SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

22 Sep, 2020

SECOND ACADEMIC COUNCIL MEETING
LIST OF MEMBERS

SL. NO.	MEMBERS AS PER UGC NORMS	MEMBERS NOMINATED
1.	The Principal (Chairman)	Dr. C. Venkatesh
2.	All the Heads of Departments in the college	1. Dr. R. Shanmugam, Chairman, BOS / Civil 2. Dr. M. Sakthivel, Chairman, BOS / CSE 3. Dr. C. Aarthi, Chairman, BOS / ECE 4. Dr. K. Umadevi, Chairman, BOS / EEE 5. Dr. M. Selvakumar, Chairman, BOS / Mech 6. Dr. P. Govindasamy Chairman, BOS / MBA 7. Prof. P. Thangarasu, Chairman, BOS / Chemistry
3.	Four Teachers of the college representing different categories of teaching staff by rotation on the basis of seniority of service in the college.	1. Dr. B. Sujatha, Dean (Academics) 2. Dr. G. Jayamurugan, AsP / CSE 3. Prof. T. Gohila, AsP/ EEE 4. Prof. S. Bhuvana, HOD / English
4.	Not less than four experts from outside the college representing such area as Industry, Commerce, Law, Education, Medicine, Engineering, etc., To be nominated by the Governing Body.	1. Mr. V. S. Ramesh, Director, M/s. STEPS Knowledge Services Pvt. Ltd, Coimbatore. 2. Shri T.N. Thirukkumar, MD, Jansons Industries, Tiruchengode. 3. Dr. N. Nagarajan, Principal, Coimbatore Institute of Engineering and Technology, Coimbatore. 4. Dr. R. Satish Kumar, Principal, Sengunthar College of Engineering, Tiruchengode.
5.	Three nominees of the university	1. Dr. K. Chinnakali, Professor/Physics, CEG, Anna University, Chennai-25. 2. Dr. B. Kothandaraman, Professor/Rubber and Plastic Technology, Anna University, Chennai-44. 3. Dr. S. Moorthy Babu, Professor/Crystal Growth Centre, Anna University, Chennai-25.
6.	A faculty member nominated by the Principal (Member Secretary).	Dr. K. L. Palanisamy, Chairman, BOS / S& H

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SECOND ACADEMIC COUNCIL MEETING   22 Sep, 2020
AGENDA

Item No.	Points to be discussed
Item 2.2 a	To confirm the minutes of the first academic council meeting.
Item 2.2 b	To discuss and resolve recommendations of Second Board of Studies meeting held during the month of August 2020 for the entire Departments (UG/PG).
Item 2.2 c	To approve the Ratifications and changes in the subject code and titles in curriculum without the alteration of the syllabi.
Item 2.2 d	To approve and conduct online examinations, question paper pattern (MCQ) and evaluation of the Final semester for the Undergraduate and Postgraduate students in this pandemic outbreak.
Item 2.2 e	To Approve Question paper setters and evaluators recommended by the Board of Studies for the entire departments (UG/PG) for the Academic year 2020-2021.
Item 2.3	To approve the Publication of the results of Regular Courses of Undergraduate and Postgraduate programmes from first to pre-final years (except final semesters) for April/May 2020 End Semester Examinations of the Academic Year 2019 – 2020, as per the guidelines of Revenue and Disaster Management (D.M.IV) Department, Govt. of Tamil Nadu and Anna University, Chennai in view of pandemic situation.
Item 2.4	The plan of action for the academic year 2020 – 2021 in the view of COVID -19.
Item 2.4 a	To discuss the modalities for conducting Online classes and Online Assessment in this pandemic situation.
Item 2.4 b	To discuss and approve the Inclusion of blended learning.
Item 2.5	Any other items brought forward by the Chairman and the members of the Academic Council.

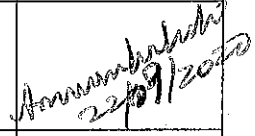SENGUNTHAR

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I. LIST OF MEMBERS PRESENT

The Second Academic Council Meeting of **SENGUNTHAR ENGINEERING COLLEGE (AUTONOMOUS)** held on 22.09.2020 at 11.00 a.m. through Google Meet in IQAC board Room with the presence of internal board members during this COVID-19 pandemic situation. The following Members were attended the meeting.

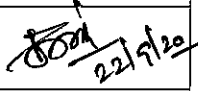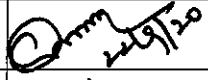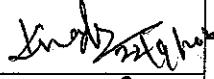| S. No.	Name of the Faculty & Designation	Position in Committee	Signature with Date
1	Dr.C.Venkatesh, Principal, Sengunthar Engineering College.	Chairman	
2	Dr. K. Chinnakali, Professor/Physics, CEG, Anna University, Chennai-25.	University Nominee	Attended through Google Meet
3	Dr. B. Kothandaraman, Professor/Rubber and Plastic Technology, Anna University, Chennai-44.	University Nominee	Attended through Google Meet
4	Dr. S. Moorthy Babu, Professor/Crystal Growth Centre, Anna University, Chennai-25.	University Nominee	Attended through Google Meet
5	Mr. V. S. Ramesh, Director, M/s. STEPS Knowledge Services Pvt. Ltd, Coimbatore.	Industrial Expert	Attended through Google Meet
6	Shri T.N. Thirukkumar, MD, Jansons Industries, Tiruchengode.	Industrial Expert	Attended through Google Meet

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7	Dr. N. Nagarajan, Principal, Coimbatore Institute of Engineering and Information Technology, Coimbatore.	Academic Expert	Attended through Google Meet
8	Dr. R. Satish Kumar, Principal, Sengunthar College of Engineering, Tiruchengode.	Academic Expert	
9	Dr. R. Shanmugam	Chairman, BOS / Civil	
10	Dr. M. Sakthivel	Chairman, BOS / CSE	
11	Dr. C. Aarthi	Chairman, BOS / ECE	
12	Dr. K. Umadevi	Chairman, BOS / EEE	
13	Dr. M. Selvakumar	Chairman, BOS / Mech	
14	Dr. P. Govindasamy	Chairman, BOS / MBA	
15	Prof. P. Thangarasu	Chairman, BOS / Chemistry	
16	Dr. B. Sujatha Dean (Academics)	Teacher Representative	
17	Dr. G.Jayamurugan AsP / CSE	Teacher Representative	
18	Prof. T. Gohila AsP / EEE	Teacher Representative	
19	Prof. S. Bhuvana HoD / English	Teacher Representative	
20	Dr. K. L. Palanisamy, Chairman, BOS / S & H	Faculty Nominated by the Principal (Member Secretary)	

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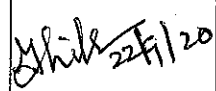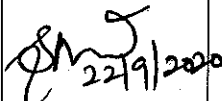
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II.   MINUTES OF THE MEETING

The Second Meeting of the Academic Council of **SENGUNTHAR ENGINEERING COLLEGE, TIRUCHENGODE** was held on 22nd September, 2020, Tuesday at 11.00 a.m. in the Internal Quality Assurance Cell under the Chairmanship of Dr.C.Venkatesh, Principal. On account of the COVID - 19 pandemic outbreaks, all the members were participated through Online Google meet.

At the outset, The Principal and Chairperson extended a warm welcome and briefed the Agenda of the Second Meeting of the Academic Council.

Then, the proceedings of the meeting was continued by Dr.K.L.Palanisamy, Member Secretary, Academic Council and he elaborated all the points to be resolved for subsequent approval from the members of the Academic Council for the academic year 2020 - 2021.

After a brief discussion, the following resolutions were passed.

ITEM:2.2 a   To confirm the minutes of the First Academic Council meeting.

The Academic Council **resolved to confirm** the minutes of the First Council Meeting held on 24th July, 2019, unanimously without any modification.

ITEM:2.2 b   To discuss and resolve recommendations of Second Board of Studies meeting held during the month of August 2020 for the Entire Departments (UG/PG).

The Academic Council reviewed the Minutes of the Second Meeting of Board of Studies which was conducted during the month of August as given below:
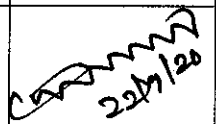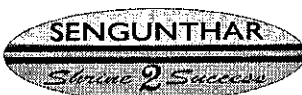
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- 25.08.2020 - CSE, S & H and MBA

- 26.08.2020 - ECE, EEE and Mechanical

- 28.08.2020 - Civil.

The Academic Council **resolved to approve** the Syllabi for III Semester under Regulations 2019 for all UG Programmes in CIVIL, CSE, ECE, EEE, Mechanical & Science and Humanities. Further the Academic Council is **resolved** to approve the Syllabi for III Semester under Regulations 2019 for PG Programmes in CSE, VLSI Design, Structural Engineering and MBA brought forward by the respective Chairman of Board of Studies incorporating the changes as mentioned in the minutes.

ITEM:2.2 c   To approve the ratifications and changes in the subject code and titles in curriculum without the alteration of the syllabi.

The Academic Council is **resolved** to approve the ratifications and changes in the subject code and titles in curriculum without the alteration of the syllabi offered.

ITEM:2.2 d   To approve and conduct online examinations, question paper pattern (MCQ) and evaluation of the Final semester for the Undergraduate and Postgraduate students in this pandemic outbreak.

Academic Council noted the Letter No. G.O. (Ms) No.505, dated 19.09.2020 received from Revenue and Disaster Management (D.M.IV) Department, Govt. of Tamil Nadu and Letter No.Endt.No.Dis.19642 / J1 / 2020, dated 21.09.2020 received from Directorate of Technical Education, Chennai. The Academic Council is **resolved** to approve the conduct of online examination, question paper pattern (answer any 30 MCQs from 40) and   evaluation   of   the   final semester for the
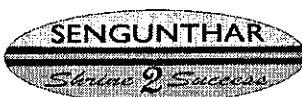
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undergraduate and postgraduate students as per the directions of Revenue and Disaster Management (D.M.IV) Department, Govt. of Tamil Nadu and Anna University, Chennai.

ITEM:2.2 e **To Approve Question paper setters and evaluators recommended by the Board of Studies for the entire departments (UG/PG) for the Academic year 2020-2021.**

The Academic Council reviewed and **resolved** to approve the Question paper setters and evaluators recommended by the Board of Studies for the entire departments for the academic year 2020-2021.

The Academic Council is **resolved** to approve that the End Semester Practical Exam Question Papers are to be set by the Internal Examiners and the concurrence will be obtained from the External Examiners in person at least half an hour before the commencement of the End Semester Practical Examinations. It is included in the curriculum as amendment for clear reference.

ITEM:2.3 **To approve the Publication of the results of Regular Courses of Undergraduate and Postgraduate programmes from first to pre-final years (except final semester) for April / May 2020 End Semester Examinations of the Academic Year 2019-2020, as per the guidelines of Revenue and Disaster Management (D.M.IV) Department, Govt. of Tamil Nadu and Anna University, Chennai in view of pandemic situation.**

Academic Council noted the **Letter No. அரசாணை (டி) எண்.111, dated 27.07.2020 received from உயர்கல்வித்(கே2)துறை, Government of Tamil Nadu and Letter No. 017053 / ECA3 / 2020, dated 07.08.2020 received from Directorate of Technical Education, Chennai.** The Academic Council is **resolved** to approve the Publication of the results of Undergraduate and Postgraduate programmes from first to pre-final years (except final semester) for April / May 2020.

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ITEM:2.4   **The plan of action for the academic year 2020 – 2021 in the view of COVID -19.**

The Academic Council reviewed and **resolved** to approve the plan of action for the academic year 2020 – 2021 in the view of COVID -19.

ITEM:2.4 a   **To discuss the modalities for conducting Online classes and Online Assessment in this pandemic situation.**

Academic Council noted the **Letter No. 2131/ AU / CAC / Autonomous / 2020 dated on 19.09.2020** received from Anna University, Chennai along with the notification of the Previous Letter No. 2055/ AU / CAC / INT ASS / 2020 dated on 15.09.2020, received from Anna University, Chennai regarding modalities for conducting the Online Classes and Online Assessment.

The Academic Council is **resolved** to conduct Online classes and Online Assessment in this pandemic situation.

ITEM:2.4 b   **To discuss and approve the Inclusion of blended learning.**

The Academic Council is **resolved** to continue the teaching – learning progress education through Blended learning.

ITEM:2.5   **Any other items brought forward by the Chairman and the members of the Academic Council.**

Nil

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The Chairman summarized the various decisions taken by the Academic Council and Dr.K.L.Palanisamy, Member Secretary, Academic Council thanked all the members for their active participation and valuable suggestions on various points discussed in the Google Online meeting.

The Meeting concluded by 11.50 a.m.

Dr. C. VENKATESH
PRINCIPAL
CHAIRMAN-ACADEMIC COUNCIL

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27 March, 2021

THIRD ACADEMIC COUNCIL MEETING
LIST OF MEMBERS

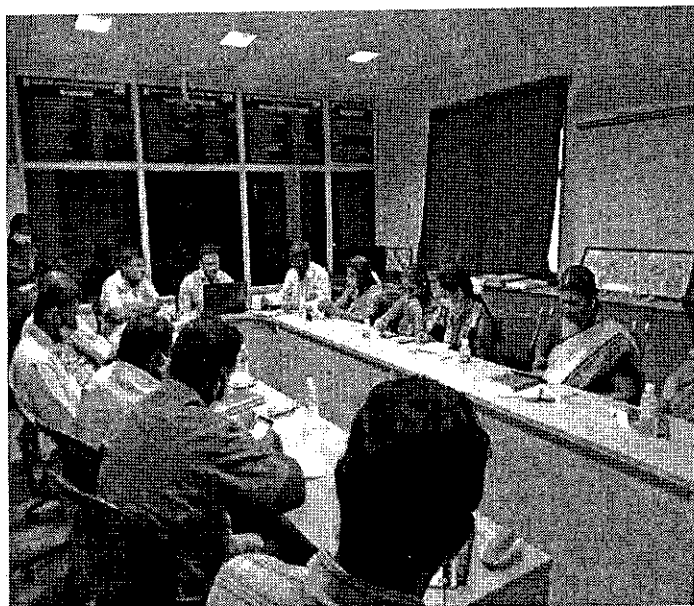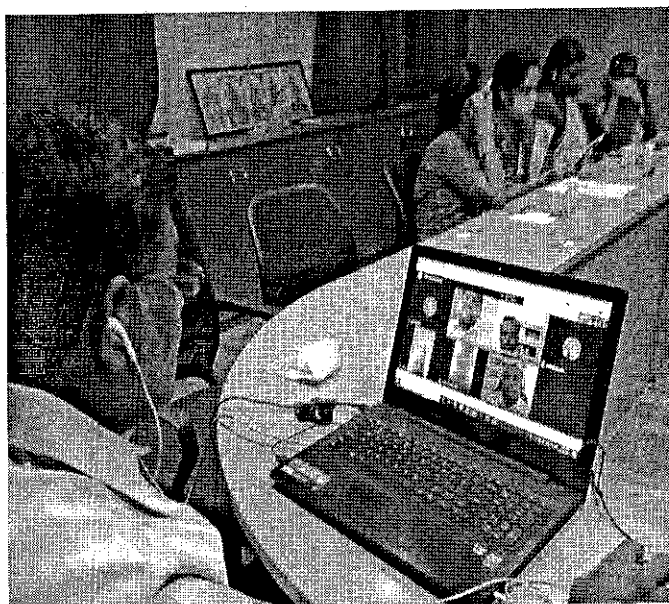| SL. NO.	MEMBERS AS PER UGC NORMS	MEMBERS NOMINATED
1.	The Principal (**Chairman**)	Dr. C. Venkatesh
2.	All the Heads of Departments in the college	1. Dr. M.Seenirajan, Chairman, BOS / Civil 2. Dr. M. Sakthivel, Chairman, BOS / CSE 3. Dr. C. Aarthi, Chairman, BOS / ECE 4. Dr. K. Umadevi, Chairman, BOS / EEE 5. Dr. M. Selvakumar, Chairman, BOS / Mech 6. Dr. P. Govindasamy Chairman, BOS / MBA 7. Prof. P. Thangarasu, Chairman, BOS / Chemistry
3.	Four Teachers of the college representing different categories of teaching staff by rotation on the basis of seniority of service in the college.	1. Dr. B. Sujatha, Dean (Academics) 2. Dr. G. Jayamurugan, AsP / CSE 3. Prof. T. Gohila, AsP/ EEE 4. Prof. S. Bhuvana, HOD / English
4.	Not less than four experts from outside the college representing such area as Industry, Commerce, Law, Education, Medicine, Engineering, etc., To be nominated by the Governing Body.	1. Mr. V. S. Ramesh, Director, M/s. STEPS Knowledge Services Pvt. Ltd, Coimbatore. 2. Shri T.N. Thirukkumar, MD, Jansons Industries, Tiruchengode. 3. Dr. N. Nagarajan, Principal, Coimbatore Institute of Engineering and Technology, Coimbatore. 4. Dr. R. Satish Kumar, Principal, Sengunthar College of Engineering, Tiruchengode.
5.	Three nominees of the university	1. Dr. K. Chinnakali, Professor/Physics, CEG, Anna University, Chennai-25. 2. Dr. B. Kothandaraman, Professor/Rubber and Plastic Technology, Anna University, Chennai-44. 3. Dr. S. Moorthy Babu, Professor/Crystal Growth Centre, Anna University, Chennai-25.
6.	A faculty member nominated by the Principal (**Member Secretary**).	Dr. K. L. Palanisamy, Chairman, BOS / S& H

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27 March, 2021

THIRD ACADEMIC COUNCIL MEETING
AGENDA

Item No.	Points to be Discussed
Item 3.1	To confirm the minutes of the Previous (Second) Academic Council meeting held on 22.09.2020.
Item 3.2	To ratify the conduction of the Supplementary Examination for the students who were absent for the examinations and for some who could not complete the Proctored Online End Semester Examinations April/May 2020 due to technical glitches such as problem in the internet connectivity, disruption of electricity and device problems.
Item 3.3	To ratify the Publication of Result for the Terminal Semester Examinations (April / May 2020) of all UG/PG Programmes.
Item 3.4	To ratify the Conduction of the End Semester (Odd Semester) Examinations of UG/PG students and arrear subjects during Nov/Dec 2020 of the Regulations 2017 and the Regulations 2019 as per the direction given by Anna University, Chennai to the Autonomous Colleges (applicable to pandemic period of covid-19).
Item 3.5	To consider and approve the B.E. Civil Engineering Programme Syllabi from V to VIII Semesters under Regulations 2019.
Item 3.6	To consider and approve the B.E. Computer Science and Engineering Programme Syllabi from V to VIII Semesters under Regulations 2019.
Item 3.7	To consider and approve the B.E. Electrical and Electronics Engineering Programme Syllabi from V to VIII Semesters under Regulations 2019.
Item 3.8	To consider and approve the B.E. Electronics and Communication Engineering Programme Syllabi from V to VIII Semesters under Regulations 2019.
Item 3.9	To consider and approve the B.E. Mechanical Engineering Programme Syllabi from V to VIII Semesters under Regulations 2019.
Item 3.10(a)	To ratify the constitution of Academic Steering Committee and its functions.

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Item 3.10(b)	To ratify all the minutes of the meeting of the Academic Steering Committee.
Item 3.11(a)	To ratify the conduction of Theory / Practical / Project classes for the UG / PG programmes through Physical / Online Mode in the Even Semester (Except second semester UG/PG) for the academic year 2020-2021.
Item 3.11(b)	To approve the conduction of Theory / Practical / Project classes for the UG / PG programmes through Physical / Online Mode in the Second Semester UG/PG for the academic year 2020-2021.
Item 3.12	To ratify the modalities to conduct the Continuous Internal Assessment for UG / PG programmes of the Regulations 2017 and the Regulations 2019 in the Even Semester (Except Second Semester) for the academic year 2020-2021.
Item 3.13	To discuss and approve the modalities to conduct the Continuous Internal Assessment for UG / PG programmes of Regulations 2019 in the Second Semester for the academic year 2020-2021.
Item 3.14	To discuss and approve the modalities to conduct the End Semester Examinations of Even Semester for the academic year 2020-2021 to the UG / PG programmes for the Regulations 2017 and the Regulations 2019.
Item 3.15	To discuss and approve for the conduction of Virtual Internship, Value added Courses, accomplish of Conferences, Symposia, Workshops and Webinars in the Even Semester for the academic year 2020-2021 to the UG / PG programmes.
Item 3.16	To suggest the Governing Body for the proposal of new programme of study in the academic year 2021-2022.
Item 3.17	To suggest the Governing Body for providing Awards to the students for their Outstanding Performance in the Academic and the Extracurricular Activities.
Item 3.18	To discuss and approve the composition of Selection Committee to Honor the Outstanding performance of both the students and the faculty members.
Item 3.19	Any other matter brought forward by the Chairman and the members of the Academic Council.

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I. LIST OF MEMBERS PRESENT

The Third Academic Council Meeting was held on 27.03.2021, Saturday at 11.00 a.m. in the IQAC board Room through Google online meet under the Chairmanship of Dr.C.Venkatesh, Principal along with the presence of internal board members during this COVID-19. The following Members were attended the meeting.

S. No.	Name of the Faculty & Designation	Position in Committee	Signature with Date
1	Dr.C.Venkatesh, Principal, Sengunthar Engineering College.	Chairman	
2	Dr. K. Chinnakali, Professor/Physics, CEG, Anna University, Chennai-25.	University Nominee	Attended through Google Meet
3	Dr. B. Kothandaraman, Professor/Rubber and Plastic Technology, Anna University, Chennai-44.	University Nominee	Attended through Google Meet
4	Dr. S. Moorthy Babu, Professor/Crystal Growth Centre, Anna University, Chennai-25.	University Nominee	Attended through Google Meet
5	Mr. V. S. Ramesh, Director, M/s. STEPS Knowledge Services Pvt. Ltd, Coimbatore.	Industrial Expert	Attended through Google Meet
6	Shri T.N. Thirukkumar, MD, Jansons Industries, Tiruchengode.	Industrial Expert	Attended through Google Meet
7	Dr. N. Nagarajan, Principal, Coimbatore Institute of Engineering and Information Technology, Coimbatore.	Academic Expert	Attended through Google Meet

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8	Dr. R. Satish Kumar, Principal, Sengunthar College of Engineering, Tiruchengode.	Academic Expert	
9	Dr. M. Seenirajan	Chairman, BOS / Civil	
10	Dr. M. Sakthivel	Chairman, BOS / CSE	
11	Dr. C. Aarthi	Chairman, BOS / ECE	
12	Dr. K. Umadevi	Chairman, BOS / EEE	
13	Dr. M. Selvakumar	Chairman, BOS / Mech	
14	Dr. P. Govindasamy	Chairman, BOS / MBA	
15	Prof. P. Thangarasu	Chairman, BOS / Chemistry	
16	Dr. B. Sujatha Dean (Academics)	Teacher Representative	
17	Dr. G.Jayamurugan AsP / CSE	Teacher Representative	
18	Prof. T. Gohila AsP / EEE	Teacher Representative	
19	Prof. S. Bhuvana HoD / English	Teacher Representative	
20	Dr. K. L. Palanisamy, Chairman, BOS / S & H	Faculty Nominated by the Principal (Member Secretary)	

II. MINUTES OF THE MEETING

The Third Academic Council meeting was held on 27.03.2021 at 11.a.m. through Google Meet (Online Mode) with the approval of Centre for Academic Courses, Anna

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University, Chennai (CAC Letter No: 167/AU/CAC/2021, Dated: 19.01.2021) as in **Annexure I**. This permission is granted as a special case and one time measure only in view of the prevailing COVID 19 situation. Besides, On account of COVID - 19 pandemic outbreaks, all the members were participated through Online Google meet.

The meeting began with the welcome address by the Principal Dr.C. Venkatesh, Chairman of the Academic Council, Sengunthar Engineering College (Autonomous). Then, the proceedings of the meeting were continued by Dr.K.L. Palanisamy, Member Secretary, Academic Council and he outlined briefly the various agenda items to be presented at the meeting. After a brief discussion, the following agenda items are considered and resolved by the 3rd Academic Council.

Item 3.1 **To confirm the minutes of the Previous (Second) Academic Council meeting held on 22.09.2020.**

The minutes of the 2nd **Academic** Council Meeting which was held on **22/09/2020,** were communicated to the members through email dated 23/09/2020. The comments received have been incorporated and placed for confirmation. The same was **approved** by the council.

Item 3.2 **To ratify the conduction of the Supplementary Examination for the students who were absent for the Proctored Online End Semester Examinations April/May 2020 and for some who could not complete the examinations due to technical glitches such as problem in the internet connectivity, disruption of electricity and device problems.**

The Academic Council noted the Letter number: 15189/C12/2020, dated: 21.11.2020 as in **Annexure II** received from Anna University, Chennai and **Resolved to approve** the conduction of the Supplementary Examination

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for the students who were absent for the Proctored Online End Semester Examinations April/May 2020 and for some who could not complete the examinations due to technical glitches such as problem in the internet connectivity, disruption of electricity and device problems.

Item 3.3   To ratify the Publication of Result for the Terminal Semester Examinations April / May 2020 of all UG/PG Programmes.

The Academic Council noted the Letter number: 2265/AU/CAC/Final Yr Mod/2020, dated: 01.10.2020 as in **Annexure III** received from the Centre for Academic Courses, Anna University, Chennai and **Resolved to approve** the Publication of Result for the Terminal Semester Examinations April / May 2020 of all UG/PG Programmes.

Item 3.4   To ratify the Conduction of the End Semester (Odd Semester) Examinations of UG / PG students and arrear subjects during Nov/Dec 2020 of the Regulations 2017 and the Regulations 2019 as per the direction given by Anna University, Chennai to the Autonomous Colleges (applicable to pandemic period of Covid-19).

The Academic Council noted the following letters

1. Letter No: 19707/C12/2020, dated: 23.11.2020 received from Anna University, Chennai,

2. Letter No: 19707/C12/2020, dated: 30.11.2020 received from Anna University, Chennai and

3. G.O. (Ms). No: 640, dated: 13.11.2020 received from Revenue and Disaster Management (DM-IV) Department.
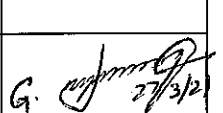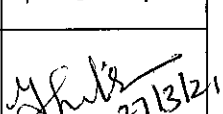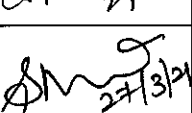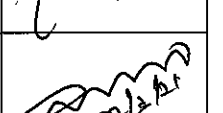
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4. Letter No: 19707/C12/2020, dated: 26.02.2021 to the Principals of all Non-Autonomous Affiliated Colleges issued by the Controller of Examinations, Anna University, Chennai as in as in **Annexure IV** and the End Semester Examinations Nov/Dec 2020 (Odd Semester) conducted in accordance with the above mentioned letters from the competent authorities as per the following mode.

Regulations	Programme	Semester	Mode of Examination	
			Theory	**Practical / Project**
2017	UG	5th & 7th	Proctored Online	Proctored Online
2019	UG/PG	3th	Proctored Online	Proctored Online
2019	UG/PG	1st	Proctored Online	Physical Mode

Resolved to approve the conduction of the End Semester (Odd Semester) Examinations of UG / PG students and arrear subjects during Nov/Dec 2020 of the Regulations 2017 and the Regulations 2019 as per the direction given by Anna University, Chennai to the Autonomous Colleges (applicable to pandemic period of Covid-19).

Item 3.5 **To consider and approve the B.E. Civil Engineering Programme Syllabi from V to VIII Semesters under Regulations 2019.**

The academic council reviewed the whole minutes of the third Board of studies Meeting of B.E. Civil Engineering Programme was conducted on 09.01.2021which incorporating the changes as mentioned in the minutes

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and **Resolved to approve** the Syllabi from V to VIII Semesters under Regulations 2019 of B.E. Civil Engineering Programme as in **Annexure V.**

Item 3.6   **To consider and approve the B.E. Computer Science and Engineering Programme Syllabi from V to VIII Semesters under Regulations 2019.**

The academic council reviewed the whole minutes of the third Board of studies Meeting of B.E.Computer Science and Engineering Programme was conducted on 09.01.2021which incorporating the changes as mentioned in the minutes and **Resolved to approve** the Syllabi from V to VIII Semesters under Regulations 2019 of B.E. Computer Science and Engineering Programme as in as in **Annexure VI.**

Item 3.7   **To consider and approve the B.E. Electrical and Electronics Engineering Programme Syllabi from V to VIII Semesters under Regulations 2019.**

The academic council reviewed the whole minutes of the third Board of studies Meeting of B.E. Electrical and Electronics Engineering Programme was conducted on 08.01.2021which incorporating the changes as mentioned in the minutes and **Resolved to approve** the Syllabi from V to VIII Semesters under Regulations 2019 of B.E. Electrical and Electronics Engineering Programme as in **Annexure VII.**

Item 3.8   **To consider and approve the B.E. Electronics and Communication Engineering Programme Syllabi from V to VIII Semesters under Regulations 2019.**

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The academic council reviewed the whole minutes of the third Board of studies Meeting of B.E. Electronics and Communication Engineering Programme was conducted on 09.01.2021which incorporating the changes as mentioned in the minutes and **Resolved to approve** the Syllabi from V to VIII Semesters under Regulations 2019 of B.E. Electronics and Communication Engineering Programme as in **Annexure VIII.**

Item 3.9 **To consider and approve the B.E. Mechanical Engineering Programme Syllabi from V to VIII Semesters under Regulations 2019.**

The academic council reviewed the whole minutes of the third Board of studies Meeting of B.E. Mechanical Engineering Programme was conducted on 08.01.2021which incorporating the changes as mentioned in the minutes and **Resolved to approve** the Syllabi from V to VIII Semesters under Regulations 2019 of B.E. Mechanical Engineering Programme as in **Annexure IX.**

Item 3.10(a) **To ratify the constitution of Academic Steering Committee and its functions.**

Resolved to approve the constitution of Academic Steering Committee and its functions as in **Annexure X.**

Item 3.10(b) **To ratify all the minutes of the meeting of the Academic Steering Committee.**

Resolved to approve all the minutes of the meeting of the Academic Steering Committee as in **Annexure XI.**

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Item 3.11(a) **To ratify the conduction of Theory / Practical / Project classes for the UG / PG programmes through Physical / Online Mode in the Even Semester (Except second semester UG/PG) for the academic year 2020-2021.**

The Academic Council noted the Letter No: 050/AU/CAI/2021, dated: 04.02.2021, as in **Annexure XII** and reviewed the mode of conduction of Theory / Practical / Project classes specified in the following table during the Covid-19 pandemic situation.

Regulations	Programme	Semester	Mode of conduct of classes	
			Theory	**Practical / Project**
2017	UG	8th	Online / Physical	Physical*
2017	UG	6th	Online	Physical*
2019	UG	4th	Online	Physical*
2019	PG	4th	-------	Physical*

* If the students from long distance / other states / continuous illness / from the containment area - online mode.

Resolved to approve the conduction of Theory / Practical / Project classes for the UG / PG programmes through Physical / Online Mode in the Even Semester (Except second semester UG/PG) for the academic year 2020-2021.

Item 3.11(b) **To approve the conduction of Theory / Practical / Project classes for the UG / PG programmes through Physical / Online Mode in the Second Semester UG/PG for the academic year 2020-2021.**

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Regulations	Programme	Semester	Mode of conduct of classes	
			Theory	Practical/Project
2019	UG/PG	2nd	Online	Physical*

If the Pandemic continuous, the practical classes will be conducted online mode.

Resolved to approve the conduction of Theory / Practical / Project classes for the UG / PG programmes through Physical / Online Mode in the Second Semester UG/PG for the academic year 2020-2021.

Item 3.12 **To ratify the modalities to conduct the Continuous Internal Assessment for UG / PG programmes of the Regulations 2017 and the Regulations 2019 in the Even Semester (Except Second Semester) for the academic year 2020-2021.**

Resolved to approve the modalities to conduct the Continuous Internal Assessment for UG / PG programmes of the Regulations 2017 and the Regulations 2019 in the Even Semester (Except Second Semester) for the academic year 2020-2021 as in **Annexure XIII.**

Item 3.13 **To discuss and approve the modalities to conduct the Continuous Internal Assessment for UG / PG programmes of Regulations 2019 in the Second Semester for the academic year 2020-2021.**

Resolved to approve the modalities to conduct the Continuous Internal Assessment for UG / PG programmes of Regulations 2019 in the Second Semester for the academic year 2020-2021as in **Annexure XIV.**

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Item 3.14 To discuss and approve the modalities to conduct the End Semester Examinations of Even Semester for the academic year 2020-2021 to the UG / PG programmes for the Regulations 2017 and the Regulations 2019.

The Academic Council noted the Letter No: 19707/C12/2020 dated: 26.03.2021 as in **Annexure XV** and **Resolved to approve** the modalities to conduct the End Semester Examinations of Even Semester for the academic year 2020-2021 to the UG / PG programmes for the Regulations 2017 and the Regulations 2019 as in **Annexure XVI.**

Item 3.15 To discuss and approve for the conduction of Virtual Internship, Value Added Courses, accomplish of Conferences, Symposia, Workshops and Webinars in the Even Semester for the academic year 2020-2021 to the UG / PG programmes.

Resolved to approve for the conduction of Virtual Internship, Value added Courses, accomplish of Conferences, Symposia, Workshops and Webinars in the Even Semester for the academic year 2020-2021 to the UG / PG programmes through online mode.

Item 3.16 To suggest the Governing Body for the proposal of new programme of study in the academic year 2021-2022.

The Academic Council recommended the Governing Body to give approval for the proposal of new programme B.E. Cyber Security Programme in the academic year 2021-2022.

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Item 3.17 **To suggest the Governing Body for providing Awards to the students for their Outstanding Performance in the Academic and the Extracurricular Activities.**

The Academic Council **recommended** the Governing Body to approve the following awards to the students for their Outstanding Performance in the Academic and the Extracurricular Activities.

S.No.	Name of the Award
1	Gold Medal for the rank holders
2	Silver Medal for the rank holders
3	Best Out Going Student of the academic year
4	Best Sports man / Sports woman of the academic year
5	Best Teacher of the academic year

The detailed description and the criteria of the awards appended as in **Annexure XVII.**

Item 3.18 **To discuss and approve the composition of Selection Committee to Honor the Outstanding performance of both the students and the faculty members.**

Resolved to approve the composition of Selection Committee to Honor the Outstanding performance of both the students and the faculty members as in **Annexure XVIII.**

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Item 3.19   **Any other matter brought forward by the Chairman and the members of the Academic Council.**

The Chairman brought the attention of the Council Member that the introduction of the Subjects related to the Hospital Management as Core Subject/ Elective Subject in Master of Business Administration (MBA) Programme based on the more enquiries sought for the admission.

Resolved to approve the introduction of the subjects related to the Hospital Management as Core Subject / Elective Subject in Master of Business Administration (MBA) Programme.

The following suggestions were given by the Academic Council Members:

- The committee recommended that the Equivalence of Certificate should be obtained from the Government of Tamil Nadu for the new programme B.E. Cyber Security to ensure the Government Jobs for the students.
- Paper Publication in National / International Journals by the faculty member shall be considered as one of the criteria for the Best Teacher Award.
- One Credit may be added to the Virtual Internship / Value Added Courses during this Covid-19 pandemic situation.

The Chairman summarized the various decisions taken by the Academic Council and Dr.K.L.Palanisamy, Member Secretary; Academic Council thanked all the members for their active participation and valuable suggestions on various points discussed in the Google Online meeting.

The Meeting was concluded by 12.30 p.m.
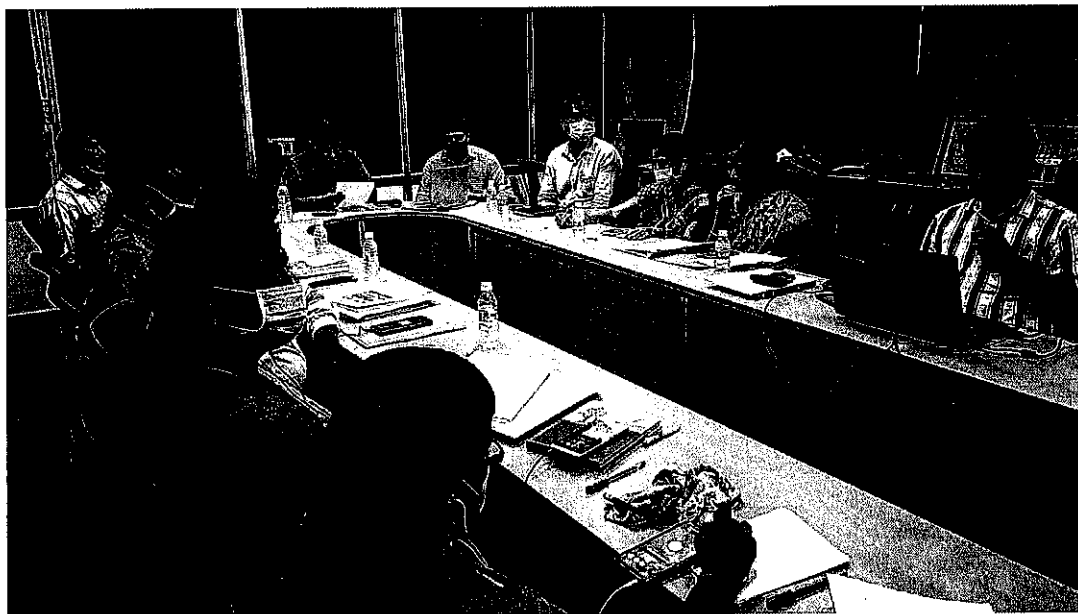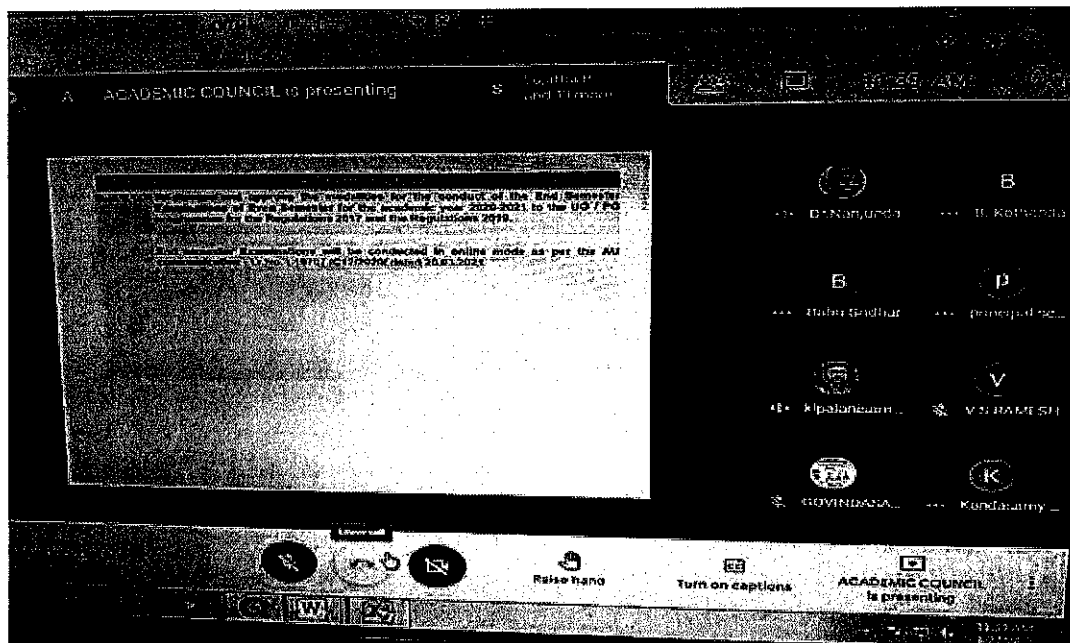
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Dr. C. VENKATESH
PRINCIPAL
CHAIRMAN - ACADEMIC COUNCIL

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28 August, 2020

DEPARTMENT OF CIVIL ENGINEERING

BOARD OF STUDIES MEETING

I. AGENDA

1. Approval of **Curriculum and Syllabi for Third and Fourth Semester** for B.E.-Civil Engineering under Regulations-2019 through Choice Based Credit System from the academic year 2020-21 onwards.

2. Approval of **Curriculum and Syllabi for Third and Fourth Semester** for M.E.- **Structural Engineering** under Regulations-2019 through Choice Based Credit System from the academic year 2020-21 onwards.

3. Any other points by the permission of the Chair.

II. LIST OF MEMBERS ATTENDED

As per the direction of Anna University, Chennai, the Board of Studies Meeting for the Academic year 2020-2021 for the Department of Civil Engineering held on 28.08.2020 at 10.00 a.m. through Google Meet in IQAC board Room with the presence of internal board members during the COVID - 19 pandemic situation. The following Members were attended the meeting.

S. No.	Name of the Faculty & Designation	Position in Committee	Signature with Date
1	Dr. R. Shanmugam Professor and Head of the Department, Department of Civil Engineering, Sengunthar Engineering College.	Chairman	R. 28-8-20

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2	**Dr. V. M. Shanthi,** Professor and Principal, Government College of Engineering, Srirangam, Trichy-620012	University Nominee	Attended through Google Meet
3	**Dr. S. S. Chandrasekaran,** Professor , School of Civil Engineering, Vellore Institute of Technology, Vellore.	External Subject Expert	Attended through Google Meet
4	**Dr. P. T. Ravichandran** Professor, Department of Civil Engineering, SRM Institute of Science and Technology, Chennai.	External Subject Expert	Attended through Google Meet
5	**Er. S. Devanandan, M.E., (Str)** Managing Director, New Premier Constructions Erode.	Industry Expert	Attended through Google Meet
6	**Mr. N.R.Manikandan** Assistant Professor / Civil	Member	*(signature)* 28\8\2020
7	**Mrs. N. Kiruthika** Assistant Professor / Civil	Member	*(signature)* 28\08\2020
8	**Ms. K. Goumathy** Assistant Professor / Civil	Member	*(signature)* 28\08\2020
9	**Ms. R. Sri Ranjani** Assistant Professor / Civil	Member	Attended through Google Meet
10	**Mr. K. R. Kesavan** Managing Director Konstruck Designers, Bangalore.	Alumnus	Attended through Google Meet

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III MINUTES OF THE MEETING

The **Chairman of BoS / CIVIL Dr. R. SHANMUGAM** welcomed all the members. Then all the points of agenda were taken up for discussion and after detailed discussion, the following suggestions were given by the Members of Board of Studies.

The following corrections were made,

1. **19CET303 – Building Techniques Equipments and Practices** is renamed as **19CET402 – Construction Techniques Equipments and Practices** with 3 credits.

2. **19CET402 – Construction Techniques Equipments and Practices** is swapped to Fourth Semester and **19CET303 – Construction Materials** is swapped to Third Semester with 3 credits.

3. The credits for the courses **19CET403 – Applied Hydraulics Engineering** and **19CET404 – Highway Engineering** in Fourth semester are increased from 3 to 4 credits.

4. **19CEE401 – Strength of Materials and Material Testing** is renamed as **19CEE401 – Strength of Materials**.

5. **19CEE402 – Soil Mechanics and Testing of Soil Properties** is renamed as **19CEE402 – Soil Mechanics**.

After many deliberations, the following resolutions were passed.

1. **It is resolved** to approve the Curriculum and Syllabi offered in Third and Fourth Semester for B.E. – Civil Engineering Programme under regulations 2019 through Choice Based Credit System from the academic year 2020-21 onwards.

2. **It is resolved** to approve the Curriculum and Syllabi offered in Third and Fourth Semester for M.E- Structural Engineering under Regulations-2019 through Choice Based Credit System from the academic year 2020-21 onwards.

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Prof. **Dr. R. Shanmugam, Chairman - BoS / CIVIL** proposed the vote of thanks to all the Committee Members of the BoS and expressed gratitude for their suggestions and for making the meeting success.

The google meeting was concluded by 11.00 a.m.

The Audio and Video of the whole meeting has recorded.

(Dr. R. SHANMUGAM)
Chairman
(BoS / CIVIL)

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09 January, 2021

DEPARTMENT OF CIVIL ENGINEERING
BOARD OF STUDIES MEETING

I. AGENDA

1. Approval of **Curricula and Syllabi from Fifth to Eighth** Semester for B.E-Civil Engineering under Regulations-2019 through Choice Based Credit System from the academic year 2021-22 onwards.

2. Ratification of prescription of exception and addition courses for a readmitted Student **Ms. B. JOTHIKA (201911501)** of B.E. Civil Engineering who has been readmitted under our Autonomous as per Anna university Regulations 2017 in the Semester- V during July 2020-December 2020 session of the academic year 2020-2021. The above said student had admitted under Muthayammal Engineering College (Autonomous) Regulations 2016 during the academic year 2017-2018 and got transferred to Sengunthar Engineering College (Autonomous) during the year 2019-2020. The above said student was debarred in the fifth semester during the academic year 2019-2020 due to her health issues. She got readmitted in the fifth semester during the year 2020-2021.

3. Any other points by the permission of the Chair.

II. LIST OF MEMBERS ATTENDED
As per the direction of Anna University, Chennai, the third Board of Studies Meeting for the Academic year 2021-2022 of the Department of Civil Engineering held on 09.01.2021 at 11.00 a.m. through Google Meet in Central library with the presence of internal board members during this COVID 19 pandemic situation. The following Members were attended the meeting.

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S. No.	Name of the Faculty & Designation	Position in Committee	Signature with Date
1	Dr. R. Shanmugam Associate Professor and Head of the departmPent, Department of Civil Engineering, Sengunthar Engineering College.	Chairman	R. Shanmugam 09.01.2024
2	Dr. V. M. Shanthi, Professor and Principal, Government College of Engineering, Srirangam, Trichy-620012	University Nominee	Attend the Google Meet
3	Dr. S. S. Chandrasekaran, Professor, School of Civil Engineering, Vellore Institute of Technology, Vellore.	External Subject Expert	Attend the Google Meet
4	Dr. P. T. Ravichandran Professor, Department of Civil Engineering, SRM Institute of Science and Technology, Chennai.	External Subject Expert	Attend the Google Meet
5	Er. S. Devanandan, M.E., (Str) Managing Director, New Premier Constructions Erode.	Industry Expert	Attend the Google Meet
6	Mrs. N. Kiruthika Assistant Professor / Civil	Member	9/01/2024
7	Mr. M.Soundar Rajan Assistant Professor / Civil	Member	9/11/2024
8	Ms. R. Sri Ranjani Assistant Professor / Civil	Member	Ranjani 09/01/2024

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9	**Ms. K. Goumathy** Assistant Professor / Civil	Member	K. 𝒢ꭒꞯꞯꭓ
10	**Mr. S.Anand Kumar** Assistant Professor / Civil	Member	𝒜. 𝒜ꞯꞯ.
11	**Mr. K. R. Kesavan** Managing Director Konstruck Designers, Bangalore.	Alumnus	Attend the Google Meet

III MINUTES OF THE MEETING

The **Chairman of BoS / CIVIL Dr. R. SHANMUGAM** welcomed all the members. Then all the points of agenda were taken up for discussion and after detailed discussion,

The following corrections made in Curriculum and Syllabi (Fifth to Eighth Semester)

1. Included the course **19CET702 - Construction Resource Planning and Management** in the Seventh Semester under Regulations-2019 through Choice Based Credit System from the academic year 2020-21 onwards in order to acquire knowledge with respect to Civil Engineering.

2. Converted the Lab Embedded theory course as **19CET603 - Design of Reinforced Concrete and Masonry structures** there of theory course in the Sixth Semester along with the changing credits points from 4 to 3.

3. Converted the theory course as **19CEE601 - Waste Water Engineering** there of Lab Embedded theory course in the Sixth Semester along with the changing credits points from 3 to 4.

4. **19MDC502 - Survey Camp** in the Fifth Semester and **19MDC701 - Industrial Training** in the Seventh Semester are included as Mandatory Courses for the industrial exposure.
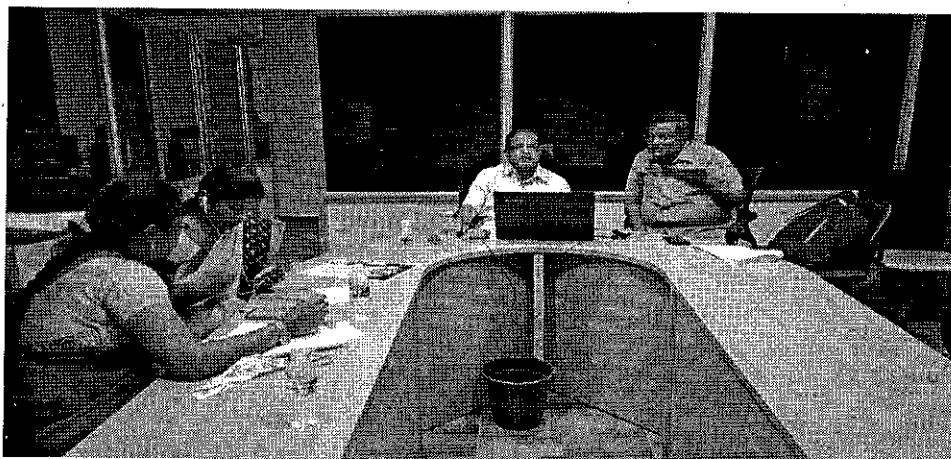
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5. **19CEOX07 - Smart Materials and Smart Structures** subject name was changed into **19CEOX07 - Smart Measuring Devices.**

6. **19CET701 - Pre-Stressed Concrete Structures, 19CEPX18 - Bridge Engineering** and **19CEPX20 - Design of Multistoried Buildings** subjects the Lecture hour changed from 3 to 2 and the Tutorial hour is changed from 0 to 2.

7. Corrections were made for all the elective subjects and its codes have been enclosed at the last.

After many deliberations, the following resolutions were passed.

1. **It is resolved** to approve the Curricula and Syllabi from Fifth to Eighth Semester B.E. – Civil Engineering Programme under regulations 2019 through Choice Based Credit System from the academic year 2021-22 onwards.

2. **Ratified** that the readmitted student **Ms. B. JOTHIKA (201911501)** has to follow the curricula and syllabi of B.E. Civil Engineering from V semester onwards under our Autonomous (as per Anna University Regulations 2017) of Sengunthar Engineering College. There is an exemption of course **CE8511- Soil Mechanics Laboratory** in the V semester in the academic year 2020-2021 since this practical has been studied by the student in the IV semester as **Soil Mechanics (Embedded)** includes practical component **and** also there is need for an additional course **CE8311- Construction Materials Laboratory** to be studied by the above said student in the V semester in the academic year 2020-2021 which was not studied by the student in the previous semesters'.

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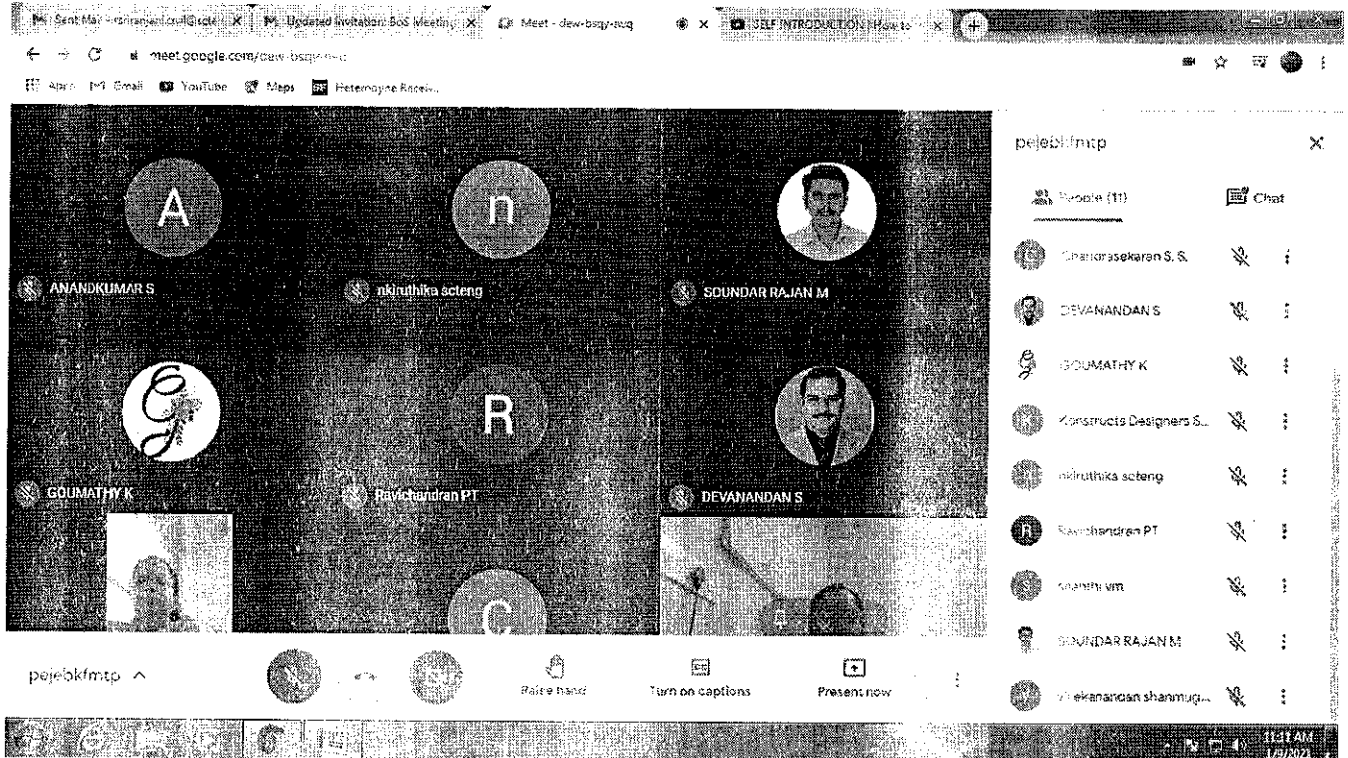
Assistant Professor Mr. **M. Soundar Rajan, Member of** BoS / CIVIL proposed the vote of thanks to all the Committee Members of the BoS and expressed gratitude for their suggestions and for making the meeting success.

The Audio and video of whole meeting has recorded.

The meeting was concluded by 12.45 p.m.

R- Shanmugam
04. 01-2021

Dr. R. SHANMUGAM
Chairman
(BoS/CIVIL)

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Corrections were made for all the elective subjects and its codes have been enclosed, such as

Course Code	Name of the Subject
19CEPX01	Architecture and Town Planning
19CEPX02	Construction Planning and Scheduling
19CEPX03	Advanced Surveying
19CEPX04	Environmental Health Engineering
19CEPX05	Digital Cadastre
19CEPX06	Design of Machine Foundation
19CEPX07	Industrial Pollution Prevention and Cleaner Production
19CEPX08	Traffic Engineering and Management
19CEPX09	Housing Planning and Management
19CEPX10	Railways, Airports and Harbour Engineering
19CEPX11	Design of Industrial Structures
19CEPX12	Environmental Impact Assessment
19CEPX13	Dynamics and Aseismic Design
19CEPX14	Ground Improvement Techniques
19CEPX15	Air Quality Monitoring and Modelling

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19CEPX16	Repair and Rehabilitation of Structures
19CEPX17	Tall Buildings
19CEPX18	Bridge Engineering
19CEPX19	Design of Special Structures
19CEPX20	Design of Multistoried Buildings
19CEPX21	Prefabricated Structures
19CEPX22	Advanced RCC Design
19CEPX23	Ground Water Contamination and Quality Monitoring and Modeling
19CEPX24	Computer Aided Design of Structures
19CEPX25	Pavement Engineering

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25 August, 2020

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

BOARD OF STUDIES MEETING

I. AGENDA

1. Approval of **Curriculum and Syllabi for Third and Fourth Semester** for B.E-Computer Science and Engineering under Regulations-2019 through Choice Based Credit System from the academic year 2020-21 onwards.

2. Approval of **Syllabi for Third and Fourth Semester** for M.E-Computer Science and Engineering under Regulations-2019 through Choice Based Credit System from the academic year 2020-21 onwards.

3. Approval of Syllabi for the course **19CSE303 – Data Structures using C** in Third Semester B.E – Electronics and Communication Engineering and the course **19CSE302 – Programming in C and C++** in Third Semester B.E – Electrical and Electronics Engineering under Regulations-2019 through Choice Based Credit System from the academic year 2020-21 onwards

4. Any other points by the permission of the Chair.

II. LIST OF MEMBERS ATTENDED

As per the direction of Anna University, Chennai, the Second Board of Studies Meeting for the Academic year 2020-2021 of the Department of Computer Science and Engineering held on 25.08.2020 at 09.30 a.m. through Google Meet in IQAC Board Room with the presence of Internal Board Members during this COVID 19 pandemic situation. The following Members were attended the meeting.

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S. No.	Name of the Faculty & Designation	Position in Committee	Signature with Date
1	Dr. M. Sakthivel Professor and Head/CSE Sengunthar Engineering College.	Chairman	25/8/2020
2	Dr. N. K. Karthikeyan Professor & Head/ IT Coimbatore Institute of Technology, Coimbatore.	University Nominee	Attended through Google Meet
3	Dr. T. Senthilkumar, AsP/CSE, School of Engineering Amrita Vishwa Vidyapeetam, Coimbatore.	External Subject Expert	Attended through Google Meet
4	Dr. G. Arulkumaran, AsP/CSE, Vel Tech Rangarajan Dr Sagunthala R & D Institute of Science and Technology, Chennai.	External Subject Expert	Attended through Google Meet
5	Mr. S. Ramkumar, Senior - Associate - Projects Cognizant Technology Solutions, Chennai.	Industry Expert	Attended through Google Meet
6	Dr. B. Sujatha Professor / CSE	Member	B. Sujatha 25/8/20
7	Dr. G. Jayamurugan Associate Professor / CSE	Member	G. 25/8/20
8	Mr. K. Ashokkumar Associate Professor / CSE	Member	25/8/2020
9	Dr.S. Radha Assistant Professor / CSE	Member	25/8/20

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10	Ms.R.Keerthana Assistant Professor / CSE	Member	R.Kth~ 25/8/2020
11	Mr. J. Karthikeyan, Executive Director, Smartificia Technology Private Limited, Coimbatore	Alumnus	Attended through Google Meet

III MINUTES OF THE MEETING

The **Chairman of BoS / CSE Dr.M.SAKTHIVEL** welcomed all the members. Then all the points of agenda were taken up for discussion and after detailed discussion, the following suggestions were given by the Members of Board of Studies.

The following corrections made in,

1. **19CST301 – Data Structures using C** is assigned with 4 credits and changed into **19CST301 – Data Structures** with 3 credits.

2. In **19CSE301 – Object Oriented Programming**, more Real Time Problems may be given as content beyond the syllabus for Practical Part.

3. Credit for the course **19CST401 – Design and Analysis of Algorithms** is changed into 4 by augmenting tutorial hour.

4. In **19CST403 – Software Engineering**, recent advancements such as Agile Methodologies, JIRA tool can be included.

5. The content of the course **19CSE401- Java Programming** in fourth semester is incorporated in other courses such as **19CSE301 Object Oriented Programming** and **19CSE501 Internet Programming**.

6. **19ECE301- Digital Electronics** course is introduced in Third Semester B.E-Computer Science and Engineering and **19EEE302- Microprocessor and Microcontroller** is shifted to fourth semester and code changed to **19ECE503**.

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7. The course code for the subject of **19ECE302 - Data Structures using C** which is prescribed for third Semester B.E. Electronics and Communication Engineering students is changed to **19CSE303**.

After many deliberations, the following resolutions were passed.

1. **It is resolved** to approve the Curriculum and Syllabi for the Third and Fourth Semester B.E. - Computer Science and Engineering Programme under regulations 2019 through Choice Based Credit System from the academic year 2020-21 onwards.

2. **It is resolved** to approve the Curriculum and Syllabi for the Third and Fourth Semester M.E. - Computer Science and Engineering Programme under regulations 2019 through Choice Based Credit System from the academic year 2020-21 onwards.

3. **It is resolved** to approve the Syllabi for the course **19CSE303 – Data Structures using C** in Third Semester B.E – Electronics and Communication Engineering and the course **19CSE302 – Programming in C and C++** in Third Semester B.E – Electrical and Electronics Engineering under Regulations-2019 through Choice Based Credit System from the academic year 2020-21 onwards

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Professor **Dr.B.Sujatha, Member of BoS / CSE** proposed the vote of thanks to all the Committee Members of the BoS and expressed gratitude for their suggestions and for making the meeting success.

The meeting concluded by 11.00 a.m.

The Audio and Video of the Whole Meeting is Recorded.

(Dr.M.SAKTHIVEL)
Chairman
(BoS/CSE)

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9th **January 2021**

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

BOARD OF STUDIES MEETING

I. AGENDA

1. Approval of **Curriculum and Syllabi from Fifth to Eighth Semester** for B.E-Computer Science and Engineering under Regulations-2019 through Choice Based Credit System from the academic year 2021-22 onwards.

2. Approval of **Syllabi for 19ECPX02 – Operating Systems (Professional Elective)** for B.E-Electronics and Communication Engineering under Regulations-2019 through Choice Based Credit System from the academic year 2021-22 onwards.

3. Ratification of prescription of exception and addition courses for a readmitted Student **Mr.M.Mohanraj (612318104020)** of B.E. Computer Science and Engineering who has been readmitted under our Autonomous Regulations 2019 in the Semester - III during July 2020-December 2020 session of the academic year 2020-2021. The above said student had admitted under the Anna University Regulations 2017 during the academic year 2018-2019 and had debarred in the semester III during the academic year 2019-2020.

4. Any other points by the permission of the Chairman.

II. LIST OF MEMBERS ATTENDED

As per the direction of Anna University, Chennai, the Third Board of Studies Meeting for the Academic year 2021-2022 of the Department of Computer Science and Engineering held on 09.01.2021 at 02.00 p.m. through Google Meet in IQAC Board Room with the presence of Internal Board Members during this COVID-19 pandemic situation. The following Members were attended the meeting.
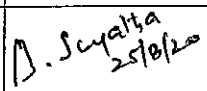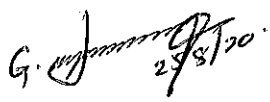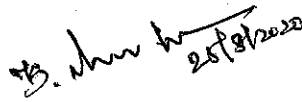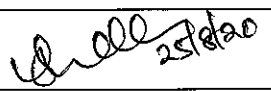
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S. No.	Name of the Faculty & Designation	Position in Committee	Signature with Date
1	Dr. M. Sakthivel Professor and Head/CSE Sengunthar Engineering College.	Chairman	
2	Dr. N. K. Karthikeyan Professor & Head/ IT Coimbatore Institute of Technology, Coimbatore.	University Nominee	Attended through Google Meet
3	Dr. T. Senthilkumar, AsP/CSE, School of Engineering Amrita Vishwa Vidyapeedam, Coimbatore.	External Subject Expert	Attended through Google Meet
4	Dr. G. Arulkumaran, AsP/CSE, Vel Tech Rangarajan Dr Sagunthala R & D Institute of Science and Technology, Chennai.	External Subject Expert	Attended through Google Meet
5	Mr.S.Ramkumar, Senior - Associate - Projects Cognizant Technology Solutions, Chennai.	Industry Expert	Attended through Google Meet
6	Dr.B.Sujatha Professor / CSE	Member	
7	Dr.G.Jayamurugan Associate Professor / CSE	Member	
8	Mr.K.Ashokkumar Associate Professor / CSE	Member	
9	Dr.S.Radha Assistant Professor / CSE	Member	
10	Ms.R.Keerthana Assistant Professor / CSE	Member	

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11	Mr. J. Karthikeyan, Executive Director, Smartificia Technology Private Limited, Coimbatore	Alumnus	Attended through Google Meet

III MINUTES OF THE MEETING

The **Chairman of BoS / CSE Dr.M.SAKTHIVEL** welcomed all the members. Then all the points of agenda were taken up for discussion and after detailed discussion

The following corrections made in Curriculum and Syllabi (Fifth to Eighth Semester)

1. In order to study the basic skills of AI, the course **19CST501 – Artificial Intelligence** is included in the Fifth semester. Hence, **19CST501 – Internet Programming** which is prescribed in the **Fifth semester** is shifted to Sixth Semester as Embedded Theory to get practical exposure by the students, and code is changed into **19CSE602** along with the same subject **Internet Programming.**

2. **19CSE602 – Big Data and Cloud Computing** course is shifted from Sixth to Seventh semester and course is changed to **19CSE702 – Cloud Computing,** and the contents of Big Data is incorporated in the Professional Elective course **19CSPX05 – Big Data Analytics.**

3. In **19CST503 – Resource Management Techniques,** more Data Science applications may be given to acquire knowledge with respect to Computer Science.

4. A new course **19MGT501 – Engineering Economics and Management** is introduced instead of **19MGT501 – Principles of Management** to enhance the process of decision making and Financial Management.

5. In **19CSPX03 – Software Testing,** Case Studies may be introduced in Unit-V for better understanding of testing in Real Time Applications.

6. The course title **19CSPX21 – Information Retrieval** is changed into **19CSPX21 – Information Retrieval Techniques.**

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After many deliberations, the following resolutions were passed.

1. **Resolved** to approve the **Curriculum and Syllabi for Fifth to Eighth Semester** B.E.- Computer Science and Engineering Programme under regulations 2019 through Choice Based Credit System from the academic year 2021-22 onwards.

2. **Resolved** to approve the **Syllabi for 19ECPX02 – Operating Systems (Professional Elective)** for B.E-Electronics and Communication Engineering under Regulations-2019 through Choice Based Credit System from the academic year 2021-22 onwards.

3. **Ratified** that the readmitted student **Mr.M.Mohanraj (612318104020)** has to follow the curricula and syllabi of B.E. Computer Science and Engineering from III semester onwards under Regulations-2019 (Autonomous) of Sengunthar Engineering College and there is **no exemption of courses and no need for additional courses** to be studied by the above said student and also the student has to register for the failed courses up to II semester, If any, under Regulations 2017, in order to complete the programme.

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Professor **Dr.B.Sujatha, Member of BoS / CSE** proposed the vote of thanks to all the Committee Members of the BoS and expressed gratitude for their suggestions and for making the meeting success.

The meeting concluded by 04.10p.m.

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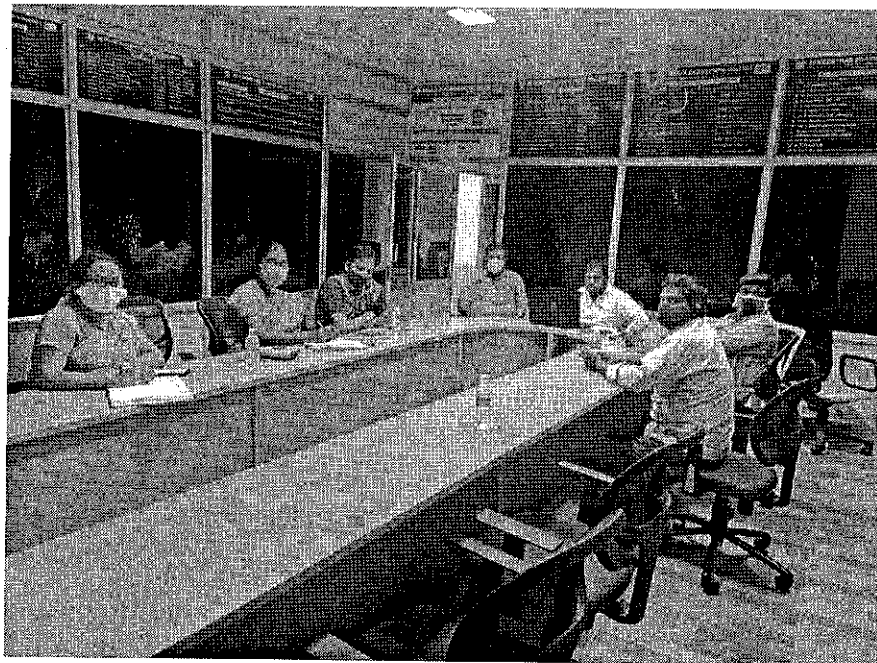Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
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(Dr.M.SAKTHIVEL)
Chairman
(BoS/CSE)

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26 August, 2020

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
BOARD OF STUDIES MEETING

I. AGENDA

1. Approval of **Curriculum and Syllabi for Third and Fourth Semester** for B.E- Electrical and Electronics Engineering under Regulations-2019 through Choice Based Credit System from the academic year 2020-21 onwards.

2. Approval of Syllabi for the courses

   - **19EET304 – Circuit Theory** in Third Semester for B.E. – Electronics and Communication Engineering

   - **19EET303 – Electrical Drives and Control** in Third Semester for B.E. – Mechanical Engineering

   - **19EET403 – Control Systems Engineering** in Fourth Semester for B.E. – Electronics and Communication Engineering

   Under Regulations - 2019 through Choice Based Credit System from the academic year 2020 - 21 onwards.

3. Any other points by the permission of the Chair.

II. LIST OF MEMBERS ATTENDED

As per the direction of Anna University, Chennai, the Board of Studies Meeting for the Academic year 2020-2021 for the Department of Electrical and Electronics Engineering held on 26.08.2020 at 01.00 p.m. through Google Meet in IQAC Board Room with the presence of internal board members during this COVID-19 pandemic situation. The following Members were attended the meeting.
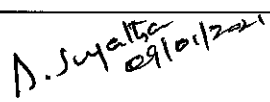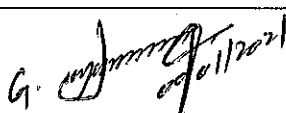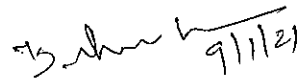
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S. No.	Name of the Faculty & Designation	Position in Committee	Signature with Date
1	Dr.K.Umadevi, Professor and Head/EEE Sengunthar Engineering College, Tiruchengode.	Chairman	26/08/2020
2	Dr.S.Dhanapal, Assistant Professor(Sr) /EEE, IRTT, Erode.	University Nominee	Attended through Google Meet
3	Dr. P. Rajalakshmy, ASP/EIE, Karunya University, Coimbatore.	External Subject Expert	Attended through Google Meet
4	Dr. S. Sujitha, ASP/EEE, New Horizon College of Engineering, Bengaluru.	External Subject Expert	Attended through Google Meet
5	Dr.S.Paramasivam Senior Manager, Donfoss Industries Pvt. Ltd., Chennai.	Industry Expert	Attended through Google Meet
6	Mrs.T.Gohila Associate Professor / EEE	Member	26/8/20
7	Mr.G.Senthilrajan Associate Professor / EEE	Member	26/8/20
8	Mr.N.Sivakumar Assistant Professor / EEE	Member	26/8/20
9	Mr.D.Sathiyaraj Assistant Professor / EEE	Member	26/8/20

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| 10 | Mr.V.Nanthakumar

Assistant Professor / EEE | Member | v . (signature) 26\8 |
| 11 | Er. G. Gnanasekaran,

Asst. Engineer,
TANGEDCO
Erode Town. | Alumnus | Attended through Google Meet |

III MINUTES OF THE MEETING

The **Chairman of BoS / EEE Dr. K. Umadevi** welcomed all the members. Then all the points of agenda were taken up for discussion and after detailed discussion, the following suggestions were given by the Members of Board of Studies.

The following corrections made:

1. The course code for the subject of **19EET302 – Digital Electronics** which is prescribed in third Semester for B.E. Electrical and Electronics Engineering is changed from **19EET302 to 19ECE301** with 4 credits.

2. The course code for the subject of **19ECT304 – Analog Electronics and Circuits** which is prescribed in third Semester for B.E. Electrical and Electronics Engineering is changed from **19ECT304 to 19EEE301** with 3 credits to 4 credits.

3. The course code and subject name for the subject of **19EEE301 – Linear and Digital Integrated Circuits** which is prescribed in third Semester for B.E. Electrical and Electronics Engineering is changed from **19EEE301 – Linear and Digital Integrated Circuits** to **19EET302 – Linear Integrated Circuits** along with credit change from 4 to 3 credits.

4. The course code for the subject of **19ECT301 – Circuit Theory** which is prescribed in third Semester B.E. Electronics and Communication Engineering students is changed from **19ECT301 to 19EET304**.

5. The course code for the subject of **19ECT403 – Control System Engineering** which is prescribed in third Semester B.E. Electronics and Communication Engineering students is changed from **19ECT403 to 19EET403**.

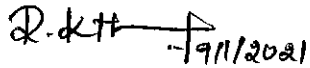# SENGUNTHAR ENGINEERING COLLEGE
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After many deliberations, the following resolutions were passed.

1. **It is resolved** to approve the Curriculum and Syllabi for the Third and Fourth Semester B.E. - Electrical and Electronics Engineering Programme under regulations 2019 through Choice Based Credit System from the academic year 2020-21 onwards.

2. **It is resolved** to approve the Syllabi for the courses
   - **19EET304 – Circuit Theory** in Third Semester for B.E. – Electronics and Communication Engineering
   - **19EET303 – Electrical Drives and Control** in Third Semester for B.E. – Mechanical Engineering
   - **19EET403 – Control Systems Engineering** in Fourth Semester for B.E. – Electronics and Communication Engineering

   under Regulations - 2019 through Choice Based Credit System from the academic year 2020 - 21 onwards.

3. **It is resolved** to include simulation software for the applicable courses in Third and Fourth Semester for B.E. - Electrical and Electronics Engineering Programme under regulations 2019 through Choice Based Credit System from the academic year 2020-21 onwards.

4. The name of the subject **Control and Instrumentation (19EEE402)** is proposed to change **as Control Systems Engineering** offered for B.E. – Electrical and Electronics Engineering in fourth semester.

Professor Mrs.T.Gohila, **Member of BoS / EEE** proposed the vote of thanks to all the Committee Members of the BoS and expressed gratitude for their suggestions and for making the meeting success.

The Google Meeting concluded by 2.30 p.m.

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The Audio and Video of the Whole Meeting has recorded.

(Dr.K. UMADEVI)
Chairman
(BoS/EEE)

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08 January, 2021

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
BOARD OF STUDIES MEETING

I.   AGENDA

1.   Approval of **Curriculum and Syllabi for Fifth and Sixth semester from the academic year 2020-21 onwards, Seventh and Eighth Semester from the academic year 2022-23 onwards** for B.E - Electrical and Electronics Engineering under Autonomous Regulations - 2019 through Choice Based Credit System.

2.   Any other points by the permission of the Chair.

II.   LIST OF MEMBERS ATTENDED

As per the direction of Anna University, Chennai, the Board of Studies Meeting for the Academic year 2020-2021 for the Department of Electrical and Electronics Engineering held on 08.01.2021 at 11.30 a.m. through Google Meet at this COVID 19 pandemic situation. The following Members were attended the meeting through Google meet.

S. No.	Name of the Faculty & Designation	Position in Committee	Signature with Date
1	Dr.K.Umadevi, Professor and Head/EEE Sengunthar Engineering College, Tiruchengode.	Chairman	*[signature]* 8|01|21
2	Dr.S.Dhanapal, Assistant Professor(Sr) /EEE, IRTT, Erode.	University Nominee	Attended through Google Meet
3	Dr. P. Rajalakshmy, ASP/EIE, Karunya University, Coimbatore.	External Subject Expert	Attended through Google Meet

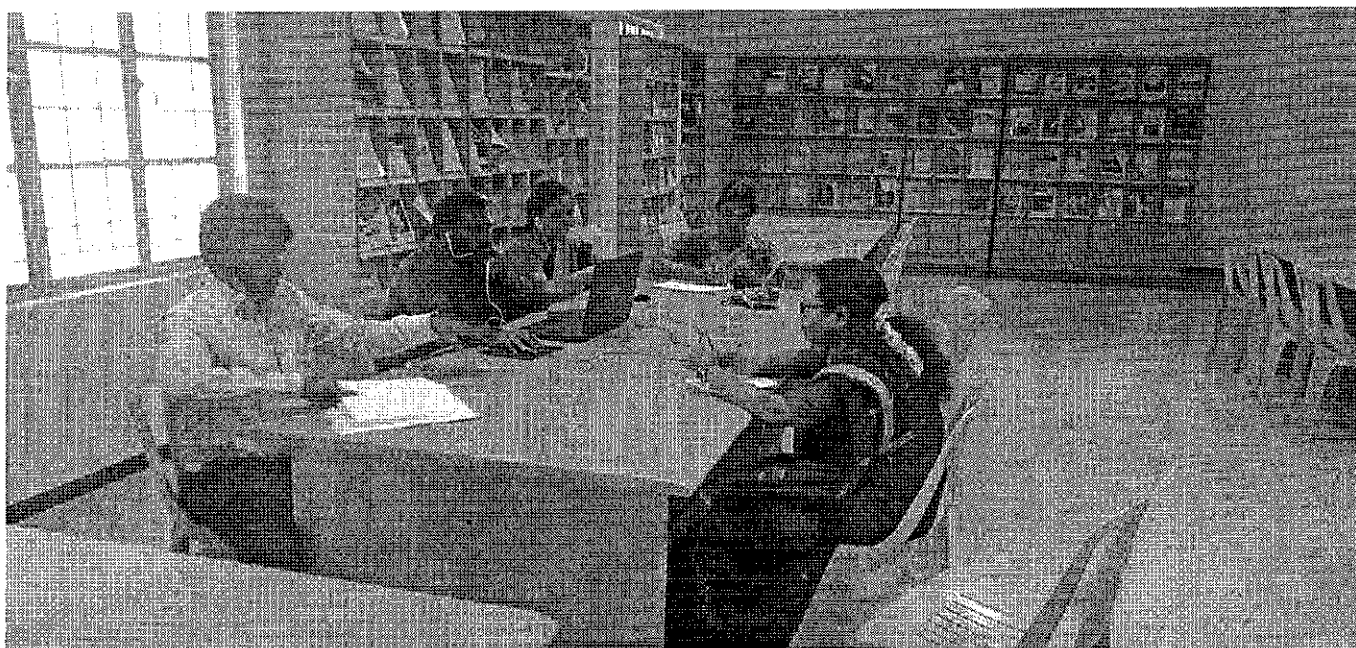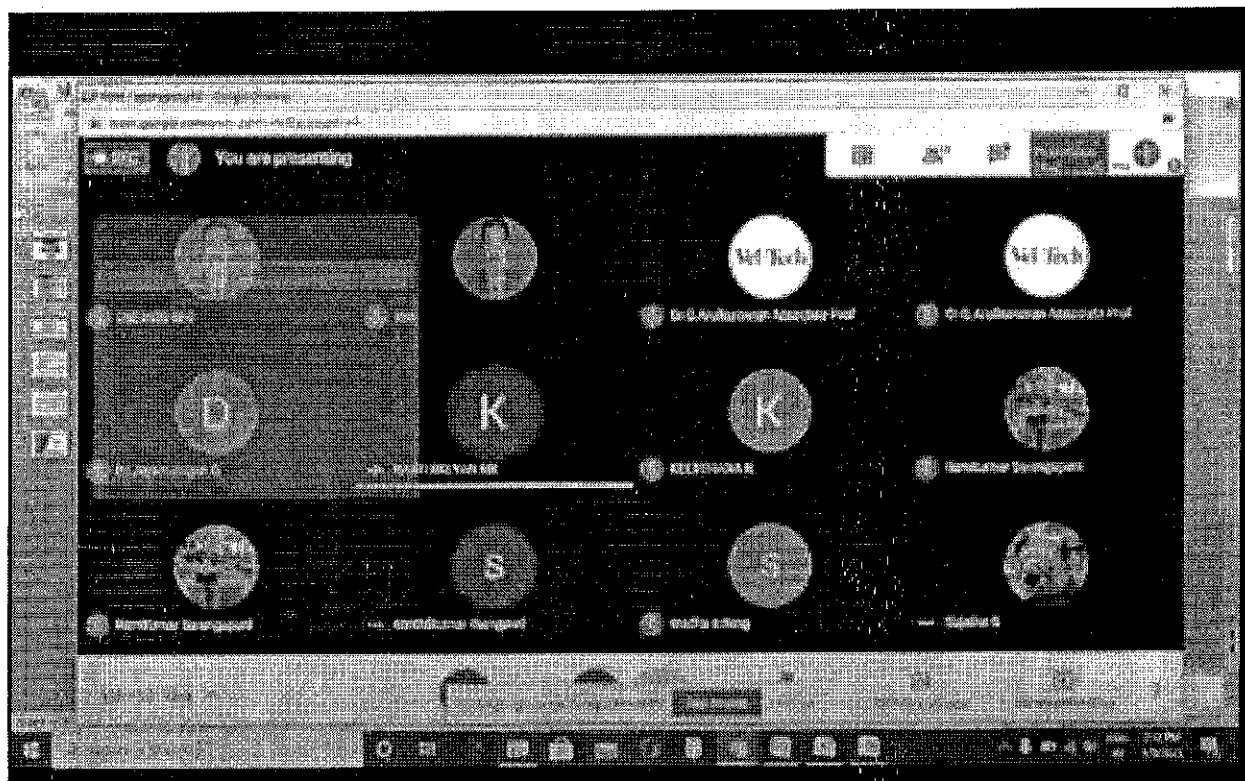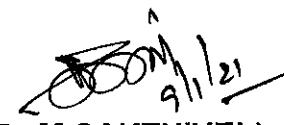# SENGUNTHAR ENGINEERING COLLEGE
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4	Dr. S. Sujitha, AsP/EEE, New Horizon College of Engineering, Bengaluru.	External Subject Expert	Attended through Google Meet
5	Dr.S.Paramasivam Senior Manager, Donfoss Industries Pvt. Ltd., Chennai.	Industry Expert	Attended through Google Meet
6	Dr.P.Ponmurugan Associate Professor / EEE	Member	
7	Mrs.T.Gohila Associate Professor / EEE	Member	
8	Mr.G.Senthilrajan Associate Professor / EEE	Member	
9	Mr.D.Sathiyaraj Assistant Professor / EEE	Member	
10	Mr.V.Nanthakumar Assistant Professor / EEE	Member	
11	Er. G. Gnanasekaran, Asst. Engineer, TANGEDCO Erode Town.	Alumnus	Attended through Google Meet

III MINUTES OF THE MEETING

The **Chairman of BoS / EEE Dr. K. Umadevi** welcomed all the members. Then all the points of agenda were taken up for discussion and after detailed discussion, the following suggestions were given by the Members of Board of Studies.

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The following corrections made in,

1. The course code and subject name for the subject of **19EEPX11 – Human rights** which is prescribed in professional elective course for B.E. Electrical and Electronics Engineering is changed from **19EEPX11 – Human rights** to **19EEPX11 – Computer Architecture.**

2. The course code and subject name for the subject of **19EEPX17 – Optimisation Techniques** which is prescribed in professional elective course for B.E. Electrical and Electronics Engineering is changed from **19EEPX17 – Optimisation Techniques** to **19EEPX17 – Computer methods in Power systems.**

3. The course code and subject name for the subject of **19EEPX18 – Electrical Energy Generation, Utilization and Conservation** which is prescribed in professional elective course for B.E. Electrical and Electronics Engineering is changed from **19EEPX18 – Electrical Energy Generation, Utilization and Conservation** to **19EEPX18 – Utilization of Electrical Energy.**

4. The course code and subject name for the subject of **19EET701 – Electrical and Hybrid vehicles** which is prescribed in professional elective course for B.E. Electrical and Electronics Engineering is changed from **19EET701 – Electrical and Hybrid vehicles** to **19EET701 – Electric Vehicles.**

After many deliberations, the following resolutions were passed.

1. It is resolved to approve the Curriculum and Syllabi for Fifth and Sixth semester from the academic year 2020-21 onwards, Seventh and Eighth Semester from the academic year 2022-23 onwards for B.E - Electrical and Electronics Engineering under Autonomous Regulations - 2019 through Choice Based Credit System.

2. Internship/Online internship course is mandatory to all students.

3. NPTEL/SWAYAM - Four week courses may be introduced in the sixth semester core/elective subjects.
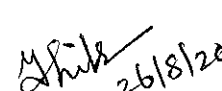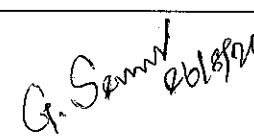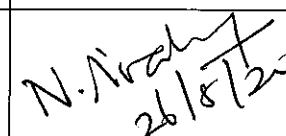
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The meeting concluded by 01.30 p.m.

Meeting is recorded.

Associate Professor Mr.G.Senthilrajan, **Member of BoS / EEE** proposed the vote of thanks to all the Committee Members of the BoS and expressed gratitude for their suggestions and for making the meeting success.

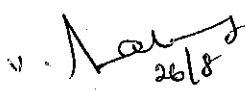**(Dr.K. UMADEVI)**
Chairman
(BoS/EEE)

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26 August, 2020

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

BOARD OF STUDIES MEETING

I. AGENDA

1. Approval of **Curriculum and Syllabi for Third and Fourth Semester** for B.E-Electronics and Communication Engineering under Regulations-2019 through Choice Based Credit System from the academic year 2020-21 onwards.

2. Approval of **Syllabi for Third and Fourth Semester** for **M.E- VLSI Design** under Regulations-2019 through Choice Based Credit System from the academic year 2020-21 onwards.

3. Approval of Syllabi for the course **19ECE301 – Digital Electronics** in Third Semester B.E – Electrical and Electronics Engineering and the course **19ECE301 – Digital Electronics** in Third Semester B.E- Computer Science and Engineering, and **19ECE401 – Communication Theory** in Fourth Semester B.E-Electronics and Communication Engineering and **19CSE303 – Data Structures using C** in Third Semester B.E – Electronics and Communication Engineering under Regulations-2019 through Choice Based Credit System from the academic year 2020-21 onwards.

4. Any other points by the permission of the Chair.

II. LIST OF MEMBERS ATTENDED

As per the direction of Anna University, Chennai, the Board of Studies Meeting for the Academic year 2020-2021 for the Department of Electronics and Communication Engineering held on 26.08.2020 at 12.30 p.m.through Google Meet during this COVID 19 pandemic situation. The following Members were attended the meeting.

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S. No.	Name of the Faculty & Designation	Position in Committee	Signature with Date
1	Dr.C.Aarthi Professor and Head/ECE Sengunthar Engineering College	Chairman	
2	Dr. M. Santhanalakshmi AsP/ECE, PSG College of Technology, Coimbatore	University Nominee	Attended through Google Meet
3	Dr. S. Dhanalakshmi Professor / ECE SRM IST Chennai	External Subject Expert	Attended through Google Meet
4	Dr. P. Anandan Professor / ECE Vel Tech Rangarajan Dr Sagunthala R & D Institute of Science and Technology, Chennai.	External Subject Expert	Attended through Google Meet
5	Dr. A. Athif Shah Managing Director ABE Semiconductor Designs Chennai.	Industry Expert	Attended through Google Meet
6	Dr. P. Ramesh Kumar Professor / ECE	Member	
7	Mr. A. Rahul Assistant Professor / ECE	Member	
8	Mr. M. Jayakumar Assistant Professor / ECE	Member	
9	Mr. P. Gopinath Assistant Professor / ECE	Member	
10	Mr. A. Suresh Assistant Professor / ECE	Member	
11	Mr. T. Sabarinathan Team Lead, L&T Infotech, Bangalore	Alumnus	Attended through Google Meet

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III MINUTES OF THE MEETING

The **Chairman of BoS / ECE Dr.C.AARTHI** welcomed all the members. Then all the points of agenda were taken up for discussion and after detailed discussion, the following suggestions were given by the Members of Board of Studies.

The following corrections made in,

1. **19ECE401 – Electronic Circuits** is shifted to third semester from fourth semester and the course code **19ECE401** is changed into **19ECE302** with 4 credits.

2. **19ECT303 – Measurements and Instrumentation** is shifted to fourth semester from third semester and the course code **19ECT303** is changed into **19ECT402** with 3 credits.

3. **19ECT401 – Communication Theory** course is introduced with Embedded Lab in fourth semester B.E-Electronics and Communication Engineering and the Course code is changed as **19ECE401 – Communication Theory** with 4 credits.

4. **19ECE301- Digital Electronics** course is introduced in Third Semester B.E-Computer Science and Engineering and Third Semester B.E-Electrical and Electronics Engineering.

5. **19EEE302- Microprocessor and Microcontroller** is shifted to fourth semester B.E-Computer Science and Engineering and the code is changed to **19ECE503**.

6. The course code for the subject of **19ECE302 - Data Structures using C** which is prescribed for third Semester B.E. Electronics and Communication Engineering students is changed to **19CSE303**.

7. All the course codes are rearranged in Sequential order.
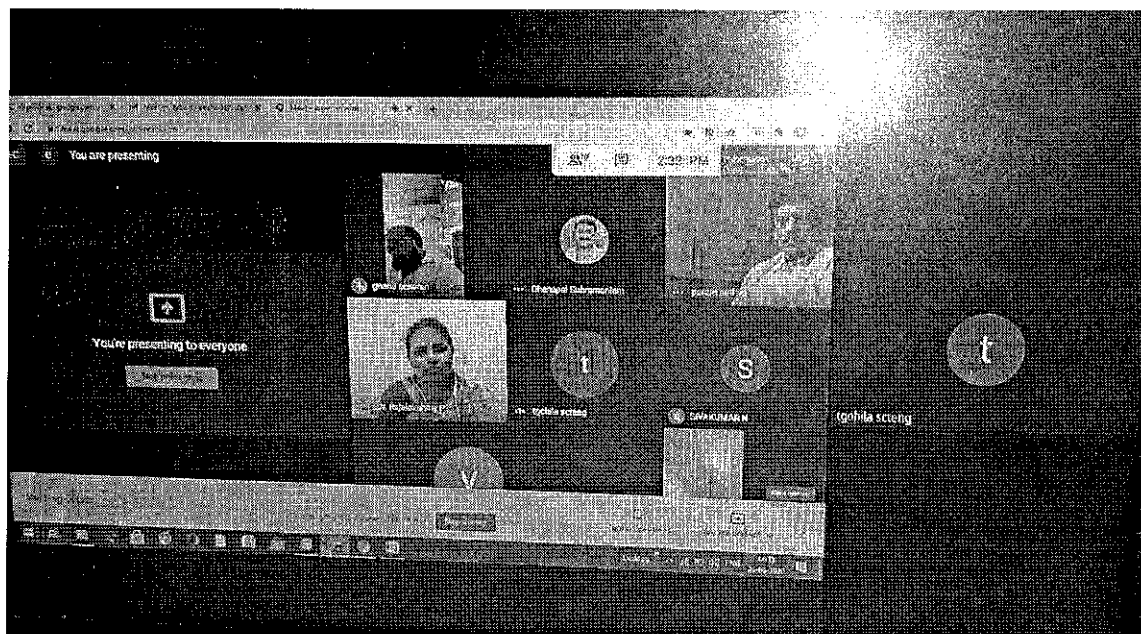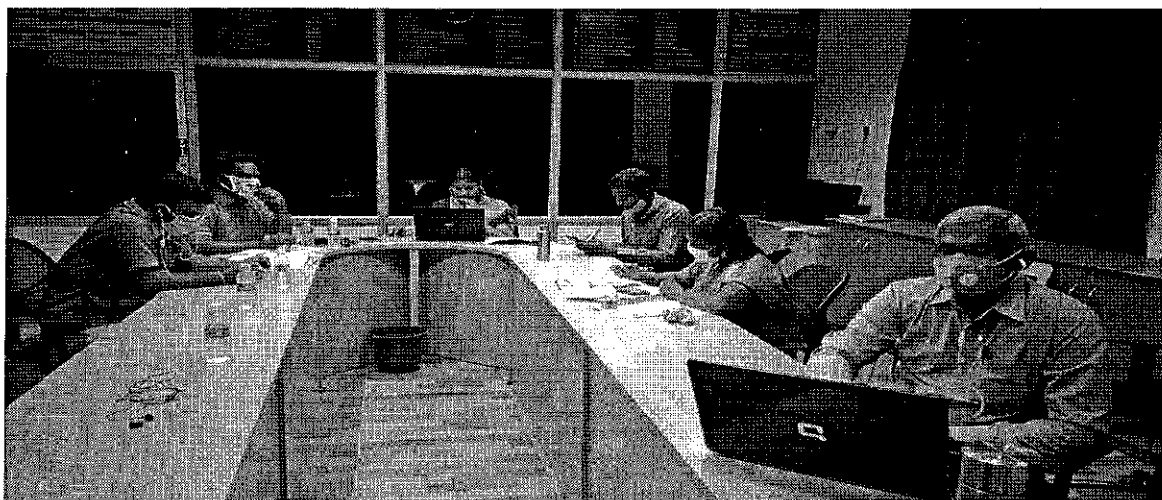
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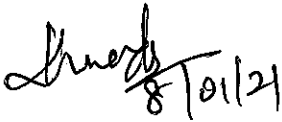## TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

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After many deliberations, the following resolutions were passed.

1. **It is resolved** to approve the Curriculum and Syllabi for the Third and Fourth Semester **B.E.–Electronics and Communication Engineering** Programme under regulations 2019 through Choice Based Credit System from the academic year 2020-21 onwards.

2. **It is resolved** to approve the Curriculum and of Syllabi for Third and Fourth Semester **M.E- VLSI Design** Programme under Regulations-2019 through Choice Based Credit System from the academic year 2020-21 onwards.

3. It is resolved to approve the Syllabi for the course **19ECE302 – Electronic Circuits** in Third Semester B.E-Electronics and Communication Engineering, and the Syllabi for the course **19ECT402 – Measurements and Instrumentation and 19ECE401 – Communication Theory** in fourth semester B.E-Electronics and Communication Engineering under Regulations-2019 through Choice Based Credit System from the academic year 2020-21.

4. **It is resolved** to approve the Syllabi for the course **19CSE303 – Data Structures using C** in Third Semester B.E – Electronics and Communication Engineering and the course **19ECE301- Digital Electronics** inThird Semester B.E – Electrical and Electronics Engineering and Third semester B.E- Computer Science and Engineering under Regulations-2019 through Choice Based Credit System from the academic year 2020-21.

Professor **Dr.P.Rameshkumar, Member of BoS / ECE** proposed the vote of thanks to all the Committee Members of the BoS and expressed gratitude for their suggestions and for making the meeting success.

The meeting concluded by 1.30 p.m.

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The Audio and Video of the whole meeting has recorded.

26/8/2020

(Dr.C.AARTHI)
Chairman
(BoS/ECE)

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9th January 2021

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

BOARD OF STUDIES MEETING

I.   AGENDA

1. Approval of **Curriculum and Syllabi for Fifth to Eighth Semester** for B.E-Electronics and. Communication Engineering under Regulations-2019 through Choice Based Credit System from the academic year 2021-22 onwards.

2. Approval of Syllabi for the course **19ECT502 – Soft Computing** in Fifth Semester B.E – Electronics and Communication Engineering and the course **19ECE602 – Digital Communication** in Sixth Semester B.E- Electronics and Communication Engineering, **19ECE702 – Embedded Systems** in Seventh Semester B.E-Electronics and Communication Engineering under Regulations-2019 through Choice Based Credit System from the academic year 2021-22 onwards.

3. Approval of Syllabi for the course **19ECPX06- Internet Of Things and, 19ECPX11- Low Power SoC Design** in Professional elective of   B.E – Electronics and Communication Engineering and the course **19ECOX01- Cryptography and Network Security** and **19ECOX05- Intellectual Property Rights** in Open Elective of B.E- Electronics and Communication Engineering, under Regulations-2019 through Choice Based Credit System from the academic year 2021-22 onwards.

4. Any other points by the permission of the Chairman.

II.   LIST OF MEMBERS ATTENDED

As per the direction of Anna University, Chennai, the Third Board of Studies Meeting for the Academic year 2021-2022 of the Department of Electronics and Communication Engineering held on 09.01.2021 at 03.00 p.m. through Google Meet in Central Library with the presence of Internal Board Members during this COVID 19 pandemic situation. The following Members were attended the meeting.

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1	Dr.C.Aarthi Professor and Head/ECE Sengunthar Engineering College	Chairman	
2	Dr. M. Santhanalakshmi AsP/ECE, PSG College of Technology, Coimbatore	University Nominee	Attended through Google Meet
3	Dr. S. Dhanalakshmi Professor / ECE SRM IST Chennai	External Subject Expert	Attended through Google Meet
4	Dr. P. Anandan Professor / ECE Vel Tech Rangarajan Dr Sagunthala R & D Institute of Science and Technology, Chennai.	External Subject Expert	Attended through Google Meet
5	Dr. A. Athif Shah Managing Director ABE Semiconductor Designs Chennai.	Industry Expert	Attended through Google Meet
6	Mr. A. Rahul Assistant Professor / ECE	Member	
7	Mr. M. Jayakumar Assistant Professor / ECE	Member	
8	Mr. P. Gopinath Assistant Professor / ECE	Member	
9	Mr. P. Sivasankaran Assistant Professor / ECE	Member	
10	Mr.M.Arunkumar Assistant Professor / ECE	Member	Attended through Google Meet
11	Mr. T. Sabarinathan Team Lead, L&T Infotech, Bangalore	Alumnus	Attended through Google Meet

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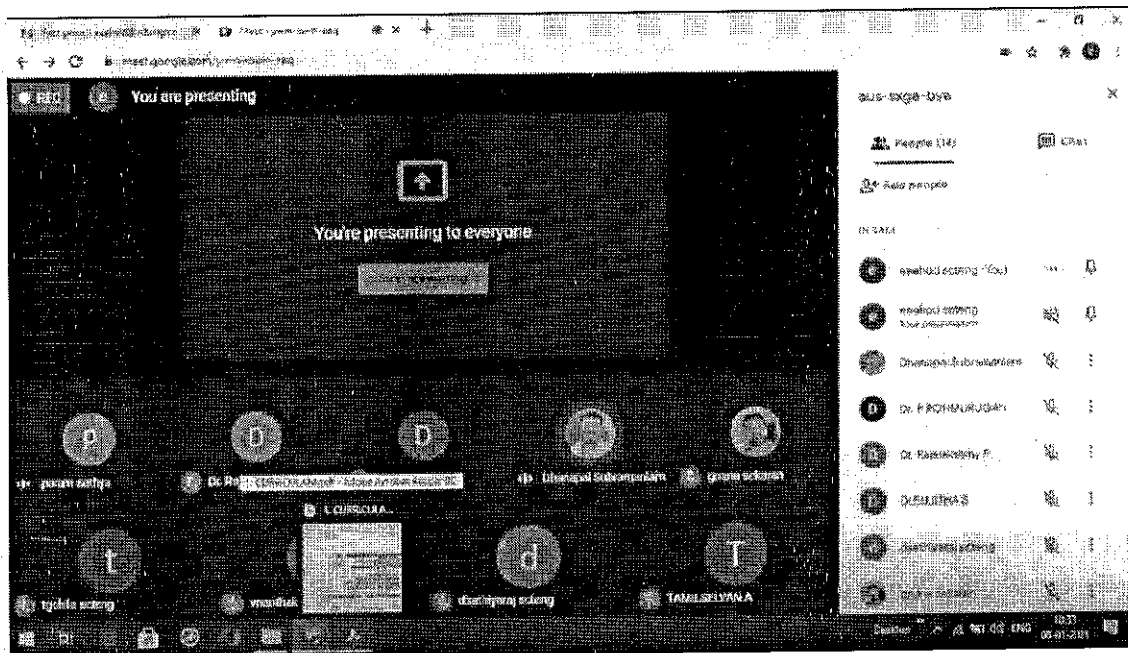(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
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III MINUTES OF THE MEETING

The **Chairman of BoS / ECE Dr.C.AARTHI** welcomed all the members. Then all the points of agenda were taken up for discussion and after detailed discussion, the following suggestions were given by the Members of Board of Studies.

The following corrections made in,

1. **19ECPX23-Soft Computing** Course is shifted from Professional Elective to Professional Core in the Fifth Semester and the code is changed into **19ECT502 – Soft Computing.**

2. **19ECE501 – Digital Communication** is shifted from Fifth to Sixth Semester as Embedded Theory to get practical exposure by the students and code is changed into **19ECE602 – Digital Communication.**

3. **19ECE602 – Embedded Systems** is shifted from Sixth to Seventh Semester as Embedded Theory to get practical exposure by the students and code is changed into **19ECE702 – Embedded Systems.**

4. **19ECOX01-Internet Of Things** and **19ECOX05-Low Power SoC Design** Courses are Shifted from open elective to Professional Elective and the code is changed as **19ECPX06- Internet Of Things** and **19ECPX11- Low Power SoC Design.**

5. **19ECPX06-Cryptography and Network Security** and **19ECPX11-Intellectual Property Rights** Courses are Shifted from Professional Elective to Open Elective and the code is changed as **19ECOX01- Cryptography and Network Security** and **19ECOX05- Intellectual Property Rights.**

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After many deliberations, the following resolutions were passed.

1. **It is resolved** to approve the **Curriculum and Syllabi for Fifth to Eighth Semester** B.E. – Electronics and Communication Engineering Programme under regulations 2019 through Choice Based Credit System from the academic year 2021-22 onwards.

2. **It is resolved** to approve the Syllabi for the course **19ECT502 – Soft Computing** in Fifth Semester B.E – Electronics and Communication Engineering and the course **19ECE602 – Digital Communication** in Sixth Semester B.E-Electronics and Communication Engineering, **19ECE702 – Embedded Systems** in Seventh Semester B.E-Electronics and Communication Engineering under Regulations-2019 through Choice Based Credit System from the academic year 2021-22 onwards.

3. **It is resolved** to approve the Syllabi for the course **19ECPX06- Internet Of Things** and **19ECPX11- Low Power SoC Design** in Professional Elective of B.E – Electronics and Communication Engineering and the course **19ECOX01- Cryptography and Network Security** and **19ECOX05- Intellectual Property Rights** in Open Elective of B.E- Electronics and Communication Engineering, under Regulations-2019 through Choice Based Credit System from the academic year 2021-22 onwards.
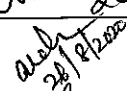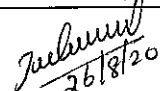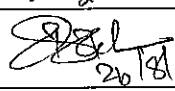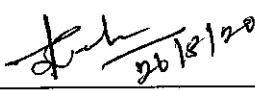
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Professor **Mr.P.Gopinath, Member of BoS / ECE** proposed the vote of thanks to all the Committee Members of the BoS and expressed gratitude for their suggestions and for making the meeting success.

The meeting concluded by 05.00 p.m.

The Audio and Video of the Whole Meeting is Recorded.

(Dr.C.AARTHI)
Chairman
(BoS/ECE)

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26 August, 2020

DEPARTMENT OF MECHANICAL ENGINEERING
BOARD OF STUDIES MEETING

I.   AGENDA

1.   Approval of Curriculum and Syllabi for Third and Fourth Semester for B.E - Mechanical Engineering under Regulations - 2019 through Choice Based Credit System from the academic year 2020 - 21 onwards.

2.   Any other points by the permission of the Chair.

II.   LIST OF MEMBERS ATTENDED

As per the direction of Anna University, Chennai, the Second Board of Studies meeting for the Academic year 2020-2021 of the Department of Mechanical Engineering held on 26.08.2020 at 11.00 a.m. through Google Meet in IQAC board Room with the presence of internal board members during this COVID-19 pandemic situation. The following Members attended the meeting.

S. No.	Name of the Faculty & Designation	Position in Committee	Signature with Date
1	Dr.M.Selvakumar Professor and Head/ Mech Sengunthar Engineering College.	Chairman	M. Samfu 26|8|2020
2	Dr.M.Nataraj Professor and Principal, Government College of Engineering, Tirunnelveli	University Nominee	Attended through Google Meet
3	Dr.P.Ponnusamy Professor/Mechanical VIT Vellore, Chennai	External Subject Expert	Attended through Google Meet

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4	Dr.M.Chandrasekaran Director/Mechanical Vels University, Pallavaram, Chennai	External Subject Expert	Attended through Google Meet
5	Er.V.C.Mahaadevan Manager, Renault Nissan Technology & Business Centre India Private Limited, Mahendra World city SEZ, Natham, Tamilnadu.	Industry Expert	Attended through Google Meet
6	Mr. N.Thiru Senthil Adhiban Assistant Professor / Mech	Member	N.T 26/8/20
7	Mr. P.Jagadeeswaran Assistant Professor / Mech	Member	Attended through Google Meet
8	Mr.C.Mohankumar Assistant Professor / Mech	Member	26/8/20
9	Mr. S.Murugesan Assistant Professor / Mech	Member	26/8/20
10	Mr. N.Saravanan Assistant Professor / Mech	Member	Attended through Google Meet
11	Mr. S.Mahendran AQUAJET Machine Tool Chennai - 95.	Alumnus	Attended through Google Meet

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III MINUTES OF THE MEETING

The Chairman of BoS / Mechanical Dr.M.Selvakumar welcomed all the members. Then all the points of agenda were taken up for discussion and after detailed discussion, the following suggestions were given by the Members of Board of Studies.

After many deliberations, the following resolutions were passed.

1. **It is resolved** to approve the Curriculum and Syllabi of Third and Fourth Semester for B.E - Mechanical degree course offered under Regulations - 2019 through Choice Based Credit System from the academic year 2020 - 21 onwards

2. **It is resolved** to upgrade the subject 19MET401 - Manufacturing Technology - II as Embedded subject for enhancing the practical knowledge of the subject and the credit points also increased from 3 to 4.So, The subject code is also changed from 19MET401 to 19MEE404

3. **It is resolved** to approve the subject 19MET403 – Composite Materials and Mechanics as Embedded course with 4 credit points, since it is one of the emerging subjects in Mechanical field. The subject code is changed from 19MET403 to 19MEE403.Subsequently, the subject code 19MET401 has given to the subject Engineering Metallurgy instead of 19MET402

4. **It is resolved** to upgraded the overall credit points as 23 because of the changing of theory subjects into Embedded subjects

Mr.N.Thiru Senthil Adhiban, Member of BoS / Mechanical proposed the vote of thanks to all the Committee Members of the BoS and expressed gratitude for their suggestions and for making the meeting success.

The google meeting was concluded by 12.30 p.m.

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The Audio and Video of the whole meeting has recorded.

(Dr.M.Selvakumar)
Chairman
(BoS/Mechanical)

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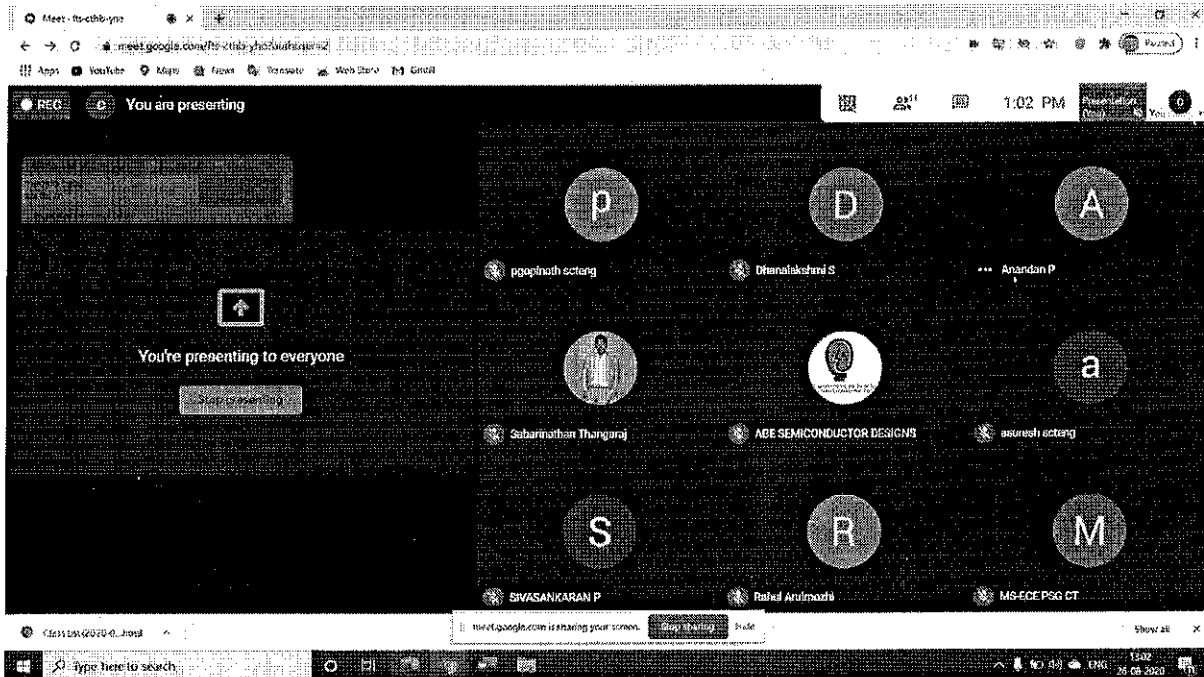**TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU**

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08 January, 2021

DEPARTMENT OF MECHANICAL ENGINEERING
BOARD OF STUDIES MEETING

I. AGENDA

1. Approval of Curriculum and Syllabi from Fifth to Eighth Semester for B.E - Mechanical Engineering under Regulations - 2019 through Choice Based Credit System from the academic year 2020 - 2021 onwards.

2. Ratification of exception and addition courses for a readmitted Student Mr.V.Prasanth (612317114501) of B.E (Mechanical Engineering) who has been readmitted under Regulations 2017 in the Fifth Semester during July 2019-December 2019 session of the academic year 2019-2020. The above said student has admitted under the Anna University Regulations 2013 during the academic year 2016-2017 and had debarred in the fifth semester during the academic year 2018-2019 and which is mentioned detailed in the Steering Committee Meeting conducted on 19.09.2019.

3. Any other points by the permission of the Chair.

II. LIST OF MEMBERS ATTENDED

As per the direction of Anna University, Chennai, the Third Board of Studies meeting for the Academic year 2020-2021 of the Department of Mechanical Engineering held on 08.01.2021 at 2.00 p.m. through Google Meet in the Central Library with the presence of internal board members during this COVID-19 pandemic situation. The following Members attended the meeting.

S. No.	Name of the Faculty & Designation	Position in Committee	Signature with Date
1	Dr.M.Selvakumar Professor and Head/ Mech Sengunthar Engineering College	Chairman	M. Selva 8\1\2021

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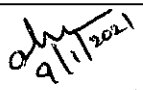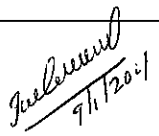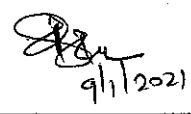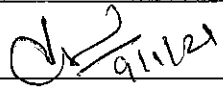| 2	Dr.M.Nataraj Professor and Principal, Government College of Engineering, Tirunnelveli	University Nominee	Attended through Google Meet
3	Dr.P.Ponnusamy Professor/Mechanical VIT Vellore, Chennai	External Subject Expert	Attended through Google Meet
4	Dr.M.Chandrasekaran Director/Mechanical Vels University, Pallavaram, Chennai	External Subject Expert	Attended through Google Meet
5	Er.V.C.Mahaadevan Manager, Renault Nissan Technology & Business Centre India Private Limited, Mahendra World city SEZ, Natham, Tamilnadu.	Industry Expert	Attended through Google Meet
6	Mr. N.ThiruSenthilAdhiban Assistant Professor / Mech	Member	*(signature)* 8/01/2021
7	Mr. P.Jagadeeswaran Assistant Professor / Mech	Member	*(signature)* 8/1/2021
8	Mr.C.Mohankumar Assistant Professor / Mech	Member	*(signature)* 8/1/21
9	Mr. S.Murugesan Assistant Professor / Mech	Member	*(signature)* 8/1/21
10	Mr. N.Saravanan Assistant Professor / Mech	Member	*(signature)* 8/1/21
11	Mr. S.Mahendran AQUAJET Machine Tool Chennai - 95.	Alumnus	Attended through Google Meet

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III MINUTES OF THE MEETING

The Chairman of BoS / Mechanical Dr.M.Selvakumar welcomed all the members. Then all the points of agenda were taken up for discussion and after detailed discussion, the following resolutions were passed.

1. **Resolved** to approve the Curriculum and Syllabi from Fifth to Eight Semester for B.E - Mechanical Engineering offered under Regulations - 2019 through Choice Based Credit System from the academic year 2020 - 21 onwards.

2. **Resolved** to interchange the fifth semester subject 19MET503- Gas Dynamics and Jet Propulsion to Seventh Semester and Seventh Semester subject 19MET701- Power Plant Engineering to Fifth Semester. Hence, the subjects are interchanged, the subject code also changed from 19MET503 to 19MET701 for the GDJP subject and from 19MET701 to 19MET503 for the PPE subject.

3. **Resolved** to increase the tutorial hour for the subject 19MET602-Design of Transmission Systems as it is a design subject and also for enhancing the tutorial knowledge of the subject. So, the credit points also increased from 3 to 4.

4. **Resolved** to upgrade the overall credit points from 162 to 163 for changing of theory subject into theory cum tutorial subject.

5. **Ratified** that the readmitted Student Mr.V.Prasanth (612317114501) has to follow the Curriculum and Syllabi of of B.E (Mechanical Engineering) from V semester onwards under Regulations 2017. Besides, there is **no exemption of courses and also no need for additional courses** to be studied by the above said student and also that the student has to register for the failed courses up to V semester, If any, under Regulations 2013, in order to complete the programme.

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Mr. N.Thiru Senthil Adhiban, Member of BoS / Mechanical proposed the vote of thanks to all the Committee Members of the BoS and expressed gratitude for their suggestions and for making the meeting success.

The BoS meeting was concluded by 03.30 p.m.

The Audio and Video of the whole meeting has recorded.

(Dr.M.Selvakumar)

Chairman

(BoS/Mechanical)

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26 August, 2020

DEPARTMENT OF MASTER OF BUSINESS ADMINISTRATION
BOARD OF STUDIES MEETING

I.   AGENDA

1. Approval of **Curriculum and Syllabi for Third and Fourth Semester** for Master of Business Administration under Regulations-2019 through Choice Based Credit System from the academic year 2020-21 onwards.

2. Any other points by the permission of the Chair.

II.   LIST OF MEMBERS ATTENDED

As per the direction of Anna University, Chennai, the Second Board of Studies Meeting for the Academic year 2020-2021 of the Department of Master of Business Administration held on 26.08.2020 at 10.30 a.m. through Google Meet in MBA Department with the presence of Internal Board Members during this COVID 19 pandemic situation. The following Members were attended the meeting.

S. No.	Name of the Faculty & Designation	Position in Committee	Signature with Date
1	Dr. P. Govindasamy Professor and HoD/M.B.A., Sengunthar Engineering College, Tiruchengode.	Chairman	P. Govindasamy 26/8/2020
2	Dr. J. Ashok, Director- School of Management Studies, Bannari Amman Institute of Technology, Sathyamangalam-638401.	University Nominee	Attended through Google Meet
3	Dr. P. Ravi Professor, Department of Management Studies, Manonmaniam Sundaranar University, Tirunelveli.	External Subject Expert	Attended through Google Meet
4	Dr. S. A. Senthil Kumar, Professor & Head Department of Management Studies, Pondicherry University, Karaikal Campus, Karaikal.	External Subject Expert	Attended through Google Meet

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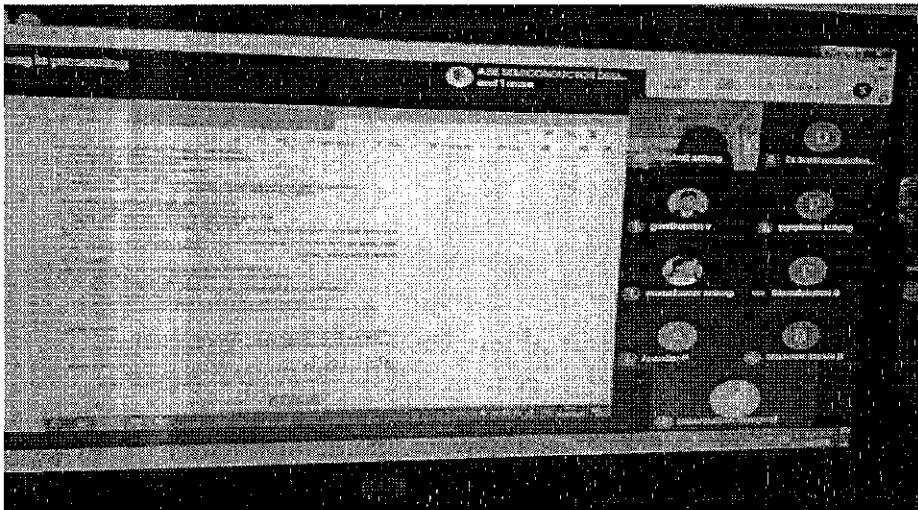Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
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5	Mr.Ramamoorthy Sundaram, Chief Executive Officer, M/s. R.G. Sundhar & Co., M/s. R.G.S.Vet Nutraceuticals Coy.,Erode.	Industry Expert	Attended through Google Meet
6	Mr. V. Saravana Kumar Assistant Professor / MBA/SEC	Member	
7	Mrs. S.Umamaheswari Assistant Professor / MBA/SEC	Member	
8	Mr. S. Jaikumar Assistant Professor / MBA/SEC	Member	
9	Mr. J. Vijayakamal Assistant Professor / MBA/SEC	Member	
10	Mr. T. Vadivel Deputy Manager – Admin. & HR, GEECO Enercon Private Limited, D/C 6, SIDCO Industrial Estate, Thuvakudy, Tiruchy – 15.	Alumnus	Attended through Google Meet

III MINUTES OF THE MEETING

The Chairman of BoS / M.B.A. Dr. P. Govindasamy welcomed all the members. Then all the points of agenda were taken up for discussion and after detailed discussion, the following suggestions were given by the Members of Board of Studies.

1. Being the MBA programme is a part of industry oriented, creating exposure among the students about the recent trends in industry through various industrial projects, field visit, seminar presentations, outbound training activities etc., to outfit themselves with the industry.
2. As the Entrepreneurship Development course is being offered only as an elective, it can be given in the core subjects.
3. Since it is a PG programme, number of Internal assessment tests can be reduced to two and give weightage to analytical skills of the students.
4. More open access software may be used to teach students in the practical laboratories.
5. HR electives may incorporate and focus on real time issues relating to people management.

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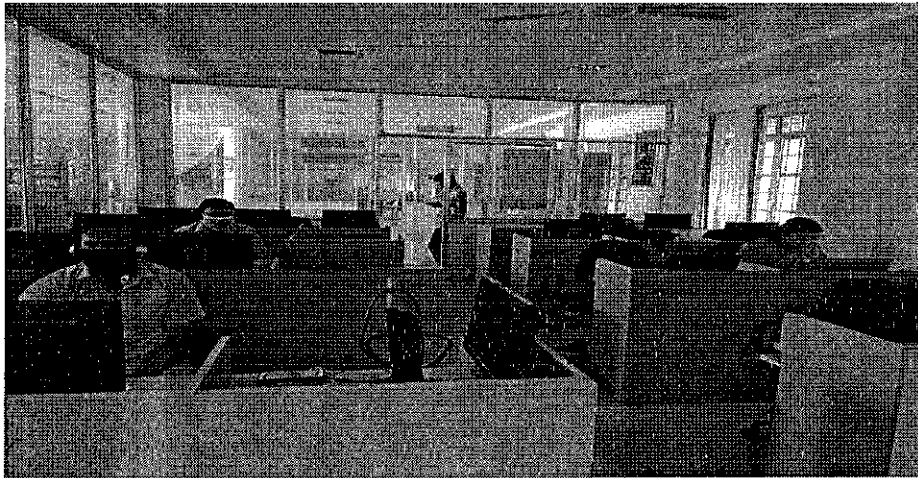Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
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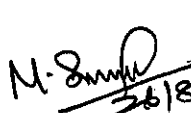### TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

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After many deliberations, the following resolutions were passed.

1. It is resolved to approve Curriculum and Syllabi for Third and Fourth Semester for Master of Business Administration under Regulations-2019 through Choice Based Credit System from the academic year 2020-21 onwards.

2. It is resolved to approve the syllabi 19EEC302 – Entrepreneurship Development Activity under Employability Enhancement course offered for all the B.E. Programmes.

Mr. V. Saravanakumar, Member of BoS / M.B.A. proposed the vote of thanks to all the Committee Members of the BoS and expressed gratitude for their suggestions and for making the meeting success.

The meeting was concluded by 11.30 A.M.

The Audio and Video of the Whole Meeting has been recorded.

(Dr.P.Govindasamy)
Chairman
(BoS/MBA)

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DEPARTMENT OF SCIENCE AND HUMANITIES
BOARD OF STUDIES MEETING

I. AGENDA

1. Approval of Syllabi for the categories mentioned below for B.E. programmes in the third and fourth semester under Regulations 2019 through Choice Based Credit System from the academic year 2020-21 onwards.

S.No	Category	Semester	Course Code	Course Name
01	Employability Enhancement Courses (EEC)	III & IV	19EEC301	Communication Skills
02	Basic Sciences (BS)	III	19MAT301	Transforms and Partial Differential Equations
03	Basic Sciences (BS)	IV	19MAT401	Probability and Queueing Theory
			19MAT402	Probability and Random Processes
			19MAT403	Numerical Methods
			19MAT404	Statistics and Numerical Methods

2. Any other points by the permission of the Chair.

II. LIST OF MEMBERS ATTENDED

As per the direction of Anna University, Chennai, the Second Board of Studies meeting for the Academic year 2020-2021 of the Department of Science and Humanities held on 25.08.2020 at 11.00 a.m. through Google Meet in IQAC board Room with the presence of internal board members during this COVID-19 pandemic situation. The following Members attended the meeting.

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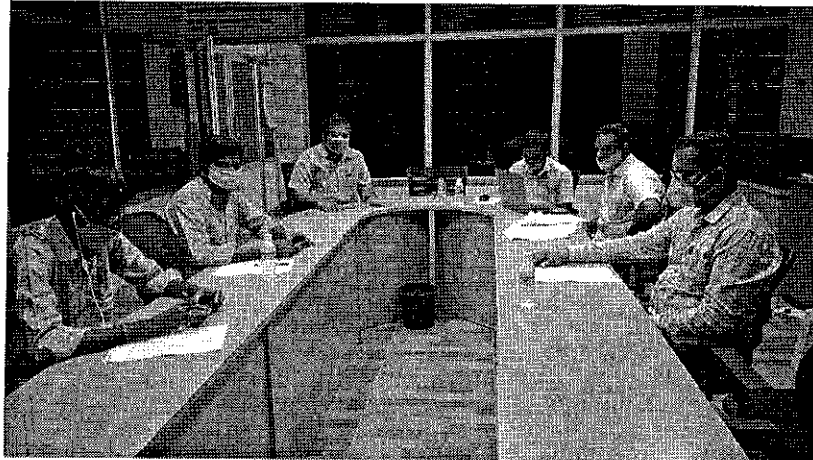### TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

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S. No.	Name of the Faculty & Designation	Position in Committee	Signature with Date
1	Dr. K. L. Palanisamy Professor and Head/S&H Sengunthar Engineering College.	Chairman	25/8/2020
2	Dr. K. Sankar Associate Professor / Mathematics, CEG Campus, Anna University, Chennai	University Nominee	Attended through Google Meet
3	Dr. V. Rajasekaran Assistant Professor, (Sr)/Div. of English, VIT, Chennai-600127.	External Subject Expert	Attended through Google Meet
4	Dr. R. Nandhakumar Associate Professor / Chemistry, Karunya Institute of Technology and Sciences, (Deemed to be University), Coimbatore.	External Subject Expert	Attended through Google Meet
5	Dr. M. Saminathan Managing Director, Muthuraman Laboratories, Erode.	Industry Expert	Attended through Google Meet
6	Mr. P. Thangarasu Associate Professor / Chemistry	Member	25/8/2020
7	Mr. G. Ayyanar Assistant Professor / Mathematics	Member	25.9.20
8	Mrs. S. Bhuvana Assistant Professor /English	Member	25/8/2020

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9	Dr. K. Vignesh Assistant Professor /Physics	Member	
10	Mr. S. Sureshsugumar Assistant Professor /Mathematics	Member	
11	Er. M. Prabhu Lead, Impiger Technologies Private Limited, Coimbatore	Alumnus	Attended through Google Meet

III MINUTES OF THE MEETING

The Chairman of BoS / S&H Dr.K.L. Palanisamy welcomed all the members. Then all the points of agenda were taken up for discussion and after detailed discussion, the following suggestions were given by the Members of Board of Studies.

I.   The following corrections made in Communication Skills (19EEC301)

1. In Unit III - Under speaking skill "Just a minute (JAM) talk" is added.
2. In Unit V - As per the guidance of BoS member Under writing skill Argumentative, Descriptive and Comparative Essays, Creative writing are added.
3. In curriculum the same subject (19EEC301 Communication Skills) is prescribed for B.E. Civil Engineering and B.E. Mechanical Engineering in the fourth semester with the course code of 19EEC401. Since, the course name and syllabus are same the course code is changed to 19EEC301 instead of 19EEC401.

II.   The following Corrections are made in Transforms and Partial Differential Equations (19MAT301)

1. In Unit V – Formation of Difference Equations is removed.

2. Corrections made in the fifth outcome that is " Use the effective mathematical tools for the solutions of Partial Differential Equations by using Z transform techniques for discrete time systems" is changed as **"Use the effective**

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mathematical tools for the solutions of difference equations by using Z transform techniques for discrete time systems" .

After many deliberations, the following resolutions were passed.

1. **It is resolved** to approve Syllabi for the categories mentioned below for B.E. programmes in the third and fourth semester under Regulations 2019 through Choice Based Credit System from the academic year 2020-21 onwards.

S.No	Category	Semester	Course Code	Course Name
01	Employability Enhancement Courses (EEC)	III & IV	19EEC301	Communication Skills
02	Basic Sciences (BS)	III	19MAT301	Transforms and Partial Differential Equations
03	Basic Sciences (BS)	IV	19MAT401	Probability and Queueing Theory
			19MAT402	Probability and Random Processes
			19MAT403	Numerical Methods
			19MAT404	Statistics and Numerical Methods

2. It is resolved to conduct three continuous assessments and no end semester examination for Communication Skills (19EEC301) as per 2019 regulations.

3. **It is resolved** that External faculty members those who are having more than 5 years of Teaching experiences in engineering colleges will be permitted to setup the above said Basic Sciences (BS) theory question papers for the end semester examinations.

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4. **It is resolved** that External and Internal faculty members those who are having more than 3 years of Teaching experiences in engineering colleges will be permitted to evaluate the above said Basic Sciences (BS) answer papers for the end semester examinations.

Mrs. S. Bhuvana, Member of BoS / S&H proposed the vote of thanks to all the Committee Members of the BoS and expressed gratitude for their suggestions and for making the meeting success.

The google meeting was concluded by 1.00 p.m.
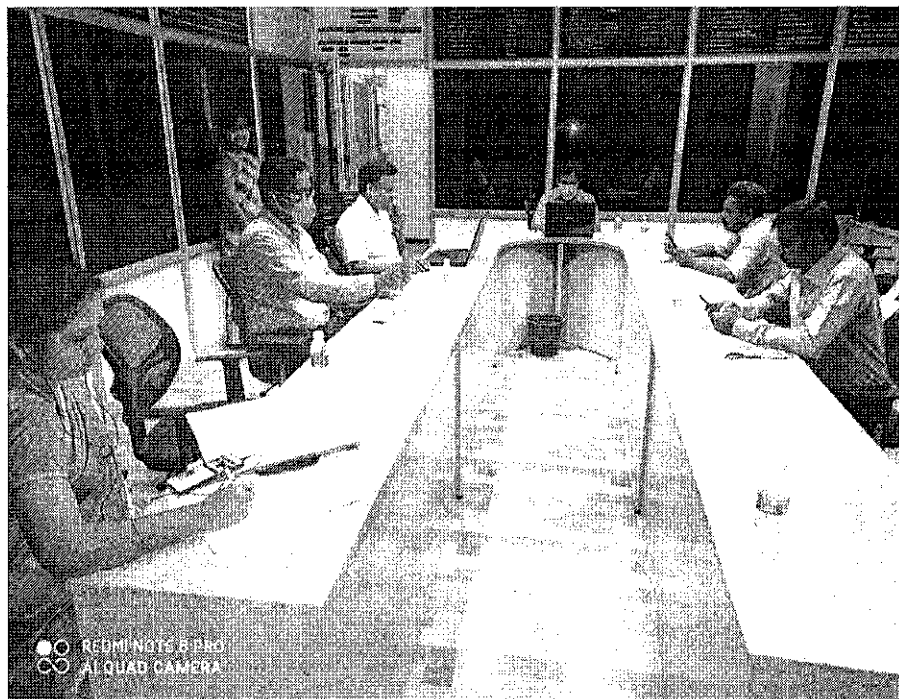
The Audio and Video of the whole meeting is recorded.

(Dr.K.L.Palanisamy)
Chairman
(BoS/S&H)

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19PSP101   MAINTENANCE AND REHABILITATION OF STRUCTURES   L T P C

3 0 0 3

OBJECTIVE:

- To study the damages, repair and rehabilitation of structures

UNIT I   INTRODUCTION   9 PERIODS

General Consideration – Distresses monitoring – Causes of distresses – Quality assurance – Defects due to climate, chemicals, wear and erosion – Inspection – Structural appraisal – Economic appraisal.

UNIT II   BUILDING CRACKS   9 PERIODS

Causes – diagnosis – Thermal and Shrinkage cracks – unequal loading – Vegetation and trees – Chemical action – Foundation movements – Remedial measures - Techniques for repair – Epoxy injection.

UNIT III   MOISTURE PENETRATION   9 PERIODS

Sources of dampness – Moisture movement from ground – Reasons for ineffective DPC – Roof leakage – Pitched roofs – Madras Terrace roofs – Membrane treated roofs - Leakage of Concrete slabs – Dampness in solid walls – condensation – hygroscopic salts – remedial treatments – Ferro cement overlay – Chemical coatings – Flexible and rigid coatings.

UNIT IV   DISTRESSES AND REMEDIES   9 PERIODS

Concrete Structures: Introduction – Causes of deterioration – Diagnosis of causes – Flow charts for diagnosis – Materials and methods of repair – repairing, spalling and disintegration – Repairing of concrete floors and pavements.

Steel Structures : Types and causes for deterioration – preventive measures – Repair procedure – Brittle fracture – Lamellar tearing – Defects in welded joints – Mechanism of corrosion – Design of protect against corrosion – Design and fabrication errors – Distress during erection. Masonry Structures: Discoloration and weakening of stones – Biotical treatments – Preservation – Chemical preservatives – Brick masonry structures – Distresses and remedial measures.

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UNIT V   STRENGTHENING OF EXISTING STRUCTURES   9 PERIODS

General principle – relieving loads – Strengthening super structures – plating – Conversation to composite construction – post stressing – Jacketing – bonded overlays – Reinforcement addition – strengthening substructures – under pinning – Enhancing the load capacity of footing – Design for rehabilitation.

TOTAL: 45 PERIODS

OUTCOME:

- At the end of this course students will be in a position to point out the causes of distress in concrete, masonry and steel structures and also they will be able to suggest the remedial measures.

TEXT BOOKS:

1. Allen R.T and Edwards S.C, "Repair of Concrete Structures", Blakie and Sons, UK, 1987

2. Dayaratnam.P and Rao.R, "Maintenance and Durability of Concrete Structures", University Press, India, 1997

REFERENCES:

1. Brebbia C. A.,"Earthquake Resistant Engineering Structures VIII",WIT Press, 2011

2. Bruce A Bolt, "Earthquakes" W H Freeman and Company, New York, 2004.

E - RESOURCES:

1. www.sasurieengg.com/e-course-material/CIVIL/IV.../CE2071%20RRS.pdf

2. Fmcet.in/civil/ce2071 uw.pdf

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19PSP102   PREFABRICATED STRUCTURES   **L T P C**
                                                     3 0 0 3

OBJECTIVE:

- To Study the design principles, analysis and design of elements.

UNIT I   DESIGN PRINCIPLES   **9**

General Civil Engineering requirements, specific requirements for planning and layout of prefabrication plant. IS Code specifications. Modular co-ordination, standardization, Disuniting of Prefabricates, production, transportation, erection, stages of loading and code provisions, safety factors, material properties, Deflection control, Lateral load resistance, Location and types of shear walls.

UNIT II   REINFORCED CONCRETE   **9**

Prefabricated structures - Long wall and cross-wall large panel buildings, one way and two way prefabricated slabs, Framed buildings with partial and curtain walls, - Connections – Beam to column and column to column.

UNIT III   FLOORS, STAIRS AND ROOFS   **9**

Types of floor slabs, analysis and design example of cored and panel types and two-way systems, staircase slab design, types of roof slabs and insulation requirements, Description of joints, their behaviour and reinforcement requirements, Deflection control for short term and long term loads, Ultimate strength calculations in shear and flexure.

UNIT IV   WALLS   **9**

Types of wall panels, Blocks and large panels, Curtain, Partition and load bearing walls, load transfer from floor to wall panels, vertical loads, Eccentricity and stability of wall panels, Design Curves, types of wall joints, their behaviour and design, Leak prevention, joint sealants, sandwich wall panels, approximate design of shear walls.

UNIT V   INDUSTRIAL BUILDINGS AND SHELL ROOFS   **9**

Components of single-storey industrial sheds with crane gantry systems, R.C. Roof Trusses, Roof Panels, corbels and columns, wind bracing design. Cylindrical, Folded plate and hyper- prefabricated shells, Erection and jointing, joint design, hand book based design.

                                                     TOTAL: 45 PERIODS

OUTCOME:

- At the end of this course student will have good knowledge about the prefabricated elements and the technologies used in fabrication and erection.
- They will be in a position to design floors, stairs, roofs, walls and industrial buildings, and various joints for the connections.

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TEXT BOOK:

1. Koncz.T., Manual of Precast Concrete Construction, Vol.I II and III & IV Bauverlag, GMBH, 1971.

2. Laszlo Mokk, Prefabricated Concrete for Industrial and Public Structures, Akademiai Kiado, Budapest, 2007.

REFERENCE BOOK:

1. Lewicki.B, Building with Large Prefabricates, Elsevier Publishing Company, Amsterdam/ London/New York, 1998.

2. Structural Design Manual, Precast Concrete Connection Details, Society for the Studies in the use of Precase Concrete, Netherland Betor Verlag, 2009

E – RESOURCES

1. www.nscet.org/civil/MAT/4th%20Yr/.../CE6016_Prefabricated %20 Structures (CP). pdf

2. https://civildigital.com/prefabricated-structures-prefabrication-concept-components-ad...

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19PSP204   **INDUSTRIAL STRUCTURES**   **LT P C**
                                                            3 0 0 3

OBJECTIVE:

To study the requirements, planning and design of Industrial structures.

UNIT I   PLANNING AND FUNCTIONAL REQUIREMENTS   9 PERIODS

Classification of Industries and Industrial structures - planning for Layout Requirements regarding Lighting, Ventilation and Fire Safety - Protection against noise and vibration - Guidelines of Factories Act.

UNIT II   INDUSTRIAL BUILDINGS   9 PERIODS

Steel and RCC - Gantry Girder, Crane Girders - Design of Corbels and Nibs – Design of Staircase.

UNIT III   POWER PLANT STRUCTURES   9 PERIODS

Types of power plants – Containment structures - Cooling Towers - Bunkers and Silos - Pipe supporting structures

UNIT IV   TRANSMISSION LINE STRUCTURES AND CHIMNEYS   9 PERIODS

Analysis and design of steel monopoles, transmission line towers – Sag and Tension calculations, Methods of tower testing – Design of s elf supporting and guyed chimney, Design of Chimney bases.

UNIT V   FOUNDATION   9 PERIODS

Design of foundation for Towers, Chimneys and Cooling Towers - Machine Foundation - Design of Turbo Generator Foundation

                                                            TOTAL: 45 PERIODS

OUTCOME:

- On completion of this course student will be able to plan industrial structures for functional requirements.
- They will be able to design various structures such as Bunkers, Silos, Cooling Towers, Chimneys, and Transmission Towers with required foundations.

TEXT BOOKS:

1. Jurgen Axel Adam, Katharria Hausmann, Frank Juttner, Klauss Daniel, Industrial Buildings: A Design Manual, Birkhauser Publishers, 2004.
2. Manohar S.N, Tall Chimneys - Design and Construction, Tata McGraw Hill, 1985

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REFERENCES:

1. Santhakumar A.R. and Murthy S.S., Transmission Line Structures, Tata McGraw Hill,1992.

2. Srinivasulu P and Vaidyanathan.C, Handbook of Machine Foundations, Tata McGraw Hill, 1976.

E – RESOURCES

1. https://www.un-ihe.org/online-course-industrial-resource-management-and-cleaner-pr.

2. https://www.udemy.com/structural-steel-design/

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19PSP205   **PRESTRESSED CONCRETE**   **L T P C**
                                                      3 0 0 3

OBJECTIVE:

- Principle of prestressing, analysis and design of prestressed concrete structures.

UNIT I   PRINCIPLES OF PRESTRESSING   9 PERIODS

Basic concepts of Prestressing - Types and systems of prestressing - Need for High Strength materials, Analysis methods, losses of prestress – Short and Long term deflections – Cable layouts

UNIT II   DESIGN OF FLEXURAL MEMBERS   9 PERIODS

Behaviour of flexural members, determination of ultimate flexural strength – Various Codal provisions - Design of flexural members, Design for shear, bond and torsion. Transfer of prestress Box girders.

UNIT III   DESIGN OF CONTINUOUS AND CANTILEVER BEAMS   9 PERIODS

Analysis and design of continuous beams - Methods of achieving continuity - concept of linear transformations, concordant cable profile and gap cables – Analysis and design of cantilever beams.

UNIT IV   DESIGN OF TENSION AND COMPRESSION MEMBERS   9 PERIODS

Design of tension members - application in the design of prestressed pipes and prestressed concrete cylindrical water tanks - Design of compression members with and without flexure - its application in the design piles, flag masts and similar structures

UNIT V   DESIGN OF COMPOSITE MEMBERS   9 PERIODS

Composite beams - analysis and design, ultimate strength - their applications. Partial prestressing its advantages and applications

                                                      TOTAL: 45 PERIODS

OUTCOME:

- On completion of this course students will have sufficient knowledge on various methods of prestressing and the concepts of partial pre-stressing.
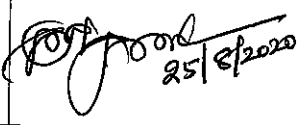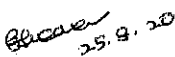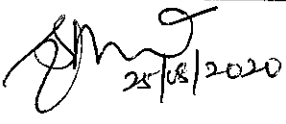- They will be in a position to design beams, pipes, water tanks, posts and similar structures.

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TEXT BOOKS:

1. Arthur H. Nilson, "Design of Prestressed Concrete", John Wiley and Sons Inc, New York, 2004

2. Krishna Raju, "Prestressed Concrete", Tata McGraw Hill Publishing Co., New Delhi, 2008.

REFERENCES:

1. Rajagopalan.N, "Prestressed Concrete", Narosa Publications, New Delhi, 2008.

2. Sinha.N.C.and.Roy.S.K, "Fundamentals of Prestressed Concrete", S.Chand and Co., 1998.

E – RESOURCES

1. https://study.unisa.edu.au › Study › Prestressed Concrete Design

2. https://precast.org/education/classes/

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19PSP302   **DESIGN OF SUB STRUCTURES**   **L T P C**
                                                            3 0 0 3

OBJECTIVES:

- To gain familiarity with different types of foundation.
- To expose the students to the design of shallow foundations and deep foundations.
- To understand the concepts of designing well, machine and special foundations.

UNIT I   SHALLOW FOUNDATIONS   9 PERIODS

Soil investigation – Basic requirements of foundation – Types and selection of foundations. Bearing capacity of soil - plate load test – Design of reinforced concrete isolated, strip, combined and strap footings – mat foundation

UNIT II   PILE FOUNDATIONS   9 PERIODS

Introduction – Types of pile foundations – load carrying capacity - pile load test – structural design of straight piles –configuration of piles- different shapes of piles cap – structural design of pile cap.

UNIT III   WELL FOUNDATIONS   9 PERIODS

Types of well foundation – Grip length – load carrying capacity – construction of wells – Failures and Remedies – Design of well foundation – Lateral stability.

UNIT IV   MACHINE FOUNDATIONS   9 PERIODS

Introduction – Types of machine foundation – Basic principles of design of machine foundation – Dynamic properties of soil – vibration analysis of machine foundation – Design of foundation for Reciprocating machines and Impact machines – Reinforcement and construction details – vibration isolation.

UNIT V   SPECIAL FOUNDATIONS   9 PERIODS

Foundation on expansive soils – choice of foundation – under-reamed pile foundation. Foundation for concrete Towers, chimneys – Design of anchors- Reinforced earth retailing walls.

TOTAL: 45 PERIODS

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OUTCOMES:

- On completion of this course students will be able to select appropriate foundation type based on available soil conditions.
- They will be in a position to determine the load carrying capacity of each type of foundation.
- They will gain thorough knowledge about the design of reinforced concrete shallow foundations, pile foundations, well foundations, and machine foundations.

TEXT BOOKS:

1. Bowles .J.E., "Foundation Analysis and Design", McGraw Hill Publishing co., New York, 1997.
2. Swamy Saran, Analysis and Design of substructures, Oxford and IBH Publishing Co. Pvt. Ltd., 2006.

REFERENCES:

1. Tomlinson.M.J, "Foundation Design and Construction", Longman, Sixth Edition, New Delhi, 1995.
2. Varghese.P.C, "Design of Reinforced Concrete Foundations" – PHI learning private limited, New Delhi – 2009.

E – RESOURCES

1. https://pdfs.semanticscholar.org/bf55/16914e710ee50238cda79b54d18cb18d0bd2.pdf
2. cac.annauniv.edu/PhpProject1/aidetails/afpg_2017_fu/02.M.E.Struc.pdf

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19PSP304   DESIGN OF STEEL CONCRETE COMPOSITE STRUCTURES   L T P C
3 0 0 3

OBJECTIVE:

- To develop an understanding of the behaviour and design concrete composite elements and structures

UNIT I   INTRODUCTION   9 PERIODS

Introduction to steel - concrete composite construction – Codes – Composite action – Serviceability and Construction issues in design.

UNIT II   DESIGN OF COMPOSITE MEMBERS   9 PERIODS

Design of composite beams, slabs, columns, beam – columns - Design of composite trusses.

UNIT III   DESIGN OF CONNECTIONS   9 PERIODS

Shear connectors – Types – Design of connections in composite structures – Design of shear connectors – Partial shear interaction.

UNIT IV   COMPOSITE BOX GIRDER BRIDGES   9 PERIODS

Introduction - behaviour of box girder bridges - design concepts.

UNIT V   CASE STUDIES   9 PERIODS

Case studies on steel - concrete composite construction in buildings - seismic behaviour of composite structures.

TOTAL: 45 PERIODS

OUTCOME:

- At the end of this course students will be in a position to design composite beams, columns, trusses and box-girder bridges including the related connections.
- They will get exposure on case studies related to steel-concrete constructions of buildings.

TEXT BOOKS:

1. Johnson R.P., "Composite Structures of Steel and Concrete Beams, Slabs, Columns and Frames for Buildings", Vol.I, Blackwell Scientific Publications, 2004.
2. Oehlers D.J. and Bradford M.A., "Composite Steel and Concrete Structural Members, Fundamental behaviour", Pergamon press, Oxford, 1995

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REFERENCES:

1.Owens.G.W and Knowles.P, "Steel Designers Manual", Steel Concrete Institute(UK), Oxford Blackwell Scientific Publications, 1992.

E – RESOURCES

1. www.iosrjournals.org/iosr-jmce/papers/Conf15010/Vol-1/2.%2008-15.pdf
2. https://www.researchgate.net/.../34305603_Analysis_and_design_of_steel_deck-concret...

OBJECTIVE:
- Students will be exposed to various problems associated with soil deposits and methods to evaluate them. The different techniques will be taught to them to improve the characteristics of difficult soils as well as design techniques required to implement various ground improvement methods.

UNIT I   PROBLEMATIC SOIL AND IMPROVEMENT TECHNIQUES   8
Role of ground improvement in foundation engineering – Methods of ground improvement – Geotechnical problems in alluvial, lateritic and black cotton soils – Selection of suitable ground improvement techniques based on soil conditions.

UNIT II   DEWATERING   10
Dewatering Techniques - Well points – Vacuum and electroosmotic methods – Seepage analysis for two dimensional flow for fully and partially penetrated slots in homogeneous deposits - Design for simple cases.

UNIT III   INSITU TREATMENT OF COHESIONLESS AND COHESIVE SOILS   10
Insitu densification of cohesionless soils – Shallow as deep compaction – Dynamic compaction - Vibroflotation, Sand compaction piles and deep compaction. Consolidation of cohesionless soils - Preloading with sand drains, and fabric drains, Stabilization of soft clay ground using stone columns and Lime piles-Installation techniques – Simple design - Relative merits of above methods and their limitations.

UNIT IV   EARTH REINFORCEMENT   9
Concept of reinforcement – Types of reinforcement material – Reinforced earth wall – Mechanism – Simple design - Applications of reinforced earth; Functions of Geotextiles in filtration, drainage, separation, road works and containment applications.

UNIT V   GROUTING TECHNIQUES   8
Types of grouts – Grouting equipments and machinery - Injection methods – Grout monitoring – Stabilization with cement, lime and chemicals – Stabilization of expansive soil.

                                         TOTAL: 45 PERIODS

OUTCOMES:
At the end of the course the student will be able to
- Gain knowledge on methods and selection of ground improvement techniques.
- Understand dewatering techniques and design for simple cases.
- Get knowledge on insitu treatment of cohesionless and cohesive soils.
- Understand the concept of earth renforcement and design of reinforced earth.
- Get to know types of grouts and grouting technique.

TEXTBOOKS:
1. Purushothama Raj. P, "Ground Improvement Techniques", Lakshmi Publications, 2nd Edition, 2016.
2. Koerner, R.M. "Construction and Geotechnical Methods in Foundation Engineering", McGraw Hill, 1994.
3. Nihar Ranjan Patra, "Ground Improvement Techniques", Vikas Publishing House, First Edition, 2012.
4. Mittal.S, "An Introduction to Ground Improvement Engineering", Medtech Publisher, First Edition, 2013.

REFERENCES:

1. Moseley, M.P., "Ground Improvement" Blockie Academic and Professional, 1992.
2. Moseley, M.P and Kirsch. K., 'Ground Improvement", Spon Press, Taylor and Francis Group, London, 2nd Edition, 2004.
3. Jones C.J.F.P. "Earth Reinforcement and Soil Structure", Thomas Telford Publishing, 1996.
4. Winterkorn, H.F. and Fang, H.Y. "Foundation Engineering Hand Book". Van Nostrand Reinhold, 1994.
5. Das, B.M., "Principles of Foundation Engineering" (seventh edition), Cengage learning, 2010.
6. Coduto, D.P., "Geotechnical Engineering - Principles and Practices", Prentice Hall of India Pvt.Ltd. New Delhi, 2011.
7. Koerner, R.M., "Designing with Geosynthetics" (Sixth Edition), Xlibris Corporation, U.S.A, 2012.
8. IS Code 9759 : 1981 (Reaffirmed 1998) "Guidelines for Dewatering During Construction", Bureau of Indian Standards, New Delhi.
9. IS Code 15284 (Part 1): 2003 "Design and Construction for Ground Improvement – Guidelines" (Stone Column), Bureau of Indian Standards, New Delhi.

CE8011   **DESIGN OF PRESTRESSED CONCRETE STRUCTURES**   **L T P C**
                                                                          3 0 0 3

OBJECTIVES:
- To introduce the need for prestressing in a structure
- To explain the methods, types and advantages of prestressing to the students.
- To make the students to design a prestressed concrete structural elements and systems
- To introduce the students the effect of prestressing in the flexural and shear behaviour of structural elements.

UNIT I   INTRODUCTION – THEORY AND BEHAVIOUR   9
Basic concepts – Advantages and disadvantages – Materials required – Systems and methods of prestressing – Analysis of sections – Stress concept – Strength concept – Load balancing concept – Effect of loading on the tensile stresses in tendons – Effect of tendon profile on deflections – Factors influencing deflections – Calculation of deflections – Short term and long term deflections – Losses of prestress – Estimation of crack width.

UNIT II   DESIGN FOR FLEXURE AND SHEAR   9
Basic assumptions of flexural design – Permissible stresses in steel and concrete as per I.S.1343 Code – Different Types of sections – Design of sections of Type I and Type II post-tensioned and pre tensioned beams – Check for flexural capacity based on I.S. 1343 Code – Influence of Layout of cables in post-tensioned beams – Location of wires in pre-tensioned beams – Design for shear based on I.S. 1343 Code.

UNIT III   DEFLECTION AND DESIGN OF ANCHORAGE ZONE   9
Factors influencing deflections – Short term deflections of uncracked members – Prediction of long term deflections due to creep and shrinkage – Check for serviceability limit states. Determination of anchorage zone stresses in post-tensioned beams – design of anchorage zone reinforcement – Check for transfer bond length in pre-tensioned beams.

UNIT IV   COMPOSITE BEAMS AND CONTINUOUS BEAMS   9
Analysis and design of composite beams – Methods of achieving continuity in continuous beams – Analysis for secondary moments – Concordant cable and linear transformation – Calculation of stresses – Principles of design.

UNIT V   TENSION AND COMPRESSION MEMBERS   9
Role of prestressing in members subjected to Tensilr forces and compressive forces – Design of tension and compression members – Tanks, pipes and poles – Partial prestressing – Definition, methods of achieving partial prestressing, merits and demerits of partial prestressing.

                                                               TOTAL: 45 PERIODS
OUTCOMES:
On successful completion of this course, students will be able to:
- Understand the behaviour of prestressed concrete members and able to analyze the prestressed concrete beams.
- Design the prestressed concrete members for flexure and shear as per the relevant design code (IS 1343).
- Analyze for deflection of prestressed concrete members and design the anchorage zone.
- Analyze and design of composite beams and continuous beams.
- Design of prestressed concrete structures - sleepers, Tanks, pipes and poles.

TEXTBOOKS:
1. Krishna Raju N., "Prestressed concrete", 5th Edition, Tata McGraw Hill Company, New Delhi, 2012
2. Pandit.G.S. and Gupta.S.P., "Prestressed Concrete", CBS Publishers and Distributers Pvt. Ltd, 2012

REFERENCES:

1. Rajagopalan.N, "Prestressed Concrete", Narosa Publishing House, 2002.
2. Dayaratnam.P., "Prestressed Concrete Structures", Oxford and IBH, 2013
3. Lin T.Y. and Ned.H.Burns, "Design of prestressed Concrete Structures", Third Edition, Wiley India Pvt. Ltd., New Delhi, 2013.
4. IS1343:1980, Code of Practice for Prestressed Concrete, Bureau of Indian Standards, New Delhi, 2012
5. IS 3370- Part 4 (2008) Indian standard Code of practice for concrete structures for the storage of liquid- Design tables, code of practice, bureau of Indian standards, new Delhi.

CE8022   **PREFABRICATED STRUCTURES**   **L T P C**
                                                                    3 0 0 3

OBJECTIVE:
- To impart knowledge to students on modular construction, industrialised construction and design of prefabricated elements and construction methods.

UNIT I   **INTRODUCTION**   **9**
Need for prefabrication - Principles of prefabrication - Modular coordination - Standarization – Materials – Systems – Production – Transportation – Erection.

UNIT II   **PREFABRICATED COMPONENTS**   **9**
Behaviour and types of structural components - Large panel systems - roof and floor slabs – Walls panels - Beams - Columns - Shear walls

UNIT III   **DESIGN PRINCIPLES**   **9**
Design philosophy- Design of cross section based on efficiency of material used – Problems in design because of joint flexibility - Allowance for joint deformation - Demountable precast concrete systems.

UNIT IV   **JOINTS AND CONNECTIONS IN STRUCTURAL MEMBERS**   **9**
Types of Joints – based on action of forces - compression joints - shear joints - tension joints - based on function - construction, contraction, expansion. Design of expansion joints - Dimensions and detailing - Types of sealants - Types of structural connections - Beam to Column - Column to Column - Beam to Beam - Column to foundation.

UNIT V   **DESIGN FOR ABNORMAL LOADS**   **9**
Progressive collapse – Codal provisions – Equivalent design loads for considering abnormal effects such as earthquakes, cyclones, etc., - Importance of avoidance of progressive collapse.
                                                      TOTAL: 45 PERIODS

OUTCOMES:
- The student will have good knowledge about design principles, layout of factory and stages of loading in precast construction.
- Acquire knowledge about panel systems, slabs, connections used in precast construction and they will be in a position to design the elements.
- Acquire knowledge about types of floor systems, stairs and roofs used in precast construction.
- Acquire knowledge about types of walls used in precast construction, sealants, design of joints.
- Acquire knowledge about components in industrial building.

TEXTBOOKS:
1. Bruggeling A.S. G and Huyghe G.F. "Prefabrication with Concrete", A.A. Balkema Publishers,USA,1991.
2. Lewitt,M. " Precast Concrete- Materials, Manufacture, Properties And Usage", Applied Science Publishers , London And New Jersey, 1982.
3. Bachmann, H. and Steinle, A. "Precast Concrete Structures", Ernst & Sohn, Berlin, 2011.

REFERENCES:
1. Koncz T., "Manual of precast concrete construction", Vol. I, II and III, Bauverlag, GMBH, 1976.
2. "Handbook on Precast Concrete Buildings", Indian Concrete Institute, 2016.
3. "Structural design manual", Precast concrete connection details, Society for the studies in the use of precast concrete, Netherland Betor Verlag, 2009.

CE8091   **HYDROLOGY AND WATER RESOURCES ENGINEERING**   **L T P C**
                                                                                      3 0 0 3

OBJECTIVE:
- To introduce the student to the concept of hydrological aspects of water availability and requirements and should be able to quantify, control and regulate the water resources.

UNIT I   PRECIPITATION AND ABSTRACTIONS   10
Hydrological cycle- Meteorological measurements – Requirements, types and forms of precipitation - Rain gauges-Spatial analysis of rainfall data using Thiessen and Isohyetal methods-Interception - Evaporation. Horton‟s equation, pan evaporation measurements and evaporation suppression - Infiltration-Horton‟s equation - double ring infiltrometer, infiltration indices.

UNIT II   RUNOFF   8
Watershed, catchment and basin - Catchment characteristics - factors affecting runoff - Run off estimation using empirical - Strange‟s table and SCS methods – Stage discharge relationships- flow measurements- Hydrograph – Unit Hydrograph – IUH

UNIT III   FLOOD AND DROUGHT   9
Natural Disasters-Flood Estimation- Frequency analysis- Flood control- Definitions of droughts- Meteorological, hydrological and agricultural droughts- IMD method-NDVI analysis- Drought Prone Area Programme (DPAP)

UNIT IV   RESERVOIRS   8
Classification of reservoirs, General principles of design, site selection, spillways, elevation - area - capacity - storage estimation, sedimentation - life of reservoirs - rule curve

UNIT V   GROUNDWATER AND MANAGEMENT   10
Origin- Classification and types - properties of aquifers- governing equations – steady and unsteady flow - artificial recharge - RWH in rural and urban areas
                                                                      TOTAL: 45 PERIODS
OUTCOMES:
The students completing the course will have
- an understanding of the key drivers on water resources, hydrological processes and their integrated behaviour in catchments,
- ability to construct and apply a range of hydrological models to surface water and groundwater problems including Hydrograph, Flood/Drought management, artificial recharge
- ability to conduct Spatial analysis of rainfall data and design water storage reservoirs
- Understand the concept and methods of ground water management.

TEXTBOOKS:
1. Subramanya .K. "Engineering Hydrology"- Tata McGraw Hill, 2010
2. Jayarami Reddy .P. "Hydrology", Tata McGraw Hill, 2008.
3. Linsley, R.K. and Franzini, J.B. "Water Resources Engineering", McGraw Hill International Book Company, 1995.

REFERENCES:
1. David Keith Todd. "Groundwater Hydrology", John Wiley & Sons, Inc. 2007
2. Ven Te Chow, Maidment, D.R. and Mays, L.W. "Applied Hydrology", McGraw Hill International Book Company, 1998.
3. Raghunath .H.M., "Hydrology", Wiley Eastern Ltd., 1998.

GEOGRAPHIC INFORMATION SYSTEM **L T P C**
3 0 0 3

OBJECTIVES :
- To introduce the fundamentals and components of Geographic Information System
- To provide details of spatial data structures and input, management and output processes.

UNIT I   FUNDAMENTALS OF GIS   9
Introduction to GIS - Basic spatial concepts - Coordinate Systems - GIS and Information Systems – Definitions – History of GIS - Components of a GIS – Hardware, Software, Data, People, Methods – Proprietary and open source Software - Types of data - Spatial, Attribute data- types of attributes – scales/ levels of measurements.

UNIT II   SPATIAL DATA MODELS   9
Database Structures - Relational, Object Oriented - Entities - ER diagram - data models - conceptual, logical and physical models - spatial data models – Raster Data Structures – Raster Data Compression - Vector Data Structures - Raster vs Vector Models- TIN and GRID data models.

UNIT III   DATA INPUT AND TOPOLOGY   9
Scanner - Raster Data Input – Raster Data File Formats – Georeferencing – Vector Data Input -Digitiser – Datum Projection and reprojection -Coordinate Transformation - Topology - Adjacency, connectivity and containment - Topological Consistency - Non topological file formats - Attribute Data linking – Linking External Databases – GPS Data Integration

UNIT IV   DATA QUALITY AND STANDARDS   9
Data quality - Basic aspects - completeness, logical consistency, positional accuracy, temporal accuracy, thematic accuracy and lineage – Metadata – GIS Standards -Interoperability - OGC - Spatial Data Infrastructure

UNIT V   DATA MANAGEMENT AND OUTPUT   9
Import/Export - Data Management functions- Raster to Vector and Vector to Raster Conversion - Data Output - Map Compilation - Chart/Graphs - Multimedia - Enterprise Vs. Desktop GIS- distributed GIS.

TOTAL: 45 PERIODS

OUTCOMES:
This course equips the student to
- Have basic idea about the fundamentals of GIS.
- Understand the types of data models.
- Get knowledge about data input and topology.
- Gain knowledge on data quality and standards.
- Understand data management functions and data output

TEXT BOOKS:
1. Kang - Tsung Chang, Introduction to Geographic Information Systems, McGraw Hill Publishing, 2nd Edition, 2011.
2. Ian Heywood, Sarah Cornelius, Steve Carver, Srinivasa Raju, "An Introduction Geographical Information Systems, Pearson Education, 2nd Edition,2007.

REFERENCE:
1. Lo.C.P., Albert K.W. Yeung, Concepts and Techniques of Geographic Information Systems, Prentice-Hall India Publishers, 2006

OAI551   **ENVIRONMENT AND AGRICULTURE**   **L T P C**
                                                                                3 0 0 3

OBJECTIVE:
  • To emphasize on the importance of environment and agriculture on changing global scenario and the emerging issues connected to it.

UNIT I   ENVIRONMENTAL CONCERNS   8
Environmental basis for agriculture and food – Land use and landscape changes – Water quality issues – Changing social structure and economic focus – Globalization and its impacts – Agro ecosystems.

UNIT II   ENVIRONMENTAL IMPACTS   9
Irrigation development and watersheds – mechanized agriculture and soil cover impacts – Erosion and problems of deposition in irrigation systems – Agricultural drainage and downstream impacts – Agriculture versus urban impacts.

UNIT III   CLIMATE CHANGE   8
Global warming and changing environment – Ecosystem changes – Changing blue-green-grey water cycles – Water scarcity and water shortages – Desertification.

UNIT IV   ECOLOGICAL DIVERSITY AND AGRICULTURE   10
Ecological diversity, wild life and agriculture – GM crops and their impacts on the environment – Insets and agriculture – Pollination crisis – Ecological farming principles – Forest fragmentation and agriculture – Agricultural biotechnology concerns.

UNIT V   EMERGING ISSUES   10
Global environmental governance – alternate culture systems – Mega farms and vertical farms – Virtual water trade and its impacts on local environment – Agricultural environment policies and its impacts – Sustainable agriculture.

                                                             TOTAL: 45 PERIODS

OUTCOMES:
  • Students will appreciate the role of environment in the current practice of agriculture and concerns of sustainability, especially in the context of climate change and emerging global issues.
  • Ecological context of agriculture and its concerns will be understood

TEXTBOOKS:
  1. M.Lakshmi Narasaiah, Environment and Agriculture, Discovery Pub. House, 2006.
  2. Arvind Kumar, Environment and Agriculture, ABH Publications, New Delhi, 2005.

REFERENCES:
  1. T.C. Byerly, Environment and Agriculture, United States. Dept. of Agriculture. Economic Research Service, 2006.
  2. Robert D. Havener, Steven A. Breth, Environment and agriculture: rethinking development issues for the 21st century : proceedings of a symposium, Winrock International Institute for Agricultural Development, 1994
  3. Environment and agriculture: environmental problems affecting agriculture in the Asia and Pacific region; World Food Day Symposium, Bangkok, Thailand. 1989

TESTING OF MATERIALS **L T P C**
3 0 0 3

OBJECTIVE:
- To understand the various destructive and non destructive testing methods of materials and its industrial applications.

UNIT I   INTRODUCTION TO MATERIALS TESTING   9
Overview of materials, Classification of material testing, Purpose of testing, Selection of material, Development of testing, Testing organizations and its committee, Testing standards, Result Analysis, Advantages of testing.

UNIT II   MECHANICAL TESTING   9
Introduction to mechanical testing, Hardness test (Vickers, Brinell, Rockwell), Tensile test, Impact test (Izod, Charpy) - Principles, Techniques, Methods, Advantages and Limitations, Applications. Bend test, Shear test, Creep and Fatigue test - Principles, Techniques, Methods, Advantages and Limitations, Applications.

UNIT III   NON DESTRUCTIVE TESTING   9
Visual inspection, Liquid penetrant test, Magnetic particle test, Thermography test – Principles, Techniques, Advantages and Limitations, Applications. Radiographic test, Eddy current test, Ultrasonic test, Acoustic emission- Principles, Techniques, Methods, Advantages and Limitations, Applications.

UNIT IV   MATERIAL CHARACTERIZATION TESTING   9
Macroscopic and Microscopic observations, Optical and Electron microscopy (SEM and TEM) - Principles, Types, Advantages and Limitations, Applications. Diffraction techniques, Spectroscopic Techniques, Electrical and Magnetic Techniques- Principles, Types, Advantages and Limitations, Applications.

UNIT V   OTHER TESTING   9
Thermal Testing: Differential scanning calorimetry, Differential thermal analysis. Thermo-mechanical and Dynamic mechanical analysis: Principles, Advantages, Applications. Chemical Testing: X-Ray Fluorescence, Elemental Analysis by Inductively Coupled Plasma-Optical Emission Spectroscopy and Plasma-Mass Spectrometry.

TOTAL: 45 PERIODS

OUTCOMES:
- Identify suitable testing technique to inspect industrial component
- Ability to use the different technique and know its applications and limitations

TEXT BOOKS:
1. Baldev Raj, T.Jayakumar, M.Thavasimuthu "Practical Non-Destructive Testing", Narosa Publishing House, 2009.
2. Cullity, B. D., "Elements of X-ray diffraction", 3rd Edition, Addison-Wesley Company Inc., New   York, 2000.
3. P. Field Foster, "The Mechanical Testing of Metals and Alloys" 7th Edition, Cousens Press, 2007.

REFERENCES:
1. Metals Handbook: Mechanical testing, (Volume 8) ASM Handbook Committee, 9th Edition, American Society for Metals, 1978.
2. ASM Metals Handbook, "Non-Destructive Evaluation and Quality Control", American Society of Metals, Metals Park, Ohio, USA.
3. Brandon D.G., "Modern Techniques in Metallography", Von Nostrand Inc. NJ, USA, 1986.

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LIST OF ELECTIVES OFFERED FOR THE STUDENTS

Department of Civil Engineering

Degree/Branch/Semester: M.E./Structural Engineering/I

Academic Year   : 2020-2021 (ODD)   Batch: 2020-2022

S. No.	Register Number	Name of the Student	Elective offered by the University	Electives Opted by the Students
1	202052001	ANGURAJ N	19PSP101 Maintenance and Rehabilitation of Structures	
2	202052002	ARAVIND S		
3	202052003	BINAY CHETTRI N		19PSP101 Maintenance and Rehabilitation of Structures
4	202052004	DHARANI S	19PSP102 Prefabricated Structures	
5	202052005	DURAI RAJ D		
6	202052006	GOKULA KANNAN N	19PSP103 Offshore Structures	19PSP102 Prefabricated Structures
7	202052007	HARIHARAN S	19PSP104 Matrix Methods for Structural Analysis	
8	202052008	POORANI D		
9	202052009	SIVAKUMAR R		

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LIST OF ELECTIVES OFFERED FOR THE STUDENTS

Department of Civil Engineering

Degree/Branch/Semester: M.E./Structural Engineering/III

Academic Year : 2020-2021 (ODD)

S. No.	Register No.	Name of the Student	Elective offered by the University	Electives Opted by the Students
1	201952001	AJAY PRASATH S	19PSP301 - Nonlinear Analysis of Structures.	
2	201952002	ASLAHUDHEEN T	19PSP302 - Design of Sub Structures	
3	201952003	BABY SHALINI K	19PSP303 - Optimization of Structures	19PSP302 - Design of Sub Structures
4	201952004	SASIKANTH R	19PSP304 - Design of Steel Concrete Composite Structures	
5	201952005	SINDU K R	19PSP305 - Design of Bridges	19PSP304 - Design of Steel Concrete Composite Structures
6	201952006	SOWMIYA R	19PSP306 - Design of Shell and Spatial Structures	
7	201952007	VINOTH S	19PSP307 - Computer Aided Analysis and Design	
8	201952008	WIPROTHARAN T		

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LIST OF ELECTIVES OFFERED FOR THE STUDENTS

Department of Civil Engineering

Degree/Branch/Semester: M.E./Structural Engineering/I

Academic Year   : 2020-2021 (ODD)   Batch: 2020-2022

S. No.	Register Number	Name of the Student	Elective offered by the University	Electives Opted by the Students
1	202052001	ANGURAJ N	19PSP101 Maintenance and Rehabilitation of Structures	
2	202052002	ARAVIND S		
3	202052003	BINAY CHETTRI N		
4	202052004	DHARANI S	19PSP102 Prefabricated Structures	19PSP101 Maintenance and Rehabilitation of Structures
5	202052005	DURAI RAJ D		
6	202052006	GOKULA KANNAN N	19PSP103 Offshore Structures	19PSP102 Prefabricated Structures
7	202052007	HARIHARAN S	19PSP104 Matrix Methods for Structural Analysis	
8	202052008	POORANI D		
9	202052009	SIVAKUMAR R		

H.O.D.   Dean (Academics)   PRINCIPAL

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LIST OF ELECTIVES OFFERED FOR THE STUDENTS

Department of Civil Engineering

Degree/Branch/Semester: M.E./Structural Engineering/III

Academic Year : 2020-2021 (ODD)

S. No.	Register No.	Name of the Student	Elective offered by the University	Electives Opted by the Students
1	201952001	AJAY PRASATH S	19PSP301 - Nonlinear Analysis of Structures.	
2	201952002	ASLAHUDHEEN T	19PSP302 - Design of Sub Structures	
3	201952003	BABY SHALINI K	19PSP303 - Optimization of Structures	19PSP302 - Design of Sub Structures
4	201952004	SASIKANTH R	19PSP304 - Design of Steel Concrete Composite Structures	
5	201952005	SINDU K R	19PSP305 - Design of Bridges	19PSP304 - Design of Steel Concrete Composite Structures
6	201952006	SOWMIYA R	19PSP306 - Design of Shell and Spatial Structures	
7	201952007	VINOTH S	19PSP307 - Computer Aided Analysis and Design	
8	201952008	WIPROTHARAN T		

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10.11.2020

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LIST OF ELECTIVES OFFERED FOR THE STUDENTS

Department of Civil Engineering

Degree/Branch/Semester: M.E./Structural Engineering/II

Academic Year   : 2020-2021 (Even)   Batch: 2020-2022

S. No.	Register Number	Name of the Student	Elective offered by the University	Electives Opted by the Students
1	202052001	Anguraj N	19PSP201 Theory of Plates 19PSP202 Mechanics of Composite Materials 19PSP203 Analysis and Design of Tall Buildings 19PSP204 Industrial Structures 19PSP205 Pre-stressed Concrete 19PSP206 Wind and Cyclone Effects on Structures	19PSP204 Industrial Structures 19PSP205 Pre-stressed Concrete
2	202052002	Aravind S		
3	202052003	Binay Chettri N		
4	202052004	Dharani S		
5	202052005	Durai Raj D		
6	202052006	Gokula Kannan N		
7	202052007	Hariharan S		
8	202052008	Poorani D		
9	202052009	Sivakumar R		

H.O.D.
23.07.21

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23/7/2021

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LIST OF ELECTIVES OFFERED FOR THE STUDENTS

Department of Civil Engineering

Degree/Branch/Semester: M.E./Structural Engineering/II

Academic Year : 2020-2021 (Even)

Batch: 2020-2022

S. No.	Register Number	Name of the Student	Elective offered by the University	Electives Opted by the Students
1	202052001	Anguraj N	19PSP201 Theory of Plates 19PSP202 Mechanics of Composite Materials 19PSP203 Analysis and Design of Tall Buildings 19PSP204 Industrial Structures 19PSP205 Pre-stressed Concrete 19PSP206 Wind and Cyclone Effects on Structures	19PSP204 Industrial Structures 19PSP205 Pre-stressed Concrete
2	202052002	Aravind S		
3	202052003	Binay Chettri N		
4	202052004	Dharani S		
5	202052005	Durai Raj D		
6	202052006	Gokula Kannan N		
7	202052007	Hariharan S		
8	202052008	Poorani D		
9	202052009	Sivakumar R		

23/07/21

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23/07/2021

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LIST OF ELECTIVES OFFERED FOR THE STUDENTS

PROFESSIONAL ELECTIVE – II

Department of Civil Engineering

Degree/Branch/Semester: B.E / Civil / VI   **Academic Year:** 2020 – 2021 (EVEN)

S. No.	Register No.	Name of the Student	Elective offered by the University	Electives Opted by the Students
1	612318103001	Deepika J	CE8001 - Ground Improvement Techniques	
2	612318103002	Kondappan A		
3	612318103003	Ramya R	CE8002 - Introduction to Soil Dynamics and Machine Foundations	
4	612318103004	Sabarisan J		CE8001 - Ground Improvement Techniques
5	612318103005	Sakthisugumar T	CE8003 - Rock Engineering	
6	612318103006	Sandhiya A	CE8004 - Urban Planning and Development	
7	612318103007	Sathyamoorthi S	CE8005 - Air Pollution and Control Engineering	
8	612318103008	Thamodharan J		
9	201911501	Jothika B	GE8075 - Intellectual Property Rights	

N·bR 9/02/2024

D. Jayatha 05/02/2024

05/02/2024

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LIST OF ELECTIVES OFFERED FOR THE STUDENTS

PROFESSIONAL ELECTIVE - IV

Department of Civil Engineering

Degree/Branch/Semester: B.E / CIVIL/ VIII   Academic Year: 2020-2021(EVEN)

S. No.	Register No.	Name of the Student	Elective offered by the University	Electives Opted by the Students
1	612317103001	AMISH R G		
2	612317103002	ANJANA MOHAN	CE8013 Coastal Engineering	
3	612317103003	AVINASH S	CE8014 Participatory Water Resources Management	
4	612317103004	BALA SUBRAMANIAN S		
5	612317103005	DEEPAK A	CE8015 Integrated Water Resources Management	
6	612317103006	JAMUNABHARATHI M		
7	612317103008	MAITHEESWARAN K	CE8016 Groundwater Engineering	CE8091 - Hydrology and Water Resources Engineering
8	612317103009	NAVEENBALA C		
9	612317103011	PREMANANDHINI N	CE8017 Water Resources Systems Engineering	
10	612317103012	RAMKUMAR V		
11	612317103014	THATHTHATHIRIAN S	CE8018 Geo-Environmental Engineering	
12	612317103015	VATHSALADEVI M		
13	612317103016	VISHAL B	CE8091 Hydrology and Water Resources Engineering	
14	612317103301	ARAVINDAN S		
15	612317103302	LOGESH K	GE8076 Professional Ethics in Engineering	
16	612317103303	YOGARAJ S		

N. 4/2/2021
H.O.D

N. Syalti 05/02/2021

05/02/2021
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LIST OF ELECTIVES OFFERED FOR THE STUDENTS

PROFESSIONAL ELECTIVE - V

Department of Civil Engineering

Degree/Branch/Semester: B.E / CIVIL/ VIII

Academic Year: 2020-2021(EVEN)

S. No.	Register No.	Name of the Student	Elective offered by the University	Electives Opted by the Students
1	612317103001	AMISH R G		
2	612317103002	ANJANA MOHAN		
3	612317103003	AVINASH S		
4	612317103004	BALA SUBRAMANIAN S	CE8019 Computer Aided Design of Structures	
5	612317103005	DEEPAK A		
6	612317103006	JAMUNABHARATHI M	CE8020 Maintenance, Repair and Rehabilitation of Structures	
7	612317103008	MAITHEESWARAN K		
8	612317103009	NAVEENBALA C	CE8021 Structural Dynamics and Earthquake Engineering	CE8022 - Prefabricated Structures
9	612317103011	PREMANANDHINI N		
10	612317103012	RAMKUMAR V	CE8022 Prefabricated Structures	
11	612317103014	THATHTHATHIRIAN S	CE8023 Bridge Engineering	
12	612317103015	VATHSALADEVI M	GE8073 Fundamentals of Nano Science	
13	612317103016	VISHAL B		
14	612317103301	ARAVINDAN S		
15	612317103302	LOGESH K		
16	612317103303	YOGARAJ S		

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LIST OF ELECTIVES OFFERED FOR THE STUDENTS

PROFESSIONAL ELECTIVE – II

Department of Civil Engineering

Degree/Branch/Semester: B.E / Civil / VI

Academic Year: 2020 – 2021 (EVEN)

S. No.	Register No.	Name of the Student	Elective offered by the University	Electives Opted by the Students
1	612318103001	Deepika J	CE8001 - Ground Improvement Techniques	
2	612318103002	Kondappan A		
3	612318103003	Ramya R	CE8002 - Introduction to Soil Dynamics and Machine Foundations	
4	612318103004	Sabarisan J		CE8001 - Ground Improvement Techniques
5	612318103005	Sakthisugumar T	CE8003 - Rock Engineering	
6	612318103006	Sandhiya A	CE8004 - Urban Planning and Development	
7	612318103007	Sathyamoorthi S	CE8005 - Air Pollution and Control Engineering	
8	612318103008	Thamodharan J		
9	201911501	Jothika B	GE8075 - Intellectual Property Rights	

N-bR 4/02/2024

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D. Jugatha 05/02/2021

05/02/2021

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LIST OF ELECTIVES OFFERED FOR THE STUDENTS

PROFESSIONAL ELECTIVE - IV

Department of Civil Engineering

Degree/Branch/Semester: B.E / CIVIL/ VIII

Academic Year: 2020-2021(EVEN)

S. No.	Register No.	Name of the Student	Elective offered by the University	Electives Opted by the Students
1	612317103001	AMISH R G		
2	612317103002	ANJANA MOHAN	CE8013 Coastal Engineering	
3	612317103003	AVINASH S	CE8014 Participatory Water Resources Management	
4	612317103004	BALA SUBRAMANIAN S		
5	612317103005	DEEPAK A	CE8015 Integrated Water Resources Management	
6	612317103006	JAMUNABHARATHI M		
7	612317103008	MAITHEESWARAN K	CE8016 Groundwater Engineering	CE8091 - Hydrology and Water Resources Engineering
8	612317103009	NAVEENBALA C		
9	612317103011	PREMANANDHINI N	CE8017 Water Resources Systems Engineering	
10	612317103012	RAMKUMAR V		
11	612317103014	THATHTHATHIRIAN S	CE8018 Geo-Environmental Engineering	
12	612317103015	VATHSALADEVI M		
13	612317103016	VISHAL B	CE8091 Hydrology and Water Resources Engineering	
14	612317103301	ARAVINDAN S	GE8076 Professional Ethics in Engineering	
15	612317103302	LOGESH K		
16	612317103303	YOGARAJ S		

N. 48 4/02/2021
H.O.D

D. Syalti 05/02/2021

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Form No. SEC-AC 09: Dt. 09.10.2015; Rev 00: Rev Dt.

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LIST OF ELECTIVES OFFERED FOR THE STUDENTS

PROFESSIONAL ELECTIVE - V

Department of Civil Engineering

Degree/Branch/Semester: B.E / CIVIL/ VIII

Academic Year: 2020-2021(EVEN)

S. No.	Register No.	Name of the Student	Elective offered by the University	Electives Opted by the Students
1	612317103001	AMISH R G		
2	612317103002	ANJANA MOHAN		
3	612317103003	AVINASH S		
4	612317103004	BALA SUBRAMANIAN S	CE8019 Computer Aided Design of Structures	
5	612317103005	DEEPAK A		
6	612317103006	JAMUNABHARATHI M	CE8020 Maintenance, Repair and Rehabilitation of Structures	
7	612317103008	MAITHEESWARAN K		
8	612317103009	NAVEENBALA C	CE8021 Structural Dynamics and Earthquake Engineering	CE8022 - Prefabricated Structures
9	612317103011	PREMANANDHINI N		
10	612317103012	RAMKUMAR V	CE8022 Prefabricated Structures	
11	612317103014	THATHTHATHIRIAN S		
12	612317103015	VATHSALADEVI M	CE8023 Bridge Engineering	
13	612317103016	VISHAL B		
14	612317103301	ARAVINDAN S	GE8073 Fundamentals of Nano Science	
15	612317103302	LOGESH K		
16	612317103303	YOGARAJ S		

H.O.D

PRINCIPAL   05/02/2021

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ESTD 2001

2020

LIST OF ELECTIVES OFFERED FOR THE STUDENTS

PROFESSIONAL ELECTIVE III

Department of Civil Engineering

Degree/Branch/Semester: B.E / CIVIL / VII

Academic Year: 2020-2021(ODD)

S. No.	Register No.	Name of the Student	Elective offered by the University	Electives Opted by the Students
1	612317103001	AMISH R G		
2	612317103002	ANJANA MOHAN	CE8006 - Pavement Engineering	
3	612317103003	AVINASH S	CE8007 -Traffic Engineering and Management	
4	612317103004	BALA SUBRAMANIAN S		
5	612317103005	DEEPAK A	CE8008 - Transport and Environment	
6	612317103006	JAMUNABHARATHI M	CE8009 - Industrial Structures	
7	612317103008	MAITHEESWARAN K	CE8010 - Environmental and Social Impact Assessment	CE8011 - Design of Prestressed Concrete Structures
8	612317103009	NAVEENBALA C	CE8011 - Design of Prestressed Concrete Structures	
9	612317103011	PREMANANDHINI N		
10	612317103012	RAMKUMAR V	CE8012 - Construction Planning and Scheduling	
11	612317103014	THATHTHATHIRIAN S		
12	612317103015	VATHSALADEVI M	N85E91 - Municipal Solid Waste Management	
13	612317103016	VISHAL B	GE8077 - Total Quality Management	
14	612317103301	ARAVINDAN S	GE8072 - Foundation Skills In Integrated Product Development	
15	612317103302	LOGESH K		
16	612317103303	YOGARAJ S		

H.O.D. 9.11.2020

09/11/2020
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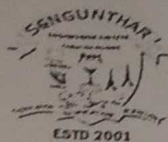## LIST OF ELECTIVES OFFERED FOR THE STUDENTS

OPEN ELECTIVE – II

Department of Civil Engineering

Degree/Branch/Semester: B.E / CIVIL/ VII   Academic Year:2020-2021(ODD)

S. No.	Register No.	Name of the Student	Elective offered by the University	Electives Opted by the Students
1	612317103001	AMISH R G		
2	612317103002	ANJANA MOHAN		
3	612317103003	AVINASH S	OAI751 - Agricultural Finance, Banking and Co-operation	
4	612317103004	BALA SUBRAMANIAN S		
5	612317103005	DEEPAK A	OGI751 - Climate Change and Its Impact	
6	612317103006	JAMUNABHARATHI M	OGI752 - Fundamentals of Planetary Remote Sensing	
7	612317103008	MAITHEESWARAN K	OEN751 - Green Building Design	
8	612317103009	NAVEENBALA C		OML751 - Testing of Materials
9	612317103011	PREMANANDHINI N	OME754 - Industrial Safety OCS752 - Introduction to C Programming	
10	612317103012	RAMKUMAR V		
11	612317103014	THATHTHATHIRIAN S	OIE751 - Robotics OML753 - Selection of Materials	
12	612317103015	VATHSALADEVI M		
13	612317103016	VISHAL B	OML751 - Testing of Materials	
14	612317103301	ARAVINDAN S	OTT752 - Textile effluent treatments	
15	612317103302	LÓGESH K		
16	612317103303	YOGARAJ S		

R. 9.11.2020
H.O.D.

05/11/2020
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LIST OF ELECTIVES OFFERED FOR THE STUDENTS

OPEN ELECTIVE – I

Department of Civil Engineering

Degree/Branch/Semester: B.E / Civil / V   **Academic Year:** 2020 – 2021 (ODD)

S. No.	Register No.	Name of the Student	Elective offered by the University	Electives Opted by the Students
1	612318103001	Deepika J	**OME551** - Energy Conservation and Management	
2	612318103002	Kondappan A	**OAI551** - Environment and Agriculture	
3	612318103003	Ramya R	**OCH551** - Industrial Nanotechnology	
4	612318103004	Sabarisan J	**OAI553** - Production Technology of Agricultural machinery	
5	612318103005	Sakthisugumar T		**OAI551** - Environment and Agriculture
6	612318103006	Sandhiya A	**ORO551** - Renewable Energy Sources	
7	612318103007	Sathyamoorthi S	**OAN551** - Sensors and Transducers	
8	612318103008	Thamodharan J	**OCS551** - Software Engineering	
9	612317103701	Jothika B	**OME552** - Vibration and Noise Control	

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LIST OF ELECTIVES OFFERED FOR THE STUDENTS

PROFESSIONAL ELECTIVE – I

Department of Civil Engineering

Degree/Branch/Semester: B.E / Civil / V   **Academic Year:** 2020 – 2021 (ODD)

S. No.	Register No.	Name of the Student	Elective offered by the University	Electives Opted by the Students
1	612318103001	Deepika J	GI8012 - Digital Cadastre	
2	612318103002	Kondappan A	GI8013 - Advanced Surveying	
3	612318103003	Ramya R	GI8014 - Geographic Information System	
4	612318103004	Sabarisan J		GI8014 - Geographic Information System
5	612318103005	Sakthisugumar T	GI8015 - Geo-informatics Applications for Civil Engineers	
6	612318103006	Sandhiya A		
7	612318103007	Sathyamoorthi S	GI8491 - Total Station and GPS Surveying	
8	612318103008	Thamodharan J	GE8071 - Disaster Management	
9	612317103701	Jothika B	GE8074 - Human Rights	

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LIST OF ELECTIVES OFFERED FOR THE STUDENTS

PROFESSIONAL ELECTIVE III

Department of Civil Engineering

Degree/Branch/Semester: B.E / CIVIL / VII

Academic Year: 2020-2021(ODD)

S. No.	Register No.	Name of the Student	Elective offered by the University	Electives Opted by the Students
1	612317103001	AMISH R G	CE8006 - Pavement Engineering	
2	612317103002	ANJANA MOHAN	CE8007 -Traffic Engineering and Management	
3	612317103003	AVINASH S	CE8008 - Transport and Environment	
4	612317103004	BALA SUBRAMANIAN S	CE8009 - Industrial Structures	
5	612317103005	DEEPAK A	CE8010 - Environmental and Social Impact Assessment	
6	612317103006	JAMUNABHARATHI M	CE8011 - Design of Prestressed Concrete Structures	
7	612317103008	MAITHEESWARAN K	CE8012 - Construction Planning and Scheduling	CE8011 - Design of Prestressed Concrete Structures
8	612317103009	NAVEENBALA C	N85E91 - Municipal Solid Waste Management	
9	612317103011	PREMANANDHINI N	GE8077 - Total Quality Management	
10	612317103012	RAMKUMAR V	GE8072 - Foundation Skills In Integrated Product Development	
11	612317103014	THATHTHATHIRIAN S		
12	612317103015	VATHSALADEVI M		
13	612317103016	VISHAL B		
14	612317103301	ARAVINDAN S		
15	612317103302	LOGESH K		
16	612317103303	YOGARAJ S		

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LIST OF ELECTIVES OFFERED FOR THE STUDENTS

OPEN ELECTIVE – II

Department of Civil Engineering

Degree/Branch/Semester: B.E / CIVIL/ VII   **Academic Year**:2020-2021(ODD)

S. No.	Register No.	Name of the Student	Elective offered by the University	Electives Opted by the Students
1	612317103001	AMISH R G		
2	612317103002	ANJANA MOHAN		
3	612317103003	AVINASH S	OAI751 - Agricultural Finance, Banking and Co-operation	
4	612317103004	BALA SUBRAMANIAN S		
5	612317103005	DEEPAK A	OGI751 - Climate Change and Its Impact	
6	612317103006	JAMUNABHARATHI M	OGI752 - Fundamentals of Planetary Remote Sensing	
7	612317103008	MAITHEESWARAN K	OEN751 - Green Building Design	
8	612317103009	NAVEENBALA C		OML751 - Testing of Materials
9	612317103011	PREMANANDHINI N	OME754 - Industrial Safety	
10	612317103012	RAMKUMAR V	OCS752 - Introduction to C Programming	
11	612317103014	THATHTHATHIRIAN S	OIE751 - Robotics	
12	612317103015	VATHSALADEVI M	OML753 - Selection of Materials	
13	612317103016	VISHAL B	OML751 - Testing of Materials	
14	612317103301	ARAVINDAN S	OTT752 - Textile effluent treatments	
15	612317103302	LÓGESH K		
16	612317103303	YOGARAJ S		

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LIST OF ELECTIVES OFFERED FOR THE STUDENTS

OPEN ELECTIVE – I

Department of Civil Engineering

Degree/Branch/Semester: B.E / Civil / V   **Academic Year:** 2020 – 2021 (ODD)

S. No.	Register No.	Name of the Student	Elective offered by the University	Electives Opted by the Students
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3	612318103003	Ramya R	**OCH551** - Industrial Nanotechnology	
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8	612318103008	Thamodharan J	**OCS551** - Software Engineering	
9	612317103701	Jothika B	**OME552** - Vibration and Noise Control	

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PROFESSIONAL ELECTIVE – I

Department of Civil Engineering

Degree/Branch/Semester: B.E / Civil / V   **Academic Year:** 2020 – 2021 (ODD)

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2	612318103002	Kondappan A	GI8013 - Advanced Surveying	
3	612318103003	Ramya R	GI8014 - Geographic Information System	
4	612318103004	Sabarisan J		GI8014 - Geographic Information System
5	612318103005	Sakthisugumar T	GI8015 - Geo-informatics Applications for Civil Engineers	
6	612318103006	Sandhiya A		
7	612318103007	Sathyamoorthi S	GI8491 - Total Station and GPS Surveying	
8	612318103008	Thamodharan J	GE8071 - Disaster Management	
9	612317103701	Jothika B	GE8074 - Human Rights	

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19PCP205   **CLOUD COMPUTING TECHNOLOGIES**   **L T P C**
                                                                3 0 0 3
OBJECTIVES:

- To understand the concepts of virtualization and virtual machines
- To gain expertise in server, network and storage virtualization.
- To understand and deploy practical virtualization solutions and enterprise solutions
- To gain knowledge on the concept of virtualization that is fundamental to cloud computing.
- To understand the various issues in cloud computing
- To be able to set up a private cloud
- To understand the security issues in the grid and the cloud environment

UNIT I VIRTUALIZATION   9
Interpretation – Binary Translation - Taxonomy of Virtual Machines. Virtualization –Management Virtualization —– Hardware Maximization – Architectures – Virtualization Management – Storage Virtualization – Network Virtualization

UNIT II VIRTUALIZATION INFRASTRUCTURE   9
Comprehensive Analysis – Resource Pool – Testing Environment –Server Virtualization – Virtual Workloads – Provision Virtual Machines – Desktop Virtualization – Application Virtualization - Implementation levels of virtualization – virtualization structure – virtualization of CPU, Memory and I/O devices – virtual clusters and Resource Management – Virtualization for data centre automation

UNIT III CLOUD PLATFORM ARCHITECTURE   9
Cloud deployment models: public, private, hybrid, community – Categories of cloud computing: Everything as a service: Infrastructure, platform, software- A Generic Cloud Architecture Design – Layered cloud Architectural Development – Virtualization Support and Disaster Recovery – Architectural Design Challenges - Public Cloud Platforms : GAE,AWS – Inter-cloud Resource Management

UNIT IV PROGRAMMING MODEL   9
Introduction to Hadoop Framework - Mapreduce, Input splitting, map and reduce functions, specifying input and output parameters, configuring and running a job –Developing Map Reduce Applications - Design of Hadoop file system –Setting up Hadoop Cluster - Cloud Software Environments -Eucalyptus, Open Nebula, Open Stack, Nimbus

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UNIT V CLOUD SECURITY 9

   Cloud Infrastructure security: network, host and application level – aspects of data security, provider data and its security, Identity and access management architecture, IAM practices in the cloud, SaaS, PaaS, IaaS availability in the cloud - Key privacy issues in the cloud –Cloud Security and Trust Management

                      TOTAL : 45 PERIODS

OUTCOMES:

Upon completion of course, students will be able to
- Employ the concepts of storage virtualization, network virtualization and its management
- Apply the concept of virtualization in the cloud computing
- Identify the architecture, infrastructure and delivery models of cloud computing
- Develop services using Cloud computing
- Apply the security models in the cloud environment

TEXT BOOKS:

1. Danielle Ruest, Nelson Ruest, -Virtualization: A Beginner"s Guide‖, McGraw-Hill Osborne Media, 2009.
2. Jim Smith, Ravi Nair , "Virtual Machines: Versatile Platforms for Systems and Processes", Elsevier/Morgan Kaufmann, 2005

REFERENCES:

1. John W.Rittinghouse and James F.Ransome, "Cloud Computing: Implementation, Management, and Security", CRC Press, 2010.
2. Kai Hwang, Geoffrey C Fox, Jack G Dongarra, "Distributed and Cloud Computing, From Parallel Processing to the Internet of Things", Morgan Kaufmann Publishers, 2012.

E-RESOURCES:

1. https://nasrinword.wordpress.com/cp5092-cloud-computing-technologies/
2. http://www.srideviengg.com/documents/cse/cloud%20computing.pdf

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19PCP209   **INFORMATION RETRIEVAL TECHNIQUES**   **L T P C**
                                                                     3 0 0 3

OBJECTIVES:

- To understand the basics of information retrieval with pertinence to modeling, query operations and indexing
- To get an understanding of machine learning techniques for text classification and clustering.
- To understand the various applications of information retrieval giving emphasis to multimedia IR, web search
- To understand the concepts of digital libraries

UNIT I INTRODUCTION: MOTIVATION   **9**

Basic Concepts – Practical Issues - Retrieval Process – Architecture - Boolean Retrieval –Retrieval Evaluation – Open Source IR Systems–History of Web Search – Web Characteristics–The impact of the web on IR —IR Versus Web Search–Components of a Search engine

UNIT II MODELING   **9**

Taxonomy and Characterization of IR Models – Boolean Model – Vector Model - Term Weighting – Scoring and Ranking –Language Models – Set Theoretic Models - Probabilistic Models – Algebraic Models – Structured Text Retrieval Models – Models for Browsing

UNIT III INDEXING   **9**

Static and Dynamic Inverted Indices – Index Construction and Index Compression. Searching -Sequential Searching and Pattern Matching. Query Operations -Query Languages – Query Processing - Relevance Feedback and Query Expansion - Automatic Local and Global Analysis – Measuring Effectiveness and Efficiency.

UNIT IV CLASSIFICATION AND CLUSTERING   **9**

Text Classification and Naïve Bayes – Vector Space Classification – Support vector machines and Machine learning on documents. Flat Clustering – Hierarchical Clustering –Matrix decompositions and latent semantic indexing – Fusion and Meta learning.

UNIT V SEARCHING THE WEB   **9**

Searching the Web –Structure of the Web –IR and web search – Static and Dynamic Ranking – Web Crawling and Indexing – Link Analysis - XML Retrieval Multimedia IR: Models and Languages – Indexing and Searching Parallel and Distributed IR – Digital Libraries

                                                  TOTAL: 45 PERIODS

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OUTCOMES:
Upon completion of this course, the students should be able to

- Build an Information Retrieval system using the available tools.
- Identify and design the various components of an Information Retrieval system.
- Apply machine learning techniques to text classification and clustering which is used for efficient Information Retrieval.
- Design an efficient search engine and analyze the Web content structure.

TEXT BOOKS:

1. Christopher D. Manning, Prabhakar Raghavan, Hinrich Schutze, ―Introduction to Information Retrieval‖, Cambridge University Press, First South Asian Edition, 2008**.**

REFERENCES:

1. Implementing and Evaluating Search Engines‖, The MIT Press, Cambridge, Massachusetts London, England, 2010
2. Ricardo Baeza – Yates, Berthier Ribeiro – Neto, ―Modern Information Retrieval: The
concepts and Technology behind Search‖ (ACM Press Books), Second Edition, 2011.

E-RESOURCES:

1. https://csenotescorner.blogspot.com/2018/02/information-retrieval-techniques.html
2. http://www.dce.edu.in/question-bank/cs6007-ir-cse-viis-au.pdf

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TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

19PCP305   SOFTWARE QUALITY ASSURANCE ANDTEST   L T P C
3 0 0 3

OBJECTIVES:
- To understand the basics of testing, test planning &design and test team organization
- To study the various types of test in the life cycle of the software product.
- To build design concepts for system testing and execution
- To learn the software quality assurance ,metrics, defect prevention techniques
- To learn the techniques for quality assurance and applying for applications**.**

UNIT I   SOFTWARE TESTING - CONCEPTS, ISSUES, AND TECHNIQUES   9
Quality Revolution, Verification and Validation, Failure, Error, Fault, and Defect, Objectives of Testing, Testing Activities, Test Case Selection White-Box and Black ,test Planning and design, Test Tools and Automation, . Power of Test. Test Team Organization and Management-Test Groups, Software Quality Assurance Group ,System Test Team Hierarchy, Team Building.

UNIT II SYSTEM TESTING   9
System Testing - System Integration Techniques-Incremental, Top Down Bottom Up Sandwich and Big Bang, Software and Hardware Integration, Hardware Design Verification Tests, Hardware and Software Compatibility Matrix Test Plan for System Integration. Built- in Testing. functional testing - Testing a Function in Context. Boundary Value Analysis, Decision Tables. acceptance testing - Selection of Acceptance Criteria, Acceptance Test Plan, Test Execution Test. software reliability - Fault and Failure, Factors Influencing Software, Reliability Models

UNIT III SYSTEMTESTCATEGORIES   10
System test categories Taxonomy of System Tests, Interface Tests Functionality Tests. GUI Tests, Security Tests Feature Tests, Robustness Tests, Boundary Value Tests Power Cycling Tests Interoperability Tests, Scalability Tests, Stress Tests, Load and Stability Tests, Reliability Tests, Regression Tests, RegulatoryTests.Test Generation from FSM models- State-Oriented Model. Finite-State Machine Transition Tour Method, Testing with State Verification. Test Architectures-Local, distributed, Coordinated, Remote.   system test design- Test Design Factors Requirement Identification, modeling a Test Design Process Test Design Preparedness, Metrics, Test Case Design Effectiveness. system test execution- Modeling Defects, Metrics for Monitoring Test Execution .Defect Reports, Defect Causal Analysis, Beta testing, measuring Test Effectiveness.

UNIT IV SOFTWARE QUALITY   8
Software quality - People's Quality Expectations**,** Frameworks and ISO-9126, McCall's Quality Factors and Criteria – Relationship. Quality Metrics. Quality Characteristics ISO 9000:2000 Software Quality Standard. Maturity models**-** Test Process Improvement ,Testing Maturity Model.

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UNIT V SOFTWARE QUALITYASSURANCE 9

Quality Assurance - Root Cause Analysis, modeling, technologies, standards and methodologies for defect prevention. Fault Tolerance and Failure Containment - Safety Assurance and Damage Control, Hazard analysis using fault-trees and event-trees. Comparing Quality Assurance Techniques and Activities**.** QA Monitoring and Measurement, Risk Identification for Quantifiable Quality Improvement. Case Study: FSM-Based Testing of Web-Based Applications.

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of this course, the students should be able to
- Perform functional and nonfunctional tests in the life cycle of the software product.
- Understand system testing and test execution process.
- Identify defect prevention techniques and software quality assurance metrics.
- Apply techniques of quality assurance for typical applications.

TEXT BOOKS:
1.Software Testing And Quality Assurance-Theory and Practice, Kshirasagar Nak Priyadarshi Tripathy, John Wiley & Sons Inc,2008
2.Software Quality Engineering: Testing, Quality Assurance, and Quantifiable Improvement, Jeff Tian, John Wiley & Sons, Inc., Hoboken, New Jersey. 2005

REFERENCES:
1.Software Quality Assurance - From Theory to Implementation, Daniel Galin, Pearson Education Ltd UK, 2004
2.Software Quality Assurance, MilindLimaye, TMH ,New Delhi, 2011

E-RESOURCES:

1.https://www.kobo.com/us/en/ebook/software-quality-assurance-3

2. https://nptel.ac.in/content/storage2/courses/106105087/pdf/m13L33.pdf

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19PCP315   INFORMATION STORAGE MANAGEMENT   L T P C
3 0 0 3

OBJECTIVES:

- To understand the storage architecture and available technologies.
- To learn to establish & manage data center.
- To learn security aspects of storage & data center.

UNIT I STORAGE TECHNOLOGY   9
Review data creation and the amount of data being created and understand the value of data to a business, challenges in data storage and data management, Solutions available for data storage, Core elements of a data center infrastructure, role of each element in supporting business activities.

UNIT II STORAGE SYSTEMS ARCHITECTURE   9
Hardware and software components of the host environment, Key protocols and concepts used by each component, Physical and logical components of a connectivity environment ,Major physical components of a disk drive and their function, logical constructs of a physical disk, access characteristics, and performance Implications, Concept of RAID and its components, Different RAID levels and their suitability for different application environments:RAID0, RAID1, RAID3, RAID4, RAID5, RAID0+1, RAID1+0, RAID6, Compare and contrast integrated and modular storage systems ,lligh-level architecture and working of an intelligent storage system.

UNIT III INTRODUCTION TO NETWORKED STORAGE   9
Evolution of networked storage, Architecture, components, and topologies of FC-SAN, NAS, and IP-SAN, Benefits of the different networked storage options, understand the need for long-term archiving solutions and describe how CAS full fill the need, understand the appropriateness of the different networked storage options for different application environments

UNIT IV INFORMATION AVAILABILITY, MONITORING & MANAGING DATACENTERS 9
List reasons for planned/unplanned outages and the impact of downtime, Impact of downtime - Business continuity (BC) and disaster recovery (DR) ,RTO and RPO, Identify single points of failure in a storage infrastructure and list solutions to mitigate these failures, architecture of backup/recovery and the different backup/ recovery topologies, replication technologies and their role in ensuring information availability and business continuity, Remote replication technologies and their role in providing disaster recovery and business continuity capabilities. Identify key areas to monitor in a data center, Industry standards for data center monitoring and management, Key metrics to monitor for different components in a storage infrastructure, Key management tasks in a data center

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UNIT V SECURING STORAGE AND STORAGEVIRTUALIZATION   9

Information security, Critical security attributes for information systems, Storage security domains, List and analyzes the common threats in each domain, Virtualization technologies, block-level and file-level virtualization technologies and processes.

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of the course, the students should be able to:

- Select from various storage technologies to suit for required application.
- Apply security measures to safeguard storage &farm.
- Analyse QoS on Storage.

TEXT BOOKS:

1. EMC Corporation, "Information Storage and Management: Storing, Managing, and Protecting Digital Information", Wiley, India, 2010.

REFERENCES:

1. Marc Farley, ―Building Storage Networksǁ, Tata McGraw Hill ,Osborne, 2001.
2. Robert Spalding, ―Storage Networks: The Complete Reference―, Tata McGraw Hill , Osborne, 2003.

E-RESOURCES:
1.http://amzn.to/2yU13u7
2. https://csenotescorner.blogspot.com/2016/08/information-storage-management.html

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LIST OF ELECTIVES OFFERED FOR THE STUDENTS

Department of Computer Science and Engineering

Degree/Branch/Semester: B.E./ CSE / VIII   Academic Year: 2020 - 2021

S.No.	Register No.	Name of the Student	Elective offered by University	Electives Opted by Students
1.	612317104001	Arun Prasanth.K	**Professional Elective - IV** EC8093 - Digital Image Processing CS8085 - Social Network Analysis IT8073 - Information Security CS8087 - Software Defined Networks CS8074 - Cyber Forensics CS8086 - Soft Computing GE8076 - Professional Ethics in Engineering	**Professional Elective - IV** IT8073 - Information Security
2.	612317104002	Bhuvaneshwari.M		
3.	612317104003	Deepika.A		
4.	612317104004	Dharsun.R.J		
5.	612317104005	Dhinakaran.R		
6.	612317104006	Durgadevi.M		
7.	612317104007	Gaushick.G		
8.	612317104009	Gowtham.N		
9.	612317104010	Gowthami.A		
10.	612317104011	Kalaivani.S		
11.	612317104013	Kokilavani R		
12.	612317104014	Manivannan L		
13.	612317104015	Mohan.K		
14.	612317104018	Monisha.R		
15.	612317104021	Porkalai.M		
16.	612317104022	Praveen.P		
17.	612317104023	Ramya Krishnan.A		
18.	612317104024	Sathis Kumar.C		
19.	612317104026	Shabika.V		
20.	612317104027	Sini.A.M		
21.	612317104028	Soundaraj.G		
22.	612317104029	Subash.P		
23.	612317104030	Subiksha.M		

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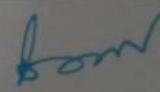
			Professional Elective - V	Professional Elective - V
24.	612317104031	Vijayalakshmi M		
25.	612317104702	Uvaraj.S		
26.	612317104703	Pavithra.V		
27.	612317104704	Monika.S		
28.	612317104705	Dharmila.P		
29.	612317104706	Ajith.M	CS8080 - Information Retrieval Techniques	
30.	612317104707	Karthika.G	CS8078 - Green Computing	
31.	612317104708	Nilani.P	CS8076 - GPU Architecture and Programming	
32.	612317104709	Ishwaryadevi.M		
33.	612317104710	Abitha.D		
34.	612317104711	Gogulakrishnan.V	CS8084 - Natural Language Processing	CS8080 - Information Retrieval Techniques
35.	612317104712	Subakeerthana.R	CS8001 - Parallel Algorithms	
36.	612317104714	Bagyalakshmi.V	IT8077 - Speech Processing	
37.	612317104715	Gomathi.S	GE8073 - Fundamentals of Nano Science	
38.	612317104716	Sankar Dinesh.N		
39.	612317104717	Janaki.M		
40.	612317104718	Meenakshi.K		
41.	612317104719	Sakthi Vel.A		
42.	612317104720	Tamilarasi.S		
43.	612317104721	Hema.T		
44.	612317104722	Vigneshwaran.G		
45.	612317104723	Arunkumar.K		
46.	612317104724	Monisha.P		

H.O.D.

PRINCIPAL

SENGUNTHAR ENGINEERING COLLEGE
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(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

LIST OF ELECTIVES OFFERED FOR THE STUDENTS

Department of Computer Science and Engineering

Degree/Branch/Semester: B.E./ CSE / VI

Academic Year: 2020 – 2021

S.No.	Register No.	Name of the Student	Elective offered by University	Electives Opted by Students
1.	612318104001	Arthika R		
2.	612318104002	Aswini R		
3.	612318104003	Bharath D	**Professional Elective I**	**Professional Elective I**
4.	612318104004	Bhuvaneshkumar S		
5.	612318104005	Boopathiraja K	CS8075 - Data Warehousing	CS8075 - Data
6.	612318104006	Dharmalingam E	and Data Mining	Warehousing and Data
7.	612318104007	Dinesh B	IT8076 - Software Testing	Mining
8.	612318104008	Durai Murugan S K	IT8072 - Embedded Systems	
9.	612318104009	Geethaipriyan S	CS8072 - Agile Methodologies	
10.	612318104010	Glarance A	CS8077 - Graph Theory and	
11.	612318104011	Gokulrajan T	Applications	
12.	612318104013	Gowthaman S G	IT8071- Digital Signal	
13.	612318104014	Harini P	Processing	
14.	612318104015	Ilamaaran C	GE8075 - Intellectual Property	
15.	612318104016	Jeeva P	Rights	
16.	612318104018	Kokila K		
17.	612318104019	Mohan R		
18.	612318104021	Monika B		
19.	612318104022	Monika V		
20.	612318104023	Monish R		
21.	612318104024	Nandhakumar M		
22.	612318104025	Nandhini B		
23.	612318104026	Nandhini S		
24.	612318104027	Naveen Kumar M		

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TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU
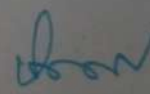
JAS-ANZ
BSCIC
ISO 9001 REGISTERED

25.	612318104028	Naveen Kumar P		
26.	612318104029	Nithis Kumar S		
27.	612318104031	Pravinya V		
28.	612318104032	Priyanka G		
29.	612318104033	Ravindhar M		
30.	612318104034	Rithanya D		
31.	612318104035	Rohini J		
32.	612318104037	Ruthis S		
33.	612318104038	Sangavi S		
34.	612318104039	Sathiyapriya S		
35.	612318104040	Shalini M		
36.	612318104041	Shalini S		
37.	612318104043	Sowdeshwaran M		
38.	612318104044	Subash K		
39.	612318104045	Surenkumar A		
40.	612318104046	Thanikadharshini M		
41.	612318104047	Vaishnavi T		
42.	612318104048	Vinitha Sree S		
43.	612318104049	Yogashini V		
44.	612318104301	Elango.M		

H.O.D.

PRINCIPAL

10.   Automated Attack and Penetration Tools
              Exploring N-Stalker, a Vulnerability Assessment Tool
11.   Defeating Malware
              i) Building Trojans ii) Rootkit Hunter

TOTAL: 60 PERIODS

OUTCOMES:
Upon Completion of the course, the students will be able to:
*   Develop code for classical Encryption Techniques to solve the problems.
*   Build cryptosystems by applying symmetric and public key encryption algorithms.
*   Construct code for authentication algorithms.
*   Develop a signature scheme using Digital signature standard.
*   Demonstrate the network security system using open source tools

REFERENCES:
1.   Build Your Own Security Lab, Michael Gregg, Wiley India

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS: SOFTWARE: C / C++ / Java or equivalent compiler GnuPG, Snort, N-Stalker or Equivalent **HARDWARE:** Standalone desktops - 30 Nos. (or) Server supporting 30 terminals or more.

CS8811	PROJECT WORK	L T P C
		0 0 20 10

OBJECTIVES:
*   To develop the ability to solve a specific problem right from its identification and literature review till the successful solution of the same. To train the students in preparing project reports and to face reviews and viva voce examination.

The students in a group of 3 to 4 works on a topic approved by the head of the department under the guidance of a faculty member and prepares a comprehensive project report after completing the work to the satisfaction of the supervisor. The progress of the project is evaluated based on a minimum of three reviews. The review committee may be constituted by the Head of the Department. A project report is   required at the end of the semester. The project work is evaluated   based   on   oral presentation and the project report jointly by external and internal examiners constituted by the Head of the Department.

TOTAL: 300 PERIODS

OUTCOME:
*   On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.

CS8075	DATA WAREHOUSING AND DATA MINING	L T P C
		3 0 0 3

OBJECTIVES:
*   To understand data warehouse concepts, architecture, business analysis and tools
*   To understand data pre-processing and data visualization techniques
*   To study algorithms for finding hidden and interesting patterns in data
*   To understand and apply various classification and clustering techniques using tools.

UNIT I   DATA WAREHOUSING, BUSINESS ANALYSIS AND ON-LINE ANALYTICAL PROCESSING (OLAP)   9

Basic Concepts - Data Warehousing Components – Building a Data Warehouse – Database Architectures for Parallel Processing – Parallel DBMS Vendors - Multidimensional Data Model – Data Warehouse Schemas for Decision Support, Concept Hierarchies -Characteristics of OLAP Systems – Typical OLAP Operations, OLAP and OLTP.

UNIT II   DATA MINING – INTRODUCTION   9

Introduction to Data Mining Systems – Knowledge Discovery Process – Data Mining Techniques – Issues – applications- Data Objects and attribute types, Statistical description of data, Data Preprocessing – Cleaning, Integration, Reduction, Transformation and discretization, Data Visualization, Data similarity and dissimilarity measures.

UNIT III   DATA MINING - FREQUENT PATTERN ANALYSIS   9

Mining Frequent Patterns, Associations and Correlations – Mining Methods- Pattern Evaluation Method – Pattern Mining in Multilevel, Multi Dimensional Space – Constraint Based Frequent Pattern Mining, Classification using Frequent Patterns

UNIT IV   CLASSIFICATION AND CLUSTERING   9

Decision Tree Induction - Bayesian Classification – Rule Based Classification – Classification by Back Propagation – Support Vector Machines –– Lazy Learners – Model Evaluation and Selection-Techniques to improve Classification Accuracy.

Clustering Techniques – Cluster analysis-Partitioning Methods - Hierarchical Methods – Density Based Methods - Grid Based Methods – Evaluation of clustering – Clustering high dimensional data- Clustering with constraints, Outlier analysis-outlier detection methods.

UNIT V   WEKA TOOL   9

Datasets – Introduction, Iris plants database, Breast cancer database, Auto imports database - Introduction to WEKA, The Explorer – Getting started, Exploring the explorer, Learning algorithms, Clustering algorithms, Association–rule learners.

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students should be able to:
- Design a Data warehouse system and perform business analysis with OLAP tools.
- Apply suitable pre-processing and visualization techniques for data analysis
- Apply frequent pattern and association rule mining techniques for data analysis
- Apply appropriate classification and clustering techniques for data analysis

TEXT BOOK:
1. Jiawei Han and Micheline Kamber, "Data Mining Concepts and Techniques", Third Edition, Elsevier, 2012.

REFERENCES:
1. Alex Berson and Stephen J.Smith, "Data Warehousing, Data Mining & OLAP", Tata McGraw – Hill Edition, 35th Reprint 2016.
2. K.P. Soman, Shyam Diwakar and V. Ajay, "Insight into Data Mining Theory and Practice", Eastern Economy Edition, Prentice Hall of India, 2006.
3. Ian H.Witten and Eibe Frank, "Data Mining: Practical Machine Learning Tools and Techniques", Elsevier, Second Edition.

IT8076   **SOFTWARE TESTING**   **L T P C**
                                                                    3 0 0 3

OBJECTIVES:
- To learn the criteria for test cases.
- To learn the design of test cases.
- To understand test management and test automation techniques.
- To apply test metrics and measurements.

UNIT I   INTRODUCTION   9
Testing as an Engineering Activity – Testing as a Process – Testing Maturity Model- Testing axioms – Basic definitions – Software Testing Principles – The Tester's Role in a Software Development Organization – Origins of Defects – Cost of defects – Defect Classes – The Defect Repository and Test Design –Defect Examples- Developer/Tester Support of Developing a Defect Repository.

UNIT II   TEST CASE DESIGN STRATEGIES   9
Test case Design Strategies – Using Black Box Approach to Test Case Design – Boundary Value Analysis – Equivalence Class Partitioning – State based testing – Cause-effect graphing – Compatibility testing – user documentation testing – domain testing - Random Testing – Requirements based testing – Using White Box Approach to Test design – Test Adequacy Criteria – static testing vs. structural testing – code functional testing – Coverage and Control Flow Graphs – Covering Code Logic – Paths – code complexity testing – Additional White box testing approaches- Evaluating Test Adequacy Criteria.

UNIT III   LEVELS OF TESTING   9
The need for Levels of Testing – Unit Test – Unit Test Planning – Designing the Unit Tests – The Test Harness – Running the Unit tests and Recording results – Integration tests – Designing Integration Tests – Integration Test Planning – Scenario testing – Defect bash elimination System Testing – Acceptance testing – Performance testing – Regression Testing – Internationalization testing – Ad-hoc testing – Alpha, Beta Tests – Testing OO systems – Usability and Accessibility testing – Configuration testing –Compatibility testing – Testing the documentation – Website testing.

UNIT IV   TEST MANAGEMENT   9
People and organizational issues in testing – Organization structures for testing teams – testing services – Test Planning – Test Plan Components – Test Plan Attachments – Locating Test Items – test management – test process – Reporting Test Results – Introducing the test specialist – Skills needed by a test specialist – Building a Testing Group- The Structure of Testing Group- .The Technical Training Program.

UNIT V   TEST AUTOMATION   9
Software test automation – skills needed for automation – scope of automation – design and architecture for automation – requirements for a test tool – challenges in automation – Test metrics and measurements – project, progress and productivity metrics.

TOTAL: 45 PERIODS

OUTCOMES:
At the end of the course the students will be able to:
- Design test cases suitable for a software development for different domains.
- Identify suitable tests to be carried out.
- Prepare test planning based on the document.
- Document test plans and test cases designed.
- Use automatic testing tools.
- Develop and validate a test plan.

TEXT BOOKS:
1. Srinivasan Desikan and Gopalaswamy Ramesh, "Software Testing – Principles and Practices", Pearson Education, 2006.
2. Ron Patton, "Software Testing", Second Edition, Sams Publishing, Pearson Education, 2007. AU Library.com

REFERENCES:
1. Ilene Burnstein, "Practical Software Testing", Springer International Edition, 2003.
2. Edward Kit," Software Testing in the Real World – Improving the Process", Pearson Education, 1995.
3. Boris Beizer," Software Testing Techniques" – 2nd Edition, Van Nostrand Reinhold, New York, 1990.
4. Aditya P. Mathur, "Foundations of Software Testing _ Fundamental Algorithms and Techniques", Dorling Kindersley (India) Pvt. Ltd., Pearson Education, 2008.

IT8072	EMBEDDED SYSTEMS	L T P C
		3 0 0 3

OBJECTIVES:
- To learn the architecture and programming of ARM processor.
- To become familiar with the embedded computing platform design and analysis.
- To get thorough knowledge in interfacing concepts
- To design an embedded system and to develop programs

UNIT I   INTRODUCTION TO EMBEDDED COMPUTING AND ARM PROCESSORS   9
Complex systems and micro processors– Embedded system design process –Design example: Model train controller- Instruction sets preliminaries - ARM Processor – CPU: programming input and output- supervisor mode, exceptions and traps – Co-processors- Memory system mechanisms – CPU performance- CPU power consumption.

UNIT II   EMBEDDED COMPUTING PLATFORM DESIGN   9
The CPU Bus-Memory devices and systems–Designing with computing platforms – consumer electronics architecture – platform-level performance analysis - Components for embedded programs- Models of programs- Assembly, linking and loading – compilation techniques- Program level performance analysis – Software performance optimization – Program level energy and power analysis and optimization – Analysis and optimization of program size- Program validation and testing.

UNIT III   SENSOR INTERFACING WITH ARDUINO   9
Basics of hardware design and functions of basic passive components-sensors and actuators-Arduino code - library file for sensor interfacing-construction of basic applications

UNIT IV   EMBEDDED FIRMWARE   9
Reset Circuit, Brown-out Protection Circuit-Oscillator Unit - Real Time Clock-Watchdog Timer - Embedded Firmware Design Approaches and Development Languages.

UNIT V   EMBEDDED C PROGRAMMING   9
Introduction-Creating 'hardware delays' using Timer 0 and Timer 1-Reading switches-Adding Structure to the code-Generating a minimum and maximum delay-Example: Creating a portable hardware delay- Timeout mechanisms-Creating loop timeouts-Testing loop timeouts- hardware timeouts-Testing a hardware timeout

TOTAL : 45 PERIODS

OUTCOMES:
Upon completion of the course, students will be able to:
- Describe the architecture and programming of ARM processor.
- Explain the concepts of embedded systems
- Understand the Concepts of peripherals and interfacing of sensors.
- Capable of using the system design techniques to develop firmware
- Illustrate the code for constructing a system

TEXT BOOKS:
1.Marilyn Wolf, "Computers as Components - Principles of Embedded Computing System Design", Third Edition "Morgan Kaufmann Publisher (An imprint from Elsevier), 2012. (unit I & II)
2 https://www.coursera.org/learn/interface-with-arduino#syllabus (Unit III)
3 .Michael J. Pont, "Embedded C", 2 nd Edition, Pearson Education, 2008.(Unit IV & V)

REFERENCES:
1.Shibu K.V, "Introduction to Embedded Systems", McGraw Hill.2014
2.Jonathan W.Valvano, "Embedded Microcomputer Systems Real Time Interfacing", Third Edition Cengage   Learning, 2012
3 Raj Kamal, "Embedded Systems-Architecture,programming and design", 3 edition,TMH.2015
4. Lyla, "Embedded Systems", Pearson , 2013
6. David E. Simon, "An Embedded Software Primer", Pearson Education,2000.

CS8072   **AGILE METHODOLOGIES**   **L   T   P   C**
                                                                                            3   0   0   3
OBJECTIVES:
- To provide students with a theoretical as well as practical understanding of agile software development practices and how small teams can apply them to create high-quality software.
- To provide a good understanding of software design and a set of software technologies and APIs.
- To do a detailed examination and demonstration of Agile development and testing techniques.
- To understand the benefits and pitfalls of working in an Agile team.
- To understand Agile development and testing.

UNIT I   AGILE METHODOLOGY   9
Theories for Agile Management – Agile Software Development – Traditional Model vs. Agile Model - Classification of Agile Methods – Agile Manifesto and Principles – Agile Project Management – Agile Team Interactions – Ethics in Agile Teams - Agility in Design, Testing – Agile Documentations – Agile Drivers, Capabilities and Values

UNIT II   AGILE PROCESSES   9
Lean Production - SCRUM, Crystal, Feature Driven Development- Adaptive Software Development - Extreme Programming: Method Overview – Lifecycle – Work Products, Roles and Practices.

UNIT III   AGILITY AND KNOWLEDGE MANAGEMENT   9
Agile Information Systems – Agile Decision Making - Earl'S Schools of KM – Institutional Knowledge Evolution Cycle – Development, Acquisition, Refinement, Distribution, Deployment , Leveraging – KM in Software Engineering – Managing Software Knowledge – Challenges of Migrating to Agile Methodologies – Agile Knowledge Sharing – Role of Story-Cards – Story-Card Maturity Model (SMM).

UNIT IV   AGILITY AND REQUIREMENTS ENGINEERING   9
Impact of Agile Processes in RE–Current Agile Practices – Variance – Overview of RE Using Agile – Managing Unstable Requirements – Requirements Elicitation – Agile Requirements Abstraction Model – Requirements Management in Agile Environment, Agile Requirements Prioritization – Agile Requirements Modeling and Generation – Concurrency in Agile Requirements Generation.

UNIT V   AGILITY AND QUALITY ASSURANCE   9
Agile Product Development – Agile Metrics – Feature Driven Development (FDD) – Financial and Production Metrics in FDD – Agile Approach to Quality Assurance - Test Driven Development – Agile Approach in Global Software Development.

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
- Realize the importance of interacting with business stakeholders in determining the requirements for a software system
- Perform iterative software development processes: how to plan them, how to execute them.
- Point out the impact of social aspects on software development success.
- Develop techniques and tools for improving team collaboration and software quality.
- Perform Software process improvement as an ongoing task for development teams.
- Show how agile approaches can be scaled up to the enterprise level.

TEXT BOOKS:
1. David J. Anderson and Eli Schragenheim, "Agile Management for Software Engineering: Applying the Theory of Constraints for Business Results", Prentice Hall, 2003.
2. Hazza and Dubinsky, "Agile Software Engineering, Series: Undergraduate Topics in Computer Science", Springer, 2009.

REFERENCES:
1. Craig Larman, "Agile and Iterative Development: A Manager's Guide", Addison-Wesley, 2004.
2. Kevin C. Desouza, "Agile Information Systems: Conceptualization, Construction, and Management", Butterworth-Heinemann, 2007.

CS8077	**GRAPH THEORY AND APPLICATIONS**	**L**	**T**	**P**	**C**
		3	**0**	**0**	**3**

OBJECTIVES:
- To understand fundamentals of graph theory.
- To study proof techniques related to various concepts in graphs.
- To explore modern applications of graph theory.

UNIT I   9
Introduction - Graph Terminologies - Types of Graphs - Sub Graph- Multi Graph - Regular Graph - Isomorphism - Isomorphic Graphs - Sub-graph - Euler graph - Hamiltonian Graph - Related Theorems.

UNIT II   9
Trees -Properties- Distance and Centres - Types - Rooted Tree-- Tree Enumeration- Labeled Tree - Unlabeled Tree - Spanning Tree - Fundamental Circuits- Cut Sets - Properties - Fundamental Circuit and Cut-set- Connectivity- Separability -Related Theorems.

UNIT III   **9**

Network Flows - Planar Graph - Representation - Detection - Dual Graph - Geometric and Combinatorial Dual - Related Theorems - Digraph - Properties - Euler Digraph.

UNIT IV   **9**

Matrix Representation - Adjacency matrix- Incidence matrix- Circuit matrix - Cut-set matrix - Path Matrix- Properties - Related Theorems - Correlations. Graph Coloring - Chromatic Polynomial - Chromatic Partitioning - Matching - Covering - Related Theorems.

UNIT V   **9**

Graph Algorithms- Connectedness and Components- Spanning Tree- Fundamental Circuits- Cut Vertices- Directed Circuits- Shortest Path - Applications overview.

                                                  TOTAL : 45 PERIODS

OUTCOMES:
Upon completion of this course, the students should be able to
- Understand the basic concepts of graphs, and different types of graphs
- Understand the properties, theorems and be able to prove theorems.
- Apply suitable graph model and algorithm for solving applications.

TEXT BOOKS:
1. Narsingh Deo, "Graph Theory with Application to Engineering and Computer Science", Prentice-Hall of India Pvt.Ltd, 2003.
2. L.R.Foulds , "Graph Theory Applications", Springer ,2016.

REFERENCES:
1. Bondy, J. A. and Murty, U.S.R., "Graph Theory with Applications", North Holland Publication,2008.
2. West, D. B., "Introduction to Graph Theory", Pearson Education, 2011.
3. John Clark, Derek Allan Holton, "A First Look at Graph Theory", World Scientific Publishing Company, 1991.
4. Diestel, R, "Graph Theory", Springer,3rd Edition,2006.
5. Kenneth H.Rosen, "Discrete Mathematics and Its Applications", Mc Graw Hill , 2007.

		L	**T**	**P**	**C**
IT8071	**DIGITAL SIGNAL PROCESSING**	**3**	**0**	**0**	**3**

OBJECTIVES:
- To understand the basics of discrete time signals, systems and their classifications.
- To analyze the discrete time signals in both time and frequency domain.
- To design lowpass digital IIR filters according to predefined specifications based on analog filter theory and analog-to-digital filter transformation.
- To design Linear phase digital FIR filters using fourier method, window technique
- To realize the concept and usage of DSP in various engineering fields.

UNIT I   **DISCRETE TIME SIGNALS AND SYSTEMS**   **9**
Introduction to DSP – Basic elements of DSP– Sampling of Continuous time signals–Representation, Operation and Classification of Discrete Time Signal–Classification of Discrete Time Systems–Discrete Convolution: Linear and Circular–Correlation.

UNIT II   **ANALYSIS OF LTI DISCRETE TIME SIGNALS AND SYSTEMS**   **9**
Analysis of LTI Discrete Time Systems using DFT–Properties of DFT–Inverse DFT– Analysis of LTI Discrete Time Systems using FFT Algorithms– Inverse DFT using FFT Algorithm.

UNIT III   INFINITE IMPULSE RESPONSE FILTERS   9
Frequency response of Analog and Digital IIR filters–Realization of IIR filter–Design of analog low pass filter–Analog to Digital filter Transformation using Bilinear Transformation and Impulse Invariant method–Design of digital IIR filters (LPF, HPF, BPF, and BRF) using various transformation techniques.

UNIT IV   FINITE IMPULSE RESPONSE FILTERS   9
Linear Phase FIR filter–Phase delay–Group delay–Realization of FIR filter–Design of Causal and Non-causal FIR filters (LPF, HPF, BPF and BRF) using Window method (Rectangular, Hamming window, Hanning window) –Frequency Sampling Technique.

UNIT V   APPLICATIONS OF DSP   9
Multirate Signal Processing: Decimation, Interpolation, Spectrum of the sampled signal –Processing of Audio and Radar signal.

TOTAL: 45 PERIODS

OUTCOMES:
At the end of the course, the students should be able to:
- Perform mathematical operations on signals.
- Understand the sampling theorem and perform sampling on continuous-time signals to get discrete time signal by applying advanced knowledge of the sampling theory.
- Transform the time domain signal into frequency domain signal and vice-versa.
- Apply the relevant theoretical knowledge to design the digital IIR/FIR filters for the given analog specifications.

TEXT BOOK:
1. John G. Proakis & Dimitris G.Manolakis, "Digital Signal Processing – Principles, Algorithms & Applications", Fourth Edition, Pearson Education / Prentice Hall, 2007.

REFERENCES
1. Richard G. Lyons, "*Understanding Digital Signal Processing*". Second Edition, Pearson Education.
2. A.V.Oppenheim, R.W. Schafer and J.R. Buck, "*Discrete-Time Signal Processing*", 8th Indian Reprint, Pearson, 2004.
3. Emmanuel C.Ifeachor, & Barrie.W.Jervis, "*Digital Signal Processing*", Second Edition, Pearson Education / Prentice Hall, 2002.
4. William D. Stanley, "Digital Signal Processing", Second Edition, Reston Publications.

GE8075	INTELLECTUAL PROPERTY RIGHTS	L T P C
		3 0 0 3

OBJECTIVE:
- To give an idea about IPR, registration and its enforcement.

UNIT I   INTRODUCTION   9
Introduction to IPRs, Basic concepts and need for Intellectual Property - Patents, Copyrights, Geographical Indications, IPR in India and Abroad – Genesis and Development – the way from WTO to WIPO –TRIPS, Nature of Intellectual Property, Industrial Property, technological Research, Inventions and Innovations – Important examples of IPR.

UNIT II   REGISTRATION OF IPRs   10
Meaning and practical aspects of registration of Copy Rights, Trademarks, Patents, Geographical Indications, Trade Secrets and Industrial Design registration in India and Abroad

UNIT III   AGREEMENTS AND LEGISLATIONS   10

International Treaties and Conventions on IPRs, TRIPS Agreement, PCT Agreement, Patent Act of India, Patent Amendment Act, Design Act, Trademark Act, Geographical Indication Act.

UNIT IV   DIGITAL PRODUCTS AND LAW   9

Digital Innovations and Developments as Knowledge Assets – IP Laws, Cyber Law and Digital Content Protection – Unfair Competition – Meaning and Relationship between Unfair Competition and IP Laws – Case Studies.

UNIT V   ENFORCEMENT OF IPRs   7

Infringement of IPRs, Enforcement Measures, Emerging issues – Case Studies.

TOTAL : 45 PERIODS

OUTCOME:
- Ability to manage Intellectual Property portfolio to enhance the value of the firm.

TEXT BOOKS:
1. V. Scople Vinod, Managing Intellectual Property, Prentice Hall of India pvt Ltd, 2012
2. S. V. Satakar, "Intellectual Property Rights and Copy Rights, Ess Ess Publications, New Delhi, 2002

REFERENCES:
1. Deborah E. Bouchoux, "Intellectual Property: The Law of Trademarks, Copyrights, Patents and Trade Secrets", Cengage Learning, Third Edition, 2012.
2. Prabuddha Ganguli,"Intellectual Property Rights: Unleashing the Knowledge Economy", McGraw Hill Education, 2011.
3. Edited by Derek Bosworth and Elizabeth Webster, The Management of Intellectual Property, Edward Elgar Publishing Ltd., 2013.

CS8091	BIG DATA ANALYTICS	L	T	P	C
		3	0	0	3

OBJECTIVES:
- To know the fundamental concepts of big data and analytics.
- To explore tools and practices for working with big data
- To learn about stream computing.
- To know about the research that requires the integration of large amounts of data.

UNIT I   INTRODUCTION TO BIG DATA   9

Evolution of Big data - Best Practices for Big data Analytics - Big data characteristics - Validating - The Promotion of the Value of Big Data - Big Data Use Cases- Characteristics of Big Data Applications - Perception and Quantification of Value -Understanding Big Data Storage - A General Overview of High-Performance Architecture - HDFS - MapReduce and YARN - Map Reduce Programming Model

UNIT II   CLUSTERING AND CLASSIFICATION   9

Advanced Analytical Theory and Methods: Overview of Clustering - K-means - Use Cases - Overview of the Method - Determining the Number of Clusters - Diagnostics - Reasons to Choose and Cautions .- Classification: Decision Trees - Overview of a Decision Tree - The General Algorithm - Decision Tree Algorithms - Evaluating a Decision Tree - Decision Trees in R - Naïve Bayes   - Bayes' Theorem - Naïve Bayes Classifier.

TEXTBOOKS:
1. Singhal J.P. "Disaster Management", Laxmi Publications, 2010. ISBN-10: 9380386427 ISBN-13: 978-9380386423
2. Tushar Bhattacharya, "Disaster Science and Management", McGraw Hill India Education Pvt. Ltd., 2012. **ISBN-10:** 1259007367, **ISBN-13:** 978-1259007361]
3. Gupta Anil K, Sreeja S. Nair. Environmental Knowledge for Disaster Risk Management, NIDM, New Delhi, 2011
4. Kapur Anu Vulnerable India: A Geographical Study of Disasters, IIAS and Sage Publishers, New Delhi, 2010.

REFERENCES
1. Govt. of India: Disaster Management Act , Government of India, New Delhi, 2005
2. Government of India, National Disaster Management Policy,2009.

EC8093	DIGITAL IMAGE PROCESSING	L	T	P	C
		3	0	0	3

OBJECTIVES:
- To become familiar with digital image fundamentals
- To get exposed to simple image enhancement techniques in Spatial and Frequency domain.
- To learn concepts of degradation function and restoration techniques.
- To study the image segmentation and representation techniques.
- To become familiar with image compression and recognition methods

UNIT I   DIGITAL IMAGE FUNDAMENTALS   9
Steps in Digital Image Processing – Components – Elements of Visual Perception – Image Sensing and Acquisition – Image Sampling and Quantization – Relationships between pixels - Color image fundamentals - RGB, HSI models, Two-dimensional mathematical preliminaries, 2D transforms - DFT, DCT.

UNIT II   IMAGE ENHANCEMENT   9
Spatial Domain: Gray level transformations – Histogram processing – Basics of Spatial Filtering– Smoothing and Sharpening Spatial Filtering, Frequency Domain: Introduction to Fourier Transform– Smoothing and Sharpening frequency domain filters – Ideal, Butterworth and Gaussian filters, Homomorphic filtering, Color image enhancement.

UNIT III   IMAGE RESTORATION   9
Image Restoration - degradation model, Properties, Noise models – Mean Filters – Order Statistics – Adaptive filters – Band reject Filters – Band pass Filters – Notch Filters – Optimum Notch Filtering – Inverse Filtering – Wiener filtering

UNIT IV   IMAGE SEGMENTATION   9
Edge detection, Edge linking via Hough transform – Thresholding - Region based segmentation – Region growing – Region splitting and merging – Morphological processing- erosion and dilation, Segmentation by morphological watersheds – basic concepts – Dam construction – Watershed segmentation algorithm.

UNIT V   IMAGE COMPRESSION AND RECOGNITION   9
Need for data compression, Huffman, Run Length Encoding, Shift codes, Arithmetic coding, JPEG standard, MPEG. Boundary representation, Boundary description, Fourier Descriptor, Regional Descriptors – Topological feature, Texture - Patterns and Pattern classes - Recognition based on matching.

TOTAL   45   PERIODS

OUTCOMES:
At the end of the course, the students should be able to:
- Know and understand the basics and fundamentals of digital image processing, such as digitization, sampling, quantization, and 2D-transforms.
- Operate on images using the techniques of smoothing, sharpening and enhancement.
- Understand the restoration concepts and filtering techniques.
- Learn the basics of segmentation, features extraction, compression and recognition methods for color models.

TEXT BOOKS:
1. Rafael C. Gonzalez, Richard E. Woods, 'Digital Image Processing', Pearson, Third Edition, 2010.
2. Anil K. Jain, 'Fundamentals of Digital Image Processing', Pearson, 2002.

REFERENCES:
1. Kenneth R. Castleman, 'Digital Image Processing', Pearson, 2006.
2. Rafael C. Gonzalez, Richard E. Woods, Steven Eddins, 'Digital Image Processing using MATLAB', Pearson Education, Inc., 2011.
3. D,E. Dudgeon and RM. Mersereau, 'Multidimensional Digital Signal Processing', Prentice Hall Professional Technical Reference, 1990.
4. William K. Pratt, 'Digital Image Processing', John Wiley, New York, 2002
5. Milan Sonka et al 'Image processing, analysis and machine vision', Brookes/Cole, Vikas Publishing House, 2nd edition, 1999

CS8085	SOCIAL NETWORK ANALYSIS	L T P C
		3 0 0 3

OBJECTIVES:
- To understand the concept of semantic web and related applications.
- To learn knowledge representation using ontology.
- To understand human behaviour in social web and related communities.
- To learn visualization of social networks.

UNIT I   INTRODUCTION   9
Introduction to Semantic Web: Limitations of current Web - Development of Semantic Web - Emergence of the Social Web - Social Network analysis: Development of Social Network Analysis - Key concepts and measures in network analysis - Electronic sources for network analysis: Electronic discussion networks, Blogs and online communities - Web-based networks - Applications of Social Network Analysis.

UNIT II   MODELLING, AGGREGATING AND KNOWLEDGE
**   REPRESENTATION   9**
Ontology and their role in the Semantic Web: Ontology-based knowledge Representation - Ontology languages for the Semantic Web: Resource Description Framework - Web Ontology Language - Modelling and aggregating social network data: State-of-the-art in network data representation - Ontological representation of social individuals - Ontological representation of social relationships - Aggregating and reasoning with social network data - Advanced representations.

UNIT III   EXTRACTION AND MINING COMMUNITIES IN WEB SOCIAL
**   NETWORKS   9**
Extracting evolution of Web Community from a Series of Web Archive - Detecting communities in social networks - Definition of community - Evaluating communities - Methods for community detection and   mining - Applications of community mining algorithms - Tools for detecting

communities social network infrastructures and communities - Decentralized online social networks - Multi-Relational characterization of dynamic social network communities.

UNIT IV   PREDICTING HUMAN BEHAVIOUR AND PRIVACY ISSUES   9

Understanding and predicting human behaviour for social communities - User data management - Inference and Distribution - Enabling new human experiences - Reality mining - Context - Awareness - Privacy in online social networks - Trust in online environment - Trust models based on subjective logic - Trust network analysis - Trust transitivity analysis - Combining trust and reputation - Trust derivation based on trust comparisons - Attack spectrum and countermeasures.

UNIT V   VISUALIZATION AND APPLICATIONS OF SOCIAL NETWORKS   9

Graph theory - Centrality - Clustering - Node-Edge Diagrams - Matrix representation - Visualizing online social networks, Visualizing social networks with matrix-based representations - Matrix and Node-Link Diagrams - Hybrid representations - Applications - Cover networks - Community welfare - Collaboration networks - Co-Citation networks.

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students should be able to:
- Develop semantic web related applications.
- Represent knowledge using ontology.
- Predict human behaviour in social web and related communities.
- Visualize social networks.

TEXT BOOKS:
1. Peter Mika, "Social Networks and the Semantic Web", First Edition, Springer 2007.
2. Borko Furht, "Handbook of Social Network Technologies and Applications", 1st Edition, Springer, 2010.

REFERENCES:
1. Guandong Xu ,Yanchun Zhang and Lin Li, "Web Mining and Social Networking – Techniques and applications", First Edition, Springer, 2011.
2. Dion Goh and Schubert Foo, "Social information Retrieval Systems: Emerging Technologies and Applications for Searching the Web Effectively", IGI Global Snippet, 2008.
3. Max Chevalier, Christine Julien and Chantal Soulé-Dupuy, "Collaborative and Social Information Retrieval and Access: Techniques for Improved user Modelling", IGI Global Snippet, 2009.
4. John G. Breslin, Alexander Passant and Stefan Decker, "The Social Semantic Web", Springer, 2009.

IT8073	INFORMATION SECURITY	L	T	P	C
		3	0	0	3

OBJECTIVES:
- To understand the basics of Information Security
- To know the legal, ethical and professional issues in Information Security
- To know the aspects of risk management
- To become aware of various standards in this area
- To know the technological aspects of Information Security

UNIT I   INTRODUCTION   9

History, What is Information Security?, Critical Characteristics of Information, NSTISSC Security Model, Components of an Information System, Securing the Components, Balancing Security and Access, The SDLC, The Security SDLC

UNIT II   SECURITY INVESTIGATION   9
Need for Security, Business Needs, Threats, Attacks, Legal, Ethical and Professional Issues -
An Overview of Computer Security - Access Control Matrix, Policy-Security policies,
Confidentiality policies, Integrity policies and Hybrid policies

UNIT III   SECURITY ANALYSIS   9
Risk Management: Identifying and Assessing Risk, Assessing and Controlling Risk -
Systems: Access Control Mechanisms, Information Flow and Confinement Problem

UNIT IV   LOGICAL DESIGN   9
Blueprint for Security, Information Security Policy, Standards and Practices, ISO 17799/BS
7799, NIST Models, VISA International Security Model, Design of Security Architecture,
Planning for Continuity

UNIT V   PHYSICAL DESIGN   9
Security Technology, IDS, Scanning and Analysis Tools, Cryptography, Access Control
Devices, Physical Security, Security and Personnel

TOTAL   45   PERIODS

OUTCOMES:
At the end of this course, the students should be able to:
- Discuss the basics of information security
- Illustrate the legal, ethical and professional issues in information security
- Demonstrate the aspects of risk management.
- Become aware of various standards in the Information Security System
- Design and implementation of Security Techniques.

TEXT BOOK:
1.   Michael E Whitman and Herbert J Mattord, "Principles of Information Security", Vikas
      Publishing House, New Delhi, 2003

REFERENCES
1.   Micki Krause, Harold F. Tipton, " Handbook of Information Security Management",
      Vol 1-3 CRCPress LLC, 2004.
2.   Stuart McClure, Joel Scrambray, George Kurtz, "Hacking Exposed", Tata McGraw-
      Hill, 2003
3.   Matt Bishop, " Computer Security Art and Science", Pearson/PHI, 2002.

CS8087	SOFTWARE DEFINED NETWORKS	L	T	P	C
		3	0	0	3

OBJECTIVES:
- To learn the fundamentals of software defined networks.
- To understand the separation of the data plane and the control plane.
- To study about the SDN Programming.
- To study about the various applications of SDN

UNIT I   INTRODUCTION   9
History of Software Defined Networking (SDN) – Modern Data Center – Traditional Switch
Architecture – Why SDN – Evolution of SDN – How SDN Works – Centralized and
Distributed Control and Date Planes

UNIT II   OPEN FLOW & SDN CONTROLLERS   9
Open Flow Specification – Drawbacks of Open SDN, SDN via APIs, SDN via Hypervisor-

Based Overlays – SDN via Opening up the Device – SDN Controllers – General Concepts

UNIT III   DATA CENTERS   9
Multitenant and Virtualized Multitenant Data Center – SDN Solutions for the Data Center Network – VLANs – EVPN – VxLAN – NVGRE

UNIT IV   SDN PROGRAMMING   9
Programming SDNs: Northbound Application Programming Interface, Current Languages and Tools, Composition of SDNs – Network Functions Virtualization (NFV) and Software Defined Networks: Concepts, Implementation and Applications

UNIT V   SDN   9
Juniper SDN Framework – IETF SDN Framework – Open Daylight Controller – Floodlight Controller – Bandwidth Calendaring – Data Center Orchestration

TOTAL :45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
- Analyze the evolution of software defined networks
- Express the various components of SDN and their uses
- Explain the use of SDN in the current networking scenario
- Design and develop various applications of SDN

TEXT BOOKS:
1. Paul Goransson and Chuck Black, ―Software Defined Networks: A Comprehensive Approach, First Edition, Morgan Kaufmann, 2014.
2. Thomas D. Nadeau, Ken Gray, ―SDN: Software Defined Networks, O'Reilly Media, 2013.

REFERENCES:
1. Siamak Azodolmolky, ―Software Defined Networking with Open Flow, Packet Publishing, 2013.
2. Vivek Tiwari, ―SDN and Open Flow for Beginnersǁ, Amazon Digital Services, Inc., 2013.
3. Fei Hu, Editor, ―Network Innovation through Open Flow and SDN: Principles and Design, CRC Press, 2014.

CS8074		**CYBER FORENSICS**		**L**	**T**	**P**	**C**
				3	**0**	**0**	**3**

OBJECTIVES:
- To learn computer forensics
- To become familiar with forensics tools
- To learn to analyze and validate forensics data

UNIT I   INTRODUCTION TO COMPUTER FORENSICS   9
Introduction to Traditional Computer Crime, Traditional problems associated with Computer Crime. Introduction to Identity Theft & Identity Fraud. Types of CF techniques - Incident and incident response methodology - Forensic duplication and investigation. Preparation for IR: Creating response tool kit and IR team. - Forensics Technology and Systems - Understanding Computer Investigation – Data Acquisition.

UNIT II   EVIDENCE COLLECTION AND FORENSICS TOOLS   9
Processing Crime and Incident Scenes – Working with Windows and DOS Systems. **Current Computer Forensics Tools:** Software/ Hardware Tools.

UNIT III   **ANALYSIS AND VALIDATION**   **9**

Validating Forensics Data – Data Hiding Techniques – Performing Remote Acquisition – Network Forensics – Email Investigations – Cell Phone and Mobile Devices Forensics

UNIT IV   **ETHICAL HACKING**   **9**

Introduction to Ethical Hacking - Footprinting and Reconnaissance - Scanning Networks - Enumeration - System Hacking - Malware Threats - Sniffing

UNIT V   **ETHICAL HACKING IN WEB**   **9**

Social Engineering - Denial of Service - Session Hijacking - Hacking Web servers - Hacking Web Applications – SQL Injection - Hacking Wireless Networks - Hacking Mobile Platforms.

TOTAL   45   PERIODS

OUTCOMES:
At the end of the course, the student should be able to:
- Understand the basics of computer forensics
- Apply a number of different computer forensic tools to a given scenario
- Analyze and validate forensics data
- Identify the vulnerabilities in a given network infrastructure
- Implement real-world hacking techniques to test system security

TEXT BOOKS:

1. Bill Nelson, Amelia Phillips, Frank Enfinger, Christopher Steuart, "Computer Forensics and Investigations", Cengage Learning, India Edition, 2016.
2. CEH official Certfied Ethical Hacking Review Guide, Wiley India Edition, 2015.

REFERENCES
1. John R.Vacca, "Computer Forensics", Cengage Learning, 2005
2. MarjieT.Britz, "Computer Forensics and Cyber Crime": An Introduction", 3rd Edition, Prentice Hall, 2013.
3. AnkitFadia " Ethical Hacking" Second Edition, Macmillan India Ltd, 2006
4. Kenneth C.Brancik "Insider Computer Fraud" Auerbach Publications Taylor & Francis Group–2008.

CS8086	**SOFT COMPUTING**	**L**	**T**	**P**	**C**
		3	**0**	**0**	**3**

OBJECTIVES:
- To learn the basic concepts of Soft Computing
- To become familiar with various techniques like neural networks, genetic algorithms and   fuzzy systems.
- To apply soft computing techniques to solve problems.

UNIT I   **INTRODUCTION TO SOFT COMPUTING**   **9**

Introduction-Artificial Intelligence-Artificial Neural Networks-Fuzzy Systems-Genetic Algorithm and Evolutionary Programming-Swarm Intelligent Systems-Classification of ANNs-McCulloch and Pitts Neuron Model-Learning Rules: Hebbian and Delta- Perceptron Network-Adaline Network-Madaline Network.

UNIT II   **ARTIFICIAL NEURAL NETWORKS**   **9**

Back propagation Neural Networks - Kohonen Neural Network -Learning Vector Quantization -Hamming Neural Network - Hopfield Neural Network- Bi-directional

Associative Memory -Adaptive Resonance Theory Neural Networks- Support Vector Machines - Spike Neuron Models.

UNIT III   FUZZY SYSTEMS   9
Introduction to Fuzzy Logic, Classical Sets and Fuzzy Sets - Classical Relations and Fuzzy Relations -Membership Functions -Defuzzification - Fuzzy Arithmetic and Fuzzy Measures - Fuzzy Rule Base and Approximate Reasoning - Introduction to Fuzzy Decision Making.

UNIT IV   GENETIC ALGORITHMS   9
Basic Concepts- Working Principles -Encoding- Fitness Function - Reproduction - Inheritance Operators - Cross Over - Inversion and Deletion -Mutation Operator - Bit-wise Operators -Convergence of Genetic Algorithm.

UNIT V   HYBRID SYSTEMS   9
Hybrid Systems -Neural Networks, Fuzzy Logic and Genetic -GA Based Weight Determination - LR-Type Fuzzy Numbers - Fuzzy Neuron - Fuzzy BP Architecture - Learning in Fuzzy BP- Inference by Fuzzy BP - Fuzzy ArtMap: A Brief Introduction - Soft Computing Tools - GA in Fuzzy Logic Controller Design - Fuzzy Logic Controller

TOTAL :   45   PERIODS

OUTCOMES:
Upon completion of this course, the students should be able to
- Apply suitable soft computing techniques for various applications.
- Integrate various soft computing techniques for complex problems.

TEXT BOOKS:
1. N.P.Padhy, S.P.Simon, "Soft Computing with MATLAB Programming", Oxford University Press, 2015.
2. S.N.Sivanandam , S.N.Deepa, "Principles of Soft Computing", Wiley India Pvt. Ltd., 2nd Edition, 2011.
3. S.Rajasekaran, G.A.Vijayalakshmi Pai, "Neural Networks, Fuzzy Logic and Genetic Algorithm, Synthesis and Applications ", PHI Learning Pvt. Ltd., 2017.

REFERENCES:
1. Jyh-Shing Roger Jang, Chuen-Tsai Sun, Eiji Mizutani, "Neuro-Fuzzy and Soft Computing", Prentice-Hall of India, 2002.
2. Kwang H.Lee, "First course on Fuzzy Theory and Applications", Springer, 2005.
3. George J. Klir and Bo Yuan, "Fuzzy Sets and Fuzzy Logic-Theory and Applications", Prentice Hall, 1996.
4. James A. Freeman and David M. Skapura, "Neural Networks Algorithms, Applications, and Programming Techniques", Addison Wesley, 2003.

GE8076   PROFESSIONAL ETHICS IN ENGINEERING   LT P C
**   3 0 0 3**

OBJECTIVES:
- To enable the students to create an awareness on Engineering Ethics and Human Values, to instill Moral and Social Values and Loyalty and to appreciate the rights of others.

UNIT I   HUMAN VALUES   10
Morals, values and Ethics – Integrity – Work ethic – Service learning – Civic virtue – Respect for others – Living peacefully – Caring – Sharing – Honesty – Courage – Valuing time – Cooperation – Commitment – Empathy – Self confidence – Character – Spirituality – Introduction to Yoga and meditation for professional excellence and stress management.

UNIT II   ENGINEERING ETHICS   9

Senses of 'Engineering Ethics' – Variety of moral issues – Types of inquiry – Moral dilemmas – Moral Autonomy – Kohlberg's theory – Gilligan's theory – Consensus and Controversy – Models of professional roles - Theories about right action – Self-interest – Customs and Religion – Uses of Ethical Theories.

UNIT III   ENGINEERING AS SOCIAL EXPERIMENTATION   9

Engineering as Experimentation – Engineers as responsible Experimenters – Codes of Ethics – A Balanced Outlook on Law.

UNIT IV   SAFETY, RESPONSIBILITIES AND RIGHTS   9
Safety and Risk – Assessment of Safety and Risk – Risk Benefit Analysis and Reducing Risk - Respect for Authority – Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Professional Rights – Employee Rights – Intellectual Property Rights (IPR) – Discrimination.

UNIT V   GLOBAL ISSUES   8
Multinational Corporations – Environmental Ethics – Computer Ethics – Weapons Development – Engineers as Managers – Consulting Engineers – Engineers as Expert Witnesses and Advisors – Moral Leadership –Code of Conduct – Corporate Social Responsibility.

                                                              TOTAL: 45 PERIODS
OUTCOMES:
- Upon completion of the course, the student should be able to apply ethics in society, discuss the ethical issues related to engineering and realize the responsibilities and rights in the society.

TEXT BOOKS:
1. Mike W. Martin and Roland Schinzinger, "Ethics in Engineering", Tata McGraw Hill, New Delhi, 2003.
2. Govindarajan M, Natarajan S, Senthil Kumar V. S, "Engineering Ethics", Prentice Hall of India, New Delhi, 2004.

REFERENCES:
1. Charles B. Fleddermann, "Engineering Ethics", Pearson Prentice Hall, New Jersey, 2004.
2. Charles E. Harris, Michael S. Pritchard and Michael J. Rabins, "Engineering Ethics – Concepts and Cases", Cengage Learning, 2009.
3. John R Boatright, "Ethics and the Conduct of Business", Pearson Education, New Delhi, 2003
4. Edmund G Seebauer and Robert L Barry, "Fundamentals of Ethics for Scientists and Engineers", Oxford University Press, Oxford, 2001.
5. Laura P. Hartman and Joe Desjardins, "Business Ethics: Decision Making for Personal Integrity and Social Responsibility" Mc Graw Hill education, India Pvt. Ltd.,New Delhi, 2013.
6. World Community Service Centre, ' Value Education', Vethathiri publications, Erode, 2011.

Web sources:
1.   www.onlineethics.org
2.   www.nspe.org
3.   www.globalethics.org
4.   www.ethics.org

CS8080   **INFORMATION RETRIEVAL TECHNIQUES**   **L T P C**
                                                               3 0 0 3

OBJECTIVES:
- To understand the basics of Information Retrieval.
- To understand machine learning techniques for text classification and clustering.
- To understand various search engine system operations.
- To learn different techniques of recommender system.

UNIT I   INTRODUCTION   9
Information Retrieval – Early Developments – The IR Problem – The User's Task – Information versus Data Retrieval - The IR System – The Software Architecture of the IR System – The Retrieval and Ranking Processes - The Web – The e-Publishing Era – How the web changed Search – Practical Issues on the Web – How People Search – Search Interfaces Today – Visualization in Search Interfaces.

UNIT II   MODELING AND RETRIEVAL EVALUATION   9
Basic IR Models - Boolean Model - TF-IDF (Term Frequency/Inverse Document Frequency) Weighting - Vector Model – Probabilistic Model – Latent Semantic Indexing Model – Neural Network Model – Retrieval Evaluation – Retrieval Metrics – Precision and Recall – Reference Collection – User-based Evaluation – Relevance Feedback and Query Expansion – Explicit Relevance Feedback.

UNIT III   TEXT CLASSIFICATION AND CLUSTERING   9
A Characterization of Text Classification – Unsupervised Algorithms: Clustering – Naïve Text Classification – Supervised Algorithms – Decision Tree – k-NN Classifier – SVM Classifier – Feature Selection or Dimensionality Reduction – Evaluation metrics – Accuracy and Error – Organizing the classes – Indexing and Searching – Inverted Indexes – Sequential Searching – Multi-dimensional Indexing.

UNIT IV   WEB RETRIEVAL AND WEB CRAWLING   9
The Web – Search Engine Architectures – Cluster based Architecture – Distributed Architectures – Search Engine Ranking – Link based Ranking – Simple Ranking Functions – Learning to Rank – Evaluations -- Search Engine Ranking – Search Engine User Interaction – Browsing – Applications of a Web Crawler – Taxonomy – Architecture and Implementation – Scheduling Algorithms – Evaluation.

UNIT V   RECOMMENDER SYSTEM   9
Recommender Systems Functions – Data and Knowledge Sources – Recommendation Techniques – Basics of Content-based Recommender Systems – High Level Architecture – Advantages and Drawbacks of Content-based Filtering – Collaborative Filtering – Matrix factorization models – Neighborhood models.

                                           TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
- Use an open source search engine framework and explore its capabilities
- Apply appropriate method of classification or clustering.
- Design and implement innovative features in a search engine.
- Design and implement a recommender system.

TEXT BOOKS:
1. Ricardo Baeza-Yates and Berthier Ribeiro-Neto, —Modern Information Retrieval: The Concepts and Technology behind Search, Second Edition, ACM Press Books, 2011.
2. Ricci, F, Rokach, L. Shapira, B.Kantor, "Recommender Systems Handbook", First Edition, 2011.

REFERENCES:
1. C. Manning, P. Raghavan, and H. Schütze, —Introduction to Information Retrieval, Cambridge University Press, 2008.
2. Stefan Buettcher, Charles L. A. Clarke and Gordon V. Cormack, —Information Retrieval: Implementing and Evaluating Search Engines, The MIT Press, 2010.

CS8078	GREEN COMPUTING	L	T	P	C
		3	0	0	3

OBJECTIVES:
- To learn the fundamentals of Green Computing.
- To analyze the Green computing Grid Framework.
- To understand the issues related with Green compliance.
- To study and develop various case studies.

UNIT I   FUNDAMENTALS   9
Green IT Fundamentals: Business, IT, and the Environment – Green computing: carbon foot print, scoop on power – Green IT Strategies: Drivers, Dimensions, and Goals – Environmentally Responsible Business: Policies, Practices, and Metrics.

UNIT II   GREEN ASSETS AND MODELING   9
Green Assets: Buildings, Data Centers, Networks, and Devices – Green Business Process Management: Modeling, Optimization, and Collaboration – Green Enterprise Architecture – Environmental Intelligence – Green Supply Chains – Green Information Systems: Design and Development Models.

UNIT III   GRID FRAMEWORK   9
Virtualization of IT systems – Role of electric utilities, Telecommuting, teleconferencing and teleporting – Materials recycling – Best ways for Green PC – Green Data center – Green Grid framework.

UNIT IV   GREEN COMPLIANCE   9
Socio-cultural aspects of Green IT – Green Enterprise Transformation Roadmap – Green Compliance: Protocols, Standards, and Audits – Emergent Carbon Issues: Technologies and Future.

UNIT V   CASE STUDIES   9
The Environmentally Responsible Business Strategies (ERBS) – Case Study Scenarios for Trial Runs – Case Studies – Applying Green IT Strategies and Applications to a Home, Hospital, Packaging Industry and Telecom Sector.

TOTAL :   45   PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
- Acquire knowledge to adopt green computing practices to minimize negative impacts on the environment.
- Enhance the skill in energy saving practices in their use of hardware.
- Evaluate technology tools that can reduce paper waste and carbon footprint by the stakeholders.
- Understand the ways to minimize equipment disposal requirements .

TEXT BOOKS:

1. Bhuvan Unhelkar, "Green IT Strategies and Applications-Using Environmental Intelligence", CRC Press, June 2014.
2. Woody Leonhard, Katherine Murray, "Green Home computing for dummies", August 2012.

REFERENCES:

1. Alin Gales, Michael Schaefer, Mike Ebbers, "Green Data Center: steps for the Journey", Shroff/IBM rebook, 2011.
2. John Lamb, "The Greening of IT", Pearson Education, 2009.
3. Jason Harris, "Green Computing and Green IT- Best Practices on regulations & industry", Lulu.com, 2008
4. Carl speshocky, "Empowering Green Initiatives with IT", John Wiley & Sons, 2010.
5. Wu Chun Feng (editor), "Green computing: Large Scale energy efficiency", CRC Press

CS8076	GPU ARCHITECTURE AND PROGRAMMING	L T P C
		3 0 0 3

OBJECTIVES:
- To understand the basics of GPU architectures
- To write programs for massively parallel processors
- To understand the issues in mapping algorithms for GPUs
- To introduce different GPU programming models

UNIT I   GPU ARCHITECTURE   12
Evolution of GPU architectures - Understanding Parallelism with GPU –Typical GPU Architecture - CUDA Hardware Overview - Threads, Blocks, Grids, Warps, Scheduling - Memory Handling with CUDA: Shared Memory, Global Memory, Constant Memory and Texture Memory.

UNIT II   CUDA PROGRAMMING   8
Using CUDA - Multi GPU - Multi GPU Solutions - Optimizing CUDA Applications: Problem Decomposition, Memory Considerations, Transfers, Thread Usage, Resource Contentions.

UNIT III   PROGRAMMING ISSUES   8
Common Problems: CUDA Error Handling, Parallel Programming Issues, Synchronization, Algorithmic Issues, Finding and Avoiding Errors.

UNIT IV   OPENCL BASICS   8
OpenCL Standard – Kernels – Host Device Interaction – Execution Environment – Memory Model – Basic OpenCL Examples.

UNIT V   ALGORITHMS ON GPU   9
Parallel Patterns: Convolution, Prefix Sum, Sparse Matrix - Matrix Multiplication - Programming Heterogeneous Cluster.

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to
- Describe GPU Architecture
- Write programs using CUDA, identify issues and debug them
- Implement efficient algorithms in GPUs for common application kernels, such as matrix multiplication
- Write simple programs using OpenCL
- Identify efficient parallel programming patterns to solve problems

TEXT BOOKS:
1. Shane Cook, CUDA Programming: —A Developer's Guide to Parallel Computing with GPUs (Applications of GPU Computing), First Edition, Morgan Kaufmann, 2012.
2. David R. Kaeli, Perhaad Mistry, Dana Schaa, Dong Ping Zhang, "Heterogeneous computing with OpenCL", 3rd Edition, Morgan Kauffman, 2015.

REFERENCES:
1. Nicholas Wilt, —CUDA Handbook: A Comprehensive Guide to GPU Programming, Addison - Wesley, 2013.
2. Jason Sanders, Edward Kandrot, —CUDA by Example: An Introduction to General Purpose GPU Programmingll, Addison - Wesley, 2010.
3. David B. Kirk, Wen-mei W. Hwu, Programming Massively Parallel Processors - A Hands-on Approach, Third Edition, Morgan Kaufmann, 2016.
4. http://www.nvidia.com/object/cuda_home_new.html
5. http://www.openCL.org

CS8084   **NATURAL LANGUAGE PROCESSING**   **L T P C**
                                                                                   3 0 0 3

OBJECTIVES:
- To learn the fundamentals of natural language processing
- To understand the use of CFG and PCFG in NLP
- To understand the role of semantics of sentences and pragmatics
- To apply the NLP techniques to IR applications

UNIT I   INTRODUCTION   9
Origins and challenges of NLP – Language Modeling: Grammar-based LM, Statistical LM - Regular Expressions, Finite-State Automata – English Morphology, Transducers for lexicon and rules, Tokenization, Detecting and Correcting Spelling Errors, Minimum Edit Distance

UNIT II   WORD LEVEL ANALYSIS   9
Unsmoothed N-grams, Evaluating N-grams, Smoothing, Interpolation and Backoff – Word Classes, Part-of-Speech Tagging, Rule-based, Stochastic and Transformation-based tagging, Issues in PoS tagging – Hidden Markov and Maximum Entropy models.

UNIT III   SYNTACTIC ANALYSIS   9
Context-Free Grammars, Grammar rules for English, Treebanks, Normal Forms for grammar – Dependency Grammar – Syntactic Parsing, Ambiguity, Dynamic Programming parsing – Shallow parsing – Probabilistic CFG, Probabilistic CYK, Probabilistic Lexicalized CFGs - Feature structures, Unification of feature structures.

UNIT IV   SEMANTICS AND PRAGMATICS   10
Requirements for representation, First-Order Logic, Description Logics – Syntax-Driven Semantic analysis, Semantic attachments – Word Senses, Relations between Senses, Thematic Roles, selectional restrictions – Word Sense Disambiguation, WSD using Supervised, Dictionary & Thesaurus, Bootstrapping methods – Word Similarity using Thesaurus and Distributional methods.

UNIT V   DISCOURSE ANALYSIS AND LEXICAL RESOURCES   8
Discourse segmentation, Coherence – Reference Phenomena, Anaphora Resolution using Hobbs and Centering Algorithm – Coreference Resolution – Resources: Porter Stemmer, Lemmatizer, Penn Treebank, Brill's Tagger, WordNet, PropBank, FrameNet, Brown Corpus, British National Corpus (BNC).

                                                                   TOTAL :45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
- To tag a given text with basic Language features
- To design an innovative application using NLP components
- To implement a rule based system to tackle morphology/syntax of a language
- To design a tag set to be used for statistical processing for real-time applications
- To compare and contrast the use of different statistical approaches for different types of NLP applications.

TEXT BOOKS:
1. Daniel Jurafsky, James H. Martin—Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics and Speech, Pearson Publication, 2014.
2. Steven Bird, Ewan Klein and Edward Loper, —Natural Language Processing with Python‖, First Edition, O'Reilly Media, 2009.

REFERENCES:
1. Breck Baldwin, —Language Processing with Java and LingPipe Cookbook, Atlantic Publisher, 2015.
2. Richard M Reese, —Natural Language Processing with Java‖, O'Reilly Media, 2015.
3. Nitin Indurkhya and Fred J. Damerau, —Handbook of Natural Language Processing, Second Edition, Chapman and Hall/CRC Press, 2010.
4. Tanveer Siddiqui, U.S. Tiwary, "Natural Language Processing and Information Retrieval", Oxford University Press, 2008.

CS8001	**PARALLEL ALGORITHMS**	**L**	**T**	**P**	**C**
		3	**0**	**0**	**3**

OBJECTIVES:
To understand different parallel architectures and models of computation.
To introduce the various classes of parallel algorithms.
To study parallel algorithms for basic problems.

UNIT I   INTRODUCTION   9
Need for Parallel Processing - Data and Temporal Parallelism - Models of Computation - RAM and PRAM Model – Shared Memory and Message Passing Models- Processor Organisations - PRAM Algorithm – Analysis of PRAM Algorithms- Parallel Programming Languages.

UNIT II   PRAM ALGORITHMS   9

Parallel Algorithms for Reduction – Prefix Sum – List Ranking –Preorder Tree Traversal – Searching -Sorting - Merging Two Sorted Lists – Matrix Multiplication - Graph Coloring - Graph Searching.

UNIT III   SIMD ALGORITHMS -I   9

2D Mesh SIMD Model - Parallel Algorithms for Reduction - Prefix Computation - Selection - Odd-Even Merge Sorting - Matrix Multiplication

UNIT IV   SIMD ALGORITHMS -II   9

Hypercube SIMD Model - Parallel Algorithms for Selection- Odd-Even Merge Sort- Bitonic Sort- Matrix Multiplication Shuffle Exchange SIMD Model - Parallel Algorithms for Reduction -Bitonic Merge Sort - Matrix Multiplication - Minimum Cost Spanning Tree

UNIT V   MIMD ALGORITHMS   9

UMA Multiprocessor Model -Parallel Summing on Multiprocessor- Matrix Multiplication on Multiprocessors and Multicomputer - Parallel Quick Sort - Mapping Data to Processors.

TOTAL :   45   PERIODS

OUTCOMES:
Upon completion of this course, the students should be able to
- Develop parallel algorithms for standard problems and applications.
- Analyse efficiency of different parallel algorithms.

TEXT BOOKS:
1. Michael J. Quinn, "Parallel Computing : Theory & Practice", Tata McGraw Hill Edition, Second edition, 2017.
2. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, "Fundamentals of Computer Algorithms", University press, Second edition , 2011.
3. V Rajaraman, C Siva Ram Murthy, " Parallel computers- Architecture and Programming ", PHI learning, 2016.

REFERENCES:
1. Ananth Grame, George Karpis, Vipin Kumar and Anshul Gupta, "Introduction to Parallel Computing", 2nd Edition, Addison Wesley, 2003.
2. M Sasikumar, Dinesh Shikhare and P Ravi Prakash , " Introduction to Parallel Processing", PHI learning , 2013.
3. S.G.Akl, "The Design and Analysis of Parallel Algorithms", PHI, 1989.

IT8077   **SPEECH PROCESSING** | L | T | P | C |
|---|---|---|---|
| 3 | 0 | 0 | 3 |

OBJECTIVES:
- To understand the fundamentals of the speech processing
- Explore the various speech models
- Gather knowledge about the phonetics and pronunciation processing
- Perform wavelet analysis of speech
- To understand the concepts of speech recognition

UNIT I   INTRODUCTION   9

Introduction - knowledge in speech and language processing - ambiguity - models and algorithms - language - thought - understanding - regular expression and automata - words & transducers – N grams

UNIT II   SPEECH MODELLING   9

Word classes and part of speech tagging – hidden markov model – computing likelihood: the forward algorithm – training hidden markov model – maximum entropy model – transformation-based tagging – evaluation and error analysis – issues in part of speech tagging – noisy channel model for spelling

UNIT III   SPEECH PRONUNCIATION AND SIGNAL PROCESSING   9

Phonetics - speech sounds and phonetic transcription - articulatory phonetics - phonological categories and pronunciation variation - acoustic phonetics and signals - phonetic resources - articulatory and gestural phonology

UNIT IV   SPEECH IDENTIFICATION   9
Speech synthesis - text normalization - phonetic analysis - prosodic analysis – diphone waveform synthesis - unit selection waveform synthesis - evaluation

UNIT V   SPEECH RECOGNITION   9
Automatic speech recognition - architecture - applying hidden markov model - feature extraction: mfcc vectors - computing acoustic likelihoods - search and decoding - embedded training - multipass decoding: n-best lists and lattices- a* ('stack') decoding - context-dependent acoustic models: triphones - discriminative training - speech recognition by humans

                                                                    TOTAL :   45   PERIODS

OUTCOMES:
On Successful completion of the course ,Students will be able to
- Create new algorithms with speech processing
- Derive new speech models
- Perform various language phonetic analysis
- Create a new speech identification system
- Generate a new speech recognition system

TEXT BOOK:
1. Daniel Jurafsky and James H. Martin, " Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics and Speech Recognition", Person education,2013.

REFERENCES
1. Kai-Fu Lee, "Automatic Speech Recognition", The Springer International Series in Engineering and Computer Science, 1999.
2. Himanshu Chaurasiya, "Soft Computing Implementation of Automatic Speech Recognition", LAP Lambert Academic Publishing, 2010.
3. Claudio Becchetti, Klucio Prina Ricotti, "Speech Recognition: Theory and C++ implementation",Wiley publications 2008.
4. Ikrami Eldirawy , Wesam Ashour, "Visual Speech Recognition", Wiley publications , 2011

GE8073   FUNDAMENTALS OF NANOSCIENCE   L T P C
                                                                             3 0 0 3
OBJECTIVES:
To learn about basis of nanomaterial science, preparation method, types and application

UNIT I   INTRODUCTION   8
Nanoscale Science and Technology- Implications for Physics, Chemistry, Biology and Engineering-Classifications of nanostructured materials- nano particles- quantum dots, nanowires-ultra-thinfilms-multilayered materials. Length Scales involved and effect on properties: Mechanical, Electronic, Optical, Magnetic and Thermal properties. Introduction to properties and motivation for study (qualitative only).

UNIT II   GENERAL METHODS OF PREPARATION   9
Bottom-up Synthesis-Top-down Approach: Co-Precipitation, Ultrasonication, Mechanical Milling, Colloidal routes, Self-assembly, Vapour phase deposition, MOCVD, Sputtering, Evaporation, Molecular Beam Epitaxy, Atomic Layer Epitaxy, MOMBE.

UNIT III   NANOMATERIALS   12
Nanoforms of Carbon - Buckminster fullerene- graphene and carbon nanotube, Single wall carbon Nanotubes (SWCNT) and Multi wall carbon nanotubes (MWCNT)- methods of synthesis(arc-growth, laser ablation, CVD routes, Plasma CVD), structure-property Relationships applications-Nanometal oxides-ZnO, TiO2,MgO, ZrO2, NiO, nanoalumina, CaO, AgTiO2, Ferrites, Nanoclays-functionalization and applications-Quantum wires, Quantum dots-preparation, properties and applications.

UNIT IV   CHARACTERIZATION TECHNIQUES   9
X-ray diffraction technique, Scanning Electron Microscopy - environmental techniques, Transmission Electron Microscopy including high-resolution imaging, Surface Analysis techniques-AFM, SPM, STM, SNOM, ESCA, SIMS-Nanoindentation.

UNIT V   APPLICATIONS   7
NanoInfoTech: Information storage- nanocomputer, molecular switch, super chip, nanocrystal, Nanobiotechlogy: nanoprobes in medical diagnostics and biotechnology, Nano medicines, Targetted drug delivery, Bioimaging - Micro Electro Mechanical Systems (MEMS), Nano Electro Mechanical Systems (NEMS)- Nanosensors, nano crystalline silver for bacterial inhibition, Nanoparticles for sunbarrier products - In Photostat, printing, solar cell, battery.

                                                                    TOTAL: 45 PERIODS

OUTCOMES:
  • Will familiarize about the science of nanomaterials
  • Will demonstrate the preparation of nanomaterials
  • Will develop knowledge in characteristic nanomaterial

TEXT BOOKS :
1. A.S. Edelstein and R.C. Cammearata, eds., "Nanomaterials: Synthesis, Properties and Applications", Institute of Physics Publishing, Bristol and Philadelphia, 1996.
2. N John Dinardo, "Nanoscale Charecterisation of surfaces & Interfaces", 2nd edition, Weinheim Cambridge, Wiley-VCH, 2000.

REFERENCES:
1. G Timp, "Nanotechnology", AIP press/Springer, 1999.
2. Akhlesh Lakhtakia,"The Hand Book of Nano Technology, Nanometer Structure, Theory, Modeling and Simulations". Prentice-Hall of India (P) Ltd, New Delhi, 2007.

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ESTD 2001

LIST OF ELECTIVES OFFERED FOR THE STUDENTS

Department of Computer Science and Engineering

Degree/Branch/Semester: M.E./ CSE / II

Academic Year: 2020 – 2021

S.No.	Register No.	Name of the Student	Elective offered by University	Electives Opted by Students
1.	202051001	AJITH KUMAR A	**Professional Elective I**	**Professional Elective I**
2.	202051002	ALAGU MARI SELVI M	19PCP201 Advanced Databases	
3.	202051003	BIRUNDHA A	19PCP202 Principles of Programming Languages	19PCP205 Cloud
4.	202051004	DEEPA K	19PCP203 Image Processing and Analysis	Computing Technologies
5.	202051005	MAHESH S	19PCP204 Web Engineering	
6.	202051006	PIRAGATHI A	19PCP205 Cloud Computing Technologies	
7.	202051007	RAJENDRAN N	**Professional Elective - II**	**Professional Elective - II**
8.	202051008	TAMILSELVI B	19PCP206 Real Time Systems	19PCP209 Information Retrieval Techniques
			19PCP207 Mobile and Pervasive Computing	
			19PCP208 Parallel Programming Paradigms	
			19PCP209 Information Retrieval Techniques	
			19PCP210 Software Architectures and Design	

H.O.D.

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<u>**LIST OF ELECTIVES OFFERED FOR THE STUDENTS**</u>

Department of Computer Science and Engineering

Degree/Branch/Semester: M.E./ CSE / III   Academic Year: 2021 – 2022

S.No.	Register No.	Name of the Student	Elective offered by University	Electives Opted by Students
1.	202051001	AJITH KUMAR A	**Professional Elective III** 19PCP301 Performance Analysis of Computer Systems 19PCP302 Language Technologies 19PCP303 Computer Vision 19PCP304 Speech Processing and Synthesis 19PCP305 Software Quality Assurance and Testing **Professional Elective - IV** 19PCP306 Formal models of software systems 19PCP307 Embedded Software Development 19PCP308 Social Network Analysis 19PCP309 Bio-inspired Computing 19PCP310 Compiler Optimization Techniques **Professional Elective - V** 19PCP311 Data Visualization Techniques 19PCP312 Reconfigurable Computing 19PCP313 Mobile Application Development 19PCP314 Bio Informatics 19PCP315 Information Storage Management	**Professional Elective III** 19PCP305 Software Quality Assurance and Testing **Professional Elective - IV** 19PCP307 Embedded Software Development **Professional Elective - V** 19PCP315 Information Storage Management
2.	202051002	ALAGU MARI SELVI M		
3.	202051003	BIRUNDHA A		
4.	202051004	DEEPA K		
5.	202051005	MAHESH S		
6.	202051006	PIRAGATHI A		
7.	202051007	RAJENDRAN N		
8.	202051008	TAMILSELVI B		

H.O.D.   PRINCIPAL

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19PVPX01	DEVICE MODELING - I	L T P C
		3 0 0 3

OBJECTIVES

- To study the MOS capacitors and to model MOS Transistors
- To understand the various CMOS design parameters and their impact on performance of the device.
- To study the device level characteristics of BJT transistors

UNIT I   MOS CAPACITORS   9

Surface Potential: Accumulation, Depletion, and Inversion, Electrostatic Potential and Charge Distribution in Silicon, Capacitances in an MOS Structure, Polysilicon-Gate Work Function and Depletion Effects, MOS under Non equilibrium and Gated Diodes, Charge in Silicon Dioxide and at the Silicon-Oxide Interface, Effect of Interface Traps and Oxide Charge on Device Characteristics, High-Field Effects, Impact Ionization and Avalanche Breakdown, Band-to-Band Tunneling, Tunneling into and through Silicon Dioxide, Injection of Hot Carriers from Silicon into Silicon Dioxide, High-Field Effects in Gated Diodes, Dielectric Breakdown

UNIT II   MOSFET DEVICES   9

Long-Channel MOSFETs, Drain-Current Model, MOSFET I –V Characteristics, Subthreshold Characteristics, Substrate Bias and Temperature Dependence of Threshold Voltage, MOSFET Channel Mobility, MOSFET Capacitances and Inversion-Layer Capacitance Effect, Short-Channel MOSFETs, Short-Channel Effect, Velocity Saturation and High-Field Transport Channel Length Modulation, Source-Drain Series Resistance, MOSFET Degradation and Breakdown at High Fields.

UNIT III   CMOS DEVICE DESIGN   9

MOSFET Scaling, Constant-Field Scaling, Generalized Scaling, Nonscaling Effects, Threshold Voltage, Threshold-Voltage Requirement, Channel Profile Design, Nonuniform Doping, Quantum Effect on Threshold Voltage, Discrete Dopant Effects on Threshold Voltage, MOSFET Channel Length, Various Definitions of Channel Length, Extraction of the Effective Channel Length, Physical Meaning of Effective Channel Length, Extraction of Channel Length by C–V Measurements.

UNIT IV   CMOS PERFORMANCE FACTORS   9

Basic CMOS Circuit Elements, CMOS Inverters, CMOS NAND and NOR Gates, Inverter and NAND Layouts, Parasitic Elements, Source–Drain Resistance, Parasitic Capacitances, Gate Resistance, Interconnect R and C, Sensitivity of CMOS Delay to Device Parameters, Propagation Delay and Delay Equation, Delay Sensitivity to Channel Width, Length, and Gate Oxide Thickness, Sensitivity of Delay to Power-Supply Voltage and Threshold Voltage, Sensitivity of Delay to Parasitic Resistance and Capacitance, Delay of Two-Way NAND and Body Effect, Performance Factors of Advanced CMOS Devices, MOSFETs in RF Circuits, Effect of Transport Parameters on CMOS Performance, Low-Temperature CMOS

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UNIT V   BIPOLAR DEVICES   9

n–p–n Transistors, Basic Operation of a Bipolar Transistor, Modifying the Simple Diode Theory for Describing Bipolar Transistors, Ideal Current–Voltage Characteristics, Collector Current, Base Current, Current Gains, Ideal IC–VCE Characteristics, Characteristics of a Typical n–p–n Transistor, Effect of Emitter and Base Series Resistances, Effect of Base–Collector Voltage on Collector Current, Collector Current Falloff at High Currents, Nonideal Base Current at Low Currents, Bipolar Device Models for Circuit and Time-Dependent Analyses Basic dc Model, Basic ac Model, Small-Signal Equivalent-Circuit Model, Emitter Diffusion Capacitance, Charge-Control Analysis, Breakdown Voltages, Common-Base Current Gain in the Presence of Base–Collector Junction Avalanche, Saturation Currents in a Transistor, Relation Between BV_{CEO} and BV_{CBO}.

TOTAL: 45 PERIODS

OUTCOMES:

To design and model MOSFET and BJT devices to desired specifications.

TEXT BOOKS:

1. Behzad Razavi, "Fundamentals of Microelectronics" Wiley Student Edition, 2nd Edition.
2. J P Collinge, C A Collinge, "Physics of Semiconductor devices" Springer 2002 Edition.

REFERENCES:

1. Yuan Taur and Tak H. Ning, "Fundamentals of Modern VLSI Devices", Cambridge University Press, Second Edition.

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19PVPX01   **DEVICE MODELING - I**   **L T P C**

3 0 0 3

OBJECTIVES

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UNIT I   MOS CAPACITORS   9

Surface Potential: Accumulation, Depletion, and Inversion, Electrostatic Potential and Charge Distribution in Silicon, Capacitances in an MOS Structure, Polysilicon-Gate Work Function and Depletion Effects, MOS under Non equilibrium and Gated Diodes, Charge in Silicon Dioxide and at the Silicon-Oxide Interface, Effect of Interface Traps and Oxide Charge on Device Characteristics, High-Field Effects, Impact Ionization and Avalanche Breakdown, Band-to-Band Tunneling, Tunneling into and through Silicon Dioxide, Injection of Hot Carriers from Silicon into Silicon Dioxide, High-Field Effects in Gated Diodes, Dielectric Breakdown

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UNIT IV   CMOS PERFORMANCE FACTORS   9

Basic CMOS Circuit Elements, CMOS Inverters, CMOS NAND and NOR Gates, Inverter and NAND Layouts, Parasitic Elements, Source–Drain Resistance, Parasitic Capacitances, Gate Resistance, Interconnect R and C, Sensitivity of CMOS Delay to Device Parameters, Propagation Delay and Delay Equation, Delay Sensitivity to Channel Width, Length, and Gate Oxide Thickness, Sensitivity of Delay to Power-Supply Voltage and Threshold Voltage, Sensitivity of Delay to Parasitic Resistance and Capacitance, Delay of Two-Way NAND and Body Effect, Performance Factors of Advanced CMOS Devices, MOSFETs in RF Circuits, Effect of Transport Parameters on CMOS Performance, Low-Temperature CMOS

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UNIT V   BIPOLAR DEVICES   9

n–p–n Transistors, Basic Operation of a Bipolar Transistor, Modifying the Simple Diode Theory for Describing Bipolar Transistors, Ideal Current–Voltage Characteristics, Collector Current, Base Current, Current Gains, Ideal IC–VCE Characteristics, Characteristics of a Typical n–p–n Transistor, Effect of Emitter and Base Series Resistances, Effect of Base–Collector Voltage on Collector Current, Collector Current Falloff at High Currents, Nonideal Base Current at Low Currents, Bipolar Device Models for Circuit and Time-Dependent Analyses Basic dc Model, Basic ac Model, Small-Signal Equivalent-Circuit Model, Emitter Diffusion Capacitance, Charge-Control Analysis, Breakdown Voltages, Common-Base Current Gain in the Presence of Base–Collector Junction Avalanche, Saturation Currents in a Transistor, Relation Between BV_{CEO} and BV_{CBO}.

TOTAL: 45 PERIODS

 OUTCOMES:

To design and model MOSFET and BJT devices to desired specifications.

TEXT BOOKS:

1. Behzad Razavi, "Fundamentals of Microelectronics" Wiley Student Edition, 2nd Edition.
2. J P Collinge, C A Collinge, "Physics of Semiconductor devices" Springer 2002 Edition.

REFERENCES:

1. Yuan Taur and Tak H. Ning, "Fundamentals of Modern VLSI Devices", Cambridge University Press, Second Edition.

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19PVPX06	NETWORKS ON CHIP	L T P C
		3 0 0 3

OBJECTIVES:

The students should be made to:

- Understand the concept of network - on - chip
- Learn router architecture designs
- Study fault tolerance network - on - chip

UNIT I   INTRODUCTION TO NOC   9

Introduction to NoC - OSI layer rules in NoC - Interconnection Networks in Network-on-ChipNetwork Topologies - Switching Techniques - Routing Strategies - Flow Control Protocol Quality-of-Service Support

UNIT II   ARCHITECTURE DESIGN   9

Switching Techniques and Packet Format - Asynchronous FIFO Design -GALS Style of Communication - Wormhole Router Architecture Design - VC Router Architecture Design - Adaptive Router Architecture Design.

UNIT III   ROUTING ALGORITHM   9

Packet routing-Qos, congestion control and flow control - router design - network link design -Efficient and Deadlock-Free Tree-Based Multicast Routing Methods - Path-Based Multicast Routing for 2D and 3D Mesh Networks- Fault-Tolerant Routing Algorithms - Reliable and Adaptive Routing Algorithms

UNIT IV   TEST AND FAULT TOLERANCE OF NOC   9

Design-Security in Networks-on-Chips-Formal Verification of Communications in Networks-on Chips-Test and Fault Tolerance for Networks-on-Chip Infrastructures-Monitoring Services for Networks-on-Chips.

UNIT V   THREE-DIMENSIONAL INTEGRATION OF NETWORK-ON-CHIP   9

Three-Dimensional Networks-on-Chips Architectures. - A Novel Dimensionally-Decomposed Router for On-Chip Communication in 3D Architectures - Resource Allocation for QoS On-Chip Communication - Networks-on-Chip Protocols-On-Chip Processor Traffic Modeling for Networks-on-Chip

TOTAL: 45 PERIODS

OUTCOMES: At the end of this course, the students should be able to:

- Compare different architecture design
- Discuss different routing algorithms
- Explain three dimensional networks - on-chip architectures

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TEXT BOOKS:

1. ChrysostomosNicopoulos, Vijaykrishnan Narayanan, Chita R.Das" Networks-on - Chip " Architectures Holistic Design Exploration", Springer.
2. Fayezgebali, Haythamelmiligi, HqhahedWatheq E1-Kharashi "Networks-on-Chips theory and practice   CRC press.

REFERENCES:

1. Konstantinos Tatas and Kostas Siozios "Designing 2D and 3D Network-on-Chip Architectures" 2013
2. Palesi, Maurizio, Daneshtalab, Masoud "Routing Algorithms in Networks-on-Chip" 2014
3. SantanuKundu, SantanuChattopadhyay "Network-on-Chip: The Next Generation of System on-Chip   Integration",2014 CRC Press

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19PVPX09	EMBEDDED SYSTEM DESIGN	L T P C
		3 0 0 3

OBJECTIVES : The students should be made to:

- Learn design challenges and design methodologies
- Study general and single purpose processor
- Understand bus structures

UNIT I   EMBEDDED SYSTEM OVERVIEW   9

Embedded System Overview, Design Challenges - Optimizing Design Metrics, Design Methodology, RT-Level Combinational and Sequential Components, Optimizing Custom Single-Purpose Processors.

UNIT II   GENERAL AND SINGLE PURPOSE PROCESSOR   9

Basic Architecture, Pipelining, Superscalar and VLIW architectures, Programmer"s view, Development Environment, Application-Specific Instruction-Set Processors (ASIPs) Microcontrollers, Timers, Counters and watchdog Timer, UART, LCD Controllers and Analog-to-Digital Converters, Memory Concepts.

UNIT III   BUS STRUCTURES   9

Basic Protocol Concepts, Microprocessor Interfacing - I/O Addressing, Port and Bus-Based I/O, Arbitration, Serial Protocols, I^{2}C, CAN and USB, Parallel Protocols - PCI and ARM Bus, Wireless Protocols - IrDA, Bluetooth, IEEE 802.11.

UNIT IV   STATE MACHINE AND CONCURRENT PROCESS MODELS   9

Basic State Machine Model, Finite-State Machine with Datapath Model, Capturing State Machine in Sequential Programming Language, Program-State Machine Model, Concurrent Process Model, Communication among Processes, Synchronization among processes, Dataflow Model, Real-time Systems, Automation: Synthesis, Verification : Hardware/Software Co-Simulation, Reuse: Intellectual Property Cores, Design Process Models.

UNIT V   EMBEDDED SOFTWARE DEVELOPMENT TOOLS AND RTOS   9

Compilation Process - Libraries - Porting kernels - C extensions for embedded systems - emulation and debugging techniques - RTOS - System design using RTOS.

TOTAL: 45 PERIODS

OUTCOMES:

At the end of this course, the students should be able to:

- Explain different protocols
- Discuss state machine and design process models
- Outline embedded software development tools and RTOS

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TEXT BOOKS:

1. Bruce Powel Douglas, "Real time UML, second edition: Developing efficient objects for embedded systems", 3rd Edition 1999, Pearson Education.
2. Daniel W. Lewis, "Fundamentals of embedded software where C and assembly meet", Pearson Education, 2002.

REFERENCES:

1. Frank Vahid and Tony Gwargie, "Embedded System Design", John Wiley & sons, 2002.
2. Steve Heath, "Embedded System Design", Elsevier, Second Edition, 2004.

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2. https://swayam.gov.in

EC8004   **WIRELESS NETWORKS**   **L T P C**

                                                                            3 0 0 3

OBJECTIVES:

The student should be made:

- To understand the concept about Wireless networks, protocol stack and standards
- To understand and analyse the network layer solutions for Wireless networks
- To study about fundamentals of 3G Services, its protocols and applications
- To have in depth knowledge on internetworking of WLAN and WWAN
- To learn about evolution of 4G Networks, its architecture and applications

UNIT I   WIRELESS LAN   9

Introduction-WLAN technologies: - IEEE802.11: System architecture, protocol architecture, 802.11b, 802.11a – Hiper LAN: WATM, BRAN, HiperLAN2 – Bluetooth: Architecture, WPAN – IEEE 802.15.4, Wireless USB, Zigbee, 6LoWPAN, WirelessHART

UNIT II   MOBILE NETWORK LAYER   9

Introduction - Mobile IP: IP packet delivery, Agent discovery, tunneling and encapsulation, IPV6-Network layer in the internet- Mobile IP session initiation protocol - mobile ad-hoc network: Routing: Destination Sequence distance vector, IoT: CoAP

UNIT III   3G OVERVIEW   9

Overview of UTMS Terrestrial Radio access network-UMTS Core network Architecture: 3GPP Architecture, User equipment, CDMA2000 overview- Radio and Network components, Network structure, Radio Network, TD-CDMA, TD – SCDMA.

UNIT IV   INTERNETWORKING BETWEEN WLANS AND WWANS   9

Internetworking objectives and requirements, Schemes to connect WLANS and 3G Networks, Session Mobility, Internetworking Architecture for WLAN and GPRS, System Description, Local Multipoint Distribution Service, Multichannel Multipoint Distribution System.

UNIT V   4G & Beyond   9

Introduction – 4G vision – 4G features and challenges - Applications of 4G – 4G Technologies: Multicarrier Modulation, Smart antenna techniques, IMS Architecture, LTE, Advanced Broadband Wireless Access and Services, MVNO.

                                                                   TOTAL: 45 PERIODS

OUTCOMES: Upon completion of the course, the student would be able to:

- Conversant with the latest 3G/4G networks and its architecture
- Design and implement wireless network environment for any application using latest wireless protocols and standards
- Ability to select the suitable network depending on the availability and requirement
- Implement different type of applications for smart phones and mobile devices with latest network strategies

TEXT BOOKS:

1. Jochen Schiller, "Mobile Communications", Second Edition, Pearson Education 2012.(Unit I,II,III)

2. Vijay Garg, "Wireless Communications and networking", First Edition, Elsevier 2007.(Unit IV,V)

REFERENCES:

1. Erik Dahlman, Stefan Parkvall, Johan Skold and Per Beming, "3G Evolution HSPA and LTE for Mobile Broadband", Second Edition, Academic Press, 2008.

2. Anurag Kumar, D.Manjunath, Joy kuri, "Wireless Networking", First Edition, Elsevier 2011.

3. Simon Haykin , Michael Moher, David Koilpillai, "Modern Wireless Communications", First Edition, Pearson Education 2013.

EC8092   **ADVANCED WIRELESS COMMUNICATION**   **L T P C**

                                                                  3 0 0 3

OBJECTIVES:

- To expose the students to the importance of improving capacity of wireless channel using MIMO
- To enable understanding of channel impairment mitigation using space-time block and Trellis codes
- To teach advanced MIMO system like layered space time codes, MU-MIMO System and MIMO-OFDM systems

UNIT I   CAPACITY OF WIRELESS CHANNELS   9
The crowded spectrum, need for high data rate, MIMO systems – Array Gain, Diversity Gain, Data Pipes, Spatial MUX, MIMO System Model. MIMO System Capacity – channel known at the TX, Channel unknown to the TX – capacity of deterministic channels, Random channels and frequency selective channels.

UNIT II   RADIO WAVE PROPAGATION   9

Radio wave propagation – Macroscopic fading- free space and out door, small scale fading Fading measurements – Direct pulse measurements, spread spectrum correlation channel sounding frequency domain channel sounding, Antenna Diversity – Diversity combining methods.

UNIT III   SPACE TIME BLOCK CODES   9

Delay Diversity scheme, Alamoti space time code – Maximum likelihood decoding maximum ratio combining. Transmit diversity space time block codes for real signal constellation and complex signal constellation - decoding of STBC.

UNIT IV   SPACE TIME TRELLIS CODES   9

 Space time coded systems, space time code word design criteria, design of space time T C on slow fading channels, design of STTC on Fast Fading channels, performance analysis in slow and fast fading channels, effect of imperfect channel estimation and Antenna correlation on performance, comparison of STBC & STTC.

UNIT V   LAYERED SPACE TIME CODES   9

LST transmitter – Horizontal and Vertical LST receiver – ML Rx, Zero forcing Rx; MMSE Rx, SIC Rx, ZF V-blast Rx- MMSE V-blast Rx, Iterative Rx - capacity of MIMO – OFDM systems – capacity of MIMO multi user systems.

                                                        TOTAL: 45 PERIODS

OUTCOMES:

The student should be able to:

- Comprehend and appreciate the significance and role of this course in the present contemporary world
- Apply the knowledge about the importance of MIMO in today's communication
- Appreciate the various methods for improving the data rate of wireless communication system

REFERENCES:

1. Mohinder Jankiraman, Space-time codes and MIMO systems, Artech House, Boston, London www.artech house.com, ISBN 1-58053-865-7-2004

2. Paulraj Rohit Nabar, Dhananjay Gore, Introduction of space time wireless communication systems, Cambridge University Press, 2003.

3. David Tse and Pramod Viswanath, —Fundamentals of Wireless Communication‖, Cambridge University Press, 2005.

4. Sergio Verdu " Multi User Detection" Cambridge University Press, 1998

EC8094   **SATELLITE COMMUNICATION**   **L T P C**

                                                                                                3 0 0 3

   OBJECTIVES:

   The student should be made to:

   - Understand the basics of satellite orbits
   - Understand the satellite segment and earth segment
   - Analyze the various methods of satellite access
   - Understand the applications of satellites
   - Understand the basics of satellite Networks

UNIT I   SATELLITE ORBITS   9
Kepler‟s Laws, Newton‟s law, orbital parameters, orbital perturbations, station keeping, geo
stationary and non Geo-stationary orbits – Look Angle Determination- Limits of visibility –
eclipse-Sub satellite point –Sun transit outage-Launching Procedures - launch vehicles and
propulsion.

UNIT II   SPACE SEGMENT   9
Spacecraft Technology- Structure, Primary power, Attitude and Orbit control, Thermal control
and Propulsion, communication Payload and supporting subsystems, Telemetry, Tracking and
command-Transponders-The Antenna Subsystem.

UNIT III   SATELLITE LINK DESIGN   9
Basic link analysis, Interference analysis, Rain induced attenuation and interference,
Ionospheric characteristics, Link Design with and without frequency reuse.

UNIT IV   SATELLITE ACCESS AND CODING METHODS   9
Modulation and Multiplexing: Voice, Data, Video, Analog – digital transmission system, Digital
video Broadcast, multiple access: FDMA, TDMA, CDMA, DAMA Assignment Methods,
compression – encryption, Coding Schemes.

UNIT V   SATELLITE APPLICATIONS   9
INTELSAT Series, INSAT, VSAT, Mobile satellite services: GSM, GPS, INMARSAT, LEO,
MEO, Satellite Navigational System. GPS Position Location Principles, Differential GPS, Direct
Broadcast satellites (DBS/DTH).

                                                                                  TOTAL: 45 PERIODS

OUTCOMES: At the end of the course, the student would be able to:

- Analyze the satellite orbits
- Analyze the earth segment and space segment
- Analyze the satellite Link design
- Design various satellite applications

TEXT BOOKS:

1. Dennis Roddy, "Satellite Communication", 4th Edition, Mc Graw Hill International, 2006.

2.   Timothy,Pratt,Charles,W.Bostain,JeremyE.Allnutt,"SatelliteCommunication",2nd   Edition, Wiley Publications,2002.

REFERENCES:

1. Wilbur L.Pritchard, Hendri G. Suyderhoud, Robert A. Nelson, "Satellite Communication Systems Engineering", Prentice Hall/Pearson, 2007.

2. N.Agarwal, "Design of Geosynchronous Space Craft", Prentice Hall, 1986.

3. Bruce R. Elbert, "The Satellite Communication Applications", Hand Book, Artech House Bostan London, 1997.

4. Tri T. Ha, "Digital Satellite Communication", II nd edition, 1990.

5. Emanuel Fthenakis, "Manual of Satellite Communications", Mc Graw Hill Book Co., 1984.

6. Robert G. Winch, "Telecommunication Trans Mission Systems", Mc Graw-Hill Book Co., 1983.

7. Brian Ackroyd, "World Satellite Communication and earth station Design", BSP professional Books, 1990.

8. G.B.Bleazard, "Introducing Satellite communications", NCC Publication, 1985.

9. M.Richharia, "Satellite Communication Systems-Design Principles", Macmillan 2003.

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NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

LIST OF ELECTIVES OFFERED FOR THE STUDENTS

Department of Electronics and Communication Engineering

Degree/Branch/Semester: B.E/ECE/V   Academic Year: 2020-2021

S. No.	Register No.	Name of the Student	Elective offered by the University	Electives Opted by the Students
1	612318106001	ABIRAMI M	**PROFESSIONAL ELECTIVE – 1** 1. CS8392 - Object Oriented Programming 2. EC8073 - Medical Electronics 3. CS8493 - Operating Systems 4. EC8074 - Robotics and Automation 5. EC8075 - Nano Technology and Applications 6. GE8074 - Human Rights 7. GE8077 - Total Quality Management	**PROFESSIONAL ELECTIVE – 1** GE8077 - Total Quality Management
2	612318106002	AJITH C		
3	612318106003	ANBALAGAN M		
4	612318106004	BRINDHA G		
5	612318106005	DHANUSH N		
6	612318106006	DINESH K		
7	612318106008	GANESHKUMARAN S		
8	612318106009	GOKUL.R		
9	612318106010	GOMATHI L	**OPEN ELECTIVE – 1** 1. OCE551- Air Pollution and Control Engineering 2. OMD551 - Basic of Biomedical Instrumentation 3. OBM551 - Bio Chemistry 4. OIT552 - Cloud Computing 5. OIT551 - Database Management Systems 6. OTL552 - Digital Audio Engineering 7. OME551 - Energy Conservation and Management 8. OBT553 - Fundamentals of Nutrition	**OPEN ELECTIVE – 1** OCE551- Air Pollution and Control Engineering
10	612318106011	GOWSALYA G		
11	612318106012	HARIHARASUDHAN P		
12	612318106013	INDHURAJ.B		
13	612318106014	JAYANTH M		
14	612318106015	JEEVITHA J		
15	612318106016	KALEESBHARATH S		
16	612318106018	LIPI SUKSHA M		
17	612318106019	MADHUMITHA V		

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18	612318106020	MANJU S	9. OCE552 - Geographic Information System	
19	612318106021	NAVEEN KUMAR B	10. OPY551 - Herbal Technology	
20	612318106022	NAVEEN KUMAR T	11. OMD552 - Hospital Waste Management	
21	612318106023	NAVIN KUMAR V	12. OCH551 - Industrial Nanotechnology	
22	612318106024	PREMA K	13. OBT551 - Introduction to Bioenergy and Biofuels	
23	612318106025	PRIYA V	14. OEI551 - Logic and Distributed Control Systems	
24	612318106026	PRIYADHARSHINI K	15. OBM552 - Medical Physics	**PROFESSIONAL ELECTIVE – 1**
25	612318106027	PRIYADHARSINI B	16. OML552 - Microscopy	
26	612318106030	SIBIYARASU.S	17. OEI552 - SCADA System and Applications Management	**GE8077 - Total Quality Management**
27	612318106031	SNEKA K	18. OBT554 - Principles of Food Preservation	
28	612318106032	SOWMIYA S	19. OMF551 - Product Design and Development	
29	612318106033	SRIVIGNESH K	20. ORO551 - Renewable Energy Sources	**OPEN ELECTIVE – 1**
30	612318106034	SUGANTHI.M	21. OCS551 - Software Engineering	
31	612318106035	SUSMITHA M	22. OTL551 - Space Time Wireless Communication	**OCE551- Air Pollution and Control Engineering**
32	612318106036	YUVARANI M	23. OTL553 - Telecommunication Network Management	
33	612318106037	YUVASRI R		
34	612318106302	KIRTHIKA K	24. OMD553 - Telehealth Technology	

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LIST OF ELECTIVES OFFERED FOR THE STUDENTS

Department of Electronics and Communication Engineering

Degree/Branch/Semester: B.E/ECE/VII   Academic Year: 2020-2021

S. No.	Register No.	Name of the Student	Elective offered by the University	Electives Opted by the Students
1	612317106001	AARTHI.M	EC8092 - Advanced Wireless Communication	EC8092 - Advanced Wireless Communication
2	612317106002	AKALYA.S		
3	612317106003	BALAJI.G		
4	612317106005	BIRUNDHA.M		
5	612317106006	DEEPIKA.M	EC8071- Cognitive Radio	
6	612317106007	DEEPIKA.T		
7	612317106008	ELAMBARASAN.G	GE8072 - Foundation Skills in Integrated Product Development	
8	612317106009	GAYATHRI.D		
9	612317106010	HARIKARTHI.A	CS8082 - Machine Learning Techniques	
10	612317106011	HARI RAGUL.R	EC8005- Electronics Packaging and Testing	
11	612317106012	KARTHIKEYAN.B		
12	612317106013	MANISH.S.A	EC8006 - Mixed Signal IC Design	
13	612317106014	MEGALA.B		
14	612317106015	MOHANAPRIYA.A	GE8071 - Disaster Management	
15	612317106016	MUGESHKANNAN.S		
16	612317106017	NAVEEN KUMAR.A		
17	612317106019	PREETHI.R		
18	612317106020	PRIYA.V		
19	612317106021	PRIYADHARSINI.R		

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20	612317106022	ROSHINI.V		
21	612317106023	SANGEETHA.S		
22	612317106024	SASIANAND N.S		
23	612317106025	SASMITHA.S	EC8092 - Advanced Wireless Communication	
24	612317106026	SELVENDRAN.S	EC8071- Cognitive Radio	
25	612317106027	SENTHAMIL SELVAN.M		
26	612317106028	SHALINI.G	GE8072 - Foundation Skills in Integrated Product Development	
27	612317106029	SIGOTHINI.R		
28	612317106031	SNEHAVALLI.N	CS8082 - Machine Learning Techniques	
29	612317106032	SRIVIDHYA.K		EC8092 - Advanced Wireless Communication
30	612317106033	SUGITHA.S	EC8005- Electronics Packaging and Testing	
31	612317106034	SURYA.V		
32	612317106035	SUSHMA E	EC8006 - Mixed Signal IC Design	
33	612317106036	VANITHA.M		
34	612317106037	VIGNESH.J	GE8071 - Disaster Management	
35	612317106301	RAVINDRAN.B		
36	612317106701	PRAVEEN R		
37	612317106702	MATHIYAZHAGAN M		
38	612317106703	SHANKAR S		
39	612317106704	MADHUMATHI S		
40	612317106705	VASANTHARA R		
41	612317106706	MYNAVATHI M		
42	612317106707	DHAYANANTH A		
43	612317106708	DEVI SATHYA R		

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44	612317106710	RAVI KUMAR M	EC8092 - Advanced Wireless Communication	EC8092 - Advanced Wireless Communication
45	612317106711	SANTHOSH M		
46	612317106712	KARTHI N	EC8071- Cognitive Radio	
47	612317106713	AKASHPATHI K		
48	612317106714	KARTHIGA S	GE8072 - Foundation Skills in Integrated Product Development	
49	612317106715	NADARAJAN S		
50	612317106716	KAVIYA S	CS8082 - Machine Learning Techniques	
51	612317106717	YUGAPRIYA G		
52	612317106718	GOWRI S	EC8005- Electronics Packaging and Testing	
53	612317106720	HARINIVAS S		
54	612317106721	ASMA J	EC8006 - Mixed Signal IC	
55	612317106722	TAMILSELVAN R	GE8071 - Disaster Management	
56	612317106723	RAMYA S V		

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9/11/20

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TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

LIST OF ELECTIVES OFFERED FOR THE STUDENTS

Department of Electronics and Communication Engineering

Degree/Branch/Semester: B.E/ECE/VII

Academic Year: 2020-2021

S. No.	Register No.	Name of the Student	Elective offered by the University	Electives Opted by the Students
1	612317106001	AARTHI.M	OAI751- Agricultural Finance, Banking and Co-operation	
2	612317106002	AKALYA.S		
3	612317106003	BALAJI.G		
4	612317106005	BIRUNDHA.M	OBM751- Basics of Human Anatomy and Physiology	
5	612317106006	DEEPIKA.M		
6	612317106007	DEEPIKA.T	OGI751- Climate Change and its Impact	
7	612317106008	ELAMBARASAN.G		
8	612317106009	GAYATHRI.D	OPY751- Clinical Trials	
9	612317106010	HARIKARTHI.A	OCS751- Data Structures and Algorithms	OCH752- Energy Technology
10	612317106011	HARI RAGUL.R		
11	612317106012	KARTHIKEYAN.B	OME751- Design of Experiments	
12	612317106013	MANISH.S.A		
13	612317106014	MEGALA.B	OCH752- Energy Technology	
14	612317106015	MOHANAPRIYA.A	OCE751- Environmental and Social Impact Assessment	
15	612317106016	MUGESHKANNAN.S		
16	612317106017	NAVEEN KUMAR.A		
17	612317106019	PREETHI.R	OGI752- Fundamentals of Planetary Remote Sensing	
18	612317106020	PRIYA.V		
19	612317106021	PRIYADHARSINI.R		

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20	612317106022	ROSHINI.V		
21	612317106023	SANGEETHA.S	OEN751- Green Building Design	
22	612317106024	SASIANAND N.S		
23	612317106025	SASMITHA.S	OBM752- Hospital Management	
24	612317106026	SELVENDRAN.S	OME754- Industrial Safety	
25	612317106027	SENTHAMIL SELVAN.M		
26	612317106028	SHALINI.G	OCS752- Introduction to C Programming	
27	612317106029	SIGOTHINI.R		OCH752- Energy Technology
28	612317106031	SNEHAVALLI.N	OBT753 - Introduction of Cell Biology	
29	612317106032	SRIVIDHYA.K		
30	612317106033	SUGITHA.S	OMF751- Lean Six Sigma	
31	612317106034	SURYA.V	OAN751- Low Cost Automation	
32	612317106035	SUSHMA E		
33	612317106036	VANITHA.M	OBT752- Microbiology	
34	612317106037	VIGNESH.J	OMV751- Marine Vehicles	
35	612317106301	RAVINDRAN.B		
36	612317106701	PRAVEEN R	OAE752 - Principles of Flight Mechanics	
37	612317106702	MATHIYAZHAGAN M	OIE751- Robotics	
38	612317106703	SHANKAR S		
39	612317106704	MADHUMATHI S	OME752- Supply Chain Management	
40	612317106705	VASANTHARA R		
41	612317106706	MYNAVATHI M	OME753- Systems Engineering	
42	612317106707	DHAYANANTH A		
43	612317106708	DEVI SATHYA R		

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44	612317106710	RAVI KUMAR M	OTL751-Telecommunication System Modeling and Simulation OML751-Testing of Materials OIC751-Transducer Engineering OCY751-Waste Water Treatment	OCH752-Energy Technology
45	612317106711	SANTHOSH M		
46	612317106712	KARTHI N		
47	612317106713	AKASHPATHI K		
48	612317106714	KARTHIGA S		
49	612317106715	NADARAJAN S		
50	612317106716	KAVIYA S		
51	612317106717	YUGAPRIYA G		
52	612317106718	GOWRI S		
53	612317106720	HARINIVAS S		
54	612317106721	ASMA J		
55	612317106722	TAMILSELVAN R		
56	612317106723	RAMYA S V		

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TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

LIST OF ELECTIVES OFFERED FOR THE STUDENTS

Department of Electronics and Communication Engineering

Degree/Branch/Semester: B.E/ECE/VI   Academic Year: 2020-2021

S. No.	Register No.	Name of the Student	Elective offered by the University	Electives Opted by the Students
1	612318106001	ABIRAMI M	**Professional Elective -II** 1. CS8792 Cryptography and Network Security 2.EC8091 Advanced Digital Signal Processing 3.EC8001 MEMS and NEMS 4.EC8002 Multimedia Compression and Communication 5.EC8003 CMOS Analog IC Design 6.EC8004 Wireless Networks 7.GE8075 Intellectual Property Rights	**Professional Elective -II** EC8004 Wireless Networks
2	612318106002	AJITH C		
3	612318106003	ANBALAGAN M		
4	612318106004	BRINDHA G		
5	612318106005	DHANUSH N		
6	612318106006	DINESH K		
7	612318106008	GANESHKUMARAN S		
8	612318106009	GOKUL R		
9	612318106010	GOMATHI L		
10	612318106011	GOWSALYA G		
11	612318106012	HARIHARASUDHAN P		
12	612318106013	INDHURAJ.B		
13	612318106014	JAYANTH M		
14	612318106015	JEEVITHA J		
15	612318106016	KALEESBHARATH S		
16	612318106018	LIPI SUKSHA M		
17	612318106019	MADHUMITHA V		
18	612318106020	MANJU S		
19	612318106021	NAVEEN KUMAR B		
20	612318106022	NAVEEN KUMAR T		
21	612318106023	NAVIN KUMAR V		
22	612318106024	PREMA K		
23	612318106025	PRIYA V		
24	612318106026	PRIYADHARSHINI K		
25	612318106027	PRIYADHARSINI B		
26	612318106030	SIBIYARASU.S		
27	612318106031	SNEKA K		
28	612318106032	SOWMIYA S		
29	612318106033	SRIVIGNESH K		
30	612318106035	SUSMITHA M		
31	612318106036	YUVARANI M		
32	612318106037	YUVASRI R		
33	612318106302	KIRTHIKA K		

H.O.D. 25/3/21

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TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

LIST OF ELECTIVES OFFERED FOR THE STUDENTS

Department of Electronics and Communication Engineering

Degree/Branch/Semester: B.E / ECE / VIII   Academic Year: 2020-2021

S. No.	Register No.	Name of the Student	Elective offered by the University	Electives Opted by the Students
1	612317106001	AARTHI.M		
2	612317106002	AKALYA.S		
3	612317106003	BALAJI.G		
4	612317106005	BIRUNDHA.M	**Elective IV**	
5	612317106006	DEEPIKA.M		
6	612317106007	DEEPIKA.T	EC8072 - Electro Magnetic Interference and Compatibility	
7	612317106008	ELAMBARASAN.G		
8	612317106009	GAYATHRI.D		**Elective IV**
9	612317106010	HARIKARTHI.A	EC8007- Low power SoC Design	
10	612317106011	HARI RAGUL.R		GE8076- Professional Ethics in Engineering
11	612317106012	KARTHIKEYAN.B		
12	612317106013	MANISH.S.A	EC8008 - Photonic Networks	
13	612317106014	MEGALA.B		
14	612317106015	MOHANAPRIYA.A	EC8009 - Compressive Sensing	
15	612317106016	MUGESHKANNAN.S		
16	612317106017	NAVEEN KUMAR.A		
17	612317106019	PREETHI.R	EC8093- Digital Image Processing	
18	612317106020	PRIYA.V		
19	612317106021	PRIYADHARSINI.R		
20	612317106022	ROSHINI.V	GE8076- Professional Ethics in Engineering	
21	612317106023	SANGEETHA.S		
22	612317106024	SASIANAND N S		
23	612317106025	SASMITHA.S		
24	612317106026	SELVENDRAN.S	**Elective V**	**Elective V**
25	612317106027	SENTHAMIL SELVAN.M		
26	612317106028	SHALINI.G	EC8010- Video Analytics	EC8094 - Satellite Communication
27	612317106029	SIGOTHINI.R	EC8011- DSP Architecture and Programming	
28	612317106031	SNEHAVALLI.N		
29	612317106032	SRIVIDHYA K		
30	612317106033	SUGITHA.S	EC8094 - Satellite Communication	
31	612317106034	SURYA.V		
32	612317106035	SUSHMA E	CS8086 - Soft Computing	
33	612317106036	VANITHA.M		
34	612317106037	VIGNESH.J		
35	612317106301	RAVINDRAN.B		

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TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

ESTD 2001

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BSCIC
ISO 9001 REGISTERED

36	612317106701	PRAVEEN R	IT8006- Principles of Speech Processing GE8073 - Fundamentals of Nano Science	
37	612317106702	MATHIYAZHAGAN M		
38	612317106703	SHANKAR S		
39	612317106704	MADHUMATHI S		
40	612317106705	VASANTHARA R		
41	612317106706	MYNAVATHI M		
42	612317106707	DHAYANANTH A		
43	612317106708	DEVI SATHYA R		
44	612317106710	RAVI KUMAR M		
45	612317106711	SANTHOSH M		
46	612317106712	KARTHI N		
47	612317106713	AKASHPATHI K		
48	612317106714	KARTHIGA S		
49	612317106715	NADARAJAN S		
50	612317106716	KAVIYA S		
51	612317106717	YUGAPRIYA G		
52	612317106718	GOWRI S		
53	612317106720	HARINIVAS S		
54	612317106721	ASMA J		
55	612317106722	TAMILSELVAN R		
56	612317106723	RAMYA S V		

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SENGUNTHAR ENGINEERING COLLEGE
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TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

LIST OF ELECTIVES OFFERED FOR THE STUDENTS

Department of Electronics and Communication Engineering-M.E.VLSI DESIGN

Degree/Branch/Semester: M.E/VLSI Design/II   Academic Year: 2020-2021

Professional Elective-I

S. No.	Register No.	Name of the Student	Professional Elective-I offered	Professional Elective-I selected by the Students
1	202053001	JANANI M	19PVPX01- Device Modeling – I 19PVPX02- RF IC Design 19PVPX03- Design of Analog Filters and Signal Conditioning Circuits 19PVPX04- Nano Scale Devices	19PVPX01- Device Modeling – I
2	202053002	MUTHARASU B		
3	202053004	TAMILSELVAN R		

Professional Elective-II

S. No.	Register No.	Name of the Student	Professional Elective-II offered	Professional Elective-II selected by the Students
1	202053001	JANANI M	19PVPX05- DSP Processor Architecture and Programming 19PVPX06- Networks on Chip 19PVPX07- Signal Integrity for High Speed 19PVPX08- Digital Control Engineering	19PVPX06- Networks on Chip
2	202053002	MUTHARASU B		
3	202053004	TAMILSELVAN R		

Professional Elective-III

S. No.	Register No.	Name of the Student	Professional Elective-III offered	Professional Elective-III selected by the Students
1	202053001	JANANI M	19PVPX09- Embedded System Design 19PVPX10- Soft Computing and Optimization Techniques 19PVPX11- Reconfigurable Architectures 19PVPX12- Advanced Microprocessors and Architectures	19PVPX09- Embedded System Design
2	202053002	MUTHARASU B		
3	202053004	TAMILSELVAN R		

H.O.D.   PRINCIPAL

GE8076   **PROFESSIONAL ETHICS IN ENGINEERING**   **L T P C**

                                                                                        3 0 0 3

OBJECTIVE:

- To enable the students to create an awareness on Engineering Ethics and Human Values, to instill Moral and Social Values and Loyalty and to appreciate the rights of others.

UNIT I   HUMAN VALUES   10

Morals, values and Ethics – Integrity – Work ethic – Service learning – Civic virtue – Respect for others – Living peacefully – Caring – Sharing – Honesty – Courage – Valuing time – Cooperation – Commitment – Empathy – Self confidence – Character – Spirituality – Introduction to Yoga and meditation for professional excellence and stress management.

UNIT II   ENGINEERING ETHICS   9

Senses of 'Engineering Ethics' – Variety of moral issues – Types of inquiry – Moral dilemmas – Moral Autonomy – Kohlberg's theory – Gilligan's theory – Consensus and Controversy – Models of professional roles - Theories about right action – Self-interest – Customs and Religion – Uses of Ethical Theories.

UNIT III   ENGINEERING AS SOCIAL EXPERIMENTATION   9

Engineering as Experimentation – Engineers as responsible Experimenters – Codes of Ethics – A Balanced Outlook on Law.

UNIT IV   SAFETY, RESPONSIBILITIES AND RIGHTS   9

Safety and Risk – Assessment of Safety and Risk – Risk Benefit Analysis and Reducing Risk - Respect for Authority – Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Professional Rights – Employee Rights – Intellectual Property Rights (IPR) – Discrimination.

UNIT V   GLOBAL ISSUES   8

Multinational Corporations – Environmental Ethics – Computer Ethics – Weapons Development – Engineers as Managers – Consulting Engineers – Engineers as Expert Witnesses and Advisors – Moral Leadership –Code of Conduct – Corporate Social Responsibility.

                                                                            TOTAL: 45 PERIODS

OUTCOMES:

- Upon completion of the course, the student should be able to apply ethics in society, discuss the ethical issues related to engineering and realize the responsibilities and rights in the society.

TEXT BOOKS:

1. Mike W. Martin and Roland Schinzinger, "Ethics in Engineering", Tata McGraw Hill, New Delhi, 2003.

2. Govindarajan M, Natarajan S, Senthil Kumar V. S, "Engineering Ethics", Prentice Hall of India, New Delhi, 2004.

REFERENCES:

1. Charles B. Fleddermann, "Engineering Ethics", Pearson Prentice Hall, New Jersey, 2004.

2. Charles E. Harris, Michael S. Pritchard and Michael J. Rabins, "Engineering Ethics – Concepts and Cases", Cengage Learning, 2009.

3. John R Boatright, "Ethics and the Conduct of Business", Pearson Education, New Delhi, 2003
4. Edmund G Seebauer and Robert L Barry, "Fundamentals of Ethics for Scientists and Engineers", Oxford University Press, Oxford, 2001.

5. Laura P. Hartman and Joe Desjardins, "Business Ethics: Decision Making for Personal Integrity and Social Responsibility" Mc Graw Hill education, India Pvt. Ltd.,New Delhi, 2013.

6. World Community Service Centre, ' Value Education', Vethathiri publications, Erode, 2011.

Web sources:

1. www.onlineethics.org

2. www.nspe.org

3. www.globalethics.org

4. www.ethics.org

GE8077   **TOTAL QUALITY MANAGEMENT**   **L T P C**

                                                                                          3 0 0 3

OBJECTIVE:

- To facilitate the understanding of Quality Management principles and process.

UNIT I   INTRODUCTION   9

Introduction - Need for quality - Evolution of quality - Definitions of quality - Dimensions of product and service quality - Basic concepts of TQM - TQM Framework - Contributions of Deming, Juran and Crosby - Barriers to TQM - Customer focus - Customer orientation, Customer satisfaction, Customer complaints, Customer retention.

UNIT II   TQM PRINCIPLES   9

 Leadership - Quality Statements, Strategic quality planning, Quality Councils - Employee involvement - Motivation, Empowerment, Team and Teamwork, Recognition and Reward, Performance appraisal - Continuous process improvement - PDCA cycle, 5S, Kaizen - Supplier partnership - Partnering, Supplier selection, Supplier Rating.

UNIT III   TQM TOOLS AND TECHNIQUES I   9

The seven traditional tools of quality - New management tools - Six sigma: Concepts, Methodology, applications to manufacturing, service sector including IT - Bench marking - Reason to bench mark, Bench marking process - FMEA - Stages, Types.

UNIT IV   TQM TOOLS AND TECHNIQUES II   9

Quality Circles - Cost of Quality - Quality Function Deployment (QFD) - Taguchi quality loss function - TPM - Concepts, improvement needs - Performance measures.

UNIT V   QUALITY MANAGEMENT SYSTEM   9
Introduction—Benefits of ISO Registration—ISO 9000 Series of Standards—Sector-Specific Standards—AS 9100, TS16949 and TL 9000-- ISO 9001 Requirements—Implementation—Documentation—Internal Audits—Registration- ENVIRONMENTAL MANAGEMENT SYSTEM: Introduction—ISO 14000 Series Standards—Concepts of ISO 14001—Requirements of ISO 14001—Benefits of EMS.

                                                                          TOTAL: 45 PERIODS

OUTCOME:

- The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.

TEXT BOOK:

1. Dale H.Besterfiled, Carol B.Michna,Glen H. Besterfield,Mary B.Sacre,Hemant Urdhwareshe and Rashmi Urdhwareshe, "Total Quality Management", Pearson Education Asia, Revised Third Edition, Indian Reprint, Sixth Impression, 2013.

REFERENCES:

1. James R. Evans and William M. Lindsay, "The Management and Control of Quality", 8th Edition, First Indian Edition, Cengage Learning, 2012.

2. Janakiraman. B and Gopal .R.K., "Total Quality Management - Text and Cases", Prentice Hall (India) Pvt. Ltd., 2006.

3. Suganthi.L and Anand Samuel, "Total Quality Management", Prentice Hall (India) Pvt. Ltd., 2006.

4. ISO9001-2015 standards

OCE551   **AIR POLLUTION AND CONTROL ENGINEERING**   **L T P C**
                                                                                                          3 0 0 3
OBJECTIVE:
- To impart knowledge on the principle and design of control of Indoor/ particulate/ gaseous air pollutant and its emerging trends.

UNIT I   INTRODUCTION   7
Structure and composition of Atmosphere – Definition, Scope and Scales of Air Pollution – Sources and classification of air pollutants and their effect on human health, vegetation, animals, property, aesthetic value and visibility- Ambient Air Quality and Emission standards.

UNIT II   METEOROLOGY   6
Effects of meteorology on Air Pollution - Fundamentals, Atmospheric stability, Inversion, Wind profiles and stack plume patterns- Atmospheric Diffusion Theories – Dispersion models, Plume rise.

UNIT III   CONTROL OF PARTICULATE CONTAMINANTS   11
Factors affecting Selection of Control Equipment – Gas Particle Interaction – Working principle - Gravity Separators, Centrifugal separators Fabric filters, Particulate Scrubbers, Electrostatic Precipitators.

UNIT IV   CONTROL OF GASEOUS CONTAMINANTS   11
Factors affecting Selection of Control Equipment – Working principle - absorption, Adsorption, condensation, Incineration, Bio filters – Process control and Monitoring.

UNIT V   INDOOR AIR QUALITY MANAGEMENT   10
Sources, types and control of indoor air pollutants, sick building syndrome and Building related illness- Sources and Effects of Noise Pollution – Measurement – Standards –Control and Preventive measures.
                                                                                              TOTAL: 45 PERIODS
OUTCOMES:
The students completing the course will have
- An understanding of the nature and characteristics of air pollutants, noise pollution and basic concepts of air quality management
- Ability to identify, formulate and solve air and noise pollution problems
- Ability to design stacks and particulate air pollution control devices to meet applicable standards.
- Ability to select control equipments.
- Ability to ensure quality, control and preventive measures.

TEXTBOOKS:
1. Lawrence K. Wang, Norman C. Pareira, Yung Tse Hung, "Air Pollution Control Engineering", Tokyo, springer science + science media LLC,2004.
2. Noel de Nevers, "Air Pollution Control Engineering", Waveland press,Inc 2017.
3. Anjaneyulu. Y, "Air Pollution and Control Technologies", Allied Publishers (P) Ltd., India 2002.

REFERENCES:
1. David H.F. Liu, Bela G. Liptak, "Air Pollution", Lweis Publishers, 2000.
2. Arthur C. Stern, "Air Pollution (Vol.I – Vol.VIII)", Academic Press, 2006.
3. Wayne T.Davis, "Air Pollution Engineering Manual", John Wiley & Sons, Inc, 2000.
4. M.N Rao and HVN Rao, "Air Pollution",Tata Mcgraw Hill Publishing Company limited,2007.
5. C.S.Rao, "Environmental Pollution Control Engineering",New Age International(P) Limited Publishers,2006.

OCE551   **AIR POLLUTION AND CONTROL ENGINEERING**   **L T P C**
                                                                              3 0 0 3

OBJECTIVE:
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Structure and composition of Atmosphere – Definition, Scope and Scales of Air Pollution – Sources and classification of air pollutants and their effect on human health, vegetation, animals, property, aesthetic value and visibility- Ambient Air Quality and Emission standards.

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Factors affecting Selection of Control Equipment – Gas Particle Interaction – Working principle - Gravity Separators, Centrifugal separators Fabric filters, Particulate Scrubbers, Electrostatic Precipitators.

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Sources, types and control of indoor air pollutants, sick building syndrome and Building related illness-Sources and Effects of Noise Pollution – Measurement – Standards –Control and Preventive measures.

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The students completing the course will have
- An understanding of the nature and characteristics of air pollutants, noise pollution and basic concepts of air quality management
- Ability to identify, formulate and solve air and noise pollution problems
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- Ability to select control equipments.
- Ability to ensure quality, control and preventive measures.

TEXTBOOKS:
1. Lawrence K. Wang, Norman C. Pareira, Yung Tse Hung, "Air Pollution Control Engineering", Tokyo, springer science + science media LLC,2004.
2. Noel de Nevers, "Air Pollution Control Engineering", Waveland press,Inc 2017.
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REFERENCES:
1. David H.F. Liu, Bela G. Liptak, "Air Pollution", Lweis Publishers, 2000.
2. Arthur C. Stern, "Air Pollution (Vol.I – Vol.VIII)", Academic Press, 2006.
3. Wayne T.Davis, "Air Pollution Engineering Manual", John Wiley & Sons, Inc, 2000.
4. M.N Rao and HVN Rao, "Air Pollution",Tata Mcgraw Hill Publishing Company limited,2007.
5. C.S.Rao, "Environmental Pollution Control Engineering",New Age International(P) Limited Publishers,2006.

OCH752   **ENERGY TECHNOLOGY**   **L T P C**
                                                                          3 0 0 3

OBJECTIVES
  • Students will gain knowledge about different energy sources

UNIT I   ENERGY   8
Introduction to energy – Global energy scene – Indian energy scene - Units of energy, conversion factors, general classification of energy, energy crisis, energy alternatives.

UNIT II   CONVENTIONAL ENERGY   8
Conventional energy resources, Thermal, hydel and nuclear reactors, thermal, hydel and nuclear power plants, efficiency, merits and demerits of the above power plants, combustion processes, fluidized bed combustion.

UNIT III   NON-CONVENTIONAL ENERGY   10
Solar energy, solar thermal systems, flat plate collectors, focusing collectors, solar water heating, solar cooling, solar distillation, solar refrigeration, solar dryers, solar pond, solar thermal power generation, solar energy application in India, energy plantations. Wind energy, types of windmills, types of wind rotors, Darrieus rotor and Gravian rotor, wind electric power generation, wind power in India, economics of wind farm, ocean wave energy conversion, ocean thermal energy conversion, tidal energy conversion, geothermal energy.

UNIT IV   BIOMASS ENERGY   10
Biomass origin - Resources – Biomass estimation. Thermochemical conversion – Biological conversion, Chemical conversion – Hydrolysis & hydrogenation, solvolysis, biocrude, biodiesel power generation gasifier, biogas, integrated gasification.

UNIT V   ENERGY CONSERVATION   9
Energy conservation - Act; Energy management importance, duties and responsibilities; Energy audit – Types methodology, reports, instruments. Benchmalcing and energy performance, material and energy balance, thermal energy management.

                                                        TOTAL : 45 PERIODS
OUTCOMES:
  • Understand conventional Energy sources, Non- conventional Energy sources, biomass sources and develop design parameters for equipment to be used in Chemical process industries. Understand energy conservation in process industries

TEXTBOOKS:
   1. Rao, S. and Parulekar, B.B., Energy Technology, Khanna Publishers, 2005.
   2. Rai, G.D., Non-conventional Energy Sources, Khanna Publishers, New Delhi, 1984.
   3. Nagpal, G.R., Power Plant Engineering, Khanna Publishers, 2008.
   4. Energy Management, Paul W.O'Callaghan McGraw – Hill, 1993

REFERENCES:
   1. Nejat Vezirog, Alternate Energy Sources, IT, McGraw Hill, New York.
   2. El. Wakil, Power Plant Technology, Tata McGraw Hill, New York, 2002.
   3. Sukhatme. S.P., Solar Enery - Thermal Collection and Storage, Tata McGraw hill, New Delhi, 1981.
   4. Handbook of Energy Audit by 7th edition Albert Thumann, P.E., C.E.M & William J Younger C.E.M, Faiment Press 2008

OCH752   **ENERGY TECHNOLOGY**   **L T P C**
                                                                    3 0 0 3

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- Students will gain knowledge about different energy sources

UNIT I   ENERGY   8
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UNIT II   CONVENTIONAL ENERGY   8
Conventional energy resources, Thermal, hydel and nuclear reactors, thermal, hydel and nuclear power plants, efficiency, merits and demerits of the above power plants, combustion processes, fluidized bed combustion.

UNIT III   NON-CONVENTIONAL ENERGY   10
Solar energy, solar thermal systems, flat plate collectors, focusing collectors, solar water heating, solar cooling, solar distillation, solar refrigeration, solar dryers, solar pond, solar thermal power generation, solar energy application in India, energy plantations. Wind energy, types of windmills, types of wind rotors, Darrieus rotor and Gravian rotor, wind electric power generation, wind power in India, economics of wind farm, ocean wave energy conversion, ocean thermal energy conversion, tidal energy conversion, geothermal energy.

UNIT IV   BIOMASS ENERGY   10
Biomass origin - Resources – Biomass estimation. Thermochemical conversion – Biological conversion, Chemical conversion – Hydrolysis & hydrogenation, solvolysis, biocrude, biodiesel power generation gasifier, biogas, integrated gasification.

UNIT V   ENERGY CONSERVATION   9
Energy conservation - Act; Energy management importance, duties and responsibilities; Energy audit – Types methodology, reports, instruments. Benchmalcing and energy performance, material and energy balance, thermal energy management.

                                          TOTAL : 45 PERIODS
OUTCOMES:
- Understand conventional Energy sources, Non- conventional Energy sources, biomass sources and develop design parameters for equipment to be used in Chemical process industries. Understand energy conservation in process industries

TEXTBOOKS:
1. Rao, S. and Parulekar, B.B., Energy Technology, Khanna Publishers, 2005.
2. Rai, G.D., Non-conventional Energy Sources, Khanna Publishers, New Delhi, 1984.
3. Nagpal, G.R., Power Plant Engineering, Khanna Publishers, 2008.
4. Energy Management, Paul W.O'Callaghan McGraw – Hill, 1993

REFERENCES:
1. Nejat Vezirog, Alternate Energy Sources, IT, McGraw Hill, New York.
2. El. Wakil, Power Plant Technology, Tata McGraw Hill, New York, 2002.
3. Sukhatme. S.P., Solar Enery - Thermal Collection and Storage, Tata McGraw hill, New Delhi, 1981.
4. Handbook of Energy Audit by 7th edition Albert Thumann, P.E., C.E.M & William J Younger C.E.M, Faiment Press 2008

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LIST OF ELECTIVES OFFERED FOR THE STUDENTS

Department of Electrical and Electronics Engineering

Degree/Branch/Semester: B.E/EEE/V

Academic Year: 2020-2021

S. No.	Register No.	Name of the Student	Elective offered by the University	Electives Opted by the Students
1	612318105001	AGALYA S	OCY551- ADVANCED ENGINEERING CHEMISTRY	OAN551- SENSORS AND TRANSDUCERS
2	612318105002	ARIHARAN B		
3	612318105004	DINESHKUMAR G		
4	612318105005	GOKUL RAJ A		
5	612318105006	GOKULRAJAN V	OCE551- AIR POLLUTION AND CONTROL ENGINEERING	
6	612318105007	GOWTHAM M		
7	612318105008	GOWTHAMAN S		
8	612318105009	HARIHARAN J	OAT551- AUTOMOTIVE SYSTEMS	
9	612318105010	HARIHARAN K		
10	612318105011	KARTHIKEYAN S	OIT551- DATABASE MANAGEMENT SYSTEMS	
11	612318105012	KATHIRAVAN A		
12	612318105013	KEERTHANA K	OIT552- CLOUD COMPUTING	
13	612318105014	KEERTHIVASAN P		
14	612318105015	MOHANKUMAR.S	OMF551- PRODUCT DESIGN AND DEVELOPMENT	
15	612318105017	NIHANTH.S		
16	612318105018	PARIMALA DEVI S	OAN551- SENSORS AND TRANSDUCERS	
17	612318105019	PONKUMAR A		
18	612318105020	PRAVEEN.G		

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19	612318105021	PURNIMA N	
20	612318105022	RAGUL MANI R	
21	612318105023	RANJITH S	
22	612318105024	SUBASHINI S	OMD551- BASICS OF BIOMEDICAL INSTRUMENTATION
23	612318105025	VARSHITHA G	
24	612318105026	VASANTHA KUMAR R	
25	612318105027	VIJAY P	
26	612318105301	SEENU R	

H.O.D. 7/11/20

PR

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TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

LIST OF ELECTIVES OFFERED FOR THE STUDENTS

Department of Electrical and Electronics Engineering

Degree/Branch/Semester: B.E/EEE/VII

Academic Year: 2020-2021

S. No.	Register No.	Name of the Student	Open Elective II offered by the University	Electives Opted by the Students
1	612317105001	ANBAZHAKAN S		
2	612317105002	ARIVUDAINAMBI M		
3	612317105004	BHARATHI S		
4	612317105005	DEEPIKA P S		
5	612317105006	DHARANI P		
6	612317105007	DIVYABHARATHI M		
7	612317105008	GAUTHAMI M		
8	612317105009	GOKULAKKANNAN M		
9	612317105010	GOKULRAMANA M		
10	612317105011	JANANI P	OBT751-Analytical Methods and Instrumentation OME751-Design of Experiments OCS752-Introduction to C Programming OCH751- Process Modeling and Simulation OEC753- Signals and Systems OML751 -Testing of Materials	OBT751-Analytical Methods and Instrumentation
11	612317105012	JAWAHAR S		
12	612317105013	JEEVANANTHAM M		
13	612317105014	KANIMOZHI D		
14	612317105015	KANNAN S		
15	612317105016	KAVEN M		
16	612317105017	KAVIBHARATHI N		
17	612317105018	KEERTHIKA S		
18	612317105019	LAVANYA E		
19	612317105020	LAVANYA E		
20	612317105022	MEGANATHAN S		
21	612317105023	NANDHAKUMAR S		
22	612317105024	NANDHINI S		
23	612317105025	NANDHINI T		
24	612317105026	NESAMANIKANDAN E		
25	612317105028	PRIYADHARSHINI P		
26	612317105029	PUGAZHENTHI S		
27	612317105030	RAMESH P		
28	612317105031	RAVI KUMAR K		

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29	612317105032	SANTHI M		
30	612317105034	SOORIYA M		
31	612317105035	SRIKUMAR K		
32	612317105036	SRI VARSHNI T M		
33	612317105038	VIGNESHWARAN M		
34	612317105039	VINITHA R		
35	612317105301	DHAYALAN S		
36	612317105302	HARIHARAN.M		
37	612317105303	TAMIZHARASI.T		
38	612317105701	VIJAY N		
39	612317105702	GNANASEKAR K		
40	612317105703	SIVA S		
41	612317105705	MOHANRAJ S		
42	612317105706	CIBI B		
43	612317105707	NANDHINI T		
44	612317105708	NAVEEN K		
45	612317105710	DINESH M		
46	612317105711	LISHANTHAN P		
47	612317105712	SASI T		

H.O.D 9/11/20

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LIST OF ELECTIVES OFFERED FOR THE STUDENTS

Department of Electrical and Electronics Engineering

Degree/Branch/Semester: B.E/EEE/VII

Academic Year: 2020-2021

S. No.	Register No.	Name of the Student	Professional Elective III & IV offered by the University	Electives Opted by the Students
1	612317105001	ANBAZHAKAN S	GE8071- Disaster Management GE8074- Human Rights MG8491- Operations Research MA8391- Probability and Statistics EI8075- Fibre Optics and Laser Instrumentation EE8008- System Identification and Adaptive Control CS8491- Computer Architecture EE8009- Control of Electrical Drives EC8095- VLSI Design EE8010- Power Systems Transients GE8077- Total Quality Management	EI8075- Fibre Optics and Laser Instrumentation GE8077- Total Quality Management
2	612317105002	ARIVUDAINAMBI M		
3	612317105004	BHARATHI S		
4	612317105005	DEEPIKA P S		
5	612317105006	DHARANI P		
6	612317105007	DIVYABHARATHI M		
7	612317105008	GAUTHAMI M		
8	612317105009	GOKULAKKANNAN M		
9	612317105010	GOKULRAMANA M		
10	612317105011	JANANI P		
11	612317105012	JAWAHAR S		
12	612317105013	JEEVANANTHAM M		
13	612317105014	KANIMOZHI D		
14	612317105015	KANNAN S		
15	612317105016	KAVEN M		
16	612317105017	KAVIBHARATHI N		
17	612317105018	KEERTHIKA S		
18	612317105019	LAVANYA E		
19	612317105020	LAVANYA E		
20	612317105022	MEGANATHAN S		
21	612317105023	NANDHAKUMAR S		
22	612317105024	NANDHINI S		
23	612317105025	NANDHINI T		
24	612317105026	NESAMANIKANDAN E		
25	612317105028	PRIYADHARSHINI P		

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26	612317105029	PUGAZHENTHI S	GE8071- Disaster Management GE8074- Human Rights MG8491- Operations Research MA8391- Probability and Statistics EI8075- Fibre Optics and Laser Instrumentation	EI8075- Fibre Optics and Laser Instrumentation GE8077- Total Quality Management
27	612317105030	RAMESH P		
28	612317105031	RAVI KUMAR K		
29	612317105032	SANTHI M		
30	612317105034	SOORIYA M		
31	612317105035	SRIKUMAR K		
32	612317105036	SRI VARSHNI T M		
33	612317105038	VIGNESHWARAN M		
34	612317105039	VINITHA R		
35	612317105301	DHAYALAN S		
36	612317105302	HARIHARAN.M		
37	612317105303	TAMIZHARASI.T	EE8008- System Identification and Adaptive Control CS8491- Computer Architecture EE8009- Control of Electrical Drives EC8095- VLSI Design EE8010- Power Systems Transients GE8077- Total Quality Management	
38	612317105701	VIJAY N		
39	612317105702	GNANASEKAR K		
40	612317105703	SIVA S		
41	612317105705	MOHANRAJ S		
42	612317105706	CIBI B		
43	612317105707	NANDHINI T		
44	612317105708	NAVEEN K		
45	612317105710	DINESH M		
46	612317105711	LISHANTHAN P		
47	612317105712	SASI T		

H.O.D

07/11/2020

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LIST OF ELECTIVES OFFERED FOR THE STUDENTS

Department of Electrical and Electronics Engineering

Degree/Branch/Semester: B.E/EEE/VI   Academic Year: 2020-2021

S. No.	Register No.	Name of the Student	Elective offered by the University	Electives Opted by the Students
1	612318105001	AGALYA S	IC8651 Advanced Control System EE8001 Visual Languages and Applications EE8002 Design of Electrical Apparatus EE8003 Power Systems Stability EE8004 Modern Power Converters GE8075 Intellectual Property Rights	EE8002 Design of Electrical Apparatus
2	612318105002	ARIHARAN B		
3	612318105004	DINESHKUMAR.G		
4	612318105005	GOKUL RAJ A		
5	612318105006	GOKULRAJAN V		
6	612318105007	GOWTHAM M		
7	612318105008	GOWTHAMAN S		
8	612318105009	HARIHARAN J		
9	612318105010	HARIHARAN K		
10	612318105011	KARTHIKEYAN S		
11	612318105012	KATHIRAVAN A		
12	612318105013	KEERTHANA K		
13	612318105014	KEERTHIVASAN P		
14	612318105015	MOHANKUMAR.S		
15	612318105017	NIHANTH.S		
16	612318105018	PARIMALA DEVI S		
17	612318105019	PONKUMAR A		
18	612318105020	PRAVEEN.G		

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19	612318105021	PURNIMA N	RO8591 Principles of Robotics EE8005 Special Electrical Machines EE8006 Power Quality EE8007 EHVAC Transmission EC8395 Communication Engineering	EE8005 Special Electrical Machines
20	612318105022	RAGUL MANI R		
21	612318105023	RANJITH S		
22	612318105024	SUBASHINI S		
23	612318105025	VARSHITHA G		
24	612318105026	VASANTHA KUMAR R		
25	612318105027	VIJAY P		
26	612318105301	SEENU R		

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TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

LIST OF ELECTIVES OFFERED FOR THE STUDENTS

Department of Electrical and Electronics Engineering

Degree/Branch/Semester: B.E/EEE/VIII   Academic Year: 2020-2021

S. No.	Register No.	Name of the Student	Professional Elective V & VI offered by the University	Electives Opted by the Students
1	612317105001	ANBAZHAKAN S	EE8011-Flexible AC Transmission Systems EE8012 - Soft Computing Techniques EE8013- Power Systems Dynamics EE8014- SMPS and UPS EE8015- Electric Energy Generation, Utilization and Conservation GE8076 -Professional Ethics in Engineering MG8591 - Principals of Management	EE8015-Electric Energy Generation, Utilization and Conservation
2	612317105002	ARIVUDAINAMBI M		
3	612317105004	BHARATHI S		
4	612317105005	DEEPIKA P S		
5	612317105006	DHARANI P		
6	612317105007	DIVYABHARATHI M		
7	612317105008	GAUTHAMI M		
8	612317105009	GOKULAKKANNAN M		
9	612317105010	GOKULRAMANA M		
10	612317105011	JANANI P		
11	612317105012	JAWAHAR S		
12	612317105013	JEEVANANTHAM M		
13	612317105014	KANIMOZHI D		
14	612317105015	KANNAN S		
15	612317105016	KAVEN M	EE8016-Energy Management and Auditing CS8391 -Data Structures EE8017-High Voltage Direct Current Transmission EE8018-Microcontroller Based System Design EE8019-Smart Grid EI8073-Biomedical Instrumentation GE8073-Fundamentals of Nano Science	EE8018-Microcontroller Based System Design
16	612317105017	KAVIBHARATHI N		
17	612317105018	KEERTHIKA S		
18	612317105019	LAVANYA E		
19	612317105020	LAVANYA E		
20	612317105022	MEGANATHAN S		
21	612317105023	NANDHAKUMAR S		
22	612317105024	NANDHINI S		
23	612317105025	NANDHINI T		
24	612317105026	NESAMANIKANDAN E		
25	612317105028	PRIYADHARSHINI P		

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TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU
ESTD 2001

26	612317105029	PUGAZHENTHI S		
27	612317105030	RAMESH P	EE8011-Flexible AC Transmission Systems EE8012 - Soft Computing Techniques EE8013- Power Systems Dynamics EE8014- SMPS and UPS EE8015- Electric Energy Generation, Utilization and Conservation GE8076 -Professional Ethics in Engineering MG8591 - Principals of Management	EE8015-Electric Energy Generation, Utilization and Conservation
28	612317105031	RAVI KUMAR K		
29	612317105032	SANTHI M		
30	612317105034	SOORIYA M		
31	612317105035	SRIKUMAR K		
32	612317105036	SRI VARSHNI T M		
33	612317105038	VIGNESHWARAN M		
34	612317105039	VINITHA R		
35	612317105301	DHAYALAN S		
36	612317105302	HARIHARAN.M		
37	612317105303	TAMIZHARASI.T		
38	612317105701	VIJAY N		
39	612317105702	GNANASEKAR K	EE8016-Energy Management and Auditing CS8391 -Data Structures EE8017-High Voltage Direct Current Transmission EE8018-Microcontroller Based System Design EE8019-Smart Grid EI8073-Biomedical Instrumentation GE8073-Fundamentals of Nano Science	EE8018-Microcontroller Based System Design
40	612317105703	SIVA S		
41	612317105705	MOHANRAJ S		
42	612317105706	CIBI B		
43	612317105707	NANDHINI T		
44	612317105708	NAVEEN K		
45	612317105710	DINESH M		
46	612317105711	LISHANTHAN P		
47	612317105712	SASI T		

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PRINCIPAL

EE8002   **DESIGN OF ELECTRICAL APPARATUS**   **L   T   P   C**
                                                                        3   0   0   3

OBJECTIVES: To impart knowledge about the following topics:
* Magnetic circuit parameters and thermal rating of various types of electrical machines.
* Armature and field systems for D.C. machines.
* Core, yoke, windings and cooling systems of transformers.
* Design of stator and rotor of induction machines and synchronous machines.
* The importance of computer aided design method.

UNIT I   DESIGN OF FIELD SYSTEM AND ARMATURE   9
Major considerations in Electrical Machine Design – Materials for Electrical apparatus – Design of Magnetic circuits – Magnetising current – Flux leakage – Leakage in Armature. Design of lap winding and wave winding.

UNIT II DESIGN OF TRANSFORMERS   9
Construction - KVA output for single and three phase transformers – Overall dimensions – design of yoke, core and winding for core and shell type transformers – Estimation of No load current – Temperature rise in Transformers – Design of Tank and cooling tubes of Transformers. Computer program: Complete Design of single phase core transformer

UNIT III   DESIGN OF DC MACHINES   9
Construction - Output Equations – Main Dimensions – Choice of specific loadings – Selection of number of poles – Design of Armature – Design of commutator and brushes – design of field Computer program: Design of Armature main dimensions

UNIT IV   DESIGN OF INDUCTION MOTORS   9
Construction - Output equation of Induction motor – Main dimensions – choice of specific loadings – Design of squirrel cage rotor and wound rotor –Magnetic leakage calculations – Operating characteristics : Magnetizing current - Short circuit current – Circle diagram - Computer program: Design of slip-ring rotor

UNIT V   DESIGN OF SYNCHRONOUS MACHINES   9
Output equations – choice of specific loadings – Design of salient pole machines – Short circuit ratio – Armature design – Estimation of air gap length – Design of rotor –Design of damper winding – Determination of full load field MMF – Design of field winding – Design of turbo alternators -Computer program: Design of Stator main dimensions-Brushless DC Machines

                                                        TOTAL :   45   PERIODS
OUTCOMES:
* Ability to understand basics of design considerations for rotating and static electrical machines
* Ability to design of field system for its application.
* Ability to design sing and three phase transformer.
* Ability to design armature and field of DC machines.
* Ability to design stator and rotor of induction motor.
* Ability to design and analyze synchronous machines.

TEXT BOOKS:
1.   Sawhney, A.K., 'A Course in Electrical Machine Design', Dhanpat Rai& Sons, New Delhi, Fifth Edition, 1984.

1. M V Deshpande 'Design and Testing of Electrical Machines' PHI learning Pvt Lt, 2011.
2. Sen, S.K., 'Principles of Electrical Machine Designs with Computer Programmes', Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi, Second Edition, 2009.

REFERENCES
1. A.Shanmugasundaram, G.Gangadharan, R.Palani 'Electrical Machine Design Data Book', New Age International Pvt. Ltd., Reprint 2007.
2. 'Electrical Machine Design', Balbir Singh, Vikas Publishing House Private Limited, 1981.
3. V Rajini, V.S Nagarajan, 'Electrical Machine Design', Pearson, 2017.
4. K.M.Vishnumurthy 'Computer aided design of electrical machines' B S Publications,2008

OBJECTIVES:
To impart knowledge on the following Topics
- Construction, principle of operation, control and performance of stepping motors.
- Construction, principle of operation, control and performance of switched reluctance motors.
- Construction, principle of operation, control and performance of permanent magnet brushless D.C. motors.
- Construction, principle of operation and performance of permanent magnet synchronous motors.
- Construction, principle of operation and performance of other special Machines.

UNIT I   STEPPER MOTORS   9
Constructional features –Principle of operation –Types – Torque predictions – Linear Analysis – Characteristics – Drive circuits – Closed loop control – Concept of lead angle - Applications.

UNIT II   SWITCHED RELUCTANCE MOTORS (SRM)   9
Constructional features –Principle of operation- Torque prediction–Characteristics Steady state performance prediction – Analytical Method – Power controllers – Control of SRM drive- Sensor less operation of SRM – Applications.

UNIT III   PERMANENT MAGNET BRUSHLESS D.C. MOTORS   9
Fundamentals of Permanent Magnets- Types- Principle of operation- Magnetic circuit analysis- EMF and Torque equations- Power Converter Circuits and their controllers - Characteristics and control- Applications.

UNIT IV   PERMANENT MAGNET SYNCHRONOUS MOTORS (PMSM)   9
Constructional features -Principle of operation – EMF and Torque equations - Sine wave motor with practical windings - Phasor diagram - Power controllers – performance characteristics -Digital controllers – Applications.

UNIT V   OTHER SPECIAL MACHINES   9
Constructional features – Principle of operation and Characteristics of Hysteresis motor-Synchronous Reluctance Motor–Linear Induction motor-Repulsion motor- Applications.

                                          TOTAL :   45   PERIODS

OUTCOMES:
- Ability to analyze and design controllers for special Electrical Machines.
- Ability to acquire the knowledge on construction and operation of stepper motor.
- Ability to acquire the knowledge on construction and operation of stepper switched reluctance motors.
- Ability to construction, principle of operation, switched reluctance motors.
- Ability to acquire the knowledge on construction and operation of permanent magnet brushless D.C. motors.
- Ability to acquire the knowledge on construction and operation of permanent magnet synchronous motors.
- Ability to select a special Machine for a particular application.

TEXT BOOKS:

- K.Venkataratnam, 'Special Electrical Machines', Universities Press (India) Private Limited, 2008.
- T. Kenjo, 'Stepping Motors and Their Microprocessor Controls', Clarendon Press London, 1984
- E.G. Janardanan, 'Special electrical machines', PHI learning Private Limited, Delhi, 2014.

REFERENCES

1. R.Krishnan, 'Switched Reluctance Motor Drives – Modeling, Simulation, Analysis, Design and Application', CRC Press, New York, 2001.
2. T. Kenjo and S. Nagamori, 'Permanent Magnet and Brushless DC Motors', Clarendon Press, London, 1988.
3. T.J.E.Miller,'Brushless Permanent-Magnet and Reluctance Motor Drives', Oxford University Press, 1989.
4. R.Srinivasan, 'Special Electrical Machines', Lakshmi Publications, 2013.

EE8015   **ELECTRIC ENERGY GENERATION, UTILIZATION AND**   **L**   **T**   **P**   **C**
                                    CONSERVATION   **3**   **0**   **0**   **3**

OBJECTIVES:

To impart knowledge on the following Topics

- To study the generation, conservation of electrical power and energy efficient equipments.
- To understand the principle, design of illumination systems and energy efficiency lamps.
- To study the methods of industrial heating and welding.
- To understand the electric traction systems and their performance.

UNIT I   **ILLUMINATION**   **9**

Importance of lighting – properties of good lighting scheme – laws of illumination – photometry - types of lamps – lighting calculations – basic design of illumination schemes for residential, commercial, street lighting, factory lighting and flood lighting – LED lighting and energy efficient lamps.

UNIT II   **REFRIGERATION AND AIR CONDITIONING**   **9**

Refrigeration-Domestic refrigerator and water coolers - Air-Conditioning-Various types of air-conditioning system and their applications, smart air conditioning units - Energy Efficient motors: Standard motor efficiency, need for efficient motors, Motor life cycle, Direct Savings and payback analysis, efficiency evaluation factor.

UNIT III   **HEATING AND WELDING**   **9**

Role of electric heating for industrial applications – resistance heating – induction heating – dielectric heating - electric arc furnaces. Brief introduction to electric welding – welding generator, welding transformer and the characteristics.

UNIT IV   **TRACTION**   **9**

Merits of electric traction – requirements of electric traction system – supply systems – mechanics of train movement – traction motors and control – braking – recent trends in electric traction.

UNIT V   **DOMESTIC UTILIZATION OF ELECTRICAL ENERGY**   **9**

Domestic utilization of electrical energy – House wiring. Induction based appliances, Online and OFF line UPS, Batteries - Power quality aspects – nonlinear and domestic loads – Earthing – Domestic, Industrial and Substation.

                                                      TOTAL : 45 PERIODS

OUTCOMES:

- To understand the main aspects of generation, utilization and conservation.
- To identify an appropriate method of heating for any particular industrial application.
- To evaluate domestic wiring connection and debug any faults occurred.
- To construct an electric connection for any domestic appliance like refrigerator as well as to design a battery charging circuit for a specific household application.
- To realize the appropriate type of electric supply system as well as to evaluate the

performance of a traction unit.
- To understand the main aspects of Traction.

TEXT BOOKS:
1. Wadhwa, C.L. "Generation, Distribution and Utilization of Electrical Energy", New Age International Pvt. Ltd, 2003.
2. Dr. Uppal S.L. and Prof. S. Rao, 'Electrical Power Systems', Khanna Publishers, New Delhi, 15th Edition, 2014.
3. Energy Efficiency in Electric Utilities, BEE Guide Book, 2010
REFERENCES
1. Partab.H, "Art and Science of Utilisation of Electrical Energy", Dhanpat Rai and Co, New Delhi, 2004.
2. Openshaw Taylor.E, "Utilization of Electrical Energy in SI Units", Orient Longman Pvt. Ltd, 2003.
3. Gupta.J.B, "Utilization of Electric Power and Electric Traction", S.K.Kataria and Sons, 2002.
4. Cleaner Production – Energy Efficiency Manual for GERIAP, UNEP, Bangkok prepared by National Productivity Council.

EE8015   **ELECTRIC ENERGY GENERATION, UTILIZATION AND**   L T P C
                                                   CONSERVATION   3 0 0 3

OBJECTIVES:
To impart knowledge on the following Topics
- To study the generation, conservation of electrical power and energy efficient equipments.
- To understand the principle, design of illumination systems and energy efficiency lamps.
- To study the methods of industrial heating and welding.
- To understand the electric traction systems and their performance.

UNIT I   ILLUMINATION   9
Importance of lighting – properties of good lighting scheme – laws of illumination – photometry - types of lamps – lighting calculations – basic design of illumination schemes for residential, commercial, street lighting, factory lighting and flood lighting – LED lighting and energy efficient lamps.

UNIT II   REFRIGERATION AND AIR CONDITIONING   9
Refrigeration-Domestic refrigerator and water coolers - Air-Conditioning-Various types of air-conditioning system and their applications, smart air conditioning units - Energy Efficient motors: Standard motor efficiency, need for efficient motors, Motor life cycle, Direct Savings and payback analysis, efficiency evaluation factor.

UNIT III   HEATING AND WELDING   9
Role of electric heating for industrial applications – resistance heating – induction heating – dielectric heating - electric arc furnaces. Brief introduction to electric welding – welding generator, welding transformer and the characteristics.

UNIT IV   TRACTION   9
Merits of electric traction – requirements of electric traction system – supply systems – mechanics of train movement – traction motors and control – braking – recent trends in electric traction.

UNIT V   DOMESTIC UTILIZATION OF ELECTRICAL ENERGY   9
Domestic utilization of electrical energy – House wiring. Induction based appliances, Online and OFF line UPS, Batteries - Power quality aspects – nonlinear and domestic loads – Earthing – Domestic, Industrial and Substation.

TOTAL : 45 PERIODS

OUTCOMES:
- To understand the main aspects of generation, utilization and conservation.
- To identify an appropriate method of heating for any particular industrial application.
- To evaluate domestic wiring connection and debug any faults occurred.
- To construct an electric connection for any domestic appliance like refrigerator as well as to design a battery charging circuit for a specific household application.
- To realize the appropriate type of electric supply system as well as to evaluate the

performance of a traction unit.
- To understand the main aspects of Traction.

TEXT BOOKS:
1. Wadhwa, C.L. "Generation, Distribution and Utilization of Electrical Energy", New Age International Pvt. Ltd, 2003.
2. Dr. Uppal S.L. and Prof. S. Rao, 'Electrical Power Systems', Khanna Publishers, New Delhi, 15th Edition, 2014.
3. Energy Efficiency in Electric Utilities, BEE Guide Book, 2010

REFERENCES
1. Partab.H, "Art and Science of Utilisation of Electrical Energy", Dhanpat Rai and Co, New Delhi, 2004.
2. Openshaw Taylor.E, "Utilization of Electrical Energy in SI Units", Orient Longman Pvt. Ltd, 2003.
3. Gupta.J.B, "Utilization of Electric Power and Electric Traction", S.K.Kataria and Sons, 2002.
4. Cleaner Production – Energy Efficiency Manual for GERIAP, UNEP, Bangkok prepared by National Productivity Council.

EE8018   **MICROCONTROLLER BASED SYSTEM DESIGN**   **L   T   P   C**
                                                                          3   0   0   3

OBJECTIVES: To impart knowledge about the following topics:
- Architecture of PIC microcontroller
- Interrupts and timers
- Peripheral devices for data communication and transfer
- Functional blocks of ARM processor
- Architecture of ARM processors

UNIT I   INTRODUCTION TO PIC MICROCONTROLLER   9
Introduction to PIC Microcontroller–PIC 16C6x and PIC16C7x Architecture–IC16cxx–-Pipelining - Program Memory considerations – Register File Structure - Instruction Set - Addressing modes – Simple Operations.

UNIT II   INTERRUPTS AND TIMER   9
PIC micro controller Interrupts- External Interrupts-Interrupt Programming–Loop time subroutine Timers-Timer Programming– Front panel I/O-Soft Keys– State machines and key switches– Display of Constant and Variability strings.

UNIT III   PERIPHERALS AND INTERFACING   9
I^{2}C Bus for Peripherals Chip Access– Bus operation-Bus subroutines– Serial EEPROM—Analog to Digital Converter–UART-Baud rate selection–Data handling circuit–Initialization - LCD and keyboard Interfacing -ADC, DAC, and Sensor Interfacing.

UNIT IV   INTRODUCTION TO ARM PROCESSOR   9
Architecture –ARM programmer's model –ARM Development tools- Memory Hierarchy – ARM Assembly Language Programming–Simple Examples–Architectural Support for Operating systems.

UNIT V   ARM ORGANIZATION   9
2-Stage Pipeline ARM Organization– 5-Stage Pipeline ARM Organization–ARM Instruction Execution- ARM Implementation– ARM Instruction Set– ARM coprocessor interface–Architectural support for High Level Languages – Embedded ARM Applications.

                                               TOTAL :   45   PERIODS

OUTCOMES:
- Ability to understand and apply computing platform and software for engineering problems.
- Ability to understand the concepts of Architecture of PIC microcontroller
- Ability to acquire knowledge on Interrupts and timers.
- Ability to understand the importance of Peripheral devices for data communication.
- Ability to understand the basics of sensor interfacing
- Ability to acquire knowledge in Architecture of ARM processors

TEXT BOOKS:
1. Peatman,J.B., "Design with PIC Micro Controllers"PearsonEducation,3rdEdition, 2004.
2. Furber,S., "ARM System on Chip Architecture" Addison Wesley trade Computer Publication,   2000.

REFERENCES

1. Mazidi, M.A.,"PIC Microcontroller" Rollin Mckinlay, Danny causey ,Prentice Hall of India, 2007.

EI8075   **FIBRE OPTICS AND LASER INSTRUMENTS**   **L T P C**
                                                                     3 0 0 3

AIM:
To contribute to the knowledge of Fibre optics and Laser Instrumentation and its Industrial andMedical Application.

COURSE OBJECTIVES
- To expose the students to the basic concepts of optical fibres and their properties.
- To provide adequate knowledge about the Industrial applications of optical fibres.
- To expose the students to the Laser fundamentals.
- To provide adequate knowledge about Industrial application of lasers.
- To provide adequate knowledge about holography and Medical applications of Lasers.

UNIT I   OPTICAL FIBRES AND THEIR PROPERTIES   9
Construction of optical fiber cable: Guiding mechanism in optical fiber and Basic component of optical fiber communication, –Principles of light propagation through a fibre: Total internal reflection, Acceptance angle (θa), Numerical aperture and Skew mode, –Different types of fibres and their properties: Single and multimode fibers and Step index and graded index fibers,– fibrecharacteristics: Mechanical characteristics and Transmission characteristics, – Absorption losses – Scattering losses – Dispersion – Connectors and splicers –Fibre termination – Optical sources: Light Emitting Diode (LED), – Optical detectors: PIN Diode.

UNIT II   INDUSTRIAL APPLICATION OF OPTICAL FIBRES   9
Fibre optic sensors: Types of fiber optics sensor, Intrinsic sensor- Temperature/ Pressure sensor, Extrinsic sensors, Phase Modulated Fibre Optic Sensor and Displacementsensor (Extrinsic Sensor) – Fibre optic instrumentation system: Measurement of attenuation (by cut back method), Optical domain reflectometers, Fiber Scattering loss Measurement, Fiber Absorption Measurement, Fiber dispersion measurements, End reflection method and Near field scanning techniques – Different types of modulators: Electro-optic modulator (EOM) –Interferometric method of measurement of length – Moire fringes – Measurement of pressure, temperature, current, voltage, liquid level and strain.

UNIT III   LASER FUNDAMENTALS   9
Fundamental characteristics of lasers – Level Lasers: Two-Level Laser, Three Level Laser, Quasi Three and four level lasers – Properties of laser: Monochromaticity, Coherence, Divergence and Directionality and Brightness –Laser modes – Resonator configuration – Q-switching and mode locking – Cavity damping – Types of lasers; – Gas lasers, solid lasers, liquid lasers and semiconductor lasers.

UNIT IV   INDUSTRIAL APPLICATION OF LASERS   9
Laser for measurement of distance, Laser for measurement of length, Laser for measurement of velocity, Laser for measurement of acceleration, Laser for measurement of current, voltage and Laser for measurement of Atmospheric Effect: Types of LIDAR, Construction And Working, and LIDAR Applications – Material processing: Laser instrumentation for material processing, Powder Feeder, Laser Heating, Laser Welding, Laser Melting, Conduction Limited Melting and Key Hole Melting – Laser trimming of material: Process Of Laser Trimming, Types Of Trim, Construction And Working Advantages – Material Removal and vaporization: Process Of Material Removal.

UNIT V   HOLOGRAM AND MEDICAL APPLICATIONS   9
Holography: Basic Principle, Holography vs. photography, Principle Of Hologram Recording, Condition For Recording A Hologram, Reconstructing and viewing the holographic image– Holography for non-destructive testing – Holographic components – Medical applications of lasers,

laser-Tissue Interactions Photochemical reactions, Thermalisation, collisional relaxation, Types of Interactions and Selecting an Interaction Mechanism – Laser instruments for surgery, removal of tumors of vocal cards, brain surgery, plastic surgery, gynaecology and oncology.

TOTAL : 45 PERIODS

COURSE OUTCOMES (COs):

1. Understand the principle, transmission, dispersion and attenuation characteristics of opticalfibers
2. Apply the gained knowledge on optical fibers for its use as communication medium and as sensor as well which have important applications in production, manufacturing industrial and biomedical applications.
3. Understand laser theory and laser generation system.
4. Students will gain ability to apply laser theory for the selection of lasers for a specific Industrial and medical application.

TEXT BOOKS:

1. J.M. Senior, 'Optical Fibre Communication – Principles and Practice', Prentice Hall of India,1985.
2. J. Wilson and J.F.B. Hawkes, 'Introduction to Opto Electronics', Prentice Hall of India, 2001.
3. Eric Udd, William B., and Spillman, Jr., "Fiber Optic Sensors: An Introduction for Engineers and Scientists ", John Wiley & Sons, 2011.

REFERENCES:

1. G. Keiser, 'Optical Fibre Communication', McGraw Hill, 1995.
2. M. Arumugam, 'Optical Fibre Communication and Sensors', Anuradha Agencies, 2002.
3. John F. Ready, "Industrial Applications of Lasers", Academic Press, Digitized in 2008.
4. Monte Ross, 'Laser Applications', McGraw Hill, 1968.
5. John and Harry, "Industrial lasers and their application", McGraw-Hill, 2002.
6. Keiser, G., "Optical Fiber Communication", McGraw-Hill, 3rd Edition, 2000.
   http://nptel.ac.in/courses/117101002/

GE8077 **TOTAL QUALITY MANAGEMENT** **L T P C**
3 0 0 3

OBJECTIVE:
- To facilitate the understanding of Quality Management principles and process.

UNIT I INTRODUCTION 9
Introduction - Need for quality - Evolution of quality - Definitions of quality - Dimensions of product and service quality - Basic concepts of TQM - TQM Framework - Contributions of Deming, Juran and Crosby - Barriers to TQM - Customer focus - Customer orientation, Customer satisfaction, Customer complaints, Customer retention.

UNIT II TQM PRINCIPLES 9
Leadership - Quality Statements, Strategic quality planning, Quality Councils - Employee involvement - Motivation, Empowerment, Team and Teamwork, Recognition and Reward, Performance appraisal - Continuous process improvement - PDCA cycle, 5S, Kaizen - Supplier partnership - Partnering, Supplier selection, Supplier Rating.

UNIT III TQM TOOLS AND TECHNIQUES I 9
The seven traditional tools of quality - New management tools - Six sigma: Concepts, Methodology, applications to manufacturing, service sector including IT - Bench marking - Reason to bench mark, Bench marking process - FMEA - Stages, Types.

UNIT IV TQM TOOLS AND TECHNIQUES II 9
Quality Circles - Cost of Quality - Quality Function Deployment (QFD) - Taguchi quality loss function - TPM - Concepts, improvement needs - Performance measures.

UNIT V QUALITY MANAGEMENT SYSTEM 9
Introduction—Benefits of ISO Registration—ISO 9000 Series of Standards—Sector-Specific Standards—AS 9100, TS16949 and TL 9000-- ISO 9001 Requirements—Implementation—Documentation—Internal Audits—Registration--**ENVIRONMENTAL MANAGEMENT SYSTEM:** Introduction—ISO 14000 Series Standards—Concepts of ISO 14001—Requirements of ISO 14001—Benefits of EMS.

TOTAL: 45 PERIODS

OUTCOME:
- The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.

TEXT BOOK:
1. Dale H.Besterfiled, Carol B.Michna,Glen H. Besterfield,Mary B.Sacre,Hemant Urdhwareshe and Rashmi Urdhwareshe, "Total Quality Management", Pearson Education Asia, Revised Third Edition, Indian Reprint, Sixth Impression, 2013.

REFERENCES:
1. James R. Evans and William M. Lindsay, "The Management and Control of Quality", 8th Edition, First Indian Edition, Cengage Learning, 2012.
2. Janakiraman. B and Gopal .R.K., "Total Quality Management - Text and Cases", Prentice Hall (India) Pvt. Ltd., 2006.
3. Suganthi.L and Anand Samuel, "Total Quality Management", Prentice Hall (India) Pvt. Ltd., 2006.
4. ISO9001-2015 standards

OAN551   **SENSORS AND TRANSDUCERS**   **L T P C**
                                                                            3 0 0 3

OBJECTIVES:
• To understand the concepts of measurement technology.
• To learn the various sensors used to measure various physical parameters.
• To learn the fundamentals of signal conditioning, data acquisition and communication systems used in mechatronics system development.

UNIT I   INTRODUCTION   9
Basics of Measurement – Classification of errors – Error analysis – Static and dynamic characteristics of transducers – Performance measures of sensors – Classification of sensors – Sensor calibration techniques – Sensor Output Signal Types.

UNIT II   MOTION, PROXIMITY AND RANGING SENSORS   9
Motion Sensors – Potentiometers, Resolver, Encoders – Optical, Magnetic, Inductive, Capacitive, LVDT – RVDT – Synchro – Microsyn, Accelerometer.,– GPS, Bluetooth, Range Sensors – RF beacons, Ultrasonic Ranging, Reflective beacons, Laser Range Sensor (LIDAR).

UNIT III   FORCE, MAGNETIC AND HEADING SENSORS   9
Strain Gage, Load Cell, Magnetic Sensors –types, principle, requirement and advantages: Magneto resistive – Hall Effect – Current sensor Heading Sensors – Compass, Gyroscope, Inclinometers.

UNIT IV   OPTICAL, PRESSURE AND TEMPERATURE SENSORS   9
Photo conductive cell, photo voltaic, Photo resistive, LDR – Fiber optic sensors – Pressure – Diaphragm, Bellows, Piezoelectric – Tactile sensors, Temperature – IC, Thermistor, RTD, Thermocouple. Acoustic Sensors – flow and level measurement, Radiation Sensors - Smart Sensors - Film sensor, MEMS & Nano Sensors, LASER sensors.

UNIT V   SIGNAL CONDITIONING and DAQ SYSTEMS   9
Amplification – Filtering – Sample and Hold circuits – Data Acquisition: Single channel and multi channel data acquisition – Data logging - applications - Automobile, Aerospace, Home appliances, Manufacturing, Environmental monitoring.

                                                              TOTAL :   45 PERIODS
OUTCOMES:
The students will be able to
CO1. Expertise in various calibration techniques and signal types for sensors.
CO2. Apply the various sensors in the Automotive and Mechatronics applications
CO3. Study the basic principles of various smart sensors.
CO4. Implement the DAQ systems with different sensors for real time applications

TEXT BOOKS:
1. Ernest O Doebelin, "Measurement Systems – Applications and Design", Tata McGraw-Hill, 2009.
2. Sawney A K and Puneet Sawney, "A Course in Mechanical Measurements and Instrumentation and Control", 12th edition, Dhanpat Rai & Co, New Delhi, 2013.

REFERENCES
1. Patranabis D, "Sensors and Transducers", 2nd Edition, PHI, New Delhi, 2010.
2. John Turner and Martyn Hill, "Instrumentation for Engineers and Scientists", Oxford Science Publications, 1999.
3. Richard Zurawski, "Industrial Communication Technology Handbook" 2nd edition, CRC Press, 2015.

OBT751   **ANALYTICAL METHODS AND INSTRUMENTATION**   **L T P C**
                                                                      3 0 0 3

UNIT I   SPECTROMETRY   9
Properties of electromagnetic radiation- wave properties – components of optical instruments– Sources of radiation – wavelength selectors – sample containers – radiation transducers – Signal process and read outs – signal to noise ratio - sources of noise – Enhancement of signal to noise - types of optical instruments – Applications.

UNIT II   MOLECULAR SPECTROSCOPY   9
Molecular absorption spectrometry – Measurement of Transmittance and Absorbance – Beer's law – Instrumentation - Applications -Theory of fluorescence and Phosphorescence –Theory of Infrared absorption spectrometry – IR instrumentation – Applications – Theory of Raman spectroscopy – Instrumentation – applications.

UNIT III   NMR AND MASS SPECTROMETRY   9
Theory of NMR –– chemical shift- NMR-spectrometers – applications of 1H and 13C NMR- Molecular mass spectra – ion sources.

Mass spectrometer. Applications of molecular mass - Electron paramagnetic resonance- g values – instrumentation.

UNIT IV   SEPARATION METHODS   9
General description of chromatography – Band broadening and optimization of column performance- Liquid chromatography – Partition chromatography – Adsorption chromatography – Ion exchange chromatography -size exclusion chromatography- Affinity chromatography- principles of GC and applications – HPLC- Capillary electrophoresis – Applications.

UNIT V   ELECTRO ANALYSIS AND SURFACE MICROSCOPY   9
Electrochemical cells- Electrode potential cell potentials – p**otentiometry**- reference electrode – ion selective and molecular selective electrodes – Instrument for potentiometric studies – **Voltametry** – Cyclic and pulse voltametry- Applications of voltametry . Study of surfaces – **Scanning probe microscopes – AFM and STM**.

                                                                  TOTAL: 45 PERIODS

TEXT BOOKS
1. Skoog, D.A. F. James Holler, and Stanky, R.Crouch "Instrumental Methods of Analysis".Cengage Learning , 2007.
2. Willard, Hobart, etal., "Instrumental Methods of Analysis". VIIth Edition, CBS, 1986.
3. Braun, Robert D. " Introduction to Instrumental Analysis". Pharma Book Syndicate, 1987.
4. Ewing,G.W. "Instrumental Methods of Chemical Analysis", Vth Edition, McGraw-Hill, 1985

REFERENCE
1. Sharma, B.K. "Instrumental Methods of Chemical Analysis : Analytical Chemistry" GoelPublishing House, 1972.
2. Haven, Mary C., etal., "Laboratory Instrumentation ". IVth Edition, John Wiley, 1995.

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19BAL108	SPOKEN AND WRITTEN COMMUNICATION	L T P C
		0 0 4 2

OBJECTIVE

• To familiarize learners with the mechanics of writing
• To enable learners to write in English precisely and effectively.
• To enable learners to speak fluently and flawlessly in all kinds of communicative contexts with all nationalities.

UNIT I   PERSONAL COMMUNICATION   12

Day-to-day conversation with family members, neighbours, relatives, friends on various topics, context specific - Journal writing, mails/emails, SMS, greeting cards, situation based - accepting/declining invitations, congratulating, consoling, conveying information, oral reports, extempore.

UNIT II   EMPLOYABILITY SKILLS   12

Interview skills - HR and technical - Types of interview, preparation for interview, mock interview, Group Discussion - Communication skills in Group Discussion, Structure of GD, GD process, successful GD techniques. Time management and effective planning - identifying barriers to effective time management, time management techniques, relationship between time management and stress management.

UNIT III   WORK PLACE COMMUNICATION   12

E-mails, minutes, reports of different kinds - annual report, status report, survey report, proposals, memorandums, presentations, interviews, profile of institutions, speeches, responding to enquiries, complaints, resumes, applications, summarizing, strategies for writing.

UNIT IV   RESEARCH WRITING   12

Articles for publication (Journals), developing questionnaire, writing abstract, dissertation, qualities of research writing, data (charts, tables) analysis, documentation.

UNIT V   WRITING FOR MEDIA AND CREATIVE WRITING   12

Features for publication (Newspapers, magazines, newsletters, notice board), case studies, short stories, travelogues, writing for children, translation, techniques of writing.

TOTAL: 60 PERIODS

Note: It is an activity based course. Student individually or as a group can organize event(s), present term papers etc. This will be evaluated by the faculty member(s) handling the course and the consolidated marks can be taken as the final mark.

No end semester examination is required for this course.

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OUTCOMES

Learners should be able to

- Get into the habit of writing regularly.
- Express themselves in different genres of writing from creative to critical to factual writing.
- Take part in print and online media communication
- Read quite widely to acquire a style of writing
- Identify their area of strengths and weaknesses in writing.
- Speak confidently with any speakers of English, including native speakers.
- Speak effortlessly in different contexts - informal and formal.

TEXT BOOKS

1. Raymond V Lesikar, John D Pettit, and Mary E Flatly, 2009. Lesikar's Basic Business Communication, 11th ed. Tata McGraw-Hill, New Delhi.
2. E.H. McGrath, S.J. 2012, Basic Managerial Skills for All. 9th ed. Prentice-Hall of India, New Delhi.

REFERENCES

1. Richard Denny, 'Communication to Win; Kogan Page India Pvt. Ltd., New Delhi, 2008.

E-RESOURCES

Blogs   : Seth Godwin, Guy Kawasaki, Kiruba Shankar
Review   : Harvard Business review
Reports   : Deloitte Netsis
Magazines: Bloomberg Business week, Economist

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SEMESTER II

19BAL208   **DATA ANALYSIS AND BUSINESS MODELING**   **L T P C**
                                                                 0 0 4 2

OBJECTIVES
- To have hands-on experience on decision modeling.

[Business models studied in theory to be practiced using Spreadsheet / Analysis Software]

S.No.	Exp. No.	Details of experiments Name	Duration
1	1	Descriptive Statistics	4
2	2	Hypothesis - Parametric	4
3	3	Hypothesis – Non-parametric	4
4	4	Correlation & Regression	4
5	5	Forecasting	4
6	-	Extended experiment – 1	4
7	6	Portfolio Selection	4
8	7	Risk Analysis & Sensitivity Analysis	4
9	8	Revenue Management	4
10	-	Extended experiment – 2	4
11	9	Transportation & Assignment	4
12	10	Networking Models	4
13	11	Queuing Theory	4
14	12	Inventory Models	4
15	-	Extended experiments – 3	4

- Spreadsheet Software and
- Data Analysis Tools

                                                         TOTAL: 60 PERIODS

OUTCOMES
- Knowledge of spreadsheets and data analysis software for business modeling.

TEXT BOOKS
1. Hansa Lysander Manohar , " Data Analysis and Business   Modelling using MS Excel ",PHI Learning private Ltd, 2017.
2. David M. Levine et al, "Statistics for Managers using MS Excel' (6th Edition) Pearson, 2010

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REFERENCES
1. Vikas Gupta, Comdex Business Accounting with Ms Excel, 2010 and Tally ERP 9.0 Course Kit, Wiley India, 2012
2. Kiran Pandya and Smriti Bulsari, SPSS in simple steps, Dreamtech, 2011

E-RESOURCES
1. https://en.wikipedia.org/wiki/Descriptive_statistics
2. https://study.com/academy/.../the-transportation-problem-features-types-solutions.html

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19BATH01   **ENTREPRENEURSHIP DEVELOPMENT**   **L T P C**
                                                          3 0 0 3

OBJECTIVES
- To develop and strengthen entrepreneurial quality and motivation in students.
- To impart basic entrepreneurial skills and understandings to run a business efficiently and effectively.

UNIT I   ENTREPRENEURAL COMPETENCE   6
Entrepreneurship concept - Entrepreneurship as a Career - Entrepreneurial Personality - Characteristics of Successful, Entrepreneur - Knowledge and Skills of Entrepreneur.

UNIT II   ENTREPRENEURAL ENVIRONMENT   12
Business Environment - Role of Family and Society - Entrepreneurship Development Training and Other Support Organisational Services - Central and State Government Industrial Policies and Regulations - International Business.

UNIT III   BUSINESS PLAN PREPARATION   12
Sources of Product for Business - Prefeasibility Study - Criteria for Selection of Product - Ownership - Capital - Budgeting Project Profile Preparation - Matching Entrepreneur with the Project - Feasibility Report Preparation and Evaluation Criteria.

UNIT IV   LAUNCHING OF SMALL BUSINESS   10
Finance and Human Resource Mobilization Operations Planning - Market and Channel Selection -Growth Strategies - Product Launching - Incubation, Venture capital, IT startups.

UNIT V   MANAGEMENT OF SMALL BUSINESS   5
Monitoring and Evaluation of Business - Preventing Sickness and Rehabilitation of Business Units-Effective Management of small Business.

                                        TOTAL: 45 PERIODS

OUTCOMES
- Students will gain knowledge and skills needed to run a business.

TEXT BOOKS
1. S.S.Khanka, Entrepreneurial Development, S.Chand and Company Limited, New Delhi,
   (Revised Edition) 2013
2. Hisrich, Entrepreneurship, Edition 9, Tata McGraw Hill, New Delhi, 2014

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REFERENCES

1. Prasanna Chandra, Projects - Planning, Analysis, Selection, Implementation and Reviews, Tata
2. McGraw-Hill, 1996
3. P.Saravanavel, Entrepreneurial Development, Ess Pee kay Publishing House, Chennai 1997

E-RESOURCES

1. https://www.toppr.com/.../entrepreneurship-development
2. ncert.nic.in/ncerts/l/lebs213.pdf

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19BATH02   INDUSTRIAL RELATIONS AND LABOUR WELFARE   L T P C
3 0 0 3

OBJECTIVES
- To explore contemporary knowledge and gain a conceptual understanding of industrial relations.

UNIT I   INDUSTRIAL RELATIONS   7
Concepts - Importance - Industrial Relations problems in the Public Sector - Growth of Trade Unions - Codes of conduct.

UNIT II   INDUSTRIAL CONFLICTS   12
Disputes - Impact - Causes - Strikes - Prevention - Industrial Peace - Government Machinery - Conciliation - Arbitration - Adjudication.

UNIT III   LABOUR WELFARE   8
Concept - Objectives - Scope - Need - Voluntary Welfare Measures - Statutory Welfare Measures - Labour - Welfare Funds - Education and Training Schemes.

UNIT IV   INDUSTRIAL SAFETY   9
Causes of Accidents - Prevention - Safety Provisions - Industrial Health and Hygiene - Importance - Problems - Occupational Hazards - Diseases - Psychological problems - Counseling - Statutory Provisions.

UNIT V   WELFARE OF SPECIAL CATEGORIES OF LABOUR   9
Child Labour - Female Labour - Contract Labour - Construction Labour - Agricultural Labour - Differently abled Labour -BPO & KPO Labour - Social Assistance - Social Security - Implications.

TOTAL: 45 PERIODS

OUTCOME
- Students will know how to resolve industrial relations and human relations problems and promote welfare of industrial labour.

TEXT BOOKS
1. Ratna Sen, Industrial Relations in India, Shifting Paradigms, Macmillan India Ltd., New Delhi, 2007
2. C.S.Venkata Ratnam, Globalisation and Labour Management Relations, Response Books, 2007

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REFERENCES

1. P.R.N Sinha, Indu Bala Sinha, Seema Priyardarshini Shekhar. Industrial Relations, Trade Unions and Labour Legislation. Pearson. 2004
2. Srivastava, Industrial Relations and Labour laws, Vikas, 2007.

E-RESOURCES

1. https://labour.gov.in/industrial-relations
2. cde.annauniv.edu/MBAQP/pdf/Elective/DBA1748/MBA%201748.pdf

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19BATH04   MANAGERIAL BEHAVIOUR AND EFFECTIVENESS   L T P C
                                                                    3 0 0 3

OBJECTIVES
- To examine managerial styles in terms of concern for production and concern for people
- To assess different systems of management and relate these systems to organizational characteristics.

UNIT I   DEFINING THE MANAGERIAL JOB   8
Descriptive Dimensions of Managerial Jobs - Methods - Model - Time Dimensions in Managerial Jobs - Effective and Ineffective Job behaviour - Functional and level differences in Managerial Job behavior.

UNIT II   DESIGNING THE MANAGERIAL JOB   12
Identifying Managerial Talent - Selection and Recruitment - Managerial Skills Development - Pay and Rewards - Managerial Motivation - Effective Management Criteria - Performance Appraisal Measures - Balanced Scorecard - Feedback - Career Management - Current Practices.

UNIT III   THE CONCEPT OF MANAGERIAL EFFECTIVENESS   7
Definition - The person, process, product approaches - Bridging the Gap - Measuring Managerial Effectiveness - Current Industrial and Government practices in the Management of Managerial Effectiveness- the Effective Manager as an Optimizer.

UNIT IV   ENVIRONMENTAL ISSUES IN MANAGERIAL EFFECTIVENESS   8
Organisational Processes - Organisational Climate - Leader - Group Influences - Job Challenge - Competition - Managerial Styles.

UNIT V   DEVELOPING THE WINNING EDGE   10
Organisational and Managerial Efforts - Self Development - Negotiation Skills - Development of the Competitive Spirit - Knowledge Management - Fostering Creativity and innovation.

TOTAL: 45 PERIODS

OUTCOME
- Students will gain knowledge about appropriate style of managerial behaviour.

TEXT BOOKS
1. Milkovich and Newman, Compensation, McGraw-Hill International, 2013.
2. Dubrin, Leadership, Research Findings, Practices & Skills, Biztantra, 2015

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REFERENCES

1. Richard L.Daft, Leadership, Cengage, 1 st Indian Reprint 2008. (Tata McGraw-Hill)
2. Blanchard and Thacker, Effective Training Systems, Strategies and Practices Pearson 2012.

E-RESOURCES

1. https://cde.annauniv.edu/mbaqp/pdf/Elective/DBA1743/MBA1725.pdf
2. https://www.academia.edu/.../MANAGERIAL BEHAVIOUR AND EFFECTIVENESS

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19BATO04	PROJECT MANAGEMENT	L T P C
		3 0 0 3

OBJECTIVES

- To learn the concepts of managing projects.

UNIT I   INTRODUCTION TO PROJECT MANAGEMENT   9

Project Management - Definition -Goal - Lifecycles. Project Selection Methods. Project Portfolio Process - Project Formulation. Project Manager - Roles- Responsibilities and Selection - Project Teams.

UNIT II   PLANNING AND BUDGETING   9

The Planning Process - Work Break down Structure - Role of Multidisciplinary teams. Budget the Project - Methods. Cost Estimating and Improvement. Budget uncertainty and risk management.

UNIT III   SCHEDULING & RESOURCE ALLOCATION   9

PERT & CPM Networks - Crashing - Project Uncertainty and Risk Management - Simulation - Gantt Charts - Expediting a project - Resource loading and leveling. Allocating scarce resources -Goldratt's Critical Chain.

UNIT IV   CONTROL AND COMPLETION   9

The Plan-Monitor-Control cycle - Data Collecting and reporting - Project Control - Designing the control system. Project Evaluation, Auditing and Termination.

UNIT V   PROJECT ORGANISATION & CONFLICT MANAGEMENT   9

Formal Organization Structure - Organization Design - Types of project organizations. Conflict - Origin & Consequences. Managing conflict - Team methods for resolving conflict.

TOTAL: 45 PERIODS

OUTCOMES

- To apply project management principles in business situations to optimize resource utilization and time optimisation.

TEXT BOOKS

1. Harvey Maylor, Project Management, Fourth Edition, Pearson Education, 2010
2. Clifford Gray and Erik Larson, Project Management, Tata McGraw Hill Edition, 6e,2014

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REFERENCES

1. John M. Nicholas, Project Management for Business and Technology - Principles and Practice, Second Edition, Pearson Education,5th Edition 2016
2. Gido and Clements, Successful Project Management, sixth Edition, Cengage, 2015.

E-RESOURCES

1. www.edo.ca/downloads/project-management.pdf
2. ebooks.lpude.in/management/mba/term_3/DMGT521_PROJECT_MANAGEMENT.pdf

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19BATO05   **SERVICES OPERATIONS MANAGEMENT**   **L T P C**
                                                                  3 0 0 3

OBJECTIVE
- To help understand how service performance can be improved by studying services operations management

UNIT I   INTRODUCTION   9
Services - Importance, role in economy, service sector - growth; Nature of services -Service classification , Service Package, distinctive characteristics , open-systems view; Service Strategy -Strategic service vision, competitive environment, generic strategies, winning customers; Role of information technology; stages in service firm competitiveness; Internet strategies - Environmental strategies.

UNIT II   SERVICE DESIGN   9
New Service Development - Design elements - Service Blue-printing - process structure - generic approaches -Value to customer; Retail design strategies - store size - Network configuration; Managing Service Experience -experience economy, key dimensions; Vehicle Routing and Scheduling.

UNIT III   SERVICE QUALITY   9
Service Quality- Dimensions, Service Quality Gap Model; Measuring Service Quality - SERVQUAL -Walk-through Audit; Quality service by design - Service Recovery - Service Guarantees; Service Encounter - triad, creating service orientation, service profit chain; Front-office Back-office Interface -service decoupling.

UNIT IV   SERVICE FACILITY   9
Services capes - behaviour - environmental dimensions - framework; Facility design - nature, objectives, process analysis - process flow diagram, process steps, simulation; Service facility layout; Service Facility Location - considerations, facility location techniques - metropolitan metric, Euclidean, centre of gravity, retail outlet location , location set covering problem.

UNIT V   MANAGING CAPACITY AND DEMAND   9
Managing Demand - strategies; Managing capacity - basic strategies, supply management tactics, operations planning and control; Yield management; Inventory Management in Services- Retail Discounting Model, Newsvendor Model; Managing Waiting Lines -Queuing systems, psychology of waiting; Managing for growth- expansion strategies, franchising , globalization.

TOTAL: 45 PERIODS

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OUTCOME:

• To design and operate a service business using the concepts, tools and techniques of service operations management.

TEXT BOOKS

1. Robert Johnston, Graham Clark, Service Operations Management, Pearson Education, 2nd Edition, 2005.
2. Richard Metters, Kathryn King-Metters, Madeleine Pullman, Steve Walton Successful Service Operations Management, South-Western, Cengage Learning, 2nd Edition ,2012

REFERENCES

1. James A. Fitzsimmons, Service Management - Operations, Strategy, Information Technology, Tata McGraw-Hill - 7th Edition 2013.
2. Bill Hollins and Sadie Shinkins, Managing Service Operations, Sage, 2006

E-RESOURCES

1. https://examupdates.in/production-and-operations-management-notes
2. www.vssut.ac.in/lecture_notes/lecture1429900757.pdf

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19BATO06   **SUPPLY CHAIN MANAGEMENT**   **L T P C**
                                                                  3 0 0 3

OBJECTIVES
- To help understand the importance of and major decisions in supply chain management for gaining competitive advantage.

UNIT I   INTRODUCTION   9
Supply Chain - Fundamentals -Evolution- Role in Economy - Importance - Decision Phases - Supplier-Manufacturer-Customer chain. - Enablers/ Drivers of Supply Chain Performance. Supply chain strategy -Supply Chain Performance Measures.

UNIT II   STRATEGIC SOURCING   9
Outsourcing - Make Vs buy - Identifying core processes - Market Vs Hierarchy - Make Vs buy continuum -Sourcing strategy - Supplier Selection and Contract Negotiation. Creating a world class supply base-Supplier Development - World Wide Sourcing.

UNIT III   SUPPLY CHAIN NETWORK   9
Distribution Network Design - Role - Factors Influencing Options, Value Addition - Distribution Strategies - Models for Facility Location and Capacity allocation. Distribution Center Location Models. Supply Chain Network optimization models. Impact of uncertainty on Network Design - Network Design decisions using Decision trees.

UNIT IV   PLANNING DEMAND, INVENTORY AND SUPPLY   9
Managing supply chain cycle inventory. Uncertainty in the supply chain **-** Analyzing impact of supply chain redesign on the inventory - Risk Pooling - Managing inventory for short life - cycle products -multiple item -multiple location inventory management. Pricing and Revenue Management.

UNIT V   CURRENT TRENDS   9
Supply Chain Integration - Building partnership and trust in SC Value of Information: Bullwhip Effect -Effective forecasting - Coordinating the supply chain. . SC Restructuring - SC Mapping - SC process restructuring, Postpone the point of differentiation - IT in Supply Chain - Agile Supply Chains -Reverse Supply chain. Agro Supply Chains.

TOTAL: 45 PERIODS

OUTCOMES
- Ability to build and manage a competitive supply chain using strategies, models, techniques and information technology.

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TEXT BOOKS

1. Sunil Chopra, Peter Meindl, Supply Chain Management: Strategy, Planning, and Operation, Pearson, 2010.
2. David Simchi-Levi, Philip Kaminsky, Edith Simchi-Levi, Designing and Managing the Supply Chain: Concepts, Strategies, and Cases, Tata McGraw-Hill, 2005.

REFERENCES

1. Ballou Ronald H, Business Logistics and Supply Chain Management, Pearson Education, 5th Edition, 2007
2. Shapiro Jeremy F, Modeling the Supply Chain, Cengage, Second Reprint , 2002.(Thomson**)**

E-RESOURCES

1. https://www.tutorialspoint.com/supply_chain_management
2. www.pondiuni.edu.in/sites/default/.../Logistics%20Supply%20Chain%20Mgt200813

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LIST OF ELECTIVES OFFERED FOR THE STUDENTS

Department of Master of Business Administration

Degree/Branch/Semester: M.B.A./III

Academic Year: 2020-2021

S. No.	Register No.	Name of the Student	Elective offered by the University	Electives Opted by the Students
1	201971001	ASHOK KUMAR J	Marketing Management(Mktg.)	H.R. & OM
2	201971002	LOGANATHAN K	Financial Management (Fin.) Human Resource Management (H.R.)	H.R. & OM
3	201971003	NANTHAKUMAR N	Systems Management (Sy.)	H.R. & OM
4	201971004	SRINIVAS R	Operations Management (OM)	H.R. & OM

H.O.D.

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19BAL108	SPOKEN AND WRITTEN COMMUNICATION	L T P C
		0 0 4 2

OBJECTIVE
- To familiarize learners with the mechanics of writing
- To enable learners to write in English precisely and effectively.
- To enable learners to speak fluently and flawlessly in all kinds of communicative contexts with all nationalities.

UNIT I   PERSONAL COMMUNICATION   12

Day-to-day conversation with family members, neighbours, relatives, friends on various topics, context specific - Journal writing, mails/emails, SMS, greeting cards, situation based - accepting/declining invitations, congratulating, consoling, conveying information, oral reports, extempore.

UNIT II   EMPLOYABILITY SKILLS   12

Interview skills - HR and technical - Types of interview, preparation for interview, mock interview, Group Discussion - Communication skills in Group Discussion, Structure of GD, GD process, successful GD techniques. Time management and effective planning - identifying barriers to effective time management, time management techniques, relationship between time management and stress management.

UNIT III   WORK PLACE COMMUNICATION   12

E-mails, minutes, reports of different kinds - annual report, status report, survey report, proposals, memorandums, presentations, interviews, profile of institutions, speeches, responding to enquiries, complaints, resumes, applications, summarizing, strategies for writing.

UNIT IV   RESEARCH WRITING   12

Articles for publication (Journals), developing questionnaire, writing abstract, dissertation, qualities of research writing, data (charts, tables) analysis, documentation.

UNIT V   WRITING FOR MEDIA AND CREATIVE WRITING   12

Features for publication (Newspapers, magazines, newsletters, notice board), case studies, short stories, travelogues, writing for children, translation, techniques of writing.

TOTAL: 60 PERIODS

Note: It is an activity based course. Student individually or as a group can organize event(s), present term papers etc. This will be evaluated by the faculty member(s) handling the course and the consolidated marks can be taken as the final mark.

No end semester examination is required for this course.

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OUTCOMES

Learners should be able to

- Get into the habit of writing regularly.
- Express themselves in different genres of writing from creative to critical to factual writing.
- Take part in print and online media communication
- Read quite widely to acquire a style of writing
- Identify their area of strengths and weaknesses in writing.
- Speak confidently with any speakers of English, including native speakers.
- Speak effortlessly in different contexts - informal and formal.

TEXT BOOKS

1. Raymond V Lesikar, John D Pettit, and Mary E Flatly, 2009. Lesikar's Basic Business Communication, 11th ed. Tata McGraw-Hill, New Delhi.
2. E.H. McGrath, S.J. 2012, Basic Managerial Skills for All. 9th ed. Prentice-Hall of India, New Delhi.

REFERENCES

1. Richard Denny, 'Communication to Win; Kogan Page India Pvt. Ltd., New Delhi, 2008.

E-RESOURCES

Blogs   : Seth Godwin, Guy Kawasaki, Kiruba Shankar
Review   : Harvard Business review
Reports   : Deloitte Netsis
Magazines: Bloomberg Business week, Economist

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SEMESTER II

19BAL208   **DATA ANALYSIS AND BUSINESS MODELING**   **L T P C**
                                                                       0 0 4 2

OBJECTIVES
- To have hands-on experience on decision modeling.

[Business models studied in theory to be practiced using Spreadsheet / Analysis Software]

S.No.	Exp. No.	Details of experiments	Duration
		Name	
1	1	Descriptive Statistics	4
2	2	Hypothesis - Parametric	4
3	3	Hypothesis – Non-parametric	4
4	4	Correlation & Regression	4
5	5	Forecasting	4
6	-	Extended experiment – 1	4
7	6	Portfolio Selection	4
8	7	Risk Analysis & Sensitivity Analysis	4
9	8	Revenue Management	4
10	-	Extended experiment – 2	4
11	9	Transportation & Assignment	4
12	10	Networking Models	4
13	11	Queuing Theory	4
14	12	Inventory Models	4
15	-	Extended experiments – 3	4

- Spreadsheet Software and
- Data Analysis Tools

TOTAL: 60 PERIODS

OUTCOMES
- Knowledge of spreadsheets and data analysis software for business modeling.

TEXT BOOKS
1. Hansa Lysander Manohar , " Data Analysis and Business   Modelling using MS Excel ",PHI Learning private Ltd, 2017.
2. David M. Levine et al, "Statistics for Managers using MS Excel' (6th Edition) Pearson, 2010

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REFERENCES
1. Vikas Gupta, Comdex Business Accounting with Ms Excel, 2010 and Tally ERP 9.0 Course Kit, Wiley India, 2012
2. Kiran Pandya and Smriti Bulsari, SPSS in simple steps, Dreamtech, 2011

E-RESOURCES
1. https://en.wikipedia.org/wiki/Descriptive_statistics
2. https://study.com/academy/.../the-transportation-problem-features-types-solutions.html

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19BATH01   ENTREPRENEURSHIP DEVELOPMENT   L T P C
3 0 0 3

OBJECTIVES

- To develop and strengthen entrepreneurial quality and motivation in students.
- To impart basic entrepreneurial skills and understandings to run a business efficiently and effectively.

UNIT I   ENTREPRENEURAL COMPETENCE   6

Entrepreneurship concept - Entrepreneurship as a Career - Entrepreneurial Personality - Characteristics of Successful, Entrepreneur - Knowledge and Skills of Entrepreneur.

UNIT II   ENTREPRENEURAL ENVIRONMENT   12

Business Environment - Role of Family and Society - Entrepreneurship Development Training and Other Support Organisational Services - Central and State Government Industrial Policies and Regulations - International Business.

UNIT III   BUSINESS PLAN PREPARATION   12

Sources of Product for Business - Prefeasibility Study - Criteria for Selection of Product - Ownership - Capital - Budgeting Project Profile Preparation - Matching Entrepreneur with the Project - Feasibility Report Preparation and Evaluation Criteria.

UNIT IV   LAUNCHING OF SMALL BUSINESS   10

Finance and Human Resource Mobilization Operations Planning - Market and Channel Selection -Growth Strategies - Product Launching - Incubation, Venture capital, IT startups.

UNIT V   MANAGEMENT OF SMALL BUSINESS   5

Monitoring and Evaluation of Business - Preventing Sickness and Rehabilitation of Business Units-Effective Management of small Business.

TOTAL: 45 PERIODS

OUTCOMES

- Students will gain knowledge and skills needed to run a business.

TEXT BOOKS

1. S.S.Khanka, Entrepreneurial Development, S.Chand and Company Limited, New Delhi,
   (Revised Edition) 2013
2. Hisrich, Entrepreneurship, Edition 9, Tata McGraw Hill, New Delhi, 2014

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REFERENCES

1. Prasanna Chandra, Projects - Planning, Analysis, Selection, Implementation and Reviews, Tata
2. McGraw-Hill, 1996
3. P.Saravanavel, Entrepreneurial Development, Ess Pee kay Publishing House, Chennai 1997

E-RESOURCES

1. https://www.toppr.com/.../entrepreneurship-development
2. ncert.nic.in/ncerts/l/lebs213.pdf

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19BATH02	INDUSTRIAL RELATIONS AND LABOUR WELFARE	L T P C
		3 0 0 3

OBJECTIVES

- To explore contemporary knowledge and gain a conceptual understanding of industrial relations.

UNIT I   INDUSTRIAL RELATIONS   7

Concepts - Importance - Industrial Relations problems in the Public Sector - Growth of Trade Unions - Codes of conduct.

UNIT II   INDUSTRIAL CONFLICTS   12

Disputes - Impact - Causes - Strikes - Prevention - Industrial Peace - Government Machinery - Conciliation - Arbitration - Adjudication.

UNIT III   LABOUR WELFARE   8

Concept - Objectives - Scope - Need - Voluntary Welfare Measures - Statutory Welfare Measures - Labour - Welfare Funds - Education and Training Schemes.

UNIT IV   INDUSTRIAL SAFETY   9

Causes of Accidents - Prevention - Safety Provisions - Industrial Health and Hygiene - Importance - Problems - Occupational Hazards - Diseases - Psychological problems - Counseling - Statutory Provisions.

UNIT V   WELFARE OF SPECIAL CATEGORIES OF LABOUR   9

Child Labour - Female Labour - Contract Labour - Construction Labour - Agricultural Labour - Differently abled Labour -BPO & KPO Labour - Social Assistance - Social Security - Implications.

TOTAL: 45 PERIODS

OUTCOME

- Students will know how to resolve industrial relations and human relations problems and promote welfare of industrial labour.

TEXT BOOKS

1. Ratna Sen, Industrial Relations in India, Shifting Paradigms, Macmillan India Ltd., New Delhi, 2007
2. C.S.Venkata Ratnam, Globalisation and Labour Management Relations, Response Books, 2007

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REFERENCES

1. P.R.N Sinha, Indu Bala Sinha, Seema Priyardarshini Shekhar. Industrial Relations, Trade Unions and Labour Legislation. Pearson. 2004
2. Srivastava, Industrial Relations and Labour laws, Vikas, 2007.

E-RESOURCES

1. https://labour.gov.in/industrial-relations
2. cde.annauniv.edu/MBAQP/pdf/Elective/DBA1748/MBA%201748.pdf

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19BATH04	**MANAGERIAL BEHAVIOUR AND EFFECTIVENESS**	L T P C
		3 0 0 3

OBJECTIVES
- To examine managerial styles in terms of concern for production and concern for people
- To assess different systems of management and relate these systems to organizational characteristics.

UNIT I   DEFINING THE MANAGERIAL JOB   8
Descriptive Dimensions of Managerial Jobs - Methods - Model - Time Dimensions in Managerial Jobs - Effective and Ineffective Job behaviour - Functional and level differences in Managerial Job behavior.

UNIT II   DESIGNING THE MANAGERIAL JOB   12
Identifying Managerial Talent - Selection and Recruitment - Managerial Skills Development - Pay and Rewards - Managerial Motivation - Effective Management Criteria - Performance Appraisal Measures - Balanced Scorecard - Feedback - Career Management - Current Practices.

UNIT III   THE CONCEPT OF MANAGERIAL EFFECTIVENESS   7
Definition - The person, process, product approaches - Bridging the Gap - Measuring Managerial Effectiveness - Current Industrial and Government practices in the Management of Managerial Effectiveness- the Effective Manager as an Optimizer.

UNIT IV   ENVIRONMENTAL ISSUES IN MANAGERIAL EFFECTIVENESS   8
Organisational Processes - Organisational Climate - Leader - Group Influences - Job Challenge - Competition - Managerial Styles.

UNIT V   DEVELOPING THE WINNING EDGE   10
Organisational and Managerial Efforts - Self Development - Negotiation Skills - Development of the Competitive Spirit - Knowledge Management - Fostering Creativity and innovation.

TOTAL: 45 PERIODS

OUTCOME
- Students will gain knowledge about appropriate style of managerial behaviour.

TEXT BOOKS
1. Milkovich and Newman, Compensation, McGraw-Hill International, 2013.
2. Dubrin, Leadership, Research Findings, Practices & Skills, Biztantra, 2015

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REFERENCES

1. Richard L.Daft, Leadership, Cengage, 1 st Indian Reprint 2008. (Tata McGraw-Hill)
2. Blanchard and Thacker, Effective Training Systems, Strategies and Practices Pearson 2012.

E-RESOURCES

1. https://cde.annauniv.edu/mbaqp/pdf/Elective/DBA1743/MBA1725.pdf
2. https://www.academia.edu/.../MANAGERIAL BEHAVIOUR AND EFFECTIVENESS

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19BATO04	**PROJECT MANAGEMENT**	**L T P C**
		3 0 0 3

OBJECTIVES
- To learn the concepts of managing projects.

UNIT I   INTRODUCTION TO PROJECT MANAGEMENT   9
Project Management - Definition -Goal - Lifecycles. Project Selection Methods. Project Portfolio Process - Project Formulation. Project Manager - Roles- Responsibilities and Selection - Project Teams.

UNIT II   PLANNING AND BUDGETING   9
The Planning Process - Work Break down Structure - Role of Multidisciplinary teams. Budget the Project - Methods. Cost Estimating and Improvement. Budget uncertainty and risk management.

UNIT III   SCHEDULING & RESOURCE ALLOCATION   9
PERT & CPM Networks - Crashing - Project Uncertainty and Risk Management - Simulation - Gantt Charts - Expediting a project - Resource loading and leveling. Allocating scarce resources -Goldratt's Critical Chain.

UNIT IV   CONTROL AND COMPLETION   9
The Plan-Monitor-Control cycle - Data Collecting and reporting - Project Control - Designing the control system. Project Evaluation, Auditing and Termination.

UNIT V   PROJECT ORGANISATION & CONFLICT MANAGEMENT   9
Formal Organization Structure - Organization Design - Types of project organizations. Conflict - Origin & Consequences. Managing conflict - Team methods for resolving conflict.

TOTAL: 45 PERIODS

OUTCOMES

- To apply project management principles in business situations to optimize resource utilization and time optimisation.

TEXT BOOKS
1. Harvey Maylor, Project Management, Fourth Edition, Pearson Education, 2010
2. Clifford Gray and Erik Larson, Project Management, Tata McGraw Hill Edition, 6e,2014

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REFERENCES

1. John M. Nicholas, Project Management for Business and Technology - Principles and Practice, Second Edition, Pearson Education,5th Edition 2016
2. Gido and Clements, Successful Project Management, sixth Edition, Cengage, 2015.

E-RESOURCES

1. www.edo.ca/downloads/project-management.pdf
2. ebooks.lpude.in/management/mba/term_3/DMGT521_PROJECT_MANAGEMENT.pdf

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19BATO05   **SERVICES OPERATIONS MANAGEMENT**   **L T P C**
                                                                  3 0 0 3

OBJECTIVE
   • To help understand how service performance can be improved by studying services operations management

UNIT I   INTRODUCTION   9
Services - Importance, role in economy, service sector - growth; Nature of services -Service classification , Service Package, distinctive characteristics , open-systems view; Service Strategy -Strategic service vision, competitive environment, generic strategies, winning customers; Role of information technology; stages in service firm competitiveness; Internet strategies - Environmental strategies.

UNIT II   SERVICE DESIGN   9
New Service Development - Design elements - Service Blue-printing - process structure - generic approaches -Value to customer; Retail design strategies - store size - Network configuration; Managing Service Experience -experience economy, key dimensions; Vehicle Routing and Scheduling.

UNIT III   SERVICE QUALITY   9
Service Quality- Dimensions, Service Quality Gap Model; Measuring Service Quality - SERVQUAL -Walk-through Audit; Quality service by design - Service Recovery - Service Guarantees; Service Encounter - triad, creating service orientation, service profit chain; Front-office Back-office Interface -service decoupling.

UNIT IV   SERVICE FACILITY   9
Services capes - behaviour - environmental dimensions - framework; Facility design - nature, objectives, process analysis - process flow diagram, process steps, simulation; Service facility layout; Service Facility Location - considerations, facility location techniques - metropolitan metric, Euclidean, centre of gravity, retail outlet location , location set covering problem.

UNIT V   MANAGING CAPACITY AND DEMAND   9
Managing Demand - strategies; Managing capacity - basic strategies, supply management tactics, operations planning and control; Yield management; Inventory Management in Services- Retail Discounting Model, Newsvendor Model; Managing Waiting Lines -Queuing systems, psychology of waiting; Managing for growth- expansion strategies, franchising , globalization.

TOTAL: 45 PERIODS

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OUTCOME:
• To design and operate a service business using the concepts, tools and techniques of service operations management.

TEXT BOOKS
1. Robert Johnston, Graham Clark, Service Operations Management, Pearson Education, 2nd Edition, 2005.
2. Richard Metters, Kathryn King-Metters, Madeleine Pullman, Steve Walton Successful Service Operations Management, South-Western, Cengage Learning, 2nd Edition ,2012

REFERENCES
1. James A. Fitzsimmons, Service Management - Operations, Strategy, Information Technology, Tata McGraw-Hill - 7th Edition 2013.
2. Bill Hollins and Sadie Shinkins, Managing Service Operations, Sage, 2006

E-RESOURCES

1. https://examupdates.in/production-and-operations-management-notes
2. www.vssut.ac.in/lecture_notes/lecture1429900757.pdf

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19BATO06 **SUPPLY CHAIN MANAGEMENT** **L T P C**
3 0 0 3

OBJECTIVES

- To help understand the importance of and major decisions in supply chain management for gaining competitive advantage.

UNIT I INTRODUCTION 9

Supply Chain - Fundamentals -Evolution- Role in Economy - Importance - Decision Phases - Supplier-Manufacturer-Customer chain. - Enablers/ Drivers of Supply Chain Performance. Supply chain strategy -Supply Chain Performance Measures.

UNIT II STRATEGIC SOURCING 9

Outsourcing - Make Vs buy - Identifying core processes - Market Vs Hierarchy - Make Vs buy continuum -Sourcing strategy - Supplier Selection and Contract Negotiation. Creating a world class supply base-Supplier Development - World Wide Sourcing.

UNIT III SUPPLY CHAIN NETWORK 9

Distribution Network Design - Role - Factors Influencing Options, Value Addition - Distribution Strategies - Models for Facility Location and Capacity allocation. Distribution Center Location Models. Supply Chain Network optimization models. Impact of uncertainty on Network Design - Network Design decisions using Decision trees.

UNIT IV PLANNING DEMAND, INVENTORY AND SUPPLY 9

Managing supply chain cycle inventory. Uncertainty in the supply chain **-** Analyzing impact of supply chain redesign on the inventory - Risk Pooling - Managing inventory for short life - cycle products -multiple item -multiple location inventory management. Pricing and Revenue Management.

UNIT V CURRENT TRENDS 9

Supply Chain Integration - Building partnership and trust in SC Value of Information: Bullwhip Effect -Effective forecasting - Coordinating the supply chain. . SC Restructuring - SC Mapping - SC process restructuring, Postpone the point of differentiation - IT in Supply Chain - Agile Supply Chains -Reverse Supply chain. Agro Supply Chains.

TOTAL: 45 PERIODS

OUTCOMES

- Ability to build and manage a competitive supply chain using strategies, models, techniques and information technology.

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2. Shapiro Jeremy F, Modeling the Supply Chain, Cengage, Second Reprint , 2002.(Thomson**)**

E-RESOURCES
1. https://www.tutorialspoint.com/supply_chain_management
2. www.pondiuni.edu.in/sites/default/.../Logistics%20Supply%20Chain%20Mgt200813

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Degree/Branch/Semester: M.B.A./III

Academic Year: 2020-2021

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1	201971001	ASHOK KUMAR J	Marketing Management(Mktg.)	H.R. & OM
2	201971002	LOGANATHAN K	Financial Management (Fin.) Human Resource Management (H.R.)	H.R. & OM
3	201971003	NANTHAKUMAR N	Systems Management (Sy.)	H.R. & OM
4	201971004	SRINIVAS R	Operations Management (OM)	H.R. & OM

H.O.D.

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SENGUNTHAR ENGINEERING COLLEGE

(AUTONOMOUS)

(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade

TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

LIST OF ELECTIVES OFFERED FOR THE STUDENTS

Department of Master of Business Administration

Degree/Branch/Semester: M.B.A./III

Academic Year: 2020-2021

S. No.	Register No.	Name of the Student	Elective offered by the University	Electives Opted by the Students
1	201971001	ASHOK KUMAR J	Marketing Management(Mktg.)	H.R. & OM
2	201971002	LOGANATHAN K	Financial Management (Fin.) Human Resource Management (H.R.)	H.R. & OM
3	201971003	NANTHAKUMAR N	Systems Management (Sy.)	H.R. & OM
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