List of New Course(s) Introduced

Department : Computer Science and Engineering

Programme Name : Bachelor of Technology

Academic Year : 2022-23

List of New Course(s) Introduced

Sr. No.	Course Code	Name of the Course
01.	AMUATB4	ENGINEERING MATHEMATICS-B
02.	PPUATB2	ENGINEERING PHYSICS
03.	ITUATE2	INTRODUCTION TO INFORMATION TECHNOLOGY
04.	ECUATE3	BASIC ELECTRICAL ENGINEERING
05.	ELUATH1	ENGLISH FOR COMMUNICATION
06.	ECUATH2	HUMAN VALUES & ETHICS
07.	PPUALB2	ENGINEERING PHYSICS LABORATORY
08.	MEUALL1	ENGINEERING GRAPHICS
09.	ECUALE3	BASIC ELECTRICAL ENGINEERING LABORATORY
10.	NSUALS1	NSS
11.	AMUBTB1	ENGINEERING MATHEMATICS-A
12.	CYUBTB3	ENGINEERING CHEMISTRY
13.	CSUBTE5	COMPUTER PROGRAMMING
14.	ECUBTE7	INTRODUCTION TO ELECTRONICS & COMMUNICATION ENGINEERING
15.	LAUBTC1	INDIAN CONSTITUTION
16.	FOUBTC2	ENVIRONMENTAL SCIENCE AND ECOLOGY
17.	CYUBLB3	ENGINEERING CHEMISTRY LABORATORY
18.	IPUBLL2	ENGINEERING WORKSHOP PRACTICES
19.	CSUBLE5	COMPUTER PROGRAMMING LABORATORY

20.	PEUBLS2	SPORTS AND YOGA

Minutes of Meetings (MoM) of Board of Studies (BoS)

Academic Year : 2022-23

School : *School of Studies of Engineering and Technology*

Department : *Computer Science and Engineering*

Date and Time : *13 June 2022*

Venue : *GOOGLE MEET/VIRTUAL MODE/HYBRID MODE*

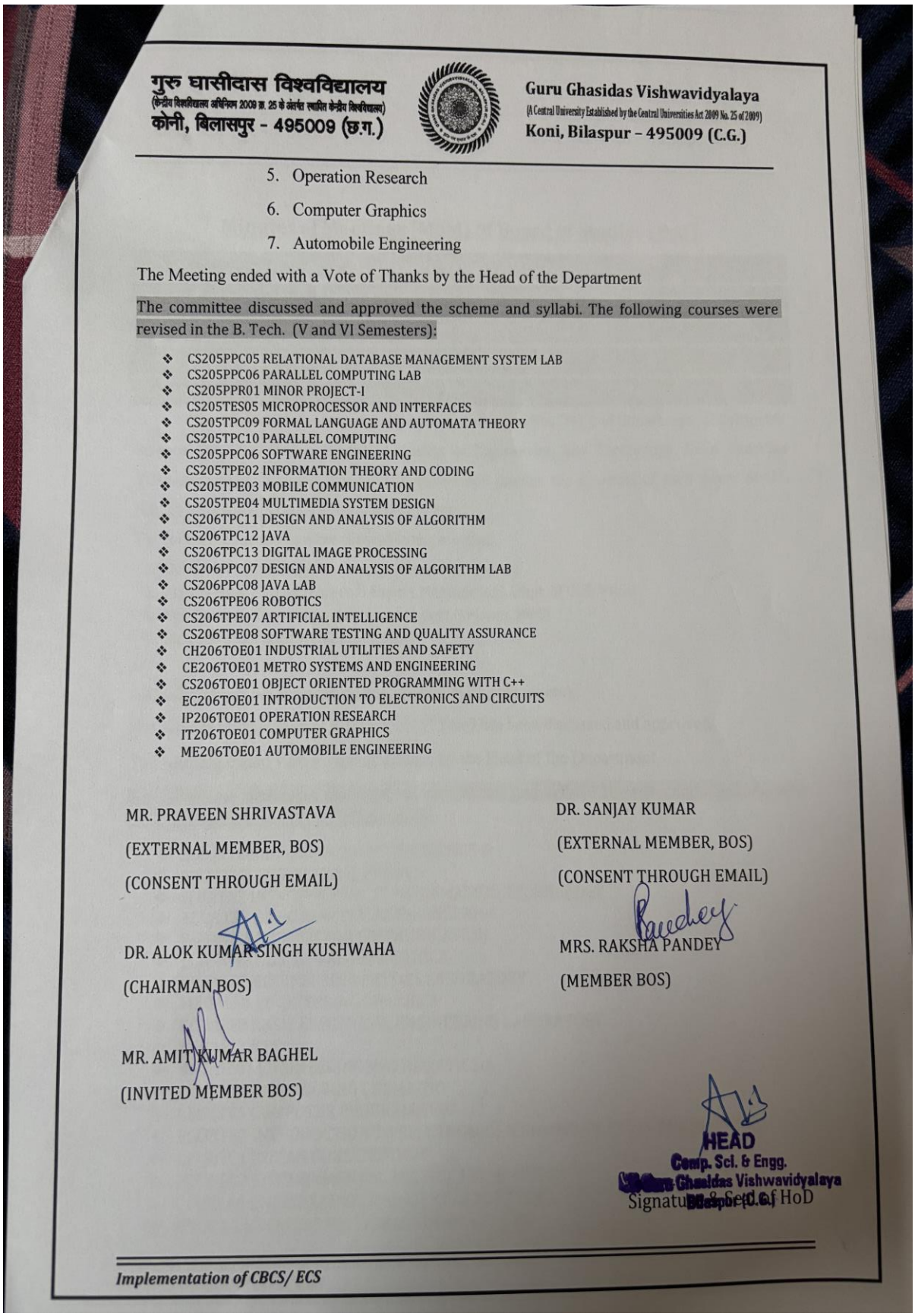
The scheduled meeting of member of Board of Studies (BoS) of Department of Computer Science and Engineering, School of Studies of Engineering and Technology, Guru Ghasidas Vishwavidyalaya, Bilaspur was held to design and discuss the contents of each paper of U.G (CBCS) and P.G. by members (both internal and external).

The following members were present in the meeting:

1. Dr. Alok Kumar Singh Kushwaha (Chairman of BOS)
2. Prof. Sanjay Kumar (External Expert Member BoS, Dept. of CSE, PRSU)
3. Mr. Praveen Shrivastava (External Expert Member, BOS)
4. Mrs. Raksha Pandey, (Member BOS)
5. Mr. Amit Baghel, (Invited Member)

Following points were discussed during the meeting

1. B.Tech. 3rd Year (Vth Semester and VIth Semester) Course Code is Revised and will be effected from Session 2022-23.
2. In B.Tech. 6th Semester,
   - I. Computer Graphics subject is Removed from Professional Core Subject and Digital Image Processing is added as a Professional Core Subject in the place of Computer Graphics.
   - II. The subject Digital Image Processing is Removed from Professional Elective List and Management Information System is Added as a Professional Elective Subject in the Place of Digital Image Processing
   - III. All the Subjects of Open Elective is Replaced with the following new Open Electives:
     1. Industrial Utilities and Safety
     2. Metro Systems and Engineering
     3. Object Oriented Programming with C++
     4. Introduction to Electronics and Circuits
     5. Operation Research
     6. Computer Graphics



गुरु घासीदास विश्वविद्यालय
(केन्द्रीय विश्वविद्यालय अधिनियम 2009 क्र. 25 के अंतर्गत स्थापित केन्द्रीय विश्वविद्यालय)
कोनी, बिलासपुर - 495009 (छ.ग.)

Guru Ghasidas Vishwavidyalaya
(A Central University Established by the Central Universities Act 2009 No. 25 of 2009)
Koni, Bilaspur – 495009 (C.G.)

5. Operation Research
6. Computer Graphics
7. Automobile Engineering

The Meeting ended with a Vote of Thanks by the Head of the Department

The committee discussed and approved the scheme and syllabi. The following courses were revised in the B. Tech. (V and VI Semesters):

- CS205PPC05 RELATIONAL DATABASE MANAGEMENT SYSTEM LAB
- CS205PPC06 PARALLEL COMPUTING LAB
- CS205PPR01 MINOR PROJECT-I
- CS205TES05 MICROPROCESSOR AND INTERFACES
- CS205TPC09 FORMAL LANGUAGE AND AUTOMATA THEORY
- CS205TPC10 PARALLEL COMPUTING
- CS205PPC06 SOFTWARE ENGINEERING
- CS205TPE02 INFORMATION THEORY AND CODING
- CS205TPE03 MOBILE COMMUNICATION
- CS205TPE04 MULTIMEDIA SYSTEM DESIGN
- CS206TPC11 DESIGN AND ANALYSIS OF ALGORITHM
- CS206TPC12 JAVA
- CS206TPC13 DIGITAL IMAGE PROCESSING
- CS206PPC07 DESIGN AND ANALYSIS OF ALGORITHM LAB
- CS206PPC08 JAVA LAB
- CS206TPE06 ROBOTICS
- CS206TPE07 ARTIFICIAL INTELLIGENCE
- CS206TPE08 SOFTWARE TESTING AND QUALITY ASSURANCE
- CH206TOE01 INDUSTRIAL UTILITIES AND SAFETY
- CE206TOE01 METRO SYSTEMS AND ENGINEERING
- CS206TOE01 OBJECT ORIENTED PROGRAMMING WITH C++
- EC206TOE01 INTRODUCTION TO ELECTRONICS AND CIRCUITS
- IP206TOE01 OPERATION RESEARCH
- IT206TOE01 COMPUTER GRAPHICS
- ME206TOE01 AUTOMOBILE ENGINEERING

MR. PRAVEEN SHRIVASTAVA
(EXTERNAL MEMBER, BOS)
(CONSENT THROUGH EMAIL)

DR. SANJAY KUMAR
(EXTERNAL MEMBER, BOS)
(CONSENT THROUGH EMAIL)

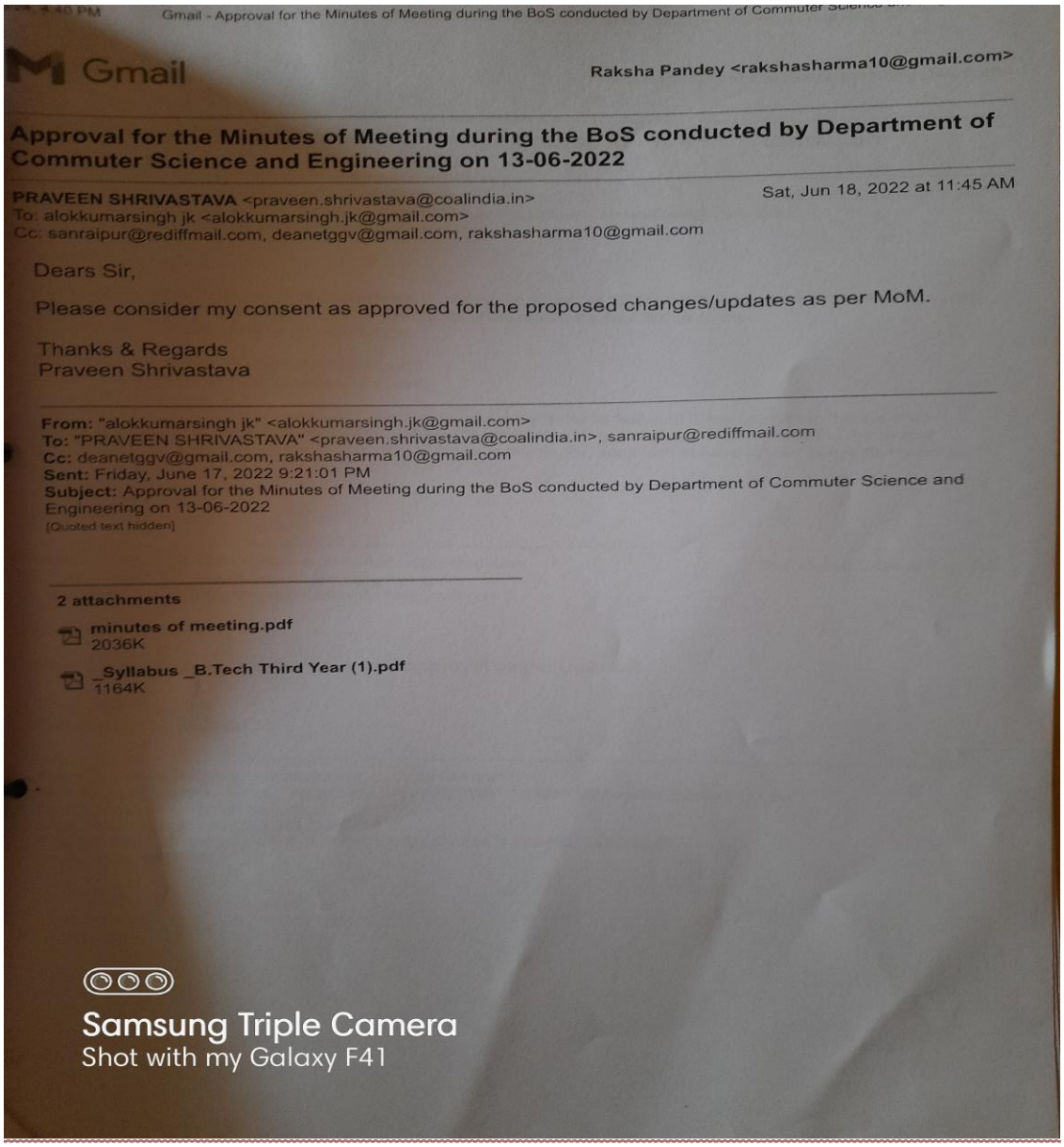
DR. ALOK KUMAR SINGH KUSHWAHA
(CHAIRMAN BOS)

MRS. RAKSHA PANDEY
(MEMBER BOS)

MR. AMIT KUMAR BAGHEL
(INVITED MEMBER BOS)

HEAD
Comp. Sci. & Engg.
Guru Ghasidas Vishwavidyalaya
Bilaspur (C.G.)
Signature & Seal of HoD

Implementation of CBCS/ ECS



Gmail - Approval for the Minutes of Meeting during the BoS conducted by Department of Commuter Science

Gmail

Raksha Pandey <rakshasharma10@gmail.com>

Approval for the Minutes of Meeting during the BoS conducted by Department of Commuter Science and Engineering on 13-06-2022

PRAVEEN SHRIVASTAVA <praveen.shrivastava@coalindia.in> Sat, Jun 18, 2022 at 11:45 AM
To: alokkumarsingh jk <alokkumarsingh.jk@gmail.com>
Cc: sanraipur@rediffmail.com, deanetggv@gmail.com, rakshasharma10@gmail.com

Dears Sir,

Please consider my consent as approved for the proposed changes/updates as per MoM.

Thanks & Regards
Praveen Shrivastava

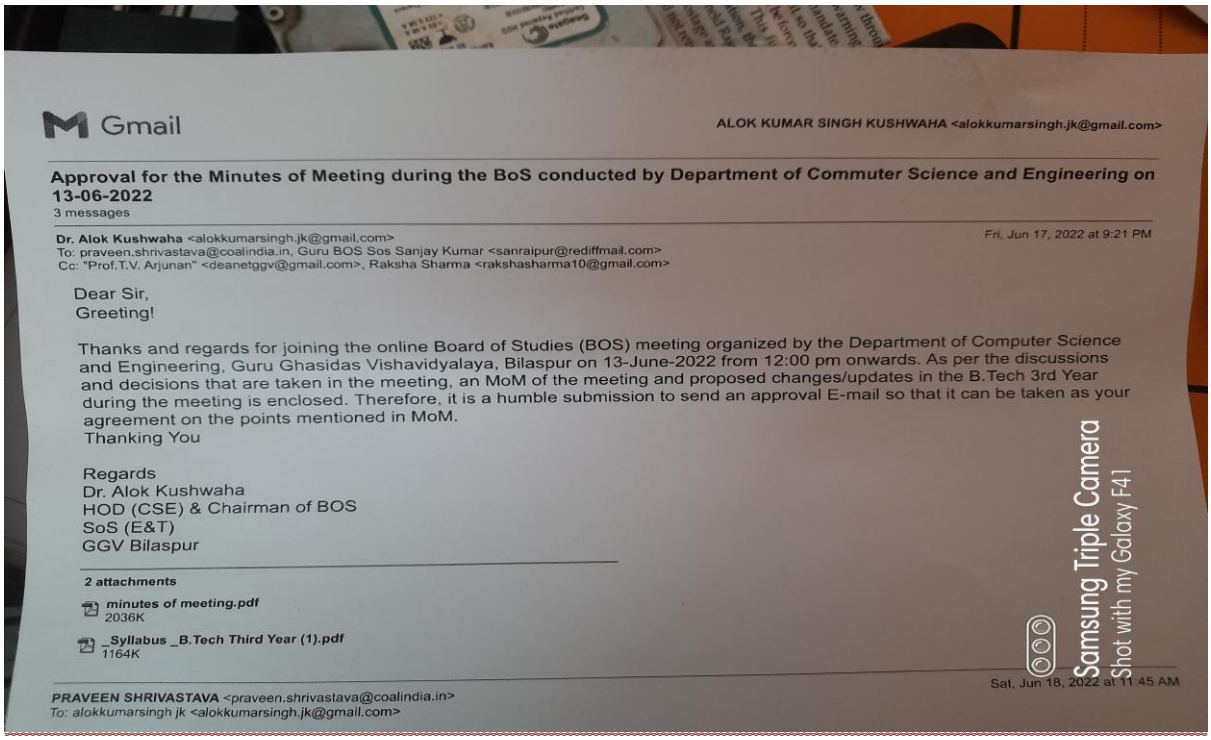
From: "alokkumarsingh jk" <alokkumarsingh.jk@gmail.com>
To: "PRAVEEN SHRIVASTAVA" <praveen.shrivastava@coalindia.in>, sanraipur@rediffmail.com
Cc: deanetggv@gmail.com, rakshasharma10@gmail.com
Sent: Friday, June 17, 2022 9:21:01 PM
Subject: Approval for the Minutes of Meeting during the BoS conducted by Department of Commuter Science and Engineering on 13-06-2022
[Quoted text hidden]

2 attachments

minutes of meeting.pdf
2036K

_Syllabus _B.Tech Third Year (1).pdf
1164K

Samsung Triple Camera
Shot with my Galaxy F41



Gmail

ALOK KUMAR SINGH KUSHWAHA <alokkumarsingh.jk@gmail.com>

Approval for the Minutes of Meeting during the BoS conducted by Department of Commuter Science and Engineering on 13-06-2022

3 messages

Dr. Alok Kushwaha <alokkumarsingh.jk@gmail.com> Fri, Jun 17, 2022 at 9:21 PM
To: praveen.shrivastava@coalindia.in, Guru BOS Sos Sanjay Kumar <sanraipur@rediffmail.com>
Cc: "Prof.T.V. Arjunan" <deanetggv@gmail.com>, Raksha Sharma <rakshasharma10@gmail.com>

Dear Sir,
Greeting!

Thanks and regards for joining the online Board of Studies (BOS) meeting organized by the Department of Computer Science and Engineering, Guru Ghasidas Vishavidyalaya, Bilaspur on 13-June-2022 from 12:00 pm onwards. As per the discussions and decisions that are taken in the meeting, an MoM of the meeting and proposed changes/updates in the B.Tech 3rd Year during the meeting is enclosed. Therefore, it is a humble submission to send an approval E-mail so that it can be taken as your agreement on the points mentioned in MoM.
Thanking You

Regards
Dr. Alok Kushwaha
HOD (CSE) & Chairman of BOS
SoS (E&T)
GGV Bilaspur

2 attachments

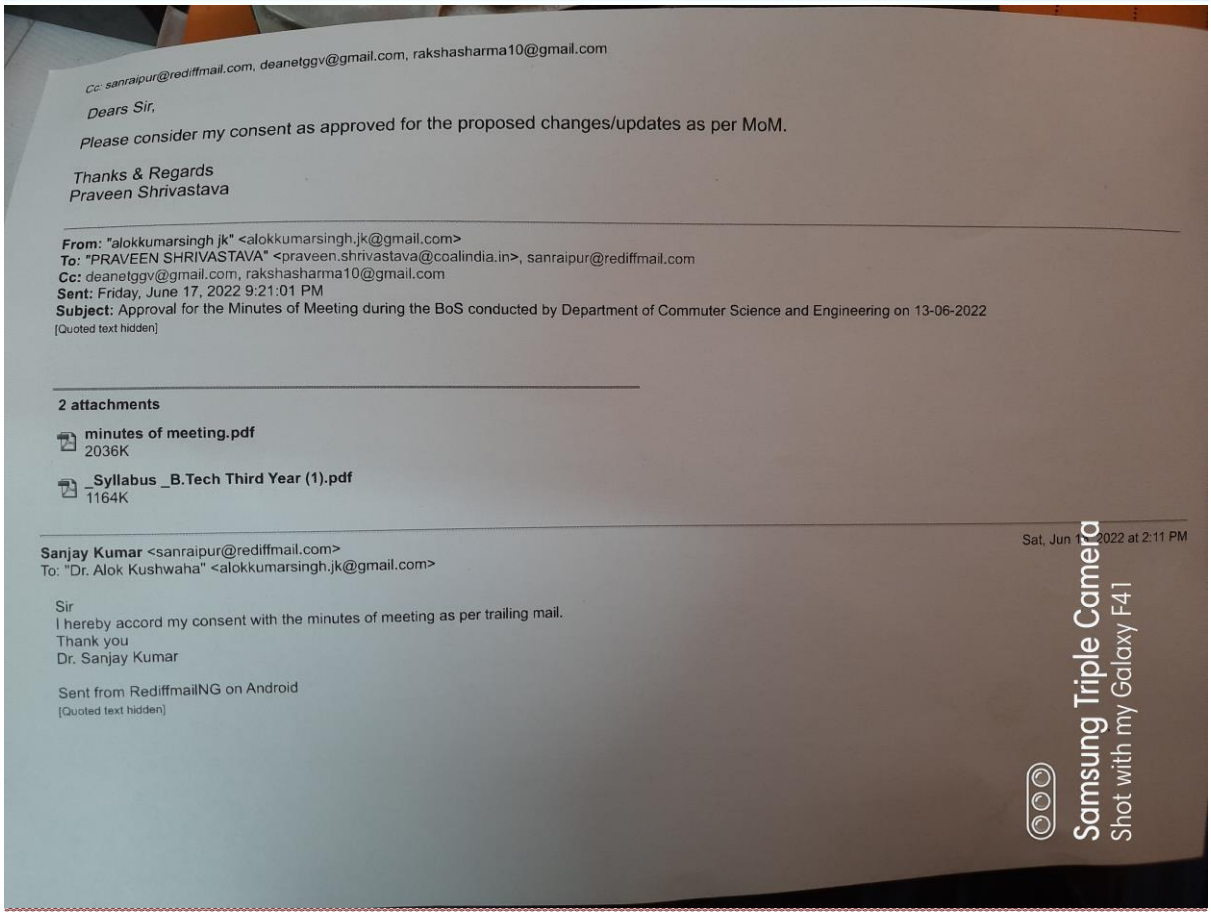
minutes of meeting.pdf
2036K

_Syllabus _B.Tech Third Year (1).pdf
1164K

Sat, Jun 18, 2022 at 11:45 AM

PRAVEEN SHRIVASTAVA <praveen.shrivastava@coalindia.in>
To: alokkumarsingh jk <alokkumarsingh.jk@gmail.com>

Samsung Triple Camera
Shot with my Galaxy F41



Cc: sanraipur@rediffmail.com, deanetggv@gmail.com, rakshasharma10@gmail.com

Dears Sir,

Please consider my consent as approved for the proposed changes/updates as per MoM.

Thanks & Regards
Praveen Shrivastava

From: "alokkumarsingh jk" <alokkumarsingh.jk@gmail.com>
To: "PRAVEEN SHRIVASTAVA" <praveen.shrivastava@coalindia.in>, sanraipur@rediffmail.com
Cc: deanetggv@gmail.com, rakshasharma10@gmail.com
Sent: Friday, June 17, 2022 9:21:01 PM
Subject: Approval for the Minutes of Meeting during the BoS conducted by Department of Commuter Science and Engineering on 13-06-2022
[Quoted text hidden]

---

2 attachments

minutes of meeting.pdf
2036K

_Syllabus _B.Tech Third Year (1).pdf
1164K

Sanjay Kumar <sanraipur@rediffmail.com>
To: "Dr. Alok Kushwaha" <alokkumarsingh.jk@gmail.com>

Sat, Jun 1[illegible]2022 at 2:11 PM

Sir
I hereby accord my consent with the minutes of meeting as per trailing mail.
Thank you
Dr. Sanjay Kumar

Sent from RediffmailNG on Android
[Quoted text hidden]

Samsung Triple Camera
Shot with my Galaxy F41

Minutes of Meetings (MoM) of Board of Studies (BoS)

Academic Year : 2022-23

School : *School of Studies of Engineering and Technology*

Department : *Computer Science and Engineering*

Date and Time : *15 DECEMBER 2022 TIMING: 5PM ONWARDS*

Venue : *GOOGLE MEET/VIRTUAL MODE/HYBRID MODE*

The scheduled meeting of member of Board of Studies (BoS) of Department of Computer Science and Engineering, School of Studies of Engineering and Technology, Guru Ghasidas Vishwavidyalaya, Bilaspur was held to design and discuss the contents of each paper of U.G (CBCS) by members (both internal and external).

The following members were present in the meeting:

1. Dr. Alok Kumar Singh Kushwaha (Chairman of BOS)
2. Prof. Sanjay Kumar (External Expert Member BoS, Dept. of CSE, PRSU)
3. Mr. Praveen Shrivastava (External Expert Member, BOS)
4. Mrs. Raksha Pandey, (Member BOS)

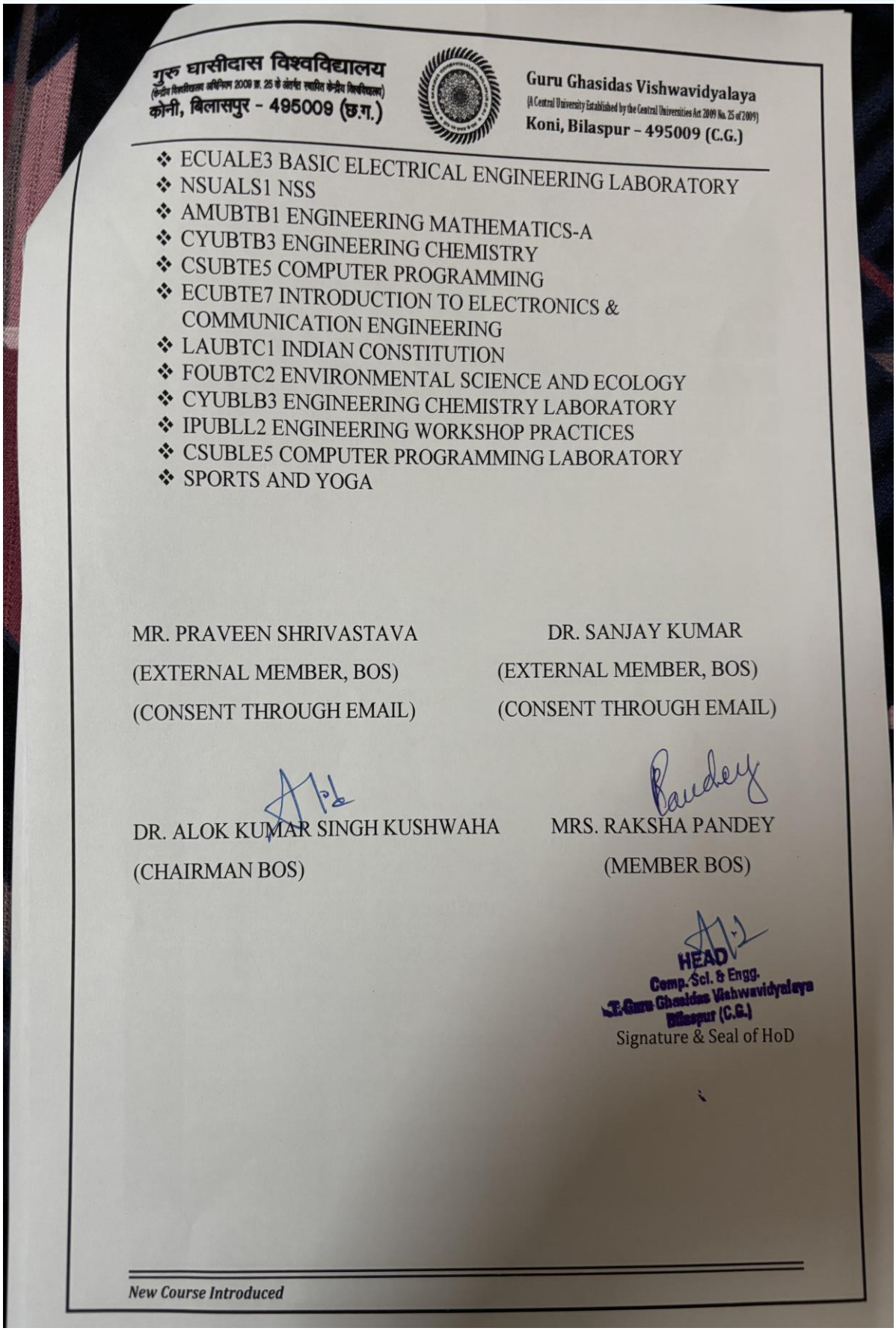
Following points were discussed and decided during the meeting

The Scheme and Syllabus of B.Tech. CSE (1st Year) has been discussed and approved.

The Meeting ended with a Vote of Thanks by the Head of the Department

The committee discussed and approved the scheme and syllabi. The following courses were revised in the B. Tech. (I and II Semesters):

- AMUATB4 ENGINEERING MATHEMATICS-B
- PPUATB2 ENGINEERING PHYSICS
- ITUATE2 INTRODUCTION TO INFORMATION TECHNOLOGY
- ECUATE3 BASIC ELECTRICAL ENGINEERING
- ELUATH1 ENGLISH FOR COMMUNICATION
- ECUATH2 HUMAN VALUES & ETHICS
- PPUALB2 ENGINEERING PHYSICS LABORATORY



गुरु घासीदास विश्वविद्यालय
(केन्द्रीय विश्वविद्यालय अधिनियम 2009 क्र. 25 के अंतर्गत स्थापित केन्द्रीय विश्वविद्यालय)
कोनी, बिलासपुर - 495009 (छ.ग.)

Guru Ghasidas Vishwavidyalaya
(A Central University Established by the Central Universities Act 2009 No. 25 of 2009)
Koni, Bilaspur – 495009 (C.G.)

- ECUALE3 BASIC ELECTRICAL ENGINEERING LABORATORY
- NSUALS1 NSS
- AMUBTB1 ENGINEERING MATHEMATICS-A
- CYUBTB3 ENGINEERING CHEMISTRY
- CSUBTE5 COMPUTER PROGRAMMING
- ECUBTE7 INTRODUCTION TO ELECTRONICS & COMMUNICATION ENGINEERING
- LAUBTC1 INDIAN CONSTITUTION
- FOUBTC2 ENVIRONMENTAL SCIENCE AND ECOLOGY
- CYUBLB3 ENGINEERING CHEMISTRY LABORATORY
- IPUBLL2 ENGINEERING WORKSHOP PRACTICES
- CSUBLE5 COMPUTER PROGRAMMING LABORATORY
- SPORTS AND YOGA

MR. PRAVEEN SHRIVASTAVA
(EXTERNAL MEMBER, BOS)
(CONSENT THROUGH EMAIL)

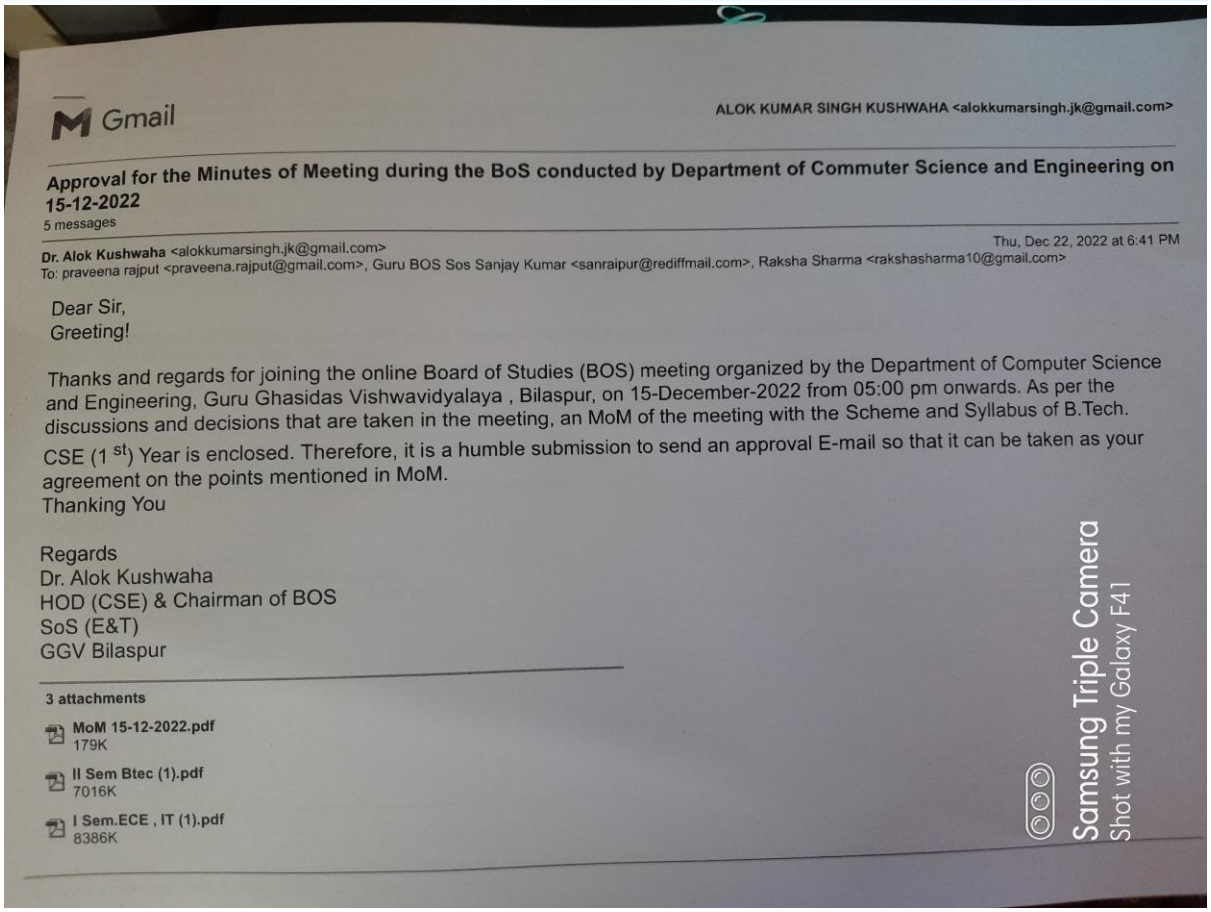
DR. SANJAY KUMAR
(EXTERNAL MEMBER, BOS)
(CONSENT THROUGH EMAIL)

DR. ALOK KUMAR SINGH KUSHWAHA
(CHAIRMAN BOS)

MRS. RAKSHA PANDEY
(MEMBER BOS)

HEAD
Comp. Sci. & Engg.
Guru Ghasidas Vishwavidyalaya
Bilaspur (C.G.)
Signature & Seal of HoD

New Course Introduced



Gmail — ALOK KUMAR SINGH KUSHWAHA <alokkumarsingh.jk@gmail.com>

Approval for the Minutes of Meeting during the BoS conducted by Department of Commuter Science and Engineering on 15-12-2022

5 messages

Dr. Alok Kushwaha <alokkumarsingh.jk@gmail.com> Thu, Dec 22, 2022 at 6:41 PM
To: praveena rajput <praveena.rajput@gmail.com>, Guru BOS Sos Sanjay Kumar <sanraipur@rediffmail.com>, Raksha Sharma <rakshasharma10@gmail.com>

Dear Sir,
Greeting!

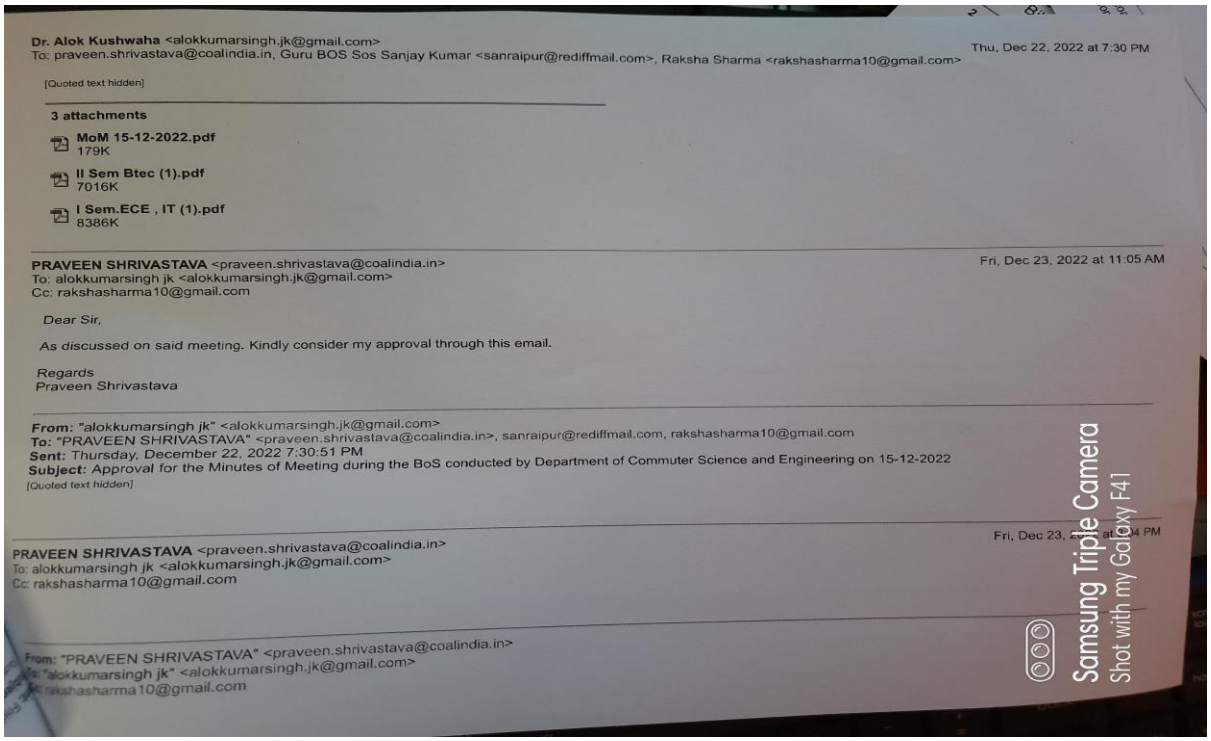
Thanks and regards for joining the online Board of Studies (BOS) meeting organized by the Department of Computer Science and Engineering, Guru Ghasidas Vishwavidyalaya , Bilaspur, on 15-December-2022 from 05:00 pm onwards. As per the discussions and decisions that are taken in the meeting, an MoM of the meeting with the Scheme and Syllabus of B.Tech. CSE (1 st) Year is enclosed. Therefore, it is a humble submission to send an approval E-mail so that it can be taken as your agreement on the points mentioned in MoM.
Thanking You

Regards
Dr. Alok Kushwaha
HOD (CSE) & Chairman of BOS
SoS (E&T)
GGV Bilaspur

3 attachments

- **MoM 15-12-2022.pdf** 179K
- **II Sem Btec (1).pdf** 7016K
- **I Sem.ECE , IT (1).pdf** 8386K

Samsung Triple Camera
Shot with my Galaxy F41



Dr. Alok Kushwaha <alokkumarsingh.jk@gmail.com> Thu, Dec 22, 2022 at 7:30 PM
To: praveen.shrivastava@coalindia.in, Guru BOS Sos Sanjay Kumar <sanraipur@rediffmail.com>, Raksha Sharma <rakshasharma10@gmail.com>

[Quoted text hidden]

3 attachments

- **MoM 15-12-2022.pdf** 179K
- **II Sem Btec (1).pdf** 7016K
- **I Sem.ECE , IT (1).pdf** 8386K

PRAVEEN SHRIVASTAVA <praveen.shrivastava@coalindia.in> Fri, Dec 23, 2022 at 11:05 AM
To: alokkumarsingh jk <alokkumarsingh.jk@gmail.com>
Cc: rakshasharma10@gmail.com

Dear Sir,

As discussed on said meeting. Kindly consider my approval through this email.

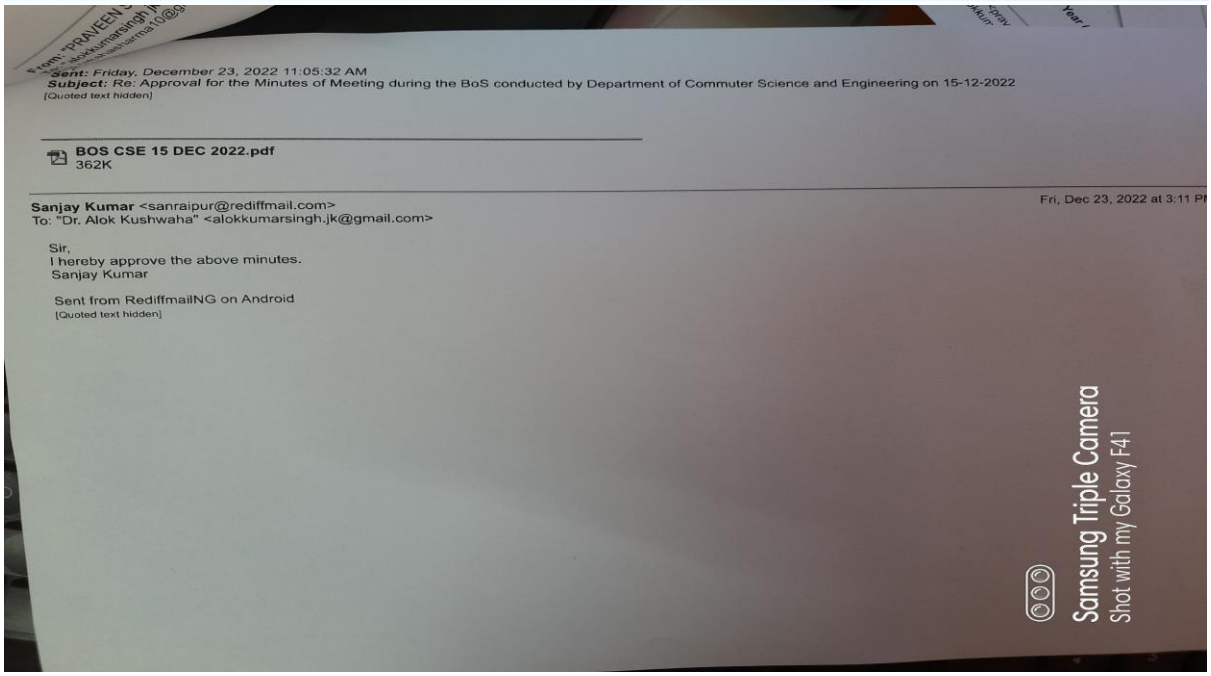
Regards
Praveen Shrivastava

From: "alokkumarsingh jk" <alokkumarsingh.jk@gmail.com>
To: "PRAVEEN SHRIVASTAVA" <praveen.shrivastava@coalindia.in>, sanraipur@rediffmail.com, rakshasharma10@gmail.com
Sent: Thursday, December 22, 2022 7:30:51 PM
Subject: Approval for the Minutes of Meeting during the BoS conducted by Department of Commuter Science and Engineering on 15-12-2022
[Quoted text hidden]

PRAVEEN SHRIVASTAVA <praveen.shrivastava@coalindia.in> Fri, Dec 23, [illegible] PM
To: alokkumarsingh jk <alokkumarsingh.jk@gmail.com>
Cc: rakshasharma10@gmail.com

From: "PRAVEEN SHRIVASTAVA" <praveen.shrivastava@coalindia.in>
To: "alokkumarsingh jk" <alokkumarsingh.jk@gmail.com>
Cc: rakshasharma10@gmail.com

Samsung Triple Camera
Shot with my Galaxy F41


Sent: Friday, December 23, 2022 11:05:32 AM
Subject: Re: Approval for the Minutes of Meeting during the BoS conducted by Department of Commuter Science and Engineering on 15-12-2022
[Quoted text hidden]
BOS CSE 15 DEC 2022.pdf
362K
Sanjay Kumar <sanraipur@rediffmail.com>
To: "Dr. Alok Kushwaha" <alokkumarsingh.jk@gmail.com>
Fri, Dec 23, 2022 at 3:11 PM
Sir,
I hereby approve the above minutes.
Sanjay Kumar
Sent from RediffmailNG on Android
[Quoted text hidden]
Samsung Triple Camera
Shot with my Galaxy F41

Scheme and Syllabus

SCHOOL OF STUDIES OF ENGINEERING AND TECHNOLOGY

Scheme of Teaching and Evaluation 2022-2023 (As per NEP-2020)
Choice Based Credit System (CBCS) and Outcome Based Education (OBE)
(Effective from the Academic year 2023-2024)

I-SEMESTER BTech ECE/ IT/CSE

S.N.	Course Code	Course Title	Teaching Hours/ week			Examination				Credits
			Theory lectures	Tutorial	Practical/ Drawing	Examination in Hours	CIA Marks	SEA Marks	Total Marks	
			L	T	P					
1	AMUATB4	Engineering Mathematics - B	3	1	-	03	40	60	100	4
2	PPUATB2	Engineering Physics	3	1	-	03	40	60	100	4
3	ITUATE2	Introduction to Information Technology	3	-	-	03	40	60	100	3
4	ECUATE3	Basic Electrical Engineering	3	-	-	03	40	60	100	3
5	ELUATH1	English for Communication	3	-	-	03	40	60	100	3
6	ECUATH2/ CSUATH2/ITUATH2	Human Values & Ethics	1	-	-	02	50	-	50	1
7	PPUALB2	Engineering Physics Laboratory	-	-	2	03	25	25	50	1
8	MEUALL1	Engineering Graphics	1	-	3	03	25	25	50	3
9	ECUALE3	Basic Electrical Engineering Laboratory	-	-	2	03	25	25	50	1
10	NSUALS1	NSS	-	-	2	01	25	25	50	1
Total			**17**	**2**	**09**	**27**	**350**	**400**	**750**	**24**

Note: AM:Mathematics, PP:Physics, ME: Mechanical Engineering, IP: Industrial & Production Engineering, CE: Civil Engineering, CS: Computer Sc. & Engg., IT: Information Technology, PE: Physical Education, NS: NSS, U: Undergraduate, T: Theory, L: Laboratory,

BASIC SCIENCE (B)	ENGINEERING SCIENCE (E)	SKILL ENHANCEMENT COURSE (L)	HUMANITIES SCIENCE (H)	MANDATORY COURSE (C)	EXTRA-CURRICULAR ACTIVITIES (S)
1. Mathematics – A 2. Physics 3. Chemistry 4. Mathematics - B	1. Engineering Mechanics 2. Introduction to Information Technology 3. Basic Electrical Engineering 4. Basic Electrical and Electronics Engineering 5. Computer Programming 6. Basic Communication Engineering	1. Engineering Graphics 2. Engineering Workshop Practices	1. English for communication 2. Human Values and Ethics	1. Indian Constitution 2. Environmental Science & Ecology	1. NSS 2.Sports and Yoga

Credit Definition:

- 1-hour lecture (L) per week per semester = 1Credit
- 1-hour tutorial (T) per week per semester = 1Credit
- 2-hour Practical/Drawing(P) per week per semester = 1 Credit

- **Four credit** courses are to be designed for 50 hours of Teaching-Learning process.
- **Three credit** courses are to be designed for 40 hours of Teaching-Learning process.
- **Two credit** courses are to be designed for 30 hours of Teaching-Learning process.
- **One credit** courses are to be designed for 15 hours of Teaching-Learning process

Note: The above is applicable only to THEORY courses

AICTE Activity Points to be earned by students admitted to B.Tech. programme (For more details refer to Chapter 6, AICTE Activity Point Programme, Model Internship Guidelines):

Over and above the academic grades, every regular student admitted to the 4 years Degree program and every student entering 4years Degree programme through lateral entry, shall earn 100 and 75 Activity Points respectively for the award of degree through AICTE Activity Point Programme. The Activity Points earned shall be reflected on the student's eighth semester Grade Card.

The activities can be spread over the years, any time during the semester weekends and holidays, as per the liking and convenience of the student from the year of entry to the programme. However, the minimum hours' requirement should be fulfilled. Activity Points (non-credit) donot affect SGPA/CGPA and shall not be considered for vertical progression.

Eligibility for UG Certificate:

A. **Undergraduate Certificate course will be offered by all departments of SoS(E&T), GGV.**
B. **For applicability of UG Certificate, the candidate who wants to exit after completing 1st year (02 semesters) BTech degree with 10 credits of skill-based courses lasting two months, including atleast 06 credits job specific internship/apprenticeship with NHEQF level 5/UCF level 4.5.**
C. **A student shall report to the concerned Head on or before the date notified by the Department/School/University, if he/she is interested to exit with UG Certificate**

New Course Introduced

गुरु घासीदास विश्वविद्यालय
(केन्द्रीय विश्वविद्यालय अधिनियम 2009 क्र. 25 के अंतर्गत स्थापित केन्द्रीय विश्वविद्यालय)
कोनी, बिलासपुर – 495009 (छ.ग.)

Guru Ghasidas Vishwavidyalaya
(A Central University Established by the Central Universities Act 2009 No. 25 of 2009)
Koni, Bilaspur – 495009 (C.G.)

SCHOOL OF STUDIES OF ENGINEERING AND TECHNOLOGY

Scheme of Teaching and Evaluation 2022-2023 (As per NEP-2020)
Choice Based Credit System (CBCS) and Outcome Based Education (OBE)
(Effective from the Academic year 2023–2024)

II-SEMESTER BTech ECE/ IT/CSE

S. N.	Course Code	Course Title	Teaching Hours/week			Examination				Credits
			Theory lectures	Tutorial	Practical/ Drawing	Examination in Hours	CIA Marks	SEA Marks	Total Marks	
			L	T	P					
1	AMUBTB1	Engineering Mathematics - A	3	1	-	03	40	60	100	4
2	CYUBTB3	Engineering Chemistry	3	-	-	03	40	60	100	3
3	CSUBTE5	Computer Programming	3	-	-	03	40	60	100	3
4	ECUBTE7	Introduction to Electronics & Communication Engineering	3	-	-	03	40	60	100	3
5	LAUBTC1	Indian Constitution	1	-	-	01	50	-	50	1
6	FOUBTC2	Environmental Science and Ecology	2	-	-	03	40	60	100	2
7	CYUBLB3	Engineering Chemistry Laboratory	-	-	2	03	25	25	50	1
8	IPUBLL2	Engineering Workshop Practices	-	-	2	03	25	25	50	1
9	CSUBLE5	Computer Programming Laboratory	-	-	2	03	25	25	50	1
10	PEUBLS2	Sports and Yoga	-	-	2		25	25	50	1
Total			**15**	**1**	**08**	**25**	**350**	**400**	**750**	**20**

Note: AM:Mathematics, PP:Physics, ME: Mechanical Engineering, IP: Industrial & Production Engineering, CE: Civil Engineering, CS: Computer Sc. & Engg., IT: Information Technology, PE: Physical Education, FO: Forestry, LA: Law, NS: NSS, U: Undergraduate, T: Theory, L: Laboratory,

BASIC SCIENCE (B)	ENGINEERING SCIENCE (E)	SKILL ENHANCEMENT COURSE (L)	HUMANITIES SCIENCE (H)	MANDATORY COURSE (C)	EXTRA-CURRICULAR ACTIVITIES (S)
1. Mathematics – A 2. Physics 3. Chemistry 4. Mathematics - B	1. Engineering Mechanics 2. Introduction to Information Technology 3. Basic Electrical Engineering 4. Basic Electrical and Electronics Engineering 5. Computer Programming 6. Basic Communication Engineering	1. Engineering Graphics 2. Engineering Workshop Practices	1. English for communication 2. Human Values and Ethics	1. Indian Constitution 2. Environmental Science & Ecology	1. NSS 2.Sports and Yoga

Credit Definition:

- 1-hour lecture (L) per week per semester = 1Credit
- 1-hour tutorial (T) per week per semester = 1Credit
- 2-hour Practical/Drawing(P) per week per semester = 1 Credit

- **Four credit** courses are to be designed for 50 hours of Teaching-Learning process.
- **Three credit** courses are to be designed for 40 hours of Teaching-Learning process.
- **Two credit** courses are to be designed for 30 hours of Teaching-Learning process.
- **One credit** courses are to be designed for 15 hours of Teaching-Learning process

Note: The above is applicable only to THEORY courses

AICTE Activity Points to be earned by students admitted to B.Tech. programme (For more details refer to Chapter 6, AICTE Activity Point Programme, Model Internship Guidelines):

Over and above the academic grades, every regular student admitted to the 4 years Degree program and every student entering 4years Degree programme through lateral entry, shall earn 100 and 75 Activity Points respectively for the award of degree through AICTE Activity Point Programme. The Activity Points earned shall be reflected on the student's eighth semester Grade Card.

The activities can be spread over the years, any time during the semester weekends and holidays, as per the liking and convenience of the student from the year of entry to the programme. However, the minimum hours' requirement should be fulfilled. Activity Points (non-credit) donot affect SGPA/CGPA and shall not be considered for vertical progression.

Eligibility for UG Certificate:

A. **Undergraduate Certificate course will be offered by all departments of SoS(E&T), GGV.**
B. **For applicability of UG Certificate, the candidate who wants to exit after completing 1st year (02 semesters) BTech degree with 10 credits of skill-based courses lasting two months, including atleast 06 credits job specific internship/apprenticeship with NHEQF level 5/UCF level 4.5.**
C. **A student shall report to the concerned Head on or before the date notified by the Department/School/University, if he/she is interested to exit with UG Certificate**

New Course Introduced

SCHEME FOR EXAMINATION
B. TECH (FOUR YEAR) DEGREE
COURSE COMPUTER SCIENCE AND ENGG
SCHOOL OF STUDIES IN ENGINEERING & TECHNOLOGY
GURU GHASIDAS VISHWAVIDYALAYA
THIRD YEAR, SEMESTER - V
W.E.F. SESSION 2022-23

Branch: - Computer Science & Engg. **Year: III** **Sem- V**

S. No.	Code no.	Subject	Periods			Evaluation Scheme			Credits
			L	T	P	IA	ESE	Total	
1	CS205TES05	Microprocessor and Interfaces	3	0	0	30	70	100	3
2	CS205TPC08	Relational Database Management System	3	0	0	30	70	100	3
3	CS205TPC09	Formal Language and Automata Theory	3	0	0	30	70	100	3
4	CS205TPC10	Parallel Computing	3	0	0	30	70	100	3
5	CS205TPEX	Professional Elective-I	3	0	0	30	70	100	3
	PRACTICAL								
1	CS205PPC05	Relational Database Management System Lab	0	0	3	30	20	50	1.5
2	CS205PPC06	Parallel Computing Lab	0	0	3	30	20	50	1.5
3	CS205PPR01	Minor Project- I	0	0	3	30	20	50	1.5
		Total							**19.5**

Professional Elective-I Subject V Sem.			
S. No.	Subject Code	Subject	Credits
1	CS205TPE01	Software Engineering	3
2	CS205TPE02	Information Theory & coding	3
3	CS205TPE03	Mobile Communication	3
4	CS205TPE04	Multimedia System Design	3

SCHEME FOR EXAMINATION
B. TECH (FOUR YEAR) DEGREE
COURSE COMPUTER SCIENCE AND ENGG
SCHOOL OF STUDIES IN ENGINEERING & TECHNOLOGY
GURU GHASIDAS VISHWAVIDYALAYA
THIRD YEAR, SEMESTER - VI
W.E.F. SESSION 2022-23

S.No.	Code no.	Subject	Periods			Evaluation Scheme			Credits
			L	T	P	IA	ESE	Total	
1	CS206TPC11	Design and Analysis of Algorithms	3	0	0	30	70	100	3
2	CS206TPC12	Java	3	0	0	30	70	100	3
3	CS206TPC13	Digital Image Processing	3	0	0	30	70	100	3
4	CS206TPEX	Professional Elective-I	3	0	0	30	70	100	3
5	CS206TPEX	Professional Elective-II	3	0	0	30	70	100	3
6	CS206TOEX	Open Elective-I	3	0	0	30	70	100	3
	PRACTICAL								
1	CS206PPC07	Design and Analysis of Algorithms Lab	0	0	3	30	20	50	1.5
2	CS206PPC08	Java Lab	0	0	3	30	20	50	1.5
3	CS206PPR02	Minor Project-II	0	0	3	30	20	50	1.5
		Total							**22.5**

W.E.F. SESSION 2022-23

Branch: - Computer Science & Engg. Year: III Sem- VI

Professional Elective-I & II Subject VI Sem.				Open Elective-I Subject VI Sem.			
S. No	Subject Code	Subject	Credit	S. No.	Subject Code	Subject	Credit
1	CS206TPE05	Management Information System	3	1	CH206TOE01	Industrial utilities andsafety	3
2	CS206TPE06	Robotics	3	2	CE206TOE01	Metro systems andEngineering	3
3	CS206TPE07	Artificial Intelligence	3	3	CS206TOE01	Object Oriented Programming with C++	3
4	CS206TPE08	Software Testing and Quality Assurance	3	4	EC206TOE01	Introduction to Electronics and Circuits	3
				5.	IP206TOE01	Operation Research	3
				6.	IT206TOE01	Computer Graphics	3
				7.	ME206TOE01	Automobile Engineering	3

SYLLABUS	(SEMESTER-I)	Periods/ Week			Internal Assessment (IA)				ESE	Grand Total	Credits
Subject Code:	ECUATH2 (for ECE) CSUATH2 (for CSE) ITUATH2 (for IT)	L	T	P	CT-1	CT-II	Attendance & Assignments	TOTAL	-	50	1
Subject:	HUMAN VALUES & ETHICS	1	0	-	20	20	10	50			

COURSE OBJECTIVE:

1. To create an awareness on Engineering Ethics and Human Values.
2. To understand social responsibility of an engineer.
3. To appreciate ethical dilemma while discharging duties in professional life.

UNIT I: Introduction to Value Education

1. Value Education, Definition, Concept and Need for Value Education.
2. The Content and Process of Value Education.
3. Basic Guidelines for Value Education.
4. Self exploration as a means of Value Education.
5. Happiness and Prosperity as parts of Value Education.

UNIT II: Harmony in the Human Being

1. Human Being is more than just the Body.
2. Harmony of the Self ('I') with the Body.
3. Understanding Myself as Co-existence of the Self and the Body.
4. Understanding Needs of the Self and the needs of the Body.
5. Understanding the activities in the Self and the activities in the Body.

UNIT III: Harmony in the Family and Society and Harmony in the Nature

1. Family as a basic unit of Human Interaction and Values in Relationships.
2. The Basics for Respect and today's Crisis: Affection, e, Guidance, Reverence, Glory,Gratitude and Love.
3. Comprehensive Human Goal: The Five Dimensions of Human Endeavour.
4. Harmony in Nature: The Four Orders in Nature.
5. The Holistic Perception of Harmony in Existence.

UNIT IV: Social Ethics

1. The Basics for Ethical Human Conduct.
2. Defects in Ethical Human Conduct.
3. Holistic Alternative and Universal Order.
4. Universal Human Order and Ethical Conduct.
5. Human Rights violation and Social Disparities.

UNIT V: Professional Ethics

1. Value based Life and Profession.
2. Professional Ethics and Right Understanding.
3. Competence in Professional Ethics.
4. Issues in Professional Ethics – The Current Scenario.
5. Vision for Holistic Technologies, Production System and Management Models.

TEXT/ REFERENCE BOOKS:

1.A.NTripathy, New Age International Publishers, 2003.
2.Bajpai. B. L , , New Royal Book Co, Lucknow, Reprinted, 2004
3.Bertrand Russell Human Society in Ethics & Politics
4.Corliss Lamont, Philosophy of Humanism
5.Gaur. R.R. ,Sangal. R, Bagaria. G.P, A Foundation Course in Value Education, Excel Books, 2009.
6.Gaur. R.R. ,Sangal. R ,Bagaria. G.P, Teachers Manual Excel Books, 2009.
7.I.C. Sharma . Ethical Philosophy of India Nagin & co Julundhar
8.Mortimer. J. Adler, – Whatman has made of man
9.William Lilly Introduction to Ethic Allied Publisher

COURSE OUTCOME:

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

1. Understand the significance of value inputs in a classroom and start applying them in their life and profession
2. Distinguish between values and skills, happiness and accumulation of physical facilities, the Self and the Body, Intention and Competence of an individual, etc.
3. Understand the role of a human being in ensuring harmony in society and nature.
4. Distinguish between ethical and unethical practices, and start working out the strategy to actualize a harmonious environment wherever they work.

SYLLABUS	(SEMESTER-I)	Periods/ Week			Internal Assessment (IA)				ESE	Grand Total	Credits
Subject Code:	ELUATH1	L	T	P	CT-1	CT-II	Attendance & Assignments	TOTAL	60	100	03
Subject:	ENGLISH FOR COMMUNICATION	3	0	-	15	15	10	40			

COURSE OBJECTIVE:

- To build up word power, to brush up the knowledge of English grammar, to develop good writing and speaking skills in the students

UNIT I: Vocabulary Building: The concept of Word Formation, Root words from foreign languages and their use in English, Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives. Synonyms, antonyms, and standard abbreviations.

UNIT II: Basic Writing Skills: Sentence Structures, Use of phrases and clauses in sentences, Importance of proper punctuation, Creating coherence, Organizing principles of paragraphs in documents, Techniques for writing precisely

UNIT III: Identifying Common Errors in Writing: Subject-verb agreement, Noun-pronoun agreement, Misplaced modifiers, Articles, Prepositions, Redundancies,Clichés

UNIT IV: Nature and Style of sensible Writing: Describing, Defining, Classifying, Providing examples or evidence, Writing introduction and conclusion.

UNIT V: Writing Practices: Comprehension, Précis Writing, Essay Writing. Oral Communication (This unit involves interactive practice sessions in Language Lab), Listening Comprehension, Pronunciation, Intonation, Stress and Rhythm, Common Everyday Situations: Conversations and Dialogues, Communication at Workplace, Interviews, Formal Presentations

COURSE OUTCOME: At the end of the course students will be able to learn a lot of new words. They also learnt the particularities and peculiarities of English grammar. As a result, they could speak and write English with the least possible error.

TEXT/ REFERENCE BOOKS:

1. Practical English Usage. Michael Swan. OUP.1995.
2. Remedial English Grammar. F.T. Wood. Macmillan.2007 (iii)On Writing Well. William Zinsser. Harper Resource Book.2001
3. Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press.2006.
4. Communication Skills. Sanjay Kumar and PushpLata. Oxford University Press.2011.
5. Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press

SYLLABUS	(SEMESTER-I)	Periods/ Week			Internal Assessment (IA)				ESE	Grand Total	Credits
Subject Code:	AMUATB4	L	T	P	CT-1	CT-II	Attendance & Assignments	TOTAL	60	100	04
Subject:	ENGINEERING MATHEMATICS - B	3	1	-	15	15	10	40			

UNIT I: Linear Algebra

Vector space, linear dependence and linear independence of vectors, linear transformations, rank and inverse by elementary transformations, system of linear equations – consistency and inconsistency, eigen value and eigen vectors, Caley-Hamilton theorem and its application to find the inverse.

UNIT II: Theory of equations

Polynomial and polynomial equations, division algorithm, roots of equations, remainder theorem, factor theorem, synthetic division, fundamental theorem of algebra, multiplication of roots, descarte's rule of sign, Descarte's method.

UNIT III: Vector Calculus

Vector functions, differentiation of vectors, velocity and acceleration, scalar and vector fieldm gradient of scalar field, directional derivative, properties of gradient, divergence of vector, curl of vector, point function, properties of divergence and curl, integration of vector function, line integral, surface integral, Green's theorem, gauss theorem, Stoke's theorem (without proof) and their simple applications,

UNIT IV: Complex Number

Complex numbers and its properties, conjugate complex numbers, standard form of complex numbers, De-Moivre's theorem, Roots of complex numbers, exponential function of complex variable, circular form of complex variable, Hyperbolic function of complex numbers, Logarithmic function of complex numbers.

UNIT V: Infinite Series

Sequence, convergent, divergent, oscillating sequence, infinite series, behavior of infinite series, ratio test, root test, comparison test, Raabe's test, Logarithmic test.

TEXT/ REFERENCE BOOKS:

1. N.P. Bali, A Textbook of Engineering Mathematics, Laxmi publications, 10th edition, 2016.
2. H.K. Das, Higher Engineering Mathematics, S. Chand, 2014
3. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 44th edition

SYLLABUS	(SEMESTER-I)	Periods/ Week			Internal Assessment (IA)				ESE	Grand Total	Credits
Subject Code:	PPUATB2	L	T	P	CT-1	CT-II	Attendance & Assignments	TOTAL	60	100	04
Subject:	ENGINEERING PHYSICS	3	1	-	15	15	10	40			

COURSE OBJECTIVE:

- To know the basic principles, effects and applications such as physical, optical parameters used for engineering applications.
- To learn about various laws and applications of electromagnetic theory.
- To know the basic structure, working principles and applications of lasers and optical fibre communication.
- To know the basics of semiconductor physics, semiconductor materials and devices and its characterization for advance technological applications
- To familiarize the basis of quantum theory and to make students to solve the physical problems for advancement of the technology.

UNIT I: Optics: Interference and Diffraction: Introduction, Young's experiment theory of interference, Coherent and non-coherent sources, Fresnel's Bi- prism and Newton's ring experiment. Diffraction of light, Fresnel and Fraunhofer's diffraction, diffraction due to plane diffraction grating.

UNIT II: Electromagnetic Theory: Coulomb's law electrostatics field and potential, electric flux, Gauss' law, Poisson's and Laplace's equation. Equation of continuity for charge conservation, Ampere's and Faraday's laws, Maxwell's Electromagnetic equations.

UNIT III: Laser and Fiber optics: Introduction, elementary idea of spontaneous and stimulated emission, active medium population inversion, Einstein's coefficients, Types of lasers and important applications of lasers. Introduction to optical fibers, basic principles of optical fiber, critical angle numerical aperture, maximum acceptance angle, classification of optical fiber.

UNIT IV: Semiconductor physics and Devices: Formation of energy in solids, Energy band gap of metals, insulators and semiconductors, classification of semiconductor: Intrinsic and Extrinsic semiconductors, Fermi levels in intrinsic and extrinsic semiconductors, Electrical conductivity in conductors and semiconductors, working of P-N junction diodes and bipolar junction transistor.

UNIT V: Introduction to Quantum Mechanics: Introduction to QuantumMechanics, photoelectric effect, Compton effect, wave-particle duality, uncertainty principle, wave function, De-Broglie waves, phase and Group velocity, Davisson and Germer experiment, Schrodinger wave equation, particle in a box (I-Dimensional)

COURSE OUTCOME: At the end of the course, students will be able to:

- Student's ability to understand the basic principles and applications of physical optics for physical parameters measurements such as length, thickness, aperture size etc.
- Student's will be able to design, characterized the lasers and optical fibers and their effective utilization in optical communications, imaging etc.
- Students demonstrate appropriate competence and working knowledge of laws of electromagnetic theory and semiconductor physics and devices for their advance applications.

TEXT/ REFERENCE BOOKS:

1. Applied physics-I and II By Navneet Gupta, Dhanpat Rai &Co.
2. Engg. Physics by S.K.Srivastava and R.A. Yadav, New Age Pub. NewDelhi
3. Engg. Physics by Uma Mukherjee, NarosaPublication.
4. Engg. Physics by M.N. Avadhanulu, S. ChandPub.
5. Electricity and Magnetism by Rangwala and Mahajan, Tata McGraw Hill.1998
6. Concepts of Physics Part-II by H.C.Verma, BharatiBhawan (P&D),1998
7. Modern physics by Beiser, McGraw Hill Inc. New York, Publication1995
8. Modern physics by Mani and Mehta, East-West PressPvt.Ltd.1998
9. Introduction to Electrodynamics, DavidGriffith
10. J. Singh, Semiconductor Optoelectronics: Physics and Technology, McGraw-HillInc.(1995).
11. B.E.A. Saleh and M.C. Teich, Fundamentals of Photonics, John Wiley & Sons.Inc.2007).
12. S.M. Sze, Semiconductor Devices: physics and Technology, Wiley(2008)
13. Yariv and p.yeh, Photonics Optical Electronics in Modern Communications, Oxford University press, New York(2007)
14. P. Bhattacharya, Semiconductor Optoelectronic Devices, prentice Hall of India(1997)
15. Online course: "Semiconductor Optoelectronics" by M. R. Shenoy onNPTEL.
16. Online course: "Optoelectronic Materials and Devices" by Monica Katiyar and Deepak onNPTEL.

SYLLABUS	(SEMESTER-I)	Periods/ Week			Internal Assessment (IA)				ESE	Grand Total	Credits
Subject Code:	ITUATE2	L	T	P	CT-1	CT-II	Attendance & Assignments	TOTAL	60	100	03
Subject:	INTRODUCTION TO INFORMATION TECHNOLOGY	3	-	-	15	15	10	40			

COURSE OBJECTIVE:

- To illustrate the concepts of cyber security and familiar and aware with various cybercrimes attack and their prevention.
- To describe the different services model of Cloud Computing and understand Understanding of different evaluating computer model of cloud computing.
- To relate theoretical concepts with problem solving approach in IoT and assess the comparative advantages and disadvantages of Virtualization technology.
- To provides the basic knowledge of use appropriate storage and access structures. the student must be able to analyse familiar with the machine learning algorithms and applications of various data science.
- To integrate classroom learning into an everyday communicative activity in distributed system. Familiar with various web services activity.

UNIT I: Cyber Security Fundamentals Security Concepts: Authentication, Authorization, Non-repudiation, Confidentiality, Integrity, availability. Cyber Crimes and Criminals: Definition of cyber-crime, types of cyber-crimes and types of cyber-criminals.

UNIT II: Cloud Computing Fundamentals: Motivation for Cloud Computing, The Need for Cloud Computing, Defining Cloud Computing, Definition of Cloud computing, Cloud Computing Is a Service, Cloud Computing Is a Platform, Principles of Cloud computing, Five Essential Characteristics, Four Cloud Deployment Models.

UNIT III: Internet of Things–Definition and Characteristics of IoT, Physical Design of IoT – IoT Protocols, IoT communication models, IOT Communication APIs IoT enabled Technologies – Wireless Sensor Networks, Cloud Computing, Big data analytics, Communication protocols, Embedded Systems, IoT Levels and Templates Domain Specific IoTs – Home, City, Environment, Energy, Retail, Logistics, Agriculture, Industry, health and Lifestyle.

UNIT IV: Data Science: -Introduction and Importance of Data Science, Statistics, Information Visualisation, Data Mining, Data Structures, and Data Manipulation, Algorithms used in Machine Learning, Data Scientist Roles and Responsibilities. Data Acquisition and Data Science Life Cycle.

UNIT V: Evaluation and Emergence of Web Services – Evaluation of Distributed Computing, Core Distributed Technologies, Challenges in Distributed System, and Introduction to web services, Web Services Architecture, Basic steps of implementing web services

COURSE OUTCOME:

1. Ability to learn about cybercrimes and how they are planned.
2. Ability to understand the cloud computing concepts and services model.
3. Ability to understand Internet of Things –Definition and Characteristics of IoT.
4. Explain how data is collected, managed and stored for data science. Understand the key concepts in data science, including their real-world applications and the toolkit used by data scientists
5. Understand the details of web services Evolution of Distributed Computing.

TEXT/ REFERENCE BOOKS:

1. Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Nina Godbole and Sunil Belapure, Wiley INDIA.
2. Introduction to Cyber Security, Chwan-Hwa(john) Wu,J.David Irwin.CRC Press T&F Group
3. Cloud Computing Principles and Paradigm by Rajashekar Buyya, James Broberg, Andhrz M. Wiley 2011.
4. Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547.
5. Mining of Massive Datasets, by Leskovec, Rajaraman, and Ullman.
6. R. Nagappan, R.Scokzylas, R.P. Sriganesh, Developing Web Services, Wiley India.

SYLLABUS	(SEMESTER-I)	Periods/ Week			Internal Assessment (IA)				ESE	Grand Total	Credits
Subject Code:	ECUATE3	L	T	P	CT-1	CT-II	Attendance & Assignments	TOTAL	60	100	03
Subject:	BASIC ELECTRICAL ENGINEERING	3	-	-	15	15	10	40			

COURSE OBJECTIVE:

- To analyse basic concepts of DC and AC circuits.
- To explain construction and operation of transformers,
- To explain the concept and working of DC machines and Induction motor.
- To explain electric installation, wiring, billing and safety measures.

UNIT I: DC CIRCUITS: Electrical circuit elements (R, L and C), voltage and current sources, Ohms Law, Kirchhoff's current and voltage laws, analysis of simple circuits with dc excitation. Superposition, Thevenin andNorton Theorems. Time-domain analysis of first-order RL and RC circuits. Mesh & nodal analysis, Star-Delta transformation and circuits.

UNIT II: AC CIRCUITS: Representation of sinusoidal waveforms, average and rms values, phasor representation, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), resonance. Three-phase balanced circuits, voltage and current relations in star and delta connections. Three-phase power measurement- Two- Wattmeter method.

UNIT III: ELECTROMAGNETISM: Concept of Magnetic effect of electric current, faraday's law of electromagnetism. BH curve, Analogy of Electric and magnetic Circuits. Concept of flux flow in magnetic circuits. TRANSFORMERS Construction, classification, ideal and practical transformer, equivalent circuit, losses in transformers, tests, voltage regulation and efficiency. Introduction to three phase transformers.

UNIT IV: DC AND AC MACHINES: Construction, Working Principle, losses and efficiency of DC Machines and three phase Induction Machine, Torque Equations, DC motor: Principle of operation, speed control.

UNIT V: ELECTRICAL INSTALLATIONS& SAFETY: Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, Earthing – Types of earthing and its importance. Electrical wiring: Conduit and concealed wiring, Two way and Three-way control of lamps. Safety precautions for electrical appliances. Calculations for energy consumption and billing.

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

CO1: Analyse basic DC and AC electric circuits.

CO2: Explain the working principles of transformers and its tests.

CO3: Explain the concepts of DC and AC machines and their applications

CO4: Understand the wiring methods, working principles of circuit protective devices, electrical billing and safety measures.

TEXT/ REFERENCE BOOKS:

1. D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2010.
2. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.
3. B L Theraja and AK Theraja," A Textbook of Electrical Technology- Vol-I & II, S. CHAND &Co ltd, 2013.
4. E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.
5. P.V. Prasad et al., Basic Electrical Engineering, Cengage 2019

SYLLABUS	(SEMESTER-I)	Periods/ Week			INTERNAL ASSESSMENT (IA)			ESE	Grand total	Credits
Subject Code:	ECUALE3	L	T	P	IA	MSE	TOTAL	25	50	01
Subject:	BASIC ELECTRICAL ENGINEERING LABORATORY	-	-	2	25	--	25			

COURSE OBJECTIVE:

- To understand basic instruments and safety measures.
- To practically provide the concept of different theorems.
- To understand the concept of RLC circuits.
- To understand the working of transformers
- To understand the concept of DC and AC machines.

List of experiments/demonstrations:

- Basic safety precautions. Introduction and use of measuring instruments – voltmeter, ammeter, multi-meter, oscilloscope. Real-life resistors, capacitors and inductors.
- To verify various theorems on DC circuits
- Measuring the steady-state and transient time-response of R-L, R-C, and R-L-C circuits to a step change in voltage (transient may be observed on a storage oscilloscope).
- Sinusoidal steady state response of R-L-C circuits – Single-phase and Three-phase circuit measurement
- Transformers: Polarity test, OC & SC tests. Loading of a transformer: measurement of primary and secondary voltages and currents and power.
- Demonstration of cut-out sections of machines: dc machine (commutator-brush arrangement), induction machine (squirrel cage rotor), and single-phase induction machine.

COURSE OUTCOME:

At the end of the course students will be able to:

- Acquire knowledge about different types of meters and construct circuits and measure different electrical quantities.
- Analyse the DC circuits
- Analyse Single Phase and Three phase AC Circuits, the representation of alternating quantities and determining the power in these circuits
- Work on machines like transformers
- Understand the construction of DC and AC machines

SYLLABUS	(SEMESTER-I)	Periods/ Week			INTERNAL ASSESSMENT (IA)			ESE	Grand total	Credits
Subject Code:	PPUALB2	L	T	P	IA	MSE	TOTAL	25	50	01
Subject:	ENGINEERING PHYSICS LABORATORY	-	-	2	25	--	25			

COURSE OBJECTIVE:

- To learn and perform the various practical related to optical components characterization, semiconductor material and devices characterization and know their applications in advance areas such as communication, industries, defence, navigationetc.

List of experiments/demonstrations:

1. To determine the wavelength of sodium light with help of Fresnel'sBi-prism.
2. To determine the refractive index and dispersive power of the material of prism with the help of spectrometer.
3. To determine the sodium light by Newton's ringmethod.
4. To determine the wavelength of sodium light by plane diffraction grating usingspectrometer.
5. To demonstrate the diffraction pattern and determine the wavelength of different colours of mercury (white) light using plane diffraction grating andspectrometer.
6. To determine the wavelength and number of line per cm on a diffraction grating using semiconductor laserdiode.
7. To determine the specific rotation of sugar solution with the help ofpolarimeter.
8. Determine the width of the single slit and diameter of circular aperture using Fraunhofer diffraction pattern produced by semiconductor laserdiode.
9. To determine the energy band gap (E_g) of a semiconductor material using P-N junctiondiode.
10. To determine the e/m ratio by the Thomson'smethod.
11. To study the P-N junction diode characteristics, in forwarded and reverse biasconditions.
12. To study the Zener diodecharacteristics.
13. To study the characteristics and gain of Transistor in C-B and C-Emode.
14. Determine the Planck'sconstant.

COURSE OUTCOME: At the end of the course students will be able to:

- Know about basic optical facts and phenomenon, characterization of optical components anddevices
- To know the basic semiconductor materials and devices and theirapplications
- To know how the performance of semiconductor devices can beimproves.

SYLLABUS	(SEMESTER-I)	Periods/ Week			INTERNAL ASSESSMENT (IA)			ESE	Grand total	Credits
Subject Code:	MEUALL1	L	T	P	IA	MSE	TOTAL	25	50	01
Subject:	ENGINEERING GRAPHICS	1	-	3	25	--	25			

COURSE OBJECTIVE:

- To learn the basic of Engineering Drawing and Orthographic Projections
- To learn the Sections and Sectional Views of Right Angular Solids
- To learn the Isometric Projections covering and overview of Computer Graphics

UNIT I: Introduction Engineering Graphics and Engineering Curves: Principles of engineering graphics and their significance – drawing instruments and their use – conventions in drawing – lettering – BIS conventions. Dimensioning rules, geometrical construction. Engineering Curves - Conic Sections, Special Curves-Cycloids, Epicycloids, Hypocycloids, Involutes and trochoid.

UNIT II: Projection of Points, Straight lines and Planes: Principles of orthographic projections – conventions – first and third angle projections. Projections of points and lines inclined to both the planes. Projections of regular planes, inclined to both planes

UNIT III: Projections Solids: Introduction, Type of solid, Projections of solids in simple position, Projection of solids with axes inclined to one of the reference planes and parallel to the other, Projections of solids with axes inclined to both H.P. and the V.P.

UNIT IV: Section of Solids and Development of Surfaces: Sectioning of regular solids - Section planes perpendicular to one plane and parallel or inclined to other plane - Development of surfaces of right, regular solids – development of prisms, cylinders, pyramids, cones and their parts.

UNIT V: Isometric Projections and Orthographic Views: Principles of Isometric Projections-Isometric Scale- Isometric Views Conventions-Plane Figures, Simple and Compound Solids. Conversion of isometric views to orthographic views. Conversion of orthographic views to isometric projections, vice-versa. Introduction to perspective projection. **Computer Aided Drafting:** Introduction to computer aided drafting package to make 2-D drawings. Demonstration purpose only - not to be included in examinations.

COURSE OUTCOME: At the end of the course, the student shall be able to:

1. Draw engineering curves, orthographic projections of lines, planes and solids.
2. Draw sections of solids including cylinders, cones, prisms and pyramids.
3. Make development of surfaces, Orthographic and Isometric projections
4. Overview of Computer Graphics.

TEXT/ REFERENCE BOOKS:

1. Bhatt N.D., Panchal V.M. & Ingle P.R., (2014), Engineering Drawing, Charotar Publishing House
2. Shah, M.B. & Rana B.C. (2008), Engineering Drawing and Computer Graphics, PearsonEducation
3. Agrawal B. & Agrawal C. M. (2012), Engineering Graphics, TMH Publication
4. Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech Publishers
5. CAD Software Theory and User Manuals

SYLLABUS	(SEMESTER-I)	Periods/ Week			INTERNAL ASSESSMENT (IA)			ESE Viva/ Assessment	Grand total	Credits
Subject Code:	NSUALS1	L	T	P	Attendance	Activities	TOTAL	25	50	01
Subject:	NSS	-	-	2	5	20	25			

S.N.	PROGRAM HEADS	HOURS/SEM
1	Cleaning program	06
2	Plantation	06
3	Health Camp/Special Days celebration	10
4	Awareness program/Rally	06

SYLLABUS	(SEMESTER-II)	Periods/ Week			Internal Assessment (IA)				ESE	Grand Total	Credits
Subject Code:	LAUBTC1	L	T	P	CT-1	CT-II	Attendance & Assignments	TOTAL	-	50	01
Subject:	INDIAN CONSTITUTION	1	-	-	20	20	10	50			

COURSE OBJECTIVE:

- To the importance of preamble of the constitution of India.
- To understand the fundamental rights and duty as a citizen of India.
- To understand the functioning of union and state government and their inter-relationship.

UNIT I: Introduction: Constitution-meaning of the term, Sources and constitutional theory, Features, Citizenship. Preamble.

UNIT II: Fundamental Rights and Duties: Fundamental Rights, Fundamental Duties, Directive Principles of State Policy

UNIT III: Union Government: Structure of Indian Union: Federalism, Centre-State relationship President: Role. Power and position, Prime Minister and council of ministers, Cabinet and Central Secretariat, Lok Sabha. Rajya Sabha

UNIT IV: State Government: Governor: Role and position, Chief Minister and council of ministers, State Secretariat

UNIT V: Relationship between Centre and States: Distribution of Legislative Powers, Administrative Relations, Coordination between States

COURSE OUTCOME: At the end of the course students will be able to:

- Describe the salient features of the Indian Constitution
- List the Fundamental Rights and Fundamental Duties of Indian citizens
- Describe the Directive Principles of State Policy and their significance

TEXT/ REFERENCE BOOKS:

1. Constitution of India, V.N. Shukla
2. The Constitutional Law of India, J.N. Pandey
3. Indian Constitutional Law. M.P. Jain

SYLLABUS	(SEMESTER-II)	Periods/ Week			Internal Assessment (IA)				ESE	Grand Total	Credits
Subject Code:	FOUBTC2	L	T	P	CT-1	CT-II	Attendance & Assignments	TOTAL	60	100	02
Subject:	ENVIRONMENTAL SCIENCE AND ECOLOGY	2	-	-	15	15	10	40			

UNIT I: Introduction: Environment - Components of Environment Ecosystem: Types & Structure of Ecosystem, Balanced ecosystem Human Activities – Food, Shelter, Economic & Social Security.
Definition, Scope and basic principles of ecology and environment, Fundamentals of Ecology and Ecosystem – Structural and Functional Components. Food chain & Food webs. Ecological pyramids; Energy flow

UNIT II: Air Pollution & Automobile Pollution: Definition, Effects – Global Warming, Acid rain & Ozone layer depletion, controlling measures.

UNIT III: Solid Waste Management, E - Waste Management & Biomedical Waste Management - Sources, Characteristics & Disposal methods.

UNIT IV: Natural Resources, Water resources – Availability & Quality aspects, Water borne diseases & water induced diseases, Fluoride problem in drinking water, Mineral resources, Forest Wealth, Material Cycles – Carbon Cycle, Nitrogen Cycle & Sulphur Cycle.

UNIT V: Energy – Different types of energy, Conventional sources & Non Conventional sources of energy: solar energy, Hydro electric energy, Wind Energy, Nuclear energy, Biomass & Biogas Fossil Fuels, Hydrogen as an alternative energy.

TEXT/ REFERENCE BOOKS:

1. Fundamentals of Ecology (3rd Ed.) 2001- MC Dash, Tata - McGraw Hill, New Delhi.
2. Introduction to Environmental Engg. (1991). - GM Masters, Prentice Hall of India.
3. Benny Joseph (2005), "Environmental Studies", Tata McGraw – Hill Publishing Company Limited.
4. R.J.Ranjit Daniels and Jagadish Krishnaswamy, (2009), "Environmental Studies",Wiley India Private Ltd., New Delhi.
5. R Rajagopalan, "Environmental Studies – From Crisis to Cure",Oxford University Press, 2005,
6. Aloka Debi, "Environmental Science and Engineering", Universities Press (India) Pvt. Ltd. 2012

SYLLABUS	(SEMESTER-II)	Periods/ Week			Internal Assessment (IA)				ESE	Grand Total	Credits
Subject Code:	AMUBTB1	L	T	P	CT-1	CT-II	Attendance & Assignments	TOTAL	60	100	04
Subject:	ENGINEERING MATHEMATICS - A	3	1	-	15	15	10	40			

UNIT I: Differential Calculus: Leibnitz theorem, Roll's theorem, Lagrange's theorem, Mean value theorem, Expansions of functions by McLaurian and Taylor's series, Tangents and normal, Maxima and minima

UNIT II: Indeterminate forms, Asymptotes, Radius of curvature, Partial differentiation, Total differentiation

UNIT III: Integral Calculus: Reduction formulae, Curve tracing, Area, Volume, Length, Surface area, Double and triple integrals, Gamma and beta function.

UNIT IV: Differential Equations: Differential equations of first order, Linear differential equation of higher order with constant coefficient, Equations reducible to linear equations with constant coefficients, Cauchy's homogeneous linear equations, Application of linear differential equations, Simultaneous differential equations.

UNIT V: Series solution of differential equations about ordinary point, Partial differential equations, linear homogeneous partial differential equations, application of partial differential equations: One dimensional heat equation and wave equation.

TEXT/ REFERENCE BOOKS:

1. N.P. Bali, A Textbook of Engineering Mathematics, Laxmi publications, 10th edition, 2016.
2. H.K. Das, Higher Engineering Mathematics, S. Chand, 2014
3. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 44th edition

SYLLABUS	(SEMESTER-II)	Periods/ Week			Internal Assessment (IA)				ESE	Grand Total	Credits
Subject Code:	CYUBTB3	L	T	P	CT-1	CT-II	Attendance & Assignments	TOTAL	60	100	03
Subject:	ENGINEERING CHEMISTRY	3	-	-	15	15	10	40			

COURSE OBJECTIVE:

To make aware and enrich the the students about the basic concept and understanding of chemical concepts of basic Chemistry and spectroscopic techniques.

UNIT I: Concept of Quantum Energy and Spectroscopy: Quantization of Energy, Regions of spectrum. Electronic Spectroscopy: Electronic Transition, Woodward Fieser rules for calculating λ_{max} of conjugated dienes & α, β-unsaturated carbonyl compound, various shifts in λ_{max} and intensities. Infra-Red Spectroscopy: Conditions for Infra-Red Spectroscopy, Molecular vibrations & factors affecting Infra-Red frequencies.

UNIT II: Chemical Bonding in Molecules: Introduction of chemical bonding, VSEPER Theory, V.B.Theory and Molecular Orbital Theory. Energy level diagrams of diatomic molecules and ions.

UNIT III: Concept of Chirality, Enantiomers, Diastereomers,Meso-compounds and Racemic mixtures. Conformation of Acyclic hydrocarbons (Ethane, Propane & n-Butane) and cyclic hydrocarbon (Cyclohexane), Plane of symmetry, Centre of symmetry, Absolute and Relative Configuration (R &S, D & L and E & Z).

UNIT IV: Reactivity of Organic Molecules, Factors influencing acidity, basicity and nucleophilicity of molecules, kinetic vs thermodynamic control of reactions.

UNIT V: Strategy for Synthesis of Organic Compounds: Reaction intermediates: Stability of Free Radicle, Carbocation and Carbanion. Introduction to reaction eg. Elimination and Substitution, Mechanisms of some named reactions.

COURSE OUTCOME: At the end of the course students will be able to:

Understand and solve the practical problems of their higher Engineering classes on the basis of understanding of Chemistry developed in their B. Tech. I sem classes.

TEXT/ REFERENCE BOOKS:

1. Engineering Chemistry by Jain and Jain; Dhanpat Rai PublicationCo.
2. Engineering Chemistry by Shikha Agarwal; Cambridge University Press, 2015edition.
3. Engineering Chemistry of Wiley India Pvt. Ltd., Vairam and others, 2014 edition(second).
4. Engineering Chemistry by Prasanth Rath, Cengage Learning, 2015edition.
5. A textbook of Engineering Chemistry by S. S. Dara; S. Chand & Co Ltd., LatestEdition
6. Applied Chemistry by H.D. Gesser, SpringerPublishers
7. Textbook of Nano-science and nanotechnology by B.S. Murthy, P. Shankar and others, University Press,IIM
8. B. Siva Shankar, "Engineering Chemistry", Tata Mc Graw Hill Publishing Limited, 3rd Edition, 2015.
9. S. S. Dara, Mukkanti, "Text of Engineering Chemistry", S. Chand & Co, New Delhi, 12th Edition, 2006.
10. C. V. Agarwal, C. P. Murthy, A. Naidu, "Chemistry of Engineering Materials", Wiley India, 5th Edition, 2013.

SYLLABUS	(SEMESTER-II)	Periods/ Week			Internal Assessment (IA)				ESE	Grand Total	Credits
Subject Code:	CSUBTE5	L	T	P	CT-1	CT-II	Attendance & Assignments	TOTAL	60	100	03
Subject:	COMPUTER PROGRAMMING	3	-	-	15	15	10	40			

COURSE OBJECTIVE:

- To understand the basic of Idea of Algorithm.
- To understand the programing concept of Arithmetic expressions and Basic Algorithms
- To learn the Functions and Structure of array.

UNIT I: Introduction to Programming: Introduction to components of a computer system (disks, memory, processor, where a program is stored and executed, operating system, compilers etc.) **- Idea of Algorithm:**steps to solve logical and numerical problems. Representation of Algorithm: Flowchart/Pseudo code with examples.From algorithms to programs; source code, variables (with data types) variables and memory locations,Syntax and Logical Errors in compilation, object and executablecode.
UNIT II: Arithmetic expressions and precedence: Conditional Branching and Loops, Writing and evaluation of conditionals and consequent branching Iteration and loops, Arrays(1-D,2-D) Character arrays and strings.
UNIT III: Basic Algorithms: Searching, concept of binary search etc, Basic Sorting Algorithms Bubble sort etc,Finding roots of equations, introduction of Algorithm complexity
UNIT IV: Function: Functions (including using built in libraries), Parameter passing in functions, call by value, passing arrays to functions: idea of call by reference binary search etc. Recursion functions Recursion, as a different way of solving problems. Example programs, such as, Finding Factorial, Fibonacci series, etc.
UNIT V: Structure: Structures, Defining structures and Array of Structures, Pointers Idea of pointers, defining pointers, Use of Pointers in self-referential structures, notion of linked list (no implementation)

COURSE OUTCOME: At the end of the course students will be able to:

- Develop the algorithm and programmers for various applications using Arithmetic expressions, arrays, pointers and Functions.

TEXT/ REFERENCE BOOKS:

1. Byron Gottfried, Schaum's Outline of Programming with C,McGraw-Hill
2. E. Balaguruswamy, Programming in ANSI C, TataMcGraw-Hill
3. Brian W. Kernighan and Dennis M. Ritchie, the C Programming Language, Prentice Hall of India

SYLLABUS	(SEMESTER-II)	Periods/ Week			Internal Assessment (IA)				ESE	Grand Total	Credits
Subject Code:	ECUBTE7	L	T	P	CT-1	CT-II	Attendance & Assignments	TOTAL	60	100	03
Subject:	INTRODUCTION TO ELECTRONICS & COMMUNICATION ENGINEERING	3	-	-	15	15	10	40			

COURSE OBJECTIVE:

- To equip students with foundational knowledge and a comprehensive overview in the field of electronics and communication engineering.
- To provide students with a fundamental grounding in electronic engineering principles essential for understanding the functionality and utilization of electronic devices, circuits, logic design, and communication systems.
- To cultivate ethical and professional attitudes in first-year engineering students, creating an academic environment that encourages teamwork, the ability to contextualize engineering issues within a broader social framework, and the pursuit of lifelong learning essential for a successful professional career.

UNIT I: Introduction to Electronics Engineering: Outline, Scope and goal of learning electronics engineering, **Introduction to semiconductor devices:** Energy bands in solids, Semiconductor & its classification, Energy band model of semiconductor, Equilibrium carrier concentration inside the energy bands, Basic principle and operation of semiconductor devices-diode, bipolar junction transistor, field effect transistors, Introduction to VLSI.

UNIT II: Applications of Semiconductor Devices: Basic concepts of rectifiers, Filters, Voltage regulators, Amplifiers and Oscillators.

UNIT III: Introduction to Digital Systems: Numbers systems, Number base conversion, Complements, Basic theorems and properties of Boolean algebra, Boolean functions, Logic gates, Logic circuit implementation using diodes and transistors, Reduction of Boolean expressions and implementation with logic gates, Karnaugh's Map and Combinational circuits.

UNIT IV: Transducers and Sensors: Introduction, Passive Electrical Transducers, Resistive Transducers, Resistance Thermometers, Thermistor. Active Electrical Transducers, Piezoelectric Transducer, Photoelectric Transducer.

UNIT V: Basics of Communication System: Definition of signal, Standard test signals, Signals operations and its representation: shifting, folding and scaling, Classification of signals, Definition of system, System classification, System properties: additivity and homogeneity, Causality, Stability, Invertibility. Electromagnetic spectrum used for communication, Fourier transform, Elements of a communication system-transmitter and receiver, Need of modulation, Introduction to analog and digital communication systems, Examples of telecommunication systems-telephone, radio, television, mobile communication and satellite communication.

COURSE OUTCOME: At the end of the course students will be able to:

CO1 Describe the overview of electronics and illustrate the concepts of semiconductor devices.
CO2 Elucidate and analyze the application of semiconductor device.
CO3 Develop competence knowledge to construct basic digital circuit by use of basic gate & its function.
CO4 Illustrates the principle of Transducers and sensors.
CO5 Comprehend the need of communication & explain the different modes of communications from wired to wireless and the computing involved.

TEXT/ REFERENCE BOOKS:

1. M. S. Tyagi, "Introduction to Semiconductor Materials and Devices" Wiley, 2008.
2. D. A. Neamen, "Electronic Circuits," Tata McGrawHill Education, 2006.
3. S. C. Lee, "Digital Circuits and Logic Design," PHI Learning, 2009.
4. J. G. Proakis and M. Salehi, "Fundamentals of Communication Systems," Prentice Hall, 2004.
5. G. Kennedy, B. Davis, "Electronic Communication Systems", TMH, 4th ed., 2008.
6. W. Tomasi, "Advanced Electronic Communication Systems", Pearson/Prentice-Hall, 6th ed., 2004.
7. A. K. Sawhney, "A Course in Electrical and Electronics Measurements and Instrumentation", 18th ed., Dhanpat Rai & Company Private Limited, 2007.

SYLLABUS	(SEMESTER-II)	Periods/ Week			INTERNAL ASSESSMENT (IA)			ESE	Grand total	Credits
Subject Code:	CYUBLB3	L	T	P	IA	MSE	TOTAL	25	50	01
Subject:	ENGINEERING CHEMISTRY LABORATORY	-	-	2	25	--	25			

COURSE OBJECTIVE:

- Application of iodometrically& titration inlab.
- Recognition of different chemicalreaction.
- Advanced lab methods like Spectrophotometry andchromatography

Course Content:

Group – A:

1. Standardization of sodium thiosulphate solution by standard potassium dichromate solution.
2. To determine the Normality and Strength (g/L) of given Ferrous Ammonium Sulphate solution 'A' using standard Ferrous Ammonium Sulphate (N/30) solution 'B' taking KMnO4 solution as an intermediate.
3. To determine the concentration of hypo solution ($Na_2S_2O_3.5H_2O$) iodometrically with given Iodine (N/50) solution.
4. Find out the Temporary hardness of given water sample using 0.01M EDTA solution,buffer solution (pH-10) and EBT as an indicator.
5. To determine chloride ion in a given water sample by Argentometric method (Mohr'smethod)

Group – B:

6. Preparation of Urea Formaldehyde resin.
7. Acetylation of Primary Amine: Preparation ofAcetanilide.
8. Base Catalyzed Aldol Condensation: Synthesis of dibenzalpropanone.
9. [4+2] Cycloaddition Reaction: Diels-Alde reaction.
10. Preparation of aspirin and calculate its yield.

Group – C:

11. To calculate the λ_{max} of a given compound using UV-visible spectrophotometer.
12. To separate the metallic ions by paper chromatography.
13. To determine the surface tension of a liquid by stalagmometer.
14. To determine the percentage composition of the given mixture consisting of two liquids A and B (non- interacting system) by viscosity method.
15. To determine the relative viscosity of given liquids by Ostwald's viscometer.

Note: At least two Experiments from each group must be performed.

COURSE OUTCOME: At the end of the course students will be able to:

Handle the chemicals of synthesis as well as titration that will ultimately make them efficient and develop their future chemistry laboratory skills.

SYLLABUS	(SEMESTER-II)	Periods/ Week			INTERNAL ASSESSMENT (IA)			ESE	Grand total	Credits
Subject Code:	IPUBLL2	L	T	P	IA	MSE	TOTAL	25	50	01
Subject:	ENGINEERING WORKSHOP PRACTICES	-	-	2	25	--	25			

COURSE OBJECTIVE:

- To impart student knowledge on various hand tools for usage in engineeringapplications.
- Be able to use analytical skills for the production ofcomponents.
- Design and model different prototypes using carpentry, sheet metal andwelding.
- Make electrical connections for daily applications.
- To make student aware of safety rules in working environments.

Course Content:

1. Study of M/C tools in lathe machine
   Demonstration of different operations of lathe machine
   Practice of facing plain turning, taper turning etc
2. Study of Carpentry tools, equipments and different jobs
   Practice of Lap joints, Butt joints, T-Lab joints
3. Practice of Lap joint, Butt Joint, T-joint
4. Preparation of ¥ shape, square shape, work pieces as per the given specification
5. Replacement of fuse, condenser of fan/motor and fan regulator;
   Installation of switch board with wiring;
   Concepts of measuring instruments.
6. Identification of various electronics components and their terminals;
   Study of logic gates AND, OR, XOR and NOT, NAND, NOR;
   Study of Basic ICs.

COURSE OUTCOME: At the end of the course students will be able to:

- Make half lap joint, Dovetail joint and Mortise &Tenonjoint
- Produce Lap joint, Tee joint and Butt joint using Ga swelding
- Prepare trapezoidal tray, Funnel and T-joint using sheet metal tools
- Make connections for controlling one lamp by a single switch, controlling two lamps by a single switch and stair case wiring

TEXT/ REFERENCE BOOKS:

1. Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K., "Elements of WorkshopTechnology", Vol. I 2008 and Vol. II 2010, Media promoters and publishers private limited,Mumbai.
2. Kalpakjian S. And Steven S. Schmid, "Manufacturing Engineering and Technology", 4th edition, Pearson Education India Edition,2002.
3. Gowri P. Hariharan and A. Suresh Babu, "Manufacturing Technology – I" Pearson Education, 2008. (iv)Roy A. Lindberg, "Processes and Materials of Manufacture", 4thedition, PrenticeHallIndia, 1998.
4. Rao P.N., "Manufacturing Technology", Vol. I and Vol. II, Tata Mc-Graw Hill House,2017.

SYLLABUS	(SEMESTER-II)	Periods/ Week			INTERNAL ASSESSMENT (IA)			ESE	Grand total	Credits
Subject Code:	CSUBLE5	L	T	P	IA	MSE	TOTAL	25	50	01
Subject:	COMPUTER PROGRAMMING LABORATORY	-	-	2	25	--	25			

COURSE OBJECTIVE:

- To learn the Branching and logical expressions and Loops
- To learn the Arrays and Function
- To understand the Numerical methods and Recursion

Course Content: The laboratory should be preceded or followed by a tutorial to explain the approach or Algorithm to be implemented for the problem given.

Tutorial 1: Problem solving using computers:
Lab1: Familiarization with programming environment
Tutorial 2: Variable types and type conversions:
Lab 2: Simple computational problems using arithmetic expressions
Tutorial 3: Branching and logical expressions:
Lab 3: Problems involving if-then-else structures
Tutorial 4: Loops, while and for loops:
Lab 4: Iterative problems e.g., sum of series
Tutorial 5: 1D Arrays: searching, sorting:
Lab 5: 1D Array manipulation
Tutorial 6: 2D arrays and Strings
Lab 6: Matrix problems, String operations
Tutorial 7: Functions, call by value:
Lab 7: Simple functions
Tutorial 8 &9: Numerical methods (Root finding, numerical differentiation, numerical Integration):
Lab 8 and 9: Programming for solving Numerical methods problems
Tutorial 10: Recursion, structure of recursive calls
Lab 10: Recursive functions
Tutorial 11: Pointers, structures and dynamic memory allocation
Lab 11: Pointers and structures

COURSE OUTCOME: At the end of the course students will be able to:

- Utilization of Branching and logical expressions and Loops, Arrays and Function and Numerical methods and Recursion for writing the programmes for various engineering applications

SYLLABUS	(SEMESTER-II)	Periods/ Week			INTERNAL ASSESSMENT (IA)			ESE Assessment	Grand total	Credits
Subject Code:	PEUBLS2	L	T	P	Attendance	Activities	TOTAL			
Subject:	SPORTS AND YOGA		-	2	5	20	25	25	50	01

Physical Fitness Tests

- AAHPER youth fitness test
- Cooper's 12 Minute run-walk test

General Introduction of games and sports

Fundamental skills, history and development of the following games and sports:

- Athletics
- Batminton
- Basketball
- Cricket
- Football
- Hockey
- Handball
- Kabaddi
- Kho-kho
- Volley-ball
- Yoga

Note:

1. Each student will have to clear one of the physical fitness tests by the end of the semester.
2. One project is to be prepared by the students at least for two games.

TEXT/ REFERENCE BOOKS:

1. Barron H M, McGhee R (1997) A Practical Approach to Measurement in Physical Education.
2. Kansal D K (1996), Test and Measurement in sports and physical education, New Delhi, D V S Publication

Sub Title: MICROPROCESSOR AND INTERFACES		
Sub Code: CS205TES05	No. of Credits: 3=3: 0: 0(L-T-P)	No of lecture hours/week :03
Exam Duration: 3 hours	IA+ESE=30+70	Total no of contact hours:36

COURSE OBJECTIVE:

- To describe the basic architecture of 8086.
- To discuss the Instruction set of 8086.
- Evaluate the different technique of interfacing with memory and IO devices.
- Develop knowledge about interfacing devices and peripheral devices.
- To describe the basic architecture of 80386 and co-processor.

UNIT No	Syllabus Content	No of Hours
1	Microprocessor Architecture -8086, Register organization of 8086, Signal descriptions of 8086 chip, Physical Memory organization, Introduction to Maximum and Minimum mode operation, Processor 8088.	8
2	Instruction formats, addressing modes, Instruction Set of 8086: Data transfer instructions, Arithmetic instructions, Logical instructions, Branch instructions, Shift and rotate instructions, String Manipulation instructions, Machine Control Instruction, Flag Manipulation Instruction, Assembler Directive and Operators, Programming with an Assembler, Programming examples.	7
3	Introduction to Stack, Stack Structure of 8086, Interrupt, Interrupt and Interrupt Service Routines, Non Maskable Interrupt, Maskable Interrupt. Subroutine, MACROS: Defining a MACRO, Passing Parameters to MACRO.	7
4	Memory Interfacing, Interfacing I/O Ports, Programmable Interval Timer 8253, Architecture and Signal Description, Operating modes, Programming and Interfacing 8253, DMA Controller 8257: Architecture and Signal Description, Keyboard/Display Controller 8279: Architecture and Signal Description, Mode of Operation, Floppy Disk Controller 8272: Architecture and Signal Description, Commands.	7
5	Multi microprocessor System: Numeric Processor 8087, IO Processor 8089. 80386 Features, Architecture and Signal Description, Register Organization, Real Mode, Protected Mode, Virtual Mode, Paging, Segmentation.	7

COURSE OUTCOMES: The students would have learnt

CO1. Learn about the basic architecture of 8086.
CO2. Develop a skill to do assembly language programming.
CO3. Learn to do interfacing with memory & IO devices.
CO4. Develop a understanding about the peripheral devices.
CO5. Learn about the basic of 80386 microprocessor & co-processor.

Text Books:

1. Advanced Microprocessors and Peripherals – Architecture, Processing and Interfacing : A.K. Ray, K.M. Bhurchandi
2. Microcomputer System 8086/8088 Family – Architecture Programming and design: Y Liu and G. A. Gibson: Prentice Hall
3. 80386 Microprocessor Handbook C.H. Pappas and W. H. Murray: Osborne McGraw Hill

Reference Books:

1. Microprocessor Architecture Programming and Application: R.C. Gaonkar: Wiley Eastern.
2. Microprocessor 8086, 80386 & Pentium, Barry B. Brey

Sub Title: Relational Data Base Management System		
Sub Code: CS205TPC08	No. of Credits: 3=3: 0: 0(L-T-P)	No of lecture hours/week :03
Exam Duration: 3 hours	IA+ESE=30+70	Total no of contact hours:36

COURSE OBJECTIVE:

- To describe a sound introduction to the discipline of database management systems.
- To give a good formal foundation on the relational model of data and usage of Relational Algebra.
- To introduce the concepts of basic SQL as a universal Database language.
- To enhance knowledge to advanced SQL topics like embedded SQL, procedures connectivity through JDBC.
- To demonstrate the principles behind systematic database design approaches by covering conceptual design, logical design through normalization.

UNIT No	Syllabus Content	No of Hours
1	**Introduction:** An overview of database management system, database system Vs file system, Database system concepts and architecture, data models schema and instances, data independence and data base language and interfaces, Data definitions language, DML, Overall Database Structure. Data Modeling using the Entity Relationship Model: ER model concepts, notation for ER diagram, mapping constraints, keys, Concepts of Super Key, candidate key, primary key, Generalization, aggregation, reduction of an ER diagrams to tables, extended ER model, relationships of higher degree.	8
2	**Relational Data Model and Language:** Relational data model concepts, integrity constraints: entity integrity, referential integrity, Keys constraints, Domain constraints, relational algebra, relational calculus, tuple and domain calculus, Introduction to SQL: Characteristics of SQL. Advantage of SQL. SQL data types and literals. Types of SQL commands. SQL operators and their procedure. Tables, views and indexes. Queries and sub queries. Aggregate functions. Insert, update and delete operations. Joins, Unions, Intersection, Minus, Cursors in SQL.	7
3	**Data Base Design & Normalization:** Functional dependencies, normal forms, first, second, third normal forms, BCNF, inclusion dependences, loss less join decompositions, normalization using FD, MVD, and JDs, alternative approaches to database design.	7
4	**Transaction Processing Concepts:** Transaction system, Testing of serializability, Serializability of schedules, conflict & view serializable schedule, recoverability, Recovery from transaction failures, log-based recovery, checkpoints, deadlock handling.	7

5	**Concurrency Control Techniques:** Concurrency control, locking Techniques for concurrency control, Time stamping protocols for concurrency control, validation-based protocol, multiple granularities, Multi version schemes, Recovery with concurrent transaction.	7

COURSE OUTCOMES: The students would have learnt

- CO1. Explain the features of database management system and relational database
- CO2. Design conceptual models of a database using E-R modeling for real life applications & construct queries in Relational Algebra
- CO3. Create & populate a RDBMS for a real-life application, with constraint & keys using SQL.
- CO4. Retrieve any type of information from a database by formulating complex queries in SQL
- CO5. Analyze the existing design of database schema & apply concept of normalization to design an optimal database.

Text Books:

1. Date C J, "An Introduction to Database System", Addison Wesley
2. Korth, Silbertz, Sudarshan, "Database Concepts", McGraw Hill
3. Elmasri, Navathe, "Fundamentals of Database Systems", Addison Wesley
4. Leon & Leon, "Database Management System", Vikas Publishing

Reference Books:

1. Bipin C. Desai, "An introduction to Database Systems", Galgotia Publication
2. Majumdar & Bhattacharya, "Database Management System", TMH
3. Ramakrishnan, Gehrke, "Database Management System", McGraw Hill
4. Kroenke, "Database Processing: Fundamentals, Design and Implementation", Pearson Education.
5. Maheshwari Jain, "DBMS: Complete Practical Approach", Firewall Media, New Delhi

Sub Title: FORMAL LANGUAGE AND AUTOMATA THEORY		
Sub Code: CS205TPC09	No. of Credits: =3: 0: 0(L-T-P)	No of lecture hours/week :03
Exam Duration: 3 hours	IA+ESE=30+70	Total no of contact hours:36

COURSE OBJECTIVE:

- To learn fundamentals of Regular and Context Free Grammars and Languages
- To understand the relation between Regular Language and Finite Automata and machines.
- To learn how to design Automata's and machines as Acceptors, Verifiers and Translators.
- To understand the relation between Contexts free Languages, PDA and TM.
- To learn how to design PDA as acceptor and TM as Calculators.
- To learn how to correlate Automata's with Programs and Functions.

UNIT No	Syllabus Content	No of Hours
1	**Finite Automata & Regular Expression:** Deterministic and Non-deterministic Finite automata, Regular Expression, two-way finite automata, Finite automata with output, Properties of regular set, Pumping lemma, Closure properties.	8
2	**Context Free Grammars (CFG):** Introduction of CFG, Derivation trees, Simplification of normal forms, CNF, GNF, Regular Grammars, UnrestrictedGrammars and Relations between Classes of languages.	7
3	**Push Down Automata:** Introduction of PDA, Definitions relationship between PDA and Context Free Languages, properties of CGL's, Decision Algorithms.	7
4	**Turing Machine:** The Turing machine model, Computable languages andfunctions, Modification of Turing machines, Church's Hypothesis	7
5	**Recursive and Recursive Enumerable Languages:** Properties of recursive and recursive enumerable languages Universal Turing machine, Undesirability Post correspondence problem, Introduction to Recursive function theory.	7

COURSE OUTCOMES: The students would have learnt

- CO1. Understand, design, construct, analyze & interpret Regular languages, Expressions and Grammers.
- CO2. Design different types of Finite Automata &machines as Acceptor, Verifier & Translator.
- CO3. Understand, design, analyze & interpret Context Free Languages, Expression & Grammers.
- CO4. Design different types of Push Down Automata as Simple Parser.
- CO5. Design different types of Turing machines as Acceptor, Verifier, Translator & basic Computing Machine.

Text Books:

1. Introduction to Automata Theory Languages and Computation, Hopcroft and Ullman, Narosa.
2. Theory of Computer Science, Mishra and Chandra shekharan, PHI.

Reference Books:

1. Theory of Computer Science, Kohan, John Wiley.
2. Theory of Computer Science, Korral
3. Introduction to Automata Theory Languages and Computation, Hopcroft and Ullman, Addison Wesley
4. Introduction to Languages & Theory of Computation, Martin, , TMH

Sub Title: PARALLEL COMPUTING		
Sub Code: CS205TPC10	No. of Credits: 3=3: 0: 0(L-T-P)	No of lecture hours/week :03
Exam Duration: 3 hours	IA+ESE=30+70	Total no of contact hours:36

COURSE OBJECTIVE:

- To introduce parallel, distributed and cloud computing, the major concept, ideas & various hardware model of parallel & distributed system.
- To study design the multiprocessor system by various interconnection network like static & dynamic etc.
- To study various technique for vector pipeline architecture design to achieve parallelism(concurrency).
- To study about advanced & more powerful processor technology.
- To study about parallel algorithm design, programming language & tools like Python, CUDA. To study about architecture design of GPU.

UNIT No	Syllabus Content	No of Hours
1	**Introduction Of Parallelism:** Introduction -parallelism in Uniprocessor systems, Principles of Scalable Performance, architectural classification schemes, SISD, SIMD, MISD, MIMD architectures, multiprocessor and multicomputer, UMA, NUMA, COMA, NORMA model Parallel algorithms: Various Sorting	8
2	**Parallel Models & Interconnection Network:** System Interconnect architecture – static, dynamic, multistage interconnection networks, design considerations throughputs, delay, blocking and non-blocking properties interconnected memory organization - C-Access, S-Access, C-S access.	7
3	**Pipeline & Vector Processing:** Principal of Pipelining - Over lapped parallelism, principal of Liner pipelining processor, General pipelining and reservation tables, arithmetic pipelining, Design of pipeline Instruction units, arithmetic pipelining design example, hazard detection and resolution, JOB sequencing and collision prevention, vector processing function organization of instructions in IBM 360/91.	7
4	**Advanced Processor and Parallelism:** Advanced processor technology – RISC & CISC computers, super scalar architecture, principles of multithreading, multithreaded architectures of MP systems. Context switching policies, shared variables, locks, semaphores, monitor, multitasking and Cray multiprocessor.	7

5	**Parallel Programming Design Coding and Debugging:** CPU parallelism, GPU parallelism-program, Exploiting parallelism in programmed multidimension -al arrays, directed acyclic graphs, distance and direction vectors, data flow computer and data flow graphs. Parallel algorithm structure, analyzing parallel algorithm. Elementary parallel algorithms, Programming: Parallel programming with Synchronous and Asynchronous, Various API of MPS, PYTHON, CUDA, OpenCL	7

COURSE OUTCOMES: The students would have learnt

CO1: Spontaneously able to design the multiprocessor system with various hardware electronics circuit like CU, ALU, RAM etc.
CO2: Design new interconnection network which connects the processors and other devices like input and output devices (I/O)
CO3: Spontaneously try and invented a new type of pipeline processor architecture in which throughput can be as better as possible than all other.
CO4: How do combine the techniques of parallelism to obtain a more power full architecture as a outcome.
CO5: Course outcomes are skills and abilities to make parallel algorithm and program to enhance the speed up of execution of process.

Text Books:

1. Computer Architecture & Parallel processing - Kai Hwang 7 Briggs. (MGH).
2. Advanced Computer Architecture with Parallel Programming", K. Hwang, MGH.
3. Quinn, Parallel computing – theory and practice, Tata McGraw Hill.
4. Sima and Fountain, Advanced Computer Architectures, Pearson Education
5. Ed. Afonso Ferreira and Jose' D. P. Rolin, Parallel Algorithms for irregular problems - State of the art, Kluwer Academic Publishers

Reference Books:

1. Parallel Computers: Arch.& Prog., Rajaraman & Siva Ram Murthy, PHI.
2. Parallel computing- Theory and practice - Michael J Quinn- Mc Graw Hill
3. Selim G. Akl, The Design and Analysis of Parallel Algorithms, PH International.

Sub Title: SOFTWARE ENGINEERING		
Sub Code: CS205TPE01	No. of Credits :3=3: 0: 0(L-T-P)	No of lecture hours/week :03
Exam Duration: 3 hours	IA+ESE=30+70	Total no of contact hours:36

COURSE OBJECTIVE:

- To discuss the fundamental concepts of Software Engineering.
- To discuss the Various Models of Software.
- Acquire skills and knowledge to advance their career, including continually upgrading professional, communication, analytic, and technical skills.
- To Learn the ability to work effectively as a team member and/or leader in an ever-changing professional environment
- Learn to develop a small Software.

UNIT No	Syllabus Content	No of Hours
1	**Software Engineering:** What is software, Evolution of Software, Characteristics of software, Types of Software, Applications of software, Layered Technology. **Software Process Models:** Linear Sequential model, Prototype model, RAD model, Incremental model, Spiral Model, Component Based Development Model.	8
2	**Managing Software Project** **The Management Spectrum:** People, Product, Process, Project. Software Process and Project Metrics – Measures and Metrics, Software Measurement- Size Oriented Metrics, Function Oriented Metrics, Metrics for Quality-Overview, Measuring Quality, DRE. Software Requirement Specification-Problem Analysis, Requirement Specification. Validation and verification, The Make /Buy Decision.	7
3	**System Design:** Introduction, design principles, Problem partitioning, abstraction, top-down and bottom-up design, Low level Design: Modularization, Structure Chart, Flow chart, Functional versus Object oriented approach, design specification, Design verification, monitoring and control.	7
4	**Coding:** Top–down and bottom-up structured programming, information hiding, programming style, internal documentation, verification, monitoring and control. **Software testing:** Software Testing fundamentals, white box testing, Basis path testing, Cyclomatic Complexity, A strategic Issues, Unit testing, Integration testing, validation testing, System Testing.	7

5	**Software Project Management:** Cost estimation, project scheduling, Software configuration management, Quality assurance, Project Monitoring, Risk management.	7

COURSE OUTCOMES: The students would have learnt

CO1. The fundamentals of Software Engineering.
CO2. How to apply the Software Engineering Lifecycle.
CO3. Understand of different Software architectural styles & process framework.
CO4. Describe Software measurement & Software risks.
CO5. To develop a Project.

Text Books:

1. Software Engineering by Bharat Bhushan Agrawal, Sumit Prakash Tayal,

Reference Books:

1. Software Engineering by Pressmen
2. Software Engineering by Pankaj Jalote
3. Software Project Management by Manish Kumar Jha.

Sub Title: INFORMATION THEORY & CODING		
Sub Code: CS205TPE02	No. of Credits: 3=3: 0: 0(L-T-P)	No of lecture hours/week :03
Exam Duration: 3 hours	IA+ESE=30+70	Total no of contact hours:36

COURSE OBJECTIVE:

- Introduce the principles and applications of information theory.
- To teach study how information is measured in terms of probability and entropy, and the relationships among conditional and joint entropies.
- To teach coding schemes, including error correcting codes.
- Explain how this quantitative measure of information may be used in order to build efficient solutions to multitudinous engineering problem

UNIT No	Syllabus Content	No of Hours
1	**Introduction:** Uncertainty, properties of information, Measures of information, Entropy: properties of entropy, information rate, conditional Entropy, Mutual Information.	8
2	**Channel Capacity:** Introduction, Shannon's Theorem, Continuous Channel, Capacity of Gaussian Channel: Shannon Hartley Theorem Bandwidth and S/N Trade-off.	7
3	**Channel Coding:** Introduction, Shannon-Fano Coding, Huffman Coding, Block Codes, Tree Codes, Cyclic Code, Hamming Codes, Convolutional Code.	7
4	**Compression:** Introduction, Types of Compression, Lossless and Lossy Compression, Binary Image Compression Schemes: Runlength Encoding, CCITT Groups, Video Compression.	7
5	**Cryptography:** Introduction, Types of Cryptosystems: Secret-key cryptosystem, Public-key cryptosystem, Encryption, Decryption, Ciphers and Secret Message, Cryptanalysis.	7

COURSE OUTCOMES: The students would have learnt	
CO1.	Apply information theory in source coding and channel coding.
CO2.	Understand how error control coding techniques are applied in communication systems.
CO3.	Understand linear block codes for error detection and correction.
CO4.	Understand various error control encoding and decoding techniques.
CO5.	Students will understand the basic concepts of Cryptography.

Text Books:

1. Information Theory, Coding and Cryptography by Ranjan Bose, Tata McGraw-Hill Education.
2. Communication System by R. P. Singh, S. D. Sapre, Tata McGraw-Hill.
3. Information Theory and Coding Techniques by J.S. Chitode and P.G. Chilveri, Technical Publication.

Reference Books:

1. Elements of Information Theory" by T. M. Cover and J. A. Thomas, John Wiley & Sons, New York.
2. Information Theory, Coding and Cryptography" by R. Bose, TMH.

Sub Title: MOBILE COMMUNICATION		
Sub Code: CS205TPE03	No. of Credits: 3=3: 0: 0(L-T-P)	No of lecture hours/week :03
Exam Duration: 3 hours	IA+ESE=30+70	Total no of contact hours:36

COURSE OBJECTIVE:

- Discuss the evolution of Mobile communication and cell concept to improve capacity of the system.
- Discuss the radio transmission of Mobile communication.
- Discuss the concept of GSM, DECT and TETRA.
- To know about infrastructure and infrastructure less network.
- Discuss the concept of mobility i.e. Mobile IP and TCP

UNIT No	Syllabus Content	No of Hours
1	**Introduction:** Applications: Vehicles, Emergencies, Business, Replacement of wired networks, Infotainment, Location dependent services. Mobile and wireless devices, history of wireless communication, Reference Model.	8
2	**Wireless Transmission:** Frequencies for Radio Transmission, Signal Propagation, Multiplexing, Modulation, Spread Spectrum, Cellular System Medium Access Control Hidden And Exposed Terminals, Near and Far Terminals, SDMA, FDMA, TDMS, CDMA, Comparison Among Multiple Access Protocols.	7
3	**Telecommunications Systems:** GSM: Mobile Services, System Architecture, Radio Interface, Protocols, Localization and Calling, Handover, Security, New Data Services. Dect, Tetra	7
4	**Wireless Lan:** Infrared vs radio transmission, Infrastructure and ad-hoc network, **IEEE 802.11:** System architecture, protocol architecture, Physical layer, medium access control layer, MAC management, 802.11b, 802.11a, Newer developments, HIPERLAN, Bluetooth.	7
5	**Mobile Communication Layers:** Mobile network layer: Mobile IP, Goals, assumptions and requirements, Entities and terminology, IP packet delivery, Agent discovery, Registration, Tunneling and encapsulation, Optimizations, Reverse tunneling, IPv6. DHCP, Mobile Ad-hoc Routing, Mobile TCP, File System	7

COURSE OUTCOMES: The students would have learnt

- CO1. Understand the evolution of Wireless communication.
- CO2. Understand the concept of cellular system.
- CO3. Understand the working of GSM.
- CO4. Understand the infrastructure less network like Bluetooth.
- CO5. Understand the concept of Mobility in mobile communication.

Text Books:

1. Mobile Communications by J. Schiller, Addison Wesley
2. Mobile IP by Charles Perkins, Addison Wesley.

Reference Books:

1. Ad hoc Networks by Charles Perkins, Addison Wesley.
2. Understanding WAP by M. V. D. Heijden, M. Taylor, Artech House.

Sub Title: MULTIMEDIA SYSTEM DESIGN		
Sub Code: CS205TPE04	No. of Credits: 3=3: 0: 0(L-T-P)	No of lecture hours/week :03
Exam Duration: 3 hours	IA+ESE=30+70	Total no of contact hours:36

COURSE OBJECTIVE:

- Understand technical aspect of Multimedia Systems.
- Discuss the standards available for different audio, video and text applications.
- Understand organization of multimedia database.
- Discuss various multimedia authoring systems.
- To develop multimedia application and analyse the performance of the same

UNIT No	Syllabus Content	No of Hours
1	**Introduction:** An introduction, Multimedia elements, Multimedia Applications, Multimedia System Architecture, Evolving Technologies for Multimedia Systems, Defining Objects for Multimedia systems, Multimedia Data Interface Standard, The need for data Compression, Multimedia databases.	8
2	**Compression Techniques:** Compression and Decompression, Types of compression, Binary Image Compression schemes, Color, Gray Scale, Still-video image Compression, Video Image Compression, Audio Compression, Fractal Compression.	7
3	**Formats**: Data and Format Standards, Rich-text Format, TIFF File Format, Resource Interchange File Format (RIFF), MIDI File Format, JPEG DIB File Format for still and Motion Images, MPEG standards Pen Input, Video and Image Display systems, Print Output Technologies, Image Scanners, Digital Voice and Audio, Digital Camera, Video Images and Animation, Full-Motion Video.	7
4	**Storage:** Storage and Retrieval Technologies, Magnetic Media Technology, Optical Media, Hierarchical Storage Management, Cache management for storage systems, Multimedia Application Design, Multimedia application classes, Types of multimedia systems, Components of multimedia systems, Organizing multimedia databases.	7

5	**Multimedia Design:** Unified Communication, video conferencing and Chat, Multimedia Authoring and User Interface, Multimedia authoring system, Hypermedia application design consideration, User interface design, Object display/playback issues, Multimedia Operating Systems introduction, real time, Resource management, process management, file systems.	7

COURSE OUTCOMES: The students would have learnt

CO1.	Various technical aspect of Multimedia systems.
CO2.	Various file formats for audio, video & text media.
CO3.	Develop various Multimedia systems applicable in real time.
CO4.	Concept of storage management of Multimedia system.
CO5.	To evaluate multimedia application for its optimum performance.

Text Books:

1. Multimedia System Design by Prabhat K. Andleigh & Kiran Thakrar, Prentice PTR, NJ.
2. Multimedia: computing communications and applications by Ralf Steinmetz and Klara Nahrstedt, Innovating technology series by Pearson Edu. Asia.

Reference Books:

1. Multimedia Communications, Directions & Innovations by Jerry D. Gibson, HarcourtIndia Pvt. Ltd.
2. Multimedia computing by Borko, Handbook of CRC Press.
3. Multimedia Applications Development by Mark J. Bunzel Sandra K. Morris, McGraw Hill.
4. Fundamentals of Multimedia by Ze-Nian Li, Mark S. Drew, by Pearson Edu. Asia

Sub Title: RELATIONAL DATA BASE MANAGEMENT SYSTEM LAB	
Sub Code: CS205PPC05	No. of Credits: 1.5=0: 0: 1.5(L-T-P)
Exam Duration: 3 hours	IA+ESE =30+20

Lab Objective:

- To provide a sound introduction to the discipline of database management as a subject in its own right, rather than as a compendium of techniques & product-specific tools.
- To familiarize the participant with the nuances database environment towards information-oriented data processing-oriented framework
- Give a good formal foundation on the relational model of data.
- To prevent SQL and procedural interface to SQL comprehensively.
- To give an information to systematic database design approaches covering conceptual design, logical design and all overview of physical design.

UnitNo.	Syllabus Content	Teaching Hours
I, II, III, IV and V	• Write the queries for Data Manipulation and Data DefinitionLanguage. • Write SQL queries using logical operations and operators. • Write SQL query using group by function. • Write SQL queries for group functions. • Write SQL queries for sub queries, nested queries. • Write a program by the use of PL/SQL. • Write SQL queries to create views. • Write an SQL query to implement JOINS. • Write a query for extracting data from more than one table. • Write a query to understand the concepts for ROLL BACK,COMMIT & CHECK POINTS.	18

LAB OUTCOMES: The students would have learnt

- Understand, appreciate and effectively explain the underlying concepts of database technologies.
- Design and implement a database schema for a given problem domain normalize a database.
- Populate and query a database using SQL DML/DDL commands.
- Declare and enforce integrity constraint on a database using a state-of-the-art RDBMS.
- Programming PL/SQL including stored procedures, stored functions, cursors, packages.

Text Books:

1. An Introduction to Database System, Date C J, Addision Wesley
2. Database Concepts, Korth, Silbertz, Sudarshan, McGraw Hill
3. Fundamentals of Database Systems, Elmasri, Navathe, Addision Wesley
4. Database Management System, Leon & Leon, Vikas Publishing House.

Reference Books:

1. An introduction to Database Systems, Bipin C. Desai, Galgotia Publication
2. Database Management System, Majumdar & Bhattacharya, TMH
3. Database Management System, Ramakrishnan, Gehrke, McGraw Hill
4. Database Processing: Fundamentals, Design and Implementation, Kroenke, Pearson Education.
5. DBMS: Complete Practical Approach, Maheshwari Jain, Firewall Media, New Delhi

Sub Title: PARALLEL COMPUTING LAB	
Sub Code: CS205PPC06	No. of Credits: 1.5=0: 0: 1.5(L-T-P)
Exam Duration: 3 hours	IA+ESE =30+20

Lab OBJECTIVE:

- To study about various platform and libraries of parallel processing.
- To study about to create MPI programs to accomplish a computational task
- To study about of API to carried out MPI
- To study about to know GPU importance in parallel programming
- To study about of shared memory in parallel

Unit No.	Content	Teaching Hours
I, II, III, IV and V	• Understanding the environment of OMP, MPI, CUDA • Parallel programming environment and platform. • Create and simulate multiple processes and threads on MP system. • Simulate parallel program to synchronization and pooling ofprocesses. • Simulate the loop and function in parallelism manner. • Simulate a parallel algorithm to perform some mathematicalcalculation and their execution time. • Simulate the parallel sorting algorithm and their execution time. • Simulate the parallel searching algorithm and their execution time. • Simulate parallel some operation on array and list with theirexecution time. • Optimization technique using shared memory module on MPsystem. • Heterogeneous calculation using PYTHON (PTK), CUDA, andOPENCL tool kit.	18

LAB OUTCOMES: The students would have learnt

- Simulate and create process & threads.
- Simulate parallel algorithm using various MPI.
- Simulate parallel program for many computational tasks.
- Simulate various memories to carry out optimization.
- Do synchronous and asynchronous of process and pooling.

Text Books:

1. Programming Massively Parallel Processors: A Hands-on Approach Paperback – 20 December 2012 by David B. Kirk , Wen-mei W. Hwu
2. Introduction to Parallel Algorithms 1st Edition by Joseph JaJa.

Reference Books:

1. Python Parallel Programming Cookbook Paperback – August 26, 2015 by Giancarlo Zaccone

Sub Title: DESIGN AND ANALYSIS OF ALGORITHMS		
Sub Code: CS206TPC11	No. of Credits: 3=3: 0: 0(L-T-P)	No of lecture hours/week :03
Exam Duration: 3 hours	IA+ESE=30+70	Total no of contact hours:36

COURSE OBJECTIVE:

- To Analysis efficiency of algorithms on the basis of their time complexity and space complexity by mathematically foundation (asymptotic notation)
- To study about design and analysis of divide and conquer and greedy algorithm on the basis of their attributes and also describe when could be used these technique and which situation for which problem
- To know dynamic programming(DP) paradigm and algorithm for problems on the different data structure like graph and array
- Know a branch and bound technique and backtracking technique for problems
- Know the classes of problems like P,NP on their basis of nature (running time complexity)

UNIT No	Syllabus Content	No of Hours
1	**Algorithms Analysis:** Space and Time Complexity, Asymptotic Notations, mathematical foundations: growth functions, complexity analysis of algorithms, Recursive algorithms, analysis of no-recursive and recursive algorithms, Recurrences equation and their solution. Master method, recursive tree and backward substitution method.	8
2	**Divide & Conquer and Greedy Method:** Divide and conquer-Finding Maxima and Minima Binary search, Merge Sort, Quick Sort, and selection sort. Stassen's Matrix multiplication Greedy method-introduction, Knapsack problem, travelling sales person problem, Minimum Spanning trees- kruskal's algorithm, prim's algorithm, Single source shortest path-Dijkstra's algorithm, Huffman codes.	7
3	**Dynamic Programming and Search Techniques:** Dynamic Programming: Introduction, Matrix chain multiplication, Single source shortest path-Bellman-Ford, all pairs shortest path, optimal binary search tree, o/1 knapsack problem, travelling sales person problem, longest common subsequence Search techniques: Techniques for binary trees, techniques for graphs –DES and BFS, connected components, Bi-connected components, and Strongly- connected components, Topological sorting.	7

	Heap Data Structure: Min and Max Heap, Fibonacci Heap, Binomial heap, Amortized Analysis, Heap sort.	
4	**Back Tracking and Branch and Bound:** Backtracking: Back tracking and Recursive back tracking, applications of back tracking paradigm, the 8-queen problem, graph coloring, Hamiltonian cycles. **Branch and Bound:** introduction, 0/1 knapsack problem, travelling sales person problem, Least Cost (LC) search – the 15-puzzle problem.	7
5	**Complexity Class Theory and Pattern Matching:** Problem classes, Optimization problem, decision making problem, P VS NP VS NPC VS NPH, Venn diagram and their analysis, deterministic and non-deterministicpolynomial time algorithm, Cook Levin theorem, Verification algorithms forsome NP Class: subset sum problem, clique problem, vertex cover,independent set problem, Circuit Satisfiability problem, 2-SAT, 3-SAT etc. Pattern matching: Basic concept of pattern reorganization and their algorithms.	7

COURSE OUTCOMES: The students would have learnt

CO1: Technique to calculate and obtain the running time complexity and space complexity of any kind of algorithm.
CO2: Design divide and conquer and greedy algorithm for problems and at the same time they will able to know that which data structure are adequate to enhance the running time complexity.
CO3: Spontaneously able to described and analyze the dynamic-programming (DP) algorithm moreover when an algorithmic design situation calls for it and can construct a new DP algorithm for given a particular problem.
CO4: Spontaneously able to construct and design branch & bound and backtracking algorithm for a particular problem on the basis of the problem nature analysis and requirement.
CO5: Analyzed and write verification algorithm for some NP and NPH class problems.

Text Books:

1. Thomas H. Cormen, Charles E. Leiserson, Ronald Rivest, Clifford Stein, "Introduction to Algorithm", Publisher PHI. ISBN 81-203-2141-3
2. Sanjoy Dasgupta, Christos H. Papadimitriou and Umesh V. Vazirani, Algorithms, Tata McGraw-Hill, 2008
3. Jon Kleinberg and Éva Tardos, Algorithm Design, Pearson, 2005.
4. Michael T Goodrich and Roberto Tamassia, Algorithm Design: Foundations, Analysis, and Interne Examples, Second Edition, Wiley, 2006.

Reference Books:

1. Udi Manber, Algorithms – A Creative Approach, Addison-Wesley, Reading, MA, 1989.
2. Harry R. Lewis and Larry Denenberg, Data Structures and Their Algorithms, Harper Collins, 1997.

Sub Title: JAVA		
Sub Code: CS206TPC12	No. of Credits: 3=3: 0: 0(L-T-P)	No of lecture hours/week :03
Exam Duration: 3 hours	IA+ESE=30+70	Total no of contact hours:36

COURSE OBJECTIVE:

- To discuss the fundamental concepts of OOPs and Java
- To discuss the Differences between C/C++ and Java.
- Knowledge of Multithreading, Packages and Applet.
- Use of Java on different Platform.
- Learn to develop a small project using Java

UNIT No	Syllabus Content	No of Hours
1	**Java Fundamentals:** Basic Concepts of Object-Oriented Programming, Java History, Java Features, How Java Differs from C and C++, Web Browsers, Java Environment, Java Program Structure, Java Tokens, Installing and Configuring Java, Implementing a Java Program, Java Virtual Machine, Command Line Arguments, Programming Style.	8
2	Constants, Variables and Data Types, Declaration of Variables, Giving values to variables, Scope of Variables, Symbolic Constants, Type Casting, Getting Values of Variables, Standard Default Values, Java Operators, Arithmetic Expression, Evaluation of Expressions, Precedence of Arithmetic Operators, Operator Precedence and Associativity, Mathematical Functions, Control Statements (if statement, switch statement and Conditional operator statement), Decision Making and Looping (while construct, do construct, for construct), Jumps in Loops.	7
3	**Class, Objects and Methods:** Introduction of Class, defining a Class, Fields Declaration, Creating Objects, Accessing Class Members, Constructors, Methods Overloading, Static Members, Nesting of Methods, **Inheritance:** Extending a Class, Overriding Methods, Final Variables and Methods, Final Classes, Abstract Methods and Classes, Visibility Control **Introduction of Array:** One Dimensional Array, Creating an array, Two-Dimensional arrays, Strings, Wrapper Classes. **Interfaces:** Defining Interfaces, Extending Interfaces, Implementing Interfaces, Accessing Interface Variables, **Packages:** Java API Packages, Using System Packages, Naming Conventions, Creating Packages, Accessing a Package, Using a Package, Adding a Class to a Package, Hiding Classes, Static Import.	7

4	**Introduction to Multithreaded Programming:** Difference between Multithreading and Multitasking, Creating threads, Extending the thread class, Stopping and Blocking a thread, Life Cycle of a thread, Using thread Methods, Thread Exception, Thread Priority, Synchronization, Implementing the Runnable Interface, Inter-thread Communication. Managing Errors and Exceptions: Types of Errors, Exceptions, Syntax of	7
5	Introduction of Applet Programming, How Applets Differ from Applications, Preparing to Write Applets, Building Applet Code, Applet Life Cycle, Creating an Executable Applet, designing a Web Page, Applet Tag, Adding Applet to HTML file, Running the Applet, Passing Parameters to Applets, Aligning the Display, Displaying Numeric values, Getting input from the user, Event handling, Introduction of Graphics Programming, Introduction to AWT package, **Managing Input/Output Files in Java:** Concept of Streams, Stream Classes, Byte Stream Classes, Character Stream Classes, Other useful I/O classes, Using the file class, Input/Output exceptions. .	7

COURSE OUTCOMES: The students would have learnt

CO1.	Understanding of basic concept of java programming.
CO2.	Knowledge of the structure of java.
CO3.	The concept of Exception handling, Package and Applet.
CO4.	To use the Java programming language for various programming technologies.
CO5.	To develop a Software in the Java programming language.

Text Books:

1. E. Balagurusamy, Programming with Java A Primer, Fourth Edition, McGrawHill, 2010.

Reference Books:

1. H. Schildt, Java TM 2: The Complete Reference, Fourth Edition, Tata McGraw-Hill, 2001.
2. K. A. Mughal and R. W. Rasmussen, A Programmer's Guide to Java TM SCJP
3. Certification A Comprehensive Primer, Third Edition, Addison Wesley, 2008

Sub Title: DIGITAL IMAGE PROCESSING		
Sub Code: CS206TPC13	No. of Credits: 3=3: 0: 0(L-T-P)	No of lecture hours/week :03
Exam Duration: 3 hours	IA+ESE=30+70	Total no of contact hours:36

COURSE OBJECTIVE: The students would have learnt

- To discuss the fundamental concepts of digital image processing.
- To discuss the various image, transform with respect to basic functions, properties and application.
- To discuss image enhancement technique in spatial and frequency domain.
- To discuss image segmentation and restoration technique in spatial and frequency domain.
- To discuss the simple image processing techniques.

UNIT No	Syllabus Content	No of Hours
1	**Digital Image Fundamentals:** Background, digital image representation, examples of field that use DIP, fundamental steps in digital image processing, Simple image model, basic relationships between pixels: neighborhood of a pixel, Connectivity, Basic transformations: translational, rotational, scaling. Color models and transformations, Pseudo color Image Processing.	8
2	**Image Transforms:** Introduction to 2D Transforms: Fourier Transform and Properties, DCT and Properties, Hadamard Transform and Properties and properties **Image Compression:** Fundamentals, image compression models, elements of Information theory, Image Compression: lossy and non-lossy compression, image compression standards.	7
3	**Image Enhancement Spatial Domain:** Background, Basic gray level transformations, histogram: Computation histogram , histogram specification, histogram equalization, enhancement using arithmetic/logic operations, basics of spatial filtering, smoothing sharpening spatial filters, combining spatial enhancement methods. **Edge Detection Methods:** Prewitt, Sobel and Robert **Frequency Domain:** Background, introduction to the frequency domain, smoothing and sharpening frequency domain filters, homomorphic filtering, generation of spatial masks from frequency domain specifications.	7
4	**Image Segmentation:** Detection of discontinuities, edge linking & boundary detection, thresholding, Region based segmentation, morphological water sheds, the use of motion in segmentation	7

5	**Image Restoration:** Degradation model, Noise models, restoration in the presence of noise only (Spatial and frequency domain filters), Inverse filtering, LMS filtering, Wiener filter, constrained least square restoration, interactive restoration, restoration in the spatial domain	7

COURSE OUTCOMES: The students would have learnt

CO1.	Understanding of basic image processing techniques.
CO2.	Image analysis using 2-D image transforms.
CO3.	Image enhancement technique in spatial and frequency domain.
CO4.	Image processing application such as compression, segmentation and restoration.
CO5.	Learn to apply different image processing technique.

Text Books:

1. Digital Image Processing, R C Gonzalez & R E Woods, PearsonEducation,3 edition.
2. Digital Image Processing and Computer Vision, Milan Sonka, Cengage learning, First edition.

Reference Books:

1. Digital Image Processing, S. Jayaraman, S. Esakkirajan, T. Veera Kumar, Tata McGraw Hill, 2009.
2. Fundamentals of Digital Image processing, A K Jain, PHI/PearsonEducation,1989.
3. Digital Image Processing, Sid Ahmed, McGraw Hill.

Sub Title: MANAGEMENT INFORMATION SYSTEM		
Sub Code: CS206TPE05	No. of Credits: 3=3: 0: 0 (L-T-P)	No of lecture hours/week :03
Exam Duration: 3 hours	IA+ESE=30+70	Total no of contact hours:36

COURSE OBJECTIVE:

- To describe the role of information technology and decision support systems in business and record the current issues with those of the firm to solve business problems.
- To introduce the fundamental principles of computer-based information systems analysis and design and develop an understanding of the principles and techniques used.
- To enable students understand the various knowledge representation methods and different expert system structures as strategic weapons to counter the threats to business and make business more competitive.
- To enable the students to use information to assess the impact of the Internet and Internet technology on electronic commerce and electronic business and understand the specific threats and vulnerabilities of computer systems.
- To provide the theoretical models used in database management systems to answer business questions.

UNIT No	Syllabus Content	No of Hours
1	**Information System:** Introduction of Information System, Fundamentals of Information System, Strategic Role of Information in Organization and Management, three dimensions of Information System, Information System and Organization, Business Process Re-Engineering, Traditional and Computer based information system.	8
2	**Decision Support System:** Integration of Information, Types of Decision making in Organization, Decision Making Process, Models and Decision Support, Decision in business Areas, Strategic Analysis	7
3	**Information System Planning**: Types of Controlling Information System, Development of MIS Methodology and Tools/Techniques for Systematic Identification, Evaluation, Modification of MIS, Information System Success and Failure Implementation	7

4	**Information System for Business Operations:** Cross Functional Information System, A study of major Financial, Production, Human Resource Information System and Marketing Information System.	7
5	**Security and Auditing of Information System:** Management of Information System and End-User Computing, Security and Ethical issues of Information System, Major issues in Information System, Auditing of Information System.	7

COURSE OUTCOMES: The students would have learnt

- CO1. Relate the basic concepts and technologies used in the field of management information systems.
- CO2. Compare the processes of developing and implementing information systems.
- CO3. Outline the role of the ethical, social and security issues of information systems.
- CO4. Translate the role of information systems in organizations, the strategic management processes, with the implications for the management.
- CO5. Apply the understanding of how various information systems like DBMS work together to accomplish information objectives of an organization.

Text Books:

1. Management Information System: A Contemporary Perspective, Kenneth C. Laudon and Jane Price Loudon, Maxwell Macmillan International Editions.

Reference Books:

1. Management Information System: Solving Business Problems with Information Technology, Gerald V. Post and David L. Anderson, Tata McGraw – Hill Edition
2. Management Information System: Managing Information Technology in the Internet worked Enterprise, James A. O'Brien Tata McGraw –Hill Edition, Fourth Edition.

Sub Title: ROBOTICS		
Sub Code: CS206TPE06	No. of Credits: 3=3: 0: 0(L-T-P)	No of lecture hours/week :03
Exam Duration: 3 hours	IA+ESE=30+70	Total no of contact hours:36

COURSE OBJECTIVE:

- Learn the basic concepts of Robots.
- Learn the concepts of Kinematics of Robotics.
- Learn the concepts of Motions, velocities and dynamic analysis of force.
- Learn the concepts of Motion and Trajectory planning.
- Learn the concepts of Potential Functions, Visibility Graphs and Coverage Planning.

UNIT No	Syllabus Content	No of Hours
1	Introduction to Robotics Evolution of robots and robotics, progressive advancement in robots, definitions and classifications, laws of robotics, robot anatomy and related attributes, human arm characteristics, robot control system, manipulation and control, sensors in robotics, robots programming, the future prospects.	8
2	10 Coordinate Frames, Mapping and Transforms Robot specification and notations, Coordinate frames, description of objects in space, transformation of vectors, inverting a homogeneous transform, fundamental rotation matrices, yaw pitch and roll, yaw pitch and roll transformation, equivalent angle.	7
3	Symbolic Modelling of Robots – Direct Kinematic Model Mechanical structure and notations, description of links and joints, kinematic modelling of the manipulator, Denavit – Hartenberg notation, kinematic relationship between adjacent links, manipulator, transformation matrix, introduction to inverse kinematic model, Artificial Intelligence in robotics.	7
4	Robotic Sensors and Vision The meaning of sensing, sensors in robotics, kinds of sensors used in robotics, robotic vision, industrial applications of vision- controlled robotic systems, process of imaging, architecture of robotic vision systems, image acquisition, description of other components of vision system, image representation, image processing.	7

5	Robot Applications Industrial applications, material handling, processing applications, assembly applications, inspection, application, principles for robot application and application planning, justification of robots, robot safety, non-industrial applications, robotic application for sustainable development & social issues.	7

COURSE OUTCOMES: The students would have learnt

CO1. Apply the basic concepts of Robots.
CO2. Apply and evaluate the concepts of Kinematics of Robotics.
CO3. Apply the Motions, velocities and dynamics analysis of force.
CO4. Apply and evaluate Motion and trajectory planning.
CO5. Apply the concepts of potential functions, visibility graphs and coverage planning.

Text Books:

1. Robotics & Control – R.K. Mittal & I.J. Nagrath – TMH Publications
2. Robotics for engineers –Yoram Korean- McGrew Hill Co.
3. Industrial Robotics Technology programming and Applications –M. P. Groover, M. Weiss.
4. Robotics Control Sensing, Vision and Intelligence –K. S. Fu, R. C. Gonzales, C. S. G. Lee-McGrew Hill Book co.

Reference Books:

1. Kinematics and Synthesis of linkages –Hardenberg and Denavit– McGrew Hill Book Co
2. Kinematics and Linkage Design – A.S. Hall – Prentice Hall
3. Kinematics and Dynamics of Machinery–J. Hirschhorn– McGrew Hill Book Company

Sub Title: ARTIFICIAL INTELLIGENCE		
Sub Code: CS206TPE07	No. of Credits: 3=3: 0: 0(L-T-P)	No of lecture hours/week :03
Exam Duration: 3 hours	IA+ESE=30+70	Total no of contact hours:36

COURSE OBJECTIVE:

- To create appreciation and understanding of both the achievements of AI and the theory underlying those achievements.
- To introduce the concepts of a Rational Intelligent Agent and the different types of Agents that can be designed to solve problems
- To review the different stages of development of the AI field from human like behavior to Rational Agents.

UNIT No	Syllabus Content	No of Hours
1	Introduction of Artificial Intelligence(AI), Difference between Intelligence and Artificial Intelligence, Definitions of AI, Strong AI and Weak AI, Application areas of AI, Comparison of Conventional and AI Computing, History of AI, Turing Test, Branches of AI, Intelligent Agents, State Space Representation, Production System, Heuristic Search, Search Methods (Uninformed Search and Informed Search), Breadth First Search, Depth First Search, Difference between Breadth First Search and Depth First Search, Hill Climbing, Best First Search.	8
2	Role of Knowledge Representation in AI, Types of Knowledge, Properties of Knowledge Representation System, Categories of Knowledge Representation Scheme, First Order Predicate Calculus, Well Formed Formula in Predicate Logic, Conversion to Clausal Form, Resolution in Predicate Logic, Semantic Nets, Properties of Semantic Nets, Frames, Scripts, Advantages and Disadvantages of Scripts.	7
3	Introduction of Expert System, Comparison between Human Expert and Expert System, Comparison between Expert System and Software System, Difference between Knowledgebase and Database, Basic Components of an Expert System, Characteristics of Expert System, Life Cycle Development of Expert System, Advantages of Expert System, Limitation of Expert System, Expert System Tools, Existing Expert Systems (DENDRAL and MYCIN).	7

4	**Introduction to LISP:** Syntax and Numeric Functions, Working with GNU CLISP, Basic Data Objects in GNU CLISP, Basic List Manipulation Functions in GNU CLISP (setq, car, cdr, cons, list, append, last, member, reverse), User Defined Functions in GNU CLISP, Predicates (atom, equal, evenp, 69odell, oddp, zerop, >=, <=, listp, null) and Conditionals (cond and if) in GNU CLISP, Logical Functions (not, or, and) in GNU CLISP, Input / Output and Local Variables (read, print, princ, terpri, format, let, prog) in GNU CLISP, Recursion and Iteration(do) in GNU CLISP, Arrays in GNU CLISP	7
5	Introduction to PROLOG, Term, Ground Term, Function, Predicate, Features of PROLOG, Program Clause, Unit Clause, Logic Program, Goal Clause, Empty Clause, Simple Query, Conjunctive Query, Structure of PROLOG Program, Working with SWI-Prolog General Syntax of PROLOG, Execution of a Query in Logic Program (Ground Query and Non-Ground Query), Law of Universal modus pone, Ground Reduction, PROLOG Control Strategy, Search Tree and Proof Tree, Relational and Arithmetic Operators, Recursion in PROLOG, Lists manipulation in PROLOG, Iterative programming in PROLOG.	7

COURSE OUTCOMES: The students would have learnt

CO1: Demonstrate knowledge of the building blocks of AI as presented in terms of intelligent agents.
CO2: Analyze and formalize the problem as a state space, graph, design heuristics and select amongst different search or game based techniques to solve them.
CO3: Develop intelligent algorithms for constraint satisfaction problems and also design intelligent systems for Game Playing
CO4: Attain the capability to represent various real life problem domains using logic based techniques and use this to perform inference or planning.
CO5: Formulate and solve problems with uncertain information using Bayesia approaches.
CO6: Apply concept Natural Language processing to problems leading to understanding of cognitive computing

Text Books:

1. E. Rich and K. Knight, Artificial Intelligence, Forty Sixth Edition, Tata McGrawHill,2007.
2. D.W. Patterson, Introduction to Artificial Intelligence and Expert Systems, Tenth Edition, Prentice Hall of India, 2001.

Reference Books:

1. S. Kaushik, Logic and Prolog Programming, New Age International Limited, 2006.

Sub Title: SOFTWARE TESTING AND QUALITY ASSURANCE		
Sub Code: CS206TPE08	No. of Credits: 3=3: 0: 0(L-T-P)	No of lecture hours/week :03
Exam Duration: 3 hours	IA+ESE=30+70	Total no of contact hours:36

COURSE OBJECTIVE:

- To discuss the fundamental concepts of Software Quality
- Finding defects which may get created by the programmer while developing the software.
- To make sure that the end result meets the business and user requirements.
- To gain the confidence of the customers by providing them a quality product.
- Gaining confidence in and providing information about the level of quality.

UNIT No	Syllabus Content	No of Hours
1	**Software Quality:** Ethical Basis for software Quality, Total quality Management Principles, Software Processes and Methodologies, Quality Standards, Practices & conventions	8
2	**Software Management:** Reviews and Audits. Enterprise Resource Planning Software, Measurement Theory, Software Quality Metrics, designing Software Measurement Programs, Organizational Learning.	7
3	**Improving Quality with Methodologies:** Structured information Engineering Object-Oriented Software, Reverse Engineering, Measuring Customer Satisfaction Defect Prevention, Reliability Models, Reliability Growth Models.	7
4	**Software Quality Engineering:** Defining Quality Requirements Management, Complexity Metrics and Models, Management issues for software Quality, Project Tracking and Oversight, Use of CASE tool Technology, Role of Groupware, data Quality Control.	7
5	**Project Configuration Management:** Configuration Management Concepts, Configuration Management Process, Document Control, Configuration Management plan of the WAR Project. **Software Testing:** Unit, Integration & System testing, Benchmarking and Certification.	7

COURSE OUTCOMES: The students would have learnt	
CO1.	Understanding basic concepts of software testing and quality assurance.
CO2.	Define the scope of software testing and quality assurance projects.
CO3.	Efficiently perform testing and quality assurance activities using modern software tools.
CO4.	Estimate cost of a testing and quality assurance project and manage budgets.
CO5.	Prepare test plans and schedules for a testing and quality assurance project.

Text Books:

1. Mark Paulik, The capability Maturity Model-guidelines for Improving the software Process, Addison Wesley
2. Wilson, Rodney C, Software RX secrets of Engineering Quality Software, Prentice Hall.

Reference Books:

1. Stephan Kan, Metrics and Models in Software quality, Addison Wesley.
2. Ginac, Frank P, Customer Oriented Software Quality Insurance, Prentice Hall

Sub Title: DESIGN AND ANALYSIS OF ALGORITHMS LAB	
Sub Code: CS206PPC07	No. of Credits: 1.5=0: 0: 1.5(L-T-P)
Exam Duration: 3 hours	IA+ESE =30+20

Lab OBJECTIVE:

- Understand the recursive type algorithm with their data structure
- Understand the divide and conquer (with recursive function) and greedy algorithm like merge sort, quick sort and single source shortest path
- Understand the dynamic programming paradigm and analysis the single source and all pair shortest path algorithm
- Understand the branch and bound technique ,heap and Fibonacci data structure to implement optimization and sorting problem
- Analysis about some NP class problems

Unit No.	Syllabus Content	Teaching Hours
I, II, III, IV and V	• Simulate the Stack data structure (recursion) and do the posteriori analysis. • Simulate BFS, DFS on Graph and estimate the running time. • Simulate Prim's and Kruskal's Algorithm and do the posteriori analysis • Simulate Dijkstra's algorithm and do the posteriori analysis • Simulate all pair shortest path problem and do the posteriori analysis • Simulate Bellman algorithm and do the posteriori analysis • Simulate of Huffman Tree and do the posteriori analysis • Simulate of check whether a given graph is connected or not using DFS method and do the posteriori analysis • Simulate of Heap Tree and heap sort and do the posteriori analysis • Simulate of N Queen's problem using Back Tracking and do the posteriori analysis • Simulate 0/1 Knapsack problem using Dynamic Programming and do the posteriori analysis • Simulate TSP problem using Dynamic Programming and do the posteriori analysis • Simulate fractional Knapsack problem and do the posteriori analysis • Simulate to find a subset sum of a given set of integer number and do the posteriori analysis • Simulate to detect the circle in graph by using DFS algorithm and do the posteriori analysis	18

LAB OUTCOMES: The students would have learnt	
CO1.	Implement recursive algorithm with array and stack data structure.
CO2.	Various tools to simulate divide & conquer algorithm and greedy using graph and link list.
CO3.	Dynamic programming to optimization type and decision type problems.
CO4.	Implement some problems like data compression algorithm and sorting algorithm using tree, array, etc.
CO5.	Simulate and optimize some NP class problem like SAT, Clique and TSP etc.

Text Books:

1. Introduction to Algorithm, Thomas H. Cormen, Charles E. Leiserson, Ronald Rivest, Clifford Stein, Publisher PHI, ISBN 81-203-2141-3
2. Algorithms, Sanjoy Dasgupta, Christos H. Papadimitriou and Umesh V. Vazirani, Tata McGraw- Hill, 2008.
3. Python Algorithms Mastering Basic Algorithms in the Python Language by Magnus LieHetland.
4. Algorithm Design, Jon Kleinberg and Éva Tardos, Pearson, 2005.

Reference Books:

1. Fundamentals of computer Algorithms, Horowitz, Sahani, Galgotia. 2nd Edition, 1998.ISBN 81- 7515-257-5
2. Data Structures and Algorithms Using Python Rance D. Necaise

Sub Title: JAVA LAB	
Sub Code: CS206PPC08	No. of Credits: 1.5=0: 0: 1.5(L-T-P)
Exam Duration: 3 hours	IA+ESE =30+20

Lab OBJECTIVE:

- To provide the knowledge of Basics of Java.
- To learn the Concept of package and Applet in Java.
- To develop an awareness of modern programming language.
- Provide practical Knowledge and Skills for developing a program with java.
- Develop ability to design a small software using java.

Unit No.	Content	Teaching Hours
I, II, III, IV and V	• Write a program to find a factorial of a given number. • Write a program to show all relational and Logical operator. • Write a program using Constructors • Write any program using the concept of method overloading. • Write a program to show the concept of Inheritance. • Write a program to using 10 string operations • Write a program using packages • Write a program to show the concept of Synchronization inMultithreading. • Write a program to show exception handling in java • Write a program to show human face using Applets	18

LAB OUTCOMES: The students would have learnt

CO1.	The basic concept of Java.
CO2.	Use an integrated development environment to write, compile, run & test simple object-oriented java program.
CO3.	About concept of Multithreading, Packages & Applet.
CO4.	Read and make elementary modifications to java programs that solve real world problems.
CO5.	To develop small software using java.

Text Books:

1. Programming with Java A Primer, E. Balagurusamy, Fourth Edition, McGrawHill, 2010.

Reference Books:

1. Java TM 2: The Complete Reference, H.Schildt, Fourth Edition, Tata McGrawHill, 2001.
2. A Programmer's Guide to Java TM SCJP Certification A Comprehensive Primer, K. A. Mughal and R. W. Rasmussen, Third Edition, Addison Wesley, 2008.

Sub Title: Industrial Utilities and Safety		
Sub Code: CH206TOE01	No. of Credits: 3=3: 0: 0(L-T-P)	No of lecture hours/week :03
Exam Duration: 3 hours	IA+ESE=30+70	Total no of contact hours:36

COURSE OBJECTIVE:
To acquire the basic knowledge about various process utilities applied in industries and problemsrelated to hazard & safety.

UNIT No	Syllabus Content	No of Hours
1	Introduction: Role and types of process utilities in industries. Case studies of some major accidents occurred inprocess industries	8
2	Steam System: Generation and application in process plants. Introduction to design of efficient steam heatingsystems, Condensate utilization. Flash steam. Steam Traps: Types and characteristics.	7
3	Water, characteristics and conditioning for process industries e.g., steam piping, boiler feed, cooling etc.,Recycling of process water.	7
4	Introduction to process safety devices and general hygiene management. Storage and ventilation.	7
5	Fire and Explosion; Definition, flammability characteristics and explosion. Design to prevent fires and explosions by inverting, purging, ventilation, sprinkler systems. Static electricity controls, Relief valve in vapour/gas,Liquid and runway reaction services.	7

COURSE OUTCOMES: The students would have learnt
- CO1. Evaluate the requirement of process utilities in process industries,
- CO2. Calculate the steam requirement and its applications as utility.
- CO3. Explain fire and explosion and its prevention methods.

Suggested Text Books:
1. High Temperature heat carrier by A. V. Chechetekin, Pergammon Press.
2. Efficient use of Steam by P. M. Goodal, Guilford
3. Chemical Process Safety: Fundamental with applications by A. Crowl Daniel and F. L. Joseph, PHI Publications.

Reference Books;

1. Handbook of Heat Transfer media by P. I. Geiringer, Van Nostral Reinhold Inc. U.S.

Sub Title: Metro Systems and Engineering		
Sub Code: CE206TOE01	No. of Credits: 3=3: 0: 0(L-T-P)	No of lecture hours/week :03
Exam Duration: 3 hours	IA+ESE=30+70	Total no of contact hours:36

Course Learning Objectives:

1. To introduce concepts of different types of mode of transportation and associated facilities.
2. To understand the concept of urban transport scenario, traffic characteristics and transport development.
3. To study the Intelligence Transport System
4. To understand ITS user services and its components.
5. To understand the approach and utility of Environmental Impact Assessment for the urban infrastructural Measures.

UNIT No	Syllabus Content	No of Hours
1	Modes of Transportation: Transportation parameters- Traffic and Transport Problems of a city, Mass transport system, Modes of transportation & characteristics, public transport system, public private transport system, Advantages and disadvantages of public transport system. Role of transportation in mass transportation, advanced modes. Transportation Infrastructure- Green bays, control stations, mitigation buildings, separator lanes and safety islands.	8
2	Urban Public Transport System Rapid transit systems: BRTS, Bus Lane system, Advantages and limitations in Indian Scenario, Rail System. Types of rail system, advantages and disadvantages of rail system, sky walk and under bridge and its advantages. Advances in infrastructure. Urban Pedestrian Safety- Skyways, Intersection subways, halt stations, crossing measures, flexibility in accessibility.	7
3	ITS Background and Telemetric systems: Definitions, features and objectives of ITS, History of ITS and its development over the world, telemetric concept, transport telemetric, telemetric structure, ITS taxonomy, ITS application areas, uses, and application overview, ITS implication through AI, ITS based regression models.	7
4	ITS components, tools and strategies: Components of user services; advanced traffic management system, advanced traveler information systems, advanced vehicle control system, commercial vehicle operational management, advanced public transportation system, electronic payment system, advanced rural transportation, security and safety systems, urban traffic control, benefits and limitations, traffic calming systems, freight management by ITS.	7

5	Environmental Impact Assessment: Description of proposed activity, structural audits, analysis of site selection procedure, baseline conditions / major concerns, green building and its advantages, description of potential positive and negative environmental, social, economic and cultural impacts including cumulative, regional, temporal and spatial considerations, significance of mitigation plans and monitoring plans (impacts and mitigation efforts)	7

COURSE OUTCOMES: The students would have learnt

CO1.	To implement the concept of urban transport scenario, traffic characteristics and transport development.
CO2	To adopt the concepts of different mode of transportation and associated facilities with advanced system.
CO3.	To Identify and differentiate ITS user services and its components.
CO4.	To plan and design appropriate ITS technology to solve real-life traffic problems.
CO5.	To propose the mitigation plan for the EIA for the urban infrastructure.

Text Books:

1. Kadialy L.R.," Traffic Engg. and Transport Planning", 8th edition, Khanna Publishers, 2011.
2. O. Flaherty C.A., "Traffic Engineering and Transport Planning", 2006.
3. AUSTROADS, The Implication of Intelligent Transport Systems for Road Safety, Austroads Incorporated, 1999.
4. Bob Williams, Intelligent Transport Systems Standards, Artech House Publishers, 2008.
5. Chowdhury, M. A. and Sadek, A, Fundamentals of Intelligent Transp. Sys. Planning, Artech House, 2003.
6. E. Bekiaris and Y.J. Nakanishi, Economic Impacts of Intelligent Transportation Systems: Innovations and Case

   Studies, Elsevier/JAI, 2004.
7. IET Intelligent Transport Systems and 15th International IEEE Conference on Intelligent Transportation Systems

   (ITSC), 16-19 September, 2012. (http://digital-library.theiet.org/content/journals/iet-its)
8. J.M. Sussman, Perspectives on Intelligent Transportation Systems (ITS), Springer, 2005
9. L. Vlacic, M. Parent, F. Harashima, Intelligent Vehicle Tech. – Theory and Appl., Butterworth-Heinemann, 2010.
10. M.A. Chowdhury and A. Sadek, Fundamentals of Intelligent Transport. Systems Planning, Artech House, 2010.
11. R. Stough, Intelligent Transport Systems: Cases and Policies, Edward Elgar, 2001, Artificial Intelligence and Intelligent Transportation Systems, National Academy Press, 2010.
12. Gonzalez R. C. and Woods R. C., "Digital Image Processing", 2nd Ed., Pearson Education, 2007.
13. Jain A. K, "Fundamentals of Digital Image Processing", Prentice Hall, 2007.
14. R.R. Barthwal "Environmental Impact Assessment" New Age International, January 2012.
15. A.R. Gajbhiye & S.R. Khandeshwar N.S. Raman, "Environmental Impact Assessment", I.K. International, 2014

Sub Title: Object Oriented Programming with C++		
Sub Code: CS206TOE01	No. of Credits: 3=3: 0: 0(L-T-P)	No of lecture hours/week :03
Exam Duration: 3 hours	IA+ESE=30+70	Total no of contact hours:36

COURSE OBJECTIVE

- To know different programming paradigms.
- To study and understand the object-oriented programming concepts and methodology.
- To implement object-oriented programming concepts in C++.
- To direct and handling file streaming
- To learn advance concept of Object-Oriented programming.

UNIT No	Syllabus Content	No of Hours
1	Principles of OOP: A look at procedure-oriented programming, OOP paradigm, Basic Concepts of OOPs, Benefits of OOP, object oriented Language. Beginning with C++ characters used in C++, Basic Data Types , C++ Tokens, Identifiers, Keywords, Constants, Variables, Input/Output statements, Structure of C++ program.	8
2	Operations and Expressions - Concept, Arithmetic Operations and Expressions, Relational and Logical operators and Expressions, Order of evaluation of expressions, Type conversion, Compound assignment Operator, Standard Library Functions and header files. Flow of control – Compound statement, sequential structure, selection structure, simple if, if-else nested if, ladder, switch, go to, loop structure, do-while, for, statement break, continue, function exit( )	7
3	Array and Function - Concept of array, Concept of subprogram, Parameter passing in function, Function prototype, Calling function, Call by value, Call by reference, Array parameters, Default argument, Returning values, Scope rules, Storage class, Inline function, Function overloading, Recursive functions. Structure, Class and Object - Define structure, Returning structure elements, Nested structure, Passing structure to function, User defined data type, Specifying a class, Defining member function, Scope of class and its member, Nested class, Data Hiding and encapsulation, Friend function, Object as function argument, Function returning object, Static member.	7
4	Constructors, Destructors, constructor function, parameterized multiple constructors, Default constructor, Copy constructor and Destructor function.	7

	Inheritance and aggregation - Derived class, various type of inheritance, Inheriting Constructors, Parts explosion as aggregation, Abstraction and property of aggregation, Constructing aggregations. Polymorphism, overloading and operator overloading.	
5	Pointer and virtual function - Pointer variable, dynamic allocationoperators, new and delete, this operator Pointers to derived class, Working with files - File & stream, Opening and closing a file, read() and write( ) functions, detecting end of file.	7

COURSE OUTCOMES: The students would have learnt

CO1.	Programming environment and basic elements.
CO2.	Introduction to object-oriented programming.
CO3.	Key features of the object-oriented programming language.
CO4.	Advantage concept of object-oriented concepts.
CO5.	Streaming concepts for file handling.

REFERENCE BOOKS:

1. Object Oriented Programming With C++ by M. P. Bhave S. A. Patekar, Pearson Education
2. Object Oriented Programming with C++ by E. Balaguruswamy.
3. Object Oriented Programming in turbo C++ by Robert Lafore.
4. Programming with C++ by D. Ravichandan.
5. Programming with C++ (SOS) by Hubbard

Sub Title: Introduction to Electronic Devices & Circuits		
Sub Code: EC206TOE01	No. of Credits: 3=3: 0: 0(L-T-P)	No of lecture hours/week :03
Exam Duration: 3 hours	IA+ESE=30+70	Total no of contact hours:36

Course Objectives:

1. To develop basic concept of semiconductor materials and physics.
2. To develop an understanding of the PN junction diode and its behavior.
3. To introduce various types of special diodes and rectifier.
4. To develop the concept and analysis of transistor characteristics, Configuration and thermal stabilization.
5. To study the physics and construction of Field Effect transistors

UNIT No	Syllabus Content	No of Hours
1	**Semiconductor concept:** Atomic structure, Bohr's atom model, Energy Band Theory of Crystals, Energy Band Structures in Metals, Semiconductors and Insulators, forbidden energy gap, Electrical properties of Ge and Si, Conductivity Equation, Mobility and Conductivity, Electron and holes in intrinsic and extrinsic semiconductors, P type and N type semiconductors– majority and minority carriers, Mass action Law, Hall effect, Carrier generation and recombination, Carrier transport: diffusion and drift process, Variation of semiconductor conductivity, resistance and bandgap with temperature and doping.	8
2	**PN Junction Diode:** Properties of P-N Junction, Open Circuited P-N Junction, Behaviour of P-N junction under forward and reverse bias, Current component of PN Diode, VI Characteristics, Temperature dependence of V-I Characteristics, Ideal diode, Breakdown phenomenon: Zener and avalanche breakdown, Diode resistance: Static and dynamic resistance, Diode Capacitance: Transition and Diffusion Capacitance, Switching Characteristics.	7
3	**Special Purpose Diodes:** Zener Diode, Varactor Diode, Tunnel Diode, Photodiode, Light Emitting Diodes- Construction, working and characteristics, Applications of Diodes: Half-Wave Diode Rectifier, Full-Wave Rectifier, Clippers and Clampers.	7
4	**Transistors:** Definition, formation of transistor- PNP and NPN, symbols, working principle, Regions of operation, Transistor current components, Transistor construction, Common Base, Common Emitter & Common Collector configurations and their characteristics, Early Effect, Current Gains: α, β, and γ relation between them, simple problems, comparison of CB, CE and CC modes, Transistor as a switch, Transistor as an amplifier, Thermal runaway, Thermal stability.	7

5	**Field Effect Transistor:** JFET Construction, Operation, VI characteristics, Transfer characteristics, Drain characteristics. FET as voltage variable resistor, Metal Oxide Semiconductor Field Effect Transistor (MOSFET): construction and working of enhancement and depletion modes, Drain and transfer characteristics, Application of MOSFET as a switch, Comparison of JFET & MOSFET.	7

Course Outcome:

Upon successful completion of the course, students will be able to

1. Analyze the operation of semiconductor physics.
2. Describe the working principle and characteristics of PN diode.
3. Describe the principle of operation and characteristics of special Semiconductor diodes.
4. Analyze the Bipolar Junction Transistor characteristics and configurations.
5. Analyze the Field Effect Transistor characteristics and its applications.

Text/Reference Books:

1. Integrated Electronics: Analog & Digital Circuit Systems- Jacob Millman & Halkias, TMH
2. Electronic Devices & Circuits- Allen Mottershead, PHI
3. Electronic Devices & Circuit Theory- Boylestad & Nashelsky, PHI
4. G. Streetman, and S. K. Banerjee, "Solid State Electronic Devices," 7th edition, Pearson,2014
5. D. Neamen, D. Biswas "Semiconductor Physics and Devices," McGraw-Hill Education
6. S. M. Sze and K. N. Kwok, "Physics of Semiconductor Devices," 3rd edition, John Wiley &Sons, 2006.
7. Sanjeev Gupta, "Electronic Devices and Circuits", Dhanpat Rai Publications.

Sub Title: Computer Graphics		
Sub Code: IT206TOE01	No. of Credits: 3=3: 0: 0(L-T-P)	No of lecture hours/week :03
Exam Duration: 3 hours	IA+ESE=30+70	Total no of contact hours:36

Course Objectives:

1. The main objective of the course is to introduce students with fundamentalconcepts and theory of computer graphics.
2. Understand the need of developing graphics application.
3. Learn algorithmic development of graphics primitives like: line, circle, polygonetc.
4. Learn the representation and transformation of graphical images and pictures.
5. It presents the important drawing algorithm, polygon fitting, clipping and 2D transformation curves and an introduction to 3D transformation.

UNIT No	Syllabus Content	No of Hours
1	**OVERVIEW OF GRAPHICS SYSTEM:** I/O devices, Raster scan & Random scan system, DDA & Bresenhams Line drawing Algorithm, Mid-Point & Bresenhams circle drawing Algorithm, Mid-point ellipse generating algorithm, Clipping: Sutherland Cohen Line Clipping, Polygon clipping: Hodgeman- Sutherland & Weiler-Atherton polygon clipping, 2-D & 3-D Transformation.	8
2	**CURVES &SURFACES:** Conics-Parametric forms for circle, ellipse, parabola, Bezier Curves-Need for cubic parametric curves c0, c1, c2 continuity, Generation though Bernstein polynomials, Condition for smooth joining of 2 segments, Convex Hull property, B-Spline Curves: Knot vectors-uniform and open uniform curves, Uniform, Periodic B-splines, Open B-splines, Uniform B-splines, Non-uniform B-splines, Rational B-splines, Beta splines.	7
3	**PROJECTIONS & HIDDEN SURFACE REMOVAL:** Parallel projection on x-y plane (including oblique view), Perspective projection-1, 2 and 3 Vanishing points, Reconstruction of 3-D images. Hidden Surface Removal: Back face removal, Floating Horizon method for curved objects, Z-Buffer or Depth Buffer Algorithm, Painter's algorithm (Depth sorting method), Binary space partitioning trees, Scan-line algorithm, Warnock's algorithm.	7
4	**SHADING & COLOR ISSUES:** Filled Area Primitives, Illumination model for diffused & specular reflection, Computing reflection vector, Gouraud and Phog Shading, Texture mapping, Bump mapping, Handling shadows, Radiosity: Lambert's Law, Basic element, Modeling transparency, Visualization of data sets, volume rendering, Color issues: Additive, Subtractive primaries, Filled Area Primitives.	7

5	**FRACTALS & ANIMATION:** Fractals: self-similar fractals-fractal dimension, Generation of Terrain-random midpoint displacement, Self-squaring fractals. Solid Modeling: Generation through sweep techniques, Constructive sold geometry, B representations, Octrees, Ray Tracing & their Theory, Animation: In-between using rotation and translation, Procedural animation, Morphing, Motion Control (Key framing).	7

COURSE OUTCOMES: The students would have learnt

- CO1. Understand the basics of computer graphics, different graphics systems and applications of computer graphics.
- CO2. Discuss various algorithms for scan conversion and filling of basic objects and their comparative analysis.
- CO3. Use of geometric transformations on graphics objects and their application in composite form.
- CO4. Extract scene with different clipping methods and its transformation to graphics display device.
- CO5. Explore projections and visible surface detection techniques for display of 3D sceneon 2D device.

Text Books:

1. Computer graphics, Hearn and Baker, PHI.

Reference Books:

1. Procedural elements of Computer Graphics, Rogers, McGraw Hill
2. Computer graphics, Harringtons S., McGraw Hill
3. Computer graphics, Schoum Series

Sub Title: Automobile Engineering		
Sub Code: ME206TOE01	No. of Credits: 3=3: 0: 0(L-T-P)	No of lecture hours/week:03
Exam Duration: 3 hours	IA+ESE=30+70	Total no of contact hours:36

Course Objective:

- To understand the basic structure of an automobile.
- To provide the concept of various subsystem associated with automobiles.
- To get an idea of different types of loads, resistances & safety features present in automobiles.
- To understand the functions of individual components associated with vehicles.
- To get knowledge on modern technology implemented in vehicles

UNIT No	Syllabus Content	No of Hours
1	Introduction: Introduction of an automobile, component & basic structure of automobile, classification, types of chassis layout with reference to prime mover location &drives. Vehicle frames: various types of frames, constructional details, materials, testing of vehicle frames, defects in frames, frameless construction & specifications, loads acting on the vehicle frame, chassis lubrication & calculation of stresses on sections. Front axle & steering system: Types of front axles, construction details, materials. Front wheel geometry viz. castor, camber, king pin inclination, Toe-in. Condition for true rolling motion of wheels during steering. Steering geometry, Ackerman & Davis steering system. Constructional details of steering linkages, different types of steering gears. Power & power assisted steering.	8
2	Transmission system: Function of transmission system, types: Sliding mesh, constant mesh & synchromesh gear box. Torque converter: Principle of operation, construction, performance characteristics, multiphase & polyphaser torque converter. Automatic transmission: Epi-cyclic gear box, determination of gear ratios for the vehicles. Clutches. Hydrostatic drive system: Types, principles, advantage & limitation, construction & working. Electric drive: Principle of early & modified Ward Leonard control system, advantages &limitations. Continually Variable Transmission (CVT): Operating principle, basic layout & operation, advantages & disadvantages. Braking system: Necessity of brake, stopping distance & time, brake efficiency, weight transfer, brake shoe, determination of braking torque. Braking systems: Mechanical, hydraulic, disc, drum, parking & emergency brakes. Power, servo & electrical brakes. Details of hydraulic system, mechanical system & components, master cylinder, factors influencing the operation of brakes such as: operating temperature, lining, brake clearance, pedal pressure, linkages etc. Different types of retarders: Eddy current & hydraulic retarders. Antilock braking system.	7

3	Driveline: Effect of driving thrust & torque reactions. Hotchkiss drive & torque tube drive, Propeller shaft, Universal joint, Constant velocity universal joint. Front wheel drive. Final drive & differential: Different types of final drive: Worm & worm wheel, straight bevel gear, spiral bevel gear hypoid gear final drives. Differential principles. Constructional details of differential unit. Non-slip differential.	7
4	Suspension & safety system: Need of suspension system, types of front & rear instructional details & characteristics of leaf spring, coil spring & torsion bar. Telescopic type shock absorbers, pneumatic suspension system, air bags, crash resistance & passenger comfort. Rear construction: Construction of rear axles, 4 types of rear axles: full floating, three quarter floating & semi floating rear axles. Rear axle housing. Construction of different types of axle housing. Multi-axle vehicles, constructional details of multiaxle vehicles	7
5	Wheels & tires: Types of wheels, construction, weird wheels, tires, construction, types: radial, bias & belted bias, slip angle, under & oversteering, tread patterns, tire specification, tubeless tire. Modern vehicle technology: Fuel cells technology for vehicles: what is fuel cell? type of fuel cell, advantages, current state of the technology, potential & challenges. Stratified charged/learn burn engines-hydrogen engines, advantages & disadvantages of hydrogen fuel. Electrical & hybrid vehicles, magnetic track vehicle. Latest engine technology features: DTS-I, GDI, Variable valve timing, electromagnetic valves.	7

Course Outcomes: The students would have learnt

- Graduates will against wrong foundation in core automobile engineering, both in theoretical & applied concepts.
- Acquire knowledge and hands-on competence in the design & development of an automobile.
- Graduates will be able to demonstrate & get an idea in identifying the problems in automobile.

Suggested Texts and Reference Materials

1. Automobile Engineering, K. K. Ramalingam, Sci tech Publications Pvt Ltd.
2. Automobile Technology, Dr. N. K. Giri, Khanna Publishers.
3. Automobile Engineering, Prof. Amitosh De, Galgotia Publications Pvt Ltd.
4. Modern Transmission Systems, A. W. Judge, Chapman & Hall Ltd.
5. Automotive Mechanics-Principle & Practice, Josepe Heitner, East West Press.
6. Torque Converter, P.M. Heldt, Chilton Book Co.