

DRAFT SYLLABUS ENGINEERING PHYSICS

(Common to all Branches)
[As per Choice Based Credit System (CBCS) scheme]
(Effective from the academic year 2021-22)

Course Code : 21PHY12/22
Teaching Hours/Week (L:T:P:S) : 2:1:0:0
Contact Hours/Week : 03
Total Hours: 40
Semester: I/II

CIE Marks : 50
SEE Marks: 50
Total Marks : 100
Exams. Hours: 03
Credits: 03

Course Learning Objectives: This course (21PHY12/22) will enable students to

- Learn the basic concepts in Physics which are very much essential in understanding and solving engineering related challenges.
- Gain the knowledge of newer concepts in modern physics for the better appreciation of modern technology.

MODULE - 1

Oscillations and Waves

Free Oscillations : Definition of SHM, derivation of equation for SHM, Mechanical and electrical simple harmonic oscillators (mass suspended to spring oscillator with series and parallel combination).

Damped and forced oscillations : Differential equation of damped oscillations and mention its general solution : over damping, critical & under damping, quality factor. Theory of forced oscillations and resonance, sharpness of resonance.

Shock Waves : Mach number, Shock Waves. Statement of Laws of conservation of mass, energy and momentum. Construction and working of Reddy shock tube, Characteristics of Reddy shock tube, applications of shock waves.

Numerical Problems.

08 - Hours

MODULE - 2

Elastic Properties of Materials :

Elasticity : Concept of elasticity, plasticity, stress, strain, tensile stress, shear stress, compressive stress, Hooke's Law, different elastic moduli, Poisson's ratio, Expression for Young's modulus (Y), Bulk modulus (K) & Rigidity modulus (n) in terms of α & β .

Bending of beams : Derivation of expression for bending moment, Single Cantilever, derivation of expression for Young's modulus.

Torsion of Cylinder : Expression for couple per unit twist of a solid cylinder (Derivation), Torsional pendulum – Expression for period of oscillation.

Numerical Problems.

08 - Hours

MODULE – 3

Electromagnetism and Quantum Mechanics

Maxwell's equation : Fundamentals of vector calculus, divergence & curl of electric field & magnetic field (static), Gauss divergence theorem & Stoke's theorem.

Role of Dielectrics : Dielectrics, Mention of solid, liquid & gaseous dielectrics with one example each. Application of dielectrics in transformers.

Quantum Mechanics : Heisenberg uncertainty principle, applications (non-existence of electron in the nucleus), wave function, properties of wave function, time independent Schrodinger wave equation, particle in box, eigen values, eigen functions

Numerical Problems.

08 – Hours

MODULE – 4

Materials Science

Electrical conductivity in metals : Free electron concept (mean free path, mean collision time, drift velocity, relaxation time), assumptions of classical free electron theory, Mention the expression for electrical conductivity for classical free electron theory , failures of classical free electron theory. Assumptions of quantum free electron theory, expression for electrical conductivity for quantum free electron theory, success of quantum free electron theory, Fermi energy, Fermi factor, dependence of Fermi factor on temperature

Semiconductor Physics : Expression for electrical conductivity in intrinsic semiconductor, Hall effect

Nanomaterials : Introduction to Nanomaterials and Quantum structures (0-D, 1-D, 2-D).

Characterization Techniques : Principle, Construction and Working of X-ray diffractometer (XRD), Scanning Electron Microscopy (SEM).

Numerical Problems.

08 - Hours

Handwritten signature in green ink.

Handwritten signature in blue ink.

Handwritten signature in blue ink.

Handwritten signature in blue ink.

MODULE – 5

Lasers and Optical Fibers

Lasers : Principles of lasers, Einstein's coefficients (derivation of expression for energy density). Requisites of laser system. Conditions for laser action. Construction & working of CO₂ & Semiconductor laser. Applications of laser in defence (Laser range finder) & Engineering (data storage).

Optical Fibers : Propagation Mechanism, angle of acceptance. Numerical aperture. Modes of Propagation & types of optical fibers, attenuation mechanisms, attenuation coefficient (qualitative), discussion of block diagram of point to point of communication system.

Numerical Problems.

08 - Hours

Course Outcomes:

Upon completion of this course, students will be able to

1. Understand various types of oscillations and their implications, the role of Shock waves in various fields and recognize the elastic properties of materials for engineering applications.
2. Realize the interrelation between time varying electric field and the transverse nature of the EM waves and their role in optical fiber communication.
3. Compute Eigen values, Eigen functions, momentum of Atomic and subatomic particles using Time independent 1-D Schrodinger's wave equation.
4. Apprehend theoretical background of laser, construction and working of different types of laser and its applications in different fields.
5. Understand various electrical and thermal properties of materials like conductors, semiconductors and dielectrics using different theoretical models.

Pedagogy (General Instructions) :

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1. Apart from conventional lecture methods various types of innovative teaching techniques through videos, animation films may be adopted so that the delivered lesson can progress the students in theoretical, applied and practical skills in physics.
2. State the necessity of physics in engineering studies and offer real life examples.
3. Seminars and Quizzes may be arranged for students in respective subjects to develop skills.
4. Encourage the students for group learning to improve their creativity and analytical skills.
5. While teaching show how every concepts can be applied to the real world. This helps the students to expand understanding level.
6. Support and guide the students for self-study.
7. Ask some higher order thinking questions in the class, which promotes critical thinking.
8. Inspire the students towards the studies by giving new ideas and examples

Question paper pattern:

Note: -

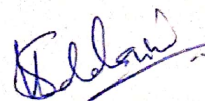
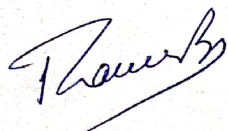
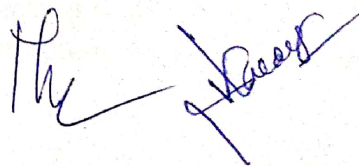
- The SEE question paper will be set for 100 marks and the marks will be proportionately reduced to 50.
- The question paper will have ten full questions carrying equal marks.
- Each full question consisting of 20 marks.
- There will be two full questions (with a maximum of four sub questions) from each module.
- Each full question will have sub question covering all the topics under a module.
- The students will have to answer five full questions, selecting one full question from each module.

Text Books:

1. A Text book of Engineering Physics- M.N. Avadhanulu and P.G. Kshirsagar, 10th revised Ed, S. Chand & Company Ltd, New Delhi.
2. Engineering Physics-Gaur and Gupta-Dhanpat Rai Publications-2017.
3. Concepts of Modern Physics-Arthur Beiser: 6 th Ed;Tata McGraw Hill Edu Pvt Ltd- New Delhi 2006.
4. X-ray diffraction- B.E Warren published by Courier Corporation.
5. Nano Composite materials- Synthesis, properties and applications, CRC Press.

Reference books:

1. Introduction to Mechanics — MK Verma: 2nd Ed, University Press(India) Pvt Ltd, Hyderabad 2009
2. Lasers and Non Linear Optics – BB laud, 3rd Ed, New Age International Publishers 2011
3. Solid State Physics-S O Pillai, 8th Ed- New Age International Publishers-2018
4. Shock waves made simple- Chintoo S Kumar, K Takayama and KPJ Reddy: Willey India Pvt. Ltd. New Delhi2014
5. Introduction to Electrodynamics- David Griffiths: 4th Ed, Cambridge University Press 2017
6. Characterization of Materials- Mitra P.K. Prentice Hall India Learning Private Limited
7. Materials Characterization Techniques- Sam zhang, Lin Li, Ashok Kumar, CRC Press, First Edition, 2008



DRAFT SYLLABUS

ENGINEERING PHYSICS LAB

[As per Choice Based Credit System (CBCS) scheme]
(Effective from the Academic Year 2021-22)

Course Code : 21PHYL16/26

Teaching Hours/Week : 02

Total Hours:30

Semester: I/II

CIE Marks : 50

SEE Marks: 50

Exams. Hours: 03

Credits: 01

Course Learning Objectives:

This course (21PHYL16/26) will enable students

- To realize experimentally, the mechanical, electrical and thermal properties of materials, concept of waves and oscillations
- To design simple circuits and hence study the characteristics of semiconductor devices

Experiment:

Module-1

1. Determination of spring constants in Series and Parallel combination.
2. Study Series and parallel LCR resonance and hence Calculate inductance, band width and quality factor using series LCR Resonance.

Module-2

3. n & I by Torsional pendulum (radius of the wire, mass and dimensions of the regular bodies to be given).
4. Young's modulus of a beam by Single Cantilever experiment.

Module-3

5. Calculation of Dielectric constant by RC charging and Discharging.
6. Stefan's Law of radiation.
7. Determination of Planck's constant using Light Emitting Diodes.

Module-4

8. Determination Estimation of Fermi Energy of Copper.
9. Study of input and output Transistor characteristics and hence calculate input resistance, and output resistance .

Module-5

10. Determine Acceptance angle and Numerical aperture of an optical fiber.
11. Determine Wavelength of semiconductor laser using Laser diffraction by calculating grating constant.




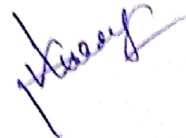
12. Draw I-V characteristics of photodiode and calculate power responsivity.
13. Young's modulus by uniform bending.

Note: Any 10 experiments are mandatory. Student has to perform 2 experiments in the semester end examination

Course Outcomes:

Upon completion of this course, students will be able to

1. Apprehend the concepts of interference of light, diffraction of light, Fermi energy and magnetic effect of current
2. Understand the principles of operations of optical fibers and semiconductor devices such as Photodiode, and NPN transistor using simple circuits
3. Determine elastic moduli and moment of inertia of given materials with the help of suggested procedures
4. Recognize the resonance concept and its practical applications
5. Understand the importance of measurement procedure, honest recording and representing the data, reproduction of final results



Web links and Video Lectures (e-Resources):

<https://www.britannica.com/technology/laser,k>

<https://nptel.ac.in/courses/115/102/115102124/>

<https://nptel.ac.in/courses/115/104/115104096/>

<http://hyperphysics.phy-astr.gsu.edu/hbase/hframe.html>

https://onlinecourses.nptel.ac.in/noc20_mm14/preview

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning :

<http://nptel.ac.in> <https://swayam.gov.in>

<https://www.vlab.co.in/participating-institute-amrita-vishwa-vidyapeetham>

Boite

M *phases*

Solder

Traverse

Sharnbasva University, Kalaburagi
Scheme of Teaching and Examination 2021-22
Outcome Based Education(OBE) and Choice Based Credit System (CBCS)
(Effective from the academic year 2021-22)

I / II SEMESTER B.Tech (Physics Group)

I / II SEMESTER B.Tech (Physics Group)												
Sl.No	Course Code	Course Title	Teaching Dept. & Paper Setting Board	Teaching Hours/week				Examination				Credits
				Theory Lecture	Tutorial	Practical/Drawing	Self-Study	Duration in hours	CIE Marks	SEE Marks	Total Marks	
				L	T	P	S					
1	21PHY12/22	Engineering Physics	Physics	2	1	---	---	3	50	50	100	03
2	21PHYL16/26	Engineering Physics Lab	Physics	---	--	2	---	3	50	50	100	01
Total				2	1	2		6	100	100	200	04

[Handwritten signature]

[Handwritten signature]

[Handwritten signature]

[Handwritten signature]

[Handwritten signature]

[Handwritten signature]

Date :- 28/11/2021

A meeting of Board of Studies (BOS) is conducted

- ① Finalization of the choice based credit scheme (CBCS) for the under graduate course.
- ② Finalization of Syllabus and Scheme of Engineering Physics (Theory and Lab) for I and II Semester.
- ③ Finalization of Syllabus and Scheme of PhD in Physics coursework.

on 28/11/2021 at 11:00 AM in University Meeting Hall, Main building, Sharnbasva University, Kalaburagi.

The following members were present in the meeting.

Internal members

① Dr. Anilkumar Bidve chairman

② Dr. Nagbannanna Guragol Member

External members

① Dr. M.V.N. Ambika Prasad Member

② Dr. Bharat Kumar Member

③ Dr. Vijaylaxmi Reddy Member

④ Dr. Siddlingeshwar B. Member

⑤ Revanasiddappa Member

⑥ Prof. Shivleela Wadankeri Member

⑦ Prof. Praveen B. Chouri Member

The meeting resolved to accept the scheme and evaluation and Syllabus prepared the department of Physics.

Faculty of Science and Technology, Sharnbasva University, Kalaburagi.

CHAIRMAN (BOS)
Department of P.G. Studies in Physics
Faculty of Science & Technology
Sharnbasva University, Kalaburagi.





Pooja D. Sharnbasva Appa
National Public School
Sharnbasva University
Sharnbasva University



Pooja Malathi Dr. Sharnbasva S. Appa
Channarayana
Sharnbasva University
Sharnbasva University



Pooja Channarayana Doddappa Appa
Balekundi 1st Puttur
Sharnbasva University
Sharnbasva University

ಶರಣಬಸವ
Sharnbasva



ವಿಶ್ವವಿದ್ಯಾಲಯ
University



Pooja Malathi Godutal Aravali
Sharnbasva University
Sharnbasva University



Pooja Doddappa Appa
Founder President
Sharnbasva University
Sharnbasva University

Kalaburagi - 585103, Karnataka - India
ಕಲಬುರಗಿ 585 103 ಕರ್ನಾಟಕ - ಭಾರತ

Phone / Fax No. 08472-277852, 277853, 277854, 277855 www.sharnbasvauniversity.edu.in - email : Sharnbasvauniversity@gmail.com

UGC Status: Letter No. F.8-29/2017(CPP-I/PU), Dated 20 Dec. 2017. Enlisted by the University Grants Commission, New Delhi, in the list of Private Universities in India.
A Private University enacted by Govt. of Karnataka as "Sharnbasva University Act. 2012" Karnataka Act No. 17 of 2013. Notification No. ED 144 URC 2016 dated 29/07/2017

Dr. Niranjan V. Nisty M.D., Ph.D.

Vice-Chancellor

Sri N.S. Devarkal B.Sc., M.A., LL.B.

Pro Vice-Chancellor

Dr. V. D. Mytri M.Tech., Ph.D.

Pro Vice-Chancellor

Dr. Anilkumar Bidve M.Sc., Ph.D.

Registrar : Cell: 6362910165

Dr. Lingraj Shastri M.E., Ph.D.

Registrar (Eval): Cell: 6362910167

Dr. Lakshmi Patil M.Tech., Ph.D.

Dean: Cell: 6362910168

Dr. Basavaraj S. Mathapati

Dean: Cell: 9448650187

Prof. Kiran Maka M.Tech., (Ph.D.)

Finance Officer: Cell: 9632294958

Faculty of Engg. & Tech.

B.Tech Branches

1. Electronics & Comm. Engineering

2. Electrical & Electronics Engineering

3. Computer Science & Engineering

4. Civil Engineering

5. Mechanical Engineering

6. Energy Engineering

M.Tech. Programmes

1. Computer Science & Engineering

2. Computer Network & Engineering

3. Digital Electronics

4. VLSI & Embedded Systems

5. Machine Design Engineering

6. Structural Engineering

7. PG Diploma Data Science for Logistics

Faculty of Engg & Tech

(Exclusively for Women)

B.Tech Branches

1. Electronics & Comm. Engineering

2. Electrical & Electronics Engineering

3. Computer Science & Engineering

4. Artificial Intelligence & Machine Learning

5. Civil Engineering

M.Tech. Faculty of Engg & Tech

1. Computer Science & Engineering

2. Digital Comm. & Network

3. Artificial Intelligence & Data Science

Faculty of Architecture

1. B. Arch

Faculty of Business Studies

1. BBM-HR, Marketing, Finance

2. MBA -HR, Marketing, Finance

3. MBA -Hospital Administration

4. MBA-Tourism & Travel Mgmt.

5. M.Com.

6. BBA Logistics

(Exclusively for Women)

1. MBA-HR, Marketing, Finance

2. BBM-HR, Marketing, Finance

3. BMS-Aviation Service & Air Cargo

Faculty of Social Science

1. M.A. Journalism & Mass Comm.

Faculty of Science & Tech.

1. M.Sc. Physics 2. M.Sc. Maths

3. M.Sc. Zoology 4. M.Sc. Botany

Faculty of Computer Application

1. MCA 2. BCA

(Exclusively for Women)

1. BCA

Faculty of Fine Art

1. M.A. Visual Art

Faculty of Music

1. M.A. Music

Faculty of Languages

1. M.A. Kannada 2. M.A. English

Date: 27-11-2021

Constitution of Board of studies in Chemistry

Reference: Hon. Vice Chancellor's approval dated 24-11-2021

With reference to the above cited subject and references, the Board of
Studies in Chemistry has been constituted as below.

Board of Studies in Chemistry

Sl. No.	Name and address of the Member	Appointed As
1	Dr. Nirdosh Patil Professor and Chairman, B.Tech (Co-Ed) Dept. of Chemistry, Sharnbasva University, Kalaburagi	Chairman
2	Dr. R S Malipatil Associate Professor, Department of Chemistry, Poojya Doddappa Appa College of Engineering, Kalaburagi.	External Member
3	Dr. Kashinath K Professor, Department of Chemistry, K C T Engg. College Kalaburagi.	External Member
4	Dr. Shivakumar R Assistant Professor, Department of Chemistry, Govt. Degree College, Kalaburagi, Gulbarga University, Kalaburagi.	External Member
5	Dr. Parvati S G Assistant Professor, Department of Chemistry, B.Tech (Co-Ed) Sharnbasva University, Kalaburagi	Member
6	Prof. Shweta Patil Assistant Professor, Department of Chemistry, B.Tech (Co-Ed) Sharnbasva University, Kalaburagi	Member

1/2

Cont. ... 2



Pooja D. Sharnbasveshwar Appa
Chairperson,
Sharnbasva University
Kalaburagi



Pooja Basappa Dr. Chakrapani S. Appa
Chairperson,
Sharnbasva University
Kalaburagi



Pooja Changanvi Doddappa Appa
Chairperson,
Sharnbasva University
Kalaburagi

ಶರಣಬಸವ
Sharnbasva



ವಿಶ್ವವಿದ್ಯಾಲಯ
University



Pooja Mallesh Godait Arvi
Chairperson,
Sharnbasva University
Kalaburagi



Pooja Doddappa Appa
Chairperson,
Sharnbasva University
Kalaburagi

Kalaburagi - 585103, Karnataka - India
ಕಲಬುರಗಿ 585 103 ಕರ್ನಾಟಕ - ಭಾರತ

Phone / Fax No. 08472-277852, 277853, 277854, 277855 www.sharnbasvauniversity.edu.in - email : Sharnbasvauniversity@gmail.com

UGC Status: Letter No. F.8-29/2017(CPP-I/PU), Dated 20 Dec. 2017. Enlisted by the University Grants Commission, New Delhi, in the list of Private Universities in India.
A Private University enacted by Govt. of Karnataka as "Sharnbasva University Act. 2012" Karnataka Act No. 17 of 2013. Notification No. ED 144 URC 2016 dated 29/07/2017

Dr. Niranjan V. Nisty M.D., Ph.D.
Vice-Chancellor

Sri N.S. Devarkal B.Sc., M.A., LL.B.
Pro Vice-Chancellor

Dr. V. D. Mytri M.Tech., Ph.D.
Pro Vice-Chancellor

Dr. Anilkumar Bidve M.Sc., Ph.D.
Registrar : Cell: 6362910165

Dr. Lingraj Shastri M.E., Ph.D.
Registrar (Eval): Cell: 6362910167

Dr. Lakshmi Patil M.Tech., Ph.D.
Dean: Cell: 6362910168

Dr. Basavaraj S. Mathapati
Dean: Cell: 9448650187

Prof. Kiran Maka M.Tech., (Ph.D.)
Finance Officer: Cell: 9632294958

Faculty of Engg. & Tech.
B.Tech Branches

1. Electronics & Comm. Engineering
2. Electrical & Electronics Engineering
3. Computer Science & Engineering
4. Civil Engineering
5. Mechanical Engineering
6. Energy Engineering

M.Tech. Programmes

1. Computer Science & Engineering
2. Computer Network & Engineering
3. Digital Electronics
4. VLSI & Embedded Systems
5. Machine Design Engineering
6. Structural Engineering
7. PG Diploma Data Science for Logistics

Faculty of Engg & Tech
(Exclusively for Women)

B.Tech Branches

1. Electronics & Comm. Engineering
2. Electrical & Electronics Engineering
3. Computer Science & Engineering
4. Artificial Intelligence & Machine Learning
5. Civil Engineering

M.Tech. Faculty of Engg & Tech

1. Computer Science & Engineering
2. Digital Comm. & Network
3. Artificial Intelligence & Data Science

Faculty of Architecture

1. B. Arch
2. BBA Logistics
3. BBA Marketing, Finance
4. BBA -HR, Marketing, Finance
5. BBA -Hospital Administration
6. BBA -Tourism & Travel Mgmt.
7. M.Com.

(Exclusively for Women)

1. BBA -HR, Marketing, Finance
2. BBA -HR, Marketing, Finance
3. BBA -Hospital Administration
4. BBA -Tourism & Travel Mgmt.

Faculty of Social Science

1. M.A. Journalism & Mass Comm.
2. M.Sc. Physics
3. M.Sc. Zoology
4. M.Sc. Botany

Faculty of Computer Application

1. MCA
2. BCA

(Exclusively for Women)

Faculty of Fine Art

1. M.A. Visual Art

Faculty of Music

1. M.A. Music

Faculty of Languages

1. M.A. Kannada
2. M.A. English

7	Prof. Ambika Bhusange Assistant Professor, Department of Chemistry, B.Tech (Women) Sharnbasva University, Kalaburagi	Member
8	Prof Anita R H Assistant Professor, Dept. of Chemistry, B.Tech (Women) Sharnbasva University, Kalaburagi	Member

Term of the nominated Members shall be two years from the date of this order.

Copy to:

1. Chairman, Board of Studies in Chemistry, Sharnbasva University, Kalaburagi.
2. All the Members of Board of Studies (BOS).
3. Registrar, Sharnbasva University, Kalaburagi.
4. Academic Dean Sharnbasva University, Kalaburagi.
5. Office copy

REGISTRAR

SHARNBASVA UNIVERSITY ENGINEERING CHEMISTRY

(Common to all branches)

[As per Choice Based Credit System (CBCS) scheme]
(Effective from the academic year 2021-22)

Course code : 21CHE12/22

Contact hours /Week :04

Total Hours : 40

Semester : I/II

CIE Marks : 50

SEE Marks : 50

Exam hours : 03

Credits : 03

Course Learning Objectives:

This course (21CHE12/22) will enable students to

1. CLO1: Impart the basic knowledge of chemistry and its principles involved in electrochemistry, energy storage devices, and its commercial applications.
2. CLO2: Understand the basic principles of corrosion and its prevention, metal finishing, and its technological importance
3. CLO3: Master the knowledge of synthesis, properties, and utilization of engineering materials like polymer, lubricants, and refractories.
4. CLO4: To understand the importance of water chemistry and apply the knowledge of green chemistry principles for the production of chemical compounds.
5. CLO5: Understand the theory, basic principle, and applications of volumetric analysis and analytical instruments. understanding the concepts of synthesis and characterization of nanomaterials.

Pedagogy (General Instructions):

These are sample Strategies; which teachers can use to accelerate the attainment of the various course outcomes.

1. Lecturer method (L) does not mean only the traditional lecture method, but a different type of teaching method may be adopted to develop the outcomes.
2. Show Video/animation films to explain methods of synthesis of nanomaterials.
3. Encourage collaborative (Group Learning) Learning in the class
4. Ask at least three HOTS (Higher-order Thinking) questions in the class, which promotes critical thinking
5. Adopt Problem Based Learning (PBL), which fosters students Analytical skills, develop thinking skills such as the ability to evaluate, generalize, and analyze information rather than simply recall it.
6. Topics will be introduced in multiple representations.
7. Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them.
8. Discuss how every concept can be applied to the real world and when that's possible, it helps improve the students' understanding.

Dr. Nirdosh Patil

Dr. R. S. Malipatil

Dr. Kashinath K. G.

Dr. Shivakumar R.

Dr. Parvati S.G.

Prof. Shweta Patil

Prof. Ambika S.B.

Prof. Anita R.H.



MODULES

MODULE-I: Electrochemistry and Energy storage systems

Electrochemical Systems: Derivation of Nernst equation for single electrode potential. Reference electrodes: Introduction, construction, working and applications of Calomel electrode. Ion-selective electrode - Definition, construction and principle of Glass electrode. Electrolyte concentration cells, numerical problems.

Fuel Cells: Introduction, differences between conventional cell and fuel cell, limitations & advantages. Construction, working and applications of methanol-oxygen fuel cell with Sulfuric acid electrolyte.

Energy storage systems: Introduction, classification primary, secondary and reserve batteries. Construction, working and applications of Ni-MH, Li-ion batteries.

8 Hours

MODULE-II: Corrosion and Metal finishing

Corrosion: Introduction, Electrochemical theory of corrosion, Factors affecting the rate of corrosion: ratio of anodic to cathodic areas, nature of metal, nature of corrosion product, nature of medium - pH conductivity and temperature Types of corrosion - Differential metal and Differential aeration - pitting and water line). Corrosion control. Metal coatings - Galvanization and Tinning. Cathodic protection - sacrificial anode and impressed current methods.

Metal finishing: Introduction, Technological importance. Electroplating: Introduction, principles governing electroplating Polarization, decomposition potential and overvoltage. electroplating of nickel (Watt's method). Electroless plating: Introduction, electroless plating of copper, distinction between electroplating and electroless plating processes.

8 Hours

MODULE-III: Chemical fuels, Solar energy and Polymers

Chemical Fuels: Introduction, classification, definitions of CV, LCV, and HCV, determination of calorific value of solid/liquid fuel using bomb calorimeter, numerical problems, Knocking of petrol engine - Definition, mechanism, ill effects and prevention. Power alcohol, unleaded petrol and biodiesel.

Solar energy: Introduction, Construction, working and applications of Photovoltaic cell.

Polymers: Introduction, Addition and condensation, mechanism of polymerization- free radical mechanism taking vinyl chloride as an example. Synthesis, properties and applications of PMMA (plexi glass), Polymer composites: Introduction, synthesis, properties and applications of Kevlar. Conducting polymer: Introduction, synthesis of polyaniline with applications.

8 Hours

MODULE-IV: Water chemistry and Green chemistry

Water Chemistry: Introduction, boiler feed water, boiler troubles with disadvantages -scale and sludge formation, boiler corrosion (due to dissolved O_2 , CO_2 , and $MgCl_2$) sewage, definitions of biological oxygen demand (BOD) and chemical oxygen demand (COD), determination of COD, numerical problems on COD. Sewage treatment: primary, secondary (activated sludge) and tertiary methods. Desalination of sea water by reverse osmosis.

Cement: Types of cement, hardening and setting, deterioration of cement.

Green chemistry: Introduction, Principle and applications of green chemistry.

8 Hours

Dr. Nirdosh Patil

Dr. R. S. Mali Patil

Dr. Kashinath K.

Dr. Shivakumar R.

Dr. Parvati S. G.

Prof. Shweta Patil

Prof. Ambika S. B.

Prof. Anila R. H.

MODULE-V : Instrumental methods of analysis and Nanomaterials

Instrumental methods of analysis: Theory, Instrumentation and applications of UV Spectrophotometer, Chromatography (TLC) Flame Photometry, Potentiometry and Conductometry (Strong acid with a strong base)

Nanomaterials: Introduction, size dependent properties (Surface area, Electrical, Optical, Catalytic and Thermal properties). Synthesis of nanomaterials: Top down and bottom up approaches.

Synthesis by Sol gel, precipitation and chemical vapour deposition, Nanoscale materials: Fullerenes, Carbon nanotubes and Dendrimers - properties and applications.

8 Hours

Course Outcomes:

At the end of the course the students are able to understand

- CO1. Basics of Electrochemistry and its applications to batteries.
- CO2. Identify the nature of corrosion, its control and to develop resistance to corrosion by electroplating and Electroless plating.
- CO3. Identify the importance of chemical fuel, solar cells, basic concept of preparation of polymer and its applications.
- CO4. Environmental pollution, waste management, importance of cement and water chemistry.
- CO5. Different techniques of Instrumental methods of analysis and fundamental principles of nanomaterials.

Question paper pattern:

Note:- The SEE question paper will be set for 100 marks and the marks will be proportionately reduced to 50.

- The question paper will have **ten** full questions carrying equal marks
- Each full question carries **20** marks
- There will be **two** full questions (with a **maximum** of **three** sub questions) from each module.
- Each full question will have sub question covering all the topics under a module.
- The students will have to answer **five** full questions, selecting **one** full question from each module.

Text Books:

1. P.C.Jain & Monica Jain. "Engineering Chemistry", Dhanpat Rai Publications, New Delhi (2015 Edition).
2. S.S.Dara, A textbook of Engineering Chemistry, 10th Edition, S Chand & Co., Ltd., New Delhi, 2014.
3. Physical Chemistry, by P.W. Atkins, Oxford Publications (Eighth edition-2006).



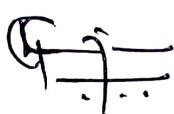

Reference books:





1. O.G.Palanna, "Engineering Chemistry", Tata McGraw Hill Education Pvt.Ltd. New Delhi, Fourth Reprint (2015-Edition).

Dr. Nirdosh Palil
Dr. R.S. Malipatil
Dr. Kashinath K.
Dr. Shivakumar R.

Dr. Parvati S.G.
Prof. Shweta Palil
Prof. Ambika S.B.
Prof. Arida R.H.

2. R.V.Gadag & A.Nityananda Shetty, "Engineering Chemistry", I.K.International Publishing House Private Ltd. New Delhi (2015-Edition).
3. "Wiley Engineering Chemistry", Wiley India Private Ltd. New Delhi second Edition -2013.
4. B.Jaiprakash, R.Venugopal, Sivakumaraiah & Pushpa Iyengar, Chemistry for Engineering Students, Subhash Publications, Bengaluru, (2015-Edition).

Dr. Nirdosh Patil 
Dr. R. S. Malipatil 
Dr. Kashinath K. 
Dr. Shivakumar R. 

Dr. Parvati S.G. 
Prof. Shweta Patil 
Prof. Ambika S.B. 
Prof. Aruna R.H. 

Sharnbasva University, Kalaburagi
Scheme of Teaching and Examination 2021-22
Outcome Based Education(OBE) and Choice Based Credit System (CBCS)
(Effective from the academic year 2021-22)

I / II SEMESTER B.Tech (Chemistry Group)

SL.No	Course Code	Course Title	Teaching Dept. & Paper Setting Board	Teaching Hours/week				Examination				Credits
				Theory Lecture	Tutorial	Practical/Drawing	Self-Study	Duration in hours	CIE Marks	SEE Marks	Total Marks	
1	21CHE12/22	Engineering Chemistry	Chemistry	L 2	T 2	P ---	S ---	3	50	50	100	03
2	21CHEL16/26	Engineering Chemistry Lab	Chemistry	---	--	2	---	3	50	50	100	01
Total				2	2	2		6	100	100	200	04

Dr. Nindesh Patil

Dr. R.S. Malipatil

Dr. Kashinath K.

Dr. Shrivakumar R

Dr. Parvati G.

Prof. Shweta Patil

Prof. Ambik Bhushange.

Prof. Anita. R.H.

SHARNBASVA UNIVERSITY ENGINEERING CHEMISTRY LABORATORY

(Common to all branches)
[As per Choice Based Credit System (CBCS) scheme]
(Effective from the academic year 2021-22)

Course code : 21CHEL16/26

Contact hours /Week :02

Total Hours : 38

Semester : I/II

CIE Marks : 50

SEE Marks : 50

Exam hours : 03

Credits : 01

Course Objectives:

Course Objectives: To provide students with practical knowledge of

- Quantitative analysis of materials by classical methods of analysis.
- Instrumental methods for developing experimental skills in building technical competence.

Instrumental Experiments

1. Potentiometric estimation of FAS using standard $K_2Cr_2O_7$ solution.
2. Conductometric estimation of acid mixture.
3. Determination of Viscosity co-efficient of the given liquid using Ostwald's viscometer.
4. Colorimetric estimation of estimation of copper.
5. Determination of P^{Ka} of the given weak acid using p^H meter.

Volumetric Experiments

1. Estimation of total hardness of water by EDTA complexometric method.
2. Estimation of CaO in cement solution by rapid EDTA method.
3. Determination of percentage of Copper in brass using standard sodium thiosulphate solution.
4. Determination of COD of waste water.
5. Estimation of Iron in haematite ore solution using standard $K_2Cr_2O_7$ solution by external indicator method.

Demonstration Experiments

1. Synthesis of nanomaterials by precipitation method.
2. Determination of percentage of chlorine in bleaching powder by Iodometric method

Course outcomes:

On completion of this course, students will have the knowledge in,

Dr. Nirodosh Patil
Dr. R. S. Malipatil
Dr. Kashinath K.
Dr. Shivakumar R.

Dr. Parvati S.G.
Prof. Shweta Patil
Prof. Ambika S.B.
Prof. Anita R.H.



CO1: Principles and procedure.(Knowledge)

CO2: Understanding the reactions.(Comprehension)

CO3: Applications

CO 4: Handling different types of instruments for analysis of materials using small quantities of materials involved for quick and accurate results (Analysis)

CO5: Carrying out different types of titrations for estimation of concerned in materials using comparatively more quantities of materials involved for good results (Synthesis)

Conduction of Practical Examination:

- a. Examination shall be conducted for 100 marks, later reduced to 50 marks.
- b. All experiments are to be included for practical examination.
- c. One instrumental and another volumetric experiment shall be set.
- d. Different experiments shall be set under instrumental and a common experiment under volumetric.

Reference Books:

1. G.H. Jeffery, J. Bassett, J. Mendham and R.C. Denney, "Vogel's A I, Text Book of Quantitative analysis, Dorling Kindersley (India) Pvt. Ltd. 35th Edition 2012.
2. O.P. Vermani & Narula, "Theory and Practice in Applied Chemistry", New Age International Publishers.
3. Gary D. Christian, "Analytical chemistry", 6th Edition, Wiley India.2015

Dr. Nirdosh Patil

Dr. R. S- Malipatil

Dr. Kashinath K.

Dr. Shivakumar R.

Dr. Parvati S. G.

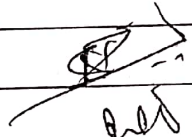

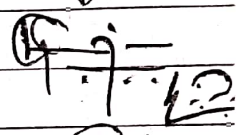
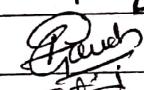
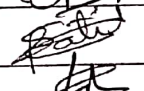
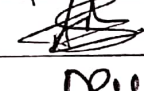
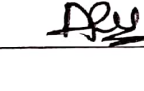
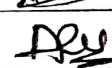
Prof. Shweta Patil

Prof. Ambika S.B.

Prof. Anila R.H.

Proceedings of the meeting of the Board of studies in Engg. Chemistry held on 27/11/2021 at 11:00am to draft the syllabus as for choice based credit system for B.Tech. first semester/second semester course for the academic year 2021-22 onwards.


The following members were present in meeting
Members present :

1.	Dr. Nirdosh Patil.	Chairman	
2.	Dr. R. S. Malipatil.	Member	
3.	Dr. Kashinath K.	Member	
4.	Dr. Shrivakumar R.	Member	
5.	Dr. Parvati S. G.	Member	
6.	Prof. Shweta Patil.	Member	
7.	Prof. Ambika S. B.	Member	
8.	Prof. Anita R. H.	Member.	

A meeting of Board of studies is conducted

- ① Finalization of the choice based credit scheme (CBCS) for the undergraduate course.
- ② Finalization of the syllabus and scheme of Engg. Chemistry (Theory and Lab) for first and second semester.

③ The meeting resolved to accept the scheme and of evaluation and syllabus proposed the department of chemistry, Faculty of Engg. and Technology, Shriharish University, Kalaburagi


Chairman
Basic Science
Chemistry (Coeducation)
University



Centenary Celebrated Sharnbasveshwar Vidya Vardhak Sangha's

ಶರಣಬಸವ
Sharnbasva
ವಿಶ್ವವಿದ್ಯಾಲಯ
University



Kalaburagi - 585103, Karnataka - India

ಕಲಬುರಗಿ - 585 103 ಕರ್ನಾಟಕ - ಭಾರತ ಸ್ಥಾಪನೆ 2017

Under the aegis of the Centenary Celebrated Sharnbasveshwar Vidya Vardhak Sangha's

Phone / Fax No. 08472-277852, 277853, 277854, 277855 www.sharnbasvauniversity.edu.in - email : Sharnbasvauniversity@gmail.com

UGC Status: Letter No. F.5-29/2017(CPP-I/PU), Dated 20 Dec. 2017. Enlisted by the University Grants Commission, New Delhi, in the list of Private Universities in India.

A Private University enacted by Govt. of Karnataka as "Sharnbasva University Act. 2012" Karnataka Act No. 17 of 2013. Notification No. ED 144 URC 2018 dated 29/07/2017

Ref.: SUK/CHE (BoS)/2021-22/

Date: 27/11/2021

NOTIFICATION

Sub.: BoS meeting notice-reg.

Ref: Hon, Vice-Chancellor's approval of dated 24/11/2021.


A meeting of Chairman (BoS) and members of Board of Studies (Chemistry Board) is arranged on dated 27/11/2021 at 11:00 am in Conference Hall, university main building.

- Agenda:** 1) To discuss and finalize the draft syllabus and scheme of Engineering Chemistry (Theory and Lab).
2) To discuss and finalize the draft syllabus and scheme of PhD in Chemistry coursework.

Kindly attend the meeting as scheduled.

Thanking You,

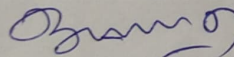
Your's faithfully

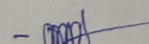

CHAIRMAN
BOS SCIENCE
Faculty of Engg. & Technology (Coeducation)
SHARNBASVA UNIVERSITY
KALABURAGI-585103

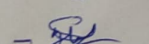
- Encl:** 1) List of BoS members.
2) Draft Scheme and Syllabus.

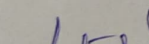
- Copy to:** 1) The Hon. Vice-Chancellor for the kind information.
2) The Registrar for information.
3) The Dean for information.
4) All concerned.

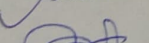
	<div><div><u>DRAFT SCHEME</u></div><div>Sharnbasva University, Kalaburagi</div><div>Scheme of Teaching and Examination 2021-22</div><div>Outcome Based Education(OBE) and Choice Based Credit System (CBCS)</div><div>(Effective from the academic year 2021-22)</div></div>											
	I / II SEMESTER B.Tech (Physics/Chemistry Group)											
Sl.No	Course Code	Course Title	Teaching Dept. & Paper Setting Board	Teaching Hours/week				Examination				Credits
				Theory Lecture	Tutorial	Practical/Drawing	Self-Study	Duration in hours	CIE Marks	SEE Marks	Total Marks	
				L	T	P	S					
1	21MAT11	Engineering Mathematics-I	Mathematics	2	2	---	---	3	50	50	100	03
2	21MAT21	Engineering Mathematics-II	Mathematics	2	2	---	---	3	50	50	100	03
Total				4	4	--	--	06	100	100	200	06

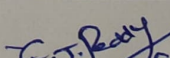
1) Dr. T.V. Biradar 

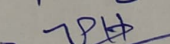
2) Dr. N.B. Naduvanamani - 

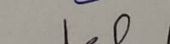
3) Dr. Shalangouda Malipatil - 

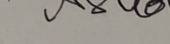
4) Dr. Mahantesh Swamy - 

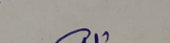
5) Dr. Shivalingappa Patil - 

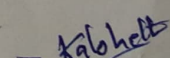
6) Dr. G. Janardhan Reddy - 

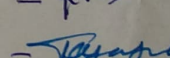
7) Dr. Veena. P. H - 

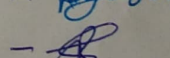
8) Dr. Ashuk Patil - 

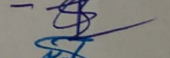
9) Prof. T. Venkatesh - 

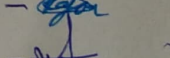
10) Dr. Suvargana Saraf - 

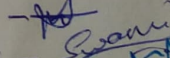
11) Dr. Swati Kalshetty - 

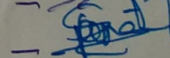
12) Prof. Jaysudha. N - 

13) Dr. Suresh Biradar - 

14) Dr. Shreedevi Kalyan - 

15) Dr. Jagadish Patil - 

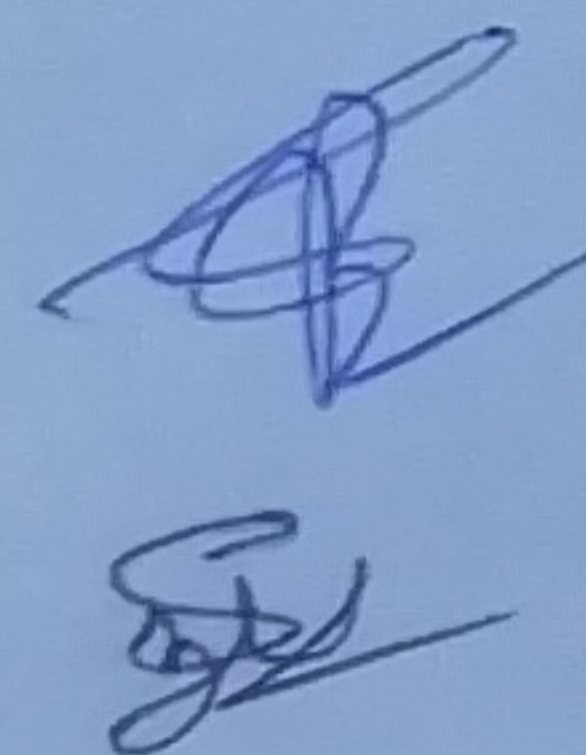
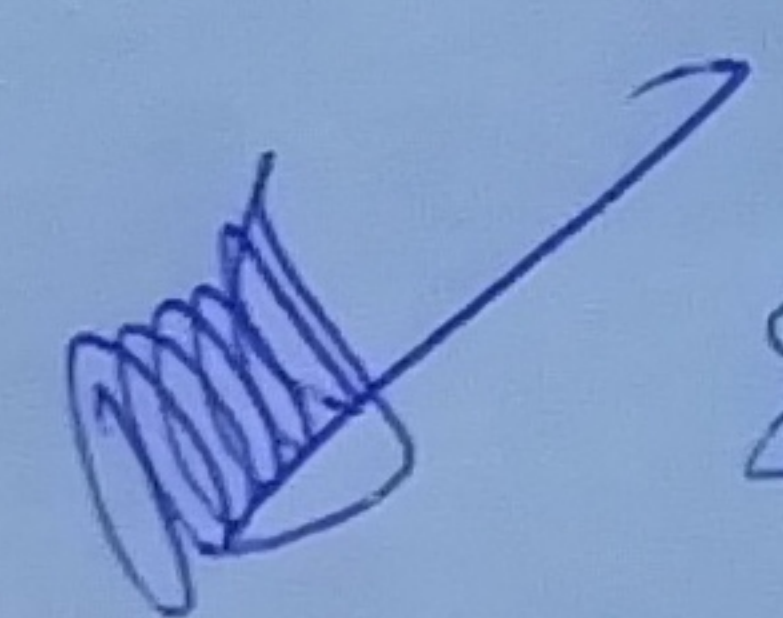
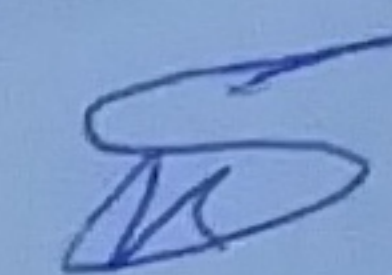
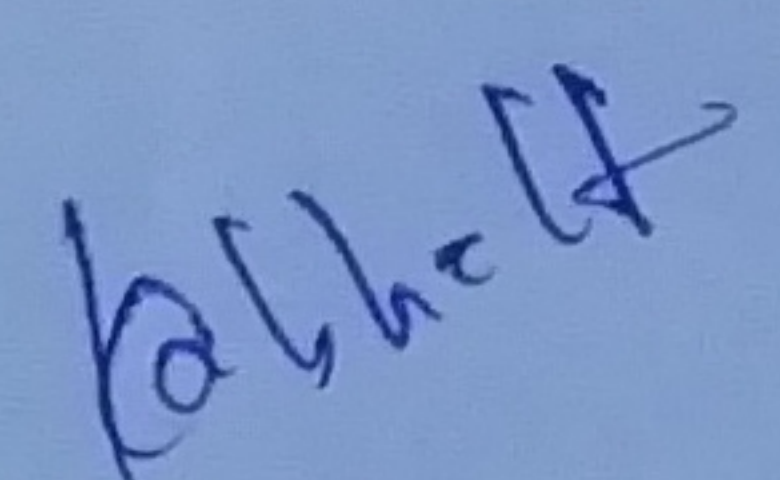
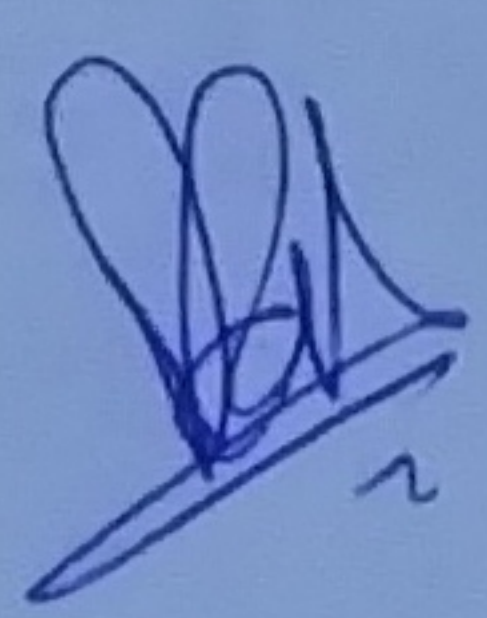
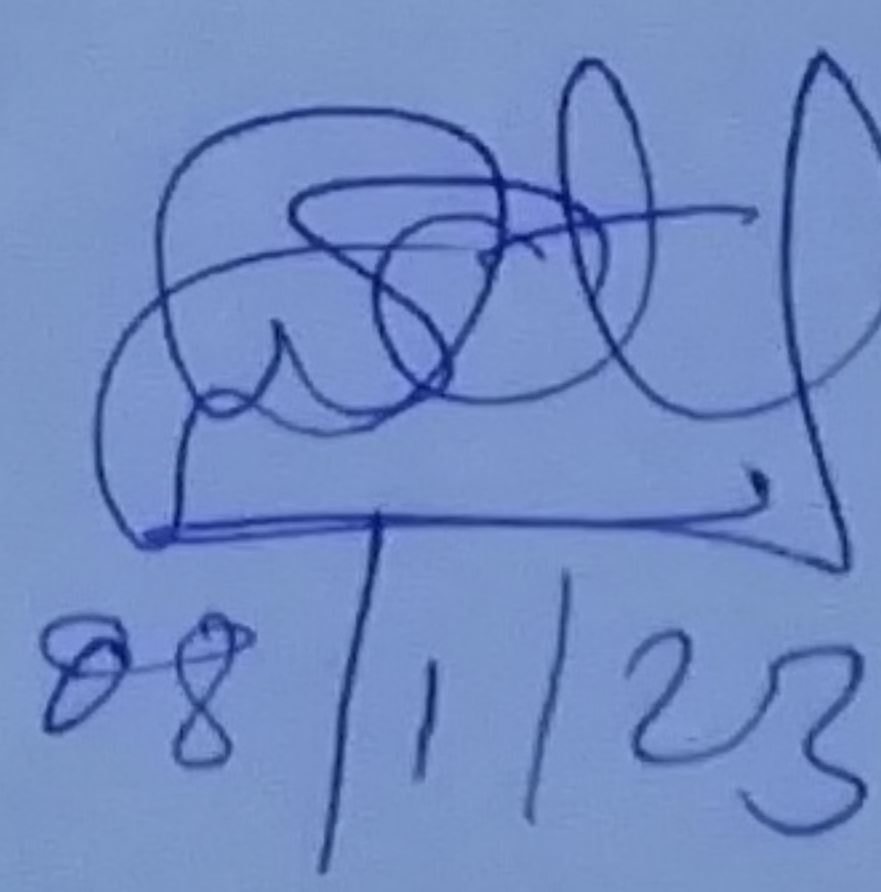
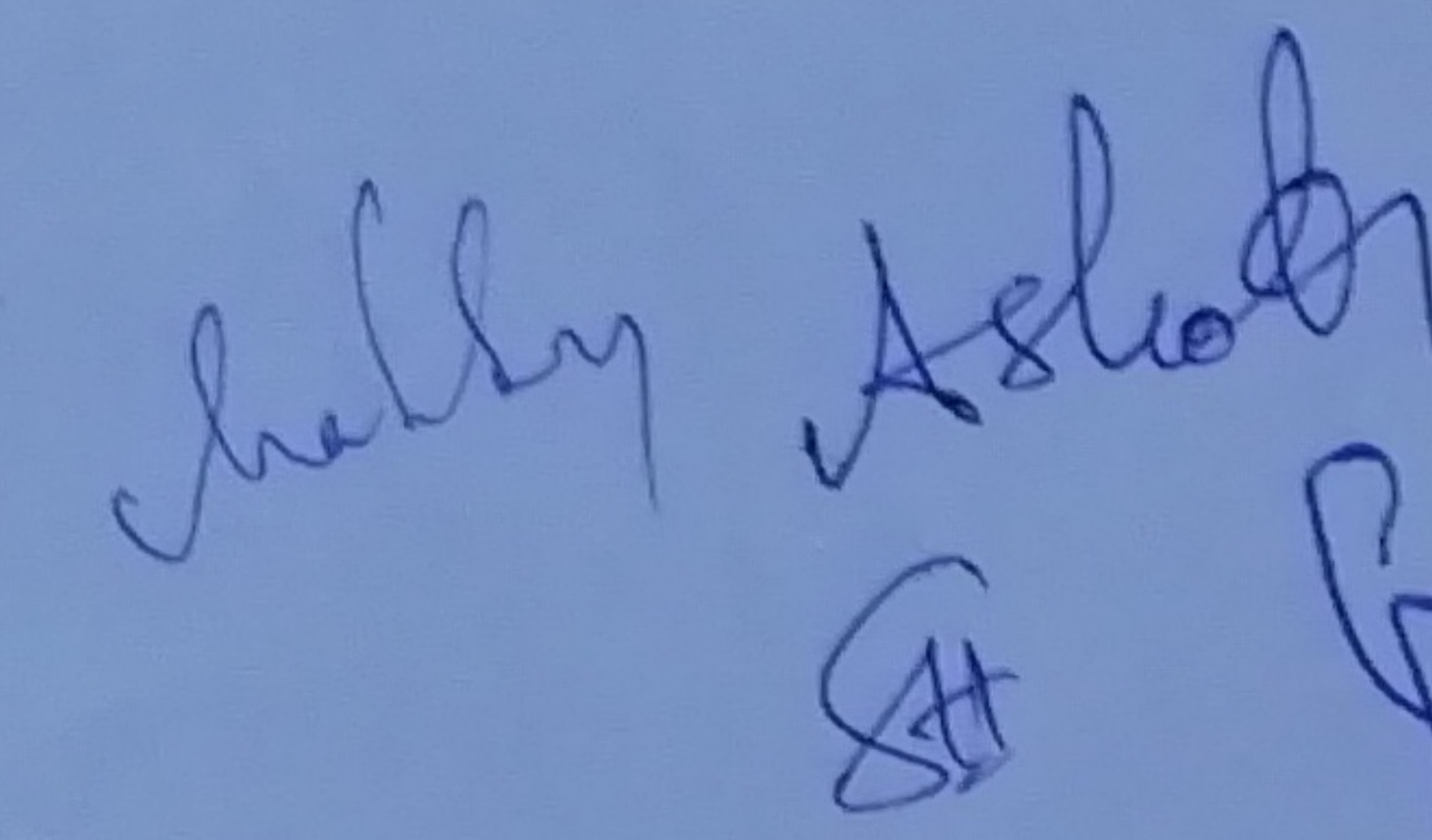
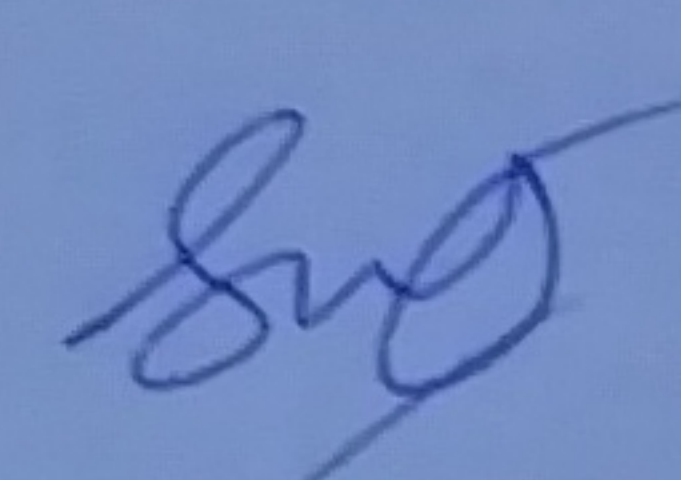
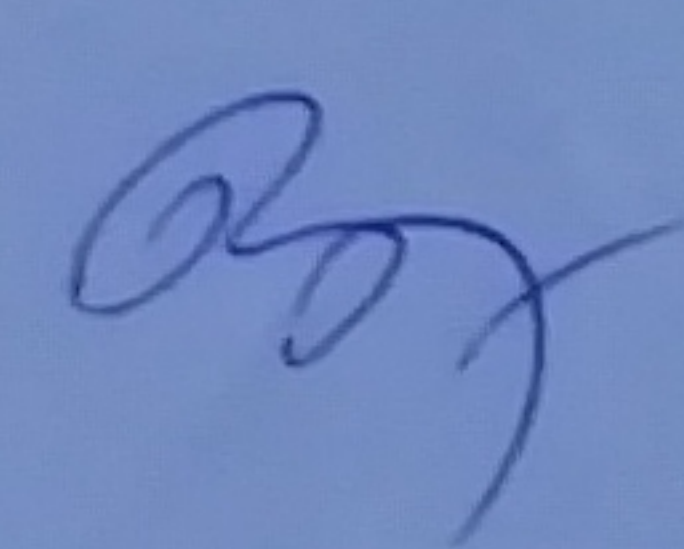
16) Prof. Shalanayya Swami - 

17) Prof. Ramesh Kempepatil - 

Sharnbasva University, Kalaburagi
Scheme of Teaching and Examination 2021-22
Outcome Based Education(OBE) and Choice Based Credit System (CBCS)
(Effective from the academic year 2021-22)

III and IV SEMESTER B.Tech (For all Branches)

SL.N o	Course Code	Course Title	Teaching Dept. & Paper Setting Board	Teaching Hours/week		Examination				Credits
				T	P	Duration in hours	CIE Marks	SEE Marks	Total Marks	
1	21MAT31	Engineering Mathematics-III	Mathematics	3		3	50	50	100	03
2	21MAT41	Engineering Mathematics-IV	Mathematics	3		3	50	50	100	03
3	21MATDIP31	Additional Mathematics-I	Mathematics	2		2	50		100	00
4	21MATDIP41	Additional Mathematics-II	Mathematics	2		2	50		100	00
Total				10		10	200	100	400	06

08/11/23

SHARNBASVA UNIVERSITY, KALABURAGI

ENGINEERING MATHEMATICS - I

Course Code	21MAT11	CIE Marks	50
Contact Hours/Week	03	SEE Marks	50
Total Hours	40	Exam Hours	03
Semester	I	Credits	03

Course Learning Objectives:

This course Engineering Mathematics-I (18MAT11) will enable students:

- To familiarize the important tools of calculus and differential equations that are essential in all branches of engineering.
- Applications of first order differential equations.
- To enable students to apply the knowledge of mathematics in ECE, EEE, CIVIL and Mechanical Engineering branches.
- To familiarize the importance of improper Integrals and its properties.
- To develop the knowledge of matrices and linear algebra in a comprehensive manner.

MODULE-1: DIFFERENTIAL CALCULUS - 1

Successive Differentiation: Standard forms of n^{th} derivatives (with proof), examples on standard functions, Leibnitz Theorem (without proof) examples, Taylor's and Maclaurin's series expansions for one variable (statements only), Indeterminate forms.

Self Study : Maxima and minima of one variable.

(RBT Levels: L1, L2 and L3)

8 Hours

Teaching – Learning Process

Chalk and talk method / Power Point Presentation

MODULE-2: DIFFERENTIAL CALCULUS - 2

Polar Curves: Expression for Angle between radius vector and tangent, length of perpendicular from pole to the tangent, angle between two polar curves, Pedal Equation of polar curves and problems.

Radius of Curvature: Radius of Curvature for Cartesian and polar form (Without proof) and problems.

Self Study : Envelopes and Evalutes.

(RBT Levels: L1, L2 and L3)

8 Hours

Teaching – Learning Process

Chalk and talk method / Power Point Presentation

MODULE-3: DIFFERENTIAL CALCULUS - 3

Function of several variables, Definitions of Partial Differentiation, Direct and Indirect partial derivatives, Symmetric functions, Jacobian's and its properties, maxima and minima for functions of one and several variables.

Differential Equation: Preamble to differential equations, Exact and Reducible to exact differential equation, Bernoulli's linear differential equation. Applications of first order first degree differential equations: Newton's law of cooling, Law of decay and growth.

Self Study : Homogeneous functions, Euler's theorem, reducible to exact type-2, type-3, type-4.

(RBT Levels: L1, L2 and L3)

8 Hours

Teaching – Learning Process

Chalk and talk method / Power Point Presentation

21MAT11

(Handwritten signatures and marks at the bottom of the page)

SHARNBASVA UNIVERSITY, KALABURAGI

MODULE-4: INTEGRAL CALCULUS

Double and Triple integral examples, changing the order of integration, changing into polar form. Application of double and triple integrals to find area and volume.

Improper Integrals: Beta and gamma functions and its properties and examples

Self Study : Evaluation of double integral over a specific region, Path independence of line integrals and definition of improper integrals of I and II kind.

(RBT Levels: L1, L2 and L3)

8 Hours

Teaching – Learning Process

Chalk and talk method / Power Point Presentation

MODULE-5: MATRICES

Preamble to matrices , Rank of matrix row reduced by echelon form, Test of consistency of homogeneous and non- homogeneous system of equations by rank, trivial and non trivial solutions, solution of linear equations by Gauss Elimination method, Gauss-Jordan method, Eigen values and Eigen vector, Rayleigh's power method.

Self Study : Orthogonal and unitary matrices, Cayley-Hamilton theorem.

(RBT Levels: L1, L2 and L3)

8 Hours

Teaching – Learning Process

Chalk and talk method / Power Point Presentation

Course Outcomes:

On completion of this course, students are able to:

1. Apply the knowledge of calculus to solve problems related to polar curves and its applications in determining the bendness of a curve.
2. Learn the notion of partial differentiation to calculate rates of change of multivariate functions and solve problems related to composite functions.
3. Apply the concept of change of order of integration and variables to evaluate multiple integrals and their usage in computing the area and volumes.
4. Solve first order linear/nonlinear differential equation analytically using standard methods.
5. Make use of matrix theory for solving system of linear equations and compute Eigen values and Eigenvectors .

Question Paper Pattern:

- The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.
- The question paper will have ten full questions carrying equal marks.
- Each full question carries 20 marks.
- There will be two full questions (with a maximum of four sub questions) from each module.
- Each full question will have sub questions covering all the topics under a module.
- The students will have to answer five full questions, selecting one full question from each module.

Text Books:

1. B.S. Grewal : Higher Engineering Mathematics, Khanna Publishers, 43rd Ed., 2015.
2. E. Kreyszig : Advanced Engineering Mathematics, John Wiley & Sons, 10th Ed.(Reprint), 2016.

21MAT11

SHARNBASVA UNIVERSITY, KALABURAGI

Reference books:

1. C.Ray Wylie, Louis C.Barrett : "Advanced Engineering Mathematics", 6th Edition,
2. McGraw-Hill Book Co., New York, 1995.
2. James Stewart : "Calculus -Early Transcendentals", Cengage Learning India Private Ltd., 2017.
3. B.V.Ramana : "Higher Engineering Mathematics" 11th Edition, Tata McGraw-Hill, 2010.
4. Srimanta Pal &Subobh C Bhunia : "Engineering Mathematics", Oxford University Press, 3rd Reprint, 2016.
5. Gupta C.B., Singh S.R. and Mukesh Kumar : "Engineering Mathematics for Semester I & II", Mc-Graw Hill Education (India) Pvt.Ltd., 2015.

Web links and Video Lectures:

1. <http://nptel.ac.in/courses.php?disciplineID=111>
2. [http://www.class-central.com/subject/math\(MOOCs\)](http://www.class-central.com/subject/math(MOOCs))
3. <http://academicearth.org>.

Bhunia

SP

SP

Mahantesh Swamy

Ashok

BH

SP

Swamy

Penalil

tablett

Tagore

PH

SHARNBASVA UNIVERSITY, KALABURAGI

ENGINEERING MATHEMATICS – II

Course Code	21MAT21	CIE Marks	50
Contact Hours/Week	03	SEE Marks	50
Total Hours	40	Exam Hours	03
Semester	II	Credits	03

Course Learning Objectives:

This course viz., Engineering mathematics-II (21MAT21) aims to prepare the students:

- To familiarize the importance of linear and non linear ordinary differential equations, partial differential equations and finding the general, singular and complete solution.
- To familiarize the importance of series solution for solving differential equations.
- To apply the knowledge of vector calculus to find surface area and volume.
- To familiarize the concept of complex valued function and properties and operations of vector and scalar valued functions.

MODULE-1: DIFFERENTIAL EQUATIONS - 1

Solution of non-linear ordinary differential equation of first order : Solvable for p , x , y and Clairaut's equation, Simultaneous differential equation, Solution of second and higher order Ordinary linear differential equation with constant co-efficients, Inverse Differential operator method, Applications of differential equations LCR circuits.

Self Study : Singular solution

(RBT Levels: L1, L2 and L3)

8 Hours

Teaching – Learning Process

Chalk and talk method / Power Point Presentation

MODULE-2: DIFFERENTIAL EQUATIONS - 2

Solution of second & higher order Ordinary linear differential equation with variable co-efficients : Cauchy Differential Equation(CDE) and Legendre's Differential equation(LDE). Method of variation of parameters. Solution of homogeneous LDE by Power series solution Method.

Self Study : Application of second order ordinary differential equation, Initial conditions(IC's) and Initial value problems(IVP's).

(RBT Levels: L1, L2 and L3)

8 Hours

Teaching – Learning Process

Chalk and talk method / Power Point Presentation

MODULE-3: PARTIAL DIFFERENTIAL EQUATIONS (PDE's)

Solution of Non-homogeneous PDE by direct integration, solution of homogeneous PDE with respect to one independent variable only, PDE of First order : Lagrange's Method and Charpits Method. Derivation of one dimensional wave equation and heat equation and solution by methods of separation of variables.

Self Study : Formation of PDE by eliminating arbitrary constant and functions, Classification of PDE

(RBT Levels: L1, L2 and L3)

8 Hours

Teaching – Learning Process

Chalk and talk method / Power Point Presentation

21MAT21

Handwritten signatures and initials at the bottom of the page, including names like Mahantish Swamy, Ashish, Vajrasab, and others.

SHARNBASVA UNIVERSITY, KALABURAGI

MODULE-4: COMPLEX VARIABLES

Complex valued function, limit, continuity, differentiability, analytic functions. Cauchy-Riemann Equation in Cartesian, Polar form. Harmonic and orthogonal property and problems on construction of Analytic function.

Self Study : Complex Trigonometry.

(RBT Levels: L1, L2 and L3)

8 Hours

Teaching – Learning Process

Chalk and talk method / Power Point Presentation

MODULE-5: VECTOR CALCULUS

Vector Differentiation: Scalar and Vector point functions, Gradient, Divergence, Curl, Laplacian operator and problems. Solenoidal and Irrotational vectors.

Vector integration, Vector Surface integral: Greens theorem, Stokes theorem. Volume Integral: Gauss divergence theorem (Without proof), examples.

Self Study : Geometrical and Physical meaning of vector differential operator.

(RBT Levels: L1, L2 and L3)

8 Hours

Teaching – Learning Process

Chalk and talk method / Power Point Presentation

Course Outcomes:

On completion of this course, students are able to:

1. Illustrate the applications of multivariate calculus to understand the solenoidal and irrotational vectors and also exhibit the inter dependence of line, surface and volume integrals.
2. Demonstrate various physical models through higher order differential equations and solve such linear ordinary differential equations.
3. Construct a variety of partial differential equations and solution by exact Methods / method of separation of variables.
4. Explain the applications of Power series and obtain series solution of ordinary differential equations.
5. Apply the knowledge of numerical methods in the modeling of various physical and engineering phenomena.

Question Paper Pattern:

- The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.
- The question paper will have ten full questions carrying equal marks.
- Each full question carries 20 marks.
- There will be two full questions (with a maximum of four sub questions) from each module.
- Each full question will have sub questions covering all the topics under a module.
- The students will have to answer five full questions, selecting one full question from each module.

Text Books:

1. B.S. Grewal: Higher Engineering Mathematics, Khanna Publishers, 43rd Ed., 2015.
2. E. Kreyszig: Advanced Engineering Mathematics, John Wiley & Sons, 10th Ed.(Reprint), 2016.

Reference books:

21MA1721

SHARNBASVA UNIVERSITY, KALABURAGI

1. C.Ray Wylie, Louis C.Barrett : "Advanced Engineering Mathematics", 6th Edition, McGraw-Hill Book Co., New York, 1995.
2. James Stewart : "Calculus -Early Transcendentals", Cengage Learning India Private Ltd, 2017.
3. B.V.Ramana : "Higher Engineering Mathematics" 11th Edition, Tata McGraw-Hill, 2010.
4. Srimanta Pal & Subodh C. Bhunia : "Engineering Mathematics", Oxford University Press, 3rd Reprint, 2016.
5. Gupta C.B., Singh S.R. and Mukesh Kumar : "Engineering Mathematics for Semester I & II", Mc-Graw Hill Education (India) Pvt.Ltd, 2015.

Web links and Video Lectures:

1. <http://nptel.ac.in/courses.php?disciplineID=111>
2. [http://www.class-central.com/subject/math\(MOOCs\)](http://www.class-central.com/subject/math(MOOCs))
3. <http://academicearth.org>.

Garima

~~Garima~~

Shruti

Kalyani

Shruti

Prithvi

Mahanteshwari

Shruti

Shruti

Shruti

Shruti

Shruti

Shruti

Shruti

SHARNBASVA UNIVERSITY, KALABURAGI

ENGINEERING MATHEMATICS – III

3rd SEMESTER SYLLABUS

Course Code	21MAT31	CIE Marks	50
Contact Hours/Week	03	SEE Marks	50
Total Hours	40	Exam Hours	03
Semester	III	Credits	03

Course Learning Objectives:

This course will enable students to:

- Introduce most commonly used analytical and numerical methods in the different engineering fields.
- Learn Laplace transform and Z-transforms to solve ODE and PDE's.
- Understanding the statistical methods, numerical methods.
- Solve the problem related to Interpolation.
- To discuss the random variable and associated probability distributions.
- Understand the vector space and associated results.
- Understand the basic concepts of set theory, relations, functions and mathematical logic.

Course Outcomes(COs):

After completion of course, the student will able to

CO#	Course Outcomes	POs	PSOs
C01	Apply the knowledge of Laplace transform from time domain to frequency domain. Knowing the property of Laplace transform and solving the problems on Signal and image processing which transforms differential equation into algebraic equation form and solving the problems also in inverse Laplace transform.	1, 2, 3	
C02	Knowing the random variable both discrete and continuous and their probability distribution, Mass density function and solving the problemson various engineering problems.	1, 2, 3	
C03	Apply the concept of correlation and regression lines for solving the problems and numerical techniqueto solve engineering problems and fit a least squares curve to the given data.	1, 2, 3	
C04	Studying the Forward and Backward Finite differences and solve the problems on interpolation and Finding the numerical integration by different methods.	1, 2, 3	
C05	Apply the knowledge of Z-transforms in solving the difference equation arising in the continuous and discrete time signals and digital processing,Apply the knowledge of vector space in digital communication/ Apply sampling distribution to solve engineering problems./ Apply the operations like union and intersection on discrete structures such as sets, relations and functions and construct mathematical arguments using logical connectives.	1, 2, 3	

Bloom's level of the course outcomes:

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)

21MAT31

SHARNBASVA UNIVERSITY, KALABURAGI

C01	✓	✓	✓			
C02	✓	✓	✓			
C03	✓	✓	✓			
C04	✓	✓	✓			
C05	✓	✓	✓			

Course Articulation Matrix / Course mapping :

CO#	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	2	2		1				1			1			
C02	3	2	2		1				1			1			
C03	3	2	2		1				1			1			
C04	3	2	2		1				1			1			
C05	3	2	2		1				1			1			

Note: 1-Low, 2-Medium, 3-High

MODULE-1: LAPLACE TRANSFORMS

Laplace Transforms: Definition, Laplace transforms of Elementary functions, properties (without proof) periodic function, Unit step function, Unit impulse function.

Inverse Laplace Transforms: Definition, Convolution Theorem (without proof) and Finding Inverse Laplace transform by convolution Theorem. Solution of Linear Differential equations using Laplace Transforms and Applications (5 Assignment Problem).

Self Study : Solution of first order simultaneous differential equation

(RBT Levels: L1, L2 and L3) 8 Hours

Teaching - Learning Process

Chalk and talk method / Power Point Presentation

MODULE-2: PROBABILITY DISTRIBUTION-1

Probability Distribution: Random variables (discrete and continuous) probability mass/density functions. Binomial distribution, Poisson distribution. Exponential and Normal distributions. Problems. (5 Assignment Problem).

Self Study : Definition of probability , addition and multiplication rule, Bay's theorem.

(RBT Levels: L1, L2 and L3)

8 Hours

Teaching - Learning Process

Chalk and talk method / Power Point Presentation

MODULE-3: STATISTICAL METHODS

Statistical Methods: Correlation-karl Pearson's co-efficient of correlation problems. Regression analysis lines of regression, Rank correlation (without proof)-problems.

Curve Fitting: Curve fitting by the method of least square. Fitting of the curves of the form $y = ax + b$, $y = ax^2 + bx + c$ & $y = ae^{bx}$.

Numerical Methods: Numerical solution of algebraic and transcendental equations by Regula-

21MAT31

[Handwritten signatures and marks at the bottom of the page]

SHARNBASVA UNIVERSITY, KALABURAGI

Falsi Method and Newton-Raphson method. (5 Assignment Problem).

Self Study : Secant method, mean, mode, median, variance and standard deviation.

8 Hours

(RBT Levels: L1, L2 and L3)

Teaching – Learning Process

Chalk and talk method / Power Point Presentation

MODULE-4: FINITE DIFFERENCES

Finite Difference: Forward and Backward differences, Newton's forward and backward interpolation formulae. Divided difference-Newton's divided difference formulae. Lagrange's-interpolation formula and inverse interpolation formula (all formula without proof) problems.

Numerical Integration: Simpsons $\left(\frac{1}{3}\right)^{rd}$, $\left(\frac{3}{8}\right)^{th}$ rules, Weddle's rule (without proof) problems.

(5 Assignment Problem).

Self Study : Numerical differentiation, Trapezoidal rule

8 Hours

(RBT Levels: L1, L2 and L3)

MODULE-5

Department of ECE and EEE : Z-Transforms and Linear Algebra

Z- Transforms: Difference Equations, Basic definitions, Damping rule, Shifting rule, Initial and Final Value theorems (without proof) and problems.

Inverse Z-transforms. Applications of Z-transforms to solve difference equation.

Linear Algebra: Introduction to Vector space and sub space, definitions, illustrative examples and simple problems, Basis and dimensions, Linear independent and linear dependent vectors (5 Assignment Problem).

Self Study : Two dimensional and three dimensional vectors, convergent and divergent series

(RBT Levels: L1, L2 and L3)

8 Hours

Teaching – Learning Process

Chalk and talk method / Power Point Presentation

Department of Civil , Mech and Energy Engg : Sampling theory and Tracing of curves

Sampling theory : Sampling, Sampling distributions, standard error, test of hypothesis for means and proportions, Type I and Type II errors, Level of significance, confidence limits for means, one tailed and two tailed tests, student's t-distribution, Chi - square distribution as a test of goodness of fit.

Tracing of curves: Cartesian form - Strophoid, Lemniscate, Parametric form - Cycloid, Astroid, Polar form - Cardioid, Lemniscate.

Self Study : Types of samplings, Cartesian equations and their geometrical representation

(RBT Levels: L1, L2 and L3)

8 Hours

Teaching – Learning Process

Chalk and talk method / Power Point Presentation

Department of CSE : Relations, Functions and Logic

Functions: Cartesian Products and Relations, Functions – into, many one One-to-One, Onto, Bijective Functions. The Pigeon-hole Principle, Function Composition and Inverse functions.

Relations: Definition and different types of relations

Introduction to logic: Basic Connectives and Truth Tables, Logic Equivalence – The Laws of Logic, Logical Implication – Rules of Inference.

21MAT31

(Handwritten signatures and marks at the bottom of the page)

SHARNBASVA UNIVERSITY, KALABURAGI

Self Study : Different types of sets and operations on sets

(RBT Levels: L1, L2 and L3) 8 Hours

Teaching – Learning Process

Chalk and talk method / Power Point Presentation

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing marks for the CIE is 45% of the maximum marks (22.5 marks out of 50). The minimum passing marks for the SEE is 35% of the maximum marks (18 marks out of 50).

A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 35% (18 Marks out of 50) in the semester-end examination (SEE), and a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation(CIE):

The CIE shall be conducted by the course teacher throughout the semester. The CIE marks for the theory component of the IC shall be 30 marks and for the laboratory component 20 Marks.

The CIE marks for the theory component shall be 50 marks and scored will be reduced to 30.As below

- Three Tests each of 15 Marks; after the completion of the syllabus of 35-40%, 65-70%, and 90- 100% respectively. Average of Best Two performances of the Internal Tests shall be considered for 15 Marks.
- Session wise assignments for 25 marks
- For Seminar and library work 05 marks
- Attendance 5 marks (95% to 100%), 04 marks (85% to 94%)

CIE for the practical component of the IC:

- On completion of every experiment/program in the laboratory, the students shall be evaluated and marks shall be awarded on the same day. The 35 marks are for conducting the experiment and preparation of the laboratory record, the other 15 marks shall be for the test conducted at the end of the semester.
- The CIE marks awarded in the case of the Practical component shall be based on the continuous evaluation of the laboratory report. Each experiment report can be evaluated for 50 marks. Marks of all experiments' write-ups are added and scaled down to 20 marks.

Semester End Examination(SEE)

1. The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.
2. The question paper will have ten full questions carrying equal marks.
3. Each full question carries 20 marks.
4. There will be two full questions (with a maximum of three sub questions) from each module
5. Each full question will have sub questions covering all the topics under a module.
6. The students will have to answer five full questions, selecting one full question from each module.

Suggested Learning Resources:

Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)Text Books

1. **B.S.Grewal:** "Higher Engineering Mathematics", Khanna publishers, 44th Ed., 2021.
2. **E. Kreyszig:** "Advanced Engineering Mathematics", John Wiley & Sons, 10th Ed., 2018.

Reference Books

1. **V. Ramana:** "Higher Engineering Mathematics" McGraw-Hill Education, 11th Ed., 2017
2. **Srimanta Pal & Subodh C. Bhunia:** "Engineering Mathematics" Oxford University Press, 3rd Ed., 2016.
3. **N.P Bali and Manish Goyal:** "A textbook of Engineering Mathematics" Laxmi Publications, 10th Ed., 2022.

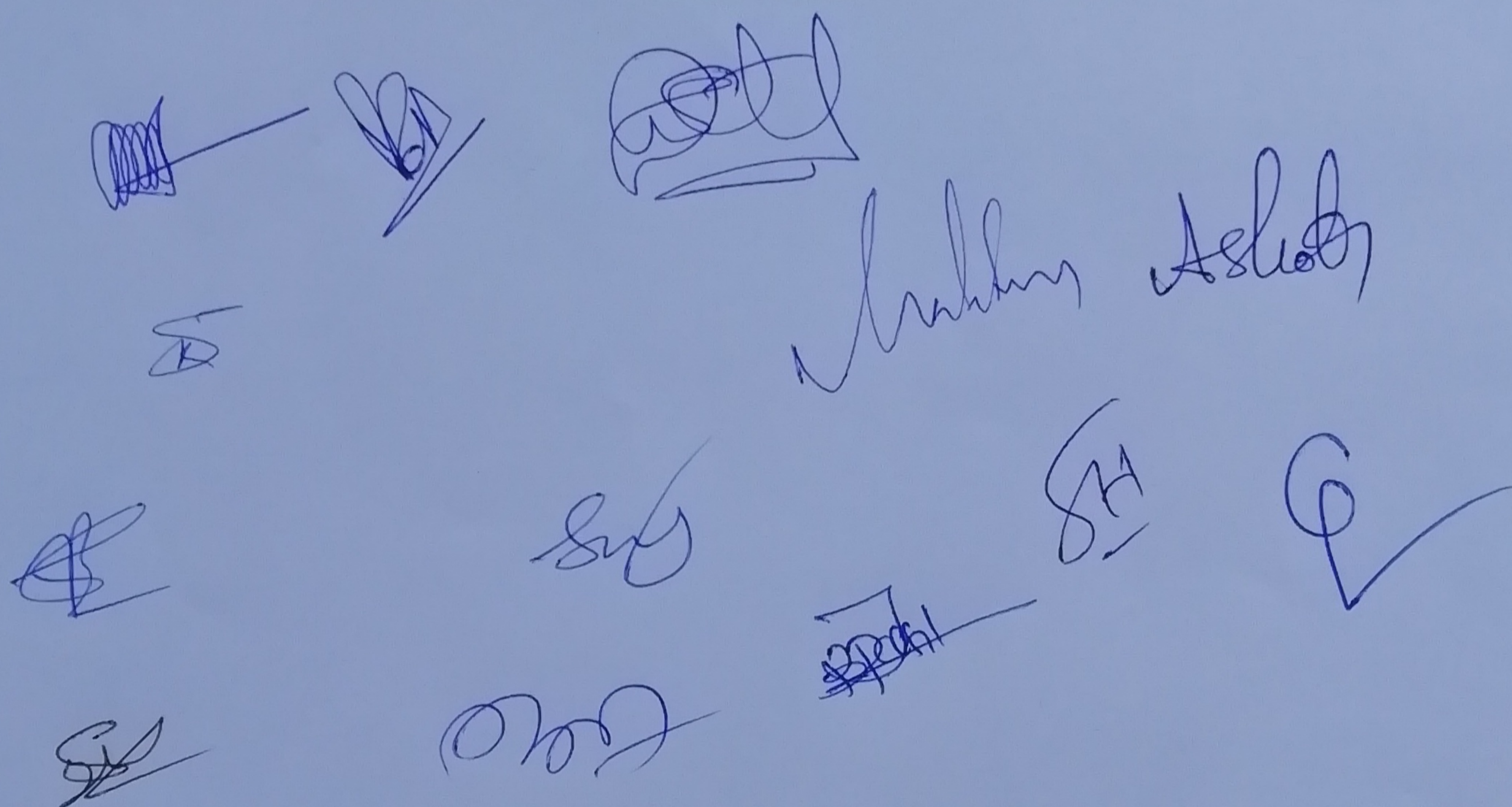
21MAT31

SHARNBASVA UNIVERSITY, KALABURAGI

4. **C. Ray Wylie, Louis C. Barrett:** "Advanced Engineering Mathematics" McGraw-Hill Book Co., New York, 6thEd., 2017.
5. **C.B Gupta, S. R Singh and Mukesh Kumar:** "Engineering Mathematic for Semester I and II", Mc-Graw Hill Education (India) Pvt.Ltd 2015.
6. **H.K. Dass and Er. Rajnish Verma:** "Higher Engineering Mathematics" S.Chand Publication, 3rdEd., 2014.
7. **James Stewart:** "Calculus" Cengage Publications, 7thEd., 2019.
8. **David CLay:** "Linear Algebra and its Applications", Pearson Publishers, 4th Ed.,2018.
9. **Gareth Williams:** "Linear Algebra with applications", Jones Bartlett Publishers Inc., 6thEd., 2017.

Web links and Video Lectures:

1. <http://nptel.ac.in/courses.php?disciplineID=111>
2. <http://www.class-central.com/subject/math>
3. <http://academicearth.org>.

A collection of approximately 15 handwritten signatures and initials in blue ink, scattered across the middle section of the page. The signatures vary in style, with some being highly stylized and others more legible. Notable signatures include one that appears to read 'Ashish' and another that looks like 'Sudhanshu'.

SHARNBASVA UNIVERSITY, KALABURAGI

ENGINEERING MATHEMATICS - IV

4th SEMESTER SYLLABUS

Course Code	21MAT41	CIE Marks	50
Contact Hours/Week	03	SEE Marks	50
Total Hours	40	Exam Hours	03
Semester	IV	Credits	03

Course Learning Objectives:

This course will enable students to:

- Learn Fourier series and Fourier transforms.
- Conversant with numerical methods to solve ordinary differential equations.
- Know then complex combers, Analytic function and associated results and problems.
- Understand Joint probability distribution and stochastic processes arising in science and engineering.
- Understand the definition of sequence, series and its importance.
- Discuss the elementary concepts of graph theory.
- Know the finite difference method and use in solving partial differential equation.

Course Outcomes(COs):

After completion of course, the student will able to

CO#	Course Outcomes	POs	PSOs
C01	Define the Periodic function and Find the Fourier series and half range series expansion of different functions in different intervals and studying Practical Harmonic functions, Know the use of periodic signals and Fourier series to analyze circuits.	1, 2, 3	
C02	Learn to solve the problems on Joint probability distribution fortwo discrete random variables. Knowing the concept of stochastic processes, probability vector, Probability matrix and studying the examples on Markov's chains in discrete time.	1, 2, 3	
C03	Solving the first order first degree ordinary differential equations arising in flow problems using single step and multistep numerical methods.	1, 2, 3	
C04	Use to solve second order ordinary and partial differential equations arising in heat and wave equations by numerical methods.	1, 2, 3	
C05	Apply the knowledge of Fourier transform to solve engineering problems. Understand the analyticity, potential fields, residues and poles of complex potentials in field theory, electromagnetic theory and studying Bilinear transformation./ Obtain the series solution of ordinary differential equations and studying special functions./ Develop the model using advanced concept of graph for real world applications.	1, 2, 3	

Bloom's level of the course outcomes:

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
C01	✓	✓	✓			
C02	✓	✓	✓			

21MAT41

SHARNBASVA UNIVERSITY, KALABURAGI

C03	✓	✓	✓			
C04	✓	✓	✓			
C05	✓	✓	✓			

Course Articulation Matrix / Course mapping :

CO#	P01	P02	P03	P04	P05	P06	P07	P08	P09	P01 0	P01 1	P01 2	PS0 1	PS0 2	PS0 3
C01	3	2	2		1				1			1			
C02	3	3			1				1			1			
C03	3	2	2		1				1			1			
C04	3	2	2		1				1			1			
C05	3	2	2		1				1			1			

Note: 1-Low, 2-Medium, 3-High

MODULE-1: FOURIER SERIES

Fourier Series: Periodic functions, Dirichlet's condition, Fourier Series of periodic functions with period 2π and with arbitrary period $2c$. Fourier series of even and odd functions
Half range Fourier Series, practical harmonic analysis(5 Assignment Problem).

Self-Study: Sequence and series of a function, convergent series.

(RBT Levels: L1, L2 and L3) 8 Hours

Teaching – Learning Process

Chalk and talk method / Power Point Presentation

MODULE-2: PROBABILITY DISTRIBUTIONS-2

Joint probability distribution: Joint Probability distribution for two discrete random variables, expectation, covariance, correlation coefficient.

Stochastic process: Stochastic processes, probability vector, stochastic matrices, fixed points, regular stochastic matrices, Markov chains, higher transition probability-simple problems.
(5 Assignment Problem).

Self Study : Joint probability distribution for continuous random variable

(RBT Levels: L1, L2 and L3)

8 Hours

Teaching – Learning Process

Chalk and talk method / Power Point Presentation

MODULE-3: NUMERICAL METHODS-1

Numerical Methods: Numerical solution of ordinary differential equations of first order and first degree, Taylor's series method, modified Euler's-method Runge Kutta method of fourth order. Milne's and Adams- Bashforth predictor and corrector methods (No derivations of formulae). (5 Assignment Problem).

Self Study : Picard's method

(RBT Levels: L1, L2 and L3)

8 Hours

Teaching – Learning Process

Chalk and talk method / Power Point Presentation

21MAT41

SHARNBASVA UNIVERSITY, KALABURAGI

MODULE-4: NUMERICAL METHODS-2

Numerical Methods: Numerical solution of second order ordinary differential equations, Runge- Kutta Method and Milne's Method, Numerical solution of P.D.E: Numerical solution of Heat equation, Wave equation, problems. (5 Assignment Problem).

Self Study : Picard's method, Numerical solution of Laplace's equation

(RBT Levels: L1, L2 and L3)

8 Hours

Teaching – Learning Process

Chalk and talk method / Power Point Presentation

MODULE-5

Department of ECE and EEE : Fourier Transforms and complex variable

Fourier Transforms: Infinite Fourier transforms, Fourier sine and cosine transforms. Inverse Fourier-transform (5 Assignment Problem).

Complex line Integrals: Cauchy's Integration theorem, Cauchy integral formula, Laurent's Series, types of singularities. Residue, Poles, Cauchy's Residue theorem (without proof) and Problems.

Transformations: Bilinear transformations and problems.

Self Study : Initial value and boundary value problems

(RBT Levels: L1, L2 and L3)

8 Hours

Teaching – Learning Process

Chalk and talk method / Power Point Presentation

Department of Civil , Mechanical and Energy Engg : Special Functions

Special Functions: Series solution of Bessel's differential equation leading to $J_n(x)$ – Bessel's function of first kind. Basic properties and orthogonality. Series solution of Legendre's differential equation leading to $P_n(x)$ – Legendre polynomials. Rodrigue's formula, problems

Self Study : Frobenius method

(RBT Levels: L1, L2 and L3)

8 Hours

Department of CSE : Graph Theory

Graph Theory: introduction to graph theory, definitions of finite and null graphs, loops, multigraphs, pseudo graph, simple graph, degree of a vertex, isolated vertices, connectedness and complete graph, minimum and maximum degree, regular graphs, subgraphs, walk, trial, paths, Euler and Hamilton graphs.

Self Study : line graphs , Bridge, Block and tree

(RBT Levels: L1, L2 and L3) 8 Hours

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing marks for the CIE is 45% of the maximum marks (22.5 marks out of 50). The minimum passing marks for the SEE is 35% of the maximum marks (18 marks out of 50).

A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 35% (18 Marks out of 50) in the semester-end examination (SEE), and a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation(CIE):

21MAT41

[Handwritten signatures and marks at the bottom of the page]

SHARNBASVA UNIVERSITY, KALABURAGI

The CIE shall be conducted by the course teacher throughout the semester. The CIE marks for the theory component of the IC shall be 30 marks and for the laboratory component 20 Marks.

The CIE marks for the theory component shall be 50 marks and scored will be reduced to 30. As below

- Three Tests each of 15 Marks; after the completion of the syllabus of 35-40%, 65-70%, and 90- 100% respectively. Average of Best Two performances of the Internal Tests shall be considered for 15 Marks.
- Session wise assignments for 25 marks
- For Seminar and library work 05 marks
- Attendance 5 marks (95% to 100%), 04 marks (85% to 94%)

CIE for the practical component of the IC:

- On completion of every experiment/program in the laboratory, the students shall be evaluated and marks shall be awarded on the same day. The 35 marks are for conducting the experiment and preparation of the laboratory record, the other 15 marks shall be for the test conducted at the end of the semester.
- The CIE marks awarded in the case of the Practical component shall be based on the continuous evaluation of the laboratory report. Each experiment report can be evaluated for 50 marks. Marks of all experiments' write-ups are added and scaled down to 20 marks.

Semester End Examination(SEE)

1. The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.
2. The question paper will have ten full questions carrying equal marks.
3. Each full question carries 20 marks.
4. There will be two full questions (with a maximum of three sub questions) from each module
5. Each full question will have sub questions covering all the topics under a module.
6. The students will have to answer five full questions, selecting one full question from each module.

Suggested Learning Resources:

Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)Text Books

1. **B.S.Grewal:** "Higher Engineering Mathematics", Khanna publishers, 44th Ed., 2021.
2. **E. Kreyszig:** "Advanced Engineering Mathematics", John Wiley & Sons, 10th Ed., 2018.

Reference Books

1. **V. Ramana:** "Higher Engineering Mathematics" McGraw-Hill Education, 11th Ed., 2017
2. **Srimanta Pal & Subodh C. Bhunia:** "Engineering Mathematics" Oxford University Press, 3rd Ed., 2016.
3. **N.P Bali and Manish Goyal:** "A textbook of Engineering Mathematics" Laxmi Publications, 10th Ed., 2022.
4. **C. Ray Wylie, Louis C. Barrett:** "Advanced Engineering Mathematics" McGraw-Hill Book Co., New York, 6th Ed., 2017.
5. **C.B Gupta, S. R Singh and Mukesh Kumar:** "Engineering Mathematic for Semester I and II", Mc-Graw Hill Education (India) Pvt. Ltd 2015.
6. **H.K. Dass and Er. Rajnish Verma:** "Higher Engineering Mathematics" S.Chand Publication, 3rd Ed., 2014.
7. **James Stewart:** "Calculus" Cengage Publications, 7th Ed., 2019.
8. **David CLay:** "Linear Algebra and its Applications", Pearson Publishers, 4th Ed., 2018.
9. **Gareth Williams:** "Linear Algebra with applications", Jones Bartlett Publishers Inc., 6th Ed., 2017.

Web links and Video Lectures:

1. <http://nptel.ac.in/courses.php?disciplineID=111>
2. <http://www.class-central.com/subject/math>

A collection of handwritten signatures and initials in blue ink on a light blue background. The signatures are arranged in two rows. The top row includes a signature that looks like 'K', a signature that looks like 'K', a signature that looks like 'K', a signature that looks like 'K', and a signature that looks like 'K'. The bottom row includes a signature that looks like 'K', a signature that looks like 'K', a signature that looks like 'K', a signature that looks like 'K', and a signature that looks like 'K'.

SHARNBASVA UNIVERSITY, KALABURAGI

ADDITIONAL MATHEMATICS - I

COMMON TO ALL BRANCHES

Course Code	21MATDIP31	CIE Marks	50
Contact Hours/Week	02	SEE Marks	00
Total Hours	25	Exam Hours	00
Semester	III	Credits	00

Course Learning Objectives:

This course will enable students to:

- Acquire basic concepts of complex trigonometry, vector algebra, differential and integral calculus and vector differentiation.
- know the basic concepts of derivatives and representation of different types of polar curves Evaluation of double and triple integrals.
- know the basic concepts of partial differential equations.
- To develop the knowledge of matrices and linear algebra in compressive manner.
- To understand the essential concept of linear algebra.

Course Outcomes(COs):

After completion of course, the student will able to

CO#	Course Outcomes	POs	PSOs
C01	Learn the representation of complex numbers in Argand diagram and understanding the vector dot product and cross product and use in finding the area, projection, etc. Also understanding the gradient, divergence and curl operators.	1, 2, 3	
C02	Apply the knowledge of calculus to find the nth derivative and solve the problems related to polar curves and its applications in determining the bendness of a curve.	1, 2, 3	
C03	Learn the notion of partial differentiation to calculate rates of change of multivariate functions and solve problems related to composite functions and solve first order linear/nonlinear differential equation analytically using standard methods.	1, 2, 3	
C04	Apply the concept of change of order of integration and variables to evaluate multiple integrals and their usage in computing the area and volumes.	1, 2, 3	
C05	Make use of matrix theory for solving system of linear equations and compute Eigen values and Eigen vectors.	1, 2, 3	

Bloom's level of the course outcomes:

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
C01	✓	✓	✓			
C02	✓	✓	✓			
C03	✓	✓	✓			
C04	✓	✓	✓			
C05	✓	✓	✓			

Course Articulation Matrix / Course mapping :

Handwritten signatures and initials at the bottom of the page, including "Kabheh" and others.

SHARNBASVA UNIVERSITY, KALABURAGI

CO#	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	2	2		1				1			1			
C02	3	2	2		1				1			1			
C03	3	2	2		1				1			1			
C04	3	2	2		1				1			1			
C05	3	2	2		1				1			1			

MODULE-1: COMPLEX TRIGONOMETRY

Complex Numbers: Definition and Properties . Modulus and Amplitude of complex number, Argand's diagram , De-Moivre's theorem (without proof)

Vector Analysis : Scalar and Vectors. Vector addition and subtraction. Multiplication of vectors (Dot and Cross products) Scalar and vector triple products- simple problems, Vector Differentiation : Gradient, Divergence and Curl.

(RBT Levels: L1, L2 and L3) 5 Hours

Teaching – Learning Process

Chalk and talk method / Power Point Presentation

MODULE-2: DIFFERENTIAL CALCULUS

Review of successive differentiation. Formulae of n^{th} derivatives of standard functions- Leibnitz's theorem (without proof).

Polar Curves: Expression for Angle between radius vector and tangent, length of perpendicular from pole to the tangent, angle between two polar curves, Pedal Equation of polar curves and problems. Taylor' and Maclaurin's series expansions.

(RBT Levels: L1, L2 and L3)

5 Hours

Teaching – Learning Process

Chalk and talk method / Power Point Presentation

MODULE-3: PARTIAL DIFFERENTIAL

Definitions of Partial Differentiation, Direct and Indirect partial derivatives, Symmetric functions, Homogeneous function and Euler's theorem on homogeneous function. Total Derivative of composite and implicit function. Jacobians.

(RBT Levels: L1, L2 and L3)

5 Hours

Teaching – Learning Process

Chalk and talk method / Power Point Presentation

MODULE-4: INTEGRAL CALCULUS

Reduction Formulae of $\int_0^{\pi/2} \sin^n x \, dx$, $\int_0^{\pi/2} \cos^n x \, dx$, and Statement of Reduction formulae $\int_0^{\pi/2} \sin^m x \cos^n x \, dx$ and Problems.

Double and Triple integral- simple problems.

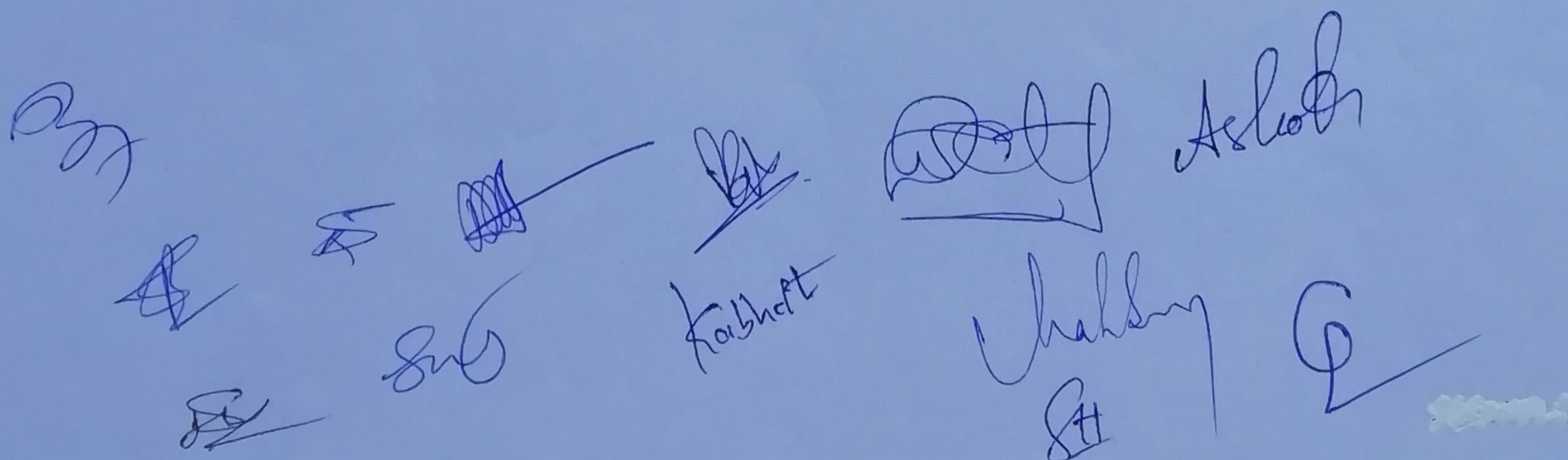
(RBT Levels: L1, L2 and L3)

5 Hours

[Handwritten signatures and marks at the bottom of the page]

SHARNBASVA UNIVERSITY, KALABURAGI

Teaching – Learning Process	Chalk and talk method / Power Point Presentation
MODULE-5: LINEAR ALGEBRA	
Basic concepts of matrices- Rank of matrix by elementary row transformations- Echelon form. Consistency of system of Linear equations. Solution of system linear equations by Gauss Elimination method, Linear Transformation, Cayley- Hamilton theorem to compute inverse of matrix. Eigen values and Eigen vector, Largest Eigen value and corresponding Eigen vector by Reyleigh's Power method. (RBT Levels: L1, L2 and L3)	
5 Hours	
Teaching – Learning Process	Chalk and talk method / Power Point Presentation
CIE + Assignments: 15+35=50 Marks There will be a 2 CIE's, the best one among 2 CIE's will be considered and there will be a 35 marks for Assignments	
Text Books: 1. B.S. Grewal : Higher Engineering Mathematics, Khanna Publishers, 43rd Ed., 2015. 2. E. Kreyszig : Advanced Engineering Mathematics, John Wiley & Sons, 10th Ed.(Reprint), 2016.	
Reference books: 1. C.Ray Wylie, Louis C.Barrett : "Advanced Engineering Mathematics", 6th Edition, McGraw-Hill Book Co., New York, 1995. 2. James Stewart : "Calculus –Early Transcendentals", Cengage Learning India Private Ltd., 2017. 3. B.V.Ramana : "Higher Engineering Mathematics" 11th Edition, Tata McGraw-Hill, 2010. 4. Srimanta Pal &Subobh C Bhunia:"Engineering Mathematics", Oxford University Press,3 rd Reprint,2016. 5. Gupta C.B., Singh S.R. and Mukesh Kumar : "Engineering Mathematics for Semester I & II", Mc-Graw Hill Education (India) Pvt.Ltd., 2015.	
Web links and Video Lectures: 1. http://nptel.ac.in/courses.php?disciplineID=111 2. http://www.class-central.com/subject/math 3. http://academicearth.org .	



SHARNBASVA UNIVERSITY, KALABURAGI

ADDITIONAL MATHEMATICS -II

COMMON TO ALL BRANCHES

Course Code	21MATDIP41	CIE Marks	50
Contact Hours/Week	02	SEE Marks	00
Total Hours	25	Exam Hours	00
Semester	IV	Credits	00

Course Learning Objectives:

This course will enable students to:

- Solve first order differential equations. .
- Solve second and higher order differential equations.
- Understand and solve the partial differential equation.
- To acquire the knowledge of elementary probability theory.
- Know the basic concepts of evaluation of double and triple integrals.

Course Outcomes(COs):

After completion of course, the student will able to

CO#	Course Outcomes	POs	PSOs
C01	Apply the knowledge of differential equation of first order to solve examples based on Newton's law of cooling.	1, 2, 3	
C02	Solve second and higher order differential equations occurring in of electrical circuits , damped/un-damped vibrations. Explain the applications of Power series and obtain series solution of ordinary differential equations.	1, 2, 3	
C03	Construct a variety of partial differential equations and solution by exact Methods / method of separation of variables.	1, 2, 3	
C04	Apply the concept of change of order of integration and variables to evaluate multiple integrals and their usage in computing the area and volumes.	1, 2, 3	
C05	Apply the knowledge of Probability to solve the simple real life problems	1, 2, 3	

Bloom's level of the course outcomes:

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
C01	√	√	√			
C02	√	√	√			
C03	√	√	√			
C04	√	√	√			
C05	√	√	√			

Course Articulation Matrix / Course mapping :

CO#	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
C01	3	2	2		1				1			1			
C02	3	2	2		1				1			1			
C03	3	2	2		1				1			1			

[Handwritten signatures and marks at the bottom of the page]

SHARNBASVA UNIVERSITY, KALABURAGI

C04	3	2	2		1				1			1			
C05	3	2	2		1				1			1			

MODULE-1: DIFFERENTIAL EQUATIONS - 1

Differential Equation-1: Solution of first order and first degree differential equations: Variable separable, Homogeneous, Exact and Reducible to exact differential equation, Linear differential equation. Applications of first order first degree differential equations: Newton's law of cooling.

(RBT Levels: L1, L2 and L3) 5 Hours

Teaching – Learning Process	Chalk and talk method / Power Point Presentation
-----------------------------	--

MODULE-2: DIFFERENTIAL EQUATIONS - 2

Differential Equations-2: Solution of second & higher order Ordinary linear differential equation with constant co-efficients. Method of variation of parameters. Solution of homogeneous LDE by Power series solution Method.

(RBT Levels: L1, L2 and L3)

5 Hours

Teaching – Learning Process	Chalk and talk method / Power Point Presentation
-----------------------------	--

MODULE-3: PARTIAL DIFFERENTIAL EQUATIONS (PDE's)

Partial Differential Equations(PDE's): Formation of PDE by eliminating arbitrary constant & functions, Solution of Non-homogeneous PDE by direct integration, solution of homogeneous PDE with respect to one independent variable only. Derivation of one dimensional wave equation and heat equation and Various possible solution of wave & heat equations by methods of separation of variables.

(RBT Levels: L1, L2 and L3)

5 Hours

Teaching – Learning Process	Chalk and talk method / Power Point Presentation
-----------------------------	--

MODULE-4: IMPROPER INTEGRALS

Improper Integrals: Beta and gamma functions and its properties and examples. Evaluation of double integral over a specific region, changing the order of integration , changing into polar form.

(RBT Levels: L1, L2 and L3)

5 Hours

Teaching – Learning Process	Chalk and talk method / Power Point Presentation
-----------------------------	--

MODULE-5: PROBABILITY

Probability: Introduction , Sample space and Events. Axioms of Probability, Addition & Multiplication theorems. Conditional probability- illustrative examples. Baye's theorem- examples.

(RBT Levels: L1, L2 and L3)

5 Hours

Teaching – Learning Process	Chalk and talk method / Power Point Presentation
-----------------------------	--

CIE + Assignments: 15+35=50 Marks

There will be a 2 CIE's, the best one among 2 CIE's will be considered and there will be a 35 marks

[Handwritten signatures and marks at the bottom of the page]

SHARNBASVA UNIVERSITY, KALABURAGI

for Assignments

Text Books:

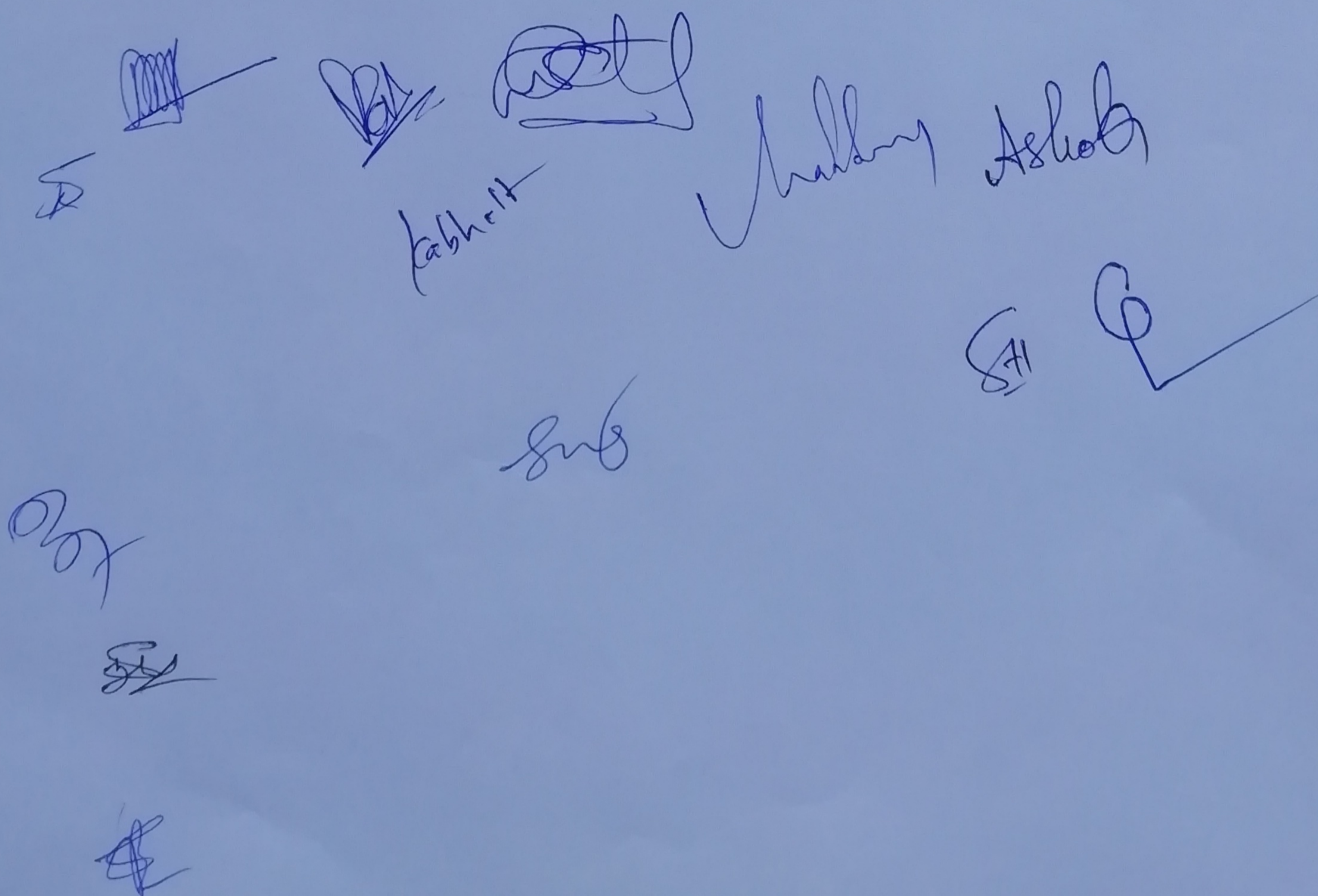
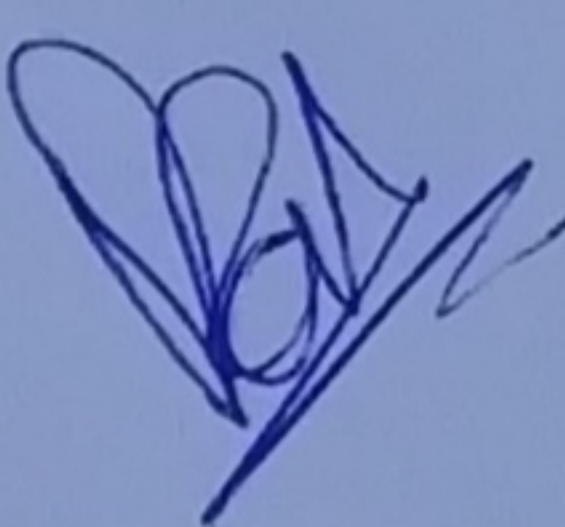
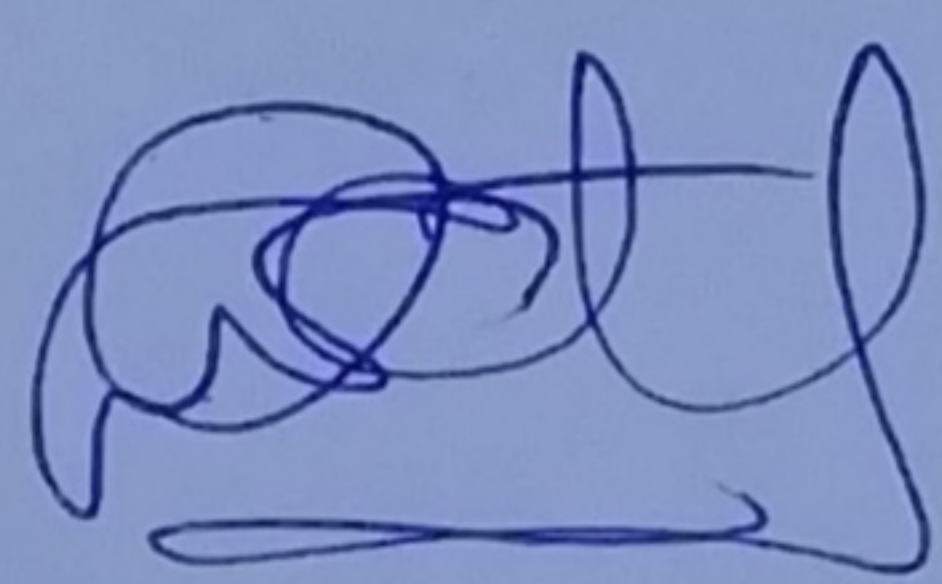
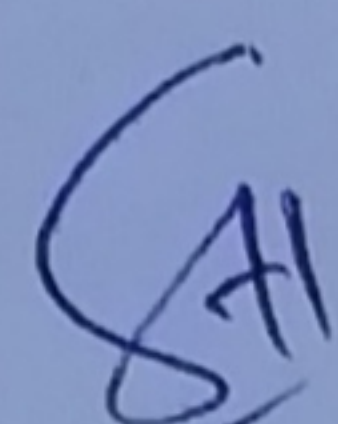
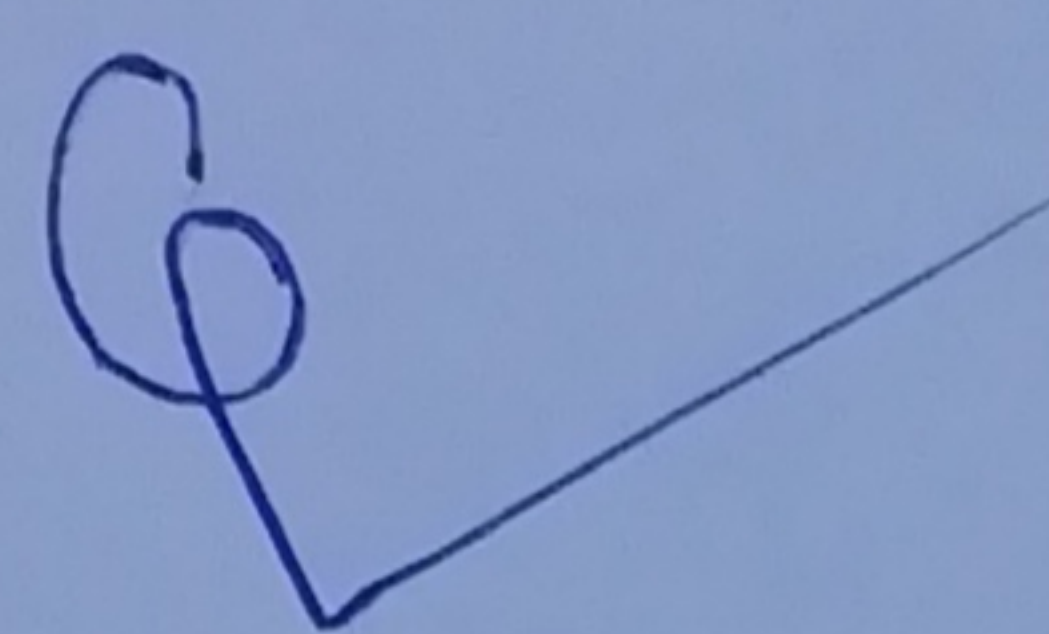
1. B.S. Grewal : Higher Engineering Mathematics, Khanna Publishers, 43rd Ed., 2015.
2. E. Kreyszig : Advanced Engineering Mathematics, John Wiley & Sons, 10th Ed.(Reprint), 2016.

Reference books:

1. C.Ray Wylie, Louis C.Barrett : "Advanced Engineering Mathematics", 6th Edition, McGraw-Hill Book Co., New York, 1995.
2. James Stewart : "Calculus –Early Transcendentals", Cengage Learning India Private Ltd., 2017.
3. B.V.Ramana : "Higher Engineering Mathematics" 11th Edition, Tata McGraw-Hill, 2010.
4. Srimanta Pal &Subobh C Bhunia:"Engineering Mathematics", Oxford University Press,3rd Reprint,2016.
5. Gupta C.B., Singh S.R. and Mukesh Kumar : "Engineering Mathematics for Semester I & II", Mc-Graw Hill Education (India) Pvt.Ltd., 2015.

Web links and Video Lectures:

1. <http://nptel.ac.in/courses.php?disciplineID=111>
2. <http://www.class-central.com/subject/math>
3. <http://academicearth.org>.




Kabhele
Chalany Ashok


Sub
Box
