	-	-	2	1	40	-	40	60	100
7	BSC	U18CH108	Engineering Chemistry Laboratory	-	-	2	1	40	-	40	60	100
8	MC	U18CH109	Environmental Studies	2	-	-	-	10	30	40	60	100
9	MC	U18EA110	EAA *: Sports/Yoga/NSS	-	-	2	-	100	-	100	-	100
10	MC	U18EA111	Universal Human Value-I (*Induction Programme*)	-	-	-	-	-	-	-	-	-
			Total:	16	3	10	21	240	180	420	480	900

[L= Lecture, T = Tutorials, P = Practicals & C = Credits] EAA: Extra Academic Activity * indicates mandatory non-credit course

Total Contact Periods/Week: 29 **Total Credits: 21**

Stream-I: ME, CSE, IT, CSN,CSE(IOT) **Stream-II: CE, EIE, EEE, ECE, ECI,CSE(AI&ML)**

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (DATA SCIENCE)
KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE, WARANGAL – 15
(An Autonomous Institute under Kakatiya University, Warangal)

URR-18R22

SCHEME OF INSTRUCTION & EVALUATION
II-SEMESTER OF 4-YEAR B. TECH DEGREE PROGRAM

[5Th+4P+1MC]

Sl. No	Category	Course Code	Course Title	Periods/week			Credits	Evaluation scheme				
				L	T	P	C	CIE			ESE	Total Marks
								TA	MSE	Total		
1	BSC	U18MH201	Engineering Mathematics – II	3	1	-	4	10	30	40	60	100
2	ESC	U18CS202R1	Data Structures through C	3	-	-	3	10	30	40	60	100
3	BSC	U18PH203	Engineering Physics	3	1	-	4	10	30	40	60	100
4	HSMC	U18MH204	English for Communication	2	-	2	3	10	30	40	60	100
5	ESC	U18EE205	Basic Electrical Engineering	3	1	_	4	10	30	40	60	100
6	ESC	U18EE206	Basic Electrical Engineering Laboratory	-	-	2	1	40	-	40	60	100
7	ESC	U18CS207R1	Data Structures through C Laboratory	-	-	2	1	40	-	40	60	100
8	BSC	U18PH208	Engineering Physics Laboratory	_	_	2	1	40	-	40	60	100
9	ESC	U18ME209	Workshop Practice	-	_	2	1	40	-	40	60	100
10	MC	U18EA210	EAA: Sports/Yoga/NSS*	-	-	2	-	100	-	100	-	100
Total:				14	3	12	22	310	150	460	540	1000

[L= Lecture, T = Tutorials, P = Practicals & C = Credits] EAA: Extra Academic Activity * indicates mandatory non-credit course

Total Contact Periods/Week: 29
Total Credits: 22
Stream-I: ME, CSE, IT, CSN,CSE(IOT)
Stream-II: CE, EIE, EEE, ECE, ECI,CSE(AI&ML)

Internships: All students should plan for mandatory 6-8 weeks internship, from end of II semester to commencement of VII semester at industry/R&D organizations/industries of national importance (IITs/IIITs/NITs). As part of Internship Evaluation in VII Semester, students are expected to submit a well-documented internship report and give an informative ppt presentation in VII semester.

U18MH101 ENGINEERING MATHEMATICS- I

Class: B.Tech. I-Semester

Branch(s): ME, CSE, IT, CSN, CSIOT
CE, EEE, ECE, ECI, CSAIML, DS

Teaching Scheme:

L	T	P	C
3	1	-	4

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Exam	60 marks

Course Learning Objectives (LOs):

This course will develop students' knowledge on /in

LO1: basic concepts of convergence of a series, mean value theorems, expansion of a function in series

LO2: partial differentiation and it's applications to functions of two/several variables

LO3 : differential equations of first order and first degree along with certain applications

LO4: the methods of solving higher order linear differential equations and introduce few applications to engineering problems

UNIT-I (9+3)

Infinite Series: Sequences & Series, General properties of series, Series of positive terms, Comparison test, Limit comparison test, Integral test, D'Alembert's Ratio test, Cauchy's nth root test, Alternating series- absolute convergence.

Differential Calculus (Functions of One Variable): Limits, Continuity, Differentiability, Rolle's theorem (Physical and algebraic interpretations), Lagrange's mean value theorem (Geometrical interpretation), Cauchy's mean value theorem. Taylor's theorem and Power series representation of functions, Maclaurin's series, Asymptotes and Tracing of Simple Curves

UNIT-II (9+3)

Differential Calculus (Functions of Several Variables): Partial differentiation, Total differentiation, Change of variables, Application to find Tangent plane and Normal to a surface, Jacobians. Taylor's theorem for function of two variables (without proof), Maximum and minimum values of functions of two variables. Langrage's method of undetermined multipliers. Differentiation under integral sign.

UNIT-III (9+3)

Differential Equations of First Order: Practical approach to differential equations. Formation and solution of differential equation. Solution of first order and first degree differential equation, variables separable form, homogeneous form, reducible to homogeneous form, First order linear equations, Equations reducible to linear equation (Bernoulli's equation), Exact differential equations, Equations reducible to exact form.

Applications of First Order Differential Equations: Simple examples of Physical applications (Orthogonal trajectories, RL series circuit problem).

UNIT-IV (9+3)

Higher Order Linear Differential Equations with Constant Coefficients: Liner differential Equations of higher order with constant coefficients, General solution, Complementary function, Particular Integral. Methods of evaluation of particular Integrals. Wronskian, Linear dependence of solutions, Method of Variation of parameters. Cauchy's homogenous linear equation. Applications: Simple examples of RLC series circuit problem.

Text Books:

[1] Grewal, B.S., Higher Engineering Mathematics, 43/e, Delhi, *Khanna Publishers* ,2014.

Reference Books:

[1] Kreyszig E, Advanced Engineering Mathematics,9th edition, Inc, U.K, John wiely *& sons,* 2013.

[2] Shanti Narayan, Differential Calculus, New Delhi, S. Chand & Co

[3] S.S. Sastry, Engineering Mathematics 3/e, Vol.II, Prentice Hall of India,2014

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: *demonstrate the convergence of a series and interpret mean value theorems*

CO2: *apply partial differentiation to functions of several variables in solving various engineering problems*

CO3: *utilize appropriate methods of differential equations of first order and first degree in solving real life engineering problems*

CO4: *solve the higher order linear differential equation with constant coefficients and few problems on engineering applications*

Course Articulation Matrix (CAM): U18 MH101 ENGINEERING MATHEMATICS- I

CO		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	U18MH101.1	3	2	1	--	--	--	--	--	--	--	--	1	-	-
CO2	U18MH101.2	3	3	2	--	--	--	--	--	--	--	--	1	-	-
CO3	U18MH101.3	3	2	2	--	--	--	--	--	--	--	--	1	-	-
CO4	U18MH101.4	3	3	2	--	--	--	--	--	--	--	--	1	-	-
U18MH101		3	2.5	1.75	--	--	--	--	--	--	--	--	1		

U18CS102 PROGRAMMING FOR PROBLEM SOLVING USING C

Class: B.Tech. I -Semester

Branch(s): ME, CSE, CSN, IT, CSIoT
CE, EEE, ECE, ECI, CSAIML , DS

Teaching Scheme :

L	T	P	C
3	-	-	3

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):

This course will develop students' knowledge in /on

LO1*: computer fundamentals and concepts of problem solving using structured programming paradigm*

LO2*: control structures and array operations*

LO3*: string functions and modular programming concepts*

LO4*: structures, unions, pointers and files in C programming*

UNIT-I (9)

Introduction to Computers: Block diagram of computer, types of computers, computer languages, problem solving and program development steps, algorithm, flowchart

Overview of C: History, basic structure of C program

Constants, Variables and Data Types: Character set, C tokens, declaration of variables, symbolic constants and macros

Operators and Expressions: Arithmetic, relational, increment, decrement, conditional, logical, bit-wise, special operators, arithmetic expressions, precedence of operators and associativity **Managing Input and Output Operations:** Reading a character, writing a character, formatted input, formatted output

UNIT-II (9)

Decision Making and Branching: Simple if, if-else, nested–if, else-if ladder, switch, conditional operator, goto statement

Decision Making and **Looping:** While, do-while, for statements, nested loops, break and continue statements

Arrays: One dimensional array, declaration of one dimensional arrays, initialization of one dimensional arrays, two dimensional arrays, initializing two dimensional arrays, linear search

UNIT-III (9)

Character Arrays and Strings: Reading strings, writing strings, string handling functions, table of strings

User Defined Functions: Need of user defined functions, definition of function, return values and their types, function calls, function declaration, category of function, no arguments and no return values, arguments but no return values, arguments with return values, no arguments but returns a value, recursion, storage classes

UNIT-IV (9)

Structures and Unions: Declaring structure variables, accessing structure members, array of structures, structures within structures, unions

Pointers: Understanding **pointers**, declaring and initializing pointer variables, pointer expressions, pointers and arrays, pointers and character strings, array of pointers, pointers as function arguments, pointers and structures

File Management in C: Defining and opening a file, input and output operations on sequential text files

Text Books:

1. E.Balagurusamy, Programming in ANSIC**,** 6th ed, New Delhi: Tata McGraw Hill, 2012

Reference Books:

1. Kerninghan and Ritchie, The C Programming Language, 2nd ed, New Delhi: Prentice Hall of India, 1988
2. A.K.Sharma, Computer Fundamentals and programming in C, Hyderabad: Universities Press, 2018.
3. Peter Norton, Introduction to Computers, 6th ed. New Delhi: Tata McGraw-Hill, 2008
4. Herbert Schildt, Complete Reference with C, 4th ed. New Delhi: Tata McGraw Hill, 2000
5. Yaswanth Khanetkar, Let Us C, 13th ed. Bangalore: BPB Publications, 2012

Course Learning Outcomes (COs):

After completion of the course, the students will be able to,

CO1*: demonstrate knowledge on fundamental of C programming language and design an algorithm & flow chart for a given application*

CO2*: apply logical skills for problem solving using control structures and arrays*

CO3*: develop string programs and modular programming withfunctions*

CO4*: implement structures, unions, pointers and files in Cprogramming*

Course Articulation Matrix (CAM): U18CS102 PROGRAMMING FOR PROBLEM SOLVING USING C

Course Outcomes		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	U18CS102.1	1	1	-	-	-	-	-	-	-	1	-	1	2	1	1
CO2	U18CS102.2	1	2	2	1	-	-	-	-	-	1	-	1	2	2	2
CO3	U18CS102.3	1	2	2	1	-	-	-	-	1	1	-	1	2	2	2
CO4	U18CS102.4	1	2	2	2	1	-	-	-	1	1	-	1	2	2	2
U18CS102		1	1.75	2	1	1	-	-	-	1	1	-	1	2	1.75	1.75

U18CH103 ENGINEERING CHEMISTRY

Class: B.Tech. I–Semester
B.Tech. II-Semester

Branch(s) : CE, EEE, ECE, ECI, CSAIML, DS ME, CSE, CSN, IT, CSIoT

Teaching Scheme:

L	T	P	C
3	1	-	4

Examination Scheme:

Continuous Internal Evaluation	40 Marks
End Semester Examination	60 Marks

Course Learning Objectives (LOs):

This course will develop students' knowledge in/on...

LO1: fundamental concepts of electrochemistry, electrochemical cells

LO2 : corrosion science, phase rule application to various equilibria, I/C engine fuels.

LO3 : basic spectroscopic techniques of chemical analysis, water analysis and treatment

LO4: basic concepts of organic chemistry, polymerization reactions, versatile applications of polymers

UNIT-I (9+3)

Electrochemistry: Specific conductance ,equivalent conductance, effect of dilution, Conductometric titrations -acid base titrations, their advantages over conventional methods, Electrode potential, Nernst equation, Electrochemical series and its applications, Calomel electrode, Determination of pH using quinhydrone electrode, hydrogen electrode, Potentiometric titrations (acid base titrations), Commercial cells- Lead-acid storage cell , Fuel cells-Hydrogen-oxygen fuel cell.

UNIT-II (9+3)

Corrosion: Introduction-corrosion by pure chemical reaction (dry corrosion), Electrochemical corrosion(wet corrosion), Factors influencing corrosion, Prevention methods of corrosion - cathodic protection, hot dipping methods(galvanizing, tinning), cladding, electroplating.

Phase rule: Description of the terms-phase, component and degrees of freedom, Gibbs phase rule equation, Application of the phase rule to one-component system (water system), two-component system (silver-lead system), Pattinson's process for desilverisation of lead.

Fuels: Characteristics of fuels for internal combustion engines, Knocking , Octane number, Cetane number, Compressed natural gas(CNG), Power alcohol.

UNIT-III (9+3)

Introduction to Methods of Chemical Analysis: Introduction to spectroscopy- Microwave spectra- theory, Application of microwave spectra in the determination of bond length of a diatomic molecule; Infra-red spectra, theory, Applications- calculation of force constant and identification of functional groups in organic compounds, Lambert-Beer's law and its applications.

Water Analysis and Treatment: Hardness of water, Determination of hardness of water by using EDTA, Determination of alkalinity, Determination of fluoride by spectrophotometry, Determination of dissolved oxygen, biochemical oxygen demand, chemical oxygen demand, Softening of water by ion-exchange process, Desalination of brackish water- Reverse osmosis, Electrodialysis

UNIT-IV (9+3)

Organic Chemistry: Fission of a covalent bond, Types of electronic effects- inductive effect, mesomeric effect , Reaction intermediates, their stabilities, Types of reagents- electrophilic, nucleophilic reagents, Mechanisms of nucleophilic substitution($SN^1$and SN^2) , addition (electrophilic, nucleophilic and free radical) reactions .

Polymers: Introduction -Types of polymerization reactions-addition, condensation , Mechanism of free radical, cationic and anionic addition polymerization, Thermo-setting and thermo plastic resins, Conducting polymers and their applications.

Text Books:

1. Jain and Jain, *Engineering Chemistry*, 16th ed. Dhanpat Rai Publishing Company, 2012.

Reference Books:

1. J.C.Kuriacose and J.Rajaram, *Chemistry in Engineering and Technology(vol.I & vol.II)*, Tata Mc. Graw-Hills Education Pvt. Ltd., 2010.
2. Shashi Chawla, *Text book of Engineering Chemistry*, 3rd ed., Dhanpat Rai Publishers, 2003.
3. S.S. Dara, S S. Umare, *A Text book of Engineering Chemistry*, 12th ed., S.Chand & Company Ltd., 2010.

Course Learning Outcomes(COs):

On completion of this course, students will be able to ...

CO1: discuss the concepts of electro chemistry and electrochemical cells

CO2: apply the materials in the field of engineering and phase rule in the study of material science, select suitable fuels for I/C engines.

CO3: determine molecular parameters using spectroscopic techniques and quality parameters of water sample, discuss softening methods of hard water.

CO4: appraise the concepts of organic chemistry, polymerization reactions and applications of polymers.

Course Articulation Matrix (CAM): U18CH103 ENGINEERING CHEMISTRY

CO		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	U18CH103.1	2	2	1	1	1	-	1	-	1	-	-	-	-	-
CO2	U18CH103.2	2	1	2	2	-	1	1	-	2	-	-	-	-	-
CO3	U18CH103.3	2	1	1	2	-	1	-	-	2	-	-	-	-	-
CO4	U18CH103.4	1	-	1	2	-	1	-	-	2	-	-	-	-	-
U18CH103		1.75	1.33	1.25	1.75	1.00	1	1	-	1.75	-	-	-	-	-

U18ME104 , ENGINEERING DRAWING

Class: B. Tech. I- Semester
B.Tech. II-Semester

Branch(s): CE, EEE, ECE, ECI, CSAIML, DS
ME, CSE, CSN, IT, CSIoT

Teaching Scheme:

L	T	P	C
2	-	4	4

Examination Scheme:

Continuous Internal Evaluation	:	40 marks
End Semester Exam	:	60 marks

Course Learning Objectives (LOs):
This course will develop students' knowledge in/on...
LO1: projections of points and straight lines-I
LO2: projections of straight lines-II and planes
LO3: projections of solids and sections of solids
LO4: isometric and orthographic projections

UNIT – I (6+12)

Introduction: Importance of Engineering Drawing, instruments- uses; Layout of drawing sheets, Types of Lines, Lettering and dimensioning, Construction of regular polygons **Projection of Points**: Introduction to orthographic projections-Vertical Plane, Horizontal plane; Views-Front view, Top view and Side view; Projection of Points-different quadrants

Projection of Straight lines - I: Line parallel to both the planes, Line parallel to one plane and perpendicular to the other reference plane, Line parallel to one plane and inclined to the other reference plane

UNIT – II (6+12)

Projection of Straight Lines – II: Line- inclined to both the planes and Traces

Projection of Planes: Planes - Perpendicular and Oblique planes; Projections of planes - parallel to one of the reference planes, inclined to one of the reference plane and perpendicular to the other; Projections of oblique planes

UNIT – III (6+12)

Projection of Solids: Types-prisms, pyramids, cylinder and cone; Simple Positions-axis parallel to a reference plane and perpendicular to the other plane, axis parallel to one plane and inclined to other reference plane; axis inclined to both the reference planes

Sections of Solids: Types-prisms and pyramids; Section planes, Sectional views and true shape of a section

UNIT – IV (6+12)

Orthographic projections: Conversion of isometric views into orthographic views

Isometric Projections: Isometric axis, Isometric Planes, Isometric View, Isometric projection, Construction of isometric view from orthographic views

AutoCAD: Introduction to AutoCAD, DRAW tools, MODIFY tools, TEXT, DIMENSION, PROPERTIES tool bar, Standard tool bars, LAYERS; drawing of orthographic and isometric projections in AutoCAD.

Textbook:

[1] Bhatt N.D., *Elementary Engineering Drawing*, Anand: Charotar Publishing House India, 2017.

Reference Books:

[1] Dhananjay A Jolhe, *Engineering Drawing*, Tata Mc Graw- hill, 2008.

[2] Venugopal K., *Engineering Graphics with Auto CAD*, Hyderabad: New Age International Publishers Ltd., 2012.

[3] W J Luzadder and J M Duff, *Fundamentals of Engineering Drawing*, Prentice-Hall of India, 1995.

Course Outcomes (COs):

On completion of this course, students will be able to…

CO1: develop projections of points & straight lines-I.

CO2: develop projections of straight lines-II & planes.

CO3: construct projection of solids and analyze internal details of an object through sectional views.

CO4: construct 2D orthographic views from 3D isometric views and develop 3D isometric views from 2D views.

Course Articulation Matrix (CAM): U18ME104 ENGINEERING DRAWING												
CO		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	U18ME104.1	2	1	1	-	-	-	-	-	-	1	-	1
CO2	U18ME104.2	2	1	1	-	-	-	-	-	-	1	-	1
CO3	U18ME104.3	2	1	1	-	-	-	-	-	-	1	-	1
CO4	U18ME104.4	2	1	1	-	1	-	-	-	-	1	-	1
U18ME104		**2**	**1**	**1**	**-**	**1**	**-**	**-**	**-**	**-**	**1**	**-**	**1**

U18CE105 ENGINEERING MECHANICS

Class: B.Tech. I-Semester
B.Tech. II-Semester

Branch(s): CE, EEE, ECE, ECI, CSAIML, DS
ME, CSE, CSN, IT, CSIoT

Teaching Scheme:

L	T	P	C
3	1	-	4

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Exam	60 marks

Course Learning Objectives (LOs):

This course will develop students' knowledge on/in...

LO1: force systems and their applications

LO2: concepts and application of friction, analysis of plane trusses

LO3: centroid and moment of inertia of geometric and composite areas

LO4: dynamics of a particle and its applications

UNIT – I (9+3)

Laws of Mechanics: Parallelogram law of forces, triangle law of forces, Newton's law of gravitation, law of superposition and transmissibility of forces.

Force Systems: Types of forces, co-planar, concurrent and parallel forces, moment and couple, free body diagram, resultant of force systems, resolution of forces, composition of forces, equilibrium equations of forces, Lami's theorem, Varignon's theorem, moment equilibrium equations, types of supports, beams and loadings, statically determinate structures, resultant and equilibrium of general force system.

UNIT –II (9+3)

Friction: Introduction, classification, laws of friction, coefficient of friction, angle of friction, ladder friction and wedge friction.

Plane Trusses: Rigid truss, stability and determinacy conditions, basic assumptions for a perfect truss, analysis of trusses by method of joints and method of sections of a cantilever and simply supported statically determinate pin-jointed trusses.

UNIT– III (9+3)

Centroid: Centroid of one dimensional figures, centroid of simple figures from first principles, centroid of composite sections.

Moment of Inertia: Moment of inertia of plane sections from first principles, theorems of moment of inertia – parallel axis theorem and perpendicular axis theorem, moment of inertia of standard sections and composite sections.

UNIT - IV (9+3)

Kinematics: Introduction to dynamics, rectilinear motion of a particle – displacement, velocity and acceleration, motion with uniform acceleration and motion with variable acceleration, curvilinear motion- rectangular components, components, acceleration of normal and tangential acceleration, projectile motion.

Kinetics: Rectilinear motion-equations of rectilinear motion, equations of dynamic equilibrium, D'Alembert's principle, curvilinear motion-equations of motion in rectangular components, tangential and normal components, equations of dynamic equilibrium, applications of work-energy, impulse –momentum principles of rectilinear motion and curvilinear motion.

Text Books:

1. Tayal A.K., *Engineering Mechanics: Statics and Dynamics*, 14th ed. New Delhi: Umesh Publishers, 2014.

Reference Books:

1. Timoshenko S., Young D.H., Rao J.V., and Sukumar Pati, *Engineering Mechanics in SI units*, 5th ed. New Delhi: McGraw Hill Education Pvt. Ltd., 2013.
2. Vijaya Kumar Reddy K., Suresh Kumar J. *Singer's, Engineering Mechanics Statics and Dynamics*, 3rd ed. (SI Units), 8th Reprint , New Delhi: BS Publications / BSP Books, 2014.
3. Bhavikatti S.S., *Engineering Mechanics*, 4th ed. New Delhi: New Age International, 2013 (reprint).
4. Basudeb Bhattacharyya, *Engineering Mechanics*, 9th ed. New Delhi: Oxford University Press, 2013.

Course Learning Outcomes (COs):

On completion of this course, the student will be able to...

CO1: articulate various force systems and their applications

CO2*: demonstrate concepts of friction and analyze plane trusses*

CO3: calculate centroid and moment of inertia of geometric and composite areas

CO4: analyze dynamics of a particle and its applications

Course Articulation Matrix (CAM): U18CE105 ENGINEERING MECHANICS

CO		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	U18CE105.1	1	2	-	-	-	-	-	-	-	-	-	1	1	-	-	1
CO2	U18CE105.2	1	2	-	-	-	-	-	-	-	-	-	1	1	-	-	1
CO3	U18CE105.3	1	2	-	-	-	-	-	-	-	-	-	1	1	-	-	1
CO4	U18CE105.4	1	2	-	-	-	-	-	-	-	-	-	1	1	-	-	1
	U18CE105	**1**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**1**	**-**	**-**	**1**

U18CS107 PROGRAMMING FOR PROBLEM SOLVING USING C LAB

Class: B.Tech. I- Semester

Branch(s): ME, CSE, CSN, IT, CSIoT
CE, EEE, ECE, ECI, CSAIML, DS

Teaching Scheme :

L	T	P	C
-	-	2	1

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):

This course will develop students' knowledge in /on

LO1*: operators and decision making statements*

LO2: *loop techniques and array operations for problem solving*

LO3: *string functions and modular programming approach for problem solving*

LO4: *structures, unions, pointers and files*

LIST OF EXPERIMENTS

1. Programs using input output functions, operators (arithmetic, relational and conditional)
2. Programs using operators (bit-wise, logical, increment and decrement)
3. Programs using conditional control structures: if, if-else, nested if
4. Programs using else if ladder, switch and goto
5. Programs using loop control structures: while
6. Programs using loop control structures: do-while and for
7. Programs on one dimensional array and two dimensional arrays
8. Programs on string handling functions
9. Programs on different types of functions, parameter passing using call-by-value, call- by-reference, recursion and storage classes
10. Programs using structures, unions, pointers to arrays and pointers to strings
11. Programs using array of pointers and pointers to structures
12. File operations and file handling functions for sequential file

Laboratory Manual:

1. Programming in C Lab Manual, Dept. of CSE, KITSW.

Reference Books:

1. E. Balagurusamy, Programming in ANSIC, 6th ed, New Delhi: Tata McGraw Hill, 2012
2. Kerninghan and Ritchie, The C Programming Language, 2nd ed, New Delhi: Prentice Hall of India, 1988
3. Yaswanth Khanetkar, Let Us C, 13th Ed. Bangalore: BPB Publications, 2012

Course Learning Outcomes (COs):

After completion of the course, the students will be able to

CO1: *develop programs using operators and decision making statements*

CO2: *apply the loops and array operations for logical programming*

CO3: *implement string programs and apply modular programming techniques*

CO4: *develop programs using structures, unions, pointers and files*

Course Articulation Matrix (CAM): U18CS107 PROGRAMMING FOR PROBLEM SOLVING USING C LAB																
Course Outcomes		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	U18CS107.1	1	1	1	1	-	-	-	1	1	1	-	1	**2**	**1**	**1**
CO2	U18CS107.2	1	2	2	1	-	-	-	-	1	1	-	1	**2**	**2**	**2**
CO3	U18CS107.3	1	2	2	1	-	-	-	-	1	1	-	1	**2**	**2**	**2**
CO4	U18CS107.4	1	2	2	2	1	-	-	-	1	1	-	1	**2**	**2**	**2**
U18CS107		**1**	**1.75**	**2.25**	**1.25**	**1**	-	-	1	1	1	-	**1**	**2**	**1.75**	**1.75**

U18CH108 ENGINEERING CHEMISTRY LABORATORY

Class: B.Tech. I -Semester
B.Tech. II -Semester

Branch(s): CE, EEE, ECE, ECI, CSAIML, DS ME, CSE, CSN, IT, CSIoT

Teaching Scheme:

L	T	P	C
-	-	2	1

Examination Scheme:

Continuous Internal Evaluation	40 Marks
End Semester Examination	60 Marks

Course Learning Objectives (LOs):

This course will develop students knowledge in /on..

LO1: water analysis techniques
LO2: determination of metals from their ores, concepts of adsorption
LO3: instrumentation methods of chemical analysis
LO4: saponification/acid value of an oil

LIST OF EXPERMENTS

1. Determination of alkalinity of test sample of water
2. Estimation of available chlorine in test sample of bleaching powder
3. Determination of hardness of water by using complexometric method
4. Determination of calcium in lime stone / dolomite
5. Estimation of cupric ions in the test solution
6. Adsorption of an acid on charcoal -applicability of adsorption isotherm
7. Synthesis of a polymer
8. Conductometric titrations
9. Potentiometric titrations
10. Colorimetric analysis-verification of Lambert-Beer's law
11. Estimation of metal ion using ion-exchange resin
12. Determination of saponification / acid value of an oil

Laboratory Manual:

1. *Manual for Engineering Chemistry Laboratory* prepared by the Department of Physical Sciences/Chemistry, KITSW

Course Learning Outcomes (COs):

On completion of this course, students will be able to...

CO1: determine water quality parameters - alkalinity, hardness
CO2: assess metals present in their ores, apply Freundlich adsorption isotherm
CO3: handle analytical instruments for chemical analysis
CO4: measure saponification /acid value of an oil

Course Articulation Matrix (CAM): U18CH108 ENGINEERING CHEMISTRY LABORATORY															
CO		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	U18CH108.1	2	-	1	3	-	1	2	-	2	-	-	-	-	-
CO2	U18CH108.2	2	-	1	3	-	-	2	-	2	-	-	-	-	-
CO3	U18CH108.3	2	-	1	3	-	-	3	-	2	-	-	-	-	-
CO4	U18CH108.4	2	-	1	3	-	-	1	-	2	-	-	-	-	-
U18CH108		2	-	1	3	-	1	2	-	2	-	-	-	-	-

U18CH109 ENVIRONMENTAL STUDIES

Class: B.Tech. I -Semester
B.Tech. II -Semester

Branch(s):CE, EEE, ECE, ECI,CSAIML, DS
ME, CSE, CSN, IT, CSIoT

Teaching Scheme

L	T	P	C
2	-	-	-

Examination Scheme:

Continuous Internal	40 marks
End Semester	60 marks

Course Learning objectives (LOs):
This course will develop students' knowledge in/on...
LO1: *necessity to use natural resources more equitably*
LO2 : *concepts of ecosystem and the importance of biodiversity conservation*
LO3 : *causes, effects and control measures of various environmental issues*
LO4 : *issues involved in enforcement of environmental legislation*

UNIT-I(6)

Introduction - The multidisciplinary nature of environmental studies - definition, scope and importance.

Natural Resources: Forest Resources - Use and over–exploitation of forests, deforestation, timber extraction, mining, dams - their effects on forests and tribal people; **Water Resources** - Use and over-utilization of surface and ground water, floods, drought, conflicts over water; **Mineral Resources** - Environmental effects of extracting and using mineral resources; **Agricultural Land** - Land as a resource, land degradation, soil erosion and desertification; **Food Resources** - World food problems, effects of modern agriculture, fertilizer-pesticide problems, water logging and salinity; **Energy Resources** - Renewable and non-renewable energy sources, use of alternate energy sources.

UNIT-II(6)

Ecosystem and Biodiversity: Ecosystem - Concepts of an ecosystem, food chain, food webs, ecological pyramids, energy flow in the ecosystem and ecological succession;

Biodiversity and its Conservation – Introduction, definition, genetic, species and ecosystem diversity, value of biodiversity, biodiversity in India, hot spots of biodiversity, man-wildlife conflicts endangered and endemic species of India, in-situ and ex-situ conservation.

UNIT-III(6)

Environmental Pollution: Global climatic change, green house gases, effects of global warming, ozone layer depletion; International conventions/protocols - Earth summit, Kyoto protocol and Montreal protocol; causes and effects of air, water, soil, marine and noise pollution with case studies; solid and hazardous waste management, effects of urban industrial and nuclear waste; natural disaster management - flood, earthquake, cyclone and landslides.

UNIT-IV(6)

Social Issues and the Environment: **Role of Individual and Society** - Role of individual in prevention of pollution, water conservation, Rain water harvesting and watershed management; **Environmental Protection / Control Acts** - Air (Prevention and control of Pollution) Act- 1981, water (Prevention and Control of Pollution) Act-1974, water Pollution Cess Act-1977, Forest conservation Act (1980 and 1992), wildlife Protection Act 1972 and environment protection Act 1986, issues involved in enforcement of environmental legislations; **Human Population and Environment** - Population growth, family welfare programmes, women and child welfare programmes, role of information technology in environment and human health.

Text Book:

1. Erach Bharucha, *Text Book of Environmental Studies for Under Graduate Courses,* 2nd ed . Universities Press (India) Pvt. Ltd, 2013.

Reference Books:

1. Y. Anjaneyulu, *Introduction to Environmental Science* , B.S. Publications, 2004.
2. Gilbert M. Masters, *Introduction to Environmental Engineering & Science* , 3 rd ed. Prentice Hall of India ,1991.
3. Anubha Kaushik, C.P. Kaushik, *Environmental Studies*, 4th ed. New Age International Publishers, 2014.
4. R.Rajagopalan, *Environmental Studies from crisis to cure*, *Oxford University Press*, 2nd ed. 2011.

Course Learning Outcomes(COs):

On completion of this Course, the student will be able to…

CO1 : *investigate any environmental issue using an interdisciplinary framework*

CO2 : *formulate an action plan for sustainable alternatives and conserving biodiversity that integrates science, humanist, social and economic perspective*

CO3 : *identify and explain the complexity of issues and processes which contribute to an environmental problem*

CO4 : *participate effectively in analysis and problem-solving through knowledge in environmental legislations*

Course Articulation Matrix (CAM): U18CH109 ENVIRONMENTAL STUDIES

CO		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	U18CH109.1	2	1	2	1	-	2	1	-	1	-	-	-		
CO2	U18CH109.2	-	-	2	-	-	1	2	-	1	-	-	-		
CO3	U18CH109.3	1	2	1	-	-	1	1	1	1	-	-	-		
CO4	U18CH109.4	-	-	1	-	-	1	2	-	1	-	-	-		
U18CH109		1.5		1.5	1	-	1.25	1.5	1	1	-	-	-		

U18EA110 EAA: SPORTS/YOGA/NSS

Class: B. Tech. I -Semester
B. Tech. II -Semester

Branch(s): ME, CSE, CSN, IT, CSIoT
CE, EEE, ECE, ECI, CSAIML, DS

Teaching Scheme :

L	T	P	C
-	-	-	-

Examination Scheme :

Continuous Internal Evaluation	
End Semester Exam	

I. SPORTS

Course Learning objectives (LOs):
The objectives of the Sports is to..
LO1: to perform and engage in a variety of physical activities
LO2 : to develop and maintain physical health and fitness through regular participation in physical activities
LO3: to demonstrate positive self esteem, mental health and physiological balance through body awareness and control
LO4 : to exhibit the spirit of fair play, team work and sportsmenship

Activities related to:

1. Physical Fitness
2. Games & Sports

II. NATIONAL SERVICE SCHEME (NSS)

Course Learning objectives (LOs):
The objectives of the NSS is to..
LO1: arouse the social consciousness of the students
LO2 : provide them with opportunity to work with people in villages and slums
LO3 : expose them to the reality of life
LO4 : bring about a change in their social perceptions
LO5 : develop competence required for responsibility sharing and team work

List of Activities:

1. Shramadanam
2. Tree Plantation
3. General Medical camps in Villages
4. Awareness on Eye Donation
5. Awareness on "Child Labour and Child Marriages"
6. Awareness programs on " Literacy, Good Health Practices, etc."
7. Safe Riding Program
8. Awareness program on "RTI Act"
9. Awareness on Blood Donation

Course Learning Outcomes (COs):
After completion of the course, the student will be able to..
CO1: develop his/her personally through community service rendered
CO2 : apply their education to find solutions to individual and community problems
CO3 : acquire capacity to meet emergencies and natural disasters
CO4 : acquire a democratic attitude, leadership qualities and practice national integration

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (NETWORKS)
KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE, WARANGAL – 15
(An Autonomous Institute under Kakatiya University, Warangal)

URR-18R22

SCHEME OF INSTRUCTION & EVALUATION
II-SEMESTER OF 4-YEAR B. TECH DEGREE PROGRAM

[5Th+4P+1MC]

Sl. No	Category	Course Code	Course Title	Periods/week			Credits	Evaluation scheme				
				L	T	P	C	CIE			ESE	Total Marks
								TA	MSE	Total		
1	BSC	U18MH201	Engineering Mathematics – II	3	1	-	4	10	30	40	60	100
2	ESC	U18CS202R1	Data Structures through C	3	-	-	3	10	30	40	60	100
3	BSC	U18PH203	Engineering Physics	3	1	-	4	10	30	40	60	100
4	HSMC	U18MH204	English for Communication	2	-	2	3	10	30	40	60	100
5	ESC	U18EE205	Basic Electrical Engineering	3	1	_	4	10	30	40	60	100
6	ESC	U18EE206	Basic Electrical Engineering Laboratory	-	-	2	1	40	-	40	60	100
7	ESC	U18CS207R1	Data Structures through C Laboratory	-	-	2	1	40	-	40	60	100
8	BSC	U18PH208	Engineering Physics Laboratory	_	_	2	1	40	-	40	60	100
9	ESC	U18ME209	Workshop Practice	-	_	2	1	40	-	40	60	100
10	MC	U18EA210	EAA: Sports/Yoga/NSS*	-	-	2	-	100	-	100	-	100
Total:				14	3	12	22	310	150	460	540	1000

[L= Lecture, T = Tutorials, P = Practicals & C = Credits] EAA: Extra Academic Activity * indicates mandatory non-credit course

Total Contact Periods/Week: 29
Total Credits: 22
Stream-I: ME, CSE, IT, CSN,CSE(IOT)
Stream-II: CE, EIE, EEE, ECE, ECI,CSE(AI&ML)

Internships: All students should plan for mandatory 6-8 weeks internship, from end of II semester to commencement of VII semester at industry/R&D organizations/industries of national importance (IITs/IIITs/NITs). As part of Internship Evaluation in VII Semester, students are expected to submit a well-documented internship report and give an informative ppt presentation in VII semester.

U18MH201 ENGINEERING MATHEMATICS- II

Class: B.Tech. II-Semester

Branch(s): ME, CSE, IT, CSN, CSIOT
CE, EEE, ECE, ECI,CSAIML, DS

Teaching Scheme:

L	T	P	C
3	1	-	4

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Exam	60 marks

Course Learning Objectives (LOs):

This course will develop students' knowledge on /in

LO1: various methods of solving system of linear equations and eigen value problems

LO2: double integral, triple integral and their applications.

LO3: vector differential calculus with few engineering applications.

LO4*: integration of vector valued functions with few engineering applications*

UNIT-I (9+3)

Matrices: Elementary transformations on a matrix. To find inverse of a matrix using elementary transformations- Rank of matrix, Normal form of a matrix, Solution of system of homogenous and non homogeneous linear equations, Linear dependence and independence of vectors.

Eigen values and Eigen vectors of a matrix- Cayley Hamilton's theorem, Reduction of a matrix to diagonal form, Reduction of a quadratic form to canonical form.

UNIT-II (9+3)

Multiple Integrals and Applications: Double integral, change of order of integration, Double integration in polar coordinates, Triple integrals, Applications: Area enclosed by plane curves, Volumes of solids, Calculation of mass, Center of gravity, Moment of Inertia of plane lamina.

Beta and Gama functions and their relations. Evaluation of improper integrals in terms of Beta and Gamma functions.

UNIT-III (9+3)

Vector Differential Calculus: Vector functions - Derivative of a vector function of a scalar variable, Velocity and acceleration, Curves in Space, Tangent, Principal normal, Binormal, Curvature, Torsion of a given curve and Frenet -Serret Formulae.

Scalar and vector point functions, Vector operators – Gradient of a scalar field, Directional derivative, angle between two surfaces.

Divergence of a vector field, Curl of a vector field and their physical interpretations. Irrotational fields & Solenoidal fields. to find scalar potential of a conservative vector field.

UNIT-IV (9+3)

Vector Integration: Integration of vector valued functions of a scalar variable, Application to find velocity and displacement of a particle. Line integral of scalar point and vector point functions, Applications: Work done by a force, Circulation; Surface Integral & Volume integral.

Green's theorem in plane, and area of a plane region using Green's theorem. Stokes theorem & Gauss divergence theorems (without proof)

Text Books:

[1] Grewal, B.S., Higher Engineering Mathematics, 43/e, Delhi, *Khanna Publishers* ,2014.

Reference Books:

[1] Kreyszig E, Advanced Engineering Mathematics,9th edition, Inc, U.K, John wiely *& sons*, 2013.

[2] Spiegel M., Vector Analysis -Schaum Series", McGraw Hill

[3] S.S. Sastry, Engineering Mathematics 3/e, Vol.II, Prentice Hall of India,2014

Course Learning Outcomes (COs):

On completion of this course, students will be able to…

CO1: *demonstrate matrix theory in solving system of linear equations and Eigen value problems*

CO2: *apply basic concepts of multiple integrals in evaluating physical quantities of real life engineering problems*

CO3: *apply differential operators on vector and scalar point functions and their few applications in the field of engineering*

CO4: *solve line, surface, volume integrals and corelate these with applications of Green, Stoke and Gauss divergence theorems*

Course Articulation Matrix (CAM): U18 MH201 ENGINEERING MATHEMATICS- II

CO		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	**U18MH201.1**	3	2	1	--	--	--	--	--	--	--	--	1	-	-
CO2	**U18MH201.2**	3	3	2	--	--	--	--	--	--	--	--	-	-	-
CO3	**U18MH201.3**	3	2	2	--	--	--	--	--	--	--	--	1	-	-
CO4	**U18MH201.4**	3	2	2	--	--	--	--	--	--	--	--	-	-	-
U18MH201		**3**	**2.25**	**1.75**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**1**		

U18CS202R1 DATA STRUCTURES THROUGH C

Class: B. Tech II-Semester

Branch(s): ME, CSE, CSN, IT, CSIoT
CE, EEE, ECE, ECI, CSAIML, DS

Teaching Scheme :

L	T	P	C
3	-	-	3

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):

This course will develop students' knowledge in/on

LO1*: fundamental data structures and their usage with arrays*

LO2*: representing the linear data structures with stacks and queues*

LO3*: arranging the data using various sorting techniques and representing the data using linked lists*

LO4*: representing non-linear data structures with trees and graphs*

UNIT – I (9)

Introduction to Data Structures: Basic terminology, classification of data structures, operations on data structures

Arrays: Operations on arrays-traversing an array, inserting an element in an array, deleting an element from an array, searching an element using binary search

Dynamic Memory Allocation: Memory allocation functions, dynamic memory allocation for single and two dimensional arrays

UNIT – II (9)

Stacks: Introduction to stacks, array representation of stacks, operations on a stack– push and pop; applications of stacks- recursion, evaluation of expressions (infix to postfix conversion, evaluation of postfix expression)

Queues: Introduction to queues, array representation of queues, circular queues

UNIT - III (9)

Linked Lists: Basic terminologies, linked list versus arrays, memory allocation and deallocation for a linked list, singly linked list operations- traversing, searching, inserting, deleting, reversing; representing stack and queue using linked list

Sorting Techniques: bubble sort, selection sort, quick sort

UNIT – IV (9)

(Concepts and algorithms only)

Trees: Introduction, types of trees. **Binary Tree:** Creating a binary tree, traversing a binary tree- preorder, inorder, postorder recursive traversals.

Binary Search Tree: Operations- searching for a node in binary search tree, inserting an element into binary search tree.

Graphs: Introduction, graph terminology, representation of graphs, graphs traversal methods- breadth first search, depth first search

Text Book:

1. Reema Thareja, Data Structures Using C, *2nd ed.* Hyderabad: Oxford University Press, 2014.

Reference Books:

1. E.Balagurusamy, Programming in ANSI-C, 6th ed. *Tata McGraw Hill*, 2012.
2. Debasis Samanta, Classic Data Structures, 2nd ed. New Delhi: *Prentice Hall India*, 2009.
3. E Balagurusamy, Data Structure Using C, New Delhi: McGraw Hill Education, 2017.
4. Richard F. Gilberg and Behrouz A. Forouzan, Data Structures: A Pseudocode Approach with 2nd ed. Singapoor: Cengage Learning, 2007.

Course Learning Outcomes(COs):

After completion of this course, students' will be able to,

CO1*: implement programs using static & dynamic arrays*

CO2*: apply the linear data structures with stacks and queue*

CO3*: arrange the data with the help of various sorting techniques and linked lists*

CO4*: organize the data using non-linear data structures with trees and graphs*

Course Articulation Matrix (CAM): U18CS202R1 **DATA STRUCTURES THROUGH C**

Course Outcomes		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	U18CS202R1.1	1	1	-	-	-	-	-	-	-	1	-	1	2	1	1
CO2	U18CS202R1.2	1	2	2	2	-	-	-	-	-	1	-	1	2	2	2
CO3	U18CS202R1.3	1	2	2	2	-	-	-	-	-	1	-	1	2	2	2
CO4	U18CS202R1.4	1	2	2	2	1	-	-	-	-	1	1	1	2	2	2
U18CS202R1		1	1.75	2	2	1	-	-	-	-	1	1	1	2	1.75	1.75

U18PH203 ENGINEERING PHYSICS

Class: B.Tech. I– Semester
B.Tech. II-Semester

Branch(s): ME, CSE, CSN, IT, CSIoT
CE, EEE, ECE, ECI, CSAIML, DS

Teaching Scheme:

L	T	P	C
3	1	-	4

Examination Scheme:

Continuous Internal Evaluation	40 Marks
End Semester Examination	60 Marks

Course Learning Objectives (LOs):

This course will develop students' knowledge in/on...

LO1: different types of oscillations with illustrations by mechanical and electrical examples, high frequency sound waves and their applications in various fields

LO2: concepts of interference, diffraction and polarization of light waves and their applications

LO3: concepts and working principles of lasers, fiber optics and their applications in various fields

LO4: basic concepts of quantum mechanics, modern materials and their applications

UNIT-I (9+3)

Oscillations: Physical examples of simple harmonic motion: Torsional pendulum, Physical pendulum; Spring-mass systems; Loaded beams; two body oscillations; Qualitative treatment of free, damped and forced oscillations- resonance; Series and parallel resonant circuits, Q-factor.

Ultrasonics: Properties of ultrasonics; Production of ultrasonic waves: Magnetostriction method and Piezo-electric method; Detection of ultrasonic waves; Acoustic grating- Determination of wavelength of ultrasonics; Applications of ultrasonic waves- Pulse echo NDT technique (reflection mode).

UNIT-II (9+3)

Interference: Superposition principle; coherence; phase change on reflection; Interference of reflected light from uniform thin films; anti reflection coating; Newton's rings in reflected light- applications: determination of wavelength of a monochromatic light and refractive index of a liquid; Michelson's Interferometer- applications: determination of wavelength of a monochromatic light, thickness and refractive index of a thin transparent sheet;

Diffraction: Distinction between Fresnel and Fraunhofer class of diffraction; Fraunhofer diffraction at a single slit (phasor method) and a circular aperture- Rayleigh's criterion for resolution; Diffraction grating (qualitative)- Dispersive power and resolving power of a diffraction grating; determination of wavelength of a monochromatic light using diffraction grating.

Polarisation: Polarised light; double refraction; geometry of calcite crystal; Nicol prism; Huygen's explanation (positive and negative crystals); quarter and half wave plates; Production and detection of plane, circularly and elliptically polarized light; Applications- Optical activity, LCDs.

UNIT-III (9+3)

Lasers (Qualitative): Difference between conventional and laser light; Absorption; Spontaneous and stimulated emission; Relation among Einstein coefficients; Basic principles - Population inversion, pumping methods, optical resonator; Types of lasers- Ruby, Nd-YAG, He-Ne and CO_2 Laser; Applications of lasers: Holography- introduction, formation and reconstruction of a hologram; Applications of holography.

Fiber Optics(Qualitative): Introduction- Total internal reflection; Fiber construction; Numerical aperture and acceptance angle; Types of optical fibers- Step index and graded index; V-number; Fiber drawing- Double crucible technique; Splicing- Fusion & Mechanical; Power losses in optical fibers- Attenuation, dispersion, bending; Fiber optic communication system; Applications of optical fibers - endoscope; Fiber optic sensors (temperature and displacement).

UNIT-IV (9+3)

Elements of Quantum Mechanics: de-Broglie concept of matter waves- de-Broglie wavelength, properties of matter waves; Schrodinger time-independent wave equation (one dimension); Physical significance of wave function (Max Born interpretation); Particle in a box (one dimension)- energy quantization; Uncertainty principle - illustration and application to the non- existence of free electron in the nucleus.

Modern Materials (Qualitative):

Magnetic Materials: Introduction- Origin of magnetic moment; Bohr magneton; Permeability; Magnetization; susceptibility; Classification of magnetic material; Applications of magnetic materials: Magnetic recording and Magnetic memories.

Superconducting Materials: Superconductivity; Meissner effect; Transition temperature; Isotope effect; London's penetration depth; Type-I and Type-II superconductors; High T_c superconductors; Applications of superconductors.

Nanomaterials: Introduction- Classification of nanomaterials; Surface area to volume ratio; Quantum confinement; Properties of nanomaterials- Physical, chemical, electrical, optical, magnetic and mechanical properties; Applications of nanomaterials (in brief); Synthesis of nanomaterial: Bottom up approach (sol-gel method) and Top down approach (ball milling method).

Text Books:

1. Bhattacharya and Bhaskaran, *Engineering Physics*, Oxford University Press, 1/e, 2013.
2. V. Rajendran, *Engineering Physics*, Mc Graw Hill, 2013.

Reference Books:

1. David Halliday, Robert Resnick & Krane, *Physics Volume I & II*, Wiley India Limited, 5/e, *2014.*
2. R.K. Gaur and S.L.Gupta, *Engineering Physics*, Dhanpath Rai and Sons, 2013.
3. P.K. Palanisamy, *Engineering Physics*, Scitech Publishers, 3/e, 2013.
4. M. Avadhanulu and Kshirsagar, *A Text Book of Engineering Physics*, S. Chand & Company Ltd, 10/e. 2013.

Course Learning Outcomes (COs):

After completion of the course, the students will be able to

CO1: determine the time period and frequency of SHM oscillatory system and know the principles and applications of ultrasonics in different fields

CO2: appraise the concepts of interference, diffraction and polarization phenomena in accurate determination of wavelengths, thicknesses, narrow slit widths, optical activity, etc

CO3: interpret the characteristics and working of lasers, optical fibers and their applications in various fields

CO4: categorize the properties of magnetic, superconducting and nanomaterials and know their engineering applications

Course Articulation Matrix (CAM): U18PH203 ENGINEERING PHYSICS															
CO		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	PO8	PO9	PO10	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	U18PH203.1	2	1	-	-	1	1	-	-	1	-	-	-	-	-
CO2	U18PH203.2	2	1	1	1	-	1	1	-	1	-	-	-	-	-
CO3	U18PH203.3	3	1	1	1	2	1	1	-	1	-	-	-	-	-
CO4	U18PH203.4	3	-	1	1	1	2	1	-	1	-	-	-	-	-
	U18PH203	2.5	1	1	1	1.33	1.25	1	-	1	-	-	-	-	-

U18MH204 ENGLISH FOR COMMUNICATION

Class: B.Tech. I-semester
B.Tech.II-Semester

Branch (s): ME, CSE, CSN, IT, CSIo
CE, EEE, ECE, ECI, CSAIML, DS

Teaching Scheme :

L	T	P	C
2	–	2	3

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):

This course will develop students' knowledge on /in...

LO1: accuracy in and familiarity with various sentence structures to communicate correctly and effectively

LO2: judicious and situational use of vocabulary to bring effectiveness to communication

LO3: various reading skills to comprehend the text

LO4: writing strategies, academic writing, pre-planning before writing and maintenance of coherence while writing a paragraph

UNIT-I (6)

Grammar:

Clause Analysis - Types of Clauses: Noun Clause - Relative Clause - Adverb Clause.

Transformation: Simple, Complex, Compound Sentences.

Errors-Nouns-Pronouns-Adjectives-Adverbs-Prepositions-Tenses-Articles-Subject-Verb Agreement

Reading

"In Banaras"- from "The Stories of My Experiments with Truth-An Autobiography of Mahathma Gandhi"

UNIT-II (6)

Vocabulary:

Vocabulary-Antonyms-Synonyms-Prefixes-Suffixes-Phrasal Verbs-One Word Substitutes-Word Pairs

Reading

"Education Provides a Solid Foundation"- from Wings of Fire –An Autobiography of APJ Abdul K

UNIT-III (6)

Reading Skills:

"An Astrologer's Day" by R.K.Narayan
"On Saying Please" by A. G. Gardiner

UNIT-IV (6)

Writing Skills:

Precis Writing
Essay Writing
Report Writing

Text Books:

1."Work Book on English for Communication" (Unit 1, 2, 3, 4) by the faculty of English, Kakatiya Institute of Technology and Science, Warangal

Reference Books:

1. Harper Collins, "Cobuild English Grammar" Third Edition, *Harper Collins Publishers Ltd.*
2. Sanjay Kumar & Pushp Lata, "Communication Skills" Second Revised Edition,2015, *Oxford University Press Ltd.*
3. R.K. Narayan," Malgudi Days" Indian Thought Publications,1943
4. APJ Abdul Kalam, "Wings of Fire" An Autobiography, Universities Press,1999
5. Mahatma Gandhi," The Story of My Experiments with Truth" An Autobiography, Global Vision Press,2013.

Course Learning Outcomes (COs):

On completion of this course, students will be able to...

CO1: Speak and write with accuracy a variety of sentence structures.

CO2: Build vocabulary through contextual clues from the text

CO3: Apply appropriate reading strategies to summarize and paraphrase the text by understanding the main ideas.

CO4: Write well organized paragraphs with accuracy contextually suitable vocabulary.

Course Articulation Matrix (CAM): U18MH204 ENGLISH FOR COMMUNICATION

CO		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	U18MH204.1	-	1	-	1	1	1	1	1	1	3	2	1		
CO2	U18MH204.2	1	1	-	--	--	--	1	--	3	2	--	3		
CO3	U18MH204.3	-	1	-	--	--	--	--	--	2	2	2	3		
CO4	U18MH204.4	-	1	1	1	--	--	1	--	3	2	1	3		
U18MH204		1	1	1	1	1	1	1	1	2.2	2.25	1.7	2.5		

ENGLISH LANGUAGE LAB

Listening Skills (3×2):

Listening to Sounds, Stress and Intonation

Listening for Information

Life Skills (3×2)

Etiquette

Goal Setting

Body Language

Speaking Skills & Writing Skills (6×2)

a. ***Presentation Techniques:***

Self Introduction

JAM (Just A Minute)

Group Discussion

Debate

Description

Interview Skills

b. ***Assignment:***

Students have to present PPT on the topics given in the English Laboratory

Writing Skills

a) planning
b) coherence
c) accuracy

U18EE205 BASIC ELECTRICAL ENGINEERING

Class: B.Tech. I- Semester
B.Tech. II-Semester

Branch(s): ME, CSE, CSN, IT, CSIoT
CE, EEE, ECE, ECI, CSAIML, DS

Teaching Scheme:

L	T	P	C
3	1	-	4

Examination Scheme:

Continuous Internal Evaluation	40
End Semester Examination	60

Course Learning Objectives (LOs):

This course will develop students' knowledge in/on

LO1: network elements and analysis of simple electrical DC circuits

LO2: DC network theorems

LO3: fundamentals of 1- and 3- AC circuits

LO4: working principles and applications of DC & AC machines, concepts of earthing, fuses, lighting sources, MCB & batteries

UNIT – I (9+3)

DC circuits: Introduction, network elements, Ohm's law, electric power, electrical energy, Kirchhoff's laws, resistances in series-voltage divider rule, resistances in parallel-current divider rule, series & parallel circuits, mesh analysis, nodal analysis (T & π networks only)

UNIT – II (9+3)

DC network theorems (Independent sources only): Introduction, superposition theorem, Thevenin's theorem, Norton's theorem, maximum power transfer theorem (T and π networks only)

UNIT – III (9+3)

1- AC circuits: Phasor representation of sinusoidal quantities, average and R.M.S values of sinusoidal wave form, AC through resistor, inductor, capacitor and series R-L-C circuit

3-f AC circuits: Production of 3-f voltages, voltage & current relationships of line and phase values for balanced star and delta connections

UNIT – IV (9+3)

Introduction to electrical machines (Qualitative treatment): Construction, principle of operation &applications of 1-f transformer, 3-f induction motor, 1-f induction motor and DC motor

Electrical earthing, fuses & lighting sources: Basic concepts of earthing, fuses and lighting sources-incandescent, fluorescent, CFL & LED lamps, Miniature Circuit Breaker(MCB), types of batteries

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Text Book:

1. K. Uma Rao, *Basic Electrical Engineering*, New Delhi: Pearson Education, 2011.

Reference Books:

1. B.L.Thereja, A.K.Thereja, *Electrical Technology Vol. I & II*,23rd ed., New Delhi: S.Chand& Company Ltd, 2005.
2. Edward Hughes, *Electrical & Electronics Technology*, 10th ed., New Delhi: Pearson Education,2010.
3. D. P. Kothari and I. J. Nagrath, *Basic Electrical Engineering*, New Delhi: Tata McGraw Hill Education (India) Pvt. Ltd., 2010.
4. Chakravarthy A, Sudhipanath and Chandan Kumar, *Basic Electrical Engineering*, Tata McGraw Hill Education (India) Pvt. Ltd., 2009.

Course Outcomes (COs):

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

CO1: determine voltage, current & power in electrical circuits using mesh & nodal analysis

CO2: apply suitable DC network theorems to analyze T & π networks

CO3: find current, voltage & power in 1-phase& 3 -phase AC circuits

CO4: explain construction, working principle & applications of electrical machines; electrical earthing, fuses, lighting sources, MCB & batteries

Course Articulation Matrix: U18EE205 BASIC ELECTRICAL ENGINEERING													
CO		PO1	PO 2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	U18EE205.1	2	1	-	-	-	-	-	-	-	-	-	-
CO2	U18EE205.2	2	2	-	-	-	-	-	-	-	-	-	-
CO3	U18EE205.3	3	3	1	1	1	-	1	-	-	1	-	-
CO4	U18EE205.4	3	3	1	1	1	1	1	1	-	1	-	-
U18EE205		**2.5**	**2.25**	**1**	**1**	**1**	**1**	**1**	**1**	-	**1**	-	-

U18EE206 BASIC ELECTRICAL ENGINEERING LABORATORY

Class: B.Tech. I-Semester
B.Tech. II-Semester

Branch(s): ME, CSE, CSN, IT,CSIoT
CE, EEE, ECE, ECI, CSAIML, DS

Teaching Scheme:

L	T	P	C
-	-	2	1

Examination Scheme:

Continuous Internal Evaluation	40
End Semester Examination	60

Course Learning Objectives (LOs):
This laboratory course will develop students' knowledge in/on
LO1: domestic wiring & basic electrical installations
LO2: network elements and analysis of electrical circuits
LO3: 1-phase and 3-phase AC circuits
LO4: measurement of illumination

LIST OF EXPERIMENTS

1. Verification of Kirchhoff's Laws
2. Verification of voltage divider rule and current divider rule
3. Verification of Thevenin's theorem
4. Verification of Norton's theorem
5. Verification of Superposition theorem
6. Verification of Maximum power transfer theorem
7. Determination of internal parameters of a choke coil
8. Impedance calculations and phasor representation of R-L series circuit
9. Impedance calculations and phasor representation of R-C series circuit
10. Load test on 1-phase transformer
11. Voltage and current relationships between line & phase quantities for balanced 3-phase star & delta connections
12. Measurement of illumination for various lighting sources

** DEMONSTRATION OF ELECTRICAL INSTALLATIONS **
[Wires, Cables, Fuse, MSB, Batteries, Earthing]

Text Books:

1. *Basic Electrical Engineering Laboratory Manual*, Department of EEE, KITSW

Course Outcomes (COs):
On completion of this course, the students will be able to…
CO1: handle basic electrical equipment
CO2: understand the concepts of network elements and theorems
CO3: understand fundamental concepts of 1-phase and 3-phase AC circuits
CO4: determine illumination of various lighting sources

Course Articulation Matrix (CAM): U18EE206 BASIC ELECTRICAL ENGINEERING LABORATORY

CO		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	U18EE206.1	2	2	1	1	1	1	-	-	2	2	1	2
CO2	U18EE206.2	2	1	-	1	-	1	-	-	2	1	1	1
CO3	U18EE206.3	2	2	2	2	1	1	1	-	2	1	2	1
CO4	U18EE206.4	2	1	1	2	1	1	1	-	2	1	1	1
U18EE206		**2**	**1.5**	**1.33**	**1.5**	**1**	**1**	**1**	**-**	**2**	**1.25**	**1.25**	**1.25**

U18CS207R1 DATA STRUCTURES THROUGH C LABORATORY

Class: B. Tech II-Semester

Branch(s): ME, CSE, CSN, IT, CSIoT
CE, EEE, ECE, ECI, CSAIML, DS

Teaching Scheme:

L	T	P	C
-	-	2	1

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

List of Experiments

Course Learning Objectives (LOs):

This course will develop student's knowledge in/on

LO1: *implementing array operations*
LO2: *organizing the data using stacks and queues*
LO3: *different types of sorting techniques*
LO4: *memory and data management using linked list*

Experiment-I

1. Program to implement initialization of array and traversal operation
2. Program to implement insertion operation on array

Experiment-II

3. Program to implement searching operations on array
4. Program to implement deletion operations on array

Experiment-III

5. Program to display the count of occurrences of every number in an array
6. Program to represent and display the sparse matrix

Experiment-IV

7. Program to implement initialization of arrays and traversal operation with DMA
8. Program to implement matrix addition and subtraction with DMA

Experiment-V

9. Program to implement matrix multiplication with DMA
10. Program to implement stack operations

Experiment-VI

11. Program to convert infix expression into postfix
12. Program to evaluate given postfix expression

Experiment-VII

13. Program to implement queue operations using arrays

Experiment-VIII

14. Program to create single linked list and implement its operations
    i) insert ii) traversal iii) search

Experiment-IX

15. Program to create single linked list and implement its operations
    i) delete ii) reversal

Experiment-X

16. Program to implement stack operations using linked list
17. Program to implement queue operations using linked list

Experiment-XI

18. Program to implement bubble sort
19. Program to implement selection sort

Experiment-XII

20. Program to implement quick sort

Laboratory Manual:

1. 'Data Structures Using C' laboratory manual, Dept. of CSE, KITSW.

Reference Books:

1. Reema Thareja, Data Structures Using C, *2nd ed.* Hyderabad: Oxford University Press, 2014.
2. E.Balagurusamy, Programming in ANSI-C, 6th ed. *Tata McGraw Hill*, 2012.
3. Richard F. Gilberg and Behrouz A. Forouzan, Data Structures: A Pseudocode Approach with C, 2nd ed. Singapoor: Cengage Learning, 2007.

Course Learning Outcomes (COs):

After completion of this course, students will be able to,

CO1*: implement the fundamental data structures using C-language*

CO2*: deveCourse Learning Objectives (LOs):*

CO3*: implement programs for arranging the data using various sorting techniques*

CO4*: develop program using linked representation*

Course Articulation Matrix (CAM): U18CS207R1 DATA STRUCTURES THROUGH C LABORATORY

Course Outcomes		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	U18CS207R1.1	1	1	-	-	-	-	-	-	1	1	-	1	**2**	**2**	**2**
CO2	U18CS207R1.2	1	2	2	2	-	-	-	-	1	1	-	1	**2**	**2**	**2**
CO3	U18CS207R1.3	1	2	2	2	-	-	-	-	1	1	-	1	**2**	**2**	**2**
CO4	U18CS207R1.4	1	2	2	2	1	-	-	-	1	1	1	1	**2**	**2**	**2**
U18CS207R1		**1**	**1.75**	**2**	**2**	**1**	-	-	-	1	1	1	**1**	**2**	**2**	**2**

U18PH208 ENGINEERING PHYSICS LABORATORY

Class: B.Tech. I– Semester
B.Tech. II-Semester

Branch(s): ME, CSE, CSN, IT, CSIoT
CE, EEE, ECE, ECI, CSAIML, DS

Teaching Scheme:

L	T	P	C
-	-	2	1

Examination Scheme:

Continuous Internal Evaluation	40 Marks
End Semester Exam	60 Marks

Course Learning Objectives (LOs):

This laboratory course will develop students' knowledge in/on...

LO1: determination of various properties like rigidity modulus, moment of inertia, acceleration due to gravity and other elastic properties from SHMs

LO2: determination of the wavelengths, diameters of thin wires, limit of resolution and optical activity with high degree of accuracy from interference, diffraction and polarization phenomena using conventional light

LO3: determination of the wavelengths, slit widths with high degree of accuracy from diffraction phenomena using laser light

LO4: determination of optical fiber characteristics

LIST OF EXPERIMENTS

1. Determination of (a) rigidity modulus of a given wire and (b) moment of inertia of a ring using torsional pendulum
2. Acceleration due to gravity (g) by compound pendulum
3. Determination of force constant of a spiral spring using static method
4. Determination of wavelengths in mercury light using diffraction Grating- Normal incidence method
5. Determination of wavelength of He-Ne laser using reflection grating
6. Resolving power of a telescope
7. Determination of slit width using He-Ne laser
8. Dispersive power of a prism using spectrometer
9. Determination of wavelength of a monochromatic light using Newton's rings
10. Determination of thickness of thin wire using wedge method
11. Determination of specific rotation of sugar solution using Polarimeter (Saccharimeter)
12. Numerical aperture of an optical fiber

Laboratory Manual:

1. *Manual for Engineering Physics Laboratory* prepared by the Department of Physical Sciences/Physics, KITSW

Reference Book:

1. C.V. Madhusudhana Rao and V. Vasanth Kumar, *Engineering Lab Manual*, Scitech publications India Pvt. Ltd, 3/e, 2012.

Course Learning Outcomes (COs):

After completion of this course, students will be able to …

CO1: determine precisely the values of elastic properties, moments of inertia, acceleration due to gravity, etc

CO2: assess precise measurements of wavelengths, diameter of thin wires, limit of resolution and optical rotation from light phenomena (Interference, diffraction and polarization)

CO3: evaluate the wavelengths, slit widths from diffraction patterns using laser light

CO4: estimate the numerical aperture, acceptance angle and fiber losses of optical fibers

Course Articulation Matrix (CAM): U18PH208 ENGINEERING PHYSICS LABORATORY															
CO		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	U18PH208.1	1	-	-	3	-	-	2	-	2	-	-	-	-	-
CO2	U18PH208.2	1	-	-	3	-	-	2	-	2	-	-	-	-	-
CO3	U18PH208.3	1	-	-	3	-	-	2	-	2	-	-	-	-	-
CO4	U18PH208.4	2	-	1	3	-	-	2	-	2	-	-	-	-	-
U18PH208		1.25	-	1	3	-	-	2	-	2	-	-	-	-	-

U18ME209 WORKSHOP PRACTICE

Class: B. Tech. I & II Semesters **Branch(s):** ME, CSE, CSN, IT, CSIoT, CE, EEE, ECE, ECI, CSAIML, DS

Teaching Scheme:

L	T	P	C
-	-	2	1

Examination Scheme:

Continuous Internal Evaluation :	40 marks
End Semester Exam :	60 marks

Course Learning Objectives (LOs):
This course will develop students' knowledge in/on...
LO1: tools and development of joints in carpentry
LO2: mould cavity using single and two piece pattern
LO3: tools and development of joints using fitting and plumbing
LO4: principle and operation of arc welding, gas welding and soldering

LIST OF EXPERIMENTS

Carpentry:
1. Prepare a cross half lap joint
2. Prepare a half lap dovetail joint
3. Prepare mortise and tenon joint

Foundry:
1. Prepare a sand mould using single piece pattern-bracket
2. Prepare a sand mould using two piece pattern-dumbbell

Fitting:
1. Prepare a square fit.
2. Prepare a half round fit.

Plumbing:
1. Prepare a PVC Pipe joint using elbows & tee
2. Prepare a PVC Pipe joint using union & coupling

Welding:
1. Prepare a single V – Butt Joint using Arc welding
2. Preparation of pipe joint using gas welding
3. Soldering and de-soldering of Resistor in PCB.

Laboratory Manual:
[1] Workshop Practice Manual, Dept. of ME, KITSW.

Reference Book:
[1] Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy., *Elements of Workshop Technology*, Vol-I-2008 &Vol-II-2010, Media Promoters and publishers Pvt. Ltd, India.

Course Learning Outcomes (COs):
On completion of the course, the student will be able to...
CO1: identify and apply suitable tools to produce cross, half lap, mortise & tenon joints in carpentry trade
CO2: apply basic gating system and produce a mould cavity for single & split pattern
CO3: identify and apply suitable tools to make various joints in fitting & plumbing trade
CO4: adapt suitable welding process and build joints in welding trade

Course Articulation Matrix (CAM): U18ME209 WORKSHOP PRACTICE

CO		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	U18ME209.1	2	1	1	-	-	1	-	-	-	1	-	1
CO2	U18ME209.2	2	1	1	-	-	1	-	-	-	1	-	1
CO3	U18ME209.3	2	1	1	-	-	1	-	-	-	1	-	1
CO4	U18ME209.4	2	1	1	-	-	1	-	-	-	1	-	1
U18ME209		**2**	**1**	**1**	**-**	**-**	**1**	**-**	**-**	**-**	**1**	**-**	1

U18EA210 EAA: SPORTS/YOGA/NSS

Class: B. Tech. I -Semester
B. Tech. II -Semester

Branch(s): ME, CSE, CSN, IT, CSIoT
CE, EEE, ECE, ECI, CSAIML, DS

Teaching Scheme :

L	T	P	C
-	-	-	-

Examination Scheme :

Continuous Internal Evaluation	
End Semester Exam	

I. SPORTS

Course Learning objectives (LOs):
The objectives of the Sports is to..
LO1: to perform and engage in a variety of physical activities
LO2 : to develop and maintain physical health and fitness through regular participation in physical activities
LO3: to demonstrate positive self esteem, mental health and physiological balance through body awareness and control
LO4 : to exhibit the spirit of fair play, team work and sportsmenship

Activities related to:

1. Physical Fitness
2. Games & Sports

II. NATIONAL SERVICE SCHEME (NSS)

Course Learning objectives (LOs):
The objectives of the NSS is to..
LO1: arouse the social consciousness of the students
LO2 : provide them with opportunity to work with people in villages and slums
LO3 : expose them to the reality of life
LO4 : bring about a change in their social perceptions
LO5 : develop competence required for responsibility sharing and team work

List of Activities:

1. Shramadanam
2. Tree Plantation
3. General Medical camps in Villages
4. Awareness on Eye Donation
5. Awareness on "Child Labour and Child Marriages"
6. Awareness programs on " Literacy, Good Health Practices, etc."
7. Safe Riding Program
8. Awareness program on "RTI Act"
9. Awareness on Blood Donation

Course Learning Outcomes (COs):
After completion of the course, the student will be able to..
CO1: develop his/her personally through community service rendered
CO2 : apply their education to find solutions to individual and community problems
CO3 : acquire capacity to meet emergencies and natural disasters
CO4 : acquire a democratic attitude, leadership qualities and practice national integration

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(An Autonomous Institute under Kakatiya University, Warangal)

(Sponsored by EKASILA EDUCATION SOCIETY)

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