

Date: 24.05.2024

From
The Principal,
Bonam Venkata Chalamayya Engineering College (Autonomous),
Odalarevu - 533210.

To
The Controller of Examinations (UG)
JNTUK Kakinada,
KAKINADA-533003

Sir,
Subject: BVCEC_Curriculum_BR20 Regulations – Change of Course Codes – Request for
Approval – Reg.

It is to bring to your kind notice that, we have noticed a few corrections in course codes and change of course title for two Courses in the Curriculum of BR20 Regulations. The Soft Copy (CD) containing all information on course titles along with course codes was submitted earlier for your kind perusal.

The information related to the changes made in the above data is enclosed with this letter.

I request you to kindly approve the changes.

Thanking You Sir,

Sincerely,

B. Srinivas 24/05/2024
Controller of Examinations

**CONTROLLER OF EXAMINATIONS
B V C Engg. College (AUTONOMOUS)
ODALAREVU - 533 210. E.G.DI., A.P.**



[Signature]
24/05/24
Principal
**PRINCIPAL
BVC ENGINEERING COLLEGE
ODALAREVU - 533 210**

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE (Autonomous) :: ODALAREVU

CHANGE OF COURSE CODES (BR20 REGULATION)

Regulation	Year	Sem	Branch Code	Branch Name	Incorrect Code	Corrected Code	Course Name (Original)	Course Name(Corrected)
BR20	3	1	1	CIVIL ENGG.	20CE6L05	20CE5L05	Highway Engineering Lab	
BR20	1	1	2	EEE	20BS2L01	20BS1L01	Applied Physics Lab	
BR20	1	2	2	EEE	20BS1T07	20BS2T07	Applied Chemistry	
BR20	3	2	2	EEE	20EE6D06	20EE6D08	POWER SYSTEM OPERATION & CONTROL	
BR20	1	1	4	ECE	20BS2L01	20BS1L01	Applied Physics Lab	
BR20	1	1	4	ECE	20ES1L08	20ES1L05	Programming for Problem Solving C & DS lab	
BR20	2	1	45	CSE(AI&DS)	20CS3L08	20AD3L03	R Programming Lab	
BR20	2	1	45	CSE(AI&DS)	20ES3L07	20AD3L02	Python Programming Lab	
BR20	2	2	45	CSE(AI&DS)	20CS4L09	20AD4L01	OPERATING SYSTEMS & UNIX LAB	
BR20	3	2	45	CSE(AI&DS)	20CD6S04	20CS6S04	GAME DEVELOPMENT	
BR20	2	1	61	AI&ML	20CS3L08	20AD3L03	R Programming Lab	
BR20	2	1	61	AI&ML	20ES3L07	20AD3L02	Python Programming Lab	
BR20	1	1	42	CSE(AI&ML)	20BS2L01	20BS1L01	APPLIED PHYSICS LAB	
BR20	2	1	61	AI&ML	20CS3S01	No Change	Skill Oriented Course-Java Script	Employability Skills- Java Script/JSON
BR20	4	2	1	CIVIL ENGG	20CE8P04	20BS8P04	Community Service Project	
BR20	4	2	2	EEE	20EE8P04			
BR20	4	2	3	ME	20ME8P04			
BR20	4	2	4	ECE	20EC8P04			
BR20	4	2	5	CSE	20CS8P04			
BR20	4	2	45	CSE(AI&DS)	20AD8P04	No Change	Major Project	Project Work, Seminar & Internship in Industry
BR20	4	2	1	CIVIL ENGG	20CE8P03			
BR20	4	2	2	EEE	20EE8P03			
BR20	4	2	3	ME	20ME8P03			
BR20	4	2	4	ECE	20EC8P03			
BR20	4	2	5	CSE	20CS8P03			
BR20	4	2	45	CSE(AI&DS)	20CS8P03	20AD8P03		

CONTROLLED BY REGISTRATIONS
BVC Engg College (Autonomous)

Signature

PRINCIPAL
BVC ENGINEERING COLLEGE
ODALAREVU - 533 210

BR20

**ACADEMIC REGULATIONS,
COURSE STRUCTURE
&
SYLLABUS**

FOR

FOUR YEAR B.TECH COURSE

IN

**ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING) &
COMPUTER SCIENC AND ENGINEERING (ARTIFICIAL
INTELLIGENCE AND MACHINE LEARNING)**



**DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING) &
COMPUTER SCIENC AND ENGINEERING (ARTIFICIAL INTELLIGENCE AND
MACHINE LEARNING)**

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE

(AUTONOMOUS)

(Approved by A.I.C.T.E, New Delhi & Permanently Affiliated to J.N.T.U.K, Kakinada)

(Accredited by NAAC)

ODALAREVU, ALLAVARAM MANDAL, E. G. Dt – 533210

ACADEMIC REGULATIONS (BR20)

For

B. Tech FOUR YEAR DEGREE COURSE

(Applicable for the batches admitted from 2020-21)



BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE (A)
ODALAREVU – 533210, ANDHRA PRADESH, INDIA

Principal

HoD CE

HoD ME

HoD CSE

Dean

HoD EEE

HoD ECE

Controller of Examinations

[Signature]
S.V. Lakshmi Sri
B. Srinivas (B. SRINIVAS)
G. Unnathi Jothi

[Signature]
C.S. Srikanth
[Dr A. PRAVIN]
[Signature]
CA. Ramakrishna





BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE

(Autonomous)

Department of Computer Science: Artificial Intelligence and Machine Learning

Date:25-06-2022

AGENDA

1. Welcome Address by Chairman-BOS
2. Discussion on Course structures for UG Program of AIML Department (II, III & IV) and submission for approval.
3. Discussion on detailed syllabus for II, III & IV year B Tech in CS AIML and submission for approval
4. Any other item.

Sl. No	Name	Designation	Signature of Members
1	Dr. Gunamani Jena, M.E, Ph.D.	Professor and HOD, Dept. of CSE & CAD	
2	Dr B S N Murthy, M. Tech.	Associate Professor	
	Dr P Devabalan. M.E, Ph.D.	Professor	
	Mr V S Ramakrishna M. Tech.	Associate Professor	
	Mrs.BGangaBhavani. M. Tech.	Associate Professor	
	Mr P Ramesh	Assistant Professor	
3	Dr K V Ramana M. Tech., Ph.D.,	Professor, Department of CSE, UCEK JNTUK, AP	
4	Dr Jimson Mathew, M.Tech., Ph.D.,	Professor and Head, Dept. of CSE, IIT - Patna	
5	Dr B D Sahoo , M.E., Ph.D.,	Associate Professor, CSE NIT, Rourkela	
6	Mr Manugula Rambabu M. Tech.,	Director, Infrastructure and DevOps, Monster India Pvt. Ltd, Bengaluru	
7	Dr.S.Rao Chintalapudi, M. Tech., Ph. D.,	Professor & Hod AIML, CMR Tech Campus, Hyderabad	

Chairman BOS-CAD:BVCEC



BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE

(Autonomous)

Department of Computer Science: Artificial Intelligence and Machine Learning

Date: ~~25~~ 06-2022

MINUTES OF MEETING

RESOLUTIONS TAKEN

1. Consider Item No.2.

Resolved to ratify the proposed course structure for B. Tech program for II, III & IV year. The approved course structures are enclosed herewith.

2. Consider Item No. 3

Resolved to ratify the proposed syllabi of following courses of II, III & IV year B. Tech CS AIML Programmes.

The approved syllabi are enclosed here.

3. Consider Item No. 4: resolved to ratify the text books and reference books as mentioned in the Item No. 3.

Finally, Chairman of BOS thanked all the members of their valuable inputs and active participation in the meeting.

Dr. G. Jena
Chairman-BOS: CSE



BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi; Permanently Affiliated to JNTUK, Kakinada)
(Accredited by NAAC with "B++" Grade)
ODALAREVU – 533210, (Via) Amalapuram
Allavaram Mandal., E.G.Dt., A.P.
e-mail: bvce@bvcegroup.in

ACADEMIC REGULATIONS (BR20)
FOR B. TECH. FOUR YEAR DEGREE COURSE(REGULAR)
(Applicable for batches admitted from 2020-21 onwards)

Bonam Venkata Chalamayya Engineering College 2020 Regulations(BR20 Regulations) applicable to all branches from 2020-21AY are given under. These regulations govern the B.Tech programs offered by the college with effect from the students admitted to the programs in academic year 2020-21.

1. Courses of study:

The following courses of study are offered at present as specializations at under graduate level for four year B.Tech degree in the Bonam Venkata Chalamayya Engineering College (A), Odalarevu.

S. No	Branch	Code	Short Name
1	Civil Engineering	01	CE
2	Electrical and Electronics Engineering	02	EEE
3	Mechanical Engineering	03	ME
4	Electronics and Communication Engineering	04	ECE
5	Computer Science and Engineering	05	CSE
6	Computer Science and Engineering (Artificial Intelligence and Data Science)	45	CSE(AI&DS)

- 2. Medium of Instruction:** The medium of instruction of the entire B. Tech undergraduate program in Engineering & Technology (including examinations and project reports) will be in English only.
- 3. Admissions:** Admission to the B. Tech Program shall be made subject to the eligibility, qualifications and specialization prescribed by the A.P. State Government/University from time to time. Admissions shall be made either on the basis of the merit rank obtained by the student in the common entrance examination conducted by the A.P. Government/University or on the basis of any other order of merit approved by the A.P. Government/University, subject to reservations as prescribed by the Government/University from time to time.
- 4. Program Pattern:**
- Total duration of the of B. Tech (Regular) Program is Four academic years(Eight Semesters)
 - Each Academic year of study is divided in to Two semesters.
 - Minimum number of instruction days in each semester is 90.
 - Grade points, based on percentage of marks awarded for each course will form the basis for calculation of SGPA (Semester Grade Point Average) and CGPA (Cumulative Grade Point Average).
 - The total credits for the Program are 160.
 - A three-week induction program is mandatory for all first year UG students and shall be conducted as per AICTE/UGC/APSCH guidelines.
 - Student is introduced to "Choice Based Credit System (CBCS)".
 - A pool of interdisciplinary and job-oriented mandatory skill courses which are relevant to the industry are integrated into the curriculum of concerned branch of engineering (total five skill courses: two basic level skill courses, one on soft skills and other two on advanced level skill courses)
 - A student has to register for all courses in a semester.

- j) All the registered credits will be considered for the calculation of final CGPA.
- k) Each semester has - 'Continuous Internal Evaluation (CIE)' and 'Semester End Examination (SEE)'. Choice Based Credit System (CBCS) and Credit Based Semester System (CBSS) as indicated by UGC and course structure as suggested by AICTE are followed.
- l) A 10 months industry/field mandatory internship, both industry and social, during the summer vacation and also in the final semester to acquire the skills required for job and make engineering graduates to connect with the needs of the industry and society at large.
- m) All students shall be mandatorily registered for Extension activities viz. NSS/Red Cross etc..
- n) The college shall assign a faculty advisor/mentor after admission to each student or group of students from same department to provide guidance in courses registration/career growth/placements/opportunities for higher studies/GATE/other competitive exams etc.

5. Subject/Course Classification: All subjects/courses offered for the undergraduate program in Engineering & Technology (B. Tech degree programs) are broadly classified as follows.

S.No	Category	Code	AICTE Credits breakup	APSCHE Credits breakup	BVCEC BR20 Credits breakup
1	Humanities and social science including Management courses	HSMC	12	10.5	10.5
2	Basic Science courses	BSC	25	21	21
3	Engineering courses science	ESC	24	24	24
4	Professional core Courses	PCC	48	51	51
5	Open Elective Courses	OEC	18	12	12
6	Professional Courses Elective	PEC	18	15	15
7	Internship, seminar, project work	PROJ	15	16.5	16.5
8	Skill Oriented Courses	SC	-	10	10
9	Mandatory courses	MC	Non-credit	Non-credit	Non-credit
Total Credits			160	160	160

6. Registration for Courses:

- i) The college shall invite registration forms from the students at the beginning of the semester for the registration for courses each semester. The registration process shall be closed within one week. If any student wishes to withdraw the registration, he/she shall submit a letter to the principal through the class teacher/instructor and HOD. The principal shall communicate the registration and withdraw details courses of each student in a consolidated form to the college examination section without fail.
- ii) There are four open electives in each branch. All Open Electives are offered to students of all branches in general. A student shall choose an open elective, by consulting the HOD/advisor, from the list in such a manner that he/she has not studied the same course in any form during the Program.
- iii) A student shall be permitted to pursue up to a maximum of two elective courses under MOOCs during the program. Students are advised to register for only for minimum 12 weeks in duration during the program. Student has to pursue and acquire a certificate for a MOOC course only from the SWAYAM/NPTEL through online with the approval of Head of the Department in order to earn the 3 credits. The Head of the department shall notify the list of such courses at the beginning of the semester. The details of the MOOCs courses registered by the students shall be submitted to the College Examination Center. The Head of the Department shall appoint a mentor for each of the MOOC subjects registered by the students to monitor the student's assignment submissions given by SWAYAM/NPTEL. The student needs to submit all the assignments given and needs to take final exam at the proctor center. The student needs to earn a certificate by passing the exam. The student will be awarded the credits given in curriculum only by submission of the certificate. In case if student does not pass subjects registered through SWAYAM/NPTEL, the same or alternative equivalent subject may be registered again through SWAYAM/NPTEL in the next semester with the recommendation of HOD and shall be passed.

- iv) Two summer internships each with a minimum of six weeks duration shall be mandatorily done/completed respectively at the end of second and third years (during summer vacations). The internship can be done by the students at local industries, Govt. Organizations, construction agencies, Industries, Hydel and thermal power projects and also in software MNCs. After completing the summer internship, the students shall register in the immediate respective odd semester and it will be evaluated at the end of the semester as per norms of the institution. The student has to produce the summer internship satisfactory report and certificate taken from the organization to be considered for evaluation. The College shall facilitate and monitor the student internship programs. Completion of internships is mandatory, if any student fails to complete internship, he/she will not be eligible for the award of degree. In such cases, the student shall repeat and complete the internship.
- v) In the final semester, the student should mandatorily register and undergo internship and in parallel he/she should work on a project with well-defined objectives. At the end of the semester the candidate shall submit an internship completion certificate and a project report. A student shall also be permitted to submit project report on the work carried out during the internship. The project report shall be evaluated with an external examiner.
- vi) Curricular Framework for Skill oriented courses
 - a) There are five (05) skill-oriented courses which shall be offered during III to VII semesters and students must register and pass the courses successfully.
 - b) For skill oriented/skill advanced course, one theory and 2 practical hours (1-0-2) or two theory hours (2-0-0) may be allotted as per the decision of concerned BOS.
 - c) Out of the five skill courses; (i) two shall be skill-oriented courses from the same domain and shall be completed in second year (ii) Of the remaining 3 skill courses, one shall be necessarily be a soft skill course and the remaining 2 shall be skill-advanced courses either from the same domain or job-oriented skill courses, which can be of inter disciplinary nature.
 - d) Students may register the interdisciplinary job-oriented skill courses based on the prerequisites and eligibility in consultation with concerned Head of the Department.
 - e) The student shall be given an option to choose either the skill courses being offered by the college or to choose a certificate course being offered by industries/Professional bodies/APSSDC or any other accredited bodies. However, the department has to assign mentors in the college to monitor the performance of the students.
 - f) If a student chooses to take a Certificate Course offered by industries/Professional bodies/APSSDC or any other accredited bodies, in lieu of the skill advanced course offered by the Department, then the department shall mark overall attendance of the student for the remaining courses in that semester excluding the skill course in all the calculations of mandatory attendance requirements upon producing a valid certificate. However, the student is deemed to have fulfilled the attendance requirement of the course, if the external agency issues a certificate with satisfactory condition. If the certificate issued by external agency is marked with unsatisfactory condition, then the student shall repeat the course either in the college or at external agency. The credits will be awarded to the student upon producing the successful Course Completion Certificate from the agency/professional bodies and after passing in the viva-voce examination conducted at college as per Institutional norms at the end of the semester.
- 7. (a) **Award of B. Tech. Degree:** A student will be declared eligible for the award of B. Tech. Degree if he fulfills the following academic regulations:
 - i) A student shall be declared eligible for award of the B. Tech Degree, if he pursues a course of study in not less than four and not more than eight academic years.
 - ii) After eight academic years from the year of their admission, he/she shall forfeit their seat in B. Tech course and their admission stands cancelled.
 - iii) The student shall register for 160 credits and must secure all the 160 credits.
 - iv) All students shall register for Extensional activities and will be required to participate in an activity specified by NSS officer during second and third semesters. Grade shall be awarded as Satisfactory or Unsatisfactory in the mark sheet on the basis of participation, attendance, performance and behavior. If a student gets an unsatisfactory Grade, he/she shall repeat the above activity in the subsequent years, in order to complete the degree requirements.

- v) Courses like Environmental Sciences, Universal Human Values, Ethics, Indian Constitution, Essence of Indian Traditional Knowledge etc., shall be included in the curriculum as non-credit mandatory courses. Environmental Sciences is to be offered compulsorily as mandatory course for all branches. A student has to secure 40% of the marks allotted in the internal evaluation for passing the course. No marks or letter grade shall be allotted for all mandatory non-credit courses.

vi) Credit Definition:

1 Hour Lecture (L) per week	1 Credit
1 Hour Tutorial (T) per week	1 Credit
1 Hour Practical (P) per week	0.5 Credit
2 Hours Practical (Lab) per week	1 Credit

- (b) Award of B. Tech. (Honor)/B. Tech. (Minor): B. Tech. with Honors or a B. Tech. with a Minor will be awarded if the student earns 20 additional credits are acquired as per the regulations/guidelines. The regulations/guidelines given by JNTUK are separately provided. Registering for Honors/Minor is optional.

8. Attendance Requirements

- A student is eligible to write the End examinations if he acquires a minimum of 40% in each subject and 75% of attendance in aggregate of all the subjects.
- Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) may be granted by the College Academic Committee. However, this Condonation concession is applicable only to any two semesters during the entire program.
- Shortage of Attendance below 65% in aggregate shall not be condoned.
- A student who is short of attendance in a semester may seek re-admission into that semester when offered within 4 weeks from the date of commencement of class work.
- Students whose shortage of attendance is not condoned in any semester are not eligible to write their end semester examination of that class.
- A stipulated fee of Rs. 500/- in the concerned semester shall be payable towards Condonation of shortage of attendance. Students availing Condonation on medical ground shall produce a medical certificate issued by the competitive authority.
- A student will be promoted to the next semester if he satisfies the (i) attendance requirement of the present semester and (ii) minimum required credits.
- If any candidate fulfills the attendance requirement in the present semester, he shall not be eligible for readmission into the same class.
- For induction program attendance shall be maintained as per AICTE norms.
- For non-credit mandatory courses the students shall maintain the attendance similar to credit courses

9. Evaluation-Distribution and Weightage of marks

- Paper setting and evaluation of the answer scripts shall be done as per the procedures laid down by the College Examination section from time to time.
- For non-credit mandatory courses, like Environmental Sciences, Universal Human Values, Ethics, Indian Constitution, Essence of Indian Traditional Knowledge, the student has to secure 40% of the marks allotted in the internal evaluation for passing the course. No marks or letter grade shall be allotted for all mandatory non-credit courses.
- A student is deemed to have satisfied the minimum academic requirements if he has earned the credits allotted to each theory/practical design/drawing subject/ project etc by securing not less than 35% of marks in the end semester exam and minimum 40% of marks in the sum total of the internal marks and end semester examination marks together.
- Distribution and Weightage of marks:

The assessment of the student's performance in each course will be based on Continuous Internal Evaluation (CIE) and Semester-End Examination (SEE). The performance of a student in each semester shall be evaluated subject-wise with a maximum of 100 marks for theory subject and 50 marks for practical subject. For theory subjects the distribution shall be 30 marks for Internal Evaluation and 70 marks for the End Examinations.

S. No	Components	Internal	External	Total
1	Theory	30	70	100
2	Engineering Graphics/Design/Drawing	30	70	100
3	Practical	15	35	50
4	Mini Project/Internship/Industrial Training/ Skill Development programs/Research Project	-	50	50
5	Project Work	60	140	200

(v) **Continuous Internal Theory Evaluation:**

- For theory subjects, during a semester, there shall be two mid-term examinations. Each mid-term examination consists of (i) **one objective examination** (ii) **one descriptive examination** and (iii) **One assignment**. The Objective examination shall be 10 marks and descriptive examination shall be for 15 marks with a total duration of 2 hours (30 minutes for objective and 90 minutes for descriptive paper).
- The first objective examination is set with 20 multiple choice questions for 10 marks (20 questions x ½ marks) from first two and half units (50% of the syllabus) and it is conducted by Examination Section. The descriptive examination is set with 3 full questions for 5 marks each from first two and half units (50% of the syllabus), the student has to answer all questions. In the similar lines, the second objective and descriptive examinations shall be conducted on the rest of the syllabus.
- The assignment is given by the concerned class teacher for five marks from first two and half units (50% of the syllabus). The second assignment shall be given from rest of the syllabus. The first assignment should be submitted before the conduct of the first mid-term examination, and the second assignment should be submitted before the conduct of the second mid-term examination.
- The total marks secured by the student in each mid-term examination are evaluated for 30 marks. The first mid marks (Mid-1) consisting of marks of objective examination, descriptive examination and assignment shall be submitted to the college examination section within one week after completion of first mid examination.
- The mid marks submitted to the college examination section shall be displayed in the concerned department notice boards for the benefit of the students.
- If any discrepancy found in the submitted Mid-1 marks, it shall be brought to the notice of College examination section within one week from the submission.
- Second mid marks (Mid-2) consisting of marks of objective examination, descriptive examination and assignment shall also be submitted to college examination section within one week after completion of second mid examination and it shall be displayed in the notice boards. If any discrepancy found in the submitted mid-2 marks, it shall be brought to the notice of college examination section within one week from the submission.
- Internal marks can be calculated with 80% weightage for better of the two mid exams and 20% Weightage for another mid exam.

Example:

Mid-1 marks = Marks secured in (objective examination-1+descriptive examination-1 + assignment-1)

Mid-2 marks = Marks secured in (objective examination-2+descriptive examination-2 + assignment-2)

Final Internal Marks = (Best of (Mid-1/Mid-2) marks x 0.8
+ Least of (Mid-1/Mid-2) marks x 0.2)

- With the above criteria, college examination section will send mid marks of all subjects in consolidated form to all the concerned departments and same shall be displayed in the concerned Department notice boards. If any discrepancy found, it shall be brought to the notice of college examination section through proper channel within one week with all proofs. Discrepancies brought after the given deadline will not be entertained under any circumstances.

(vi) **Semester End Theory Examinations Evaluation:**

- The semester end examinations will be conducted by college examination section for 70 marks consists of five questions carrying 14 marks each. Each of these questions is from one unit and may contain sub-questions. For each question there will be an "either" "or" choice, which means that there will be two questions from each unit and the student should answer either of the two

questions.

- (b) For practical subjects there shall be continuous evaluation during the semester for 15 internal marks and 35 end examination marks. The internal 15 marks shall be awarded as follows: day to day work - 5 marks, Record-5 marks and the remaining 5 marks to be awarded by conducting an internal laboratory test. The end examination shall be conducted by the teacher concerned and external examiner appointed by controller of examinations, BVCEC.
- Note: All the laboratory records and internal test papers shall be preserved in respective departments as per Institution norms and shall be produced to the Committees of Institution/University as and when they ask for.
- (c) For the subjects having design and / or drawing (such as Engineering Graphics, Engineering Drawing, Machine Drawing and Electrical Engineering workshop) and estimation, the distribution shall be 30 marks for internal evaluation (15 marks for continuous Assessment (day-to-day work) and 15 marks for internal tests) and 70 marks for end examination. There shall be two internal tests in a Semester for 15 marks each and final marks can be calculated with 80% weightage for better of the two tests and 20% weightage for other test and these are to be added to the marks obtained in day-to-day work.
- (d) Evaluation of the summer internships: It shall be completed in collaboration with local industries, Govt. Organizations, construction agencies, Industries, Hydel and thermal power projects and also in software MNCs in the area of concerned specialization of the UG program. Students shall pursue this internship during summer vacation just before its offering as per course structure. The minimum duration of this course shall be at least 6 weeks. The student shall register for the internship as per course structure after commencement of academic year. A supervisor/mentor/advisor has to be allotted to guide the students for taking up the summer internship. The supervisor shall monitor the attendance of the students while taking up the internship. Attendance requirements are as per the norms of the Institute. After successful completion, students shall submit a summer internship technical report to the concerned department and appear for an oral presentation before the departmental committee consists of an external examiner appointed by the College; Head of the Department, supervisor of the internship and a senior faculty member of the department. A certificate from industry/skill development center shall be included in the report. The report and the oral presentation shall carry 40% and 60% weightages respectively. It shall be evaluated for 50 external marks at the end of the semester. There shall be no internal marks for Summer Internship. A student shall secure minimum 40% of marks for successful completion. In case, if a student fails, he/she shall reappear as and when semester supplementary examinations are conducted by the college.
- (e) The job-oriented skill courses may be registered at the college or at any accredited external agency. A student shall submit a record/report on the on the list skills learned. If the student completes job-oriented skill course at external agency, a certificate from the agency shall be included in the report. The course will be evaluated at the end of the semester for 50 marks Internal: 15 marks for internal test 10 marks, record 5 marks evaluation, and External for 35 marks (marks split up: writeup: 10 marks, Execution: 20 marks viva-voce: 05 marks) along with laboratory end examinations in the presence of external Examiner appointed from other reputed institute, and internal examiner (course instructor or mentor). There are no internal marks for the job-oriented skill courses.
- (f) Mandatory Course (M.C): Environmental Sciences, Universal Human Values, Ethics, Indian Constitution, Essence of Indian Traditional Knowledge etc non-credit (zero credits) mandatory courses. Environmental Sciences shall be offered compulsorily as mandatory course for all branches. A minimum of 75% attendance is mandatory in these subjects. There shall be an external examination for 70 marks and it shall be conducted by the college internally. Two internal examinations shall be conducted for 30 marks and a student has to secure at least 40% of the marks for passing the course. There is no objective exam for mandatory courses. No marks or letter grade shall be printed in the transcripts for all mandatory non-credit courses, but only Completed (Y)/Not-completed (N) will be specified.
- (g) Procedure for Conduct and Evaluation of MOOC: There shall be a Discipline Centric Elective Course through Massive Open Online Course (MOOC) as Program Elective course. The student shall register for the course (Minimum of 12 weeks) offered by SWAYAM/NPTEL through online with the approval of Head of the Department. The Head of the Department shall

appoint one mentor for each of the MOOC subjects offered. The student needs to register the course in the SWAYAM/NPTEL portal. During the course, the mentor monitors the student's assignment submissions given by SWAYAM/NPTEL. The student needs to submit all the assignments given and needs to take final exam at the proctor center. The student needs to earn a certificate by passing the exam. The student will be awarded the credits given in curriculum only by submission of the certificate. In case if student does not pass subjects registered through SWAYAM/NPTEL, the same or alternative equivalent subject may be registered again through SWAYAM/NPTEL in the next semester with the recommendation of HOD and shall be passed.

(h) **Major Project (Project - Project work, seminar and internship in industry):**

In the final semester, the student should mandatorily register and undergo internship and in parallel he/she should work on a project with well-defined objectives. At the end of the semester the candidate shall submit an internship completion certificate and a project report. A student shall also be permitted to submit project report on the work carried out during the internship. The project report shall be evaluated with an external examiner.

Evaluation: The total marks for project work 200 marks and distribution shall be 60 marks for internal and 140 marks for external evaluation. The supervisor assesses the student for 30 marks (Report: 15 marks, Seminar: 15 marks). At the end of the semester, all projects shall be showcased at the department for the benefit of all students and staff and the same is to be evaluated by the departmental Project Review Committee consisting of supervisor, a senior faculty and HOD for 30 marks. The external evaluation of Project Work is a Viva-Voce Examination conducted in the presence of internal examiner and external examiner appointed by the Institute and is evaluated for 140 marks.

10. **Recounting of Marks in the End Semester Examination:** A student can request for recounting of his/her answer book on payment of a prescribed fee as per College norms.
11. **Re-evaluation/Revaluation by Challenge of the End Semester Examination:** A student can request for Revaluation/Revaluation by Challenge of his/her answer book on payment of a prescribed fee as per college norms.
12. **Supplementary Examinations:** A student who has failed to secure the required credits can appear for a supplementary examination, as per the schedule announced by the college.
13. **Malpractices in Examinations:** Disciplinary action shall be taken in case of malpractices during mid/End examinations as per the rules framed by the College/University.
14. **Promotion Rules**
The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in item no.8 for promotion to higher classes
 - a) A student shall be promoted from first year to second year if he fulfills the minimum attendance requirement as per college norms.
 - b) A student will be promoted from II to III year if he fulfills the academic requirement of 40% of credits up to either II year I-Semester or II year II-Semester from all the examinations, whether or not the candidate takes the examinations and secures prescribed minimum attendance in II year II semester.
 - c) A student shall be promoted from III year to IV year if he fulfills the academic requirements of 40% of the credits up to either III year I semester or III year II semester from all the examinations, whether or not the candidate takes the examinations and secures prescribed minimum attendance in III year II semester.
15. **Course Pattern**
 - a) The entire course of study is for four academic years; all years are on semester pattern.
 - b) A student eligible to appear for the end semester examination in a subject, but absent from it or has failed in the end semester examination, may write the exam in that subject when conducted next.
 - c) When a student is detained for lack of credits/shortage of attendance, he may be re-admitted into the same semester/year in which he has been detained. However, the academic regulations under which he was first admitted shall continue to be applicable to him.
16. **Earning of Credit:**

A student shall be considered to have completed a course successfully and earned the credits if he/she secures an acceptable letter grade in the range O to D as given below. Letter grade 'F' in any course implies the failure of the student in that course and no credits earned. Absent is also treated as no credits earned. For projects, the same % percentages will be followed for grading.

Marks Range Theory (Max – 100)	Marks Range Lab (Max – 50)	Letter Grade	Level	Grade Point
≥90	≥45	O	Outstanding	10
≥80 to <90	≥40 to <44	S	Excellent	9
≥70 to <80	≥35 to <39	A	Very Good	8
≥60 to <70	≥30 to <34	B	Good	7
≥50 to <60	≥25 to <29	C	Fair	6
≥40 to <50	≥20 to <24	D	Satisfactory	5
<40	<20	F	Fail	0
		AB	Absent	0

17. Computation of SGPA and CGPA

The UGC recommends the following procedure to compute the Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA):

- (i) $SGPA(S_k)$ of k^{th} semester (1 to 8) is the ratio of sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the total number of credits of all the courses undergone/registered by a student, i.e.,

$$SGPA(S_k) = \frac{\sum_{i=1}^n (C_i \times G_i)}{\sum_{i=1}^n C_i}$$

Where C_i is the number of credits of the i^{th} course/subject in a semester and G_i is the grade point scored by the student in the i^{th} course/subject and n is the number of courses/subjects registered in that semester.

- (ii) CGPA: The CGPA is calculated in the same manner taking into account all the 'm' courses/subjects registered by the student over all the semesters of a Program i.e., in all eight semesters

$$CGPA = \frac{\sum_{i=1}^m (C_i \times S_i)}{\sum_{i=1}^m C_i}$$

Where S_i is SGPA of the i^{th} semester and C_i is the total number of credits in that semester.

- (iii) SGPA and CGPA shall be rounded off to 2 decimal points and reported in transcripts.
 (iv) While computing the SGPA/CGPA, the subjects in which the student is awarded Zero grade points will also be included.
 (v) *Grade Point*: It is a numerical weight allotted to each letter grade on a 10-point scale.
 (vi) *Letter Grade*: It is an index of the performance of students in a said course. Grades are denoted by letters O, S, A, B, C, D, F and AB.
 (vii) As per AICTE regulations, conversion of CGPA into equivalent percentage is as follows:
 Equivalent Percentage = $(CGPA - 0.75) \times 10$
 (viii) Illustration of Computation of SGPA and CGPA

Illustration for SGPA: Let us assume there are 6 subjects in a semester. The grades obtained as follows:

Course	Credit	Grade Obtained	Grade point	$S_i = \text{Credit} \times \text{Grade}$
Subject 1	3	A	8	$3 \times 8 = 24$
Subject 2	3	B	7	$3 \times 7 = 21$
Subject 3	3	C	6	$3 \times 6 = 18$
Subject 4	3	O	10	$3 \times 10 = 30$
Subject 5	3	D	5	$3 \times 5 = 15$
Subject 6 (SAC)	2	S	9	$2 \times 9 = 18$
Lab 1	1.5	O	10	$1.5 \times 10 = 15$
Lab 2	1.5	S	9	$1.5 \times 9 = 13.5$
Lab 2	1.5	S	9	$1.5 \times 9 = 13.5$
	21.5			168

Thus, $SGPA = 168/21.5 = 7.813 = 7.8$ (approx.)

Illustration for CGPA:

Semester 1	Semester 2	Semester 3	Semester 4
Credits: 19.5 SGPA: 6.9	Credits: 19.5 SGPA: 7.8	Credits: 21.5 SGPA: 5.6	Credits: 21.5 SGPA: 6.0
Semester 5	Semester 6	Semester 7	Semester 8
Credits: 21.5 SGPA: 6.3	Credits: 21.5 SGPA: 7.8	Credits: 23 SGPA: 6.4	Credits: 12 SGPA: 7.5

Thus,

$$CGPA = [(6.9 \times 19.5) + (7.8 \times 19.5) + (5.6 \times 21.5) + (6.0 \times 21.5) + (6.3 \times 21.5) + (7.8 \times 21.5) + (6.4 \times 23) + (7.5 \times 12)] / 160$$

$$CGPA = 5.88$$

18. Award of Class

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

Class Awarded	CGPA to be secured	Remarks
First Class with Distinction	≥ 7.75 (Without any supplementary appearance)	From the CGPA secured from 160 Credits
First Class	≥ 6.75	
Second Class	≥ 5.75 to < 6.75	
Pass Class	≥ 5.00 to < 5.75	

19. Minimum Instruction Days

The minimum instruction days for each semester shall be 90 working days. There shall be no branch transfers after the completion of the admission process. There shall be no transfer from one college/stream to another within the Colleges

Withholding of Results

If the student is involved in indiscipline/malpractices/court cases, the result of the student will be withheld.

20. Transitory Regulations

- (a) Discontinued or detained candidates are eligible for re-admission as and when next offered.
- (b) The re-admitted candidate will be governed by the rules & regulations under which the candidate has been admitted.
- (c) (i) In case of transferred students from other autonomous Institutes, credits shall be transferred to college as per the academic regulations and course structure of BVCEC.
(ii) The students seeking transfer to other colleges have to obtain the credits of any equivalent subjects as prescribed by the parent institute. In addition, the transferred candidates have to pass the failed subjects at the earlier Institute with already obtained internal/sessional marks.

21. Gap - Year

Gap Year concept of Student Entrepreneur in Residence shall be introduced and outstanding students who wish to pursue entrepreneurship are allowed to take a break of one year at any time after I/II/III year to pursue entrepreneurship full time. This period shall be counted for the maximum time for graduation. An evaluation committee at institution level shall be constituted to evaluate the proposal submitted by the student and the committee shall decide on permitting the student for availing the Gap Year.

22. General

- (a) Wherever the words "he", "him", "his", occur in the regulations, they include "she", "her", "hers".
- (b) The academic regulation should be read as a whole for the purpose of any interpretation.
- (c) In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the head of the institution is final.
- (d) The Institute may change or amend the academic regulations or syllabi at any time and the changes or amendments made shall be applicable to all the students with effect from the dates notified by the Institute.



BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE
(AUTONOMOUS)
 (Approved by AICTE, New Delhi; Permanently Affiliated to JNTUK, Kakinada)
 (Accredited by NAAC with "B++" Grade)
ODALAREVU – 533210, (Via) Amalapuram
Allavaram Mandal., E.G.Dt., A.P.
 e-mail: bvce@bvcgroup.in

ACADEMIC REGULATIONS (BR20) **FOR B. TECH (LATERAL ENTRY SCHEME)**

Applicable for students admitted into II B. Tech. from the Academic Year 2021-22 onwards

1 Award of B. Tech. Degree

A student will be declared eligible for the award of B.Tech. Degree if he fulfills the following academic regulations:

- a) A student shall be declared eligible for the award of the B. Tech Degree, if he pursues a course of study in not less than three academic years and not more than six academic years. After six academic years from the year of their admission, he/she shall forfeit their seat in B. Tech course and their admission stands cancelled.
 - b) The candidate shall register for 121 credits and secure all the 121 credits.
2. The attendance regulations of B. Tech. (Regular) shall be applicable to B.Tech (lateral entry).

3. Promotion Rule

A student shall be promoted from second year to third year if he fulfills the minimum attendance requirement.

A student shall be promoted from III year to IV year if he fulfills the academic requirements of 40% of the credits up to either III year I semester or III year II semester from all the examinations, whether or not the candidate takes the examinations and secures prescribed minimum attendance in III year II semester.

4. Award of Class

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

Class Awarded	CGPA to be secured	Remarks
First Class with Distinction	≥ 7.75 (Without any supplementary appearance)	From the CGPA secured from 121 Credits
First Class	≥ 6.75	
Second Class	≥ 5.75 to < 6.75	
Pass Class	≥ 5.00 to < 5.75	

The Grades secured, Grade points and Credits obtained will be shown separately in the memorandum of marks.

5. All the other regulations as applicable to B. Tech. 4-year degree course (Regular) will hold good for B. Tech. (Lateral Entry Scheme).

COMMUNITY SERVICE PROJECT

Introduction

1. Community Service Project is an experiential learning strategy that integrates meaningful community service with instruction, participation, learning and community development
2. Community Service Project involves students in community development and service activities and applies the experience to personal and academic development.
3. Community Service Project is meant to link the community with the college for mutual benefit. The community will be benefited with the focused contribution of the college students for the village/ local development. The college finds an opportunity to develop social sensibility and responsibility among students and also emerge as a socially responsible institution.

Objective

Community Service Project should be an integral part of the curriculum, as an alternative to the 2 months of Summer Internships / Apprenticeships / On the Job Training, whenever there is an exigency when students cannot pursue their summer internships. The specific objectives are;

1. To sensitize the students to the living conditions of the people who are around them,
2. To help students to realize the stark realities of the society.
3. To bring about an attitudinal change in the students and help them to develop societal consciousness, sensibility, responsibility and accountability
4. To make students aware of their inner strength and help them to find new /out of box solutions to the social problems.
5. To make students socially responsible citizens who are sensitive to the needs of the disadvantaged sections.
6. To help students to initiate developmental activities in the community in coordination with public and government authorities.
7. To develop a holistic life perspective among the students by making them study culture, traditions, habits, lifestyles, resource utilization, wastages and its management, social problems, public administration system and the roles and responsibilities of different persons across different social systems.

Implementation of Community Service Project

1. Every student should put in a minimum of 180 hours for the Community Service Project during the summer vacation.
2. Each class/section should be assigned with a mentor.
3. Specific Departments could concentrate on their major areas of concern. For example, Dept. of Computer Science can take up activities related to Computer Literacy to different sections of people like - youth, women, house-wives, etc
4. A log book has to be maintained by each of the student, where the activities undertaken/involved to be recorded.
5. The log book has to be countersigned by the concerned mentor/faculty in charge.
6. Evaluation to be done based on the active participation of the student and grade could be awarded by the mentor/faculty member.
7. The final evaluation to be reflected in the grade memo of the student.
8. The Community Service Project should be different from the regular programs of NSS/NCC/Green Corps/Red Ribbon Club, etc.
9. Minor project report should be submitted by each student. An internal Viva shall also be conducted by a committee constituted by the principal of the college.
10. Award of marks shall be made as per the guidelines of Internship/apprentice/ on the job training

Procedure

1. A group of students or even a single student could be assigned for a particular habitation or village or municipal ward, as far as possible, in the near vicinity of their place of stay, so as to enable them to commute from their residence and return back by evening or so.
2. The Community Service Project is a twofold one—
 - a) First, the student/s could conduct a survey of the habitation, if necessary, in terms of their own domain or subject area. Or it can even be a general survey, incorporating all the different areas. A common survey format could be designed. This should not be viewed as a duplication of work by the Village or Ward volunteers, rather, it could be another primary source of data.
 - b) Secondly, the student/s could take up a social activity, concerning their domain or subject area. The different areas, could be like —
 - Agriculture
 - Health
 - Marketing and Cooperation
 - Animal Husbandry
 - Horticulture
 - Fisheries
 - Sericulture
 - Revenue and Survey
 - Natural Disaster Management
 - Irrigation
 - Law & Order
 - Excise and Prohibition
 - Mines and Geology
 - Energy
 - Internet
 - Free Electricity
 - Drinking Water

EXPECTED OUTCOMES

BENEFITS OF COMMUNITY SERVICE PROJECT TO STUDENTS

Learning Outcomes

1. Positive impact on students' academic learning
2. Improves students' ability to apply what they have learned in "the real world"
3. Positive impact on academic outcomes such as demonstrated complexity of understanding, problem analysis, problem-solving, critical thinking, and cognitive development
4. Improved ability to understand complexity and ambiguity

Personal Outcomes

1. Greater sense of personal efficacy, personal identity, spiritual growth, and moral development
2. Greater interpersonal development, particularly the ability to work well with others, and build leadership and communication skills

Social Outcomes

1. Reduced stereotypes and greater inter-cultural understanding
2. Improved social responsibility and citizenship skills
3. Greater involvement in community service after graduation

Career Development

1. Connections with professionals and community members for learning and career opportunities

2. Greater academic learning, leadership skills, and personal efficacy can lead to greater opportunity

Relationship with the Institution

1. Stronger relationships with faculty
2. Greater satisfaction with college
3. Improved graduation rates

BENEFITS OF COMMUNITY SERVICE PROJECT TO FACULTY MEMBERS

1. Satisfaction with the quality of student learning
2. New avenues for research and publication via new relationships between faculty and community
3. Providing networking opportunities with engaged faculty in other disciplines or institutions
4. A stronger commitment to one's research

BENEFITS OF COMMUNITY SERVICE PROJECT TO COLLEGES AND UNIVERSITIES

1. Improved institutional commitment
2. Improved student retention
3. Enhanced community relations

BENEFITS OF COMMUNITY SERVICE PROJECT TO COMMUNITY

1. Satisfaction with student participation
2. Valuable human resources needed to achieve community goals
3. New energy, enthusiasm and perspectives applied to community work
4. Enhanced community-university relations.

SUGGESTIVE LIST OF PROGRAMS UNDER COMMUNITY SERVICE PROJECT

The following the recommended list of projects for Engineering students. The lists are not exhaustive and open for additions, deletions and modifications. Colleges are expected to focus on specific local issues for this kind of projects. The students are expected to carry out these projects with involvement, commitment, responsibility and accountability. The mentors of a group of students should take the responsibility of motivating, facilitating, and guiding the students. They have to interact with local leadership and people and appraise the objectives and benefits of this kind of projects. The project reports shall be placed in the college website for reference. Systematic, Factual, methodical and honest reporting shall be ensured.

For Engineering Students

1. Water facilities and drinking water availability
2. Health and hygiene
3. Stress levels and coping mechanisms
4. Health intervention programs
5. Horticulture
6. Herbal plants
7. Botanical survey
8. Zoological survey
9. Marine products
10. Aqua culture
11. Inland fisheries
12. Animals and species
13. Nutrition
14. Traditional health care methods
15. Food habits
16. Air pollution
17. Water pollution
18. Plantation
19. Soil protection

20. Renewable energy
21. Plant diseases
22. Yoga awareness and practice
23. Health care awareness programs and their impact
24. Use of chemicals on fruits and vegetables
25. Organic farming
26. Crop rotation
27. Floury culture
28. Access to safe drinking water
29. Geographical survey
30. Geological survey
31. Sericulture
32. Study of species
33. Food adulteration
34. Incidence of Diabetes and other chronic diseases
35. Human genetics
36. Blood groups and blood levels
37. Internet Usage in Villages
38. Android Phone usage by different people
39. Utilization of free electricity to farmers and related issues
40. Gender ration in schooling level- observation.

Complimenting the community service project, the students may be involved to take up some awareness campaigns on social issues/special groups. The suggested list of programs are;

Programs for School Children

1. Reading Skill Program (Reading Competition)
2. Preparation of Study Materials for the next class.
3. Personality / Leadership Development
4. Career Guidance for X class students
5. Screening Documentary and other educational films
6. Awareness Program on Good Touch and Bad Touch (Sexual abuse)
7. Awareness Program on Socially relevant themes.

Programs for Women Empowerment

1. Government Guidelines and Policy Guidelines
2. Womens' Rights
3. Domestic Violence
4. Prevention and Control of Cancer
5. Promotion of Social Entrepreneurship

General Camps

1. General Medical camps
2. Eye Camps
3. Dental Camps
4. Importance of protected drinking water
5. ODF awareness camp
6. Swatch Bharat
7. AIDS awareness camp
8. Anti Plastic Awareness
9. Programs on Environment
10. Health and Hygiene
11. Hand wash programs
12. Commemoration and Celebration of important days

Programs for Youth Empowerment

1. Leadership
2. Anti-alcoholism and Drug addiction
3. Anti-tobacco
4. Awareness on Competitive Examinations
5. Personality Development

Common Programs

1. Awareness on RTI
2. Health intervention programs
3. Yoga
4. Tree plantation
5. Programs in consonance with the Govt. Departments like –
 - i. Agriculture
 - ii. Health
 - iii. Marketing and Cooperation
 - iv. Animal Husbandry
 - v. Horticulture
 - vi. Fisheries
 - vii. Sericulture
 - viii. Revenue and Survey
 - ix. Natural Disaster Management
 - x. Irrigation
 - xi. Law & Order
 - xii. Excise and Prohibition
 - xiii. Mines and Geology
 - xiv. Energy

Role of Students:

1. Students may not have the expertise to conduct all the programs on their own. The students then can play a facilitator role.
2. For conducting special camps like Health related, they will be coordinating with the Governmental agencies.
3. As and when required the College faculty themselves act as Resource Persons.
4. Students can work in close association with Non-Governmental Organizations like Lions Club, Rotary Club, etc or with any NGO actively working in that habitation.
5. And also, with the Governmental Departments. If the program is rolled out, the District Administration could be roped in for the successful deployment of the program.
6. An in-house training and induction program could be arranged for the faculty and participating students, to expose them to the methodology of Service Learning.

Timeline for the Community Service Project Activity

Duration: 8 weeks

1. Preliminary Survey (One Week)

- a) A preliminary survey including the socio-economic conditions of the allotted habitation to be conducted.
- b) A survey form based on the type of habitation to be prepared before visiting the habitation with the help of social sciences faculty. (However, a template could be designed for different habitations, rural/urban.
- c) The Governmental agencies, like revenue administration, corporation and municipal authorities and village secretariats could be aligned for the survey.

2. ***Community Awareness Campaigns (Two Weeks)***

Based on the survey and the specific requirements of the habitation, different awareness campaigns and programs to be conducted, spread over two weeks of time. The list of activities suggested could be taken into consideration.

3. ***Community Immersion Program (Four Weeks)***

Along with the Community Awareness Programs, the student batch can also work with any one of the below listed governmental agencies and work in tandem with them. This community involvement program will involve the students in exposing themselves to the experiential learning about the community and its dynamics. Programs could be in consonance with the Govt. Departments.

4. ***Community Exit Report (One Week)***

During the last week of the Community Service Project, a detailed report of the outcome of the 8 weeks works to be drafted and a copy shall be submitted to the local administration. This report will be a basis for the next batch of students visiting that particular habitation. The same report submitted to the teacher-mentor will be evaluated by the mentor and suitable marks are awarded for onward submission to the Institution.

Throughout the Community Service Project, a daily log-book need to be maintained by the students batch, which should be countersigned by the governmental agency representative and the teacher-mentor, who is required to periodically visit the students and guide them.

MALPRACTICES RULES
DISCIPLINARY ACTION FOR / IMPROPER CONDUCT IN EXAMINATIONS

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

	other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	
7.	Leaves the exam hall taking away answer script or intentionally tears the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all Institution examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
8.	Possess any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat.
9.	If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the colleges expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the College will be handed over to police and, a police case will be registered against them.
10.	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year.
11.	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester/year examinations.
12.	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the Institution for further action and impose suitable punishment.	

Malpractices identified by squad or special invigilators

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

* * * * *



Ragging

Prohibition of ragging in educational institutions Act 26 of 1997

Salient Features

Ragging within or outside any educational institution is prohibited.

Ragging means doing an act which causes or is likely to cause Insult or Annoyance of Fear or Apprehension or Threat or Intimidation or outrage of modesty or Injury to a student.

ABSOLUTELY NO TO RAGGING

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

IN CASE OF ANY EMERGENCY CALL:9392522444

LET US MAKE BVC ENGINEERING COLLEGE(AUTONOMOUS)
AS A RAGGING FREE INSTITUTE



Ragging

Prohibition of Ragging in Educational Institutions Act 26 of 1997

Salient Features

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

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

IN CASE OF ANY EMERGENCY CALL:9392522444

LET US MAKE BVC ENGINEERING COLLEGE(AUTONOMOUS)
AS A RAGGING FREE INSTITUTE



PROCEEDINGS OF THE
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, KAKINADA
KAKINADA-533003, Andhra Pradesh (India)

Proc. No. JNTUK/DAP/CSP/Distribution of Credits /2022

Date: 24.09.2022

Sub: JNTUK – Academic Planning – Community Service Project – Distribution of Credits – Orders – Issued.

Ref: 1. APSCHE Guidelines for Community Service Project.
2. Note orders of the Hon'ble Vice Chancellor, JNTUK

ORDER:

In the ref (1) read above, the APSCHE has introduced Community Service Project for 180 hours leading to 4 Credits to all the Undergraduate courses which is mandatory and issued the Guidelines.

In this connection, the final project work is supposed to address the needs of the society. As the student has exposure to the society for 180 hours during the Community Service Project, he/she may be awarded 4 credits to CSP and the credits to the final year project be reduced by 4 credits so that the total credits is limited to 160.

In view of the above, the Hon'ble Vice-Chancellor, JNTUK is pleased to accord permission to award 4 credits to CSP by reducing the same credits in the final year project so that the total credits is limited to 160.


REGISTRAR
REGISTRAR

J.N.T. University Kakinada
Kakinada-533003

To
The Director of Evaluation, JNTUK, Kakinada.
Copy to the All the Principals of the constituent & Affiliated Colleges, JNTUK.
Copy to the Secretary to Hon'ble Vice-Chancellor, JNTUK Kakinada.
Copy to PA to the Rector, JNTUK.
Copy to PA to the Registrar, JNTUK.
Copy to the Director, Academic Planning, JNTUK Kakinada
Copy to the Director, Academic Audit, JNTUK.



**BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE
(AUTONOMOUS)**

ODALAREVU – 533 210, Andhra Pradesh, India

**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
COURSE STRUCTURE – BR20
For U.G – B.Tech – *ARTIFICIAL INTELLIGENCE AND MACHINE
LEARNING***

I Year – I SEMESTER

1	20ES1T01	Basic Electrical and Electronics Engineering	3	0	0	3
2	20BS1T01	Linear Algebra & Differential Equations	3	0	0	3
3	20BS1T07	Applied Chemistry	3	0	0	3
4	20ES1T05	Programming for Problem Solving I	3	0	0	3
5	20ES1L07	Computer Engineering Workshop Lab	2	0	2	3
6	20ES1L01	Basic Electrical and Electronics Engineering Lab	0	1	2	1.5
7	20BS1L03	Applied Chemistry Lab	0	0	3	1.5
8	20ES1L08	Programming for Problem Solving I Lab	0	0	3	1.5
	20HS1M01	*Induction Training	3	0	0	0
Total Credits			16	1		19.5

	<i>online</i>	<i>online</i>		<i>online</i>	
Dr. K V Ramana, Professor of CSE, UCEK, JNTUK.	Dr. Jimson Mathew Accos. Professor of CSE IIT Patna.	Dr. B D Sahoo Professor of CSE NIT Rourkela.	Mr. K Rambabu, Director, Monster India Pvt. Ltd. Bengaluru.	Dr. S Rao Chintalapudi, Professor & HoD, CSE(AI&ML) CMRTC, Hyd	Dr. G Jena Professor & HoD Of CSE.
University Expert	External Expert	External Expert	Industry Expert	Alumni	Chairman - BoS



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COURSE STRUCTURE – BR20
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LEARNING***

I Year – II SEMESTER

S. No	Course Code	Subjects	L	T	P	Credits
1	20HS2T01	English	3	0	0	3
2	20BS2T02	Integral Transforms and Calculus	3	0	0	3
3	20ES2T04	Engineering Drawing	2	0	2	3
4	20BS2T05	Applied Physics	3	0	0	3
5	20ES2T 06	Programming for Problem Solving 2	3	0	0	3
6	20BS2L01	Applied Physics Lab	0	0	3	1.5
7	20ES2L09	Programming for Problem Solving 2 Lab	0	0	3	1.5
8	20HS2L01	English Communication Skills Lab	0	0	3	1.5
	20HS2M02	* Indian Constitution	2	0	0	0
Total Credits			17	1	8	19.5

Dr. K V Ramana, Professor of CSE, UCEK, <i>Boch</i> JNTUK.	Dr. Jimson Mathew Accos. Professor of CSE IIT Patna.	Dr. B D Sahoo Professor of CSE NIT Rourkela.	Mr. K Rambabu, Director, Monster India Pvt. Ltd. Bengaluru.	Dr. S Rao Chintalapudi, Professor & HoD, CSE(AI&ML) CMRTC, Hyd	Dr. G Jena Professor & HoD Of CSE.
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For U.G – B.Tech – *ARTIFICIAL INTELLIGENCE AND MACHINE
LEARNING***

II Year – I SEMESTER

S.No	Course Code	Courses	L	T	P	Credits
1	20BS3T03	Probability and Statistics	3	0	0	3
2	20HS3T02	Managerial Economics and Financial Analysis	3	0	0	3
3	20ML3T01	Computer Organization	3	0	0	3
4	20CS3T04	Python Programming	3	0	0	3
5	20CS3T05	Digital Logic Design	3	0	0	3
6	20ML3L01	Unix and Shell Programming Lab	3	0	0	1.5
7	20CS3L07	Python Programming Lab	0	0	3	1.5
8	20CS3L03	R Programming Lab	0	0	3	1.5
9	20CS3S01	Skill Oriented Course - Java Script	1	0	2	2
	20BS3M03	Environmental Science	2	0	0	0
Total			21	0	8	21.5

	<i>online</i>	<i>online</i>	<i>OK</i>	<i>OK</i>	<i>OK</i>
Dr. K V Ramana, Professor of CSE, UCEK, JNTUK.	Dr. Jimson Mathew Accos. Professor of CSE IIT Patna.	Dr. B D Sahoo Professor of CSE NIT Rourkela.	Mr. K Rambabu, Director, Monster India Pvt. Ltd. Bengaluru.	Dr. S Rao Chintalapudi, Professor & HoD, CSE(AI&ML) CMRTC, Hyd	Dr. G Jena Professor & HoD Of CSE.
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II Year – II SEMESTER

S.No	Course Code	Courses	L	T	P	Credits
1	20BS4T04	Numerical Methods and Complex Variables	3	0	0	3
2	20CS4T06	Java Programming	3	0	0	3
3	20AD4T02	Data Science	3	0	0	3
4	20CS4T07	Operating Systems	3	0	0	3
5	20CS4T08	Mathematical Foundations of Computer Science	3	0	0	3
6	20CS4L07	Java Programming Lab	0	0	3	1.5
7	20CS4L09	Operating Systems Lab	0	0	3	1.5
8	20AD4L02	Data Science Lab	0	0	3	1.5
9	20CS4S02	Skill Oriented Course - MongoDB	1	0	2	2
Total			16	0	11	21.5

	<i>online</i>	<i>online</i>			
Dr. K V Ramana, Professor of CSE, UCEK, JNTUK.	Dr. Jimson Mathew Accos. Professor of CSE IIT Patna.	Dr. B D Sahoo Professor of CSE NIT Rourkela.	Mr. K Rambabu, Director, Monster India Pvt. Ltd. Bengaluru.	Dr. S Rao Chintalapudi, Professor & HoD, CSE(AI&ML) CMRTC, Hyd	Dr. G Jena Professor & HoD Of CSE.
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III Year – I SEMESTER

S.No	Course Code	Courses	L	T	P	Credits
1	20CS5T03	Computer Networks	3	0	0	3
2	20AD5T04	Machine Learning	3	0	0	3
3	20CS5T11	Data Base Management System	3	0	0	3
4	20ML5E01 20CS5E02 20CE5E01 20ME5E01	Open Elective- I 1. Artificial Intelligence 2. Object Oriented Programming 3. Interior Space Design 4. Industrial Automation and Robotics	3	0	0	3
5	20CS5D01 20CS5D03 20AD5D03 20AD5D03	Professional Elective- I 1. Computer Graphics 2. Software Engineering 3. Object Oriented Analysis and Design 4. DevOps/MOOCs -I	3	0	0	3
6	20CS5L12	DBMS Lab	0	0	3	1.5
7	20AD5L03	Machine Learning Lab	0	0	3	1.5
8	20CS5P01	Summer Internship	0	0	3	1.5
9	20AD5S01	Skill Advanced Course: Continuous Integration and Continuous Delivery using DevOps	1	0	2	2
10	20HS5M04	Foreign Language	2	0	0	0
Total			18	0	11	21.5

Dr. K V Ramana, Professor of CSE, UCEK, JNTUK.	Dr. Jimson Mathew Accos. Professor of CSE IIT Patna.	Dr. B D Sahoo Professor of CSE NIT Rourkela.	Mr. K Rambabu, Director, Monster India Pvt. Ltd. Bengaluru.	Dr. S Rao Chintalapudi, Professor & HoD, CSE(AI&ML) CMRTC, Hyd	Dr. G Jena Professor & HoD Of CSE.
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III Year – II SEMESTER

S.No	Course Code	Courses	L	T	P	Credits
1	20CS6T12	Compiler Design	3	0	0	3
2	20CS6T13	Data Mining and Data Warehousing	3	0	0	3
3	20AD6T05	Deep Learning	3	0	0	3
4	20AD6D04 20AD6D05 20CS6D07 20AD6D06	Professional Elective -II 1. Design and Analysis of Algorithms 2. Software Project Management 3. Distributed Systems 4. Data Wrangling in Data Science/MOOCs-2	3	0	0	3
5	20CS6E03 20ME6E02 20CE6E02 20EC6E02	Open Elective- II 1. Mean Stack Development 2. Operations Research 3. Green Building 4. <i>Micro Controller & Applications</i> <i>Gru</i>	2	0	2	3
6	20CS6L13	Compiler Design Lab	0	0	3	1.5
7	20CS6L14	Data Mining Lab	0	0	3	1.5
8	20AD6L04	Deep Learning with Tensorflow Lab	0	0	3	1.5
9	20CS6S04	Skill Advanced course: Game Development	1	0	2	2
10	20HS6M05	Universal Human Values	2	0	0	0
Total			17	0	13	21.5

<i>K. V. Ramana</i> Dr. K V Ramana, Professor of CSE, UCEK, JNTUK. <i>Reclor</i>	<i>online</i> Dr. Jimson Mathew Accos. Professor of CSE IIT Patna.	<i>online</i> Dr. B D Sahoo Professor of CSE NIT Rourkela.	<i>OK Ramana</i> Mr. K Rambabu, Director, Monster India Pvt. Ltd. Bengaluru.	<i>ad</i> Dr. S Rao Chintalapudi, Professor & HoD, CSE(AI&ML) CMRTC, Hyd	<i>G</i> Dr. G Jena Professor & HoD Of CSE.
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**For U.G – B.Tech – *ARTIFICIAL INTELLIGENCE AND
MACHINE LEARNING***

IV Year – I SEMESTER

S.No	Course Code	Courses	L	T	P	Credits
1	20CS7D09 20AD7D07 20AD7D08 20AD7D09	Professional Elective-III 1. Cryptography and Network Security 2 Reinforcement Learning 3. Social Media Analytics 4. Block Chain Technologies/MOOCs-3	3	0	0	3
2	20CS7D13 20CS7D16 20AD7D10 20AD7D11	Professional Elective-IV 1. Software Testing Methodologies 2. Computer Vision 3. Adhoc and Sensor Networks 4. NOSQL Databases/MOOCs-4	3	0	0	3
3	20AD7D12 20AD7D13 20AD7D14 20AD7D15	Professional Elective-V 1. Social Network Analysis 2. Recommender Systems 3. AI Chatbots 4. Data Visualization/MOOCs-5	3	0	0	3
4	20CS7E04 20CE7E03 20EC7E03 20EE7E03	Open Elective -III 1. Nature Inspired Computing Techniques 2. Disaster Management 3. Embedded Systems 4. Electrical Distribution Systems	2	0	2	3
5	20CS7E05 20EC7E04 20ME7E04 20CE7E04	Open Elective- IV 1. Secure Coding Techniques 2. 5G Communications 3. 3D Printing Technologies 4. Project Management	2	0	2	3
6	20HS7E01	Humanity and Social Science Elective 1. Resource Management 2. Industrial Management 3. Management Science 4. IPR and Patents	3	0	0	3
7	20HS7S01	English for Employability	1	0	2	2
8	20CS7P02	Industrial/Research Internship 2 months after III_I Evaluated during IV_I	0	0	0	3
Total			17	0	6	23

Dr. R V Ramana, Professor of CSE, UCEK, JNTUK.	Dr. Jimson Mathew Accos. Professor of CSE IIT Patna.	Dr. B D Sahoo Professor of CSE NIT Rourkela.	Mr. K Rambabu, Director, Monster India Pvt. Ltd. Bengaluru.	Dr. S Rao Chintalapudi, Professor & HoD, CSE(AI&ML) CMRTC, Hyd	Dr. G Jena Professor & HoD Of CSE.
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BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE
ODALAREVU – 533 210, Andhra Pradesh, India

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

DETAILED SYLLABUS FOR BR20

UG: B.Tech COMPUTER SCIENCE AND ENGINEERING (ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING) & ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

Revised Course Structure for IV B.Tech II Semester

Sl. No	Course Category	Course Code	Course Title	Hours per Week			Credits
				L	T	P	C
1	Major Project	20ML8P03	Project Work, Seminar and Internship in Industry	0	0	16	8
2	Project	20BS8P04	Community Service Project	0	0	8	4
Total Credits							12

<i>online</i>	<i>online</i>	<i>online</i>	<i>online</i>	<i>online</i>	<i>PSR</i>
Dr K V Ramana, Professor of CSE. UCEK, JNTUK Kakinada.	Dr. Jimson Mathew, Professor of CSE, IIT Patna.	Dr. B D Sahoo, Professor of CSE, NIT Rourkela.	Mr. K Rambabu, Director, Monster India Pvt, Bangalore.	Dr. S Rao Chintalapudi, Professor and HoD, CSE(AIML) CMR Technical Campus, Hyderabad.	Dr. P. Subba Rao, Professor of CSE(AI&ML)/ AI&ML, BVCEC.

Head of the
CAD, AIML & CSM
 BVC Engineering College, Odalarevu
 East Godavari, A.P. 533 210



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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

COURSE STRUCTURE – BR20

**For U.G – B.Tech – ARTIFICIAL INTELLIGENCE AND
MACHINE LEARNING**

IV Year II Semester

S.No	Course Code	Courses	L	T	P	Credits
1	20CS8P03	Major Project Work	0	0	0	12
Total			0	0	0	12

Dr. R V Ramana, Professor of CSE, UCEK, JNTUK.	Dr. Jimson Mathew Accos, Professor of CSE IIT Patna.	Dr. B D Sahoo Professor of CSE NIT Rourkela.	Mr. K Rambabu, Director, Monster India Pvt. Ltd. Bengaluru.	Dr. S Rao Chintalapudi, Professor & HoD, CSE(AI&ML) CMRTC, Hyd	Dr. G Jena Professor & HoD Of CSE.
University Expert	External Expert	External Expert	Industry Expert	Alumni	Chairman - BoS

CSE(AI&DS)

BVCEC- Request for Approval of Course Structure for IV B.Tech II Semester

6 messages

Wed, Apr 3, 2024 at 2:32 PM

HoD CAD <hodcad.bvce@bvcgroup.in>

To: Jimson Mathew <jimson@iitp.ac.in>, "N. Ramakrishnaiah" <nkrishna27@gmail.com>, vamsivihar@jntucek.ac.in, chapram@nitw.ac.in, bdsahu@nitrl.ac.in, Subhash Ch <srao.chintalapudi@gmail.com>, kanugula.rambabu@monsterindia.com, Venkata Ramana Kurama <vamsivihar@gmail.com>

Respected Sir(s)

we have approved the course structure for BR20 Regulations for the Department of Computer Science and Engineering of BVC Engineering College, Odalarevu and the same is attached herewith for your kind perusal. As per the directions of our affiliated university (JNTUK Kakinada) and Andhra Pradesh state council of higher education, we need to incorporate community service project in the final semester of B.Tech. Hence all members of BoS-CSE need to approve the same. Hence I request you to kindly give your approval for the same through this mail.

I am here with the attached Course structure already ratified, proposed change of final semester course structure and Circular issued by the University.

Thank you Sir.

4 attachments

 BR20_CSE(AI&DS)_ Revised CourseStructure for 4_2.doc
97K

 JNTUK Circular.pdf
223K

 AIML BR 20 Course Structure.pdf
2922K

 CSE(AI&DS)BR 20 Course structure.pdf
3199K

Wed, Apr 3, 2024 at 2:40 PM

Sudhakar Ch <chapram@nitw.ac.in>

To: HoD CAD <hodcad.bvce@bvcgroup.in>

Respected sir,
Modified course structure is approved.

Prof. Chapram Sudhakar
Professor, Department of CSE,
National Institute of Technology,
Warangal - 506 004
Telangana, INDIA
email: chapram@nitw.ac.in; sudhakarchapram@gmail.com; sudhakarchapram@yahoo.co.in;
Phone: 0870-2462731 (O), 9440647945 (M)

[Quoted text hidden]

Wed, Apr 3, 2024 at 6:02 PM

N. Ramakrishnaiah <nkrishna27@gmail.com>

To: HoD CAD <hodcad.bvce@bvcgroup.in>

Sir,
Approved from my side...

with Thanks & Regards,
Dr. N. RAMAKRISHNAIAH
B.Tech., M.Tech., Ph.D.
Professor of Computer Science & Engineering
University College of Engineering Kakinada (A)
Jawaharlal Nehru Technological University Kakinada
Kakinada - 533003, Andhra Pradesh, India
Mobile No: + 91 9652730019

On Wed, Apr 3, 2024 at 2:33 PM HoD CAD <hodcad.bvce@bvcgroup.in> wrote:

[Quoted text hidden]

Thu, Apr 4, 2024 at 7:57 AM

Jimson Mathew <jimson@iitp.ac.in>

To: HoD CAD <hodcad.bvce@bvcgroup.in>

Treat this as consent

Get Outlook for iOS

From: HoD CAD <hodcad.bvce@bvcgroup.in>

Sent: Wednesday, April 3, 2024 2:32:45 PM

To: Jimson Mathew <jimson@iitp.ac.in>; N. Ramakrishnaiah <nkrishna27@gmail.com>; vamsivihar@jntucek.ac.in <vamsivihar@jntucek.ac.in>; chapram@nitw.ac.in <chapram@nitw.ac.in>; bdsahu@nitrl.ac.in <bdsahu@nitrl.ac.in>; Subhash Ch <srao.chintalapudi@gmail.com>; kanugula.rambabu@monsterindia.com <kanugula.rambabu@monsterindia.com>; Venkata Ramana Kurama <vamsivihar@gmail.com>

Subject: BVCEC- Request for Approval of Course Structure for IV B.Tech II Semester

[Quoted text hidden]

Thu, Apr 4, 2024 at 9:22 AM

Subhash Ch <srao.chintalapudi@gmail.com>

To: HoD CAD <hodcad.bvce@bvcgroup.in>

Dear Sir,

I approve allocating 4 credits to the Community Service Project in the Final Year.

Thanking you sir,

On Wed, Apr 3, 2024 at 2:33 PM HoD CAD <hodcad.bvce@bvcgroup.in> wrote:

[Quoted text hidden]

With Regards,

Dr. S Rao Chintalapudi

B.Tech,M.Tech, Ph.D (FullTime-JNTUK), LMCSI

Professor & HoD,

Department of CSE (AI&ML),

CMR Technical Campus (Autonomous),

Kandlakoya (V), Hyderabad

Mobile No: +91-9949379392/9014668066

website: <https://sites.google.com/site/sraochintalapudi>

HoD CAD <hodcad.bvce@bvcgroup.in>

Fri, Apr 19, 2024 at 10:17 AM

To: Subhash Ch <srao.chintalapudi@gmail.com>, chapram@nitw.ac.in, Jimson Mathew <jimson@iitp.ac.in>, bdsahu@nitrkl.ac.in, kanugula.rambabu@monsterindia.com

Respected Sir(s)

we have approved the course structure for BR20 Regulations for the Department of Computer Science and Engineering (CSE(AI&DS), AI&ML, CSE(AI&ML)) of BVC Engineering College, Odalarevu and the same is attached herewith for your kind perusal. As per the directions of our affiliated university (JNTUK Kakinada) and Andhra Pradesh state council of higher education, we need to incorporate community service project in the final semester of B.Tech. Hence all members of BoS-CSE(AI&DS), AI&ML, CSE(AI&ML) need to approve the same. Hence I request you to kindly give your approval for the same through this mail.

[Quoted text hidden]

5 attachments

-  BR20_CSE(AI&DS)_ Revised CourseStructure for 4_2.doc
97K
-  JNTUK Circular.pdf
223K
-  AIML BR 20 Course Structure.pdf
2922K
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3199K
-  BR20_AI&ML_CSE(AI&ML)_ Revised CourseStructure for 4_2.docx
67K

BVCEC- Request for Approval of Course Structure for IV B.Tech II Semester

8 messages

HoD CAD <hodcad.bvce@bvcgroup.in>

Wed, Apr 3, 2024 at 2:32 PM

To: Jimson Mathew <jimson@iitp.ac.in>, "N. Ramakrishnaiah" <nkrishna27@gmail.com>, vamsivihar@jntucek.ac.in, chapram@nitw.ac.in, bdsahu@nitrkl.ac.in, Subhash Ch <srao.chintalapudi@gmail.com>, kanugula.rambabu@monsterindia.com, Venkata Ramana Kurama <vamsivihar@gmail.com>

Respected Sir(s)

we have approved the course structure for BR20 Regulations for the Department of Computer Science and Engineering of BVC Engineering College, Odalarevu and the same is attached herewith for your kind perusal. As per the directions of our affiliated university (JNTUK Kakinada) and Andhra Pradesh state council of higher education, we need to incorporate community service project in the final semester of B.Tech. Hence all members of BoS-CSE need to approve the same. Hence I request you to kindly give your approval for the same through this mail.

I am here with the attached Course structure already ratified, proposed change of final semester course structure and Circular issued by the University.

Thank you Sir.

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2922K **CSE(AI&DS)BR 20 Course structure.pdf**
3199K

Sudhakar Ch <chapram@nitw.ac.in>

Wed, Apr 3, 2024 at 2:40 PM

To: HoD CAD <hodcad.bvce@bvcgroup.in>

Respected sir,

Modified course structure is approved.

Prof. Chapram Sudhakar

Professor, Department of CSE,

National Institute of Technology,

Warangal - 506 004

Telangana, INDIA

email: chapram@nitw.ac.in; sudhakarchapram@gmail.com; sudhakarchapram@yahoo.co.in;

Phone: 0870-2462731 (O), 9440647945 (M)

On Wed, Apr 3, 2024 at 2:33 PM HoD CAD <hodcad.bvce@bvcgroup.in> wrote:

Respected Sir(s)

we have approved the course structure for BR20 Regulations for the Department of Computer Science and Engineering of BVC Engineering College, Odalarevu and the same is attached herewith for your kind perusal. As per the directions of our affiliated university (JNTUK Kakinada) and Andhra Pradesh state council of higher education, we need to incorporate community service project in the final semester of B.Tech. Hence all members of BoS-CSE need to approve the same. Hence I request you to kindly give your approval for the same through this mail.

I am here with the attached Course structure already ratified, proposed change of final semester course structure and Circular issued by the University.

Thank you Sir.

N. Ramakrishnaiah <nkrishna27@gmail.com>

Wed, Apr 3, 2024 at 6:02 PM

To: HoD CAD <hodcad.bvce@bvcgroup.in>

Sir,

Approved from my side...

with Thanks & Regards,

Dr. N. RAMAKRISHNAIAH

B.Tech., M.Tech., Ph.D.

Professor of Computer Science & Engineering

University College of Engineering Kakinada (A)

Jawaharlal Nehru Technological University Kakinada

Kakinada - 533003, Andhra Pradesh, India

Mobile No: + 91 9652730019

On Wed, Apr 3, 2024 at 2:33 PM HoD CAD <hodcad.bvce@bvcgroup.in> wrote:

Respected Sir(s)

we have approved the course structure for BR20 Regulations for the Department of Computer Science and Engineering of BVC Engineering College, Odalarevu and the same is attached herewith for your kind perusal. As per the directions of our affiliated university (JNTUK Kakinada) and Andhra Pradesh state council of higher education, we need to incorporate community service project in the final semester of B.Tech. Hence all members of BoS-CSE need to approve the same. Hence I request you to kindly give your approval for the same through this mail.

I am here with the attached Course structure already ratified, proposed change of final semester course structure and Circular issued by the University.

Thank you Sir.

Jimson Mathew <jimson@iitp.ac.in>

Thu, Apr 4, 2024 at 7:57 AM

To: HoD CAD <hodcad.bvce@bvcgroup.in>

Treat this as consent

Get Outlook for iOS

From: HoD CAD <hodcad.bvce@bvcgroup.in>
Sent: Wednesday, April 3, 2024 2:32:45 PM
To: Jimson Mathew <jimson@iitp.ac.in>; N. Ramakrishnaiah <nkrishna27@gmail.com>; vamsivihar@jntucek.ac.in <vamsivihar@jntucek.ac.in>; chapram@nitw.ac.in <chapram@nitw.ac.in>; bdsahu@nitrkl.ac.in <bdsahu@nitrkl.ac.in>; Subhash Ch <srao.chintalapudi@gmail.com>; kanugula.rambabu@monsterindia.com <kanugula.rambabu@monsterindia.com>; Venkata Ramana Kurama <vamsivihar@gmail.com>
Subject: BVCEC- Request for Approval of Course Structure for IV B.Tech II Semester

Respected Sir(s)

we have approved the course structure for BR20 Regulations for the Department of Computer Science and Engineering of BVC Engineering College, Odalarevu and the same is attached herewith for your kind perusal. As per the directions of our affiliated university (JNTUK Kakinada) and Andhra Pradesh state council of higher education, we need to incorporate community service project in the final semester of B.Tech. Hence all members of BoS-CSE need to approve the same. Hence I request you to kindly give your approval for the same through this mail.

I am here with the attached Course structure already ratified, proposed change of final semester course structure and Circular issued by the University.

Thank you Sir.

Subhash Ch <srao.chintalapudi@gmail.com>
To: HoD CAD <hodcad.bvce@bvcgroup.in>

Thu, Apr 4, 2024 at 9:22 AM

Dear Sir,

I approve allocating 4 credits to the Community Service Project in the Final Year.

Thanking you sir,

On Wed, Apr 3, 2024 at 2:33 PM HoD CAD <hodcad.bvce@bvcgroup.in> wrote:

Respected Sir(s)

we have approved the course structure for BR20 Regulations for the Department of Computer Science and Engineering of BVC Engineering College, Odalarevu and the same is attached herewith for your kind perusal. As per the directions of our affiliated university (JNTUK Kakinada) and Andhra Pradesh state council of higher education, we need to incorporate community service project in the final semester of B.Tech. Hence all members of BoS-CSE need to approve the same. Hence I request you to kindly give your approval for the same through this mail.

I am here with the attached Course structure already ratified, proposed change of final semester course structure and Circular issued by the University.

Thank you Sir.

With Regards,

Dr. S Rao Chintalapudi

B.Tech, M.Tech, Ph.D (FullTime-JNTUK), LMCSI

Professor & HoD,

Department of CSE (AI&ML),

CMR Technical Campus (Autonomous),

Kandlakoya (V), Hyderabad

Mobile No: +91-9949379392/9014668066

website: <https://sites.google.com/site/sraochintalapudi>

HoD CAD <hodcad.bvce@bvcgroup.in>

Fri, Apr 19, 2024 at 10:17 AM

To: Subhash Ch <srao.chintalapudi@gmail.com>; chapram@nitw.ac.in; Jimson Mathew <jimson@iitp.ac.in>; bdsahu@nitrkl.ac.in; kanugula.rambabu@monsterindia.com

Respected Sir(s)

we have approved the course structure for BR20 Regulations for the Department of Computer Science and Engineering (CSE(AI&DS), AI&ML, CSE(AI&ML)) of BVC Engineering College, Odalarevu and the same is attached herewith for your kind perusal. As per the directions of our affiliated university (JNTUK Kakinada) and Andhra Pradesh state council of higher education, we need to incorporate community service project in the final semester of B.Tech. Hence all members of BoS-CSE(AI&DS), AI&ML, CSE(AI&ML) need to approve the same. Hence I request you to kindly give your approval for the same through this mail.

I am here with the attached Course structure already ratified, proposed change of final semester course structure and Circular issued by the University.

Thank you Sir.

5 attachments

 BR20_CSE(AI&DS)_ Revised CourseStructure for 4_2.doc
97K

 JNTUK Circular.pdf
223K

 AIML BR 20 Course Structure.pdf
2922K

 CSE(AI&DS)BR 20 Course structure.pdf
3199K

 BR20_AI&ML_CSE(AI&ML)_ Revised CourseStructure for 4_2.docx
67K

Sudhakar Ch <chapram@nitw.ac.in>

Fri, Apr 19, 2024 at 10:20 AM

To: HoD CAD <hodcad.bvce@bvcgroup.in>

Modified course structure is approved.

Prof. Chapram Sudhakar

Professor, Department of CSE,

National Institute of Technology,

Warangal - 506 004

Telangana, INDIA

email: chapram@nitw.ac.in; sudhakarchapram@gmail.com; sudhakarchapram@yahoo.co.in;

Phone: 0870-2462731 (O), 9440647945 (M)

On Fri, Apr 19, 2024 at 10:17 AM HoD CAD <hodcad.bvce@bvcgroup.in> wrote:

Respected Sir(s)

we have approved the course structure for BR20 Regulations for the Department of Computer Science and Engineering (CSE(AI&DS), AI&ML, CSE(AI&ML)) of BVC Engineering College, Odalarevu and the same is attached herewith for your kind perusal. As per the directions of our affiliated university (JNTUK kakinada) and Andhra Pradesh state council of higher education, we need to incorporate community service project in the final semester of B.Tech. Hence all members of BoS-CSE(AI&DS), AI&ML, CSE(AI&ML) need to approve the same. Hence I request you to kindly give your approval for the same through this mail.

I am here with the attached Course structure already ratified, proposed change of final semester course structure and Circular issued by the University.

Thank you Sir.

Jimson Mathew <jimson@iitp.ac.in>
To: HoD CAD <hodcad.bvce@bvcgroup.in>

Fri, Apr 19, 2024 at 10:22 AM

Treat this as consent.

Dr. Jimson Mathew
Professor
Dept of Computer Science and Engg.
Indian Institute of Technology Patna,
Patna 801106
+91- 6115233347 (office)
+91-9110956262 (mob)

From: HoD CAD <hodcad.bvce@bvcgroup.in>
Sent: Friday, April 19, 2024 10:17 AM
To: Subhash Ch; chapram@nitw.ac.in; Jimson Mathew; bdsahu@nitrkl.ac.in; kanugula.rambabu@monsterindia.com
Subject: Fwd: BVCEC- Request for Approval of Course Structure for IV B.Tech II Semester

Respected Sir(s)

we have approved the course structure for BR20 Regulations for the Department of Computer Science and Engineering (CSE(AI&DS), AI&ML, CSE(AI&ML)) of BVC Engineering College, Odalarevu and the same is attached herewith for your kind perusal. As per the directions of our affiliated university (JNTUK kakinada) and Andhra Pradesh state council of higher education, we need to incorporate community service project in the final semester of B.Tech. Hence all members of BoS-CSE(AI&DS), AI&ML, CSE(AI&ML) need to approve the same. Hence I request you to kindly give your approval for the same through this mail.

I am here with the attached Course structure already ratified, proposed change of final semester course structure and Circular issued by the University.

Thank you Sir.

Good afternoon Sir.. This is from BVC

12:30 pm ✓✓

⇒ Forwarded

 **BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE**
(AUTONOMOUS)
DHANURU - 533 210, Andhra Pradesh, India

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
COURSE STRUCTURE - BR20
For U.G - B.Tech - ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
1 Year - 1 SEMESTER

⇒

AIML BR 20 Course Structure.pdf
10 pages • 3.0 MB • PDF

12:53 pm ✓✓

⇒ Forwarded

⇒  **BR20_CSE(AI&ML)_Revised CourseStructur...**
99 kB • DOC

12:53 pm ✓✓

Sir Kindly approve the Revised course structure of IV Btech II SEM of CSE(AIML).
Thank you

12:55 pm ✓✓

Approved 12:59 pm

Thank you very much sir

1:00 pm ✓✓



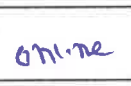
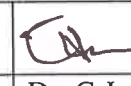
**BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE
(AUTONOMOUS)**

ODALAREVU – 533 210, Andhra Pradesh, India

**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
COURSE STRUCTURE – BR20
For U.G – B.Tech – *ARTIFICIAL INTELLIGENCE AND MACHINE
LEARNING***

I Year – I SEMESTER

1	20ES1T01	Basic Electrical and Electronics Engineering	3	0	0	3
2	20BS1T01	Linear Algebra & Differential Equations	3	0	0	3
3	20BS1T07	Applied Chemistry	3	0	0	3
4	20ES1T05	Programming for Problem Solving 1	3	0	0	3
5	20ES1L07	Computer Engineering Workshop Lab	2	0	2	3
6	20ES1L01	Basic Electrical and Electronics Engineering Lab	0	1	2	1.5
7	20BS1L03	Applied Chemistry Lab	0	0	3	1.5
8	20ES1L08	Programming for Problem Solving 1 Lab	0	0	3	1.5
	20HS1M01	*Induction Training	3	0	0	0
Total Credits			16	1		19.5

					
Dr. K V Ramana, Professor of CSE, UCEK, JNTUK.	Dr. Jimson Mathew Accos. Professor of CSE IIT Patna.	Dr. B D Sahoo Professor of CSE NIT Rourkela.	Mr. K Rambabu, Director, Monster India Pvt. Ltd. Bengaluru.	Dr. S Rao Chintalapudi, Professor & HoD, CSE(AI&ML) CMRTC, Hyd	Dr. G Jena Professor & HoD Of CSE.
University Expert	External Expert	External Expert	Industry Expert	Alumni	Chairman - BoS



**BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE
(AUTONOMOUS)**

ODALAREVU – 533 210, Andhra Pradesh, India

**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
COURSE STRUCTURE – BR20
For U.G – B.Tech – *ARTIFICIAL INTELLIGENCE AND MACHINE
LEARNING***

I Year – II SEMESTER

S. No	Course Code	Subjects	L	T	P	Credits
1	20HS2T01	English	3	0	0	3
2	20BS2T02	Integral Transforms and Calculus	3	0	0	3
3	20ES2T04	Engineering Drawing	2	0	2	3
4	20BS2T05	Applied Physics	3	0	0	3
5	20ES2T 06	Programming for Problem Solving 2	3	0	0	3
6	20BS2L01	Applied Physics Lab	0	0	3	1.5
7	20ES2L09	Programming for Problem Solving 2 Lab	0	0	3	1.5
8	20HS2L01	English Communication Skills Lab	0	0	3	1.5
	20HS2M02	* Indian Constitution	2	0	0	0
Total Credits			17	1	8	19.5

Dr. K V Ramana, Professor of CSE, UCEK, JNTUK.	Dr. Jimson Mathew Accos. Professor of CSE IIT Patna.	Dr. B D Sahoo Professor of CSE NIT Rourkela.	Mr. K Rambabu, Director, Monster India Pvt. Ltd. Bengaluru.	Dr. S Rao Chintalapudi, Professor & HoD, CSE(AI&ML) CMRTC, Hyd	Dr. G Jena Professor & HoD Of CSE.
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**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
COURSE STRUCTURE – BR20
For U.G – B.Tech – *ARTIFICIAL INTELLIGENCE AND MACHINE
LEARNING***

II Year – I SEMESTER

S.No	Course Code	Courses	L	T	P	Credits
1	20BS3T03	Probability and Statistics	3	0	0	3
2	20HS3T02	Managerial Economics and Financial Analysis	3	0	0	3
3	20ML3T01	Computer Organization	3	0	0	3
4	20BS3T02	Python Programming	3	0	0	3
5	20CS3T05	Digital Logic Design	3	0	0	3
6	20ML3L01	Unix and Shell Programming Lab	3	0	0	1.5
7	20BS3L07	Python Programming Lab	0	0	3	1.5
8	20BS3L03	R Programming Lab	0	0	3	1.5
9	20CS3S01	Skill Oriented Course - Java Script	1	0	2	2
	20BS3M03	Environmental Science	2	0	0	0
Total			21	0	8	21.5

	<i>online</i>	<i>online</i>	<i>OK Ramana</i>	<i>AL</i>	<i>CU</i>
Dr. K V Ramana, Professor of CSE, UCEK, JNTUK.	Dr. Jimson Mathew Accos. Professor of CSE IIT Patna.	Dr. B D Sahoo Professor of CSE NIT Rourkela.	Mr. K Rambabu, Director, Monster India Pvt. Ltd. Bengaluru.	Dr. S Rao Chintalapudi, Professor & HoD, CSE(AI&ML) CMRTC, Hyd	Dr. G Jena Professor & HoD Of CSE.
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**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
COURSE STRUCTURE – BR20
For U.G – B.Tech – *ARTIFICIAL INTELLIGENCE AND MACHINE
LEARNING***

II Year – II SEMESTER

S.No	Course Code	Courses	L	T	P	Credits
1	20BS4T04	Numerical Methods and Complex Variables	3	0	0	3
2	20CS4T06	Java Programming	3	0	0	3
3	20AD4T02	Data Science	3	0	0	3
4	20CS4T07	Operating Systems	3	0	0	3
5	20CS4T08	Mathematical Foundations of Computer Science	3	0	0	3
6	20CS4L07	Java Programming Lab	0	0	3	1.5
7	20CS4L09	Operating Systems Lab	0	0	3	1.5
8	20AD4L02	Data Science Lab	0	0	3	1.5
9	20CS4S02	Skill Oriented Course - MongoDB	1	0	2	2
Total			16	0	11	21.5

Dr. K V Ramana, Professor of CSE, UCEK, JNTUK.	Dr. Jimson Mathew Accos. Professor of CSE IIT Patna.	Dr. B D Sahoo Professor of CSE NIT Rourkela.	Mr. K Rambabu, Director, Monster India Pvt. Ltd. Bengaluru.	Dr. S Rao Chintalapudi, Professor & HoD, CSE(AI&ML) CMRTC, Hyd	Dr. G Jena Professor & HoD Of CSE.
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(AUTONOMOUS)**

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**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
COURSE STRUCTURE – BR20
For U.G – B.Tech – *ARTIFICIAL INTELLIGENCE AND MACHINE
LEARNING***

III Year – I SEMESTER

S.No	Course Code	Courses	L	T	P	Credits
1	20CS5T03	Computer Networks	3	0	0	3
2	20AD5T04	Machine Learning	3	0	0	3
3	20CS5T11	Data Base Management System	3	0	0	3
4	20ML5E01 20CS5E02 20CE5E01 20ME5E01	Open Elective- I 1. Artificial Intelligence 2. Object Oriented Programming 3. Interior Space Design 4. Industrial Automation and Robotics	3	0	0	3
5	20CS5D01 20CS5D03 20AD5D01 20AD5D03	Professional Elective- I 1. Computer Graphics 2. Software Engineering 3. Object Oriented Analysis and Design 4. DevOps/MOOCs -1	3	0	0	3
6	20CS5L12	DBMS Lab	0	0	3	1.5
7	20AD5L03	Machine Learning Lab	0	0	3	1.5
8	20CS5P01	Summer Internship	0	0	3	1.5
9	20AD5S01	Skill Advanced Course: Continuous Integration and Continuous Delivery using DevOps	1	0	2	2
10	20HS5M04	Foreign Language	2	0	0	0
Total			18	0	11	21.5

Dr. K V Ramana, Professor of CSE, UCEK, JNTUK.	Dr. Jimson Mathew Accos. Professor of CSE IIT Patna.	Dr. B D Sahoo Professor of CSE NIT Rourkela.	Mr. K Rambabu, Director, Monster India Pvt. Ltd. Bengaluru.	Dr. S Rao Chintalapudi, Professor & HoD, CSE(AI&ML) CMRTC, Hyd	Dr. G Jena Professor & HoD Of CSE.
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**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
COURSE STRUCTURE – BR20**

**For U.G – B.Tech – *ARTIFICIAL INTELLIGENCE AND MACHINE
LEARNING***

III Year – II SEMESTER

S.No	Course Code	Courses	L	T	P	Credits
1	20CS6T12	Compiler Design	3	0	0	3
2	20CS6T13	Data Mining and Data Warehousing	3	0	0	3
3	20AD6T05	Deep Learning	3	0	0	3
4	20AD6D04 20AD6D05 20CS6D07 20AD6D06	Professional Elective -II 1. Design and Analysis of Algorithms 2. Software Project Management 3. Distributed Systems 4. Data Wrangling in Data Science/ MOOCs-2	3	0	0	3
5	20CS6E03 20ME6E02 20CE6E02 20EC6E02	Open Elective- II 1. Mean Stack Development 2. Operations Research 3. Green Building 4. Micro Controller & Applications <i>Gu</i>	2	0	2	3
6	20CS6L13	Compiler Design Lab	0	0	3	1.5
7	20CS6L14	Data Mining Lab	0	0	3	1.5
8	20AD6L04	Deep Learning with Tensorflow Lab	0	0	3	1.5
9	20CS6S04	Skill Advanced course: Game Development	1	0	2	2
10	20HS6M05	Universal Human Values	2	0	0	0
Total			17	0	13	21.5

<i>KVR</i> Dr. K V Ramana, Professor of CSE, UCEK, JNTUK. <i>Reclor</i>	<i>online</i> Dr. Jimson Mathew Accos. Professor of CSE IIT Patna.	<i>online</i> Dr. B D Sahoo Professor of CSE NIT Rourkela.	<i>OK Rambabu</i> Mr. K Rambabu, Director, Monster India Pvt. Ltd. Bengaluru.	<i>auto</i> Dr. S Rao Chintalapudi, Professor & HoD, CSE(AI&ML) CMRTC, Hyd	<i>G</i> Dr. G Jena Professor & HoD Of CSE.
University Expert	External Expert	External Expert	Industry Expert	Alumni	Chairman - BoS



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(AUTONOMOUS)**

ODALAREVU – 533 210, Andhra Pradesh, India

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

COURSE STRUCTURE – BR20

**For U.G – B.Tech – *ARTIFICIAL INTELLIGENCE AND
MACHINE LEARNING***

IV Year – I SEMESTER

S.No	Course Code	Courses	L	T	P	Credits
1	20CS7D09 20AD7D07 20AD7D08 20AD7D09	Professional Elective-III 1. Cryptography and Network Security 2 Reinforcement Learning 3. Social Media Analytics 4. Block Chain Technologies/MOOCs-3	3	0	0	3
2	20CS7D13 20CS7D16 20AD7D10 20AD7D11	Professional Elective-IV 1. Software Testing Methodologies 2. Computer Vision 3. Adhoc and Sensor Networks 4. NOSQL Databases/MOOCs-4	3	0	0	3
3	20AD7D12 20AD7D13 20AD7D14 20AD7D15	Professional Elective-V 1. Social Network Analysis 2. Recommender Systems 3. AI Chatbots 4. Data Visualization/MOOCs-5	3	0	0	3
4	20CS7E04 20CE7E03 20EC7E03 20EE7E03	Open Elective -III 1. Nature Inspired Computing Techniques 2. Disaster Management 3. Embedded Systems 4. Electrical Distribution Systems	2	0	2	3
5	20CS7E05 20EC7E04 20ME7E04 20CE7E04	Open Elective- IV 1. Secure Coding Techniques 2. 5G Communications 3. 3D Printing Technologies 4. Project Management	2	0	2	3
6	20HS7E01	Humanity and Social Science Elective 1. Resource Management 2. Industrial Management 3. Management Science 4. IPR and Patents	3	0	0	3
7	20HS7S01	English for Employability	1	0	2	2
8	20CS7P02	Industrial/Research Internship 2 months after III_I Evaluated during IV_I	0	0	0	3
Total			17	0	6	23

Dr. K V Ramana, Professor of CSE, UCEK, JNTUK.	Dr. Jimson Mathew Accos. Professor of CSE IIT Patna.	Dr. B D Sahoo Professor of CSE NIT Rourkela.	Mr. K Rambabu, Director, Monster India Pvt. Ltd. Bengaluru.	Dr. S Rao Chintalapudi, Professor & HoD, CSE(AI&ML) CMRTC, Hyd	Dr. G Jena Professor & HoD Of CSE.
University Expert	External Expert	External Expert	Industry Expert	Alumni	Chairman - BoS



**BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE
(AUTONOMOUS)**

ODALAREVU – 533 210, Andhra Pradesh, India

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

COURSE STRUCTURE – BR20

**For U.G – B.Tech – *ARTIFICIAL INTELLIGENCE AND
MACHINE LEARNING***

IV Year II Semester

S.No	Course Code	Courses	L	T	P	Credits
1	20CS8P03	Major Project Work	0	0	0	12
Total			0	0	0	12

					
Dr. K V Ramana, Professor of CSE, UCEK, JNTUK.	Dr. Jimson Mathew Accos. Professor of CSE IIT Patna.	Dr. B D Sahoo Professor of CSE NIT Rourkela.	Mr. K Rambabu, Director, Monster India Pvt. Ltd. Bengaluru.	Dr. S Rao Chintalapudi, Professor & HoD, CSE(AI&ML) CMRTC, Hyd	Dr. G Jena Professor & HoD Of CSE.
University Expert	External Expert	External Expert	Industry Expert	Alumni	Chairman - BoS



BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE

(Autonomous)

Department of Computer Science: Artificial Intelligence and Machine Learning

Date:25-06-2022

AGENDA

1. Welcome Address by Chairman-BOS
2. Discussion on Course structures for UG Program of AIML Department (II, III & IV) and submission for approval.
3. Discussion on detailed syllabus for II, III & IV year B Tech in CS AIML and submission for approval
4. Any other item.

Sl. No	Name	Designation	Signature of Members
1	Dr. Gunamani Jena, M.E, Ph.D.	Professor and HOD, Dept. of CSE & CAD	
2	Dr B S N Murthy, M. Tech.	Associate Professor	
	Dr P Devabalan. M.E, Ph.D.	Professor	
	Mr V S Ramakrishna M. Tech.	Associate Professor	
	Mrs.BGangaBhavani. M. Tech.	Associate Professor	
	Mr P Ramesh	Assistant Professor	
3	Dr K V Ramana M. Tech., Ph.D.,	Professor, Department of CSE, UCEK JNTUK, AP	
4	Dr Jimson Mathew, M.Tech., Ph.D.,	Professor and Head, Dept. of CSE, IIT - Patna	
5	Dr B D Sahoo , M.E., Ph.D.,	Associate Professor, CSE NIT, Rourkela	
6	Mr Kanugula Rambabu M. Tech.,	Director, Infrastructure and DevOps, Monster India Pvt. Ltd, Bengaluru	
7	Dr.S.Rao Chintalapudi, M. Tech.,.Ph. D.,	Professor & Hod AIML CMR Tech Campus, Hyderabad	

Chairman BOS-CAD:BVCEC



BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE

(Autonomous)

Department of Computer Science: Artificial Intelligence and Machine Learning

Date: ~~25~~ 06-2022

MINUTES OF MEETING

RESOLUTIONS TAKEN

1. Consider Item No.2.

Resolved to ratify the proposed course structure for B. Tech program for II, III & IV year. The approved course structures are enclosed herewith.

2. Consider item No. 3

Resolved to ratify the proposed syllabi of following courses of II, III & IV year B. Tech CS AIML Programmes.

The approved syllabi are enclosed here.

3. **Consider item No. 4:** resolved to ratify the text books and reference books as mentioned in the item No. 3.

Finally, Chairman of BOS thanked all the members of their valuable inputs and active participation in the meeting.

Dr. G. Jena

Chairman-BOS: CSE



B.V.C ENGINEERING COLLEGE::Odalarevu
(Autonomous)
Physics
Department of Science and Humanities

Minutes of meeting of the Board of Studies for Physics subject in Department of Science and Humanities held on 23.01.2021 at 10 am through online (Zoom) meeting.

Members Present:

S.No.	Name of the Members	Signature
1	A.Durga Madhuri, Associate Professor HOD- S&H, Chairman of BOS	
2	Prof. G. Padmaja Rani, Dept. of Physics, Jawaharlal Nehru Technological University, Kakinada. BOS Chairman-Physics.	
3	Dr. K. Ramachandra Rao , Associate Professor & Research Director, Crystal Growth & Nanoscience Research Center, Department of Physics, Government Degree College (A), Rajamahendravaram	
4	Dr. T N V K V Prasad, Principal Scientist, Soil science, A N G Ranga Agricultural University, Tirupathi.	
5	Mr.S.T. Naidu, Associate Professor Department of Science and Humanities, B.V.C Engineering College, Odalarevu	
6	Mr.J. Anjaneyulu , Associate Professor Department of Science and Humanities, B.V.C Engineering College, Odalarevu	
7	Mr.Y V Yogeswara Rao , Assistant Professor Department of Science and Humanities, B.V.C Engineering College, Odalarevu	

Chairman of BOS
(Mrs.A.Durga Madhuri)

Department of Science & Humanities

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE – ODALAREVU
(AUTONOMOUS)

DATE : 23rd JAN 2021

TIME: 10.00A.M

VENUE: Conference Hall, Administrative Block

Mode : online (Zoom) Meeting

AGENDA

1. Welcome Address by Chairman-BOS.
2. Discussion on proposed course structure of B. Tech and ratification of the same.
3. Discussion on proposed B. Tech physics courses syllabi and ratification of the same.
4. Ratification of the proposed model papers for internal (subjective& objective) and external Examinations of both theory and laboratory courses for Under Graduate Programs (B.Tech.)
5. Finalization of names of reputed institutions for setting question paper and valuation of answer scripts.
6. Finalization of text books and reference books.
7. Any other item.

Copy to :

- 1) Mr.S.T. Naidu
Associate. Professor.
- 2) Mr .J.Anjaneyulu
Associate. Professor.
- 3) Mr .Y.V. Yogeswara rao
Asst. Professor.
- 4) Dr.G.Padmaja Rani
Professor,JNTUK
- 5) Dr.TNVKV Prasad
Principal, Scientist
ANG Ranga agricultural university
- 6) Dr. K.Ramachandra Rao
Associate Professor, Govt Degree College
Rajahmundry.


Chairman of BOS
(A.Durga Madhuri)



B.V.C ENGINEERING COLLEGE::Odalarevu
(Autonomous)

Department of Science and Humanities

RESOLUTIONS TAKEN:

1. Considered item No.2.

Resolved to ratify the proposed course structure for B.Tech Programme for 1st year I and II semesters.

The approved course structures are enclosed herewith. (Annexure-I for B.Tech)

2. Considered item No.3.

Resolved to ratify the proposed syllabi of following courses of first year B.Tech Programmes for all circuit and non circuit branches for A.Y. 2020-21 onwards.

S.No	Name of the Programme	Name of the Course
1.	I B.Tech	Applied Physics I-I & I-II
		Applied Physics lab I-I&I-II
		Engineering Physics I-II
		Engineering Physics Lab I-II
		Induction Training I-I
		Indian Constitution I-II

The approved syllabi are enclosed herewith. (Annexure III(a, b, c) for B.Tech).

3. Considered Item No.4.

Resolved to ratify the proposed **scheme of model papers** for internal and external examinations (Theory & Lab) of Both B.Tech Programmes.

The approved scheme of model papers are enclosed herewith. (Annexure-V for B.Tech)

4. Considered Item No.5.

Resolved to Approve for **setting of question papers and valuation of answer scripts** from reputed institutions including State, Central Universities and NITs.

5. Considered Item No.6.

Resolved to ratify the **text books and reference books** as mentioned in the Item No.3

Members suggested to incorporate some important web links or URLs in every subject as references. Accordingly their suggestions were implemented in every subject of B.Tech Programmes

6. Considered Item No.7.

i. Resolved to conduct the BOS-Meeting at least once in a year

ii. Resolved to specify the subject codes for all courses in B.Tech Programmes.

Finally chairman of BOS thanked all the members for their valuable inputs and active participation in the meeting.


Chairman of BOS

I B.Tech. PHYSICS SYLLABUS

(Applied Physics for all circuit branches like ECE,EEE, CSE CAD ... etc.)

A.Y - 2020-2021 onwards



B.V.C Engineering (Autonomous) College

Odalarevu, 533210

Andhra Pradesh, INDIA

I B.TECH I SEM (CSE/CIVIL/MECH/CSE(AI&DS/AI&ML/CSE(AI&ML))				
BASIC ELECTRICAL AND ELECTRONICS ENGINEERING	L	T	P	C
20ES1T01	3	0	0	3

UNIT – I Electrical Circuits:

Basic definitions - Types of network elements - Ohm's Law - Kirchhoff's Laws - Inductive networks - Capacitive networks - Series - Parallel circuits - Star-delta and delta-star transformations.

UNIT - II

Dc Machines:

Principle of operation of DC generator - EMF equation - Types of DC machine - Applications - Three-point starter - Speed control methods of DC motor - Swinburne's Test.

UNIT – III

Transformers & Machines

Principle of operation and construction of single-phase transformers - EMF equation - Losses - OC & SC tests - Efficiency- Applications.
Principle of operation and construction of alternators- Types of alternators - Principle of operation of synchronous motor - Applications.

UNIT - IV

Rectifiers & Linear ICs:

PN junction diodes - Diode applications(Half wave and bridge rectifiers). Characteristics of operation amplifiers (OP-AMP) - applications of OP-AMPs (inverting, non-inverting).

UNIT V

Transistors:

PNP and NPN junction transistor, transistor as an amplifier- Transistor amplifier - Frequency response of CE amplifier

Text Books:

1. **Electrical Technology** by Surinder Pal Bali, Pearson Publications.
2. **Electronic Devices and Circuits**, R.L. Boylestad and Louis Nashelsky, 9th edition, PEI/PHI 2006.

Reference Books:

1. **Electrical Circuit Theory and Technology** by John Bird, Routledge Taylor & Francis Group
2. **Basic Electrical Engineering** by M.S.Naidu and S.Kamakshiah, TMH Publications
3. **Fundamentals of Electrical Engineering** by Rajendra Prasad, PHI Publications, 2nd edition
4. **Basic Electrical Engineering** by Nagsarkar, Sukhija, Oxford Publications, 2nd edition
5. **Industrial Electronics** by G.K. Mittal, PHI



Dr. S. SRIKANTH, B.Tech. M.Tech., Ph.D.,
Professor & Head
Department of Electrical and Electronics Engineering
B.V.C. ENGINEERING COLLEGE,
ODALAREVU - 533 210

Course Code: 20ES1T04 (ECE)

20ES2T04 (EEE, CSE & CSE-AI&DS)

L T P C
1 0 4 3

ENGINEERING DRAWING
(Common to EEE, ECE, CSE & CAD)

Course Objectives:

COB1: To provide basic concepts in engineering drawing

COB2: To impart knowledge about standard principles of orthographic projections of objects

COB3: To visualize and represent the pictorial views with proper dimensioning and scaling

Course Outcomes:

At the end of this course, the student will be able to:

CO1: Construct polygons and engineering curves

CO2: Draw orthographic projections of points and lines inclined to one reference plane

CO3: Draw projections lines inclined to both the reference planes and traces

CO4: Draw projections of planes

CO5: Draw projections of solids

CO6: Convert the isometric views to orthographic views and vice-versa

UNIT I

Objective: To introduce the students to use drawing instruments and to draw polygons, Engg. curves and scales.

Lines, Lettering and Dimensioning: Types of lines, Lettering, Dimensioning

Polygons: Constructing regular polygons by general methods, inscribing and describing polygons on circles.

Curves: Parabola, Ellipse and Hyperbola by general methods, cycloids, involutes, tangents & normals for the curves.

UNIT II

Objective: To introduce orthographic projections, projections of points & Line inclined one plane

Orthographic Projections: Horizontal plane, vertical plane, profile plane, importance of reference lines, projections of points in various quadrants, projections of line inclined to one plane,

UNIT III

Objective: The objective is to make the students draw the projections of line inclined to both the reference planes and traces.

Projections of Line inclined to both the planes: Line inclined to both the reference planes, determination of true lengths, angles of inclination and traces - HT, VT

APPLIED PHYSICS

(common to all circuit branches like ECE,EEE, CSE CAD ... etc)

Course Code : 20BS1T05(ECE,EEE)
20BS2T05 (CSE,CAD)

L	T	P	C
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Objective

The objective of this course is to develop scientific temper and analytical capability through learning physical concepts and their applications in science and technology.

Course Outcomes:

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

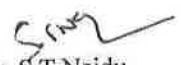
- CO 1- Understand the principles of interference and diffraction to design and enhance the resolving Power of various optical instruments.(BL2)
- CO 2 - Understand the basics of modern technologies in lasers and optical fibers and their applications in Various fields.(BL2)
- CO 3 - Identify the magnetic and dielectric materials from their basic behavior and Learn their applications.(BL3)
- CO 4 - Summarise the basic concepts of Quantum Theory.(BL2)
- CO 5 - Interpret the effects of temperature on Fermi Dirac distribution function and classification of Solids based on band theory (BL5)
- CO 6 - Analyze the principles of carrier concentration in semiconductors.(BL4)


A.D. Madhuri
(Chairperson -BOS)


Dr.G.Padmaja Rani
(University Nominee)


Dr.T.N.K.V Prasad
(Subject Expert)


Dr. Ramachandra Rao
(Subject Expert)


Mr. S.T.Naidu
(Member, BOS)

UNIT I Wave Optics

8 hrs

Interference: Introduction- Principle of superposition -Interference of light -Interference in thin films (Reflection Geometry) -Newton's Rings-Determination of wavelength and refractive index.

Diffraction: Introduction -Fresnel and Fraunhofer diffraction -Fraunhofer diffraction due to single slit, double slit -N-slits (Qualitative) -Rayleigh criterion for resolving power-Diffraction Grating -Resolving power of Grating(Qualitative)-Introduction to polarization.

Unit II Lasers & Fiber Optics

10 hrs

Lasers: Introduction -Characteristics of laser -Spontaneous and Stimulated emissions of radiation - Einstein's coefficients -Population inversion -Lasing action -Pumping Schemes -Ruby laser -He-Ne laser -Applications of lasers.

Fiber optics: Introduction -Principle of optical fiber-Acceptance Angle -Numerical Aperture - Classification of optical fibers based on refractive index profile and modes -Applications

Unit III Dielectric & Magnetic Materials

8 hrs

Dielectric Materials: Introduction -Dielectric polarization -Dielectric polarizability, Susceptibility and Dielectric constant -Types of polarizations-Electronic (Quantitative), Ionic (Quantitative) and Orientation polarizations (Qualitative) -Lorentz internal field-Clausius-Mossotti equation-Piezoelectricity.

Magnetic Materials :Introduction -Magnetic dipole moment -Magnetization-Magnetic susceptibility and permeability -Origin of permanent magnetic moment -Classification of magnetic materials: Dia, para, Ferro, antiferro & Ferrimagnetic materials -Domain concept for Ferromagnetism & Domain walls (Qualitative) -Hysteresis -soft and hard magnetic materials-Eddy currents-Engineering applications.


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(Subject Expert)


Mr. S.T.Naidu
(Member, BOS)

Unit IV Quantum Mechanics

5 hrs

Quantum Mechanics: Dual nature of matter –Heisenberg's Uncertainty Principle –Physical Significance and properties of wave function –Schrodinger's time independent and dependent wave equations–Particle in a one-dimensional infinite potential well .

Unit V Free Electron Theory & Band Theory of Solids

8 hrs

Free Electron Theory: Classical free electron theory (Qualitative with discussion of merits and demerits) –Quantum free electron theory–Equation for electrical conductivity based on quantum free electron theory-Fermi-Dirac distribution-Density of states (3D) -Fermi energy.

Band theory of Solids: Bloch's Theorem (Qualitative) -Kronig -Penney model (Qualitative)-E vs K diagram -effective mass of electron –Classification of crystalline solids–concept of hole.

UNIT VI Semiconductor Physics

9 hrs

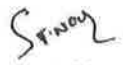
Semiconductors: Introduction-Intrinsic semiconductors –Density of charge carriers –Electrical conductivity –Fermi level –extrinsic semiconductors –density of charge carriers –dependence of Fermi energy on carrier concentration and temperature -Drift and diffusion currents –Einstein's equation-Hall effect –Hall coefficient –Applications of Hall effect.


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(Subject Expert)


Dr. Ramachandra Rao
(Subject Expert)


Mr. S.T.Naidu
(Member, BOS)

Textbooks

1. Pillai, S. O., Solid State Physics, 5th edition, New Age International (P) Ltd., New Delhi, 2004.
2. Solid State Physics by A.J. Dekker (Mc Millan India Ltd).
3. Principles of electronics by V.K Mehta S.Chand Publishers.
4. Applied Physics' by MN Avadhanulu & TVS Arun Murthy (S.CHAND).
5. RK Gaur & SL Gupta, Engineering physics, Dhartapati rai publications.
6. Applied Physics by palanasamy (Scitech publications)

References

1. Engineering Physics' by Sanjay D Jain and Girish G Sahasrabudhe (University Press),
2. Engineering Physics' by Mani Naidu S (Pearson Publications)).
3. Applied Physics' by T. Bhimasankaram (BSP BH Publications).
4. Physics' by Palanisamy (Scitech Publishers)
5. Engineering Physics' by B.K.Pandey & S. Chaturvedi (Cengage Learning)
6. Introduction to solid state physics' by Charles Kittel (Willey India Pvt.Ltd)

Online resources:

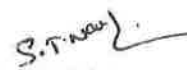
1. <http://ocw.mit.edu/courses/physics>
2. Online course: "Semiconductor Optoelectronics" by M R Shenoy on NPTEL
3. Online course: "Optoelectronic Materials and Devices" by M. Katiyar and D. Gupta NPTEL


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(Subject Expert)


Mr. S.T.Naidu
(Member, BOS)

APPLIED PHYSICS LAB

(Common to all circuit branches like ECE,EEE, CSE,CAD ... etc)

Course Code: 20BS1L01(ECE,EEE)
20BS2L01(CSE,CAD)

L T P C
0 0 3 1.5

Objective: To train the Engineering students to handle instruments and their design methods to improve the accuracy of measurements.

Outcome: Physics lab curriculum gives fundamental understanding of design of an instrument with targeted accuracy for physical measurements.

APPLIED PHYSICS LAB

(Any 10 of the following listed 15 experiments)

- 8 experiments to be performed in regular mode
- 2 experiments to be performed in online mode (virtual lab)

List of Experiments:

1. Determination of wavelength of a source-Diffraction Grating-Normal incidence
2. Newton's rings –Radius of Curvature of Plano convex Lens.
3. Determination of Acceleration due to Gravity and Radius of Gyration- Compound Pendulum
4. Energy Band gap of a Semiconductor p - n junction diode
5. Study of LED I/V Characteristics
6. I/V characteristics of Photodiode
7. Determination of Planck's constant using photocell
8. Determine the rigidity modulus of a material – Torsional pendulum
9. Thermistor characteristics – Temperature Coefficient
10. Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus
11. Study the variation of B versus H by magnetizing the magnetic material(B-H curve)
12. Verification of the laws of vibrations in stretched strings - Sonometer.
13. Determine the time constant for R-C circuit.
14. Determination of Hall voltage and Hall coefficients of a given semiconductor using Hall effect
15. Study of I/V Characteristics of Semiconductor p - n junction diode.

REFERENCES:

1. Engineering Physics Lab Manual by Dr.Y. Aparna & Dr.K.Venkateswarao (V.G.S.Book links)
2. Physics practical manual, Lorven Publications.

Web link:

URL: www.vlab.amrita.edu/index.php

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(University Nominee)

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(Subject Expert)

Dr. Rameshchandra Rao
(Subject Expert)

Mr. S.T.Naidu
(Member, BOS)

I B.Tech PHYSICS SYLLABUS

(Engineering Physics for all non circuit branches like ME , CIVIL ... etc.)

A.Y. - 2020-2021 onwards



B.V.C Engineering College (Autonomous)

Odalarevu, 533210

Andhra Pradesh, INDIA

ENGINEERING PHYSICS

(Common for all non circuit branches like ME , CIVIL ... etc)

Course Code : 20BS2T06(ME,CIVIL)

L	T	P	C
3	0	0	3

Objective

The objective of this course is to develop scientific temper and analytical capability through learning concepts in physics and their applications in science and technology.

Course Outcomes:

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

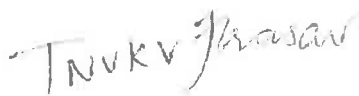
- CO 1:- Understand the principles of interference and diffraction to design and enhance the Resolving power of various optical instruments.(BL2)
- CO2:- Understand the basics of modern technologies in lasers and optical fibers and their applications in various fields.(BL2)
- CO 3:- Identify the magnetic and dielectric materials from their basic behavior and Learn their applications.(BL3)
- CO 4 - Identify different planes in the crystal structure.(BL3)
- CO 5 - Derive expressions for different types of oscillations. (BL6)
- CO 6 - Analyze acoustic properties of typically used materials in buildings and applications of ultrasonics.(BL4)


A.D. Madhuri

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Dr.G.Padmaja Rani

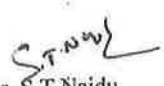
(University Nominee)


Dr.T.N.K.V Prasad

(Subject Expert)


Dr. Ramachandra Rao

(Subject Expert)


Mr. S.T.Naidu

(Member, BOS)

UNIT I: Wave Optics

8 hrs

Interference: Introduction- Principle of superposition -Interference of light -Interference in thin films (Reflection Geometry) -Newton's Rings-Determination of wavelength and refractive index.

Diffraction: Introduction -Fresnel and Fraunhofer diffraction -Fraunhofer diffraction due to single slit, double slit -N-slits (Qualitative) -Rayleigh criterion for resolving power-Diffraction Grating -Resolving power of Grating(Qualitative)- Introduction to polarization

Unit II: Lasers & Fiber Optics

10 hrs

Lasers: Introduction -Characteristics of laser -Spontaneous and Stimulated emissions of radiation - Einstein's coefficients -Population inversion -Lasing action -Pumping mechanisms -Ruby laser -He-Ne laser -Applications of lasers.

Fiber optics: Introduction -Principle of optical fiber-Acceptance Angle -Numerical Aperture - Classification of optical fibers based on refractive index profile and modes -Applications

Unit III: Dielectric & Magnetic Materials

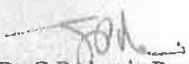
8 hrs

Dielectric Materials: Introduction -Dielectric polarization -Dielectric polarizability, Susceptibility and Dielectric constant -Types of polarizations-Electronic (Quantitative), Ionic (Quantitative) and Orientation polarizations (Qualitative) -Lorentz internal field-Clausius-Mossotti equation-Piezoelectricity.

Magnetic Materials :Introduction -Magnetic dipole moment -Magnetization-Magnetic susceptibility and permeability -Origin of permanent magnetic moment -Classification of magnetic materials: Dia, para, Ferro, antiferro & Ferrimagnetic materials -Domain concept for Ferromagnetism & Domain walls (Qualitative) -Hysteresis -soft and hard magnetic materials-Eddy currents-Engineering applications.


A.D. Madhuri

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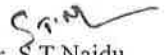
(University Nominee)


Dr. T.N.K.V Prasad

(Subject Expert)


Dr. Ramachandra Rao

(Subject Expert)


Mr. S.T.Naidu

(Member, BOS)

Unit IV: Crystallography

Crystallography: Space lattice, Basis, Unit Cell and lattice parameters –Bravais Lattice –crystal systems (3D) – coordination number -packing fraction of SC, BCC & FCC -Miller indices –separation between successive (hkl) planes - Bragg's law.

Unit V: Simple Harmonic Motion, Damped & Forced Vibrations

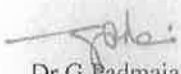
Introduction -simple harmonic oscillator and its characteristics-energy of Simple harmonic oscillator - lissajous figures - damped vibrations - damped harmonic oscillator with different conditions-forced vibrations-Resonance- Quality factor.

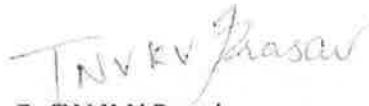
UNIT VI: Acoustics & Ultrasonics

Acoustics: Introduction –requirements of acoustically good hall–Reverberation –Reverberation time– Sabine's formula (Jaegers method) -Absorption coefficient and its determination –Factors affecting acoustics of buildings and their remedial measures.

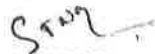
Ultrasonics: Introduction -Properties -Production by magnetostriction and piezoelectric methods – Detection -Applications.


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Textbooks

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4. **RK Gaur & SL Gupta**, Engineering physics , Dhanapati rai publications.
5. Engineering Physics' by **Palanisamy** (Scitech Publishers).
6. Unified physics (Vol1) By **Dr.S.L.Gupta & Sanjeev Gupta**(Jai prakash Nath &Company, Meerut).

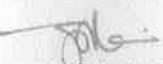
References

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Online resources:

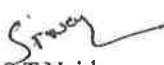
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3. Online course: "Optoelectronic Materials and Devices" by **M. Katiyar and D. Gupta** NPTEL


A.D. Madhuri
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ENGINEERING PHYSICS LAB
(Common for all non circuit branches like ME , CIVIL ... etc)

Course Code : 20BS2L02(ME,CIVIL)

L T P C
0 0 3 1.5

Objective: To train the Engineering students to handle instruments and their design methods to improve the accuracy of measurements.

Outcome: Physics lab curriculum gives fundamental understanding of design of an Instrument with targeted accuracy for physical measurements.

List of Experiments
(Any 10 of the following listed 15 experiments)

- 8 experiments to be performed through regular mode
- 2 experiments to be performed online mode (virtual lab)

List of Experiments:

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2. Newton's rings –Radius of Curvature of Plano convex Lens.
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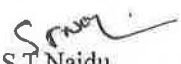
URL: www.vlab.amrita.edu/index.php


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B.V.C ENGINEERING COLLEGE::Odalarevu
(Autonomous)

Physics

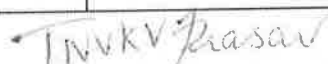
Department of Science and Humanities

Text Books & Reference Books for Physics Course

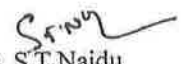
Sl.No.	Name of the subject	Text Books	Reference books
	Applied Physics	1. Pillai, S. O., Solid State Physics, 5th edition, New Age International (P) Ltd., New Delhi, 2004 2. Solid State Physics by A.J. Dekker (Mc Millan India Ltd) 3. Principles of electronics by V.K Mehta S .Chand Publishers 4. Applied Physics' by MN Avadhanulu & TVS Arun Murthy (S.CHAND) 5. RK Gaur & SL Gupta, Engineering physics , Dhanapati rai publications. 6. Applied physics by palanisamy (scitech publishers)	1. Engineering Physics' by Sanjay D Jain and Girish G Sahasrabudhe (University Press), 2. Engineering Physics' by Mani Naidu S (Pearson Publications)). 3. Applied Physics' by T. Bhimasankaram (BSP BH Publications). 4. Physics' by Palanisamy (Scitech Publishers) 5. Engineering Physics' by B.K.Pandey & S. Chaturvedi (Cengage Learning) 6. Introduction to solid state physics' by Charles Kittel (Wiley India Pvt.Ltd


A.D. Madhuri
(Chairperson –BOS)


Dr.G.Padmaja Rani
(University Nominee)


Dr.T.N.K.V Prasad
(Subject Expert)


Dr. Ramachandra Rao
(Subject Expert)


Mr. S.T.Naidu
(Member, BOS)

Answer all questions

3 x 10 = 30 Marks

Q.No	Questions	Marks	CO	BL
1.a	Derive an expression for the interference in thin films due to reflected light .	5	1	5
1.b	Derive the expression for Resolving power of a grating based on Rayleigh's Criterion ,	5	1	5
2.a	Explain the construction and working of RUBY laser with the help of energy level diagram ,	5	2	2
2.b	Derive an expression for the numerical aperture of an optical fiber .	5	2	3
3.a	Explain hysteresis loop observed in ferromagnetic materials. And explain the classification of magnetic material based on hysteresis loop .	5	3	2
3.b	Derive classius – mosotti relation in dielectrics	5	3	4

Answer all questions

3 x 10 = 30 Marks

Q.No	Questions	Marks	CO	BL
1.a	(a) Show that FCC is most closely packed of the three cubic structures by working out the packing factors.	5	4	6
1.b	(b)What are miller indices ? how are they obtained?	5	4	1
2.a	Derive an expression for equation of a particle executing in SHM	5	5	2
2.b	Describe the motion of a damped harmonic oscillator	5	5	3
3.a	Discuss the factors affecting the architectural acoustics of a building and their remedy..	5	6	3
3.b	Calculate the reverberation time of hall with volume of 1500m ³ and whose total absorption is equivalent to 100square meters sabine.	5	6	2

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3.a	Explain hysteresis loop observed in ferromagnetic materials. And explain the classification of magnetic material based on hysteresis loop.	5	3	2
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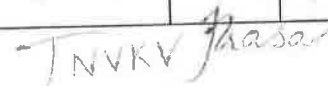
Answer all questions

3 x 10 = 30 Marks

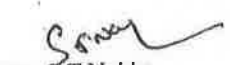
Q.No	Questions	Marks	CO	BL
1.a	Show that for a quantum particle confined to an infinite deep potential box with finite length, the energy levels are quantized..	5	4	1
1.b	What are matter waves and list out their properties?	5	4	1
2.a	Explain the Fermi-Dirac distribution function of electrons. Explain the effect of temperature on the distribution.	5	5	2
2.b	Write the draw backs of classical theory	5	5	1
3.a	State and explain hall effect.	5	6	3
3.b	Define Drift & Diffusion currents and derive Einstein's equation.	5	6	1


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Answer all questions**20 x 1 = 20 Marks**

1. Wave nature of light is evidenced by []
a) Photoelectric effect b) Interference c) black body radiation d) nuclear emission
2. Two sources are said to be coherent if their emitted waves have []
a) Same wavelength b) Same Amplitude c) constant phase difference d) above all
3. The units of permittivity. []
a) No units b) farad/meter c) coulomb/meter d) Newton
4. When the light wave is reflected at the air - glass interface, the change of phase of reflected wave is equal to []
a) 0 b) $\pi/2$ c) $\pi/4$ d) π
5. Two waves having their intensities in the ratio 9:1 produce interference. In the interference patterns the ratio of maximum to minimum intensity is equal to []
a) 2:1 b) 9:1 c) 3:1 d) 4:1
6. When a thin film of oil or soap bubble is illuminated with white light, multiple colors appear. This is due to []
a) Diffraction
b) Polarization
c) Total internal reflection
d) Interference
7. The penetration of waves into the regions of the geometrical shadow is []
a) Interference b) Diffraction c) Polarization d) Dispersion
8. In Farunhofer diffraction of the wavefront undergoing diffraction has to be []
a) Spherical
b) Cylindrical
c) Elliptical
d) Plane
9. In diffraction due to double slit we observe []
a) Wider interference fringes and narrower diffraction bands
b) Interference and diffraction fringes of equal width
c) Wider diffraction bands and within that narrower interference fringes
d) Diffraction pattern due to both the slits independently
10. When white light is incident on diffraction grating, the light diffracted more will be []
(a) Blue b) Yellow c) Violet d) Red.
11. Monochromatic light falling normally on a grating gives rise to diffracted second order beam at an angle 30 deg. If the grating has 5000 lines/cm, wavelength of light is []
a) 600 nm b) 400 nm c) 500 nm d) 650 nm.

P.T.O.

12. Maximum number of orders possible with a grating is []

- a) independent of grating element
- b) directly proportional to grating element
- c) inversely proportional to grating element
- d) directly proportional to wavelength

13. Emission of photon when an electron jumps from higher energy state to lower energy state due to interaction of external energy called []

- a) Spontaneous Emission b) Stimulated emission c) Induced emission d) Amplified emission

14. Population of the various energy levels of a system in thermal equilibrium is given by []

- a) Boltzman-distribution law b) Einstein relations c) Planck's Law d) Beer's Law

15. The magnetism exhibited by all materials

[]

- a) dia b) Para c) Ferro d) Ferri

16. In Ruby lasing material the percentage of chromium ions in Aluminum oxide is []

- a) 0.5
- b) 0.05
- c) 5
- d) 0.005

17. The color of the laser output from a Ruby laser?

[]

- a) Green b) Blue c) Red d) Violet

18. Coherence of light is measured from

[]

- a) Variation in spot size with distance
- b) visibility of interference fringes it produces
- c) brightness of the beam
- d) wavelength of the beam

19. Laser radiation is

[]

- a) Monochromatic
- b) Highly directional
- c) Coherent and stimulated
- d) Above all

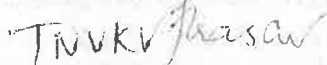
20. He-Ne gas laser is

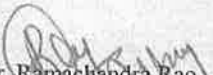
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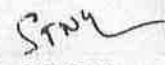
- (a) pulsed laser (b) semiconductor laser (c) Solid state laser (d) continuous laser


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Mr. S.T.Naidu
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Answer all questions

20 x 1 = 20 Marks

1. Wave nature of light is evidenced by []
a) Photoelectric effect b) Interference c) black body radiation d) nuclear emission
2. Two sources are said to be coherent if their emitted waves have []
a) Same wavelength b) Same Amplitude c) constant phase difference d) above all
3. The units of permittivity. []
a) No units b) farad/meter c) coulomb/meter d) Newton
4. When the light wave is reflected at the air - glass interface, the change of phase of reflected wave is equal to []
a) 0 b) $\pi/2$ c) $\pi/4$ d) π
5. Two waves having their intensities in the ratio 9:1 produce interference. In the interference patterns the ratio of maximum to minimum intensity is equal to []
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b) Polarization
c) Total internal reflection
d) Interference
7. The penetration of waves into the regions of the geometrical shadow is []
a) Interference b) Diffraction c) Polarization d) Dispersion
8. In Fraunhofer diffraction of the wavefront undergoing diffraction has to be []
a) Spherical
b) Cylindrical
c) Elliptical
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9. In diffraction due to double slit we observe []
a) Wider interference fringes and narrower diffraction bands
b) Interference and diffraction fringes of equal width
c) Wider diffraction bands and within that narrower interference fringes
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10. When white light is incident on diffraction grating, the light diffracted more will be []
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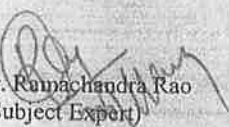
P.T.O.

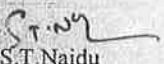
11. Monochromatic light falling normally on a grating gives rise to diffracted second order beam at an angle 30 deg. If the grating has 5000 lines/cm, wavelength of light is
a) 600 nm b) 400 nm c) 500 nm d) 650 nm. []
12. Maximum number of orders possible with a grating is []
a) independent of grating element
b) directly proportional to grating element
c) inversely proportional to grating element
d) directly proportional to wavelength
13. Emission of photon when an electron jumps from higher energy state to lower energy state due to interaction of external energy called []
a) Spontaneous Emission b) Stimulated emission c) Induced emission d) Amplified emission
14. Population of the various energy levels of a system in thermal equilibrium is given by []
a) Boltzman-distribution law b) Einstein relations c) Planck's Law d) Beer's Law
15. The magnetism exhibited by all materials []
a) dia b) Para c) Ferro d) Ferri
16. In Ruby lasing material the percentage of chromium ions in Aluminum oxide is []
a) 0.5
b) 0.05
c) 5
d) 0.005
17. The color of the laser output from a Ruby laser? []
a) Green b) Blue c) Red d) Violet
18. Coherence of light is measured from []
a) Variation in spot size with distance
b) visibility of interference fringes it produces
c) brightness of the beam
d) wavelength of the beam
19. Laser radiation is []
a) Monochromatic
b) Highly directional
c) Coherent and stimulated
d) Above all
20. He-Ne gas laser is []
(a) pulsed laser (b) semiconductor laser (c) Solid state laser (d) continuous laser


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Dr. Ramachandra Rao
(Subject Expert)


Mr. S.T. Naidu
(Member, BOS)

Course Code: 20BSIT05
BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE:: ODALAREVU
(AUTONOMOUS)

I-B.Tech I-Semester Regular Examinations (BR20), APRIL - 2021

Applied Physics (Com. to all circuit branches like ECE,EEE,CSE,CID....etc)

Time: 3 hours

(MODEL PAPER)

Max. Marks: 60

Question Paper consists of Part-A and Part-B

Answer ALL the question in Part-A

Answer any FOUR Questions from Part-B

PART-A

Sl.No.	Question	Marks	Co	BL
1	(a) Explain the phenomenon of interference of light	2	1	2
	(b) Distinguish between spontaneous emission & stimulated emission	2	2	2
	(c) Define magnetic susceptibility	2	3	1
	(d) Write the physical significance of wave function	2	4	1
	(e) What are the drawbacks of classical theory?	2	5	1
	(d) What is the difference between N-type & P-type semiconductor?	2	6	1
PART-B				
2	(a) Derive an expression for diameter of the n^{th} dark ring in Newton's rings viewed in reflected light system.	8	1	5
	(b) In the Newton's rings experiment the diameter of 4^{th} and 12^{th} dark rings is 0.4 cm & 0.7 cm respectively. Find the diameter of 20^{th} dark ring.	4	1	3
3	(a) Explain the construction and working of RUBY laser with the help of energy level diagram.	8	2	2
	(b) What is the principle behind an optical fiber works?	4	2	1
4	(a) Explain hysteresis loop observed in ferromagnetic materials. And explain the classification of magnetic material based on hysteresis loop.	8	3	2
	(b) Derive Clausius - Mosotti relation in dielectrics.	4	3	5
5	(a) Derive time independent Schrödinger wave equation.	8	4	5
	(b) Explain the de Broglie concept of matter waves.	4	4	2
6	(a) Explain Kronig Penney model.	8	5	2
	(b) Define concept of hole.	4	5	1
7	(a) State and Explain Hall effect.	8	6	2
	(b) What do you understand by drift & diffusion currents in the case of a semiconductor?	4	6	2

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(University Nominee)

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(Subject Expert)

Dr. Ramachandra Rao
(Subject Expert)

Mr. S.T.Naidu
(Member, BOS)

Course Code: 20BS2T06
BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE:: ODALAREVU
(AUTONOMOUS)

I-B.Tech II-Semester Regular Examinations (BR20), MAY/JUNE - 2021

(Com. To all non circuit branches like MECH,CIVIL.....etc)

ENGINEERING PHYSICS

(MODEL PAPER)

Time: 3 hours

Max. Marks: 60

Question Paper consists of Part-A and Part-B

Answer ALL the question in Part-A

Answer any FOUR Questions from Part-B

PART-A

Sl.No.	Question	Marks	Co	BL
1	(a) Explain the phenomenon of interference of light	2	1	2
	(b) Distinguish between spontaneous emission & stimulated emission	2	2	2
	(c) Define magnetic susceptibility	2	3	1
	(d) Write the Brag's law	2	4	1
	(e) Define Q factor	2	5	1
	(d) Write the factors affecting the acoustics of buildings	2	6	1
PART-B				
2	(a) Derive an expression for diameter of the n^{th} dark ring in Newton's rings viewed in reflected light system.	8	1	5
	(b) In the Newton's rings experiment the diameter of 4^{th} and 12^{th} dark rings is 0.4 cm & 0.7 cm respectively. find the diameter of 20^{th} dark ring.	4	1	3
3	(a) Explain the construction and working of RUBY laser with the help of energy level diagram.	8	2	2
	(b) What is the principle behind an optical fiber works?	4	2	1
4	(a) Explain hysteresis loop observed in ferromagnetic materials. And explain the classification of magnetic material based on hysteresis loop.	8	3	2
	(b) Derive classius – mosotti relation in dielectrics	4	3	5
5	(a) Show that FCC is most closely packed of the three cubic structures by working out the packing factors.	8	4	4
	(b) What are miller indices ? how are they obtained?	4	4	1
6	(a) What are the damped oscillations? Derive the equation of motion of damped harmonic oscillator and obtain its solution.	8	5	1
	(b) Write the characteristics of SHM.	4	5	2
7	(a) Derive and explain for sabine's formula for reverberation time (Jaegers method).	8	6	1
	(b) Explain the absorption coefficient of sound.	4	6	2

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B.V.C ENGINEERING COLLEGE::Odalarevu
(Autonomous)

B.Tech I year I Sem [Model Paper- External]

(Applied/Engineering physics lab)

Course Code:20BSIL01/20BS2L02

Time:3 Hrs

Date:

Max .Marks: 50

1. Determination the radius of curvature of plano convex lens by forming Newtons rings .

SCHEME OF EVALUATION

Practical: 50M

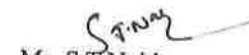
Formula , Explanation & Tabular form	-	15M
Observation:	-	15M
Calculation:	-	5M
Viva voce	-	5M
For result	-	10M


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B.V.C ENGINEERING COLLEGE::Odalarevu
(Autonomous)

B.Tech I year I Sem [Model Paper- Internal]

(Applied/Engineering physics lab)

Course Code:20BS1L01/20BS1L02

Time:2Hrs

Date:

Max .Marks: 25

1) Study of I/V Characteristics of p - n diode

SCHEME OF EVALUATION

1. Record

5M

2. Internal Exam

10M

3. Day to Day Performance:

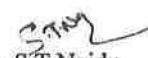
10M


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B.V.C ENGINEERING COLLEGE::Odalarevu

(Autonomous)

Department of Science and Humanities (English)

Minutes of meeting of the Board of Studies for English subject in Department of Science and Humanities held on 20-01-2021 at 2pm through online (Zoom) meeting.

Members Present:

S.No.	Name of the Members	Signature
1	A.Durga Madhuri Associate Professor HOD- S&H, Chairman of BOS	
2	Prof. K. Sree Ramesh Professor, Adikavi Nannaya University. Rajamahendravaram	
3	Dr. T Ashok Professor, Registrar, Adikavi Nannaya University. Rajamahendravaram	
4	Dr. B. Aseesh Babu Assistant Professor, SKBR Coleege, Amalapuram	
5	Dr. A Nageswara Rao Professor Department of Science and Humanities, B.V.C Engineering College, Odalarevu	
6	Mr.N. Anand Kumar , Assistant Professor Department of Science and Humanities, B.V.C Engineering College, Odalarevu	
7.	Mr.SANA. Mashahaddi Assistant Professor Department of Science and Humanities, B.V.C Engineering College, Odalarevu	
8.	G. Srirama Murthy Asst. professor Department of Science and Humanities, B.V.C Engineering College, Odalarevu	

A. DURGA MADHURI
(Chairman, BOS)

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE – ODALAREVU
(AUTONOMOUS)

Department of Science & Humanities
Minutes of Meeting (English BOS)

DATE : 20th Jan, 2021

TIME: 2.00pm

VENUE: Conference Hall, Administrative Block

Mode: Online (Zoom) Meeting

AGENDA

1. Welcome Address by Chairman-BOS.
2. Discussion on proposed course structure of B. Tech ratification of the same.
3. Discussion on proposed B. Tech First Year and Final year English courses syllabi and ratification of the same.
4. Ratification of the proposed model papers for Internal (subjective & objective) and External Examinations of both theory and laboratory courses for Under Graduate (B. Tech)
5. Finalization of names of reputed institutions for setting question paper and valuation of answer scripts.
6. Finalization of text books and reference books.
7. Any other item.

Copy to :

- 1) Dr. A Nageswara Rao
Professor.
- 2) Mr N. Anand Kumar
Asst. Professor.
- 3) Mr SANA Mashahaddi
Asst. Professor.
- 4) Mr G. Sriram Murthy
Asst. Professor.
- 5) Dr. T Ashok
Professor,
Adikavi Nannaya University.
- 6) Dr. B. Aseesh Babu
Associate Professor,
SKBR College, Amalapuram
- 7) Dr. K. Sree Ramesh
Professor,
Adikavi Nannaya University.


Chairman of BOS



B.V.C ENGINEERING COLLEGE::Odalarevu
(Autonomous)

Department of Science and Humanities

RESOLUTIONS TAKEN:

1. Considered item No.2.

Resolved to ratify the proposed course structure for B.Tech Programme for 1st year and semesters.

The approved course structures are enclosed herewith. (Annexure-I for B.Tech)

2. Considered item No.3.

Resolved to ratify the proposed syllabi of following courses of first and Final year B.Tech Programmes.

S.No	Name of the Programme	Name of the Course
1.	I B.Tech	English-I
		English Communication Skills Lab I-I
		Indian Constitution I-II
2.	IV B.Tech.	English for Employability Lab (IV-I)

The approved syllabi are enclosed herewith. (Annexure III(a, b, c) for B.Tech).

3. Considered Item No.4.

Resolved to ratify the proposed **scheme of model papers** for internal and external examinations (Theory & Lab) of B.Tech Programme.

The approved scheme of model papers are enclosed herewith. (Annexure-V for B.Tech)

4. Considered Item No.5:

Resolved to Approve for **setting of question papers and valuation of answer scripts** from reputed institutions including State, Central Universities and NITs

5. Considered Item No.6.

Resolved to ratify the **text books and reference books** as mentioned in the Item No.3

Members suggested incorporating some important web links or URLs in every subject as references. Accordingly their suggestions were implemented in every subject of B.Tech Programmes

6. Considered Item No.7.

i. Resolved to conduct the BOS-Meeting at least once in a year

ii. Resolved to specify the subject codes for all courses in B.Tech Programmes

Finally chairman of BOS thanked all the members for their valuable inputs and active participation in the meeting.


Chairman of BOS

ENGLISH – I
(Common to all branches)

Course Code 20HS1T01 (ECE & EEE)
20HS2T01 (CIV, MECH, CSE & CAD)

L	T	P	C
2	-	-	2

Introduction

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training the students to acquire communicative competence, the syllabus has been designed to develop linguistic and communicative competence of the students of Engineering.

As far as the detailed textbooks are concerned, the focus should be on the skills of listening, speaking, reading and writing. The non-detailed textbook is meant for extensive reading for pleasure and profit. Thus the stress in the syllabus is primarily on the development of communicative skills and fostering of ideas.

Course Objectives:

COB 1: To improve the language proficiency of the students in English with emphasis on LSRW skills.

COB 2: To enable the students to study and comprehend the prescribed lessons and subjects more effectively relating to their theoretical and practical components.

COB 3: To develop the communication skills of the students in both formal and informal situations.

COB 4: To develop the ways to overcome fear and use of words for irony.

COB 5: To make the learners understand the development conditions and the core competences of the State of prioritize education system.

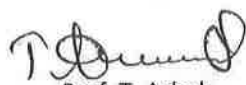
COB 6: To discuss that water is the world's most precious natural resources.

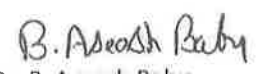
COB 7: To discuss how human sensitivity changes in accordance to times and situations in life.

COB 8: To inform the learner that all men can come together to abolish the war.


A.D. Madhuri
(Chairman-BOS)


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(University Nominee)


Prof. T. Ashok
(Subject Expert)


Dr. B. Aseesh Babu
(Subject Expert)


Dr. A. Nageswara Rao
(Member of BOS)

LISTENING SKILLS:

Objectives:

1. To enable the students to appreciate the role of listening skill and improve their pronunciation.
2. To enable the students to comprehend the speech of people belonging to different backgrounds and regions.
3. To enable the students to listen for general content, to fill up information and for specific information.

SPEAKING SKILLS:

Objectives:

1. To make the students aware of the importance of speaking for their personal and professional communication.
2. To enable the students to express themselves fluently and accurately in social and professional success.
3. To help the students describe objects, situations and people.
4. To make the students participate in group activities like role-plays, discussions and debates.
5. To make the students participate in just a minute talks.

READING SKILLS:

Objectives:

1. To enable the students to comprehend a text through silent reading.
2. To enable the students to guess the meanings of words, messages and inferences of texts in given contexts.
3. To enable the students to skim and scan a text.
4. To enable the students to identify the topic sentence.
5. To enable the students to identify discourse features.
6. To enable the students to make intensive and extensive reading.

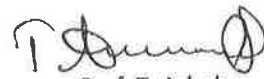
WRITING SKILLS:

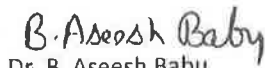
Objectives:

1. To make the students understand that writing is an exact formal skills.
2. To enable the students to write sentences, paragraphs, e-mails and essays.
3. To make the students identify and use appropriate vocabulary.
4. To enable the students to narrate and describe.
5. To enable the students to write coherently and cohesively.


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Course Outcomes:

At the end of the Course, Student will be able to:

- CO 1: Identify the ways to overcome fear and use of words for irony.
- CO 2: Interpret the development conditions and the core competences of the state to prioritize education system.
- CO 3: Analyze water as the world's most precious natural resources.
- CO 4: Illustrate human sensitivity to the changing times and situations in life.
- CO 5: Predict that war causes destruction and calling for peace establishment.
- CO 6: Illustrate biographies for motivating readers and strengthening communicative grammar skills

Methodology:

1. The class is to be learner-centred where the learners are to read the texts to get a comprehensive idea of those texts on their own with the help of the peer group and the teacher.
2. Integrated skill development methodology has to be adopted with focus on individual language skills as per the tasks/exercise.
3. The tasks/exercises at the end of each unit should be completed by the learners only and the teacher intervention is permitted as per the complexity of the task/exercise.
4. The teacher is expected to use supplementary material wherever necessary and also generate activities/tasks as per the requirement.
5. The teacher is permitted to use lecture method when a completely new concept is introduced in the class.

Recommended Topics:**UNIT-I:**

1. AN ASTROLOGER'S DAY - R.K. NARAYAN (Detailed)
2. G.D. NAIDU (Non-Detailed)

UNIT-II:

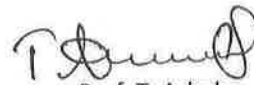
1. BUILDING A NEW STATE - A. P. J. ABDUL KALAM (Detailed)
2. G.R. GOPINATH (Non-Detailed)



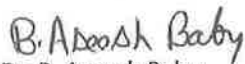
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UNIT-III:

1. WATER: THE ELIXER OF LIFE- C. V. RAMAN (Detailed)
2. SUDHA MURTHY (Non-Detailed)

UNIT-IV:

1. THE WOODROSE-ABBURI CHAYA DEVI (Detailed)
2. JAGADIS CHANDRA BOSE (Non-Detailed)

UNIT-V:

1. PROGRESS- ST. JOHN ERVINE (Detailed)
2. HOMI JEANGIR BHABHA(Non-Detailed)

Textbooks:

Detailed Text Book: **USING ENGLISH** by Orient Black Swan.

Non-Detailed Text Book: **Trailblazers** by Orient black Swan.



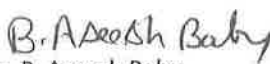
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ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB
(Common to all branches)

Course Code 20HS1L01 (EEE & ECE)
20HS2L01 (CIV, MECH, CSE & CAD)

L T P C
- - 2 1.5

OBJECTIVES

COB: To perform outstandingly in interviews, discussions, lectures and presentations.

COB: To apply the new expressions and collocations to make the language more refined

COB: To update the habit of writing by connecting all formats of the letters existed in academia and industry.

COB: Develop the syntactical proficiency through various exercises on grammar

COB: To comprehend the paragraphs in quicker and faster ways by apply the skimming, scanning and skipping techniques.

COB: To comprehend the varieties of accents existed in language.

OUT COMES

Co.1. Prepare the learners to improve speech production and confidence levels avoiding stage fright.

Co.2. Build the ability of qualifying IELTS, TOFEL, GRE and the other competitive exams.

Co.3. Develop the technical and professional skills in writing emerged to corporate needs.

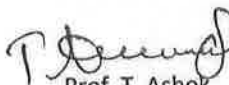
Co.4. Apply to use the language devices and connectors while writing and speaking.

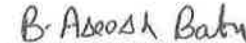
Co.5. Generate the interest among the learners to read all texts intensively and extensively.

Co.6. Identify the different speeches in life through active and focused listening.


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SYLLABUS

Unit I: Communication Skills

- a. Body Language
- b. JAM
- c. Introduce yourself
- d. Role-play

Unit II: Vocabulary Development

- a. Synonyms and Antonyms
- b. Cloze Test
- c. Interchange of Words
- d. Sentence Matching
- e. One Word Substitutions
- f. Commonly Confused Words
- g. Verbal Analogy
- h. Sentence Fillers
- i. Idioms & Phrases

Unit III: Writing Strategies

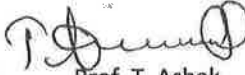
- a. Paragraph Writing
- b. Report Writing
- b. Essay Writing and Picture composition
- c. Letter Writing: Business Letters,
- d. Job Application Letters: Opening, Body and Closing
- e. Resume Design and Parts of a Resume
- f. E-mail Writing

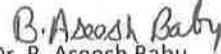
Unit IV: Communicative Grammar

- a. Error Identification/ Error Location
- b. Sentence Improvement
- c. Identifying Correct Alternative
- d. Incomplete Sentence
- e. Para Jumbles
- f. Phrase/Connectors (Starters)


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Unit V: Reading Comprehension

- a. Reading Process
- b. Reading Strategies
- c. Tips to Answering Questions

Unit VI: Listening Skills

- a. Listening to audio lectures/stories/biographies
- b. Listening to announcements/Radio

Lab Software: Globarena Technologies Ltd.,

Prescribed Text Books:

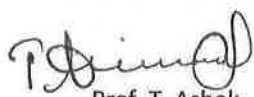
1. **Communicative English for Engineers and Professionals** by Nitin Bhatnagar & Mamata Bhatnagar, Pearson Publications, 2010, New Delhi
2. **English for Technical Communication for Engineering students**, Aysha Vishwamohan, Tata McGraw Hill, 2009
3. **Effective Technical Communication** by M.A. Sharif Rizvi, Tata MacGrawhill, 2005, New Delhi
4. **Soft Skills – Key to Success in workplace and life** by Meenakshi Raman & Shalini Upadhayay; Cengage Publications

Reference Books:

1. **Business Communication** by Meenakshi Raman (II edition), Oxford Publications.
2. **Technical Communication Principles and Practice**. Raman, Meenakshi and Sharma, Sangeeta. Third Edition. New Delhi: Oxford University Press. 2015. Print.
3. **Technical Communication** by Meenakshi Raman & Sangeetha Sarma, OU Press, 3rd edition, 2014.


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ENGLISH FOR EMPLOYABILITY

(Common to all branches)

Course Code 20HS7S01

L	T	P	C
-	-	3	2

Course Objectives:

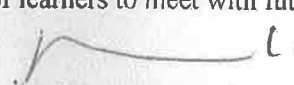
- COB 1: Imbibe the ability to understand and interpret unspoken gestures from others.
- COB 2: To present the point of view effectively and support the arguments of the topic.
- COB 3: Learn to speak and interrupt politely by concluding with a positive discussion.
- COB. 4: Design a presentation structurally evolved with a content and organizing points.
- COB. 5: To describe academic credentials exhibited by a coherent manner.
- COB 6: To grow up the confidence of learners to make them fitful for the questions they encountered.

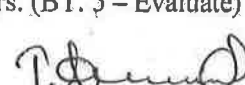
Course Outcomes:

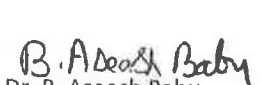
At the end of the Course, Student will be able to:

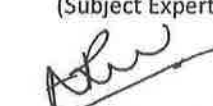
- CO.1. Recognize the way how body language functions in communicative and non-communicative domains. (BT-2 – Understand)
- CO 2. Make use of effective delivery strategies to select compile and synthesize information for an oral presentations. (BT – 5 (Evaluation)
- CO. 3.Demonstrate in Mock Interviews, Mock Discussion and Public Speaking. (BT 3 (Application)
- CO.4. Identify communicative competency to respond to others in different situations. (BT.1 Remember)
- CO. 5. Develop the writing skills to meet the organizational objectives (BT.6 – Create)
- CO. 6. Asses the potentialities of learners to meet with future endeavors. (BT. 5 – Evaluate)


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PRACTICE 1:
BODY LANGUAGE

PRACTICE 2:
DEBATING

PRACTICE 3:
GROUP DISCUSSION

PRACTICE 4:
PRESENTATION SKILLS

PRACTICE 5:
RESUME / CV WRITING

PRACTICE 6:
INTERVIEW SKILLS

Lab Manual: Strengthen your Communication Skills by Dr.M.Hari Prasad, Dr.Salivendra J.Raju and Dr.G.Suvarna Lakshmi, Maruthi Publications, 2010

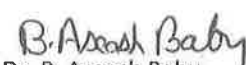
Reference Books:

1. Strengthen your Communication Skills by Dr.M.Hari Prasad, Dr.Salivendra J.Raju and Dr.G.Suvarna Lakshmi, Maruthi Publications.
2. English for Professionals by Prof Eliah, B.S Publications, Hyderabad.
3. A practical Course in effective English speaking skills, PHI
4. Spring Board to Success, Orient Black Swan
5. Cornerstone, developing soft skills, Pearson Education.


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B.V.C ENGINEERING COLLEGE::Odalarevu

(Autonomous)

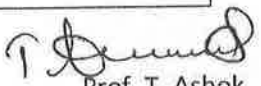
Department of Science and Humanities (English)

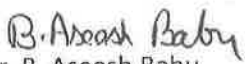
Text Books & Reference Books for English Course

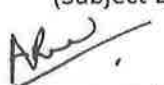
S.No	Name of the subject	Text Books
1	<i>English-I</i>	Detailed Text Book English Essentials' by Orient Black Swan Publishers, Hyd Non Detailed Text Book : Trail Blazers by Orient Black Swan Publishers, Hyd
2	<i>English Communications Lab</i>	Interact English Lab Manual for Undergraduate Students by Orient Black Swan Pvt. Ltd. Publishers
3	<i>Reference Books</i>	1.Strengthen your Communication Skills by Dr.M.Hari Prasad, Dr.Salivendra J.Raju and Dr.G.Suvarna Lakshmi, Maruthi Publications. 2.English for Professionals by Prof Eliah, B.S Publications, Hyderabad. 3.A practical Course in Effective English Speaking Skills, PHI 4. Spring Board to Success, Orient Black Swan 5. Cornerstone, Developing Soft Skills, Pearson Education. 6. Communication Skills by Sanjay Kumar , Pushpa Lata , Oxford University Publications.


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B.V.C ENGINEERING COLLEGE (A):: ODALAREVU

SCIENCE AND HUMANITIES

I B.Tech – I Sem – Descriptive Exam

COMMUNICATIVE ENGLISH

(Common to all branches)

Time: 90 Minutes

Max. Marks: 30

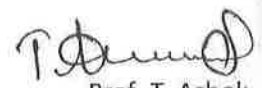
Answer all questions

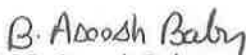
All questions carry equal marks

- | | | | | | |
|---|---|---|----|------|------|
| 1 | a | Life cannot exist without water- Explain. | L2 | CO 3 | [5M] |
| | b | Describe G.D. Naidu's travels and experiences in his life. | L2 | CO 6 | [5M] |
| 2 | a | Examine the narrator's attitude towards the woodrose creeper change after she sees its flowers in the vase? | L3 | CO 4 | [5M] |
| | b | Support your reasons as A.J.Sam plays a vital role in Gopinath's future development. | L5 | CO 6 | [5M] |
| 3 | a | List out your reasons that Eddies's death was an act of patriotism. | L1 | CO 5 | [5M] |
| | b | Prepare an essay on 'the way Covid-19 has impacted on social and economical life;. | L6 | CO 6 | [5M] |


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Mode

B.V.C ENGINEERING COLLEGE (A):: ODALAREVU

SCIENCE AND HUMANITIES

I B.Tech I Semester Objective Examination Model paper

COMMUNICATIVE ENGLISH (CODE....)

(Common to all branches)

Time: 20 Minutes

Max. Marks: 20

Name: _____

Reg. No : _____

Branch -Section:

Signature of the Student _____

Signature of the Invigilator _____

Answer all questions

Each question carries 1 mark

Choose the right answer from the given options

1. What was G.D. Naidu's first job? []
A) Mechanic B) waiter C) Agricultural labour D) None
2. What is the cheering sight mentioned in Water: The elixir of life []
A) Rain fed tanks B) Lakes C) Rivers D) Oceans
3. What war was Gopinath involved in during his time in the army? []
A) 1962 Indo-China B) 1971 Indo-Pak C) World War II D) Kargil war
4. Choose the meaning for the word: Pugnacious []
A) silly not important B) keep on quarreling C) rejoice D) bitter
5. Fill in the blank with the most appropriate phrasal verb: I must----- my cupboard. []
A) clear off B) clear out C) clear away D) clear
6. One who believes that people are self-centered and insincere _____ []
A) amateur B) infallible C) credulous D) cynic
7. Choose the correct meaning of the word: Mutilated []
A) Strong felling B) Removing a part of something or someone's body
C) A deep hole C) A final threat
8. How does C.V. Raman show that water is the real elixir of life? []
(A) Water exists in all plants and animal forms (B) Life cannot exist on earth without water.

(C) Waterways can be used as means of cheap effective transport. (D) All the above

9. The narrator's son in The Wood rose cuts the creeper because-----

[]

A) quarreled with his wife B) does not like his mother water it C) It was blocking the light

D) It was not thriving

10. H. J. Bhabha went to Cambridge and studied -----

[]

A) physics B) chemistry C) Engineering D) Mathematics

11. Choose the most appropriate verb form:

This time tomorrow, I ----- bench tomorrow.

[]

A) Will be lying B) am lying C) will lie D) lie

12. Planting of the appropriate type of vegetation will result in....

[]

A) The continuance of successful agriculture B) The terracing of the land

C) Preventing environmental pollution D) Reducing the momentum of the flow of water

13. Choose the correct meaning of the word: Drudgery

[]

A) To look after B) To decorate C) Hard boring work D) To pretend

14. What awards did Sudha Murthy get in 2006?

[]

A) Padma Award B) Rajya Lakshmi Award C) FICCI Award 4) Padma Sri Award

15. What is the meaning of the word: Ikebana?

[]

A) The art of Japanese flower arrangement B) to think C) without any taste or flavor D) to give a abrupt order

16. Ruts are formed by -----

[]

A) Seasonal rainfall B) Plain water C) Rapidly flowing rain water D) The upper layer of the soil

17. "There was no decency in his death!" Whose death is referred here?

[]

A) Tom Meldon B) Hannah C) Eddie Meldon D) Corrie

18. J.C. Bose who came into contact with the renowned scientist Lord Rayleigh at -----

[]

A) Oxford University B) Texas University C) IISC D) Cambridge University

19. Identify the meaning of the idiom: A storm in the tea cup

[1]

A) to be upset or annoyed B) feel bored C) be extremely happy D) a lot of fuss over nothing

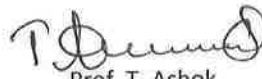
20. Synonym of the word: Savage

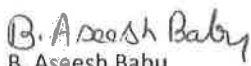
[1]

A) physical attack B) Tame C) refined D) calm


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Model

COURSE CODE: 20HS1T01 (ECE & EEE)
20HS2T01 (CIV, MECH, CSE & CAD)

B.V.C ENGINEERING COLLEGE (A):: ODALAREVU

SCIENCE AND HUMANITIES

I B.Tech – I Sem – Model Paper

COMMUNICATIVE ENGLISH

(Common to all branches)

Time: 3 Hrs

Max. Marks: 60

Question Paper consists of Part-A and part-B

Answer ALL the questions in Part-A

Answer any FOUR Questions from Part-B

PART-A (6X2=12 MARKS)

- 1.a) What situation The Astrologer Day based on? (2M)
- b) Why was Kalam visiting the state of Jharkhand? (2M)
- c) How does water help in the formation of fertile land? (2M)
- d) What kind of life does the narrator lead in her son's home? (2M)
- e) List three inventions Naidu created or helped to create. (2M)
- f) What field of study was Bhabha interested in? (2M)

PART-B (4X12 = 48 MARKS)

2. a) What techniques did the astrologer use to surprise and satisfy his customers? (6 Marks)
- b) What's the contribution of G.D. Naidu towards the development of Indian industrial field?(6M)
3. a) What does Kalam think about 'value addition' in India? (6 Marks)
- b) Write the rags to riches story of G.R. Gopinath. (6 Marks)
4. a) Why water is considered one of the most powerful and wonderful things on the earth in the perspective of C.V.Raman? (6 Marks)
- b) Sudha Murthy is an ideal entrepreneur – Discuss (6 Marks)
5. a) How does the narrator's attitude to the woodrose creeper change after she sees its flowers in a vase? (6 Marks)
- b) Describe the contribution of J.C. Bose on plant sciences. (6 Marks)
6. a) What were Homi Jahangir Bhaba's efforts to set up research institutes in India? (6 Marks)

b) Write an email to your university Vice-chancellor suggesting about the implementation of unified engineering syllabus in all over India. (6 Marks)

7. a) Rearrange the following jumbled sentences in correct order. (6 Marks)

- a. The commercial uses of bamboo are astonishing.
- b. India produces over 3 million tonnes of bamboo annually, and nearly half of it is turned into paper.
- c. Another important use of bamboo is in housing.
- d. Concrete reinforced with bamboo can replace even steel in building, for example, suspension bridges.
- e. Scientists at the Forest Research Institute, Dehradun, are working on the extraction of diesel fuel from the jointed stem of bamboo.
- f. With its network of rhizomes and roots, bamboo also plays an important role in the prevention of soil erosion.

b) Answer the following with suitable prepositions. (3 Marks)

- a. Mani's clients are happy ----- his work.
- b. We are sorry ----- having disturbed you.
- c. The woman ----- car is my neighbor.

c) Correct the following sentences. (3 Marks)

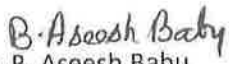
- a. I didn't find no one in the office on Sunday.
- b. She can take care of herself.
- c. Whom are these shoes?

Model


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BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE – ODALAREVU
(AUTONOMOUS)
I B.Tech LAB INTERNAL MARKS ASSESMENT

ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB

CODE: 20HS1L01 (EEE & ECE)
20HS2L01 (CIV, MECH, CSE & CAD)

INTERNAL LAB ASSESMENT (25 Marks)

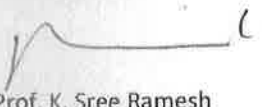
Day to Day Activities : 10 Marks

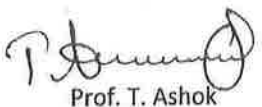
Record : 05 Marks

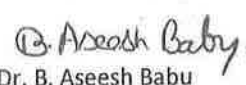
Internal Test : 10 Marks

Total 25 Marks


A.D. Madhuri
(Charman-BOS)


Prof. K. Sree Ramesh
(University Nominee)


Prof. T. Ashok
(Subject Expert)


Dr. B. Aseesh Babu
(Subject Expert)


Dr. A. Nageswara Rao
(Member of BOS)

Lab Intern
I year

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE – ODALAREVU
(AUTONOMOUS)
I B.Tech LAB EXTERNAL MARKS ASSESMENT

ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB

CODE: 20HS1L01 (EEE & ECE)
20HS2L01 (CIV, MECH, CSE & CAD)

EXTERNAL LAB ASSESMENT (50 Marks)

Written Exam : 20 Marks

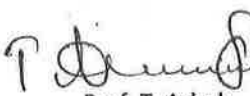
Activity : 10Marks

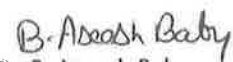
Viva Voce by the External : 20 Marks

Total 50 Marks


A.D. Madhuri
(Charman-BOS)


Prof. K. Sree Ramesh
(University Nominee)


Prof. T. Ashok
(Subject Expert)


Dr. B. Aseesh Babu
(Subject Expert)


Dr. A. Nageswara Rao
(Member of BOS)

Lab Ex
I. year

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE – ODALAREVU
(AUTONOMOUS)
IV B.Tech LAB INTERNAL MARKS ASSESMENT

ENGLISH FOR EMPLOYABILITY LAB

CODE:

INTERNAL LAB ASSESMENT (25 Marks)

Day to Day Activities: 10 Marks

Record : 05 Marks

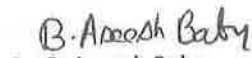
Internal Test : 10 Marks

Total 25 Marks


A.D. Madhuri
(Charman-BOS)


Prof. K. Sree Ramesh
(University Nominee)


Prof. T. Ashok
(Subject Expert)


Dr. B. Aseesh Babu
(Subject Expert)


Dr. A. Nageswara Rao
(Member of BOS)

Copy : Enter
Marked

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE – ODALAREVU
(AUTONOMOUS)
IV B.Tech LAB EXTERNAL MARKS ASSESMENT

ENGLISH FOR EMPLOYABILITY LAB

CODE:

EXTERNAL LAB ASSESMENT (50 Marks)

Written Exam : 20 Marks

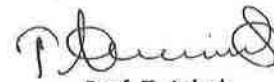
Activity : 10Marks

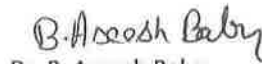
Viva Voce by the External : 20 Marks

Total 50 Marks


A.D. Madhuri
(Charman-BOS)


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Prof. T. Ashok
(Subject Expert)


Dr. B. Aseesh Babu
(Subject Expert)


Dr. A. Nageswara Rao
(Member of BOS)

Lab External
Assesment



B.V.C ENGINEERING COLLEGE:: Odalarevu (Autonomous)

Department of Science and Humanities
Subject: Chemistry

The Board of Studies Meeting of DEPARTMENT OF SCIENCE and HUMANITIES for Chemistry course was convened at 12.00 pm on 23-01-2021 through Online (ZOOM) mode under the chairmanship of Ms. A.D. Madhuri, Head of the Department. The members present discussed various aspects such as changes to be made in the Syllabi, Scheme of Evaluation and model papers for theory and practical exams for implementing them during the I, II semesters for the academic year 2020-2021 onwards. The following members were present.

S.No.	Name of the Members	Signature
1	A.Durga Madhuri Associate Professor HOD Chairman of BOS	
2	Dr. S Satya Veni Assistant Professor JNTUK , Kakinada	
3	Dr. K V Subba Raju Professor, S R K R Engineering College, Bhimavaram	K.V.Subba -
4	Dr. A. Venkateswara Rao Professor, S K B R College, Amalapuram	
5	E S V Subrahmanyam, Associate Professor Department of Science and Humanities, B.V.C Engineering College, Odalarevu.	
6	Ch. S.Srilatha Assistant Professor Department of Science and Humanities, B.V.C Engineering College, Odalarevu.	
7	B.Sushma Assistant Professor Department of Science and Humanities, B.V.C Engineering College, Odalarevu.	

Chairman (BOS)
Ms. A. Durga Madhuri

Department of Science & Humanities
BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE – ODALAREVU
(AUTONOMOUS)

DATE : 23rd January, 2021
VENUE: Through online (Zoom) meeting

TIME: 12.00 P.M

AGENDA

1. Welcome Address by Chairman-BOS.
2. Discussion on proposed course structure of B. Tech and ratification of the same.
3. Discussion on proposed B. Tech First Year Chemistry courses syllabi ratification of the same.
4. Ratification of the proposed model papers for Internal(subjective& objective) and External examinations of both theory and laboratory courses for Under Graduate (B.Tech)
5. Finalization of names of reputed institutions for setting question paper and valuation of Answer scripts.
6. Finalization of text books and reference books.
7. Any other item.

Copy to :

- 1) Mr.E.S.V.Subrahmanyam
Assoc. Professor.
- 2) Mrs.Ch.S.Srilatha
Asst. Professor
- 3) Mrs. P Jaya Lakshmi
Asst. Professor.
- 4) Mrs B Sushma
Asst. Professor.
- 5) Dr. K V Subbaraju
Professor,
SRKR Engineering College.
- 6) Dr.A.Venkataswara Rao
Professor,
SKBR College.
- 7) Dr. S Satyaveni
Asst. Professor, JNTUK, Kakinada


Chairman of BOS



B.V.C ENGINEERING COLLEGE::Odalarevu
(Autonomous)

Department of Science and Humanities

RESOLUTIONS TAKEN:

1. Considered item No.2.

Resolved to ratify the proposed course structure for B.Tech Programme for 1st year and semesters.

The approved course structures are enclosed herewith. (Annexure-I for B.Tech)

2. Considered item No.3.

Resolved to ratify the proposed syllabi of following courses of first year B.Tech Programmes.

S.No	Name of the Programme	Name of the Course
1.	I B.Tech	Engineering Chemistry I-I
		Engineering Chemistry Lab I-I
		Applied Chemistry I-II
		Applied Chemistry Lab I-II
		Induction Training I-I
		Indian Constitution I-II

The approved syllabi are enclosed herewith. (Annexure III(a, b, c) for B.Tech);

3. Considered Item No.4.

Resolved to ratify the proposed **scheme of model papers** for internal and external examinations (theory & Lab) of Both B.Tech Programme.

The approved scheme of model papers are enclosed herewith. (Annexure-V for B.Tech)

4. Considered Item No.5.

Resolved to Approve for **setting of question papers and valuation of answer scripts** from reputed institutions including State, Central Universities and NITs

5. Considered Item No.6.

Resolved to ratify the **text books and reference books** as mentioned in the Item No.3

Members suggested to incorporate some important web links or URLs in every subject as references. Accordingly their suggestions were implemented in every subject of B.Tech Programmes

6. Considered Item No.7.

i. Resolved to conduct the BOS-Meeting at least once in a year

ii. Resolved to specify the subject codes for all courses in B.Tech Programmes

Finally chairman of BOS thanked all the members for their valuable inputs and active participation in the meeting.


Chairman of BOS

Applied Chemistry

Course Code: 20BS1T07

(CSE, CAD)

L T P C

3 0 0 3

Course Code: 20BS1T07

(EEE, ECE)

Course objectives

COB:1 Recognize the relative energies of bonding and anti bonding molecular orbitals and crystal field stabilization energy.

COB:2 Understand the basic principles of spectroscopy where electromagnetic radiation interacts with Chemical substances.

COB:3 To impart the knowledge of water treatment, setting of cement and repair of concrete structures, Nano materials.

course outcomes

CO:1 Analyze microscopic chemistry in terms of atomic and molecular orbitals.

CO:2 Distinguish the range of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques.

CO:3 Solve the numerical problems on hardness of water and explain water treatment methods and Principles.

CO:4 Outline galvanic cells, reference electrodes, electrochemical series, analyze the corrosion of metals and apply a suitable method of corrosion prevention.

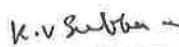
CO:5 Summarize the methods of synthesis, properties and applications of nano materials.

CO:6 Understand the preparation, properties and applications of some polymers and elastomers.

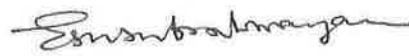

A.D. Madhuri

(chairman-BOS)


Dr. S. Satya Veni
(University Nominee)


Dr. K. V. Subba Raju
(Subject Expert)


Dr. A. Venkateswara Rao
(Subject Expert)


Mr. E. S. V. Subrahmanyam
(Member, BOS)

UNIT-I

8 - HOURS

Molecular Orbital Theory and Coordination Compounds:

Linear Combination Of Atomic Orbitals – Molecular orbital theory – homo nuclear diatomic molecules ($H_2, He_2, He_2^+, Li_2, Be_2, B_2, C_2, N_2, O_2, O_2^+, O_2^-, F_2$ and Ne_2). Application of Molecular orbital theory for bonding in metals.

Introduction to coordination compounds- crystal field theory and splitting of d-orbitals in octahedral, tetrahedral and square planar complexes, factors effecting crystal field splitting.

UNIT-II

10 - HOURS

Spectroscopic techniques and applications:

UV: Introduction - electronic energy levels-electronic transitions-absorption laws-chromophores and auxochromes - bathochromic shift - hypsochromic shift- hyper chromic shift – hypochromic shift-Applications.

IR: Introduction - basic theory - selection rules - absorption of infrared radiation and molecular vibrations-Applications.

NMR: Introduction-spin active nuclei behaving as nuclear magnets- energy absorption and resonance-relaxation phenomenon-commonly used NMR solvents – chemical shift-factors influencing the chemical shift shielding and deshielding-Applications.

UNIT-III

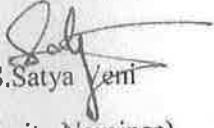
9 - HOURS

Water Technology:

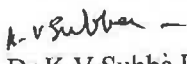
Introduction - hardness of water - calcium carbonate equivalents - units of hardness - causes of hardness - types of hardness, disadvantages of hard water. Determination of hardness by EDTA. Boiler troubles - priming and foaming, scale and sludge formation, boiler corrosion, caustic embrittlement - softening of hard water: lime - soda process, zeolite process and ion exchange process. Water purification by Reverse Osmosis for drinking and Industry.


A.B. Madhuri

(chairman-BOS)


Dr.S. Satya Veni

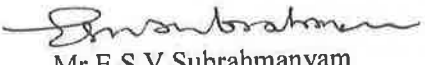
(University Nominee)


Dr.K.V. Subba Raju

(Subject Expert)


Dr.A. Venkateswara Rao

(Subject Expert)


Mr.E.S.V. Subrahmanyam

(Member , BOS)

10 - HOURS

UNIT-IV

Electrochemistry and Corrosion:

Introduction to electrochemistry galvanic cells, single electrode potential, standard electrode potential, electro chemical series, E.M.F of cell and its measurements, Nernst equation, electrolyte concentration cells, reference electrodes- Standard Hydrogen Electrode & Standard Calomel Electrode. Reversible and irreversible cells. Lithium Batteries for Electric Vehicles and electronic devices.

Corrosion:-

Chemical and electro chemical corrosion – mechanism - Galvanic corrosion, pitting corrosion – passivity - Factors influencing corrosion- Electrochemical Principles to control corrosion.

9 - HOURS

UNIT-V

Chemistry of Engineering Materials:

Components of Portland cement, their chemical Composition and Properties, setting and hardening of cement, Cements for special purpose- Repair of concrete structures using special additives.

Nano Materials:- Introduction – sol-gel method - characterization by Brunauer –Emmett-Teller, Transmission Electron Microscopic methods-properties and applications of Nano materials, Fullerenes and Nanotubes. Preparation of Nanotubes.

10 - HOURS

UNIT-VI

High Polymers:

Introduction - addition and condensation polymerization - effect of polymer structure on properties. Thermoplastics and Thermosetting plastics - Preparation, Properties and Applications of PVC, Polycarbonates and Bakelite. Biodegradable Polymers. Advantages of plastics and how to reuse, recycle and manage/dispose of plastic waste.

Elastomers:-

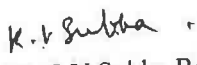
Natural rubber - vulcanization of rubber - preparation, properties and applications of Buna-S, Buna-N, Thiokol and Polyurethanes.

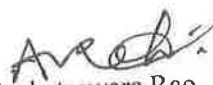

A.D. Madhuri

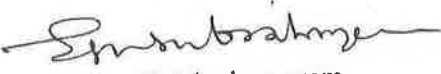
(chairman-BOS)


Dr. S. Satya Veni

(University Nominee)


Dr. K. V. Subba Raju
(Subject Expert)


Dr. A. Venkateswara Rao


Mr. E. S. V. Subrahmanyam

(Subject Expert)

(Member , BOS)

Standard books:

- i) Engineering chemistry by jain and jain: Dhanpat Rai publishing company
- ii) Engineering chemistry –fundamentals and applications by SHIKHA AGARWAL-
Cambridge University press
- iii) Engineering chemistry by R.P.Mani,K.N.Mishra,B.Ramadevi,V.R.reddy Cengage Learning

Reference books:

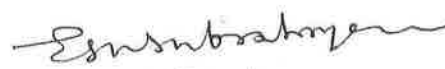
- i) University chemistry by B.H. Mahan
- ii) Engineering chemistry by K.Sesha Maheswaramma mridula chugh pearson publications


A.D. Madhuri
(chairman-BOS)


Dr.S. Satya Veni
(University Nominee)


Dr.K. V. Subba Raju
(Subject Expert)


Dr.A. Venkateswara Rao
(Subject Expert)


Mr.E.S. V. Subrahmanyam
(Member , BOS)

LIST OF EXPERIMENTS IN APPLIED CHEMISTRY LAB

Course code: 20BS1L03 (CSE&CAD)

L T P C

20BS1L03 (EEE&ECE)

0 0 3 1.5

COURSE OBJECTIVE: The purpose of the titration is the detection of the equivalence point at which chemically equivalent amount of the reactants have been mixed.

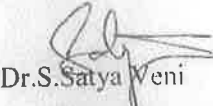
Outcomes: The students entering into the professional course have practically very little exposure to lab classes. The experiments introduce volumetric analysis; redox titrations with different indicators. EDTA titrations; then they are exposed to a few instrumental methods of chemical analysis. Thus at the end of lab course, the student is exposed to different methods of chemical analysis and use of some commonly employed instruments. They thus acquire some experimental skills.

Experiments

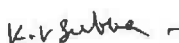
1. Introduction to chemistry laboratory-Molarity, Normality, primary, secondary standard solutions, Volumetric titrations, Qualitative analysis, Quantitative analysis etc.
2. Determination of alkalinity of a sample containing Na_2CO_3 and NaHCO_3 .
3. Determination of KMnO_4 using standard oxalic acid solution.
4. Determination of Ferrous iron using standard $\text{K}_2\text{Cr}_2\text{O}_7$ solution.
5. Determination of Copper Using standard $\text{K}_2\text{Cr}_2\text{O}_7$ solution.
6. Determination of temporary and permanent hardness of water using standard EDTA solution.
7. Determination of copper using standard EDTA solution.
8. Determination of pH of the given sample solution using pH meter.
9. Conductometric titration between strong acid and strong base.


A.D. Madhuri

(chairman-BOS)


Dr. S. Satya Veni

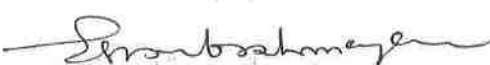
(University Nominee)


Dr. K. V. Subba Raju

(Subject Expert)


Dr. A. Venkateswara Rao

(Subject Expert)


Mr. E. S. V. Subrahmanyam

(Member, BOS)

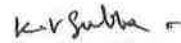
10. Conductometric titration between strong acid and weak base.
11. Determination of zinc using standard EDTA solution.
12. Potentiometric titration between strong acid and strong base.
13. To determine available chlorine in bleaching powder.
14. Preparing a Printed Circuit Board using Ferric Chloride Solution.

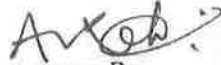
Reference books:

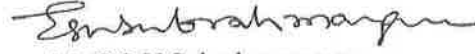
1. A Textbook of quantitative analysis: Arthur I. Vogel.
2. Dr. Jyotsna Cherukuri (2012) Laboratory Manual of engineering chemistry-II, VGS Techno series.
3. Chemistry practical Manual, Lorven publications.
4. K. Mukkanti (2009) practical Engineering chemistry, B.S. Publication.


A.D. Madhuri
(chairman-BOS)


Dr. S. Satya Veni
(University Nominee)


Dr. K. V. Subba Raju
(Subject Expert)


Dr. A. Venkateswara Rao
(Subject Expert)


Mr. E. S. V. Subrahmanyam
(Member, BOS)

Engineering Chemistry

Course Code: 20BS1T08

(CE, ME)

L T P C

3 0 0 3

Course objectives

COB:1 Recognize the relative energies of bonding and anti bonding molecular orbitals and crystal field stabilization energy.

COB:2 Fuels as a source of energy are a basic need of any industry, particularly industries like thermal power stations, steel industry, fertilizer industry etc.

COB:3 To impart the knowledge of water treatment, setting of cement and repair of concrete structures, Nano materials.

course outcomes

CO:1 Analyze microscopic chemistry in terms of atomic and molecular orbitals.

CO:2 Explain types of fuels, analysis of coal, refining of petroleum, gaseous of fuels, problems on combustion.

CO:3 Solve the numerical problems on hardness of water and explain water treatment methods and Principles.

CO:4 Outline galvanic cells, Reference electrode, electrochemical series, analyze the corrosion of metals and apply a suitable method of corrosion prevention.

CO:5 Summarize the methods of synthesis, properties and applications of nano materials.

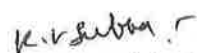
CO:6 Understand the preparation, properties and applications of some polymers and elastomers.


A.D. Madhuri

(chairman-BOS)


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(University Nominee)


Dr. K. V. Subba Raju

(Subject Expert)


Dr. A. Venkateswara Rao

(Subject Expert)


Mr. E. S. V. Subrahmanyam

(Member, BOS)

UNIT-I**8 - HOURS****Molecular Orbital Theory and Coordination Compounds:**

Linear Combination of Atomic Orbitals – Molecular orbital theory – homo nuclear diatomic molecule ($H_2, He_2, He_2^+, Li_2, Be_2, B_2, C_2, N_2, O_2, O_2^+, O_2^-, F_2$ and Ne_2). Application of Molecular orbital theory for bonding in metals.

Introduction to coordination compounds- crystal field theory and splitting of d-orbitals in octahedral, tetrahedral and square planar complexes, factors effecting crystal field splitting.

UNIT-II**10 - HOURS****Fuel Technology:**

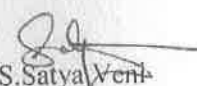
Introduction-Classification of fuels - solid fuels – coal - Proximate and ultimate analysis of coal - calorific value – Higher Calorific Value and Lower Calorific Value - Dulong's formula - Bomb calorimeter - Numerical problems on calorific value - Liquid fuels - petroleum refining – cracking - synthetic petrol - petrol knocking - Diesel knocking. Gaseous fuels - Natural gas, Liquified Petroleum Gas and Compressed Natural Gas – combustion - calculation of air for the combustion of a fuel.

UNIT-III**9 - HOURS****Water Technology:**

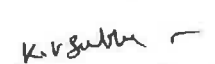
Introduction - hardness of water - calcium carbonate equivalents - units of hardness - causes of hardness - types of hardness, disadvantages of hard water. Determination of hardness by EDTA. Boiler troubles - priming and foaming, scale and sludge formation, boiler corrosion, caustic embrittlement - softening of hard water: lime - soda process, zeolite process and ion exchange process. Water purification by Reverse Osmosis for drinking and Industry.


A.D. Madhuri

(chairman-BOS)


Dr. S. Satya Venk

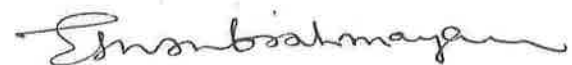
(University Nominee)


Dr. K. V. Subba Raju

(Subject Expert)


Dr. A. Venkateswara Rao

(Subject Expert)


Mr. E. S. V. Subrahmanyam

(Member, BOS)

UNIT-IV

10 - HOURS

Electrochemistry and Corrosion:

Introduction to electrochemistry galvanic cells, single electrode potential, standard electrode potential, electro chemical series, E.M.F of cell and its measurements, Nernst equation, electrolyte concentration cells, reference electrodes- Standard Hydrogen Electrode & Standard Calomel Electrode Reversible and irreversible cells. Lithium Batteries for Electric Vehicles and electronic devices.

Corrosion:-

Chemical and electro chemical corrosion – mechanism - Galvanic corrosion, pitting corrosion – passivity - Factors influencing corrosion- Electrochemical Principles to control corrosion.

UNIT-V

9 - HOURS

Chemistry of Engineering Materials:

Components of Portland cement, their chemical Composition and Properties, setting and hardening of cement, Cements for special purpose-Repair of concrete structures using special additives.

Nano Materials:- Introduction – sol-gel method - characterization by Brunauer –Emmett-Teller, Transmission Electron Microscopic methods-properties and applications of Nano materials, Fullerenes and Nanotubes.Preparation of Nanotubes.

UNIT-VI

10 - HOURS

High Polymers:

Introduction - addition and condensation polymerization - effect of polymer structure on properties. Thermoplastics and Thermosetting plastics - Preparation, Properties and Applications of PVC, Polycarbonates and Bakelite.Biodegradable Polymers.Advantages of plastics and how to reuse, recycle and manage/dispose of plastic waste.

Elastomers:-

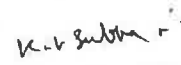
Natural rubber - vulcanization of rubber - preparation, properties and applications of Buna-S, Buna-N, Thiokol and Polyurethanes.


A.D. Madhuri

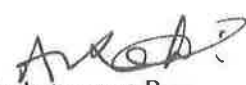
(chairman-BOS)


Dr.S. Satya Veni

(University Nominee)


Dr.K. V. Subba Raju

(Subject Expert)


Dr.A. Venkateswara Rao

(Subject Expert)


Mr.E.S.V. Subrahmanyam

(Member , BOS)

Standard books:

- i) Engineering chemistry by jain and jain: Dhanpat Rai publishing company
- ii) Engineering chemistry –fundamentals and applications by SHIKHA AGARWAL-Cambridge University press
- iii) Engineering chemistry by R.P.Mani,K.N.Mishra,B.Ramadevi,V.R.reddy Cengage Learning

Reference books:

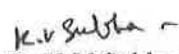
- i) University chemistry by B.H. Mahan
- ii) Engineering chemistry by K.Sesha Maheswaramma mridula chugh pearson publications


A.D. Madhuri

(chairman-BOS)


Dr.S. Satya Veni

(University Nominee)


Dr.K.V. Subba Raju

(Subject Expert)


Dr.A. Venkateswara Rao

(Subject Expert)



Mr.E.S.V. Subrahmanyam

(Member , BOS)

LIST OF EXPERIMENTS IN ENGINEERING CHEMISTRY LAB

Course code: 20BS1LO4(CE,ME)

L T P C

0 0 3 1.5

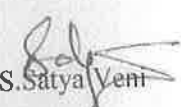
COURSE OBJECTIVE: The purpose of the titration is the detection of the equivalence point at which chemically equivalent amount of the reactants have been mixed.

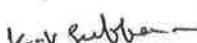
Outcomes: The students entering into the professional course have practically very little exposure to lab classes. The experiments introduce volumetric analysis; redox titrations with different indicators. EDTA titrations; then they are exposed to a few instrumental methods of chemical analysis. Thus at the end of lab course, the student is exposed to different methods of chemical analysis and use of some commonly employed instruments. They thus acquire some experimental skills.

List of Experiments

1. Introduction to chemistry laboratory-Molarity, Normality, primary, secondary standard solutions, Volumetric titrations, Qualitative analysis, Quantitative analysis etc.
2. Determination of alkalinity of a sample containing Na_2CO_3 and NaHCO_3 .
3. Determination of KMnO_4 using standard oxalic acid solution.
4. Determination of Ferrous iron using standard $\text{K}_2\text{Cr}_2\text{O}_7$ solution.
5. Determination of copper using standard $\text{K}_2\text{Cr}_2\text{O}_7$ solution.
6. Determination of temporary and permanent hardness of water using standard EDTA solution.
7. Determination of copper using standard EDTA solution.
8. Determination of pH of the given sample solution using pH meter.
9. Conductometric titration between strong acid and strong base.


A.D. Madhuri
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Mr. E. S. V. Subrahmanyam
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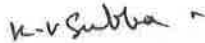
10. Conductometric titration between strong acid and weak base.
11. Determination of zinc using standard EDTA solution.
12. Potentiometric titration between strong acid and strong base.
13. To determine available chlorine in bleaching powder.
14. Preparing a Printed Circuit Board using Ferric Chloride Solution.

Reference books:

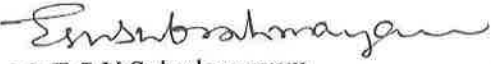
1. A Textbook of quantitative analysis: Arthur I. Vogel.
2. Dr. Jyotsna Cherukuri (2012) Laboratory Manual of engineering chemistry-II, VGS Techno series.
3. Chemistry practical Manual, Lorven publications.
4. K. Mukkanti (2009) practical Engineering chemistry, B.S. Publication.


A.D. Madhuri
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(Member, BOS)



B.V.C ENGINEERING COLLEGE::Odalarevu
(Autonomous)

B.Tech I year I Sem [Model Paper- External]

(Applied & Engineering Chemistry Lab)

Course Code:20BS1L03(CSE&CAD)
20BS2L03(ECE&EEE)

Time: 3 Hrs

Date:
Max .Marks: 50

1) Determination of hardness by EDTA method?

SCHEME OF EVALUATION

1. Record: 10 M

2. Practical: 40 m

a) Procedure (in first 10minutes)	-	10 M
b) Standardization of problem solution	-	5 M
c) Tabulation	-	5 M
d) Viva voce	-	5 M
e) For result	-	15 M

Total 50 M

Marks assessment for Result:

<1% - 15M

1-1.5% - 10M

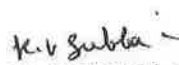
above 2% - 7M


A.B. Madhuri

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(Member , BOS)



B.V.C ENGINEERING COLLEGE::Odalarevu

(Autonomous)

B.Tech I year I Sem [Model Paper- Internal]

(Applied & Engineering Chemistry Lab)

Course Code: 20BS1L03(CSE&CAD)
20BS2L03(ECE&EEE)

Time: 2 Hrs

Date:
Max .Marks: 25

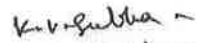
1) Determination of KMnO_4 using standard oxalic acid solution.

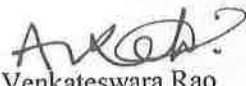
SCHEME OF EVALUATION

1. Observation (Day to Day work)	10 M
2. Record	05 M
3. Internal Exam	10 M
Total	25 M


A.D. Madhuri
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BVC ENGINEERING COLLEGE::ODALAREVU

(AUTONOMOUS)

B.Tech I Year Sem [Model Paper –Internal]

APPLIED CHEMISTRY MID-1

Time: 90 Mins

MARKS-30

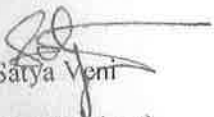
Course Code:20BS1T07 (CSE,CAD)

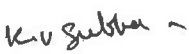
Course Code:20BS2T07(EEE,ECE)

I Answer all the questions

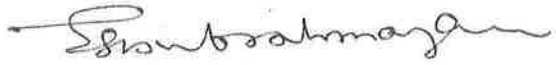
- | | CO | BL | MARKS |
|---|----|----|-------|
| 1 a) Draw diagram for the splitting of d-orbitals in octahedral complexes . | 1 | L4 | 5M |
| b) Write the M.O diagram of N ₂ molecule.Explain its bond order and magnetic property. | 1 | L1 | 5M |
| 2 a) Derive an expression for Lamberts Beer's law. | 2 | L3 | 5M |
| b) Explain chromophores and auxochromes. | 2 | L2 | 5M |
| 3 a) Draw a neat diagram and explain ion exchange process. | 3 | L4 | 5M |
| b) A water sample contains Ca(HCO ₃) ₂ =16.2mg/lit
CaSO ₄ =27.2mg/lit
MgSO ₄ =6mg/lit
Calculate temporary permanent and total hardness. | 3 | L3 | 5M |


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Mr.E.S.V.Subrahmanyam
(Member , BOS)

B.V.C ENGINEERING COLLEGE::ODALAREVU

AUTONOMOUS

Objective Paper - Applied Chemistry

Time:30 Mins

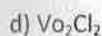
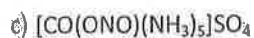
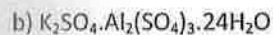
Max Marks:20

Answer all questions:

20x1=20 Marks

1. which of the following is a complex compound?

[]



2. The bond order of He_2^+ molecular ion is

[]

a) 1

b) 0.5

c) 1.5

d) 2

3. The formula for bond order

[]

a) $(N_a + N_b)/3$

b) $(N_a - N_b)/2$

c) $(N_a + N_b)/2$

d) $(N_b - N_a)/2$

4. The UV- Visible region is

[]

a) 200-400 nm

b) 300-600 nm

c) 400-800 nm

d) 200-800 nm

5. Source of I.R radiation

[]

a) Globar

b) Electric discharge

c) Incandescent solid

d) None

6. The reference used in NMR spectroscopy is

[]

a) tetra methyl silicon

b) trimethyl silicon

c) trimethyl siloxane

d) tetra methyl siloxane

7. The spectra that arises due to the transitions induced between the nuclear spin energy levels of a molecule and applied magnetic field is called

[]

a) IR

b) UV

c) NMR

d) NPF

8. Temporary hardness of water is removed by

[]

a) filtration

b) sedimentation

c) boiling

d) coagulation

9. One part of CaCO_3 equivalent hardness per 10^5 parts of water is called

[]

- a) degree Clark b) ppm c) degree French d) mg/l

10. Calgon is the trade name of

[]

- a) sodium silicate b) sodium hexa metaphosphate
c) sodium meta phosphate d) calcium phosphate

[]

11. Calomel is

- a) mercuric sulphate b) mercurous sulphate
c) mercurous chloride d) mercuric chloride

[]

12. The electrode potential of S.H.E is

- a) 1 V b) 2 V c) 3 V d) 0 V

[]

13. Corrosion is an example of

- a) oxidation b) reduction c) electrolysis d) erosion

[]

14. The following metal is used for the cladding of aluminium

- a) 99.5% pure Al b) 100% pure Al c) 98.5% pure Al d) 99% pure Al

[]

15. CNT is prepared by one of the following methods

- a) arc discharge b) electrolysis c) heating in presence of air d) oxidation

[]

16. A nanometer is

- a) 10^{-6} of a meter b) 10^{-8} of a meter c) 10^{-9} of a meter d) 10^{-7} of a meter

[]

17. Fullerenes form complexes with one of the following metals

- a) Zn b) Fe c) W d) Na

[]

18. A thermo plastic resin is formed by the phenomenon of

- a) chlorination b) condensation polymerisation
c) nitration d) chain polymerisation

19 The diameter of carbon nanotube is []

a) 1.5 nm

b) 1.6 nm

c) 1.8 nm

d) 1.3 nm

20. The resin present in polycarbonate is []

a) epoxy

b) phenol formaldehyde

c) poly isoprene

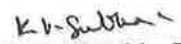
d) mercaptol


A.D. Madhuri

(chairman-BOS)


Dr. S. Satya Veni

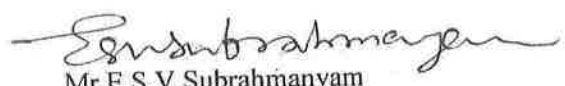
(University Nominee)


Dr. K. V. Subba Raju

(Subject Expert)


Dr. A. Venkateswara Rao

(Subject Expert)


Mr. E. S. V. Subrahmanyam

(Member, BOS)

BVC ENGINEERING COLLEGE:ODALAREVU

(AUTONOMOUS)

B.Tech I Year Sem [Model Paper –External]

APPLIED CHEMISTRY (COMMON TO ECE, EEE&CSE,CAD)

Time:3 hours

Max marks:60

Course Code:20BS1T07 (CSE,CAD)

Course Code:20BS2T07(EEE,ECE)

Question paper consists of part A and part B

Answer all questions in part-A

Answer any four questions from part-B

Part-A (6x2=12Marks)

- | | | | |
|---|-----|----|-----|
| I a) what are bonding and anti bonding orbitals ? | CO1 | 2M | BL1 |
| b) Define bathochromic shift. | CO2 | 2M | BL1 |
| c) What are scale and shuldge? | CO3 | 2M | BL1 |
| d) What is impressed current? | CO4 | 2M | BL1 |
| e) Explain Buckminster fullerene. | CO5 | 2M | BL2 |
| f) Explain the preparation of thikol. | CO6 | 2M | BL2 |

Part-B (4x12=48 Marks)

2. a) Discuss the salient features of crystal field theory. Discuss the spilliting of d- orbitals in case of octahedral and tetrahedral complexes.
- | | | | |
|--|-----|----|-----|
| | CO1 | 6M | BL2 |
|--|-----|----|-----|
- b) Explain M.O diagram for O₂ molecule and its propertie.
- | | | | |
|--|-----|----|-----|
| | CO1 | 6M | BL2 |
|--|-----|----|-----|
3. a) Explain electronic transitions taking place in UV spectroscopy.
- | | | | |
|--|-----|----|-----|
| | CO2 | 6M | BL2 |
|--|-----|----|-----|
- b) Explain splitting of NMR signals.
- | | | | |
|--|-----|----|-----|
| | CO2 | 6M | BL2 |
|--|-----|----|-----|
4. a) Describe Ion exchange process.
- | | | | |
|--|-----|----|-----|
| | CO3 | 6M | BL2 |
|--|-----|----|-----|
- b) Define hardness of water. How can you express hardness? Give the disadvantages of hard water.
- | | | | |
|--|-----|----|-----|
| | CO3 | 6M | BL2 |
|--|-----|----|-----|

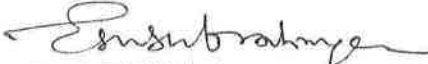
5. a) Discuss construction and working of calomel electrode.	CO4	6M	BL2
b) Explain rusting of iron using electro chemical theory.	CO4	6M	BL2
6 a) Explain any two methods of preparation of CNT.	CO5	6M	BL2
b) Summarize the reactions in setting and hardening of cement.	CO5	6M	BL2
7 a) Discuss the mechanism of addition polymerization.	CO6	6M	BL1
b) Explain preparation of			
i)PVC ii)Bakelite iii)Buna-s	CO5	6M	BL2


A.D.Madhuri
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(Member , BOS)

BVC ENGINEERING COLLEGE::ODALAREVU

(AUTONOMOUS)

B.Tech I Year Sem [Model Paper –Internal]

ENGINEERING CHEMISTRY MID-1

Time:90 Mins

MARKS-30

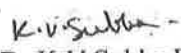
Course Code:20BS1T08 (CE , ME)

I Answer all the questions

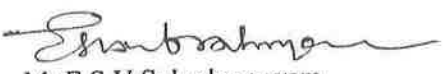
	CO	BL	MARKS
1 a) Draw diagram for the splitting of d-orbitals in octahedral complexes.	1	L4	5M
b) Write the M.O diagram of N_2 molecule.Explain its bond order and magnetic property .	1	L1	5M
2 a) Explain proximate analysis of coal.	2	L2	5M
b) Draw a neat diagram and explain Bergius process for preparing synthetic petrol.	2	L4	5M
3 a) Draw a neat diagram and explain ion exchange process.	3	L4	5M
b) A water sample contains $Ca(HCO_3)_2=16.2mg/lit$ $CaSO_4=27.2mg/lit$ $MgSO_4=6mg/lit$ Calculate temporary permanent and total hardness.	3	L3	5M


A.D.Madhuri
(chairman-BOS)


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(Subject Expert)


Mr.E.S.V.Subrahmanyam
(Member , BOS)

B.V.C ENGINEERING COLLEGE::ODALAREVU

AUTONOMOUS

Objective Paper-Engineering Chemistry

Max Marks:20

Time:30 mins

1. The coordination number of Fe in $[\text{Fe}(\text{CN})_6]^{3-}$ is []
a) 6 b) 3 c) 1 d) 2
2. EAN of copper in $[\text{Cu}(\text{NH}_3)_4]^{2+}$ is []
a) 35 b) 36 c) 49 d) 40
3. Molecule having unpaired electrons in anti bonding orbitals is []
a) N_2 b) O_2 c) C_2 d) B_2
- 4) The bond order in He_2^+ ion is []
a) 0 b) 1 c) 0.5 d) 2
- 5.The formula for bond order []
a) $\frac{1}{2}(\text{Na}-\text{Nb})$ b) $\frac{1}{2}(\text{Na}+\text{Nb})$ c) $\frac{1}{2}(\text{Nb}-\text{Na})$ d) $\frac{1}{3}(\text{Nb}-\text{Na})$
- 6.Silver chloride is soluble in ammonia due to the formation of []
a) $[\text{Ag}(\text{NH}_3)_2]^{2+}$ b) $[\text{Ag}(\text{NH}_3)]^+$ c) $[\text{Ag}(\text{NH}_3)_4]^+$ d) $[\text{Ag}(\text{NH}_3)_2]^+$
7. The amount of nitrogen in coal is determined by []
a) proximate analysis. b) heating in the absence of air. c) ultimate analysis.
d) burning it completely in air.
8. Isooctane has octane rating of []
a) 100 b) 0 c) 50 d) above 100
9. Which of the following is used as a get engine fuel? []
a) LPG b) power alcohol c) kerosene d) coal.
- 10.The process of splitting higher hydrocarbons into smaller hydrocarbon molecules is called []
a) pyrolysis b) decomposition c) cracking d) combustion.

11. The calorific value of a coal sample is higher if it's

[]

- a) moisture content is high. b) volatile matter is high.
c) fixed carbon content is high. d) ash content is high.

12) Bergius process of synthetic petrol involves mainly

[]

- a) catalytic hydrogenation of Coal. b) cracking of heavy oil.
c) heating coal alone under Pressure. d) passing water gas over hot powdered coal under pressure.

13) Hydrocarbon content in Gasoline is

[]

- a) C_1-C_4 b) C_4-C_{12} c) $C_{15}-C_{23}$ d) C_{20} above.

14) An example of primary solid fuel

[]

- a) coke b) coal gas c) lignite d) charcoal.

15) A Knocking sound is produced in internal combustion engines when the fuel

[]

- a) contains some water b) contains lubricating oil c) burns fast d) burns slow

16) Temporary hardness of water can be removed by

[]

- a) boiling b) filtration c) screening d) sedimentation

17) Blow down operation causes the removal of

[]

- a) scales b) sludge c) both of these d) hot water only

18) Calcium carbonate equivalents of 11.1 mg of calcium chloride is

[]

- a) 10 b) 1 c) 100 d) 5

19) Hardness of water is caused by

[]

- a) sodium chloride b) sodium carbonate c) calcium chloride d) potassium nitrate

20) Lime-soda process uses

[]

- a) $Ca(OH)_2$ b) Na_2CO_3 c) Both $Ca(OH)_2$ and Na_2CO_3 d) None of these.

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)
I-B.Tech I-Semester Regular/Supply End Examinations
ENGINEERING CHEMISTRY
(Common to:CE&ME)

Time:3 hours

Max.Marks:60

Question Paper consists of Part-A and Part-B
Answer ALL the question in Part-A
Answer any FOUR Questions from Part-B

PART-A(6X2= 12M)

1. a) Draw MO diagram for N_2 molecule. (2M)
- b) What is octane number? (2M)
- c) Calculate $CaCO_3$ equivalent of 24 mg of $MgSO_4$. (2M)
- d) Explain why silver cannot displace hydrogen from acids. (2M)
- e) What is Buckminster fullerene? (2M)
- f) What are elastomers?

PART-B(4X12=48M)

- 2.a) Explain molecular orbital diagram of O_2 and its properties. (6M)
- b) Discuss Splitting of d-orbitals in octahedral complexes. (6M)
- 3.a) Explain ultimate analysis of coal. (6M)
- b) A sample of coal was found to have the following percentage composition C=75%, H=5%, O=12%, N=3.3% and ash 4.7%. Calculate the minimum amount of air necessary for complete combustion of 1kg of coal. (6M)
- 4.a) What is boiler Corrosion? How is it caused? How can we prevent it? (6M)
- b) Explain the determination of total hardness of water by EDTA method. (6M)
- 5.a) Derive Nernst equation. (6M)
- b) Describe Galvanic corrosion and differential aeration corrosion. (6M)

6.a) Describe manufacture of Portland cement with the help of a neat labeled diagram (6M)

b) Write a note on preparation and applications of carbon nano tubes. (6M)

7.a) Distinguish between thermoplastics and thermosetting plastics (6M)

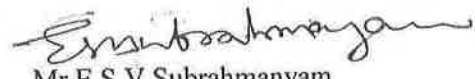
b) Write a note on disadvantages of raw rubber and Vulcanization of rubber. (6M)


A.D. Madhuri
(chairman-BOS)


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(University Nominee)


Dr.K. V. Subba Raju
(Subject Expert)


Dr.A. Venkateswara Rao
(Subject Expert)


Mr.E.S.V. Subrahmanyam
(Member , BOS)



B.V.C ENGINEERING COLLEGE::Odalarevu
(Autonomous)

Text Books & Reference Books for chemistry courses

s.no	Name of the subject	Text Books	Reference books
1	<i>Engineering chemistry</i>	1.Engineering chemistry by Jain And Jain: Dhanpat Rai publishing co 2.Unified chemistry by O.P Agarwal vol-i 3.Unified chemistry by O.P Agarwal vol-ii 4.Unified chemistry by O.P Agarwal vol-iii	1.University chemistry by B.H. Mahan 2.Principal applications by M.J. Sienko And R.A.Plane 3.Physical chemistry by P.W.Atkins 4.Fundamentals of molecular spectroscopy by C.N.Banwel 5.Organic chemistry: structure and function by K.P.C.Volhardt and N.E Schore 5 th edition
2	<i>Applied chemistry</i>	(1.Engineering chemistry by Jain And Jain: Dhanpat Rai publishing co 2.Unified chemistry by O.P Agarwal vol-i 3.Unified chemistry by O.P Agarwal vol-ii 4.Unified chemistry by O.P Agarwal vol-iii	1.University chemistry by B.H. Mahan 2.Principal applications by M.J. Sienko And R.A.Plane 3.Physical chemistry by P.W.Atkins 4.Fundamentals of molecular spectroscopy by C.N.Banwel 5.Organic chemistry: structure and function by K.P.C.Volhardt and N.E Schore 5 th edition


Chairman (BOS)
Ms. A. Durga Madhuri

Department of Science & Humanities

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE – ODALAREVU
(AUTONOMOUS)

DATE : 23rd January, 2021

TIME: 2:00 P.M

VENUE: THROUGH ONLINE (ZOOM)

AGENDA

1. Welcome Address by Chairman-BOS.
2. Discussion on proposed course structure of B. Tech and ratification of the same.
3. Discussion on proposed B. Tech Mathematics courses syllabi Mathematics syllabi and ratification of the same
4. Ratification of the proposed model papers for internal(subjective& objective) and external examinations of theory courses for Under Graduate (B.Tech)..
5. Finalization of names of reputed institutions for setting question paper and valuation of answer scripts.
6. Finalization of text books and reference books.
7. Any other item.

Copy to :

- 1) Mr.P Ganga Raju
Asst. Professor.
- 2) Mr. P V N Sagar
Asst. Professor.
- 3) Mr .P K V Subrahmanyam
Asst. Professor.
- 4) Mrs. B.Satya Jyothi
Asst. Professor.
- 5) Mrs. M Chaitanya
Asst. Professor.
- 5) Dr. T Sriram Murthy
Professor, HOD of Basic Sciences,
Sri Vishnu Engineering College for Women,
- 6) Dr. U Venugopalam
Asst. Professor,
IIT, Srikakulam.
- 7) Dr. G.V.S.R Deekshitulu
HOD.Department of Mathematics,
J N T U Kakinada.


Chairman of BOS



B.V.C ENGINEERING COLLEGE:: Odalarevu (Autonomous)

Department of Science and Humanities Subject: Mathematics

The Board of Studies Meeting of DEPARTMENT OF SCIENCE and HUMANITIES for Chemistry course was convened at 2.00 pm on 23-01-2021 through Online (ZOOM) mode under the chairmanship of Ms. A.D. Madhuri, Head of the Department. The members present discussed various aspects such as changes to be made in the Syllabi, Scheme of Evaluation and model papers for theory and practical exams for implementing them during the I, II semesters for the academic year 2020-2021 onwards. The following members were present.

S.No.	Name of the Members	Signature
1	A.Durga Madhuri Associate Professor HOD- S&H, Chairman of BOS.	
2	Dr. G.V.S.R.Deekshitulu HOD.Department of Mathematics, J N T U Kakinada	
3	Dr. T Sriram Murthy Professor, HOD of Dept., Basic Sciences, Sri Vishnu Engineering College for Women, Bhimavaram	
4	Dr. U Venu Gopalam Assistant Professor, IIIT, Srikakulam	
5	P.Gangaraju , Assistant Professor Department of Science and Humanities, B.V.C Engineering College, Odalarevu	
6	P V N Sagar, Assistant Professor Department of Science and Humanities, B.V.C Engineering College, Odalarevu	
7	P K V Subrahmanyam Assistant Professor Department of Science and Humanities, B.V.C Engineering College, Odalarevu	



B.V.C ENGINEERING COLLEGE::Odalarevu
(Autonomous)

Mathematics
Department of Science and Humanities

Minutes of meeting of the Board of Studies for mathematics subject in Department of Science and Humanities held on 23.01.2021 through online ZOOM meeting..

S.No.	Name of the Members	Signature
1	A.Durga Madhuri Associate Professor HOD- S&H, Chairman of BOS	
2	Dr. G.V.S.R.Deekshitulu HOD.Department of Mathematics, JNTU Kakinada	
3	Dr. T Sriram Murthy Professor, HOD of Dept., Basic Sciences, Sri Vishnu Engineering College for Women, Bhimavaram	
4	Dr. U Venu Gopalam Assistant Professor, IIIT, Srikakulam	
5	P.Gangaraju , Assistant Professor Department of Science and Humanities, B.V.C Engineering College, Odalarevu	
6	P V N Sagar, Assistant Professor Department of Science and Humanities, B.V.C Engineering College, Odalarevu	
7	P K V Subrahmanyam Assistant Professor Department of Science and Humanities, B.V.C Engineering College, Odalarevu	
8	B.Satya Jyothi ,Assistant Professor Department of Science and Humanities, B.V.C Engineering College, Odalarevu	
9	M . Chaitanya, Assistant Professor Department of Science and Humanities, B.V.C Engineering College, Odalarevu	



B.V.C ENGINEERING COLLEGE::Odalarevu
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Department of Science and Humanities

RESOLUTIONS TAKEN:

1. Considered item No.2.

Resolved to ratify the proposed course structure for B.Tech Programmes for 1st year and 2nd year

The approved course structures are enclosed herewith. (Annexure-I for B.Tech)

2. Considered item No.3.

Resolved to ratify the proposed syllabi of following courses of first year & 2nd year B.Tech Programmes.

S.No	Name of the Programme	Name of the Course
1.	I&II B.Tech	Linear Algebra & Differential Equations I-I
		Integral Transforms & calculus I-I
		Probability and Statistics II-I
		Numerical Methods & Complex Variables II-II
		Induction Training I-I
		Indian Constitution I-II

The approved syllabi are enclosed herewith. (Annexure III(a, b, c) for B.Tech).

3. Considered Item No.4.

Resolved to ratify the proposed **scheme of model papers** for internal and external examinations (theory) of B.Tech Programmes.

The approved scheme of model papers are enclosed herewith. (Annexure-V for B.Tech)

4. Considered Item No.5.

Resolved to Approve for **setting of question papers and valuation of answer scripts** from reputed institutions including State, Central Universities and NITs

5. Considered Item No.6.

Resolved to ratify the **text books and reference books** as mentioned in the Item No.3

Members suggested to incorporate some important web links or URLs in every subject as references. Accordingly their suggestions were implemented in every subject of B.Tech. Tech

Considered Item No.7.

- i. Resolved to conduct the BOS-Meeting at least once in a year
- ii. Resolved to specify the subject codes for all courses in B.Tech

Finally chairman of BOS thanked all the members for their valuable inputs and active participation in the meeting.


Chairman of BOS

I B.TECH I SEMESTER

LINEAR ALGEBRA AND DIFFERENTIAL EQUATIONS (Common to all Branches)

Course Code: 20BS1T01

L	T	P	C
3	0	0	3

Course Objectives:

- COB 1: To develop the basic mathematical skills those are imperative for effective Understanding of engineering subjects
- COB 2: To equip the students with the methods of solving system of linear equations and the Concepts of Eigen values and Eigen vectors.
- COB 3: To familiarize students with analytical methods to solve Ordinary differential equations.

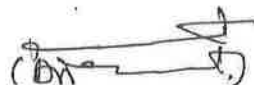
Course Outcomes:

At the end of the course, student will be able to:

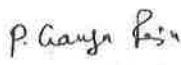
- CO 1: Determine rank of the given matrix and is able to find the solution of given system of linear equations. (L3)
- CO 2: Illustrate Eigen values, Eigen vectors and is able to understand their applications. (L4)
- CO 3: Apply differential calculus to model rate of change in time of any physical phenomena and solve it. (L3)
- CO 4: Apply appropriate analytical technique to model and solving higher order differential equations. (L3)
- CO 5: Understand partial differentiation and able to apply in finding maxima and minima. (L2)
- CO6: Find the solution of one-dimensional wave equation and heat equation (L3)


A.D. Madhuri
(Chairman-BOS)


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(University Nominee)


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(Subject Expert)


Dr. U. Venu Gopalam
(Subject Expert)


Mr. P. Ganga Raju
(Member, BOS)

Unit I:- Matrices and Linear systems of equations

Rank of a Matrix-Echelon form-Normal form – Solution of linear system of equations homogenous and non-homogenous equations – Gauss elimination -Gauss Jordon- Gauss Seidal methods.

Applications: Finding the current in electrical circuits.

Unit II:- Eigen values - Eigen vectors

Eigen values - Eigen vectors– Properties – Cayley-Hamilton theorem (statement only) - Inverse and powers of a matrix by using Cayley-Hamilton theorem- Reduction to Diagonal form(symmetric) – Quadratic forms and nature of the quadratic forms – Reduction of quadratic form to canonical forms by orthogonal transformation

Unit III:- Differential equations of first order and first degree

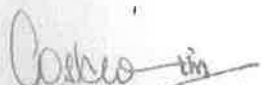
Formation of D.E-Linear-Bernoulli-Exact-Reducible to exact differential equations

Applications: - Newton's Law of cooling-Law of natural growth and decay-Orthogonal trajectories

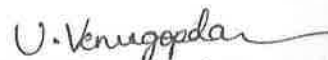
Unit IV:-Linear differential equations of higher order

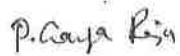
Non-homogeneous equations of higher order with constant coefficients with Non homogeneous terms of the type e^{ax} , $\sin ax$, $\cos ax$, *polynomials in x*, $e^{ax}V(x)$, $xV(x)$ - Method of Variation of parameters.


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UNIT V: - Partial differentiation:

Introduction – Homogeneous function – Euler's theorem – Total derivative – Chain rule – Jacobian – Functional dependence – Taylor's and Maclaurin's series expansion of functions of two variables.(with out proof). Maxima and Minima of functions of two variables without constraints and Lagrange's method (with constraints).

Unit VI: - First and Higher order Partial Differential Equations

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions – solutions of first order linear (Lagrange) equation and nonlinear (standard types) equations. Solutions of linear homogeneous Partial differential equations with constant coefficients– Non homogeneous terms of the type e^{ax+by} , $\sin(ax + by)$, $\cos(ax + by)$, $x^m y^n$. Method of Separation of Variables

Applications: One dimensional wave equation and heat equation

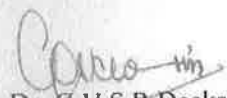
Text Books:

1. B.S.GREWAL, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers.
2. Dr T K V Iyengar, Dr B.Krishna Gandhi, S.Ranhanatham and Dr. M.V.S.S.N Prasad, Engineering Mathematics, S.Chand & Company Ltd.
3. B. V. Ramana, Higher Engineering Mathematics, 2007 Edition, Tata Mc. Graw Hill Education.

Reference Books:

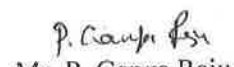
1. N.P.Bali & Manish Goyal, A Text book of Engineering Mathematics, Lakshmi Publications.
2. ERWIN KREYSZIG, Advanced Engineering Mathematics, 10th Edition, Wiley-India
3. DEAN G. DUFFY, Advanced engineering mathematics with MATLAB, CRC Press
4. Peter O' Neil, Advanced Engineering Mathematics, Cengage.


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I B.TECH-II SEMESTER
INTEGRAL TRANSFORMS AND CALCULAS
(Common to all Branches)

Subject code: 20BS2T02

L T P C
3 0 0 3

Course Objectives:

- COB 1: To equip the students with the necessary mathematical skills and techniques those are Essential for an engineering course.
- COB 2: To help the students acquire a necessary base of Multiple Integrals.
- COB 3: Making the student capable of creating vector differentiation and integration for real life Situation.

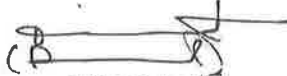
Course Outcomes:

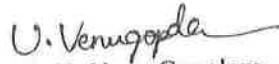
At the end of the course, student will be able to:

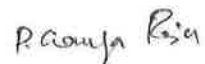
- CO 1: Apply the Laplace transform for solving differential equations.(L3)
- CO 2: Determine Fourier series, Fourier Transforms of the given functions.(L3)
- CO 3: Compute the Z- transforms for certain functions and apply the properties of Z- transforms to solve difference equations.(L)
- CO 4: Apply multiple integrals to find area, volume center of mass, center of gravity of given Region/object. (L3)
- CO 5: Assess the information with their identities regarding physical perception by Gradient, divergence and curl. (L5)
- CO 6: Evaluate integrals of function or vector related quantities over curves, surfaces, and domains in two- and three – dimensional space.(L5)


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(Subject Expert)


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(Subject Expert)


Mr. P. Ganga Raju
(Member, BOS)

UNIT I: - Laplace transforms

Laplace transforms of standard functions-Shifting theorems - Transforms of derivatives and integrals - Unit step function - Dirac's delta function- Inverse Laplace transforms- Convolution theorem (with out proof). ROC of Laplace transforms

Applications: Solving ordinary differential equations (initial value problems) using Laplace transforms.

Unit II:- Fourier series and Fourier Transforms

Fourier Series: Introduction - Periodic functions - Fourier series of periodic function - Dirichlet's conditions - Even and odd functions - Change of interval - Half-range sine and cosine series.

Fourier Transforms: Fourier integral theorem (without proof) - Fourier sine and cosine integrals - Fourier Sine and cosine transforms - Properties - inverse transforms - Finite Fourier transforms. Convolution Theorem (with out proof).

UNIT III:- Z-transforms

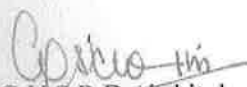
Z-transform - properties - Damping rule - Shifting rule - Initial and final value theorems - Inverse z-transform - Convolution theorem (with out proof) - Solution of difference equation by z-transforms. ROC of Z-transforms

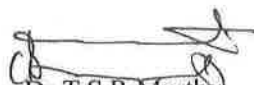
UNIT IV: Multiple Integrals:

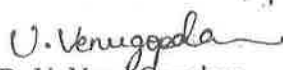
Evaluation of Double Integrals (Cartesian and polar coordinates)-change of order of integration (only Cartesian form)-Evaluation of Triple Integrals-Change of variables (Cartesian to polar) for double integrals only.

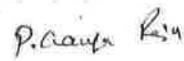
Applications: Finding Areas and Volumes.


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Unit V:- Vector Differentiation

Gradient- Divergence- Curl - Laplacian and second order operators -Vector identities.

Applications: Potential surfaces

Unit VI :- Vector Integration

Line, Surface and volume integrals, Vector integral theorems: Green's-Gauss divergence-Stokes Theorem (statements only) and related problems.

Applications: work done by force.

Text Books:

1. B. S. Grewal, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers.
2. Dr T K V Iyengar, Dr B.Krishna Gandhi, S.Ranhanatham and Dr. M.V.S.S.N Prasad, Engineering Mathematics, S.Chand & Company Ltd.
3. B. V. Ramana, Higher Engineering Mathematics, 2007 Edition, Tata Mc. Graw Hill Education.

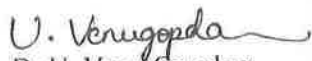
Reference Books:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 10th Edition, Wiley-India.
2. Dean. G. Duffy, Advanced Engineering Mathematics with MATLAB, 3rd Edition, CRC Press.
3. Peter O' Neil, Advanced Engineering Mathematics, Cengage.
4. N.P.Bali & Manish Goyal, A Text book of Engineering Mathematics, Lakshmi Publications.


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II B.TECH I SEMESTER
PROBABILITY AND STATISTICS
(Common to all Branches)

Subject code: 20BS3T03

L T P C

3 0 0 3

Course Objectives:

- COB 1: Know the importance of usage of Probability and Statistics.
COB 2: To help the students, acquire a necessary base of Correlation, Quality Checking.

Course Outcomes:

At the end of the course, student will be able to:

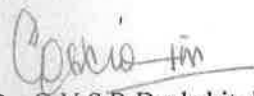
- CO 1: Use the knowledge of Probability and Statistics in various situations. (L3)
CO 2: Analyze the concepts, Random variables and Probability distributions. (L4)
CO 3: Understand sampling theory and estimation. (L2)
CO 4: Decide the test applicable for giving inference about Population Parameter based on Sample statistic. (L3)
CO 5: Measure Correlation between variables and obtain lines of regression. (L5)
CO 6: Design quality control charts for quality checking. (L6)

UNIT I:-Introduction to Probability and Statistics

Statistics-Measures of Central Tendency-mean, mode, median, Measures of Dispersion-Variance, standard deviation, Skewness, Kurtosis.

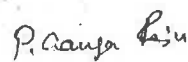
Probability-Addition law of Probability-Independent Events-Conditional Probability-Bayes Theorem (with out proof).


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Mr. P. Ganga Raju
(Member, BOS)

UNIT II:-Random variables and Distributions

Introduction- Random variables- Distribution function- Discrete distributions (Binomial and Poisson distributions only) Continuous distributions: Normal, Gamma and Weibull distributions.

UNIT III Sampling Theory and Estimation

Introduction - Population and samples- Sampling distribution of mean for large and small samples (with known and unknown variance) – Proportion sums and differences of means -Sampling distribution of variance -Point and interval estimators for means and proportions.

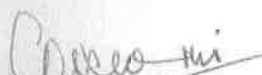
UNIT IV Tests of Hypothesis

Introduction - Type I and Type II errors - Maximum error - One tail, two-tail tests- Tests concerning one mean and proportion, two means- Proportions and their differences using Z-test, Student's t-test - F-test and Chi -square test

UNIT V: - Curve fitting and Correlation

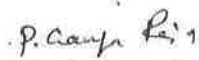
Introduction – Method of Least square, Fitting a straight line –Second degree curve-exponential curve - power curve by method of least squares, Simple Correlation and Regression


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(Subject Expert)


Mr. P. Ganga Raju
(Member, BOS)

UNIT VI: - Statistical Quality Control Methods

Introduction - Methods for preparing control charts – Problems using $\bar{x}$, p, R charts and attribute charts

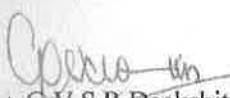
Text Books:

1. Dr.T.S.R.Murthy, Probability and Statistics for Engineers, BS Publications
2. Jay I.devore, Probability and Statistics for Engineering and the Sciences.8th edition,Cengage.
3. Dr T K V Iyengar, Dr B.Krishna Gandhi, S.Ranhanatham and Dr. M.V.S.S.N Prasad, Probability and Statistics, S.Chand & Company Ltd.
4. T.Veerarajan, Probability, Statistics and Random Processes. Tata Mc Graw Hill Publication

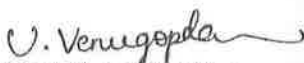
Reference Books:

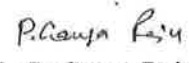
1. S.C .Gupta , V.K .Kapoor, Fundamentals of Mathematical Statistics, Sultan Chand & Sons Publishers
2. Sheldon, M. Rosss, Introduction to probability and statistics Engineers and the Scientists 4 th edition, Academic Foundation,2011
3. Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers and Keying Ye , Probability and statistics for Engineers and Scientists , Eighth edition, Pearson Education.
4. Richards A Johnson, Irvin Miller and Johnson E Freund. Probability and Statistics for Engineering, 9th Edition,PHI.


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II B.TECH II SEMESTER

Numerical Methods and Complex Variable

(Common to all Branches)

Subject code: 20BS4T04

L T P C

3 0 0 3

Course Objectives:

COB 1: To help the student Understand the numerical way of solving equations and integration.

COB 2: To become familiar with the concepts of Complex Functions.

Course Outcomes:

At the end of the course, student will be able to:

CO 1: Use Numerical Methods in Solving Equations. (L3)

CO 2: Calculate function value and its integration value by using different numerical methods. (L3)

CO 3: Understand Methods of finding numerical solution of differential equations. (L2)

CO 4: Use the knowledge of Beta and Gamma functions in evaluating improper integrals(L2).

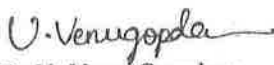
CO 5: Understand Functions of complex variables and will be able to find analytic Function. (L2)

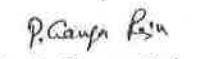
CO 6: Evaluate definite integral of given complex function using Cauchy's theorem and residues. (L5)


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Mr. P. Ganga Raju
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Unit I: - Solution of Algebraic and Transcendental Equations

Introduction- Bisection method – Method of false position (Regula-False Method) – Iteration method – Newton- Raphson method (One Variable)

Unit II: - Interpolation and Numerical Integration

Introduction- Errors in polynomial interpolation – Finite differences- Forward differences- Backward Differences –Central differences – Symbolic relations and separation of symbols - Differences of a Polynomial-Newton's formulae for interpolation – Interpolation with unequal intervals - Lagrange's Interpolation formula-Trapezoidal rule- Simpson's 1/3rd and 3/8th rule.

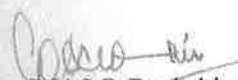
Unit III: - Numerical solution of Ordinary Differential Equations with initial conditions

Solution of ordinary differential equations with initial conditions by Taylor's series Method - Picard Method of successive Approximations Euler's method, Modified Euler's Method – Runge-Kutta method (second and fourth order).

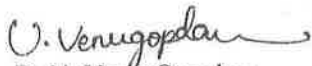
UNIT IV: Special functions

Def of improper integral, Beta and Gamma functions- Properties - Relation between Beta and Gamma functions- Evaluation of improper integrals


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Mr. P. Ganga Raju
(Member, BOS)

Unit-V: - Functions of Complex variable

Complex function, Real and Imaginary parts of Complex function, Limit, Continuity and Derivative of Complex function, Cauchy-Riemann equations, Analytic function, Entire function, singular point, conjugate Function, C-R equations in polar form, Harmonic functions, Milne-Thomson method.

Unit-VI: Complex Integration

Line integral of a complex function, Cauchy's theorem (only statement) -Cauchy's Integral Formula (only statement), Taylor's series(only statement), Laurent's series (only statement)-Zeros of an analytic function-Types of Singularities-pole of order m, simple pole- Residues, Residue theorem (only statement). Evaluation of integrals of the type

$$(a) \text{ Improper real integrals } \int_{-\infty}^{\infty} f(x) dx \quad (b) \int_0^{2\pi} f(\cos \theta, \sin \theta) d\theta$$

Text Books:

1. B.S.GREWAL, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers.
2. B. V. Ramana, Higher Engineering Mathematics, 2007 Edition, Tata Mc. Graw Hill Education.
3. Dr T K V Iyengar, Dr B.Krishna Gandhi, S.Ranhanatham and Dr. M.V.S.S.N Prasad, Engineering Mathematics, S.Chand & Company Ltd.

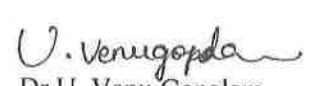
Reference Books:

1. N.P.Bali & Manish Goyal, A Text book of Engineering Mathematics, Lakshmi Publications.
2. James ward brown, Ruel V.Churchill, Complex variable and Applications, Mc.Graw Hill Publications
3. ERWIN KREYSZIG, Advanced Engineering Mathematics, 10th Edition, Wiley-India
4. Steven C. Chapra, Applied Numerical Methods with MATLAB for Engineering and Science, Tata Mc. Graw Hill Education


A.D. Madhuri
(Chairman-BOS)


Dr. G V.S.R Deekshitulu.
(University Nominee)


Dr.T.S.R.Murthy
(Subject Expert)


Dr.U. Venu Gopalam
(Subject Expert)


Mr. P. Ganga Raju
(Member, BOS)



B.V.C ENGINEERING COLLEGE::Odalarevu
(Autonomous)

B.Tech I year ISEM [Model Paper- Internal]

(Subjective paper- LINEAR ALGEBRA & Differential Equations)

Date:

Time: 90 min
Course Code: 20BS1T01
Answer all questions

3 x 10 = 30 Marks

1. (a) Solve $(D^2 + 6D + 9)y = 2e^{-3x}$

(5M)

(b) Solve $(D^2 + 2D + 2)y = e^x + \sin 2x$

(5M)

2 (a). Prove that $u = \frac{x^2 - y^2}{x^2 + y^2}$, $v = \frac{2xy}{x^2 + y^2}$ are functionally dependent and find the relation between them

(5M)

(b). Find the minimum value of $x^2y^3z^4$ subject to the condition $2x + 3y + 4z = a$

(5M)

3. (a). Solve the partial differential equation $x p^2 + y q^2 = z$

(5M)

b) Form the partial differential equations by eliminating the arbitrary function $z = f(x^2 + y^2 + z^2)$

(5M)

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J. Venugopala

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE (A)

Time: 3 hours

(MODEL PAPER - EXTERNAL)
(LINEAR ALGEBRA & DIFFERENTIAL EQUATIONS)

Max. Marks: 60

(Common to all branches)

Question Paper consists of Part-A and Part-B

Answer ALL the question in Part-A

Answer any FOUR Questions from Part-B

PART -A (6×2=12 Marks)

- 1 (a) Find the rank of the matrix $\begin{bmatrix} 0 & 1 & 2 \\ 1 & 4 & 2 \\ 2 & 6 & 5 \end{bmatrix}$ using Echelon form (2M)
- (b) P.T that the matrix A & A^T have same Eigen values (2M)
- (c) Find P.I of $(D^2 + 4D + 5)y = x^2$ (2M)
- (d) Solve $ydx - xdy = a(x^2 + y^2)dx$ (2M)
- (e) Verify Rolle's Theorem for $f(x) = x^2 - 2x - 3$ in the interval $(-1, 3)$ (2M)
- (f) Form the partial differential equations by eliminating the arbitrary constants $z = ax^3 + by^3$ (2M)

PART -B (4X12=48 Marks)

- 2 a) Test for consistency and Solve the equations (6M)
 $5x+3y+7z=4, 3x+26y+2z=9, 7x+2y+10z=5$
- b) Solve by Gauss-seidal method the equations (6M)
 $9x-2y+z-t=50, x-7y+3z+t=20, 2x+2y+7z+2t=22, x+y-2z+6t=18$
- 3 a) Determine the Eigen-values and Eigen vectors of the (6M)
 Matrix $A = \begin{bmatrix} 3 & 1 & 4 \\ 0 & 2 & 6 \\ 0 & 0 & 5 \end{bmatrix}$
- b) Verify cayley Hamilton theorem for $A = \begin{bmatrix} 1 & 0 & 3 \\ 2 & 1 & -1 \\ 1 & -1 & 1 \end{bmatrix}$ & hence Calculate A^{-1} (6M)
- 4 a) Solve $(3y^2+4xy-x)dx + x(x+2y)dy=0$ (6M)
- b) A body is originally at 80°C cools down to 60°C in 20 min the temperature of the air being 40°C . what will be the temperature of the body after 40 min from the original (6M)
- 5 a) Solve $(D^2+1)^2y=x^4+2\sin x\cos 3x$ (6M)
- b) Solve $\frac{d^2y}{dx^2} - 4\frac{dy}{dx} + 3y = e^x \sin 2x$ (6M)

U. Venugopda

6) (a) If $u = \tan^{-1}\left(\frac{x^3 + y^3}{x + y}\right)$, prove that $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = \sin 2u$ [6M]

(b) Verify if $u = 2x - y + 3z$, $v = 2x - y - z$, $w = 2x - y + z$, are functionally dependent and if so, Find the relation between them. [6M]

7) (a) Solve the partial differential equation $\frac{p}{x^2} + \frac{q}{y^2} = z$ [6M]

(b) Solve $4u_x + u_y = 3u$ given $u = 3e^{-y} - e^{-xy}$ when $x = 0$ [6M]

Answer

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V. Venugopalan



B.V.C ENGINEERING COLLEGE::Odalarevu
(Autonomous)

Text Books & Reference Books for Mathematics courses

s.no	Name of the subject	Text Books	Reference books
1	Linear Algebra & Differential Equations	1.B.S.GREWAL, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers. 2.B.V.Ramana, Higher Engineering Mathematics, 2007 Edition, Tata Mc. Graw Hill Education. 3. Dr T K V Iyengar, Dr B.Krishna Gandhi, S.Ranhanatham and Dr. M.V.S.S.N Prasad, Engineering Mathematics, S.Chand & Company Ltd.	1. DEAN G. DUFFY, Advanced engineering mathematics with MATLAB, CRC Press 2. N.P.Bali & Manish Goyal A Text book of Engineering Mathematics, Lakshmi Publications 3.ERWIN KREYSZIG, Advanced Engineering Mathematics, 10th Edition, Wiley-India 4. Peter O' Neil, Advanced Engineering Mathematics, Cengage.

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U. Venugopalan

2	Integral Transforms & Calculus	1. B.S.GREWAL, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers. 2. B.V.Ramana, Higher Engineering Mathematics, 2007 Edition, Tata Mc. Graw Hill Education. 3. Dr T K V Iyengar, Dr B.Krishna Gandhi, S.Ranhanatham and Dr. M.V.S.S.N Prasad, Engineering Mathematics, S.Chand & Company Ltd.	1. DEAN G. DUFFY, Advanced engineering mathematics with MATLAB, CRC Press 2. N.P.Bali & Manish Goyal A Text book of Engineering Mathematics, Lakshmi Publications 3. ERWIN KREYSZIG, Advanced Engineering Mathematics, 10th Edition, Wiley-India 4. Peter O' Neil, Advanced Engineering Mathematics, Cengage.
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V. Venugopala

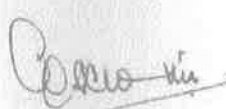
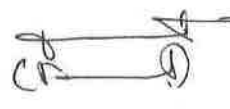
3	Probability & Statistics	1. Dr.T.S.R.Murthy, Probability and Statistics for Engineers, BS Publications 2. Jay I.devore, Probability and Statistics for Engineering and the Sciences.8th edition,Cengage. 3. Dr T K V Iyengar, Dr B.Krishna Gandhi, S.Ranhanatham and Dr. M.V.S.S.N Prasad, Probability and Statistics, S.Chand & Company Ltd. 4. T.Veerarajan, Probability, Statistics and Random Processes. Tata Mc Graw Hill Publication	1. S.C .Gupta , V.K .Kapoor, Fundamentals of Mathematical Statistics, Sultan Chand & Sons Publishers 2. Richards A Johnson, Irvin Miller and Johnson E Freund. Probability and Statistics for Engineering, 9th Edition,PHI. 3. Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers and Keying Ye , Probability and statistics for Engineers and Scientists , Eighth edition, Pearson Education. 4. Sheldon, M. Rosss, Introduction to probability and statistics Engineers and the Scientists 4 th edition, Academic Foundation,2011
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U. Venugopalan

4	Numerical Methods & Complex Variables	1. B.S.GREWAL, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers. 2. B.V.Ramana, Higher Engineering Mathematics, 2007 Edition, Tata Mc. Graw Hill Education. 3. Dr T K V Iyengar, Dr B.Krishna Gandhi, S.Ranhanatham and Dr. M.V.S.S.N Prasad, Engineering Mathematics, S.Chand & Company Ltd.	1. N.P.Bali & Manish Goyal, A Text book of Engineering Mathematics, Lakshmi Publications. 2. James ward brown, Ruel V.Churchill, Complex variable and Applications, Mc.Graw Hill Publications 3. ERWIN KREYSZIG, Advanced Engineering Mathematics, 10th Edition, Wiley-India 4. Steven C. Chapra, Applied Numerical Methods with MATLAB for Engineering and Science, Tata Mc. Graw Hill Education
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BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE
ODALAREVU – 533 210, Andhra Pradesh, India

I Year - I Semester	Code: 20ES1T05	L	T	P	C
		3	0	0	3
PROGRAMMING FOR PROBLEM SOLVING 1					
Course Objectives: The objectives of Programming for Problem Solving Using C are ● To learn about the computer systems, computing environments, developing of a computer program and Structure of a C Program ● To gain knowledge of the operators, selection, control statements and repetition in C ● To learn about the design concepts of arrays, strings, enumerated structure and union types. To learn about their usage. ● To assimilate about pointers, dynamic memory allocation and know the significance of Preprocessor. ● To assimilate about File I/O and significance of functions					
Course Outcomes: Upon the completion of the course the student will learn ● To write algorithms and to draw flowcharts for solving problems ● To convert flowcharts/algorithms to C Programs, compile and debug programs ● To use different operators, data types and write programs that use two-way/ multi-way selection ● To select the best loop construct for a given problem ● To design and implement programs to analyze the different pointer applications ● To decompose a problem into					
UNIT I Introduction to C Programming- History, evolution of C, The Software Development Process, Development of C Algorithms. C Tokens, The main() Function, The printf() Function, Data Types, Operators, evaluation of Expression, Variable , Declarations and Initializations. Operator Precedence and Associativity. Assignment - Implicit Type Conversions, Explicit Type Conversions (Casts), Assignment Variations, Mathematical Library Functions, Interactive Input, Formatted Output, Format Modifiers.					
UNIT II Flow of Control: Selection: if-else Statement, nested if, examples, Multi-way selection: switch, else-if, examples. Repetition: Basic Loop Structures, Pretest and Posttest Loops, Counter-Controlled and Condition-Controlled Loops, The while Statement, The for Statement, Nested Loops, The do-while Statement.					
UNIT III Arrays & Pointers: Arrays: One-Dimensional Arrays, Input and Output of Array Values, Array Initialization, Arrays as Function Arguments, Two-Dimensional Arrays, Matrices, Larger Dimensional Arrays, basics of searching and sorting. Pointers: Concept of a Pointer, Initialization of pointer variables, pointers as function arguments, passing by address, Dangling memory, address arithmetic, character pointers and functions, pointers to pointers, Dynamic memory management functions, command line arguments					
UNIT IV Functions: Parameter Declarations, Returning a Value, Functions with Empty Parameter Lists, Variable Scope, Variable Storage Class, Local Variable Storage Classes, Global Variable Storage Classes, Pass by Reference, Passing Addresses to a Function, Storing Addresses, Using Addresses, Declaring and Using Pointers, Passing Addresses to a Function. Case Study: Swapping Values, Recursion - Mathematical Recursion, Recursion versus Iteration. Strings: String Fundamentals, String Input and Output, String Processing, Library Functions					



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UNIT V

Structures: Derived types, Structures declaration, Initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, **Pointers to structures, self referential structures. Unions,** declaration, Initialization of Unions, difference between Structures and Unions- memory allocations, type def, bit-fields. **Data Files:** Declaring, Opening, and Closing File Streams, Reading from and Writing to Text Files, Random File Access

Text Books:

- 1) Programming for Problem Solving, Behrouz A. Forouzan, Richard F.Gilberg, CENGAGE.
- 2) The C Programming Language, Brian W.Kernighan, Dennis M. Ritchie, 2e, Pearson.

Reference Books:

- 1) Computer Fundamentals and Programming, Sumithabha Das, McGraw Hill.
- 2) Programming in C, Ashok N. Kamthane, AmitKamthane, Pearson.
- 3) Computer Fundamentals and Programming in C, PradipDey, ManasGhosh, OXFORD.

	<i>online</i>	<i>online</i>			
Dr. K V Ramana, Professor of CSE, UCEK, JNTUK.	Dr. Jimson Mathew Accos. Professor of CSE IIT Patna.	Dr. B D Sahoo Professor of CSE NIT Rourkela.	Mr. K Rambabu, Director, Monster India Pvt. Ltd. Bengaluru.	Dr. S Rao Chintalapudi, Professor & HoD, CSE(AI&ML) CMR Technical Campus, Hyderabad	Dr. G Jena Professor & HoD Of CSE.
University Expert	External Expert	External Expert	Industry Expert	Alumni	Chairman - BoS



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ODALAREVU – 533 210, Andhra Pradesh, India

I Year - I Semester	Code: 20ES1L08	L	T	P	C
		0	0	3	1.5
PROGRAMMING FOR PROBLEM SOLVING 1 LAB					
Exercise - 1 a) Demonstrate basic Linux command to write C program , compile and Run b) Write a program to print your details c) Write a program for addition, subtraction, multiplication and division					
Exercise - 2 a) Write a C Program to convert Celsius to Fahrenheit and vice versa b) Calculate simple and compound Interest					
Exercise - 3 Control Flow - I a) Write a C Program to Find Whether the Given Year is a Leap Year or not. b) Write a C Program to decide a number is even or odd					
Exercise – 4 Control Flow - II a) Write a C Program to Find Whether the Given Number is Prime Number Armstrong Number b) Write a C program to print Floyd Triangle c) Write a C Program to print Pascal Triangle					
Exercise – 5 Control Flow - III a) Write a C Program to make a simple Calculator to Add, Subtract, Multiply or Divide Using switch...case b) Write a C Program to grade a student based on his percentage.					
Exercise – 6 Functions a) Write a C Program demonstrating of parameter passing in Functions and returning values. b) Write a C Program illustrating Fibonacci, Factorial with Recursion without Recursion c) Write a C Program FOR Towers of Hanoi					
Exercise – 7 Arrays Demonstration of arrays a) Search-Linear. b) Sorting-Bubble, Selection. c) Operations on Matrix.					
Exercise – 8 Strings a) Implementation of string manipulation operations with library function. i) Copy , ii) concatenate iii) length iv) compare b) Implementation of string manipulation operations without library function. i) copy ii) concatenate iii) length iv) compare					
Exercise – 9 Arrays and Pointers a) Write a C Program to Access Elements of an Array Using Pointer b) Write a C Program to find the sum of numbers with arrays and pointers					
Exercises - 10 Structures a) Write a C Program to Store Information of a Book Using Structure					



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- b) Write a C Program to Store Information Using Structures with Dynamically Memory Allocation
c) Write a C Program to Add Two Complex Numbers by Passing Structure to a Function

Exercise – 11 Unions

- a) Write a C Program to print the student details by using Unions
b) Write a C Program to demonstrate bit fields

Exercise – 12 Dynamic Memory Allocations

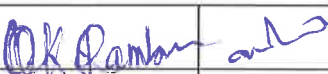
- a) Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using malloc () function.
b) Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using calloc () function. Understand the difference between the above two programs

Exercise -13 Files

- a) Write a C programming code to open a file and to print its contents on screen.
b) Write a C program to copy files

Exercise - 14 Files Continued

- a) Write a C program merges two files and stores their contents in another file.
b) Write a C program to delete a file.

	<i>online</i>	<i>online</i>			
Dr. K V Ramana, Professor of CSE, UCEK, JNTUK.	Dr. Jimson Mathew Accos. Professor of CSE IIT Patna.	Dr. B D Sahoo Professor of CSE NIT Rourkela.	Mr. K Rambabu, Director, Monster India Pvt. Ltd. Bengaluru.	Dr. S Rao Chintalapudi, Professor & HoD, CSE(AI&ML) CMRTC, Hyd	Dr. G Jena Professor & HoD Of CSE.
University Expert	External Expert	External Expert	Industry Expert	Alumni	Chairman - BoS



BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE
ODALAREVU – 533 210, Andhra Pradesh, India

I Year - II Semester	Code: 20ES2T06	L	T	P	C
		3	0	0	3
PROGRAMMING FOR PROBLEM SOLVING 2					
Course Objectives: The objective of the course is to ☐ Introduce the fundamental concept of data structures and abstract data types ☐ Emphasize the importance of data structures in developing and implementing efficient algorithms ☐ Describe how arrays, records, linked structures, stacks, queues, trees, and graphs are represented in memory and used by algorithms					
Course Outcomes: After completing this course a student will be able to: ☐ Summarize the properties, interfaces, and behaviors of basic abstract data types ☐ Discuss the computational efficiency of the principal algorithms for sorting & searching ☐ Use arrays, records, linked structures, stacks, queues, trees, and Graphs in writing programs ☐ Demonstrate different methods for traversing trees					
UNIT I Data structure -Definition, types of data structures Recursion: Definition, Design Methodology and Implementation of recursive algorithms, Linear and binary recursion, recursive algorithms for factorial function, GAD computation, Fibonacci sequence, Towers of Hanoi, Tail recursion List Searches using Linear Search, Binary Search, Fibonacci Search Sorting Techniques: Basic concepts, Sorting by: Insertion sort, selection-heap sort, exchange-bubble sort, quick sort, distribution-radix sort and merging-merge sort Algorithms					
UNIT II Stacks and Queues: Basic Stack Operations, Representation of a Stack using Arrays, Stack Applications: Reversing list, Factorial Calculation, Infix to postfix Transformation, Evaluating Arithmetic Expressions. Queues: Basic Queues Operations, Representation of a Queue using array, Implementation of Queue Operations using Stack, Queues. Applications of Queues -Round robin Algorithm, Circular Queues, Priority Queues					
UNIT III Linked Lists: Introduction, single linked list, representation of a linked list in memory, Operations on a single linked list, Reversing a single linked list, applications of single linked list to represent polynomial expressions and sparse matrix manipulation, Advantages and disadvantages of single linked list, Double linked list, Circular linked list.					
UNIT IV Trees: Basic tree concepts, Binary Trees: Properties, Representation of Binary Trees using arrays and linked lists, operations on a Binary tree, Binary Tree Traversals (recursive), Creation of binary tree from in-order, preorder and post order traversals Advanced concepts of Trees: Tree Traversal using stack (non recursive), Threaded Binary Trees. Binary search tree, Basic concepts, BST operations: insertion, deletion, balanced binary trees-need,					



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basics and applications in computer science (No operations).

UNIT V

Graphs: Basic concepts, Representations of Graphs: using Linked list and adjacency matrix, Graph algorithms Graph Traversals (**BFS & DFS**), applications: Dijkstra's shortest path, Transitive closure, Minimum Spanning Tree using Prim's Algorithm, Warshall's Algorithm (**Algorithmic Concepts Only, No Programs required**).

Text Books:

- 1.Data Structure with C, Seymour Lipschutz, TMH
- 2.Data Structures, 2/e, Richard F, Gilberg, Forouzan, Cengage

Reference Books:

1. C & Data structures 5th Edn. by Balagurusamy
- 2.Data Structures using C, Reema Thareja, Oxford
- 3.Data Structures and Algorithm Analysis in C, 2nded, Mark Allenweiss

	<i>online</i>	<i>online</i>			
Dr. K V Ramana, Professor of CSE, UCEK, JNTUK.	Dr. Jimson Mathew Accos. Professor of CSE IIT Patna.	Dr. B D Sahoo Professor of CSE NIT Rourkela.	Mr. K Rambabu, Director, Monster India Pvt. Ltd. Bengaluru.	Dr. S Rao Chintalapudi, Professor & HoD, CSE(AI&ML) CMR Technical Campus, Hyderabad	Dr. G Jena Professor & HoD Of CSE.
University Expert	External Expert	External Expert	Industry Expert	Alumni	Chairman - BoS



BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE
ODALAREVU – 533 210, Andhra Pradesh, India

I Year - II Semester	Code: 20ES2L09	L	T	P	C
		3	0	0	3
PROGRAMMING FOR PROBLEM SOLVING 2 LAB					
Exercise1:					
Write recursive program which computes the n th Fibonacci number, for appropriate values of n. Analyze behavior of the program obtain the frequency count of the statement for various values of n.					
Exercise2:					
Write recursive program for the following					
a) Write recursive and non recursive C program for calculation of Factorial of an integer					
b) Write recursive and non recursive C program for calculation of GAD(n, m)					
c) Write recursive and non recursive C program for Towers of Hanoi: N disks are to be transferred from peg S to peg D with Peg I as the intermediate peg.					
Exercise3:					
a) Write C program that use both recursive and non recursive functions to perform Linear search for a Key value in a given list.					
b) Write C program that use both recursive and non recursive functions to perform Binary search for a Key value in a given list.					
c) Write C program that use both recursive and non recursive functions to perform Fibonacci search for a Key value in a given list.					
Exercise4:					
a) Write C program that implement Bubble sort, to sort a given list of integers in ascending order					
b) Write C program that implement Quick sort, to sort a given list of integers in ascending order					
c) Write C program that implement Insertion sort, to sort a given list of integers in ascending order					
Exercise5:					
a) Write C program that implement heap sort ,to sort a given list of integers in ascending order					
b) Write C program that implement radix sort, to sort a given list of integers in ascending order					
c) Write C program that implement merge sort, to sort a given list of integers in ascending order					
Exercise6:					
a) Write C program that implement stack(its operations)using arrays					
b) Write C program that implement stack(its operations)using Linked list					
Exercise7:					
a) Write a C program that uses Stack operations to convert infix expression into postfix expression					
a) Write C program that implement Queue (its operations) using arrays.					
b) Write C program that implement Queue(its operations)using linked lists					
Exercise8:					
a) Write a C program that uses functions to create a singly linked list					
b) Write a C program that uses functions to perform insertion operation on a singly linked list					
c) Write a C program that uses functions to perform deletion operation on a singly linked list					
Exercise9:					
a) Adding two large integers which are represented in linked list fashion.					
b) Write a C program to reverse elements of a single linked list.					



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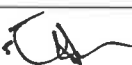
- c) Write a C program to store a polynomial expression in memory using linked list
- d) Write a C program to representation the given sparse matrix using arrays.
- e) Write a C program to representation the given sparse matrix using linked list

Exercise10:

- a) Write a C program to Create a Binary Tree of integers
- b) Write a recursive C program for traversing a binary tree in preorder, in order and post order.
- c) Write a non recursive C program for traversing a binary tree in preorder, in order and post order.
- d) Program to check balance property of a tree.

Exercise11:

- a) Write a C program to create a BST
- b) Write a C program to insert an ode in to a BST.
- c) Write a C program to delete an ode from a BST.

					
Dr. K V Ramana, Professor of CSE, UCEK, JNTUK.	Dr. Jimson Mathew Accos. Professor of CSE IIT Patna.	Dr. B D Sahoo Professor of CSE NIT Rourkela.	Mr. K Rambabu, Director, Monster India Pvt. Ltd. Bengaluru.	Dr. S Rao Chintalapudi, Professor & HoD, CSE(AI&ML) CMR Technical Campus, Hyderabad	Dr. G Jena Professor & HoD Of CSE.
University Expert	External Expert	External Expert	Industry Expert	Alumni	Chairman - BoS



BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE
ODALAREVU – 533 210, Andhra Pradesh, India

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
DETAILED SYLLABUS FOR – BR20
UG: B.Tech - ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
II Year – I SEMESTER

S.No	Course Code	Courses	L	T	P	Credits
1	20BS3T03	Probability and Statistics	3	0	0	3
2	20HS3T02	Managerial Economics and Financial Analysis	3	0	0	3
3	20ML3T01	Computer Organization	3	0	0	3
4	20ES3T04	Python Programming	3	0	0	3
5	20CS3T05	Digital Logic Design	3	0	0	3
6	20ML3L01	UNIX and Shell Programming Lab	3	0	0	1.5
7	20ES3L07	Python Programming Lab	0	0	3	1.5
8	20CS3L08	R Programming Lab	0	0	3	1.5
9	20CS3S01	Skill Oriented Course - Java Script	1	0	2	2
	20BS3M03	Environmental Science	2	0	0	0
Total			21	0	8	21.5

					
Dr. K V Ramana, Professor of CSE, UCEK, JNTUK.	Dr. Jimson Mathew Accos. Professor of CSE IIT Patna.	Dr. B D Sahoo Professor of CSE NIT Rourkela.	Mr. K Rambabu, Director, Monster India Pvt. Ltd. Bengaluru.	Dr. S Rao Chintalapudi, Professor & HoD, CSE(AI&ML) CMR Technical Campus, Hyderabad	Dr. G Jena Professor & HoD Of CSE.
University Expert	External Expert	External Expert	Industry Expert	Alumni	Chairman - BoS



PROBABILITY AND STATISTICS (Common to all Branches)

Subject code: 20BS3T03

Course Objectives:

- COB 1: Know the importance of usage of Probability and Statistics.
- COB 2: To help the students acquire a necessary base of Correlation, Quality Checking.
- COB 3: Use R for statistical programming, computation, graphics, and modeling

Course Outcomes:

At the end of the course, student will be able to:

- CO 1: Use the knowledge of Probability and Statistics in various situations. (L3)
- CO 2: Analyze the concepts, Random variables and Probability distributions. (L4)
- CO 3: Measure Correlation between variables and obtain lines of regression. (L5)
- CO 4: Design quality control charts for quality checking. (L6)
- CO 5: Use R for statistical programming, computation, graphics, and modeling. (L3)
- CO 6: Classify Functions and use R in an efficient way. (L4)

UNIT I:-Introduction to Probability and Statistics

Probability-Addition law of Probability-Independent Events-Conditional Probability-Bayes Theorem (with out proof).

Statistics-Measures of Central Tendency-mean, mode, median, Measures of Dispersion-Variance, standard deviation, Skewness, Kurtosis.

UNIT II:-Random variables and Distributions

Introduction- Random variables- Distribution function- Discrete distributions (Binomial and Poisson distributions only) Continuous distributions: Normal, Normal approximation to Binomial distribution, Gamma and Weibull distributions.

UNIT III: - Curve fitting and Correlation

Introduction - Fitting a straight line –Second degree curve-exponential curve - power curve by method of least squares, Simple Correlation and Regression

UNIT IV: - Statistical Quality Control Methods

Introduction - Methods for preparing control charts – Problems using $\bar{x}$, p, R charts and attribute charts

UNIT V: - Introduction of R

Basic Math, Variables, Data Types, Vectors, Arrays, Lists, Data Frames Matrices, , Classes. R Programming Structures, Control Statements, Loops, - Looping Over Non vector Sets, If-Else, Arithmetic and Boolean Operators and values.
Math Function Extended Example Functions Sorting, Linear Algebra Operation on Vectors and Matrices. Graphics, Creating Graphs, Histogram, the plot() Function –Customizing Graphs, Saving Graphs to Files. Regression. Create R Pie, Bar Charts using R, Create Histogram and Line graph, Calculate mean, median and mode using R Analyze Linear Regression using R.



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Text Books:

1. **B.S.GREWAL**, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers.
2. **N.P.Bali**, Engineering Mathematics, Lakshmi Publications.
3. Probability and Statistics, **Dr T K V Iyengar, Dr B.Krishna Gandhi, S.Ranhanatham** and **Dr. M.V.S.S.N Prasad**, S.Chand & Company Ltd.
4. The Art of R Programming, **Norman Matloff**, Cengage Learning
5. R for Everyone, **Lander**, Pearson

Reference Books:

1. Fundamentals of Mathematical Statistics, **S.C .Gupta , V.K .Kapoor**, S.Chand & Company Ltd
2. **B.V.Ramana**, Engineering Mathematics: 4th Edition, Tata McGraw Hill, 2009, New Delhi
3. **ERWIN KREYSZIG**, Advanced Engineering Mathematics, 10th Edition, Wiley-India
4. R Cookbook, **Paul Teetor, Oreilly**.
5. R in Action, **Rob Kabacoff**, Manning



II Year – I SEMESTER

L T P C
3 0 0 3

MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Course Code:20HS3T02

Unit – I:

Introduction to Managerial Economics and demand Analysis:

Definition of Managerial Economics and Scope-Managerial Economics and its relation with other subjects- Concepts of Demand-Types-Determinants-Law of Demand its Exception-Elasticity of Demand-Types and Measurement-Demand forecasting and its Methods.

Unit – II:

Production and Cost Analyses:

Production function-Isoquants and Isocosts-Law of Variable proportions-Cobb-Douglas Production function-Economics of Sale-Cost Concepts-Opportunity Cost-Fixed vs Variable Costs-Explicit Costs vs Implicit Costs-Out of Pocket Costs vs Imputed Costs-Cost Volume Profit analysis-Determination of Break-Even Point (Simple Problem)

Unit – III:

Introduction to Markets, Theories of the Firm & Pricing Policies:

Market Structures: Perfect Competition, Monopoly and Monopolistic and Oligopoly – Features – Price, Output Determination – Managerial Theories of firm: Maris and Williamson's models – Methods of Pricing: Limit Pricing, Market Skimming Pricing, Internet Pricing: Flat Rate Pricing, Usage sensitive, Transaction based pricing, Priority Pricing.

Unit – IV:

Types of Business Organization and Business Cycles:

Features and Evaluation of Sole Trader – Partnership – Joint Stock Company – State/Public Enterprises and their forms – Business Cycles – Meaning and Features – Phases of Business Cycle.

Unit – V:

Introduction to Accounting & Financing Analysis:

Introduction to Double Entry Systems – Preparation of Financial Statements-Analysis and Interpretation of Financial Statements-Ratio Analysis – Preparation of Funds flow cash flow statements (Simple Problems)

Capital and Capital Budgeting: Capital Budgeting: Meaning of Capital-Capitalization-Meaning of Capital Budgeting-Need for Capital Budgeting-Techniques of Capital Budgeting-Traditional and Modern Methods.

TEXT BOOKS

1. Dr. N. Appa Rao, Dr. P. Vijay Kumar: 'Managerial Economics and Financial Analysis', Cengage Publications, New Delhi – 2011
2. Dr. A. R. Aryasri – Managerial Economics and Financial Analysis, TMH 2011
3. Prof. J.V.Prabhakara rao, Prof. P. Venkatarao. 'Managerial Economics and Financial Analysis', Ravindra Publication.

REFERENCES:

1. V. Maheswari: Managerial Economics, Sultan Chand.
2. Suma Damodaran: Managerial Economics, Oxford 2011.
3. Dr. B. Kuberudu and Dr. T. V. Ramana: Managerial Economics & Financial Analysis, Himalaya Publishing House 2011.



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II Year - I Semester	Code: 20ML3T01	L	T	P	C
		3	0	0	3
COMPUTER ORGANIZATION					
Course Objectives: The course objectives of Computer Organization are to discuss and make student familiar with the ➤ Principles and the Implementation of Computer Arithmetic ➤ Operation of CPUs including RTL, ALU, Instruction Cycle and Busses ➤ Fundamentals of different Instruction Set Architectures and their relationship to the CPU Design ➤ Memory System and I/O Organization ➤ Principles of Operation of Multiprocessor Systems and Pipelining					
Course Outcomes: By the end of the course, the student will ➤ Develop a detailed understanding of computer systems ➤ Cite different number systems, binary addition and subtraction, standard, floating-point, and micro operations ➤ Develop a detailed understanding of architecture and functionality of central processing unit ➤ Exemplify in a better way the I/O and memory organization ➤ Illustrate concepts of parallel processing, pipelining and inter processor communication					
UNIT I Basic Structure of Computers: Basic Organization of Computers, Historical Perspective, Bus Structures, Data Representation: Data types, Complements, Fixed Point Representation. Floating, Point Representation. Other Binary Codes, Error Detection Codes. Computer Arithmetic: Addition and Subtraction, Multiplication Algorithms, Division Algorithms.					
UNIT II Register Transfer Language and Micro operations: Register Transfer language. Register Transfer Bus and Memory Transfers, Arithmetic Micro operations, Logic Micro Operations, Shift Micro Operations, Arithmetic Logic Shift Unit. Basic Computer Organization and Design: Instruction Codes, Computer Register, Computer Instructions, Instruction Cycle, Memory – Reference Instructions. Input –Output and Interrupt, Complete Computer Description.					
UNIT III Central Processing Unit: General Register Organization, STACK Organization. Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer. Microprogrammed Control: Control Memory, Address Sequencing, Micro Program example, Design of Control Unit.					
UNIT IV Memory Organization: Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory. Input-Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupts, Direct Memory Access.					
UNIT V Multi Processors: Introduction, Characteristics of Multiprocessors, Interconnection Structures, Inter Processor Arbitration Pipeline: Parallel Processing, Pipelining, Instruction Pipeline, RISC Pipeline, Array Processor.					
Text Books: 1) Computer System Architecture, M. Morris Mano, Third Edition, Pearson, 2008. 2) Computer Organization, Carl Hamacher, Zvonko Vranesic, Safwat Zaky, 5/e, McGraw Hill, 2002.					
Reference Books: 1) Computer Organization and Architecture, William Stallings, 6/e, Pearson, 2006. 2) Structured Computer Organization, Andrew S. Tanenbaum, 4/e, Pearson, 2005. 3) Fundamentals of Computer Organization and Design, Sivarama P. Dandamudi, Springer, 2006.					

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II Year - I Semester	Code: 20ES3T04	L	T	P	C
		3	0	0	3
PYTHON PROGRAMMING					
Course Objectives: The Objectives of Python Programming are ➤ To learn about Python programming language syntax, semantics, and the runtime environment ➤ To be familiarized with universal computer programming concepts like data types, containers ➤ To be familiarized with general computer programming concepts like conditional execution, loops & functions ➤ To be familiarized with general coding techniques and object-oriented programming					
Course Outcomes: ➤ Develop essential programming skills in computer programming concepts like data types, containers ➤ Apply the basics of programming in the Python language ➤ Solve coding tasks related conditional execution, loops ➤ Solve coding tasks related to the fundamental notions and techniques used in object-oriented programming					
UNIT I Introduction to Python, Program Development Cycle, Input, Processing, and Output, Displaying Output with the Print Function, Comments, Variables, Reading Input from the Keyboard, Performing Calculations, Operators. Type conversions, Expressions, More about Data Output. Data Types, and Expression: Strings Assignment, and Comment, Numeric Data Types and Character Sets, Using functions and Modules. Decision Structures and Boolean Logic: if, if-else, if-elif-else Statements, Nested Decision Structures, Comparing Strings, Logical Operators, Boolean Variables. Repetition Structures: Introduction, while loop, for loop, Calculating a Running Total, Input Validation Loops, Nested Loops.					
UNIT II Control Statement: Definite iteration for Loop Formatting Text for output, Selection if and if else Statement Conditional Iteration The While Loop. Strings and Text Files: Accessing Character and Substring in Strings, Data Encryption, Strings and Number Systems, String Methods Text Files.					
UNIT III List and Dictionaries: Lists, Defining Simple Functions, Dictionaries, Design with Function: Functions as Abstraction Mechanisms, Problem Solving with Top Down Design, Design with Recursive Functions, Case Study Gathering Information from a File System, Managing a Program's Namespace, Higher Order Function. Modules: Modules, Standard Modules, Packages.					
UNIT IV File Operations: Reading config files in python, Writing log files in python, Understanding read functions, read(), readline() and readlines(), Understanding write functions, write() and writelines(), Manipulating file pointer using seek, Programming using file operations. Object Oriented Programming: Concept of class, object and instances, Constructor, class attributes and destructors, Real time use of class in live projects, Inheritance , overlapping and overloading operators, Adding and retrieving dynamic attributes of classes, Programming using OOps support. Design with Classes: Objects and Classes, Data modeling Examples, Case Study An ATM, Structuring Classes with Inheritance and Polymorphism					
UNIT V Errors and Exceptions: Syntax Errors, Exceptions, Handling Exceptions, Raising Exceptions, User-defined Exceptions, Defining Clean-up Actions, Redefined Clean-up Actions. Graphical User Interfaces: The Behavior of Terminal Based Programs and GUI - Based, Programs, Coding Simple GUI-Based Programs, Other Useful GUI Resources. Programming: Introduction to Programming Concepts with Scratch.					
Text Books: 1) Fundamentals of Python First Programs, Kenneth. A. Lambert, Cengage. 2) Python Programming: A Modern Approach, VamsiKurama, Pearson.					
Reference Books: 1) Introduction to Python Programming, Gowrishankar.S, Veena A, CRC Press. 2) Introduction to Programming Using Python, Y. Daniel Liang, Pearson.					

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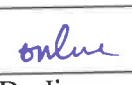
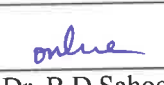
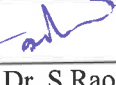
II Year - I Semester	Code: 20CS3T05	L	T	P	C
		3	0	0	3
DIGITAL LOGIC DESIGN					
Course Objectives: - To introduce the basic tools for design with combinational and sequential digital logic and state machines. □To learn simple digital circuits in preparation for computer engineering.					
Course Outcomes: - A student who successfully fulfills the course requirements will have demonstrated: - An ability to define different number systems, binary addition and subtraction, 2's complement representation and operations with this representation. □An ability to understand the different switching algebra theorems and apply them for logic functions. □An ability to define the Karnaugh map for a few variables and perform an algorithmic reduction of logic functions. □An ability to define the other minimization methods for any number of variables Variable Entered Mapping (VEM) and Quine-McCluskey (QM) Techniques and perform an algorithmic reduction of logic functions.					
UNIT I Number Systems Binary, Octal, Decimal, Hexadecimal Number Systems. Conversion of Numbers From One Radix To Another Radix,r's Complement and(r-1)'s Complement Subtraction of Unsigned Numbers, Problems, Signed Binary Numbers, Weighted and Non weighted codes					
UNIT II Logic Gates and Boolean Algebra Basic Gates NOT, AND, OR, Boolean Theorems, Complement And Dual of Logical Expressions, Universal Gates, Ex-Or And Ex-or Gates, SOP, POS, Minimizations of Logic Functions Using Boolean Theorems.					
UNIT III Gate Level Minimization: Karnaugh Map Method (K-Map): Minimization of Boolean Functions maximum up to Four Variables, POS and SOP, Simplifications withDon't care conditions Using K-Map, NAND and NOR Implementation.					
UNIT IV Combinational Logic Circuits Design of Half Adder, Full Adder, Half Subtractor, Full Subtractor, Ripple Adders and Subtractor, Design of Decoders, Encoders, Multiplexers, Priority Encoder, Code Converters.					
UNIT V Introduction to Sequential Logic Circuits Classification of Sequential Circuits, Basic Sequential Logic Circuits: Latch and Flip-Flop, RS-Latch Using NAND and NOR Gates, Truth Tables. RS, JK, T and D FlipFlops, Truth and Excitation Tables, Conversion of FlipFlops. FlipFlops with Asynchronous Inputs (Preset and Clear). Registers and Counters Design of Registers, Buffer Register, Control Buffer Registers, Bidirectional Shift Registers, Universal Shift Register, Design of Ripple Counters, Ring Counter, Johnson Counter.					
Text Books: 1. Digital Design, 5/e, M.Morris Mano, Michael D Ciletti, PEA. 2. Fundamentals of Logic Design, 5/e, Roth, Cengage.					
Reference Books: 1. Digital Logic and Computer Design, M.Morris Mano, PEA. 2. Digital Logic Design, Leach, Malvino, Saha, TMH. 3. Modern Digital Electronics, R.P. Jain, TMH.					

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II Year - I Semester	Code: 20ML3L01	L	T	P	C
		3	0	0	3
UNIX AND SHELL PROGRAMMING LAB					
List of Experiments					
1. Study of Unix/Linux general purpose utility command list man, who, cat, cd, cp, ps, ls, mv, rm, mkdir, rmdir, echo, more, date, time, kill, history, chmod, chown, finger, pwd, cal, logout, shutdown.					
2. Perform the case study on:					
b) Study of vi editor.					
c) Study of Bash shell, Bourne shell and C shell in Unix/Linux operating system.					
d) Study of Unix/Linux file system (tree structure).					
e) Study of .bashrc, /etc/bashrc and Environment variables.					
3. Write a shell script that takes a command –line argument and reports on whether it is directory, a file, or something else.					
4. Write a shell script that accepts a file name starting and ending line numbers as arguments and displays all the lines between the given line numbers.					
5. Write a shell script that computes the gross salary of an employee according to the following rules: i)If basic salary is < 1500 then HRA =10% of the basic and DA =90% of the basic. ii)If basic salary is >=1500 then HRA =Rs500 and DA=98% of the basic The basic salary is entered interactively through the key board.					
6. Write a shell script that accepts two integers as its arguments and computers the value of first number raised to the power of the second number.					
7. Write a shell script which receives two file names as arguments. It should check whether the two file contents are same or not. If they are same then second file should be deleted.					
8. Write a shell script that displays a list of all the files in the current directory to which the user has read, write and execute permissions.					
9. Develop an interactive script that ask for a word and a file name and then tells how many times that word occurred in the file.					
10. Write a shell script to perform the following string operations: i)To extract a sub-string from a given string. ii)To find the length of a given string					

					
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II Year - I Semester	Code: 20ML3L012	L	T	P	C
		3	0	0	3
PYTHON PROGRAMMING LAB					
Course Objectives: The aim of Python Programming Lab is ➤ To acquire programming skills in core Python. ➤ To acquire Object Oriented Skills in Python ➤ To develop the skill of designing Graphical user Interfaces in Python ➤ To develop the ability to write database applications in Python					
Course Outcomes: By the end of this lab, the student is able to ➤ Write, Test and Debug Python Programs ➤ Use Conditionals and Loops for Python Programs ➤ Use functions and represent Compound data using Lists, Tuples and Dictionaries ➤ Use various applications using python					
List of Experiments 1) Write a program that asks the user for a weight in kilograms and converts it to pounds. There are 2.2 pounds in a kilogram. 2) Write a program that asks the user to enter three numbers (use three separate input statements). Create variables called total and average that hold the sum and average of the three numbers and print out the values of total and average. 3) Write a program that uses a <i>for</i> loop to print the numbers 8, 11, 14, 17, 20, . . . , 83, 86, 89. 4) Write a program that asks the user for their name and how many times to print it. The program should print out the user's name the specified number of times. 5) Generate a random number between 1 and 10. Ask the user to guess the number and print a message based on whether they get it right or not. 6) Write a program that asks the user for two numbers and prints <i>Close</i> if the numbers are within .001 of each other and <i>Not close</i> otherwise. 7) Write a program that asks the user to enter a word and prints out whether that word contains any vowels. 8) In algebraic expressions, the symbol for multiplication is often left out, as in $3x+4y$ or $3(x+5)$. Computers prefer those expressions to include the multiplication symbol, like $3*x+4*y$ or $3*(x+5)$. Write a program that asks the user for an algebraic expression and then inserts multiplication symbols where appropriate. 9) Write a program that generates a list of 20 random numbers between 1 and 100. Print the list. Print the average of the elements in the list. Print the largest and smallest values in the list. Print the second largest and second smallest entries in the list Print how many even numbers are in the list. 10) Write a program that asks the user for an integer and creates a list that consists of the factors of that integer. 11) Write a program that generates 100 random integers that are either 0 or 1. Then find the longest run of zeros, the largest number of zeros in a row. For instance, the longest run of zeros in $[1,0,1,1,0,0,0,1,0,0]$ is 4. 12) Write a program that removes any repeated items from a list so that each item appears at most once. For instance, the list $[1,1,2,3,4,3,0,0]$ would become $[1,2,3,4,0]$. 13) Write a function called <i>sum_digits</i> that is given an integer num and returns the sum of the digits of num. 14) Write a function called <i>first_diff</i> that is given two strings and returns the first location in which the strings differ. If the strings are identical, it should return -1. 15) Write a function called <i>number_of_factors</i> that takes an integer and returns how many factors the number has. 16) Write a function called <i>is_sorted</i> that is given a list and returns True if the list is sorted and False otherwise. 17) Write a function called <i>root</i> that is given a number x and an integer n and returns $x^{1/n}$. In the function definition, set the default value of n to 2. 18) Write a function called <i>primes</i> that is given a number n and returns a list of the first n primes. Let the default value of n be 100. 19) Write a function called <i>merge</i> that takes two already sorted lists of possibly different lengths, and merges					



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them into a single sorted list.

Do this using the sort method. (b) Do this without using the sort method.

20) Write a program that asks the user for a word and finds all the smaller words that can be made from the letters of that word. The number of occurrences of a letter in a smaller word can't exceed the number of occurrences of the letter in the user's word.

21) Write a program that reads a file consisting of email addresses, each on its own line. Your program should print out a string consisting of those email addresses separated by semicolons.

22) Write a class called Time whose only field is a time in seconds. It should have a method called *convert_to_minutes* that returns a string of minutes and seconds formatted as in the following example: if seconds is 230, the method should return '5:50'. It should also have a method called *convert_to_hours* that returns a string of hours, minutes, and seconds formatted analogously to the previous method.

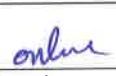
23) Write a Python class to implement $\text{pow}(x, n)$.

24) Write a Python class to reverse a string word by word.

25) Write a program that opens a file dialog that allows you to select a text file. The program then displays the contents of the file in a textbox.

26) Write a program to demonstrate Try/except/else.

27) Write a program to demonstrate try/finally and with/as.

					
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II Year - I Semester	Code: 20CS3L08	L	T	P	C
		3	0	0	3
R-PROGRAMMING LAB					
Course Objective: In this course student will learn about the fundamentals of R programming, standard R libraries, solid understanding of R functions, write programs using the R and gain skills in R programming Language, get acquaintances with Arrays, Files, Strings, Packages, and distributions using R.					
Course Outcomes: By the end of this lab, the student is able to ➤ Implement basic concepts of R programming, and its different module that includes conditional, looping, lists, Strings, Functions, Frames, Arrays, and File programming. ➤ Implement the concepts of R Script to extract the data from data frames and file operations. ➤ Implement the various statistical techniques using R. ➤ Extend the functionality of R by using add-on packages ➤ Use R Graphics and Tables to visualize results of various statistical operations on data					
List of Experiments					
Week 1: Installing R and RStudio Basic functionality of R, variable, data types in R					
Week 2: a) Implement R script to show the usage of various operators available in R language. b) Implement R script to read person's age from keyboard and display whether he is eligible for voting or not. c) Implement R script to find biggest number between two numbers. d) Implement R script to check the given year is leap year or not.					
Week 3: a) Implement R Script to generate first N natural numbers. b) Implement R Script to check given number is palindrome or not. c) Implement R script to print factorial of a number. d) Implement R Script to check given number is Armstrong or not.					
Week 4: a) Implement R Script to perform various operations on string using string libraries. b) Implement R Script to check given string is palindrome or not. c) Implement R script to accept line of text and find the number of characters, number of vowels and number of blank spaces in it. d) Implement R script for Call-by-value and Call-by-reference					
Week 5: a) Implement R Script to create a list. b) Implement R Script to access elements in the list. c) Implement R Script to merge two or more lists. Implement R Script to perform matrix operation					
Week 6: Implement R script to perform following operations: d) various operations on vectors e) Finding the sum and average of given numbers using arrays. f) To display elements of list in reverse order. g) Finding the minimum and maximum elements in the array.					
Week 7: a) Implement R Script to perform various operations on matrices b) Implement R Script to extract the data from data frames. c) Write R script to display file contents. d) Write R script to copy file contents from one file to another					
Week 8: a) Implement R Script to create a Pie chart, Bar Chart, scatter plot and Histogram.					



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b) Implement R Script to perform mean, median, mode, range, summary, variance, standard deviation operations.

Introduction to ggplot2 graphics

Week 9:

a) Implement R Script to perform Normal, Binomial distributions.

b) Implement R Script to perform correlation, Linear and multiple regression.

Week 10:

Introduction to Non-Tabular Data Types: Time series, spatial data, Network data.

Data Transformations: Converting Numeric Variables into Factors, Date

Operations, String Parsing, Geo coding

Week 11:

Introduction Dirty data problems: Missing values, data manipulation, duplicates, forms of data dates, outliers, spelling

Week 12:

Data sources: SQLite examples for relational databases, Loading SPSS and SAS files, Reading from Excel and Google Spreadsheets, API and web scraping examples

					
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II Year - I Semester	Code: 20CS3S01	L	T	P	C
		1	0	2	2
JAVA SCRIPT					
UNIT I					
An introduction: An Introduction to JavaScript,Code editors, Developer console JavaScript Fundamentals: Hello, world!, Code structure, Variables, Data types, Interaction: alert, prompt, confirm, Type Conversions					
UNIT II					
Basic operators, maths, Comparisons, Conditional branching: if, '?', Logical operators, Loops: while and for The "switch" statement					
UNIT III					
Functions, Function expressions, Arrow functions, the basics JavaScript specials					
UNIT IV					
Objects: the basics: Objects, Number, Boolean, Strings, Math, Reg Exp, HTML DOM Date and time					
UNIT V					
JSON					

	<i>online</i>	<i>online</i>			
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ENVIRONMENTAL SCIENCE

Course Code: 20BS3M03

Syllabus:

UNIT – I Multidisciplinary nature of Environmental Studies: Definition, Scope and Importance – Sustainability: Stockholm and Rio Summit–Global Environmental Challenges: Global warming and climate change, Carbon Credits, acid rains, ozone layer depletion, population growth and explosion, effects. Role of information Technology in Environment and human health. Ecosystems: Concept of an ecosystem. - Structure and function of an ecosystem. - Producers, consumers and decomposers. - Energy flow in the ecosystem - Ecological succession. – Food chains, food webs and ecological pyramids. - Introduction, types, characteristic features, structure and function of Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems.

UNIT – II Natural Resources: Natural resources and associated problems Forest resources – Use and over – exploitation, deforestation – Timber extraction – Mining, dams and other effects on forest and tribal people Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems

Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, Sustainable mining of Granite, Lignite, Coal, Sea and River sands.

Food resources: World food problems, changes caused by non-agriculture activities-effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity

Energy resources: Growing energy needs, renewable and non-renewable energy sources use of alternate energy sources Vs Oil and Natural Gas Extraction.

Land resources: Land as a resource, land degradation, Wasteland reclamation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

UNIT – III Biodiversity and its conservation: Definition: genetic, species and ecosystem diversity-classification - Value of biodiversity: consumptive use, productive use, social- Biodiversity at national and local levels. India as a mega-diversity nation - Hot-spots of biodiversity - Threats to biodiversity: habitat loss, man-wildlife conflicts - Endangered and endemic species of India – Conservation of biodiversity: conservation of biodiversity.

UNIT – IV Environmental Pollution: Definition, Cause, effects and control measures of Air pollution, Water pollution, Soil pollution, Noise pollution, Nuclear hazards. Role of an individual in prevention of pollution.

- Pollution case studies, Sustainable Life Studies. Impact of

Fire Crackers on Men and his well being. Solid Waste Management: Sources, Classification, effects and control measures of urban and industrial solid wastes. Consumerism and waste products, Biomedical, Hazardous and e – waste management.

UNIT – V Social Issues and the Environment: Urban problems related to energy –Water conservation, rain water harvesting-Resettlement and rehabilitation of people; its problems and concerns. Environmental ethics: Issues and possible solutions. Environmental Protection Act - Air (Prevention and Control of Pollution) Act. –Water (Prevention and control of Pollution) Act

-Wildlife Protection Act -Forest Conservation Act-Issues involved in enforcement of environmental legislation. -Public awareness.

UNIT – VI Environmental Management: Impact Assessment and its significance various stages of EIA, preparation of EMP and EIS, Environmental audit. Ecotourism, Green Campus – Green business and Green politics.



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The student should Visit an Industry / Ecosystem and submit a report individually on any issues related to Environmental Studies course and make a power point presentation.

Text Books:

1. Environmental Studies, K. V. S. G. Murali Krishna, VGS Publishers, Vijayawada
2. Environmental Studies, R. Rajagopalan, 2nd Edition, 2011, Oxford University Press.
3. Environmental Studies, P. N. Palanisamy, P. Manikandan, A. Geetha, and K. Manjula Rani; Pearson Education, Chennai

Reference:

1. Text Book of Environmental Studies, Deeshita Dave & P. Udaya Bhaskar, Cengage Learning.
2. A Textbook of Environmental Studies, Shaashi Chawla, TMH, New Delhi
3. Environmental Studies, Benny Joseph, Tata McGraw Hill Co, New Delhi
4. Perspectives in Environment Studies, Anubha Kaushik, C P Kaushik, New Age International Publishers, 2014



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II Year II Semester



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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

DETAILED SYLLABUS – BR20

For U.G – B.Tech – ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

II Year – II SEMESTER

S.No	Course Code	Courses	L	T	P	Credits
1	20BS4T04	Numerical Methods and Complex Variables	3	0	0	3
2	20CS4T06	Java Programming	3	0	0	3
3	20AD4T02	Data Science	3	0	0	3
4	20CS4T07	Operating Systems	3	0	0	3
5	20CS4T08	Mathematical Foundations of Computer Science	3	0	0	3
6	20CS4L07	Java Programming Lab	0	0	3	1.5
7	20CS4L09	Operating Systems Lab	0	0	3	1.5
8	20AD4L02	Data Science Lab	0	0	3	1.5
9	20CS4S02	Skill Oriented Course - MongoDB	1	0	2	2
Total			16	0	11	21.5

	<i>online</i>	<i>online</i>		<i>online</i>	
Dr. K V Ramana, Professor of CSE, UCEK, JNTUK.	Dr. Jimson Mathew Accos. Professor of CSE IIT Patna.	Dr. B D Sahoo Professor of CSE NIT Rourkela.	Mr. K Rambabu, Director, Monster India Pvt. Ltd. Bengaluru.	Dr. S Rao Chintalapudi, Professor & HoD, CSE(AI&ML) CMRTC, Hyd	Dr. G Jena Professor & HoD Of CSE.
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Numerical Methods and Complex Variable

(Common to all Branches)

Subject code: 20BS4T04

L T P C

3 0 0 3

Course Objectives:

COB 1: To help the student Understand the numerical way of solving equations and integration.
COB 2: To become familiar with the concepts of Complex Functions.

Course Outcomes:

At the end of the course, student will be able to:

- CO 1: Use Numerical Methods in Solving Equations. (L3)
- CO 2: Calculate function value and its integration value by using different numerical methods. (L3)
- CO 3: Understand Methods of finding numerical solution of differential equations. (L2)
- CO 4: Use the knowledge of Beta and Gamma functions in evaluating improper integrals(L2).
- CO 5: Understand Functions of complex variables and will be able to find analytic Function. (L2)
- CO 6: Evaluate definite integral of given complex function using Cauchy's theorem and residues. (L5)

Unit I: - Solution of Algebraic and Transcendental Equations

Introduction- Bisection method – Method of false position (Regula-False Method) – Iteration method – Newton- Raphson method (One Variable)

Unit II: - Interpolation and Numerical Integration

Introduction- Errors in polynomial interpolation – Finite differences- Forward differences- Backward Differences –Central differences – Symbolic relations and separation of symbols - Differences of a Polynomial-Newton's formulae for interpolation – Interpolation with unequal intervals - Lagrange's Interpolation formula-Trapezoidal rule- Simpson's 1/3rd and 3/8th rule.

Unit III: - Numerical solution of Ordinary Differential Equations with initial conditions

Solution of ordinary differential equations with initial conditions by Taylor's series Method - Picard Method of successive Approximations Euler's method, Modified Euler's Method – Runge-Kutta method (second and fourth order).

UNIT IV: Special functions

Def of improper integral, Beta and Gamma functions- Properties - Relation between Beta and Gamma functions- Evaluation of improper integrals

Unit-V: - Functions of Complex variable & Complex Integration

Complex function, Real and Imaginary parts of Complex function, Limit, Continuity and Derivative of Complex function, Cauchy-Riemann equations, Analytic function, Entire function, singular point, conjugate Function, C -R equations in polar form, Harmonic functions, Milne-Thomson method.



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Line integral of a complex function, Cauchy's theorem (only statement) -Cauchy's Integral Formula (only statement), Taylor's series(only statement), Laurent's series (only statement)-Zeros of an analytic function- Types of Singularities-pole of order m, simple pole- Residues, Residue theorem (only statement).

Evaluation of integrals of the type

(a) Improper real integrals $\int_{-\infty}^{\infty} f(x)dx$ (b) $\int_0^{2\pi} f(\cos\theta, \sin\theta)d\theta$

Text Books:

1. **B.S.GREWAL**, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers.
2. **B. V. Ramana**, Higher Engineering Mathematics, 2007 Edition, Tata Mc. Graw Hill Education.
3. **Dr T K V Iyengar, Dr B.Krishna Gandhi, S.Ranhanatham** and **Dr. M.V.S.S.N Prasad**, Engineering Mathematics, S.Chand & Company Ltd.

Reference Books:

1. **N.P.Bali & Manish Goyal**, A Text book of Engineering Mathematics, Lakshmi Publications.
2. **James ward brown, Ruel V.Churchill**, Complex variable and Applications, Mc.Graw Hill Publications
3. **ERWIN KREYSZIG**, Advanced Engineering Mathematics, 10th Edition, Wiley-India
4. **Steven C. Chapra**, Applied Numerical Methods with MATLAB for Engineering and Science, Tata Mc. Graw Hill Education



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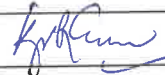
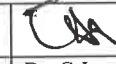
II Year - II Semester	Code: 20CS4T06	L	T	P	C
		3	0	0	3
JAVA PROGRAMMING					
Course Objectives: • Understanding the OOP's concepts, classes and objects, threads, files, applets, swings and act. • This course introduces computer programming using the JAVA programming language with object-oriented programming principles. • ☐ Emphasis is placed on event-driven programming methods, including creating and manipulating objects, classes, and using Java for network level programming and middleware development					
Course Outcomes: • ☐ Understand Java programming concepts and utilize JavaGraphical User Interface in Program writing. • ☐ Write, compile, execute and troubleshoot Java programming for networking concepts. • ☐ Build Java Application for distributed environment. • ☐ Design and Develop multi-tier applications. • ☐ Identify and Analyze Enterprise applications.					
UNIT I Introduction to OOP, procedural programming language and object oriented language, principles of OOP, applications of OOP, history of java, java features, JDK, JVM, program structure. Variables, primitive data types, identifiers, literals, operators, expressions, precedence rules and associativity, primitive type conversion and casting, flow of control.					
UNIT II Arrays, command line arguments, Classes and objects, class declaration, creating objects, methods, constructors and constructor overloading, garbage collector, importance of static keyword and examples, this keyword, nested classes.					
UNIT III Inheritance, types of inheritance, super keyword, final keyword, overriding and abstract class. Interfaces, creating the packages, using packages, importance of CLASSPATH and java.lang package. Exception handling, importance of try, catch, throw, throws and finally block, user defined exceptions, Assertions.					
UNIT IV Multithreading: introduction, thread life cycle, creation of threads, thread priorities, thread synchronization, communication between threads. Reading data from files and writing data to files, random access file.					
UNIT V . Introduction to Java FX, AWT: introduction, components and containers, Button, Label, Checkbox, Radio Buttons, List Boxes, Choice Boxes, Container class, Layouts, Menu and Scrollbar.					
Text Books: 1. The complete Reference Java, 8th edition, Herbert Schildt, TMH. 2. Programming in JAVA, Sachin Malhotra, SaurabhChoudary, Oxford. 3. Introduction to java programming, 7th edition by Y Daniel Liang, Pearson.					
Reference Books: 1) Introduction to java programming, 7th edition by Y Daniel Liang,Pearson 2) Constructive JAVA Programming, Sagayaraj, Denis, Karthik, Gajalakshmi, Universities Press. 3) JAVA Programming for Core and Advanced Learners, Sagayaraj, Denis, Karthik, Gajalakshmi, Universities Press.					

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II Year - II Semester	Code: 20AD4T02	L	T	P	C
	DATA SCIENCE	3	0	0	3
Course Objectives: - To provide a strong foundation of fundamental concepts in Data Science. - To provide a basic exposition to the goals and methods of Data Science. - To familiarize with Python libraries for Data Analysis and Data Visualization. - Produce Python code to statistically analyze a dataset.					
Course Outcomes: Upon successful completion of the course, the student will be able to: - Enumerate the history and foundations of Data Science - Apply the basic principles of Data Science in problem solving - Demonstrate various mathematical operations on arrays using NumPy - Analyze and manipulate Data using Pandas - Creating static, animated, and interactive visualizations using Matplotlib.					
UNIT I What is Data science? Datafication, Exploratory Data Analysis, The Data science process, A data scientist role in this process.					
UNIT II NumPy Basics: The NumPy ndarray: A Multidimensional Array Object, Creating ndarrays, Data Types for ndarrays, Operations between Arrays and Scalars, Basic Indexing and Slicing, Boolean Indexing, Fancy Indexing, Data Processing Using Arrays, Expressing Conditional Logic as Array Operations, Methods for Boolean Arrays, Sorting, Unique.					
UNIT III Getting Started with pandas: Introduction to pandas, Library Architecture, Features, Applications, Data Structures, Series, Data Frame, Index Objects, Essential Functionality Reindexing, Dropping entries from an axis, Indexing, selection, and filtering), Sorting and ranking, Summarizing and Computing Descriptive Statistics, Unique Values, Value Counts, Handling Missing Data, filtering out missing data.					
UNIT IV Visualizing Data: matplotlib, Bar charts, Line charts, Scatter plots, Statistics: Describing a single set of data, Central tendencies, Dispersion, Correlation, Simpson's paradox, Probability: dependence and independence, Conditional Probability, Bayes's Theorem, Random Variables, Continuous distribution, Normal distribution.					
UNIT V Data Loading, storage and File formats: Reading and writing data in text formats, Reading text files in pieces, Writing data out to text format, JSON Data, XML and HTML: Web scripting, Binary Data Formats, Interacting with HTML and Web APIs, Interacting with Databases, Storing and Loading Data in MongoDB.					
Text Books: - Wes McKinney, "Python for Data Analysis", O'REILLY, ISBN:978-1-449-31979-3, 1st edition, October 2012. - Cathy O'Neil, Rachel Schutt, Doing Data Science, Straight Talk from the Frontline. O'Reilly, 2013. - Joel Grus, "Data Science from Scratch: First Principles with Python", O'Reilly Media, 2015					
Reference Books: - Python: The Complete Reference, Martin C. Brown, McGraw Hill Education - Head First Python, Paul Barry, O'Reilly J. Leskovec, A. Rajaraman, J.D. Ullman. Mining of Massive Datasets. Cambridge University Press. (Indian Edition; Online pdf is available for download)					

					
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II Year - II Semester	Code: 20CS4T07			
	L	T	P	C
3003				
OPERATING SYSTEMS				
Course Objectives: The objectives of this course is to				
• Introduce to the internal operation of modern operating systems • Define, explain, processes and threads, mutual exclusion, CPU scheduling, deadlock, memory management, and file systems • Understand File Systems in Operating System like UNIX/Linux and Windows • Understand Input Output Management and use of Device Driver and Secondary Storage (Disk) Mechanism • Analyze Security and Protection Mechanism in Operating System				
Course Outcomes: After learning, the course the students should be able to:				
➤ Describe various generations of Operating System and functions of Operating System ➤ Describe the concept of program, process and thread and analyze various CPU Scheduling Algorithms and compare their performance ➤ Solve Inter Process Communication problems using Mathematical Equations by various methods ➤ Compare various Memory Management Schemes especially paging and Segmentation in Operating System and apply various Page Replacement Techniques ➤ Outline File Systems in Operating System like UNIX/Linux and Windows				
UNIT I Operating Systems Overview: Operating system functions, Operating system structure, Operating systems operations, Computing environments, Open-Source Operating Systems. System Structures: Operating System Services, User and Operating-System Interface, systems calls, Types of System Calls, system programs, operating system structure, operating system debugging, System Boot.				
UNIT II Process Concept: Process scheduling, Operations on processes, Inter-process communication, Communication in client server systems. Multithreaded Programming: Multithreading models, Thread libraries, Threading issues. Process Scheduling: Basic concepts, Scheduling criteria, Scheduling algorithms, Multiple processors scheduling, Thread scheduling. Inter-process Communication: Race conditions, Critical Regions, Mutual exclusion with busy waiting, sleep and wakeup, Semaphores, Mutexes, Monitors, Message passing, Barriers, Classical IPC Problems - Dining philosophers problem, Readers and writers problem.				
UNIT III Memory-Management Strategies: Introduction, Swapping, Contiguous memory allocation, Paging, Segmentation. Virtual Memory Management: Introduction, Demand paging, Copy on-write, Page replacement, Frame allocation, Thrashing, Memory-mapped files, Kernel memory allocation.				
UNIT IV Deadlocks: Resources, Conditions for resource deadlocks, Ostrich algorithm, Deadlock detection and recovery, Deadlock avoidance, Deadlock prevention.				
UNIT V File Systems: Files, Directories, File system implementation, management and optimization. Secondary-Storage Structure: Overview of disk structure, and attachment, Disk scheduling, RAID structure, Stable storage implementation.				
Text Books: 1) Silberschatz A, Galvin P B, and Gagne G, Operating System Concepts, 9th edition, Wiley, 2013. 2) Tanenbaum A S, Modern Operating Systems, 3rd edition, Pearson Education, 2008.				
Reference Books: 1) Dhamdhere D M, Operating Systems A Concept Based Approach, 3rd edition, Tata McGraw-Hill, 2012. 2) Stallings W, Operating Systems -Internals and Design Principles, 6th edition, Pearson Education, 2009 3) Nutt G, Operating Systems, 3rd edition, Pearson Education, 2004.				

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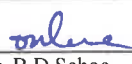
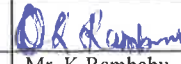
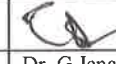
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II Year - II Semester	Code: 20CS4T08		L	T	P	C
			3	0	0	3
MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE						
Course Objectives: <i>This course is designed :</i> - To introduce the students to the topics and techniques of discrete methods and combinatorial reasoning. - To introduce a wide variety of applications. The algorithmic approach to the solution of problems is fundamental in discrete mathematics, and this approach reinforces the close ties between this discipline and the area of computer science.						
UNIT I Mathematical Logic: Propositional Calculus: Statements and Notations, Connectives, Well Formed Formulas, Truth Tables, Tautologies, Equivalence of Formulas, Duality Law, Tautological Implications, Normal Forms, Theory of Inference for Statement Calculus, Consistency of Premises, Indirect Method of Proof. Predicate Calculus: Predicative Logic, Statement Functions, Variables and Quantifiers, Free and Bound Variables, Inference Theory for Predicate Calculus						
UNIT II Set Theory: Introduction, Operations on Binary Sets, Principle of Inclusion and Exclusion, <i>Relations:</i> Properties of Binary Relations, Relation MaTriex and Digraph, Operations on Relations, Partition and Covering, Transitive Closure, Equivalence, Compatibility and Partial Ordering Relations, Hasse Diagrams						
UNIT III <i>Functions:</i> Bi-jective Functions, Composition of Functions, Inverse Functions, Permutation Functions, Recursive Functions, Lattice and its Properties.						
UNIT IV Algebraic Structures: <i>Algebraic Structures:</i> Algebraic Systems, Examples, General Properties, Semi Groups and Monoids, Homomorphism of Semi Groups and Monoids, Group, Subgroup, Abelian Group, Homomorphism, Isomorphism.						
UNIT V Combinatorics: Basics of counting, permutations, permutations with repetitions, circular permutations, combinations, Generating functions of permutations and combinations, Binomial and Multinomial coefficients, Binomial and Multinomial theorems, The principles of Inclusion-Exclusion, Pigeonhole principle and its Applications. Recurrence Relations: Generating functions,function of sequences,Partial fractions,Calculating coefficient of generating functions,Reccurence Relations,Formulation as Reccurence relations,Solving Reccurence relation by substitution ad generating functions,Method of Characteristic roots,Solving homogeneous recurrence relations						
Text Books: 1.Discrete Mathematical Structures with Applications to Computer Science, J. P. Tremblay and P. Manohar, Tata McGraw Hill. 2. Elements of Discrete Mathematics-A Computer Oriented Approach, C. L. Liu and D. P.						



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II Year - II Semester	Code: 20CS4L07	L	T	P	C
		0	0	3	1.5
JAVA PROGRAMMING LAB					
List of Experiments					
Exercise - 1 (Basics)					
a). Write a JAVA program to display default value of all primitive data type of JAVA					
b) Write a case study on public static void main(250 words)					
Exercise - 2 (Operations, Expressions, Control-flow, Strings)					
a). Write a JAVA program to search for an element in a given list of elements using binary search mechanism.					
(b) Write a JAVA program using StringBuffer to delete, remove character.					
Exercise - 3 (Class, Objects)					
a). Write a JAVA program to implement class mechanism. – Create a class, methods and invoke them inside main method.					
b). Write a JAVA program to implement constructor.					
Exercise - 4 (Methods)					
a). Write a JAVA program to implement constructor overloading.					
b). Write a JAVA program implement method overloading.					
Exercise - 5 (Inheritance)					
a). Write a JAVA program to implement multi level Inheritance					
b). Write a java program for abstract class to find areas of different shapes					
Exercise - 6 (Inheritance - Continued)					
a). Write a JAVA program give example for “super” keyword.					
b). Write a JAVA program to implement Interface. What kind of Inheritance can be achieved?					
Exercise - 7 (Exception)					
a).Write a JAVA program that describes exception handling mechanism					
b).Write a JAVA program Illustrating Multiple catch clauses.					
c). Write a JAVA program that implements Runtime polymorphism					
Exercise – 8 (User defined Exception)					
a). Write a JAVA program to Illustrate try, catch.					
b). Write a JAVA program to Illustrate finally					
c).Write a JAVA program for creation of User Defined Exception					
Exercise – 9 (Threads)					
a). Write a JAVA program that creates threads by extending Thread class .First thread display“Good Morning “every 1 sec, the second thread displays “Hello “every 2 seconds and the third display “Welcome” every 3 seconds ,(Repeat the same by implementing Runnable)					
b). Write a program illustrating isAlive and join ()					
c). Write a Program illustrating Daemon Threads.					
d).Write a JAVA program Producer Consumer Problem					
Exercise – 10 (Packages)					
a). Write a JAVA program illustrate class path					
b). Write a JAVA program to create an import a package.					

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II Year - II Semester	Code: 20AD4L02	L	T	P	C
		0	0	3	1.5
DATA SCIENCE LAB					
Course Objectives: ○ To familiarize Python Libraries for Data Collection ○ To Apply different Data Cleaning methods for Data Preparation ○ To Apply appropriate statistical methods for Data Preparation ○ To Understand characteristics of Data-by-Data Visualization techniques ○ To Identify and apply appropriate Libraries for Data Analysis					
Course Outcomes: Upon successful completion of the course, the student will be able to: • Apply appropriate tools for Data Collection and Manipulation • Will be able to identify and apply appropriate Data Cleaning techniques for Data Preparation • Elucidate statistical measures to Analyze the nature of Data. • Implement Data Visualization Methods for getting insights of Data. • Will be able to Analyze Data by implementing Concepts of Data Preparation					
WEEK1: 1. Install Jupyter/NumPy/Panda in Python 2. Study of Jupyter Notebook System					
WEEK 2: 1. Write a Program in Python to Manipulate, Aggregate and Analyze data using NumPy 2. Write a Program in Python to Handle and Analyze data using Pandas 3. Write a Program in Python to Read and write different types of Files (csv,json, txt etc).					
WEEK 3: 1. Write program to create a list, manipulate and slices it. 2. Create a new list and add elements to it from another list, and creates a matrix from two lists 3. Create same a, b steps for Tuple and Dictionary					
WEEK 4: Creating a NumPy Array a. Basic ndarray b. Array of zeros c. Array of ones d. Random numbers in ndarray e. An array of your choice f. Imatrix in NumPy g. Evenly spaced ndarray					
WEEK 5: The Shape and Reshaping of NumPy Array a. Dimensions of NumPy array b. Shape of NumPy array c. Size of NumPy array d. Reshaping a NumPy array e. Flattening a NumPy array f. Transpose of a NumPy array					
WEEK 6: Indexing and Slicing of NumPy Array a. Slicing 1-D NumPy arrays					



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	b. Slicing 2-D NumPy arrays c. Slicing 3-D NumPy arrays d. Negative slicing of NumPy arrays
WEEK 7:	Expanding and Squeezing a NumPy Array a. Expanding a NumPy array b. Squeezing a NumPy array c. Sorting in NumPy Arrays
WEEK 8:	Stacking and Concatenating Numpy Arrays a. Stacking ndarrays b. Concatenating ndarrays c. Broadcasting in Numpy Arrays
WEEK 9:	Perform following operations using pandas a. Creating dataframe b. concat() c. Setting conditions d. Adding a new column
WEEK 10:	Perform following operations using pandas a. Filling NaN with string b. Sorting based on column values c. groupby()
WEEK 11:	Read the following file formats using pandas a. Text files b. CSV files c. Excel files d. JSON files
WEEK 12:	Perform following visualizations using matplotlib a. Bar Graph b. Pie Chart c. Box Plot d. Histogram e. Line Chart and Subplots f. Scatter Plot
WEEK 13:	Given the <i>iris dataset</i>: https://archive.ics.uci.edu/ml/datasets/iris 1. How many rows does it contain? How many columns? 2. Compute the average petal length 3. Compute the average of all numerical columns 4. Extract the petal length outliers (i.e. those rows whose petal length is 50% longer than the average petal length) 5. Extract the petal length outliers (as above) for each iris species 6. Compute the standard deviation of all columns, for each iris species 6. Extract the petal length outliers (as above) for each iris species 7. Extract the group-wise petal length outliers, i.e. find the outliers (as above) for each iris species using group by (), aggregate, and merge (). Write a python program to compute all the functionalities of the above-mentioned data.
WEEK 14:	



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Consider the sample data

```
people = ('G1','G2','G3','G4','G5','G6','G7','G8')
segments = 4
multi-dimensional data= [[ 3.40022085, 7.70632498, 6.4097905, 10.51648577, 7.5330039,
7.1123587, 12.77792868, 3.44773477],
[ 11.24811149, 5.03778215, 6.65808464, 12.32220677, 7.45964195, 6.79685302,
7.24578743, 3.69371847],
[ 3.94253354, 4.74763549, 11.73529246, 4.6465543, 12.9952182, 4.63832778, 11.16849999,
8.56883433],
[ 4.24409799, 12.71746612, 11.3772169, 9.00514257, 10.47084185, 10.97567589,
3.98287652, 8.80552122]]
```

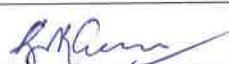
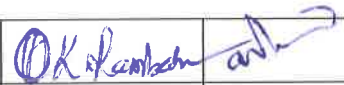
Write a Python program to create stack bar plot and add label to each section.

Text Books:

4. Cathy O'Neil and Rachel Schutt. Doing Data Science, Straight Talk from The Frontline. O'Reilly.
5. Jure Leskovek, AnandRajaraman and Jeffrey Ullman. Mining of Massive Datasets. v2.1, Cambridge University Press.

Reference Books:

1. Joel Grus, Data Science from Scratch, O'Reilly Publications.
2. Davy Ceilen, Introducing Data Science: Big Data, Machine Learning, and More, Using Python Tools, DreamTech Publications.

					
Dr. K V Ramana, Professor of CSE, UCEK, JNTUK.	Dr. Jimson Mathew Accos. Professor of CSE IIT Patna.	Dr. B D Sahoo Professor of CSE NIT Rourkela.	Mr. K Rambabu, Director, Monster India Pvt. Ltd. Bengaluru.	Dr. S Rao Chintalapudi, Professor & HoD, CSE(AI&ML) CMR Technical Campus, Hyderabad	Dr. G Jena Professor & HoD Of CSE.
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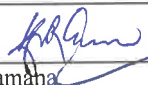
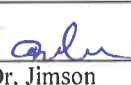
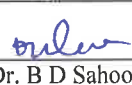
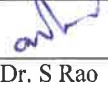
II Year - II Semester	Code: 20CS4L09		L	T	P	C
			0	0	3	1.5
OPERATING SYSTEMS LAB						
List of Experiments						
1. Simulate the following CPU scheduling algorithms a) Round Robin b) SJF c) FCFS d) Priority						
2. Loading executable programs into memory and execute System Call implementation-read(), write(), open() () and close()						
3. Multiprogramming-Memory management- Implementation of Fork(), Wait(), Exec() and Exit() System calls						
4. Simulate all File allocation strategies a) Sequenced, b)Indexed, c) Linked						
5. Simulate MVT and MFT						
6. Simulate all File Organization Techniques a) Single level directory b) Two level c) Hierarchical d) DAG						
7. Simulate Bankers Algorithm for Dead Lock Avoidance						
8. Simulate Bankers Algorithm for Dead Lock Prevention.						
9. Simulate all page replacement algorithms. a) FIFO b) LRU c) LFU etc....						
10. Simulate Paging Technique of memory management.						

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II Year - II Semester	Code: 20CS4L09	L	T	P	C
		0	0	3	1.5
Skill Oriented Course: MONGO DB					
Course Outcomes: Upon successful completion of the course, the student will be able to: • Installing and configuring mongo DB in windows • Perform all database operations using mongo DB • Develop applications by integrating mongo DB with java/PHP.					
List of Experiments: 1. Mongo DB installation and configuration in windows. 2. Demonstrate how to create and drop a database in Mongo DB. 3. Creating the Collection in Mongo DB on the fly 4. Creating collection with options before inserting the documents and drop the collection created. 5. Mongo DB insert document a. Insert single document b. Insert multiple documents in collection 6. Querying all the documents in json format and Querying based on the criteria. 7. Mongo DB update document a. Using update() method. b. Using save() method. 8. Mongo DB delete document from a collection. a. Using remove() method. b. Remove only one document matching your criteria c. Remove all documents 9. Mongo DB Projection 10. limit(), skip(), sort() methods in Mongo DB 11. Mongo DB indexing a. Create index in Mongo DB b. Finding the indexes in a collection c. Drop indexes in a collection d. Drop all the indexes 12. Mongo DB with java and PHP a. Create a simple application that uses Mongo DB with Java b. Create a simple application that uses Mongo DB with PHP					
Web References: 1. https://beginnersbook.com/2017/09/mongodb-tutorial/					

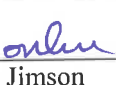
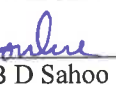
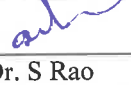
					
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
DETAILED SYLLABUS FOR REGULATIONS – BR20
UG: B.Tech - ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
III Year – I SEMESTER

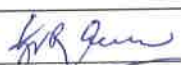
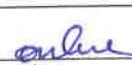
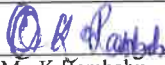
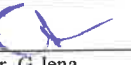
S.No	Course Code	Courses	L	T	P	Credits
1	20CS5T09	Computer Networks	3	0	0	3
2	20AD5T01	Machine Learning	3	0	0	3
3	20CS5T11	Data Base Management System	3	0	0	3
4	20ML5E01 20CS5E02 20CE5E01 20ME5E01	Open Elective- I 1. Artificial Intelligence 2. Object Oriented Programming 3. Interior Space Design 4. Industrial Automation and Robotics	3	0	0	3
5	20CS5D01 20CS5D03 20AD5D01 20AD5D02	Professional Elective- I 1. Computer Graphics 2. Software Engineering 3. Object Oriented Analysis and Design 4. DevOps/MOOCs -1	3	0	0	3
6	20CS5L12	DBMS Lab	0	0	3	1.5
7	20AD5L03	Machine Learning Lab	0	0	3	1.5
8	20CS5P01	Summer Internship	0	0	3	1.5
9	20AD5S03	Skill Advanced Course: Continuous Integration and Continuous Delivery using DevOps	1	0	2	2
10	20HS5M04	Foreign Language	2	0	0	0
Total			18	0	11	21.5

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III Year - I Semester	Code: 20CSE1003	L	T	P	C
		3	0	0	3
COMPUTER NETWORKS					
Course Outcomes:					
After completing this course the student must demonstrate the knowledge and ability to:					
1. Independently understand basic computer network technology and identify the different types of network topologies and protocols.					
2. Understand Network models and Physical layer					
3. Study the techniques used in data link layer.					
4. Understand the routing strategies for an IP based networking					
UNIT I					
Introduction: OSI overview, TCP/IP and other networks models, Examples of Networks: Novell Networks, Arpanet, Internet, Network Topologies WAN, LAN, MAN.					
UNIT II					
Physical Layer – Guided Transmission Media, Digital Modulation and Multiplexing: Frequency Division Multiplexing, Time Division Multiplexing, Code Division Multiplexing.					
UNIT III					
The Data Link Layer - Services Provided to the Network Layer – Framing – Error Control Flow Control, Error Detection and Correction, Elementary Data Link Protocols, Sliding Window Protocols. Random Access: ALOHA, MAC addresses, carrier sense multiple access (CSMA), CSMA/CD, CSMA/CA, controlled Access: Reservation, Polling, Token Passing, channelization: FDMA, TDMA, CDMA.					
UNIT IV					
Network Layer: Virtual circuit and Datagram subnets-Routing algorithm shortest path routing, Flooding, Hierarchical routing, Broad cast, Multi cast, distance vector routing.					
Transport Layer: The transport service, elements of transport protocols, congestion control, the internet transport protocols.					
UNIT V					
Application Layer –The Domain Name System: The DNS Name Space, Resource Records, Name Servers, Electronic Mail: Architecture and Services, The User Agent, Message Formats, Message Transfer, Final Delivery, The wireless web: WAP—The Wireless Application Protocol					
Text Books:					
1. Computer Networks—Andrew S Tanenbaum, 4 th Edition. Pearson Education/PHI					
2. Data Communications and Networks–Behrouz A. Forouzan. Third Edition TMH.					
Reference Books:					
1.An Engineering Approach to Computer Networks- S. Keshav, 2ndEdition, Pearson Education					
2.Understanding communications and Networks, 3rd Edition, W.A.Shay, Thomson					
3.Computer Networks, 5ed, David Patterson, Elsevier					

					
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III Year - I Semester	Code: 20AD5T0: 4	L	T	P	C
MACHINE LEARNING					
Course Objectives: - Identify problems that are amenable to solution by ANN methods, and which ML methods may be suited to solving a given problem. - Formalize a given problem in the language/framework of different ANN methods (e.g., as a search problem, as a constraint satisfaction problem, as a planning problem, as a Markov decision process, etc).					
Course Outcomes: After the completion of the course, student will be able to - Explain the fundamental usage of the concept Machine Learning system - Demonstrate on various regression Technique - Analyze the Ensemble Learning Methods					
UNIT I Introduction- Artificial Intelligence, Machine Learning, Deep learning, Types of Machine Learning Systems, Main Challenges of Machine Learning. Statistical Learning: Introduction, Supervised and Unsupervised Learning, Training and Test Loss, Tradeoffs in Statistical Learning, Estimating Risk Statistics, Sampling distribution of an estimator, Empirical Risk Minimization.					
UNIT II Supervised Learning (Regression/Classification):Basic Methods: Distance based Methods, Nearest Neighbours, Decision Trees, Naive Bayes, Linear Models: Linear Regression, Logistic Regression, Generalized Linear Models, Support Vector Machines, Binary Classification: Multiclass/Structured outputs, MNIST, Ranking.					
UNIT III Ensemble Learning and Random Forests: Introduction, Voting Classifiers, Bagging and Pasting, Random Forests, Boosting, Stacking. Support Vector Machine: Linear SVM Classification, Nonlinear SVM Classification SVM Regression, Naïve Bayes Classifiers.					
UNIT IV Unsupervised Learning Techniques: Clustering, K-Means, Limits of K-Means, Using Clustering for Image Segmentation, Using Clustering for Preprocessing, Using Clustering for Semi-Supervised Learning, DBSCAN, Gaussian Mixtures. Dimensionality Reduction: The Curse of Dimensionality, Main Approaches for Dimensionality Reduction, PCA, Using Scikit-Learn, Randomized PCA, Kernel PCA.					
UNIT V Neural Networks and Deep Learning: Introduction to Artificial Neural Networks with Keras, Implementing MLPs with Keras, Installing TensorFlow 2, Loading and Preprocessing Data with TensorFlow.					
Text Books: 1.Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow, 2nd Edition, O'Reilly Publications, 2019 2.Data Science and Machine Learning Mathematical and Statistical Methods,Dirk P. Kroese, Zdravko I. Botev, Thomas Taimre, Radislav Vaisman,25th November 2020					
Reference Books: 1. Trevor Hastie, Robert Tibshirani, Jerome Friedman, The Elements of Statistical Learning, Springer 2009 2. Christopher Bishop, Pattern Recognition and Machine Learning, Springer, 2007 3.Machine Learning Probabilistic Approach, Kevin P. Murphy, MIT Press, 2012.					

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III Year - I Semester	20CS5T11	L	T	P	C
		3	0	0	3
DATA BASE MANAGEMENT SYSTEM					
Course Objectives: 1. To introduce about database management systems 2. To give a good formal foundation on the relational model 3. To introduce the concepts of basic SQL as a universal Database language					
Course Outcomes: 1. Describe fundamental concepts a relational database 2. Create, maintain and manipulate a relational database using SQL 3. Apply Conceptual and Logical database design					
UNIT I Introduction: Database system, Characteristics (Database Vs File System), Database Users (Actors on Scene, Workers behind the scene), Advantages of Database systems, Database applications. Brief introduction of different Data Models; Concepts of Schema, Instance and data independence; Three tier schema architecture for data independence; Database system structure, environment, Centralized and Client Server architecture for the database.					
UNIT II Relational Model: Introduction to relational model, concepts of domain, attribute, tuple, relation, importance of null values, constraints (Domain, Key constraints, integrity constraints) and their importance BASIC SQL: Simple Database schema, data types, table definitions (create, alter), different DML operations (insert, delete, update), basic SQL querying (select and project) using where clause, arithmetic & logical operations, SQL functions (Date and Time, Numeric, String conversion).					
UNIT III Entity Relationship Model: Introduction, Basic features of ER model, Representation of entities, attributes, entity set, relationship, relationship set, constraints, ER diagrams Generalization/specialization and Aggregation. SQL: Creating tables with relationships, implementation of key and integrity constraints, nested queries, sub queries, grouping, aggregation, ordering, implementation of different types of joins, views(updatable and non-updatable), relational set operations.					
UNIT IV Schema Refinement (Normalization): Purpose of Normalization or schema refinement, concept of functional dependency, Closure of functional dependency and attribute closure, Normal forms based on functional dependency(1NF, 2NF and 3 NF), concept of surrogate key, Boyce-Codd normal form(BCNF), Lossless join and dependency preserving decomposition, Fourth normal form(4NF), Fifth Normal Form (5NF).					
UNIT V TRANSACTION MANAGEMENT Transaction, properties of transactions, transaction log, and transaction management with SQL using commit rollback and save point. Concurrency control for lost updates, uncommitted data, in consistent retrievals and the Scheduler. Concurrency control with locking methods: lock granularity, lock types, two phase locking for ensuring serializability, deadlocks, Concurrency control with time stamp ordering: Wait/Die and Wound/Wait Schemes. Indexing Techniques: Indexing, Cluster Indexes, Primary and Secondary Indexes , Index data Structures, Hash Based Indexing, B+ Trees: Searching, Insertion, Deletion					
Text Books: 1.Database System Concepts by Abraham Silberschatz, Henry F. Korth, S. Sudarshan, 7th Edition, McGraw-Hill Education, 2019. 2. Database Management Systems by Raghu Ramakrishnan, Johannes Gehrke, 3rd Edition., McGraw-Hill Education (India), 2014.					
Reference Books: 1.Database Principles: Fundamentals of Design, Implementation, and Management by Steven Morris, Keeley Crockett, Carlos Coronel, Craig Blewett, Cengage, 2020. 2. Fundamentals of Database Systems by RamezElmasri, Shamkant B. Navathe, 7th Edition, Pearson Education India, 2015. 3. Introduction to Database Systems by C J Date, 8th Edition, Pearson Education, 2009.					

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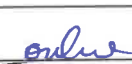
III Year - I Semester	Code: 20ML5E01	L	T	P	C
		3	0	0	3
ARTIFICIAL INTELLIGENCE					
Course Objectives:					
Course Objectives:					
☐ To provide a strong foundation of fundamental concepts in Artificial Intelligence.					
☐ To provide a basic exposition to the goals and methods of Artificial Intelligence.					
Course Outcomes:					
Upon successful completion of the course, the student will be able to:					
☐ Enumerate the history and foundations of Artificial Intelligence					
☐ Apply the basic principles of AI in problem solving					
☐ Choose the appropriate representation of Knowledge					
UNIT I					
Introduction: What Is AI?, The Foundations of Artificial Intelligence, The History of Artificial Intelligence, The State of the Art, Agents and Environments, Good Behavior: The Concept of Rationality, The Nature of Environments, The Structure of Agents.					
UNIT II					
Problem Solving: Problem-Solving Agents, Example Problems, Searching for Solutions, Uninformed Search Strategies, Informed (Heuristic) Search Strategies, Local Search Algorithms and Optimization Problems, Searching with Nondeterministic Actions.					
UNIT III					
Logic concepts: Introduction, propositional calculus, propositional logic, natural deduction system, axiomatic system, semantic tableau system in propositional logic, resolution refutation in propositional logic, predicate logic					
UNIT IV					
Knowledge Representation: Knowledge-Based Agents, Logic, Propositional Logic: A Very Simple Logic, Ontological Engineering, Categories and Objects, Events, Mental Events and Mental Objects, Reasoning Systems for Categories, The Internet Shopping World.					
UNIT V					
Expert system and applications: Introduction phases in building expert systems, expert system versus traditional systems, rule-based expert systems blackboard systems truth maintenance systems, application of expert systems, list of shells and tools					
Text Books:					
1) Stuart Russell and Peter Norvig, "Artificial Intelligence: A Modern Approach" , 3rd Edition, Pearson					
2) Artificial Intelligence, A new Synthesis, Nils J Nilsson, Elsevier					
Reference Books:					
1. Artificial intelligence, A modern Approach , 2nd edition, Stuart Russel, Peter Norvig, PEA					
2. Artificial Intelligence- Rich, Kevin Knight, Shiv Shankar B Nair, 3rd edition, TMH					
3. Introduction to Artificial Intelligence, Patterson, PHI					

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III Year - I Semester	Code : 20CS5E02	L	T	P	C
		3	0	0	3
OBJECT ORIENTED PROGRAMMING					
Course Objectives: - Understanding the OOP’s concepts, classes and objects, threads, files, applets, swings and act. - This course introduces computer programming using the JAVA programming language with object-oriented programming principles.					
Course Outcomes: - Understand Java programming concepts and utilize Java Graphical User Interface in Program writing. ☐ Write, compile, execute and troubleshoot Java programming for networking concepts. ☐ Build Java Application for distributed environment.					
UNIT I Introduction to OOP, procedural programming language and object oriented language, principles of OOP, applications of OOP, history of java, java features,JDK, JVM, program structure. Variables, primitive data types, identifiers, literals, operators, expressions, precedence rules and associativity, primitive type conversion and casting, flow of control.					
UNIT II Arrays, command line arguments, Classes and objects, class declaration, creating objects, methods, constructors and constructor overloading, garbage collector, importance of static keyword and examples, this keyword, nested classes.					
UNIT III Inheritance, types of inheritance, super keyword, final keyword, overriding and abstract class. Interfaces, creating the packages, using packages, importance of CLASSPATH and java.lang package. Exception handling, importance of try, catch, throw, throws and finally block, user defined exceptions, Assertions.					
UNIT IV Multithreading: introduction, thread life cycle, creation of threads, thread priorities, thread synchronization, communication between threads. Reading data from files and writing data to files, random access file					
UNIT V Introduction to Java FX, AWT: introduction, components and containers, Button, Label, Checkbox, Radio Buttons, List Boxes, Choice Boxes, Container class, Layouts, Menu and Scrollbar.					
Text Books: - The complete Reference Java, 8th edition, Herbert Schildt, TMH. - Programming in JAVA, Sachin Malhotra, SaurabhChoudary, Oxford. - Introduction to java programming, 7th edition by Y Daniel Liang, Pearson.					
Reference Books: - Introduction to java programming, 7th edition by Y Daniel Liang,Pearson - Constructive JAVA Programming, Sagayaraj, Denis, Karthik, Gajalakshmi, Universities Press. - JAVA Programming for Core and Advanced Learners, Sagayaraj, Denis, Karthik, Gajalakshmi, Universities Press.					

					
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III Year - I Semester	Code: 20CS5D01	L	T	P	C
		3	0	0	3
COMPUTER GRAPHICS					
Course Objectives: ✓ To develop, design and implement two and three dimensional graphical structures. ✓ To enable students to acquire knowledge Multimedia compression and animations. ✓ To learn Creation, Management and Transmission of Multimedia objects					
Course Outcomes: ✓ Illustrate the basics of computer graphics, different graphics systems and applications of computer graphics with various algorithms for line, circle and ellipse drawing objects for 2D transformations. ✓ Illustrate able to create the general software architecture of programs that use 3D object sets with computer graphics ✓ Apply projections and visible surface detection techniques for display of 3D scene on 2D screen					
UNIT I Introduction to Graphics: Application areas of Computer Graphics, overview of graphics systems, video-display devices, graphics monitors and work stations and input devices. 2D Primitives: Output primitives-Line, Circle and Ellipse drawing algorithms, Attributes of output primitives, Two dimensional Geometric transformations, Two dimensional viewing Line, Polygon, Curve and Text clipping algorithms.					
UNIT II 3D Concepts: Parallel and Perspective projections, Three dimensional object representation- Polygons, Curved lines, Splines, Quadric Surfaces, Visualization of data sets, 3D transformations, Viewing, Visible surface identification.					
UNIT III Graphics Programming: Color Models- RGB, YIQ, CMY, HSV, Animations -General Computer Animation, Raster, Keyframe. Graphics programming using OPENGL-Basic graphics primitives, Drawing three dimensional objects, Drawing three dimensional scenes.					
UNIT IV Rendering: Introduction to shading models, Flat and Smooth shading, Adding texture to faces, Adding shadows of objects, Building a camera in a program, Creating shaded objects					
UNIT V Overview of Ray Tracing: Intersecting rays with other primitives, Adding Surface texture, Reflections and Transparency, Boolean operations on Objects.					
Text Books: 1) Donald Hearn, Pauline Baker, Computer Graphics – C Version, second edition, Pearson Education, 2004. 2) Schaum's Outline of Computer Graphics Second Edition, Zhigang Xiang, Roy A. Plastock.					
Reference Books: 1) James D. Foley, Andries Van Dam, Steven K. Feiner, John F. Hughes, Computer Graphics- Principles and practice, Second Edition in C, Pearson Education, 2007. 2) F.S. Hill, Computer Graphics using OPENGL, Second edition, Pearson Education, 2003.					

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University Expert	External Expert	External Expert	Industry Expert	Alumni	Chairman - BoS



BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE
ODALAREVU – 533 210, Andhra Pradesh, India

IV Year - I Semester	Code: 20CS5D03	L	T	P	C
		3	0	0	3
SOFTWARE ENGINEERING					
Course Objectives: This course is designed to: ✓ Give exposure to phases of Software Development, common process models including Waterfall, and the Unified Process, and hands-on experience with elements of the agile process ✓ Give exposure to a variety of Software Engineering practices such as requirements analysis and specification, code analysis, code debugging, testing, traceability, and version control ✓ Give exposure to Software Design techniques					
Course Outcomes: Students taking this subject will gain software engineering skills in the following areas: ✓ Ability to transform an Object-Oriented Design into high quality, executable code ✓ Skills to design, implement, and execute test cases at the Unit and Integration level ✓ Compare conventional and agile software methods					
UNIT I The Nature of Software, The Unique Nature of WebApps, Software Engineering, The Software Process, Software Engineering Practice, Software Myths. A Generic Process Model, Process Assessment and Improvement, Prescriptive Process Models, Specialized Process Models, The Unified Process, Personal and Team Process Models, Process Technology.					
UNIT II Agility, Agility and the Cost of Change, Agile Process, Extreme Programming (XP), Other Agile Process Models, A Tool Set for the Agile Process, Software Engineering Knowledge, Core Principles, Principles That Guide Each Framework Activity, Requirements Engineering, Establishing the Groundwork, Eliciting Requirements, Developing Use Cases, Building the Requirements Model, Negotiating Requirements, Validating Requirements.					
UNIT III Requirements Analysis, Scenario-Based Modeling, UML Models That Supplement the Use Case, Data Modeling Concepts, Class-Based Modeling, Requirements Modeling Strategies, Flow-Oriented Modeling, Creating a Behavioral Model, Patterns for Requirements Modelling, Requirements Modeling for WebApps.					
UNIT IV Design within the Context of Software Engineering, The Design Process, Design Concepts, The Design Model, Software Architecture, Architectural Genres, Architectural Styles, Assessing Alternative Architectural Designs, Architectural Mapping Using Data Flow, Components, Designing Class-Based Components, Conducting Component-Level Design, Component-Level Design for WebApps, Designing Traditional Components, Component-Based Development.					
UNIT V The Golden Rules, User Interface Analysis and Design, Interface Analysis, Interface Design Steps, WebApp Interface Design, Design Evaluation, Elements of Software Quality Assurance, SQA Tasks, Goals & Metrics, Statistical SQA, Software Reliability, A Strategic Approach to Software Testing, Strategic Issues, Test Strategies for Conventional Software, Test Strategies for Object-Oriented Software, Test Strategies for WebApps, Validation Testing, System Testing, The Art of Debugging, Software Testing Fundamentals, Internal and External Views of Testing, White-Box Testing, Basis Path Testing.					
Text Books: 1) Software Engineering a practitioner's approach, Roger S. Pressman, Seventh Edition, McGraw Hill Higher Education. 2) Software Engineering, Ian Sommerville, Ninth Edition, Pearson.					
Reference Books: 1) Software Engineering, A Precise Approach, PankajJalote, Wiley India, 2010. 2) Software Engineering, Ugrasen Suman, Cengage.					

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III Year - I Semester	Code: 20AD5D02	L	T	P	C
		3	0	0	3
OBJECT ORIENTED ANALYSIS AND DESIGN					
Course Objectives: 1. To understand how to solve complex problems. 2. Analyze and design solutions to problems using object oriented approach. 3. Study the notations of Unified Modeling Language					
Course Outcomes: 1. Ability to find solutions to the complex problems using object oriented approach. 2.Represent classes, responsibilities and states using UML notation 3.Identify classes and responsibilities of the problem domain					
UNIT I Introduction: The Structure of Complex systems, The Inherent Complexity of Software, Attributes of Complex System, Organized and Disorganized Complexity, Bringing Order to Chaos, Designing Complex Systems, Evolution of Object Model, Foundation of Object Model, Elements of Object Model, Applying the Object Model.					
UNIT II Classes and Objects: Nature of object, Relationships among objects, Nature of a Class, Relationship among Classes, Interplay of Classes and Objects, Identifying Classes and Objects, Importance of Proper Classification, Identifying Classes and Objects, Key abstractions and Mechanisms.					
UNIT III Introduction to UML: Why we model, Conceptual model of UML, Architecture, Classes, Relationships, Common Mechanisms, Class diagrams, Object diagrams.					
UNIT IV Basic Behavioral Modeling: Interactions, Interaction diagrams, Use cases, Use case Diagrams, Activity Diagrams.					
UNIT V Advanced Behavioral Modeling: Events and signals, state machines, processes and Threads, time and space, state chart diagrams.					
Text Books: 1. “Object- Oriented Analysis And Design with Applications”, Grady BOOCH, Robert A. Maksimchuk, Michael W. ENGLE, Bobbi J. Young, Jim Conallen, Kellia Houston, 3rd edition, 2013, PEARSON. 2. “The Unified Modeling Language User Guide”, Grady Booch, James Rumbaugh, Ivar Jacobson, 12th Impression, 2012, PEARSON.					
Reference Books: 1. “Object-oriented analysis and design using UML”, Mahesh P. Matha, PHI 2. “Head first object-oriented analysis and design”, Brett D. McLaughlin, Gary Pollice, Dave West, O’Reilly					

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ODALAREVU – 533 210, Andhra Pradesh, India

III Year - I Semester	Code: 20AD5D03	L	T	P	C
		3	0	0	3
Dev Ops					
Course Objectives: This course is designed to: ➔ Adapt the software Engineering practices that combine Software Development and IT operations for Quality Software ➔ Enumerate the principles of continuous development and deployment, automation of configuration management, inter-team collaboration, and IT service agility					
Course Outcomes: 1. Illustrate the Phases of Software Development life cycle (L2) 2. Appraise the values and principles of agile software development (L5) 3. Create the Instance of applications 4. Interpret the aspects in user's context 5. Demonstrate the Continuous Integration, Delivery and Deployment					
UNIT I Phases of Software Development life cycle. Values and principles of agile software development					
UNIT II Fundamentals of DevOps: Architecture, Deployments, Orchestration, Need, Instance of applications, DevOps delivery pipeline, DevOps eco system.					
UNIT III DevOps adoption in projects: Technology aspects, Agiling capabilities, Tool stack implementation, People aspect, processes					
UNIT IV CI/CD: Introduction to Continuous Integration, Continuous Delivery and Deployment , Benefits of CI/CD, Metrics to track CICD practices					
UNIT V Devops Maturity Model: Key factors of DevOps maturity model, stages of Devops maturity model, DevOps maturity Assessment					
Text Books: 1. The DevOps Handbook: How to Create World-Class Agility, Reliability, and Security in Technology Organizations, Gene Kim , John Willis , Patrick Debois , Jez Humb, 1st Edition, O'Reilly publications, 2016. 2. What is Devops? Infrastructure as code, 1st Edition, Mike Loukides , O'Reilly publications, 2012.					
Reference Books: 1) Building a DevOps Culture, 1st Edition, Mandi Walls, O'Reilly publications, 2013. 2) Achieving DevOps: A Novel About Delivering the Best of Agile, DevOps, and microservices, 1st Edition, Dave Harrison, Knox Lively, Apress publications, 2019					

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III Year - I Semester	Code : 20CS5L12	L	T	P	C
		0	0	3	1.5
DBMS LAB					
Course Objectives:					
1. Populate and query a database using SQL DDL/DML Commands					
2. Declare and enforce integrity constraints on a database					
3. Writing Queries using advanced concepts of SQL					
4. Programming PL/SQL including procedures, functions, cursors and triggers					
Course Outcomes:					
1. Utilize SQL to execute queries for creating database and performing data manipulation operations					
2. Apply Queries using SQL					
3. Build PL/SQL programs including stored procedures, functions, cursors and triggers					
DBMS PROGRAMS					
1 Creation, altering and dropping of tables and inserting rows into a table (use constraints while creating tables) examples using SELECT command.					
2 Queries (along with sub Queries) using ANY, ALL, IN, EXISTS, NOTEXISTS, UNION, INTERSET, Constraints. Example:- Select the roll number and name of the student who secured fourth rank in the class.					
3 Queries using Aggregate functions (COUNT, SUM, AVG, MAX and MIN), GROUP BY, HAVING and Creation and dropping of Views.					
4 Queries using Conversion functions (to_char, to_number and to_date), string functions (Concatenation, lpad, rpad, ltrim, rtrim, lower, upper, initcap, length, substr and instr), date functions (Sysdate, next_day, add_months, last_day, months_between, least, greatest, trunc, round, to_char, to_date)					
5 i. Create a simple PL/SQL program which includes declaration section, executable section and exception – Handling section (Ex. Student marks can be selected from the table and printed for those who secured first class and an exception can be raised if no records were found) ii. Insert data into student table and use COMMIT, ROLLBACK and SAVEPOINT in PL/SQL block.					
6 Develop a program that includes the features NESTED IF, CASE and CASE expression. The program can be extended using the NULLIF and COALESCE functions.					
7 Program development using WHILE LOOPS, numeric FOR LOOPS, nested loops using ERROR Handling, BUILT-IN Exceptions, User defined Exceptions, RAISE APPLICATION ERROR.					
8 Programs development using creation of procedures, passing parameters IN and OUT of PROCEDURES.					
9 Program development using creation of stored functions, invoke functions in SQL Statements and write complex functions.					
10 Develop programs using features parameters in a CURSOR, FOR UPDATE CURSOR, WHERE CURRENT of clause and CURSOR variables.					
11 Develop Programs using BEFORE and AFTER Triggers, Row and Statement Triggers and INSTEAD OF Triggers					

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III Year - I Semester	Code : 20AD5L03		L	T	P	C
			0	0	3	1.5
MACHINE LEARNING LAB						
Course Objectives: This course will enable students to learn and understand different Data sets in implementing the machine learning algorithms.						
Course Outcomes: At the end of the course, student will be able to						
• Implement procedures for the machine learning algorithms • Design and Develop Python programs for various Learning algorithms • Apply appropriate data sets to the Machine Learning algorithms • Develop Machine Learning algorithms to solve real world problems						
Experiments:						
Experiment-1: Implement and demonstrate the FIND-S algorithm for finding the most specific hypothesis based on a given set of training data samples. Read the training data from a .CSV file.						
Experiment-2: For a given set of training data examples stored in a .CSV file, implement and demonstrate the Candidate-Elimination algorithm to output a description of the set of all hypotheses consistent with the training examples.						
Experiment-3: Write a program to demonstrate the working of the decision tree based ID3 algorithm. Use an appropriate data set for building the decision tree and apply this knowledge to classify a new sample.						
Experiment-4: Exercises to solve the real-world problems using the following machine learning methods: a) Linear Regression b) Logistic Regression c) Binary Classifier						
Experiment-5: Develop a program for Bias, Variance, Remove duplicates , Cross Validation						
Experiment-6: Write a program to implement Categorical Encoding, One-hot Encoding						
Experiment-7: Build an Artificial Neural Network by implementing the Back propagation algorithm and test the same using appropriate data sets.						
Experiment-8: Write a program to implement k-Nearest Neighbor algorithm to classify the iris data set. Print both correct and wrong predictions.						
Experiment-9: Implement the non-parametric Locally Weighted Regression algorithm in order to fit data points. Select appropriate data set for your experiment and draw graphs.						
Experiment-10: Assuming a set of documents that need to be classified, use the naïve Bayesian Classifier model to perform this task. Built-in Java classes/API can be used to write the program. Calculate the accuracy, precision, and recall for your data set.						
Experiment-11: Apply EM algorithm to cluster a Heart Disease Data Set. Use the same data set for clustering using k-Means algorithm. Compare the results of these two algorithms and comment on the quality of clustering. You can add Java/Python ML library classes/API in the program.						
Experiment-12: Exploratory Data Analysis for Classification using Pandas or Matplotlib.						
Experiment-13: Write a Python program to construct a Bayesian network considering medical data. Use this model to demonstrate the diagnosis of heart patients using standard Heart Disease Data Set						
Experiment-14: Write a program to Implement Support Vector Machines and Principle Component Analysis						
Experiment-15: Write a program to Implement Principle Component Analysis						
Text Books: 1. Machine Learning – Tom M. Mitchell, MGH 2. Fundamentals of Speech Recognition By Lawrence Rabiner and Biing – Hwang Juang.						
Reference Books: 1. Machine Learning: An Algorithmic Perspective, Stephen Marsland, Taylor & Francis						

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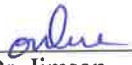
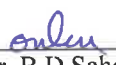
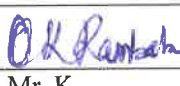
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III Year - I Semester	Code : 20AD5S03	L	T	P	C
		0	0	3	1.5
Skill Advanced Course: Continuous Integration and Continuous Delivery using DevOps					
Course Outcomes: At the end of the Course, Student will be able to: ➤ Understand the why, what and how of DevOps adoption ➤ Attain literacy on Devops ➤ Align capabilities required in the team ➤ Create an automated CICD pipeline using a stack of tools					
Exercise 1:					
Reference course name :Software engineering and Agile software development					
Get an understanding of the stages in software development lifecycle, the process models, values and principles of agility and the need for agile software development. This will enable you to work in projects following an agile approach to software development.					
Solve the questions given in the reference course name to gauge your understanding of the topic					
Exercise 2:					
Reference course name: Development & Testing with Agile: Extreme Programming					
Get a working knowledge of using extreme automation through XP programming practices of test first development, refactoring and automating test case writing.					
Solve the questions in the “Take test” module given in the reference course name to gauge your understanding of the topic					
Exercise 3:					
Module name : DevOps adoption in projects					
It is important to comprehend the need to automate the software development lifecycle stages through DevOps. Gain an understanding of the capabilities required to implement DevOps, continuous integration and continuous delivery practices.					
Solve the questions given in Quiz1, Quiz2, Quiz 3					
Exercise 4:					
Module name :Implementation of CICD with Java and open source stack					
Configure the web application and Version control using Git using Git commands and version control operations.					
Exercise 5:					
Module Name: Implementation of CICD with Java and open source stack					
Configure a static code analyzer which will perform static analysis of the web application code and identify the coding practices that are not appropriate. Configure the profiles and dashboard of the static code analysis tool.					
Exercise 6:					
Module Name: Implementation of CICD with Java and open source stack					
Write a build script to build the application using a build automation tool like Maven. Create a folder structure that will run the build script and invoke the various software development build stages. This script should invoke the static analysis tool and unit test cases and deploy the application to a web application server like Tomcat.					
Exercise 7:					
Module Name: Implementation of CICD with Java and open source stack					
Configure the Jenkins tool with the required paths, path variables, users and pipeline views.					
Exercise 8:					
Module name: Implementation of CICD with Java and open source stack					
Configure the Jenkins pipeline to call the build script jobs and configure to run it whenever there is a change made to an application in the version control system. Make a change to the background color of the landing page of the web application and check if the configured pipeline runs.					



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Exercise 9:
Module name: Implementation of CICD with Java and open source stack
Create a pipeline view of the Jenkins pipeline used in Exercise 8. Configure it with user defined messages.
Exercise 10 :
Module name: Implementation of CICD with Java and open source stack
In the configured Jenkins pipeline created in Exercise 8 and 9, implement quality gates for static analysis of code.
Exercise 11:
Module name :Implementation of CICD with Java and open source stack
In the configured Jenkins pipeline created in Exercise 8 and 9, implement quality gates for static unit testing.
Exercise 12:
Module name :Course end assessment
In the configured Jenkins pipeline created in Exercise 8 and 9, implement quality gates for code coverage.
Text Books:
1. Learning Continuous Integration with Jenkins: A beginner's guide to implementing Continuous Integration and Continuous Delivery using Jenkins - Nikhil Pathania, Packt publication [https://www.amazon.in/Learning-Continuous-Integration-Jenkins-Pathania/dp/1785284835]
2. Jenkins 2 – Up and Running: Evolve Your Deployment Pipeline for Next Generation Automation - Brent Laster, O'Reilly publication [https://www.amazon.in/Jenkins-2-Running-Brent-Laster/dp/1491979593]
Web Links: (Courses mapped to Infosys Springboard platform)
1. https://infyspringboard.onwingspan.com/en/app/toc/lex_auth_013382690411003904735_shared/overview [Software Engineering and Agile software development]
2. https://infyspringboard.onwingspan.com/en/viewer/html/lex_auth_01350157819497676810467 [Development & Testing with Agile: Extreme Programming]
3. https://infyspringboard.onwingspan.com/en/viewer/html/lex_auth_01353898917192499226_shared [DevOps CICD]

					
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III Year – II SEMESTER



BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
DETAILED SYLLABUS FOR REGULATIONS – BR20
UG: B.Tech - ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

III Year – II SEMESTER

S.No	Course Code	Courses	L	T	P	Credits
1	20CS6T12	Compiler Design	3	0	0	3
2	20CS6T13	Data Mining and Data Warehousing	3	0	0	3
3	20CS6T14	Deep Learning	3	0	0	3
4	20AD6D04 20AD6D05 20CS6D07 20AD6D06	Professional Elective -II 1. Design and Analysis of Algorithms 2. Software Project Management 3. Distributed Systems 4. Data Wrangling in Data Science/ MOOCs-2	3	0	0	3
5	20CS6E03 20ME6E02 20CE6E02 20EC6E02	Open Elective- II (Inter Disciplinary) 1. Mean Stack Development 2. Operations Research 3. Green Building 4. Micro controller & Applications <i>Cur</i>	2	0	2	3
6	20CS6L13	Compiler Design Lab	0	0	3	1.5
7	20CS6L14	Data Mining Lab	0	0	3	1.5
8	20AD6L04	Deep Learning with Tensorflow Lab	0	0	3	1.5
9	20CS6S04	Skill Advanced course: Game Development	1	0	2	2
10	20HS6M05	Universal Human Values	2	0	0	0
Total			17	0	13	21.5

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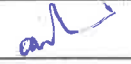
III YEAR II SEM	Code: 20CS6T12	L	T	P	C
		3	0	0	3
COMPILER DESIGN					
Course Objectives: Understand the basic concept of compiler design, and its different phases which will be helpful to construct new tools like LEX, YACC, etc.					
Course Outcomes: . At the end of the course, student will be able to • Demonstrate phases in the design of compiler • Organize Syntax Analysis, Top Down and LL(1) grammars • Design Bottom Up Parsing and Construction of LR parsers					
UNIT I Lexical Analysis: Language Processors, Structure of a Compiler, Lexical Analysis, The Role of the Lexical Analyzer, Bootstrapping, Input Buffering, Specification of Tokens, Recognition of Tokens, Lexical Analyzer Generator-LEX, Finite Automata, Regular Expressions and Finite Automata, Design of a Lexical Analyzer Generator.					
UNIT II Syntax Analysis: The Role of the Parser, Context-Free Grammars, Derivations, Parse Trees, Ambiguity, Left Recursion, Left Factoring, Top Down Parsing: Pre Processing Steps of Top Down Parsing, Backtracking, Recursive Descent Parsing, LL (1) Grammars, Non-recursive Predictive Parsing, Error Recovery in Predictive Parsing.					
UNIT III Bottom Up Parsing: Introduction, Difference between LR and LL Parsers, Types of LR Parsers, Shift Reduce Parsing, SLR Parsers, Construction of SLR Parsing Tables, More Powerful LR Parses, Construction of CLR (1) and LALR Parsing Tables, Dangling Else Ambiguity, Error Recovery in LR Parsing, Handling Ambiguity Grammar with LR Parsers.					
UNIT IV Syntax Directed Translation: Syntax-Directed Definitions, Evaluation Orders for SDD's, Applications of Syntax Directed Translation, Syntax-Directed Translation Schemes, Implementing L-Attributed SDD's. Intermediate Code Generation: Variants of Syntax Trees, Three Address Code, Types and Declarations, Translation of Expressions, Type Checking, Control Flow, Backpatching, Intermediate Code for Procedures.					
UNIT V Run Time Environments: Storage Organization, Run Time Storage Allocation, Activation Records, Procedure Calls, Displays, Code Optimization: The Principle Sources of Optimization, Basic Blocks, Optimization of Basic Blocks, Structure Preserving Transformations, Flow Graphs, Loop Optimization, Data-Flow Analysis, Peephole Optimization Code Generation: Issues in the Design of a Code Generator, Object Code Forms, Code Generation Algorithm, Register Allocation and Assignment.					
Text Books: 1) Compilers: Principles, Techniques and Tools, Second Edition, Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffry D. Ullman, Pearson. 2) Compiler Construction-Principles and Practice, Kenneth C Louden, Cengage Learning.					
Reference Books: 1) Modern compiler implementation in C, Andrew W Appel, Revised edition, Cambridge University Press. 2) The Theory and Practice of Compiler writing, J. P. Tremblay and P. G. Sorenson, TMH 3) Writing compilers and interpreters, R. Mak, 3rd edition, Wiley student edition.					
e-Resources: 1) https://nptel.ac.in/courses/106/104/106104123/					

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II YEAR II SEM	Subject Code: 20CS6T13	L	T	P	C
		3	0	0	3
DATA MINING AND DATA WAREHOUSING					
Course Objectives: To Understand about Data Warehouse and Data Mining to extract knowledge from data repository for data analysis, frequent pattern, classification , Clustering and prediction.					
Course Outcomes: ➤ Understand Importance of extraction of Knowledge from huge data and Data mining functionalities. ➤ Understand the data pre-processing techniques aggregation, sampling, dimensionality reduction. ➤ Understand multi-dimensional data model like OLAP and Architecture of Data Warehouse					
UNIT I Introduction: What Motivated Data Mining? Why Is It Important, Data Mining—On What Kind of Data, Data Mining Functionalities—What Kinds of Patterns can Be Mined? Are All of the Patterns Interesting?, Data Mining Task Primitives, Major Issues in Data Mining.(Han & Kamber)					
UNIT II Data Pre-processing: Why Pre-process the Data? Descriptive Data Summarization, Data Cleaning, Data Integration and Transformation, Data Reduction, Data Discretization and Concept Hierarchy Generation, Data Warehouse and OLAP Technology: An Overview: What Is a Data Warehouse? A Multidimensional Data Model, Data Warehouse Architecture, (Han & Kamber)					
UNIT III Association Analysis: Basic Concepts and Algorithms: Introduction, Frequent Item Set generation, Rule generation, compact representation of frequent item sets, FP-Growth Algorithm.(Tan & Vipin)					
UNIT IV Classification: Basic Concepts, General Approach to solving a classification problem, Decision Tree Induction: Working of Decision Tree, building a decision tree, methods for expressing an attribute test conditions, measures for selecting the best split, Algorithm for decision tree induction. Classification: Alternative Techniques, Bayes’ Theorem, Naïve Bayesian Classification, Bayesian Belief Networks					
UNIT V Cluster Analysis: Basic Concepts and Algorithms: What Is Cluster Analysis? Different Types of Clustering, Different Types of Clusters, K-means, The Basic K-means Algorithm, K-means: Additional Issues, Bisecting K-means, K-means and Different Types of Clusters, Strengths and Weaknesses, K-means as an Optimization Problem, Agglomerative Hierarchical clustering, Basic Agglomerative Hierarchical clustering Algorithm, Specific Techniques, DBSCAN, Traditional Density: center-Based Approach, The DBSCAN Algorithm, Strengths and Weaknesses.(Tan & Vipin)					
Text Books: 1. Introduction to Data Mining: Pang- Ning Tan & Michael Steinbach, Vipin Kumar, Pearson. 2. Data Mining concepts and Techniques, 3/e, Jiawei Han, Michel Kamber, Elsevier.					
Reference Books: 1. Data Mining Techniques and Applications: An Introduction, Hongbo Du, Cengage Learning. 2. Data Mining :Introductory and Advanced topics: Dunham, Pearson.					

					
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BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE
ODALAREVU – 533 210, Andhra Pradesh, India

III YEAR II SEM	Subject Code: 20AD6T05	L	T	P	C
		3	0	0	3
DEEP LAERNING					
Course Objectives: The main objective of the course is to make students: • Learn deep learning methods for working with sequential data, • Learn deep recurrent and memory networks, • Learn deep Turing machines					
Course Outcomes: After the completion of the course, student will be able to • Demonstrate the fundamental concepts learning techniques of Artificial Intelligence, Machine Learning and Deep Learning. • Discuss the Neural Network training, various random models. • Explain the Techniques of Keras, TensorFlow, Theano and CNTK					
UNIT I: Fundamentals of Deep Learning: Artificial Intelligence, History of Machine learning: Probabilistic Modeling, Early Neural Networks, Kernel Methods, Decision Trees, Random forests and Gradient Boosting Machines, Fundamentals of Machine Learning: Four Branches of Machine Learning, Evaluating Machine learning Models, Overfitting and Underfitting. [Text Book 2]					
UNIT II: Introducing Deep Learning: Biological and Machine Vision, Human and Machine Language, Artificial Neural Networks, Training Deep Networks, Improving Deep Networks. [Text Book3]					
UNIT III: Neural Networks: Anatomy of Neural Network, Introduction to Keras: Keras, TensorFlow, Theano and CNTK, Setting up Deep Learning Workstation, Classifying Movie Reviews: Binary Classification, Classifying newswires: Multiclass Classification. [Text Book 2]					
Convolutional Neural Networks: Nerual Network and Representation Learing, Convolutional Layers, Multichannel Convolution Operation, Recurrent Neural Networks: Introduction to RNN, RNN Code, PyTorch Tensors: Deep Learning with PyTorch, CNN in PyTorch. [Text Book 3]					
Interactive Applications of Deep Learning: Machine Vision, Natural Language processing, Generative Adversial Networks, Deep Reinforcement Learning. [Text Book 1]					
Deep Learning Research: Autoencoders, Deep Generative Models: Boltzmann Machines Restricted Boltzmann Machines, Deep Belief Networks. [Text Book 1]					
Text Books: 1.Deep Learning- Ian Goodfellow, Yoshua Bengio and Aaron Courville, MIT Press, 2016 2.Deep Learning with Python - Francois Chollet, Released December 2017, Publisher(s): Manning Publications, ISBN: 9781617294433 3.Deep Learning Illustrated: A Visual, Interactive Guide to Artificial Intelligence - Jon Krohn, Grant Beyleveld, Aglaé Bassens, Released September 2019, Publisher(s): Addison-Wesley Professional, ISBN: 9780135116821					
Reference Books: 1.Artificial Neural Networks, Yegnanarayana, B., PHI Learning Pvt. Ltd, 2009. 2.Matrix Computations, Golub, G.,H., and Van Loan,C.,F, JHU Press,2013. 3.Neural Networks: A Classroom Approach, Satish Kumar, Tata McGraw-Hill Education, 2004.					

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III YEAR II SEM	Subject Code: 20AD6D04	L	T	P	C
		3	0	0	3
DESIGN AND ANALYSIS OF ALGORITHMS					
Course Objectives: Upon completion of this course, students will be able to do the following: • Ability to understand, analyze and denote time complexities of algorithms • To introduce the different algorithmic approaches for problem solving through numerous example problems					
Course Outcomes: After the completion of the course, student will be able to • Analyze the performance of a given algorithm, denote its time complexity using the asymptotic notation for recursive and non-recursive algorithms • List and describe various algorithmic approaches and Solve problems using divide and conquer & greedy Method • Synthesize efficient algorithms dynamic programming approaches					
UNIT I Introduction: Algorithm, Pseudo code for expressing algorithms, performance Analysis-Space complexity, Time complexity, Asymptotic Notation-Big oh notation, Omega notation, Theta notation, small oh notation and Little oh notation, probabilistic analysis.					
UNIT II Divide and conquer: General method, applications-Binary search, Quick sort, Merge sort, Defective Chess board					
UNIT III Greedy method: General method, applications-Job sequencing with deadlines, knapsack problem, spanning trees, Minimum cost spanning trees, Single source shortest path problem.					
UNIT IV Dynamic Programming: General method, applications-Matrix chain multiplication, Optimal binary search tree, String Edition Problem, 0/1 knapsack problem, All pairs shortest path problem, <i>Optimal</i> Merge Pattern,					
UNIT V Backtracking: General method, applications-n-queen problem, sum of sub sets problem, graph coloring, Hamiltonian cycles.					
Text Books: 1. Fundamentals of Computer Algorithms, Ellis Horowitz, Satraj Sahni and Rajasekharam, Universities Press. 2.Design and Analysis of Algorithms , S Sridhar, Oxford 3. Design and Analysis of Algorithms, Parag Himanshu Dave, Himansu Balachandra Dave, 2 nd ed, Pearson Education.					
Reference Books: 1. Design and Analysis of algorithms, Aho, Ullman and Hopcroft, Pearson education. 2.Introduction to Algorithms, second edition, T. H. Cormen, C.E. Leiserson, R. L. Rivest and. Stein, PHI Pvt. Ltd.					

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ODALAREVU – 533 210, Andhra Pradesh, India

III YEAR II SEM	Subject Code: 20AD6D05	L	T	P	C
		3	0	0	3
SOFTWARE PROJECT MANAGEMENT					
Course Objectives: At the end of the course, the student shall be able to: ➤ To describe and determine the purpose and importance of project management from the perspectives of planning, tracking and completion of project ➤ To compare and differentiate organization structures and project structures					
Course Outcomes: Upon the completion of the course students will be able to:- ➤ Apply the process to be followed in the software development life-cycle models. ➤ Apply the concepts of project management & planning. ➤ Implement the project plans through managing people, communications and change.					
UNIT I Conventional Software Management: The waterfall model, conventional software Management performance. Evolution of Software Economics: Software Economics, pragmatic software cost estimation. Improving Software Economics: Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections.					
UNIT II The Old Way and The New: The principles of conventional software Engineering, principles of modern software management, transitioning to an iterative process. Life Cycle Phases: Engineering and production stages, inception, Elaboration, construction, transition phases. Artifacts of The Process: The artifact sets, Management artifacts, Engineering artifacts, programmatic artifacts.					
UNIT III Model Based Software Architectures: A Management perspective and technical perspective. Work Flows of the Process: Software process workflows, Iteration workflows. Checkpoints of the Process: Major mile stones, Minor Milestones, Periodic status assessments.					
UNIT IV Iterative Process Planning: Work breakdown structures, planning guidelines, cost and schedule estimating, Iteration planning process, Pragmatic planning. Project Organizations and Responsibilities: Line-of-Business Organizations, Project Organizations, evolution of Organizations.					
UNIT V Process Automation: Automation Building blocks, The Project Environment. Project Control and Process Instrumentation: The seven core Metrics, Management indicators, quality indicators, life cycle expectations, pragmatic Software Metrics, Metrics automation. Project Estimation and Management: COCOMO model, Critical Path Analysis, PERT technique, Monte Carlo approach (Text book 2)					
Text Books: 1) Software Project Management, Walker Royce, Pearson Education, 2005. 2) Software Project Management, Bob Hughes, 4th edition, Mike Cotterell, TMH.					
Reference Books: 1) Software Project Management, Joel Henry, Pearson Education. 2) Software Project Management in practice, Pankaj Jalote, Pearson Education, 2005. 3) Effective Software Project Management, Robert K. Wysocki, Wiley, 2006.					

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III Year - II Semester	Code: 20CS6D07	L	T	P	C
		3	0	0	3
DISTRIBUTED SYSTEMS					
Course Outcomes: ➤ Develop a familiarity with distributed file systems. ➤ Describe important characteristics of distributed systems and the salient architectural features of such systems. ➤ Describe the features and applications of important standard protocols which are used in distributed systems. ➤ Gaining practical experience of inter-process communication in a distributed environment					
UNIT I Characterization of Distributed Systems: Introduction, Examples of Distributed Systems, Resource Sharing and the Web, Challenges. System Models: Introduction, Architectural Models- Software Layers, System Architecture, Variations, Interface and Objects, Design Requirements for Distributed Architectures, Fundamental Models- Interaction Model, Failure Model, Security Model					
UNIT II Interprocess Communication: Introduction, The API for the Internet Protocols- The Characteristics of Interprocess communication, Sockets, UDP Datagram Communication, TCP Stream Communication; External Data Representation and Marshalling; Client Server Communication; Group Communication- IP Multicast- an implementation of group communication, Reliability and Ordering of Multicast.					
UNIT III Distributed Objects and Remote Invocation: Introduction, Communication between Distributed Objects- Object Model, Distributed Object Model, Design Issues for RMI, Implementation of RMI, Distributed Garbage Collection; Remote Procedure Call, Events and Notifications, Case Study: JAVA RMI					
UNIT IV Operating System Support: Introduction, The Operating System Layer, Protection, Processes and Threads – Address Space, Creation of a New Process, Threads.					
UNIT V Transactions & Replications: Introduction, System Model and Group Communication, Concurrency Control in Distributed Transactions, Distributed Dead Locks, Transaction Recovery; Replication-Introduction, Passive (Primary) Replication, Active Replication.					
Text Books: 1. Ajay D Kshemkalyani, MukeshSinghal, “Distributed Computing, Principles, Algorithms and Systems”, Cambridge. 2. George Coulouris, Jean Dollimore, Tim Kindberg, “Distributed Systems- Concepts and Design”, Fourth Edition, Pearson Publication					
Reference Books: 1. Distributed-Systems-Principles-Paradigms-Tanenbaum PHI					

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III Year - II Semester	Code: 20AD6D06	L	T	P	C
		3	0	0	3
DATA WRANGLING IN DATA SCIENCE					
Course Outcomes: Upon completion of this course, the students will be able to - Identify and execute the basic data format. - Perform the computations with Excel and pdf files - Understand the concepts of data cleanup - Explore and analyze the Image and video data - Understand the concepts web scraping					
UNIT I INTRODUCTION TO DATA WRANGLING: Data Wrangling- Importance of Data Wrangling -How is Data Wrangling performed- Tasks of Data Wrangling-Data Wrangling Tools-Introduction to Python-Python Basics-Data Meant to be Read by Machines-CSV Data-JSON Data-XML Data					
UNIT II WORKING WITH EXCEL FILES AND PDFS: Installing Python Packages-Parsing Excel Files-Parsing Excel Files -Getting Started with Parsing-PDFs and Problem Solving in Python-Programmatic Approaches to PDF Parsing-Converting PDF to Text-Parsing PDFs Using pdf miner-Acquiring and Storing Data-Databases: A Brief Introduction-Relational Databases: MySQL and PostgreSQL-Non-Relational Databases: NoSQL-When to Use a Simple File-Alternative Data Storage					
UNIT III DATA CLEANUP: Why Clean Data?- Data Cleanup Basics-Identifying Values for Data Cleanup-Formatting Data-Finding Outliers and Bad Data-Finding Duplicates-Fuzzy Matching-RegEx Matching-Normalizing and Standardizing the Data-Saving the Data-Determining suitable Data Cleanup-Scripting the Cleanup-Testing with New Data					
UNIT IV DATA EXPLORATION AND ANALYSIS: Exploring Data-Importing Data-Exploring Table Functions-Joining Numerous Datasets-Identifying Correlations-Identifying Outliers-Creating Groupings-Analyzing Data-Separating and Focusing the Data-Presenting Data-Visualizing the Data-Charts-Time-Related Data-Maps-Interactives-Words-Images, Video, and Illustrations-Presentation Tools-Publishing the Data-Open Source Platforms					
UNIT V WEB SCRAPING: What to Scrape and How-Analyzing a Web Page-Network/Timeline-Interacting with JavaScript-In-Depth Analysis of a Page-Getting Pages-Reading a Web Page-Reading a Web Page with LXML-XPath-Advanced Web Scraping-Browser-Based Parsing-Screen Reading with Selenium-Screen Reading with Ghost.PySpidering the Web-Building a Spider with Scrapy-Crawling Whole Websites with Scrapy.					
Text Books: - Data Wrangling with Python, Jacqueline Kazil& Katharine Jarmul, O'Reilly Media, Inc,2016 - Data Wrangling with Python: Creating actionable data from raw sources,,Dr. TirthajyotiSarkar, ShubhadeepPackt Publishing Ltd,2019					
Reference Books: - Hands-On Data Analysis with Pandas, Stefanie Molin, Packt Publishing Ltd,2019 - Practical Data Wrangling, Allan Visocheck, Packt Publishing Ltd,2017 - Principles of Data Wrangling: Practical Techniques for Data Preparation, TyeRattenbury, Joseph M. Hellerstein, Jeffrey Heer, Sean Kandel, Connor Carreras, , O'Reilly Media, Inc,2017					

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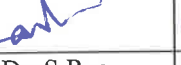
III Year - II Semester	Code: 20CS6E03	L	T	P	C
		3	0	0	3
MEAN STACK DEVELOPMENT					
Course Outcomes: After the completion of the course, student will be able to ➤ Enumerate the Basic Concepts of Web & Markup Languages ➤ Develop web Applications using Scripting Languages & Frameworks ➤ Make use of Express JS and Node JS frameworks ➤ Illustrate the uses of web services concepts like restful, react js ➤ Apply Deployment Techniques & Working with cloud platform					
UNIT I Introduction to Web: Internet and World Wide Web, Domain name service, Protocols: HTTP, FTP, SMTP. Html5 concepts, CSS3, Anatomy of a web page. XML: Document type Definition, XML schemas, Document object model, XSLT, DOM and SAX Approaches.					
UNIT II JavaScript: The Basic of JavaScript: Objects, Primitives Operations and Expressions, Control Statements, Arrays, Functions, Constructors, Pattern Matching using Regular Expressions. Angular Java Script Angular JS Expressions: ARRAY, Objects, \$eval, Strings, Angular JS Form Validation & Form Submission, Single Page Application development using Angular JS.					
UNIT III Node.js: Introduction, Advantages, Node.js Process Model, Node JS Modules. Express.js: Introduction to Express Framework, Introduction to Nodejs , What is Nodejs, Getting Started with Express, Your first Express App, Express Routing, Implementing MVC in Express, Middleware, Using Template Engines, Error Handling , API Handling , Debugging, Developing Template Engines, Using Process Managers, Security & Deployment.					
UNIT IV RESTful Web Services: Using the Uniform Interface, Designing URIs, Web Linking, Conditional Requests. React Js: Welcome to React, Obstacles and Roadblocks, React’s Future, Keeping Up with the Changes, Working with the Files, Pure React, Page Setup, The Virtual DOM, React Elements, ReactDOM, Children, Constructing Elements with Data, React Components, DOM Rendering, Factories.					
UNIT V Mongo DB: Introduction, Architecture, Features, Examples, Database Creation & Collection in Mongo DB. Deploying Applications: Web hosting & Domains, Deployment Using Cloud Platforms.					
Text Books: 1) Programming the World Wide Web, Robet W Sebesta, 7ed, Pearson. 2) Web Technologies, Uttam K Roy, Oxford 3) Pro Mean Stack Development, ELadElrom, Apress 4) Restful Web Services Cookbook, Subbu Allamraju, O’Reilly 5) JavaScript & jQuery the missing manual, David sawyer mcfarland, O’Reilly 6) Web Hosting for Dummies, Peter Pollock, John Wiley Brand					
Reference Books: 1) Ruby on Rails up and Running, Lightning fast Web development, Bruce Tate, Curt Hibbs, Oreilly (2006). 2) Programming Perl, 4ed, Tom Christiansen, Jonathan Orwant, Oreilly (2012). 3) Web Technologies, HTML, JavaScript, PHP, Java, JSP, XML and AJAX, Black book, Dream Tech. 4) An Introduction to Web Design, Programming, Paul S Wang, Sanda S Katila, Cengage Learning.					

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III Year – II Semester	Code: 20CS6L13	L	T	P	C
		3	0	0	3
COMPILER DESIGN LAB					
Course Objectives: To enlighten the student with knowledge base in compiler design and its applications					
Course Outcomes: The end of the course student will be able to • Design simple lexical analyzers • Determine predictive parsing table for a CFG • Apply Lex and Yacc tools • Examine LR parser and generating SLR Parsing table • Relate Intermediate code generation for subset C language					
Experiments: 1. Write a C program to identify different types of Tokens in a given Program. 2. Write a Lex Program to implement a Lexical Analyzer using Lex tool. 3. Write a C program to Simulate Lexical Analyzer to validating a given input String. 4. Write a C program to implement the Brute force technique of Top down Parsing. 5. Write a C program to implement a Recursive Descent Parser. 6. Write C program to compute the <i>First</i> and <i>Follow</i> Sets for the given Grammar. 7. Write a C program for eliminating the left recursion and left factoring of a given grammar 8. Write a C program to check the validity of input string using Predictive Parser. 9. Write a C program for implementation of LR parsing algorithm to accept a given input string. 10. Write a C program for implementation of a Shift Reduce Parser using Stack Data Structure to accept a given input string of a given grammar. 11. Write a C program for generating the three address code of a given expression/statement. 12. Write a C program for implementation of a Code Generation Algorithm of a given expression/statement.					
Text Books & Reference Books : 1. Compilers: Principles, Techniques and Tools, Second Edition, Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffry D. Ullman, Pearson Publishers, 2007. 2. John R Levine, Tony Mason, Doug Brown, "Lex and Yacc", Orielly, 2nd Edition, 2009.					

					
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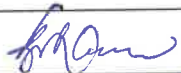
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III YEAR II SEM	Code: 20CS6L14		L	T	P	C
			0	0	3	1.5
DATA MINING LAB						
Course Objectives: The main objective of the course is to • Inculcate Conceptual, Logical, and Physical design of Data Warehouses OLAP applications and OLAP deployment • Design a data warehouse or data mart to present information needed by management in a form that is usable • Emphasize hands-on experience working with all real data sets. • Test real data sets using popular data mining tools such as WEKA, Python Libraries • Develop ability to design various algorithms based on data mining tools.						
Course Outcomes: By the end of the course student will be able to • Design a data mart or data warehouse for any organization • Extract knowledge using data mining techniques and enlist various algorithms used in information analysis of Data Mining Techniques • Demonstrate the working of algorithms for data mining tasks such as association rule mining, classification for realistic data • Implement and Analyze on knowledge flow application on data sets and Apply the suitable visualization techniques to output analytical results						
List of Experiments: 1. Creation of a Data Warehouse. ➤ Build Data Warehouse/Data Mart (using open source tools like Pentaho Data Integration Tool, Pentaho Business Analytics; or other data warehouse tools like Microsoft-SSIS, Informatica, Business Objects,etc.,) ➤ Design multi-dimensional data models namely Star, Snowflake and Fact Constellation schemas for any one enterprise (ex. Banking, Insurance, Finance, Healthcare, manufacturing, Automobiles, sales etc). ➤ Write ETL scripts and implement using data warehouse tools. ➤ Perform Various OLAP operations such slice, dice, roll up, drill up and pivot 2. Explore machine learning tool “WEKA” ➤ Explore WEKA Data Mining/Machine Learning Toolkit. ➤ Downloading and/or installation of WEKA data mining toolkit. ➤ Understand the features of WEKA toolkit such as Explorer, Knowledge Flow interface, Experimenter, command-line interface. ➤ Navigate the options available in the WEKA (ex. Select attributes panel, Preprocess panel, Classify panel, Cluster panel, Associate panel and Visualize panel) ➤ Study the arff file format Explore the available data sets in WEKA. Load a data set (ex. Weather dataset, Iris dataset, etc.) ➤ Load each dataset and observe the following: 1. List the attribute names and they types 2. Number of records in each dataset 3. Identify the class attribute (if any) 4. Plot Histogram 5. Determine the number of records for each class. 6. Visualize the data in various dimensions 3. Perform data preprocessing tasks and Demonstrate performing association rule mining on data sets ➤ Explore various options available in Weka for preprocessing data and apply Unsupervised filters like Discretization, Resample filter, etc. on each dataset ➤ Load weather. nominal, Iris, Glass datasets into Weka and run Apriori						



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- Algorithm with different support and confidence values.
- Study the rules generated. Apply different discretization filters on numerical attributes and run the Apriori association rule algorithm. Study the rules generated.
 - Derive interesting insights and observe the effect of discretization in the rule generation process.
4. Demonstrate performing classification on data sets
- Load each dataset into Weka and run Id3, J48 classification algorithm. Study the classifier output. Compute entropy values, Kappa statistic.
 - Extract if-then rules from the decision tree generated by the classifier, Observe the confusion matrix.
 - Load each dataset into Weka and perform Naïve-bayes classification and k-Nearest Neighbour classification. Interpret the results obtained.
 - Plot RoC Curves
 - Compare classification results of ID3, J48, Naïve-Bayes and k-NN classifiers for each dataset, and deduce which classifier is performing best and poor for each dataset and justify.
5. Demonstrate performing clustering of data sets
- Load each dataset into Weka and run simple k-means clustering algorithm with different values of k (number of desired clusters).
 - Study the clusters formed. Observe the sum of squared errors and centroids, and derive insights.
 - Explore other clustering techniques available in Weka.
 - Explore visualization features of Weka to visualize the clusters. Derive interesting insights and explain.
6. Demonstrate knowledge flow application on data sets
- Develop a knowledge flow layout for finding strong association rules by using Apriori, FP Growth algorithms
 - Set up the knowledge flow to load an ARFF (batch mode) and perform a cross validation using J48 algorithm
 - Demonstrate plotting multiple ROC curves in the same plot window by using j48 and Random forest tree
7. Demonstrate ZeroR technique on Iris dataset (by using necessary preprocessing technique(s)) and share your observations
8. Write a java program to prepare a simulated data set with unique instances.
9. Write a Python program to generate frequent item sets / association rules using Apriori algorithm
10. Write a program to calculate chi-square value using Python. Report your observation.
11. Write a program of Naive Bayesian classification using Python programming language.
12. Implement a Java program to perform Apriori algorithm
13. Write a program to cluster your choice of data using simple k-means algorithm using JDK
14. Write a program of cluster analysis using simple k-means algorithm Python programming language.
15. Write a program to compute/display dissimilarity matrix (for your own dataset containing at least four instances with two attributes) using Python
16. Visualize the datasets using matplotlib in python.(Histogram, Box plot, Bar chart, Pie chart etc.,)

					
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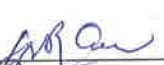
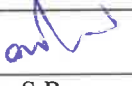
III YEAR II SEM	Code: 20AD6L04	L	T	P	C
		0	0	3	1.5
DEEP LEARNING WITH TENSORFLOW LAB					
Course Outcomes:					
On completion of this course, the student will be able to					
• Implement deep neural networks to solve real world problems • Choose appropriate pre-trained model to solve real time problem • Interpret the results of two different deep learning models					
List of Experiments:					
1. Implement multilayer perceptron algorithm for MNIST Hand written Digit Classification. 2. Design a neural network for classifying movie reviews (Binary Classification) using IMDB dataset. 3. Design a neural Network for classifying news wires (Multi class classification) using Reuters dataset. 4. Design a neural network for predicting house prices using Boston Housing Price dataset. 5. Build a Convolution Neural Network for MNIST Hand written Digit Classification. 6. Build a Convolution Neural Network for simple image (dogs and Cats) Classification 7. Use a pre-trained convolution neural network (VGG16) for image classification. 8. Implement one hot encoding of words or characters. 9. Implement word embeddings for IMDB dataset. 10. Implement a Recurrent Neural Network for IMDB movie review classification problem.					
Text Books:					
1. Reza Zadeh and Bharath Ramsundar, “Tensorflow for Deep Learning”, O’Reilly publishers, 2018					
References:					
1. https://github.com/fchollet/deep-learning-with-python-notebooks					

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III YEAR II SEM		Code: 20CS6S04	L	T	P	C
			0	0	3	1.5
Skill Advanced course: Game Development						
1	Mini – Game Project					
2	Coin Collection Game					
3	Adventure Game					
4	Car Race Game					
5	Puzzle Game					
Software's						
1	Unity 5.6.7f1					
2	Blender 2.79					
3	Krita					
4	World Machine					

					
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ODALAREVU – 533 210, Andhra Pradesh, India

**DEPARTMENT OF COMPUTER SCIENCE AND
ENGINEERING**

DETAILED SYLLABUS FOR REGULATIONS – BR20

**UG: B.Tech - ARTIFICIAL INTELLIGENCE AND MACHINE
LEARNING**

IV Year – I SEMESTER

S.No	Course Code	Courses	L	T	P	Credits
1	20CS7D09 20AD7D07 20AD7D08 20CS7D18	Professional Elective-III 1. Cryptography and Network Security 2 Reinforcement Learning 3. Social Media Analytics 4. Block Chain Technologies	3	0	0	3
2	20CS7D13 20CS7D16 20CS7D11 20AD7D09	Professional Elective-IV 1. Software Testing Methodologies 2. Computer Vision 3. Adhoc and Sensor Networks 4. NOSQL Databases	3	0	0	3
3	20AD7D10 20AD7D11 20AD7D12 20AD7D13	Professional Elective-V 1. Social Network Analysis 2. Recommender Systems 3. AI Chatbots 4. Data Visualization	3	0	0	3
4	20CS7E04 20CE7E03 20EC7E03 20EE7E03	Open Elective -III 1. Nature Inspired Computing Techniques 2. Disaster Management 3. Embedded Systems 4. Electrical Distribution Systems	2	0	2	3
5	20CS7E05 20EC7E04 20ME7E04 20CE7E04	Open Elective- IV 1. Secure Coding Techniques 2. 5G Communications 3. 3D Printing Technologies 4. Project Management	2	0	2	3
6	20HS7E01	Humanity and Social Science Elective 1. Resource Management 2. Industrial Management 3. Management Science 4. IPR and Patents	3	0	0	3
7	20HS7S01	English for Employability	1	0	2	2
8	20CS7P02	Industrial/Research Internship 2 months after III_I Evaluated during IV_I	0	0	0	3
Total			17	0	6	23

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IV Year - I Semester	Code: 20CS7D09	L	T	P	C
		3	0	0	3
CRYPTOGRAPHY AND NETWORK SECURITY					
Course Outcomes: By the end of the course the student ✓ Identify information security goals, classical encryption techniques ✓ Compare and apply different encryption and decryption techniques ✓ Apply the knowledge of cryptographic checksums and evaluate the performance of different message digest algorithms ✓ Apply different digital signature algorithms to achieve authentication ✓ Apply network security basics, analyze different attacks on networks and evaluate the performance of firewalls and security protocols like SSL, IPSec, and PGP					
UNIT I Introduction: Elements of Information security, Security attacks, services & mechanisms, A model of network security, Symmetric Cipher Model, Substitution Techniques, Transportation Techniques, Steganography					
UNIT II Block Ciphers & Symmetric Key Cryptography Traditional Block Cipher Structure, Block Cipher Design Principles, Data Encryption Standard, AES-Structure, Transformation functions, Key Expansion.					
UNIT III Number Theory: Prime and Relatively Prime Numbers, Modular Arithmetic, Fermat's and Euler's Theorems, The Chinese Remainder theorem. Public Key Cryptography: Principles, public key cryptography algorithms, RSA Algorithms, Diffie Hellman Key Exchange, Elgamal encryption & decryption.					
UNIT IV Cryptographic Hash Functions & Digital Signatures Application of Cryptographic hash Functions, Requirements & Security, Secure Hash Algorithm, Message Authentication Functions, Requirements & Security, and HMAC & CMAC. Digital Signatures, NIST Digital Signature Algorithm. Key management & distribution.					
UNIT V Transport Level Security: Web Security Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Shell (SSH), Electronic Mail Security: Pretty Good Privacy (PGP) and S/MIME. Security: IP Security Overview, IP Security Architecture.					
Text Books: 1. Cryptography & Network Security: Principles and Practices, William Stallings, PEA, Sixth edition. 2. Introduction to Computer Networks & Cyber Security, Chwan Hwa Wu, J.David Irwin, CRC press					
Reference Books: 1. Everyday Cryptography, Fundamental Principles & Applications, Keith Martin, Oxford 2. Network Security & Cryptography, Bernard Menezes, Cengage, 2010					

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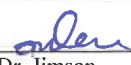
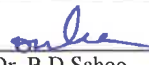


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IV Year - I Semester	Code: 20AD7D07	L	T	P	C
		3	0	0	3
REINFORCEMENT LEARNING					
Course Objectives: Learn various approaches to solve decision problems with functional models and algorithms for task formulation, Tabular based solutions, Function approximation solutions, policy gradients and model based reinforcement learning.					
Course Outcomes: By completing the course the students will be able to: - Understand basic concepts of Reinforcement learning - Identifying appropriate learning tasks for Reinforcement learning techniques - Understand various methods and applications of reinforcement learning					
UNIT I Introduction: Reinforcement Learning, Examples, Elements of Reinforcement Learning, Limitations and Scope, An Extended Example: Tic-Tac-Toe Multi-armed Bandits: A k-armed Bandit Problem, Action-value methods, The 10-armed Testbed, Incremental Implementation, Tracking a Nonstationary Problem, Optimistic Initial Values, Upper –Confidence-Bound Action Selection, Gradient Bandit Algorithm					
UNIT II Finite Markov Decision Process: The Agent-Environment Interface, Goals and Rewards, Returns and Episodes, Unified Notation for Episodic and Continuing Tasks, Policies and Value Functions, Dynamic Programming: Policy Evaluation, Policy Improvement, Policy Iteration, Value Iteration, Asynchronous Dynamic Programming, Generalized Policy Iteration, Efficiency of Dynamic Programming					
UNIT III Monte Carlo Methods: Monte Carlo Prediction, Monte Carlo Estimation of Action Values, Monte Carlo Control, Monte Carlo Control without Exploring Starts, Off-policy Prediction via Importance Sampling, Incremental Implementation, Discontinuing-aware Importance Sampling, Per-decision Importance Sampling					
UNIT IV Off-policy Methods with Approximation: Semi-gradient Methods, Examples of Off-policy Divergence, The Deadly Triad, Linear Value-function Geometry, Gradient Descent in the Bellman Error, The Bellman Error is not Learnable, Gradient-TD methods, Emphatic-TD methods, Reducing Variance					
UNIT V Policy Gradient Methods: Policy Approximation and its Advantages, The Policy Gradient Theorem, REINFORCE: Monte Carlo Policy Gradient, REINFORCE with Baseline, Actor-Critic Methods, Policy Gradient for Continuing Problems, Policy Parameterization for Continuous Actions Applications and Case Studies: TD-Gammon, Samuel's Checkers Player, Watson's Daily Double Wagering, Optimizing Memory Control, Personalized Web Services					
Text Books: 1. R. S. Sutton and A. G. Barto, "Reinforcement Learning - An Introduction," MIT Press, 2018.					
Reference Books: 1. Szepesvári, Csaba, "Algorithms for Reinforcement Learning," United States: Morgan & Claypool, 2010. 2. Puterman, Martin L., "Markov Decision Processes: Discrete Stochastic Dynamic Programming," Germany: Wiley, 2014.					

					
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IV Year - I Semester	Code: 20AD7D08			L	T	P	C
				3	0	0	3
SOCIAL MEDIA ANALYTICS							
Course Objectives: Understand and deal with any social media network, strategy, or campaign.							
Course Outcomes: By completing the course the students will be able to: - Understand social media categories and types of social media analytics - Understand the impact of social media analytics integration with and affects other areas of business.							
UNIT I Introduction: Foundation for Analytics, Evolution of Data and the Digital Gap, Social Media Data Sources: Offline and Online, Definition of Social Media, Data Sources in Social Media Channels, Estimated vs. Factual Data Sources, Public and Private Data, Data Gathering in Social Media Analytics, Social Media Network Support of Data Collection, API: Application Programming Interface, Web Crawling or Scraping,							
UNIT II From Data to Insights: Example of a Single Metric Giving Actionable Insight, An Example of a Metric Leading to New Questions, Creating a Plan to Shape Data into Insights, The Planning Stage: Projecting Possible Insights, Analysis of a Social Media Post, The process of Comparison, Data Aggregation, Calculations and Display, Data Display, Social Media and Big Data, Potential Challenges							
UNIT III Analytics in Social Media: Types of Analytics in Social Media, Analytics or Channel Analytics, Social Media Listening: Keyword and Mention-Based Analysis, Demographics, Interests and Sentiment, Advertising Analytics: Focus on Conversions and ROI of Paid Social Media Campaigns, Conversions: The Key to Digital and Social Advertising, CMS Analytics: Measuring the Performance of the Content Management Team, CRM Analytics: Customer Support and Sales via Social Media							
UNIT IV Dedicated vs. Hybrid Tools : Common to all Tools, Dedicated Tools, Advantages of Dedicated Tools, Disadvantages of Dedicated tools, Hybrid Tools, Dedicated Tools with Hybrid Features, Advantages of Hybrid Tools, Disadvantages of Hybrid Tools, Data Integration Tools, Advantages of Data Integration Tools, Disadvantages of Data Integration Tools.							
UNIT V Social Network Landscape: Concept and UX on Social Networks, Features and Their Strategic Value, Interactivity: How Social is the Network, Content Flow on Social Network The Analytics Process: Analysis is Comparison, Investigation beyond Social Analytics, Shaping a Method: The End Game for an Analyst, The Analysis Circle, Dynamic Cycles.							
Text Books: 1.Alex Goncalves, “Social Media Analytics Strategy-Using Data to Optimize Business Performance,” Apress, 2017							
Reference Books: - Qiu, Liangfei., Kumar, Subodha, “Social Media Analytics and Practical Applications: The Change to the Competition Landscape,” United States: CRC Press, 2021. - Sponder, Marshall, “Social Media Analytics: Effective Tools for Building, Interpreting, and Using Metrics,” United Kingdom: McGraw-Hill Education, 2011.							

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IV Year - I Semester	Code: 20AD7D29	L	T	P	C
		3	0	0	3
BLOCKCHAIN TECHNOLOGIES					
Course Objectives: By the end of the course, students will be able to ☐ Understand how block chain systems (mainly Bit coin and Ethereum) work and to securely interact with them, ☐ Design, build, and deploy smart contracts and distributed applications, ☐ Integrate ideas from block chain technology into their own projects.					
Course Outcomes: At the end of the course, student will be able to ☐ Demonstrate the foundation of the Block chain technology and understand the processes in payment and funding. ☐ Identify the risks involved in building Block chain applications. ☐ Review of legal implications using smart contracts. ☐ Choose the present landscape of Blockchain implementations and Understand Crypto currency markets ☐ Examine how to profit from trading crypto currencies.					
UNIT I Introduction, Scenarios, Challenges Articulated, Blockchain, Blockchain Characteristics, Opportunities Using Blockchain, History of Blockchain. Evolution of Blockchain : Evolution of Computer Applications, Centralized Applications, Decentralized Applications, Stages in Blockchain Evolution, Consortia, Forks, Public Blockchain Environments, Type of Players in Blockchain Ecosystem, Players in Market.					
UNIT II Blockchain Concepts: Introduction, Changing of Blocks, Hashing, Merkle-Tree, Consensus, Mining and Finalizing Blocks, Currency aka tokens, security on blockchain, data storage on blockchain, wallets, coding on blockchain: smart contracts, peer-to-peer network, types of blockchain nodes, risk associated with blockchain solutions, life cycle of blockchain transaction.					
UNIT III Architecting Blockchain solutions: Introduction, Obstacles for Use of Blockchain, Blockchain Relevance Evaluation Framework, Blockchain Solutions Reference Architecture, Types of Blockchain Applications. Cryptographic Tokens, Typical Solution Architecture for Enterprise Use Cases, Types of Blockchain Solutions, Architecture Considerations, Architecture with Blockchain Platforms, Approach for Designing Blockchain Applications.					
UNIT IV Ethereum Blockchain Implementation: Introduction, Tuna Fish Tracking Use Case, Ethereum Ecosystem, Ethereum Development, Ethereum Tool Stack, Ethereum Virtual Machine, Smart Contract Programming, Integrated Development Environment, Truffle Framework, Ganache, Unit Testing, Ethereum Accounts, MyEtherWallet, Ethereum Networks/Environments, Infura, Etherscan, Ethereum Clients, Decentralized Application, Metamask, Tuna Fish Use Case Implementation, OpenZeppelin Contracts					
UNIT V Hyperledger Blockchain Implementation, Introduction, Use Case – Car Ownership Tracking, Hyperledger Fabric, Hyperledger Fabric Transaction Flow, FabCar Use Case Implementation, Invoking Chaincode Functions Using Client Application.					
Text Books: 1) Ambadas, Arshad Sarfarz Ariff, Sham “Blockchain for Enterprise Application Developers”, Wiley 2) Andreas M. Antonopoulos, “Mastering Bitcoin: Programming the Open Blockchain”, O’Reilly					
Reference Books: 1) Blockchain: A Practical Guide to Developing Business, Law, and Technology Solutions, Joseph Bambara, Paul R. Allen, Mc Graw Hill. 2) Blockchain: Blueprint for a New Economy, Melanie Swan, O’Reilly					

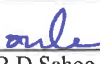
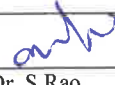
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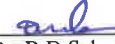
IV Year - I Semester	Code : 20CS7D13	L	T	P	C
		3	0	0	3
SOFTWARE TESTING METHODOLOGIES					
Course Objectives:					
1. To study the fundamental concepts of software testing which includes objectives, process, criteria, strategies, and methods. 2. To discuss various software testing types and levels of testing like black and white box testing along with levels unit test, integration, regression, and system testing.					
Course Outcomes:					
1. Know the basic concepts of software testing and its essentials. 2. Able to identify the various bugs and correcting them after knowing the consequences of the bug. 3. Use of program’s control flow as a structural model is the corner stone of testing. 4. Performing functional testing using control flow and transaction flow graphs.					
UNIT I					
Introduction:-Purpose of testing, Dichotomies,model for testing, consequences of bugs, taxonomy of bugs, Flow graphs and Path testing:- Basics concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.					
UNIT II					
Transaction Flow Testing:-transaction flows, transaction flow testing techniques. Dataflow testing:- Basics of dataflow testing, strategies in dataflow testing, application of dataflow testing.					
UNIT III					
Domain Testing:-domains and paths, Nice & ugly domains, domain testing, domains and interfaces testing, domain and interface testing, domains and testability.					
UNIT IV					
Paths, Path products and Regular expressions:- path products &path expression, reduction procedure, applications, regular expressions & flow anomaly detection. Logic Based Testing:-overview, decision tables,path expressions,kv charts, specifications.					
UNIT V					
State, State Graphs and Transition testing:- state graphs, good & bad state graphs, state testing, Testability tips. Graph Matrices and Application:-Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm, building tools					
Text Books:					
1. Software Testing techniques – Boris Beizer, Dreamtech, second edition. 2. Software Testing Tools – Dr.K.V.K.K.Prasad, Dreamtech.					
Reference Books:					
1. The craft of software testing – Brian Marick, Pearson Education. 2. Software Testing Techniques – SPD(Oreille)					

					
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IV Year - I Semester	Code: 20CS7D16	L	T	P	C
		3	0	0	3
COMPUTER VISION					
Course Objectives: To introduce students the fundamentals of image formation; To introduce students the major ideas, methods, and techniques of computer vision and pattern recognition; To develop an appreciation for various issues in the design of computer vision and object recognition systems;					
Course Outcomes: After completing the course Student will be able to: 1. Identify basic concepts, terminology, theories, models and methods in the field of computer vision, 2. Describe known principles of feature detection and matching, 3. Describe basic methods of computer vision related to image stitching, photography like high dynamic range imaging and blur removal.					
UNIT I Introduction: Image Formation: Geometric Primitives and Transformation, Photometric Image Formation, Digital Camera, Image Processing: Point Operators, Linear Filtering, More Neighborhood Operators, Fourier Transforms, Pyramids and Wavelets, Geometric Transformations, Global Optimization.					
UNIT II Feature Detection and Matching: Points and Patches, Edges, Lines, Segmentation: Active Contours, Split and Merge, Mean Shift and Mode Finding, Normalized Cuts, Feature-Based Alignment: 2D and 3D Feature-based Alignment, Pose Estimation, Geometric Intrinsic Calibration.					
UNIT III Structure and Motion: Triangular, Two-frame Structure from Motion, Factorization, Bundle Adjustment, Constrained Structure and Motion, Dense Motion Estimation: Translation Alignment, Parametric Motion, Spline-based Motion, Optical Flow, Layered motion					
UNIT IV Image Stitching: Motion Models, Global Alignment, Composing, Computational Photography: Photometric Calibration, High Dynamic Range Imaging, Super-Resolution and Blur Removal, image Matting and Compositing, Texture Analysis and Synthesis.					
UNIT V 3D Reconstruction: Shape From X, Active Range Finding, Surface Representation, Point-based Representation, Volumetric Representation, Model-based Reconstruction, Recovering Texture Maps and Albedos, Image- based Rendering: View Interpolation, Layered Depth Images, Light Fields and Lumigraphs, Environment Mattes, Video-based Rendering.					
Text Books: 1. Richard Szeliski, Computer Vision: Algorithms and Applications, Springer-Verlag London Limited, 2011. 2. Simon J.D Prince, Computer Vision: Models, Learning and Inference, 1st Edition, 2012.					
Reference Books: 1. Computer Vision - A modern approach, by D. Forsyth and J. Ponce, Prentice Hall Robot Vision, by B. K. P. Horn, McGraw-Hill. 2. Haralick& Shapiro, “Computer and Robot Vision”, Vol II 3. G erardMedioni and Sing Bing Kang “Emerging topics in computer vision”7					

					
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IV Year - I Semester	Code: 20AS7D10	L	T	P	C
		3	0	0	3
ADHOC AND SENSOR NETWORKS					
Course Outcomes: By the end of the course the student ➤ Able to think and develop new applications in Manets and WSN. ➤ Able to take any new technical issue related to these new thrust areas and come up with a solution(s). ➤ Able to develop algorithms/protocols for Manets and WSN. ➤ Understand the issues and solutions of various layers of Manets, namely MAC layer, Network Layer & Transport Layer in Manets and WSN. ➤ Understand the issues in <i>Security and Sensor Network and Tools</i>.					
UNIT I Introduction to Ad Hoc Networks: Characteristics of MANETs, applications of MANETs, and challenges of MANETs. Routing in MANETs: Criteria for classification, Taxonomy of MANET routing algorithms, Topology based routing algorithms, Position based routing algorithms,					
UNIT II Data Transmission: Broadcast storm problem, Broadcasting, Multicasting and Geo casting					
UNIT III TCP over Ad Hoc: TCP protocol overview, TCP and MANETs, and Solutions for TCP over Ad hoc networks.					
UNIT IV Basics of Wireless Sensors and Applications: Applications, Classification of sensor networks, Architecture of sensor networks, Physical layer, MAC layer, Link layer.					
UNIT V Security: Security in ad hoc networks, Key management, Secure routing, Cooperation in MANETs, and Intrusion detection systems.					
Text Books: - Ad hoc and Sensor Networks - Theory and Applications, by Carlos Cordeiro and Dharma P. Agrawal, World Scientific Publications, March 2006, ISBN 981-256-681-3. - Wireless Sensor Networks: An Information Processing Approach, Feng Zhao, Leonidas Guibas, Elsevier Science ISBN: 978-1-55860-914-3, (Morgan Kauffman)					
Reference Books: AD HOC AND SENSOR NETWORKS: THEORY AND APPLICATIONS 2ND EDITION, KINDLE EDITION					

					
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IV Year - I Semester	Code: 20AD7D11	L	T	P	C
		3	0	0	3
NoSQL DATABASES					
Course Objectives: From the course the student will ☐ To understand the relational database design principles ☐ To become familiar with the basic issues of transaction processing and concurrency control ☐ To become familiar with database storage structures and access techniques					
Course Outcomes: After the completion of the course, student will be able to do the following ☐ Identify what type of NoSQL database to implement based on business requirements (key-value, document, full text, graph, etc.) ☐ Apply NoSQL data modeling from application specific queries ☐ Use Atomic Aggregates and denormalization as data modelling techniques to optimize query processing					
UNIT I Introduction to NoSQL: Definition And Introduction, Sorted Ordered Column-Oriented Stores, Key/Value Stores, Document Databases, Graph Databases, Examining Two Simple Examples, Location Preferences Store, Car Make And Model Database, Working With Language Bindings.					
UNIT II Interacting with NoSQL: If NoSql Then What, Language Bindings For NoSQL Data Stores, Performing Crud Operations, Creating Records, Accessing Data, Updating And Deleting Data.					
UNIT III NoSQL Storage Architecture: Working With Column-Oriented Databases, Hbase Distributed Storage Architecture, Document Store Internals, Understanding Key/Value Stores In Memcached And Redis, Eventually Consistent Non-Relational Databases.					
UNIT IV NoSQL Stores: Similarities Between Sql And Mongodb Query Features, Accessing Data From Column-Oriented Databases Like Hbase, Querying Redis Data Stores, Changing Document Databases, Schema Evolution In Column-Oriented Databases, Hbase Data Import And Export, Data Evolution In Key/Value Stores.					
UNIT V Indexing and Ordering Data Sets : Essential Concepts Behind A Database Index, Indexing And Ordering In Mongodb, Creating and Using Indexes In Mongodb, Indexing And Ordering In Couchdb, Indexing In Apache Cassandra.					
Text Books: 1) Pramod Sadalage and Martin Fowler, NoSQL Distilled, Addison-Wesley Professional, 2012. 2) Dan McCreary and Ann Kelly, Making Sense of NoSQL, Manning Publications, 2013.					
Reference Books: 1) Shashank Tiwari, Professional NoSQL, Wrox Press, Wiley, 2011, ISBN: 978-0-470-94224-6 2) Gaurav Vaish, Getting Started with NoSQL, Packt Publishing, 2013.					

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**BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE
(AUTONOMOUS)**

ODALAREVU – 533 210, Andhra Pradesh, India

IV Year - I Semester	Code: 20AD7D1	L	T	P	C
		3	0	0	3
SOCIAL NETWORK ANALYSIS					
Course Outcomes: After completing the course student should: • Know basic notation and terminology used in network science • Be able to visualize, summarize and compare networks • Illustrate basic principles behind network analysis algorithms • Develop practical skills of network analysis in R programming language • Be capable of analyzing real work networks					
UNIT I Social Network Analysis: Preliminaries and definitions, Erdos Number Project, Centrality measures, Balance and Homophily.					
UNIT II Random graph models: Random graphs and alternative models, Models of network growth, Navigation in social Networks, Cohesive subgroups, Multidimensional Scaling, Structural equivalence, roles and positions.					
UNIT III Network topology and diffusion, Contagion in Networks, Complex contagion, Perco Percolation and information, Navigation in Networks Revisited					
UNIT IV Small world experiments, small world models, origins of small world, Heavy tails, Small Diameter, Clustering of connectivity, The Erdos Renyi Model, Clustering Models					
UNIT V Network structure - Important vertices and page rank algorithm, towards rational dynamics in networks, basics of game theory, Coloring and consensus, biased voting, network formation games, network structure and equilibrium, behavioral experiments, Spatial and agent-based models					
Text Books: 1. S. Wasserman and K. Faust. "Social Network Analysis: Methods and Applications", Cambridge University Press 2. D. Easley and J. Kleinberg, "Networks, Crowds and Markets: Reasoning about a highly connected world", Cambridge University Press, 1 st edition, 2010					
Reference Books: 1. Maarten van Steen. "Graph Theory and Complex Networks. An Introduction", 2010 2. Reza Zafarani, Mohammed Ali Abbasi, Huan Liu. "Social Media Mining: An Introduction". Cambridge University Press 2014 3. Maksim Tsvetovat and Alexander Kouznetsov. "Social Network Analysis for Startups". O'Reilly Media, 2011					

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IV Year - I Semester	Code: 20AD7D13	L	T	P	C
		3	0	0	3
RECOMMENDER SYSTEMS					
Course Objectives: To develop state-of-the-art recommender systems that automates a variety of choice-making strategies with the goal of providing affordable, personal, and high-quality recommendations					
Course Outcomes: By completing the course the students will be able to: • Understand the basic concepts of recommender systems • Carry out performance evaluation of recommender systems based on various metrics • Implement machine-learning and data-mining algorithms in recommender systems data sets. • Design and implement a simple recommender system.					
UNIT I An Introduction to Recommender Systems: Goals of Recommender Systems, Basic Models of Recommender Systems, Collaborative Filtering Models, Content-Based Recommender Systems, Knowledge-Based Recommender Systems, Domain-Specific Challenges in Recommender Systems, Advanced Topics and Applications.					
UNIT II Neighborhood-Based Collaborative Filtering: Key Properties of Ratings Matrices, Predicting Ratings with Neighborhood-Based Methods, Clustering and Neighborhood-Based Methods, Dimensionality Reduction and Neighborhood Methods, A Regression Modeling View of Neighborhood Methods, Graph Models for Neighborhood-Based Methods					
UNIT III Model-Based Collaborative Filtering: Decision and Regression Trees, Rule-Based Collaborative Filtering, Naïve Bayes Collaborative Filtering, Latent Factor Models, Integrating Factorization and Neighborhood Models					
UNIT IV Content-Based Recommender Systems: Basic Components of Content-Based Systems, Preprocessing and Feature Extraction, Learning User Profiles and Filtering, Content-Based Versus Collaborative Recommendations Knowledge-Based Recommender Systems: Constraint-Based Recommender Systems, Case-Based Recommenders, Persistent Personalization in Knowledge-Based Systems.					
UNIT V Evaluating Recommender Systems: Evaluation Paradigms, General Goals of Evaluation Design, Design Issues in Offline Recommender Evaluation, Accuracy Metrics in Offline Evaluation, Limitations of Evaluation Measures					
Text Books: 1. Charu .C. Aggarwal, Recommender Systems: The Textbook, Springer, 2016.					
Reference Books: 1. Jannach D., Zanker M. and FelFering A., Recommender Systems: An Introduction, Cambridge University Press(2011), 1st ed. 2. Ricci F., Rokach L., Shapira D., Kantor B.P., Recommender Systems Handbook, Springer(2011), 1 st ed. 3. Manouselis N., Drachsler H., Verbert K., Duval E., Recommender Systems For Learning, Springer (2013), 1 st ed. 4. J. Leskovec, A. Rajaraman and J. Ullman, Mining of massive datasets, 2 nd Ed., Cambridge, 2012					

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IV Year - I Semester	Code: 20AD7D14	L	T	P	C
		3	0	0	3
AI CHATBOTS					
Course Objectives: - Learn how artificial intelligence powers chatbots, get an overview of the bot ecosystem and bot anatomy, and study different types of bots and use cases. - Identify best practices for defining a chatbot use case, and use a rapid prototyping framework to develop a use case for a personalized chatbot.					
Course Outcomes: - Develop an in-depth understanding of conversation design, including on boarding, flows, utterances, entities, and personality. - Design, build, test, and iterate a fully-functional, interactive chatbot using a commercial platform.					
Deploy the finished chatbot for public use and interaction					
UNIT I Introduction: Benefits from Chatbots for a Business, A Customer-Centric Approach in Financial Services, Chatbots in the Insurance Industry, Conversational Chatbot Landscape, Identifying the Sources of Data: Chatbot Conversations, Training Chatbots for Conversations, Personal Data in Chatbots, Introduction to the General Data Protection Regulation (GDPR)					
UNIT II Chatbot Development Essentials: Customer Service-Centric Chatbots, Chatbot Development Approaches, Rules-Based Approach, AI-Based Approach, Conversational Flow, Key Terms in Chatbots, Utterance, Intent, Entity, Channel, Human Takeover, Use Case: 24x7 Insurance Agent					
UNIT III Building a Chatbot Solution: Business Considerations, Chatbots Vs Apps, Growth of Messenger Applications, Direct Contact Vs Chat, Business Benefits of Chatbots, Success Metrics, Customer Satisfaction Index, Completion Rate, Bounce Rate, Managing Risks in Chatbots Service, Generic Solution Architecture for Private Chatbots					
UNIT IV Natural Language Processing, Understanding, and Generation: Chatbot Architecture, Popular Open Source NLP and NLU Tools, Natural Language Processing, Natural Language Understanding, Natural Language Generation, Applications					
UNIT V Introduction to Microsoft Bot, RASA, and Google Dialog flow: Microsoft Bot Framework, Introduction to QnA Maker, Introduction to LUIS, Introduction to RASA, RASA Core, RASA NLU, Introduction to Dialog flow Chatbot Integration Mechanism: Integration with Third-Party APIs, Connecting to an Enterprise Data Store, Integration Module					
Text Books: Abhishek Singh, Karthik Ramasubramanian, Shrey Shivam, "Building an Enterprise Chatbot: Work with Protected Enterprise Data Using Open Source Frameworks", ISBN 978-1-4842-5034-1, Apress, 2019					
Reference Books: - Janarthanam and Srinu, Hands-on chatbots and conversational UI development: Build chatbots and voice user interfaces with C (1 ed.), Packt Publishing Ltd, 2017. ISBN 978-1788294669. - Galitsky, Boris., Developing Enterprise Chatbots (1 ed.), Springer International Publishing, 2019. ISBN 978-303004298					

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IV Year - I Semester	Code: 20AD7D15	L	T	P	C
		3	0	0	3
DATA VISUALIZATION					
Course Outcomes: Upon completion of this course, the students will be able to - Understand basics of Data Visualization - Implement visualization of distributions					
UNIT I INTRODUCTION TO VISUALIZATION: Visualizing Data-Mapping Data onto Aesthetics, Aesthetics and Types of Data, Scales Map Data Values onto Aesthetics, Coordinate Systems and Axes- Cartesian Coordinates, Nonlinear Axes, Coordinate Systems with Curved Axes, Color Scales-Color as a Tool to Distinguish, Color to Represent Data Values, Color as a Tool to Highlight, Directory of Visualizations- Amounts, Distributions, Proportions, x-y relationships, Geospatial Data					
UNIT II VISUALIZING DISTRIBUTIONS: Visualizing Amounts-Bar Plots, Grouped and Stacked Bars, Dot Plots and Heatmaps, Visualizing Distributions: Histograms and Density Plots- Visualizing a Single Distribution, Visualizing Multiple Distributions at the Same Time, Visualizing Distributions: Empirical Cumulative Distribution Functions and Q-Q Plots-Empirical Cumulative Distribution Functions, Highly Skewed Distributions, Quantile Plots, Visualizing Many Distributions at Once- Visualizing Distributions Along the Vertical Axis, Visualizing Distributions Along the Horizontal Axis					
UNIT III VISUALIZING ASSOCIATIONS & TIME SERIES: Visualizing Proportions-A Case for Pie Charts, A Case for Side-by-Side Bars, A Case for Stacked Bars and Stacked Densities, Visualizing Proportions Separately as Parts of the Total, Visualizing Nested Proportions- Nested Proportions Gone Wrong, Mosaic Plots and Tree maps, Nested Pies, Parallel Sets. Visualizing Associations Among Two or More Quantitative Variables-Scatter plots, Correlograms, Dimension Reduction, Paired Data. Visualizing Time Series and Other Functions of an Independent Variable-Individual Time Series, Multiple Time Series and Dose-Response Curves, Time Series of Two or More Response Variables					
UNIT IV VISUALIZING UNCERTAINTY: Visualizing Trends-Smoothing, Showing Trends with a Defined Functional Form, Detrending and Time-Series Decomposition, Visualizing Geospatial Data-Projections, Layers, Choropleth Mapping, Cartograms, Visualizing Uncertainty-Framing Probabilities as Frequencies, Visualizing the Uncertainty of Point Estimates, Visualizing the Uncertainty of Curve Fits, Hypothetical Outcome Plots					
UNIT V PRINCIPLE OF PROPORTIONAL INK: The Principle of Proportional Ink-Visualizations Along Linear Axes, Visualizations Along Logarithmic Axes, Direct Area Visualizations, Handling Overlapping Points-Partial Transparency and Jittering, 2D Histograms, Contour Lines, Common Pitfalls of Color Use-Encoding Too Much or Irrelevant Information, Using Non monotonic Color Scales to Encode Data Values, Not Designing for Color-Vision Deficiency					
Text Books: - Claus Wilke, "Fundamentals of Data Visualization: A Primer on Making Informative and Compelling Figures", 1st edition, O'Reilly Media Inc, 2019. - Ossama Embarak, Data Analysis and Visualization Using Python: Analyze Data to Create Visualizations for BI Systems, Apress, 2018					
Reference Books: Tony Fischetti, Brett Lantz, R: Data Analysis and Visualization, O'Reilly, 2016					

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IV Year - I Semester	Code: 20CS7E04	L	T	P	C
		3	0	0	3
NATURE INSPIRED COMPUTING TECHNIQUES					
Course Objectives: Learn the theoretical foundations of Nature Inspired Computing techniques, how they can be used to solve problems, and in which areas are most useful and effective.					
Course Outcomes: By completing the course the students will be able to: - Understand the strengths, weaknesses and appropriateness of nature-inspired algorithms. - Apply nature-inspired algorithms to optimization, design and learning problems.					
UNIT I Analysis of Algorithms: Analysis of Optimization Algorithms, Nature Inspired Algorithms, Parameter Tuning and Parameter Control: Parameter Tuning, Hyper optimization, Multi objective View, Parameter Control, Simulated Annealing: Algorithm, Basic Convergence Properties, Stochastic Tunneling					
UNIT II Genetic Algorithms: Introduction, Role of Genetic Operators, Choice of Parameters, GA Variants, Differential Evolution: Introduction, Differential Evolution, Variants, Choice of Parameters, Convergence Analysis, Particle Swarm Optimization: Swarm Intelligence, PSO Algorithm, Accelerated PSO, Binary PSO					
UNIT III Firefly Algorithms: Firefly Behavior, Standard Firefly Algorithm Variations of Light Intensity and Attractiveness, Controlling Randomization, Firefly Algorithms in Applications Cuckoo Search: Cuckoo Breeding Behavior, Levy Flights, Cuckoo Search: Special Cases of Cuckoo Search, Variants of Cuckoo Search, Global Convergence, Applications					
UNIT IV Bat Algorithms: Echolocation of Bats: Behavior of Microbats, Acoustics of Echolocation, Bat Algorithms: Movement of Virtual Bats, Loudness and Pulse Emission, Binary Bat Algorithm, Variants of the Bat Algorithm, Convergence Analysis, Applications: Continuous Optimization, Combinatorial Optimization and Scheduling, Inverse Problems and Parameter Estimation, Classifications, Clustering and Data Mining, Image Processing, Fuzzy Logic and Other Applications					
UNIT V Flower Pollination Algorithms: Introduction, Characteristics of Flower Pollination, Flower Pollination Algorithms, Multi-Objective Flower Pollination Algorithms, Validation and Numerical Experiments: Single-Objective Test Functions, Multi-Objective Test Functions, Applications: Single-Objective Design Benchmarks, Multi-Objective Design Benchmarks					
Text Books: 1. “Nature-Inspired Optimization Algorithms”, Yang, Xin-She, Elsevier Science, 2014.					
Reference Books: 1.“Nature-Inspired Computing and Optimization: Theory and Applications,” Germany: Springer International Publishing, 2017.					

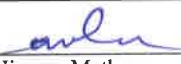
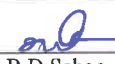
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ODALAREVU – 533 210, Andhra Pradesh, India

IV Year - I Semester	Code: 20CS7E05	L	T	P	C
		3	0	0	3
SECURE CODING TECHNIQUES					
Course Outcomes: At the end of the Course, student will be able to: • Differentiate the objectives of information security • Understand the trend, reasons and impact of the recent Cyber attacks • Understand OWASP design principles while designing a web application					
UNIT I Network and Information security Fundamentals: Network Basics, Network Components, Network Types, Network Communication Types, Introduction to Networking Models, Cyber Security Objectives and Services, Other Terms of Cyber Security, Myths Around Cyber Security, Myths Around Cyber Security, Recent Cyber Attacks, Generic Conclusion about Attacks, Why and What is Cyber Security, Categories of Attack					
UNIT II Introduction to Cyber security: Introduction to OWASP Top 10, A1 Injection, A1 Injection Risks Root Causes and its Mitigation, A1 Injection, A2 Broken Authentication and Session Management, A7 Cross Site Scripting XSS,A3 Sensitive Data Exposure, A5 Broken Access Control, A4 XML External Entity (XEE), A6 Security Misconfiguration, A7 Missing Function Level Access Control, A8 Cross Site Request Forgery CSRF, A8 Insecure Deserialization, A9 Using Components With Known Vulnerabilities.					
UNIT III Secure coding practices and OWASP Top 10: Declarative Security, Programmatic Security, Concurrency, Configuration, Cryptography, Input and Output Sanitization, Error Handling, Input Validation, Logging and auditing, Session Management, Exception Management, Safe APIs, Type Safety, Memory Management, Tokenizing, Sandboxing, Static and dynamic testing, vulnerability scanning and penetration testing					
UNIT IV Secure coding practices in C/C++ and Java: Potential Software Risks in C/C++, Defensive coding, Preventative Planning, Clean Code, Iterative Design, Assertions, Pre Post Conditions, Low level design inspections, Unit Tests Java- Managing Denial of Service, Securing Information, Data Integrity, Accessibility and Extensibility, Securing Objects, Serialization Security					
UNIT V Secure coding in Python: Interactive Python Scripting, Python Variables, Conditionals, Loops, Functions, External Modules, File operations, Web requests					
Text Books: 1. Networking Fundamentals, 2019 edition, Packt, Author: Gordon Davies 2. Principles of Information Security, Authors: Michael E. Whitman and Herbert J. Mattord, Course technology incorp.					
Web Reference : 1.https://www.stealthlabs.com/blog/infographic-top-15-cybersecurity-myths-vs-reality/ 2. https://microage.ca/cybersecurity-layering-approach/ 3.https://www.synopsys.com/glossary/what-is-threat-modeling.html#:~:text=Threat%20modeling%20is%20a%20structured,An%20abstraction%20of%20the%20system					

					
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