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(Approved by AICTE, New Delhi & Affiliated to Jharkhand University of Technology, Ranchi)

RUN AND MANAGED BY BIRSA INSTITUTE OF TECHNOLOGY (TRUST) - BITT

मानवता की सेवा, सभी के लिए सर्वश्रेष्ठ शिक्षा

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UNIT OF BITT

हमारे सभी विद्यार्थियों एवं सहयोगियों को
हमारी 27 वर्षों की गौरवशाली यात्रा का हिस्सा
बनने के लिए धन्यवाद.

आपका विश्वास ही हमारी निरंतर सफलता की प्रेरणा है।

सर्वश्रेष्ठ पॉलीटेक्निक संस्थान, सर्वोत्तम पढ़ाओ, सर्वोत्तम बनाओ।

BITT-G/NOTICE/2022-23/ 10275
Dated: 25/02/2022

NOTICE

(EXAMINATION DEPARTMENT)

2nd INTERNAL EXAMINATION

All the students of 3rd and 5th semesters of all branches of session 2019-22 & 2020-23 are hereby informed that the 2nd internal exam (online) will be Scheduled on 26th February 2022 and 28th February 2022, in accordance with the postponed date from Reframed/Tentative Academic calendar of Jharkhand University of Technology (JUT) and the College Notice.

Students are directed to follow the rules & regulation framed for the online internal examinations. Students are also advised to go through the time table provided as here under for the examination. To appear in the 2nd Internal Exam, the students of 3rd and 5th semesters (EE, CSE, ME, ECE, and CE) are required to be submitted all answer sheets for 1st internal examination and Assignment -1 and also clear all their dues before the commencement of 2nd Internal Examination, Non clearance of dues may cause inconvenience to students and no student is allowed to appear in the internal examination. Non-appearance in Internal exam will be treated as absent and 0 marks will be awarded to the student. The evaluation of internal marks for final semester results depends on the performance in the Internal Examination as well as sincerity, behavior, conduct, attendance and other academic activities during the semester.

The students are strictly instructed to submit their answer sheets of 1st Internal examination and assignment – 1 and also clear all their dues to avoid any inconvenience. Under dues no student will be allowed to appear in the 2nd Internal Examination and in any circumstances he/she cannot get any academic, non-academic support from the college.

A student is required to have 75% Attendance* in a semester (although the college insists for 100% attendance in semester), Failure of 75% attendance shall invite one or any combination of the following actions:

- The Principal may, at any point of time, allocate extra classes in concerned subject(s) to make up the shortfall in the attendance (for the students having short fall by 2-3%). In such cases, concerned students will be mandatorily required to attend the (extra) classes.
- A student shall not be allowed to fill the semester examination form or may fill with fine as applicable by the principal at the time of examination form submission.

BITT HELP-DESK:

BITT Special Student's Care: Should you have any Enquiry / Observations / Suggestions / Grievances / Complaint / Appreciation / Required Support / Willing to Support / Feedbacks, you are being advised to use your communication medium as given instructions within the specified time and days only and they will get a reply within 72 working hrs. No any other communication medium will be entertained for your Queries/Observations/ Suggestions/ Grievances/ Feedbacks. Please reach us on -

Call BITT Helpline No: +91- 9470193650 (Days – Monday, Wednesday & Friday, Time- 11:30 AM - 01:30 PM), Only Voice calls will accept during active hrs. & days. It is further advised not to call to any other contact number for Suggestions/Enquiry/Grievances/Complaint/Appreciation/Required Support/Willing to Support.

BITT WhatsApp Helpline No: 9931080111 (days - Monday - Thursday, Time - 12:30 PM - 02:30 PM), Only WhatsApp query will be accepted during the active hrs. & days. No any voice call will be entertained on this No. It is further advised not to WhatsApp to any other contact number for Suggestions/Enquiry/ Grievances/ Complaint/Appreciation/Required Support/Willing to Support.

BITT BROADCAST NO: +91-7061967009, 993108011 All students are advised to save the above No. in their phone book diary, because the important information/notices related to academic/non- academic are sent through this BITT BROADCAST NO. **+91-7061967009, 9931080111**. It is further advised not to call/WhatsApp to this contact number for Suggestions/Enquiry/Grievances/Complaint/Appreciation/Required Support/Willing to Support.
Write us (For any Queries / Observations / Suggestions / Grievances / Feedbacks / Support / Complaint): rkbitt@gmail.com. It is further advised not to Email to any other officials for Suggestions/Enquiry/Grievances/ Complaint/Appreciation/Required Support/Willing to Support.

Write us (For documents related queries only): bittpolytechnic@yahoo.com (days between Monday - Thursday, Time- 11:30 AM - 03:00 PM), Only mails will be accepted during active hrs. & days. The students are advised to mail only after taking confirmation on BITT Helpline No: **+91-9470193650**. It is further advised not to email to any other officials for documents related support/enquiry.

NOTE 1: The Students wish to collect the documents of there from the college need to follow the process by getting the email of the college for collection of documents on a specified date, they are advised to collect the documents at the given time otherwise students themselves will be responsible for any inconveniences in collection of documents before or after the date.

NOTE 2: In respect of Caution refund (Whose application is submitted in the correct/incorrect format by March, 2020), the students who have been given time for verification or other procedures through the email, will remain the same. So the students are advised to follow the email, sent by the college, otherwise the students themselves are responsible for any inconveniences. Apart from this, no one else will be entertained. Other students regarding Caution refund will be automatically informed by the college through further notice.

NOTE 3 : COVID 19 Cases in the third wave of pandemic have started to fall and according to the relevant order

of the Home, Prison and Disaster Management Department of the State Government, Government of India and Home, Prison and Disaster Management Department, Government of Jharkhand, in the light of Memo Number 40/CS, dated 01.02.2022 for offline office visit or for any academic/non-academic work or activities, all diploma students of session 2013-16, 2014-17, 2015- 18, 2016-19, 2017-20, 2018-21, 2019-22 and 2020-23 will have to seek permission by contacting BITT Helpline No. **9470193650** only (days- Monday, Wednesday, Friday, Time-11:30 AM to 01:30 PM.). So that all the rules & regulations/guidelines/covid protocols are complied with as per the COVID-19 Prevention Act. The institute management will not be liable against any action taken by the district administration and law, if any violation of the rules is found. Therefore, all the students and parents are requested to follow the above rules at all times. We apologize for any inconvenience caused by this. The diploma students of all sessions 2013-16, 2014-17, 2015-18, 2016-19, 2017-20, 2018-21, 2019-22, 2020-23 and 2021-24 are further Informed that they are required to submit their certificate of COVID vaccination (both doses, as per applicable) as per the COVID guideline while visiting the college campus. Therefore, the students are advised to keep the hard copy and soft copy of Covid vaccination certificate so that it can be shown to the respective authorized authorities on demand.

BIRSA INSTITUTE OF TECHNOLOGY (TRUST)- BITT: Indeed, it is pride moment for all of us that BITT Group of Institution is Celebrating it's 27 Glorious Years in field of Technical Education, Scholarship & Serving the Nation in the Excellent way. BITT Polytechnic - मानवता की सेवा, सभी के लिए सर्वश्रेष्ठ शिक्षा (Approved by AICTE, NEW DELHI & Affiliated to Jharkhand University of Technology) - सर्वश्रेष्ठ पॉलिटेक्निक संस्थान, सर्वोत्तम पढ़ाओ, सर्वोत्तम बनाओ We firmly believe in “Student Centric Approach. So, Be Proactive, Not Reactive!!! " Your kind cooperation in this regard is highly appreciated.

Covid Guidelines: The College has no responsibility in case any of the student, visitors (visiting office) get corona infected the college is following all the COVID protocols keeping the spread of CORONA.

Your co-operation in this regard, will help in containment of spread of COVID-19 virus and various associated variants of Concern (VOCs).

Stay Safe & Healthy!!!

With Best Wishes,
BITTP,
Devi Darshan, Getlatu, Ranchi-835217

For related queries: Admission/Scholarship/Placement/Start-up/Entrepreneurship/Notices/Any details, Visit URL given as: http://www.bittpolytechnic.com

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BITT DIGITAL 2nd INTERNAL EXAMINATION SYLLABUS (Subject wise)			
DEPARTMENT OF COMPUTER SCIENCE ENGINEERING			
S.NO.	**SEMESTER**	**SUBJECT AND CODE**	**SYLLABUS (PORTION)**
1	IIIrd	Electrical Technology (ECE 304)	Laws and Theorems applicable to DC networks (KCL & KVL, Node voltage & Mesh current analysis, Star-Delta and Delta-Star conversion, Superposition principle, Thevenin & Norton theorem), Transients in R-L and R-C circuits with DC excitation, Simple problems. Single-Phase AC Circuits: Single-phase EMF Generation, Average and Effective value of periodic ac signals, Peak factor & Form factor, Phasor and Complex representation of sinusoids, Power factor, complex power. Three-Phase AC Circuits: Comparison between single-phase and three-phase systems, three phase EMF Generation, Line and Phase quantities in star and delta networks, Introduction to Magnetic Circuits: Introduction to Electromagnetism, B-H curve, Permeability, Reluctance, Solution of magnetic circuits, Hysteresis and Eddy current loss. Single-Phase Transformers: Construction and principle of operation, EMF Equation, Transformation ratio, Practical and Ideal transformers, Transformer losses, Brief idea on Transformer Phasor diagram and transformer rating, Auto transformer. Introduction to 3 phase transformer. D.C. Machines: Principle of operation, construction, classification of DC machines, EMF equation of DC generator, Speed Equation of DC Motor. Series, shunt and compound dc motors. Induction Motors: Introduction to Single-phase and Three-phase Induction Motors, Concept of Slip. Synchronous motors and special types of ac motors. Introduction to generation, transmission and distribution of AC Power, basic idea on grounding, and safety, illumination
2	IIIrd	Math III (301)	Integration: Definition of integration as anti-derivative. Integration of standard function. Rules of integration (Integrals of sum, difference, scalar multiplication). Methods of Integration. Integration by trigonometrically transformation. Integration by substitution. Integration by parts. Integration of rational and irrational functions. Integration by Partial fractions. Definite Integration. Concept of definite integrations with examples. Properties of definite integral with simple problems. Applications of definite integrals. Area under the curve. Area bounded by two curves. Differential Equation Definition of differential equation, order and degree of differential equation. Formation of differential equation. Solution of differential equations of first order and first Degree such as variable separable form, reducible to Variable separable, Homogeneous and Linear Differential Equation. Applications of Differential equations. Rectilinear motion (motion under constant and variable acceleration) Newton's Law of Cooling. Numerical Methods Solution of algebraic equations Bisection method, Regula-falsi method and Newton Raphson method. Solution of simultaneous equations containing 3 unknowns. Gauss elimination method. Jacobi's Iterative Method Gauss Seidal method. Interpolation Concept of interpolation and extrapolation. Different operators (Δ, ∇ &), relation between them, some problems based on operators, formation of Difference Table. Newton's Forward and Backward difference interpolation formulae. Lagrange's interpolation formula. Problems based on above. Numerical Differentiation &Integration. Newton's forward and backward difference formulae for first and second order

			differentiation at any point. Numerical integration. Trapezoidal rule and Simpson's 1/3rdrule. Probability: Definition of random experiment, sample space, event occurrence of event and types of events (impossible, mutually exclusive, exhaustive, equally likely). Definition of probability, addition and multiplication theorems of probability. Probability Distribution: Binomial distribution. Poisson's distribution. Normal distribution, Simple examples based on above. Laplace Transform Definition of Laplace transforms Laplace transform of standard functions. Properties of Laplace transform such as Linearity, first shifting, second shifting, multiplication by tn, division by t. Inverse Laplace transforms. Properties-linearly first shifting, second shifting. Method of partial fractions, Fourier Series. Definition of Fourier series (Euler's formula). Series expansion of continuous functions in the intervals. Linear Programming: Introduction, Solution of Linear Programming problem (LPP) by Graphical Method.
3	IIIrd	Electronic Devices and Circuits (ECE 303)	Characteristics, Current components, Current gains: alpha and beta. Variation of transistor parameter with temperature and current level, Operating point, Hybrid model, DC model of transistor, h-parameter equivalent circuits. CE, CB and CC configuration. DC and AC an analysis of single stage CE, CC (Emitter follower) and CB amplifiers AC& DC load line, Ebers-Moll model. Biasing & stabilization techniques. Thermal runaway, Thermal stability. Construction and operation, Noise performances of FET, Parasitic of MOSFET, Small signal models of JFET & MOSFET, Biasing of JFET's & MOSFET's, Low frequency single stage CS and CD (source follower) JFET amplifiers, FET as voltage variable resistor and FET as active load, CMOS. Analysis of BJT and FET multistage amplifier, DC and RC coupled amplifiers. Frequency response of single and multistage amplifier, mid-band gain, gains at low and high frequency. Analysis of DC and differential amplifiers, Cascade and cascade configuration of multistage amplifiers (CE-CE, CE-CB, CS-CS and CS-CD), Darlington pair Classification, Feedback concept, Feedback Topologies, Transfer gain with feedback, General characteristics of negative feedback amplifiers. Analysis of voltage-series, voltage-shunt, current-series and current-shunt feedback amplifier. Stability criterion. OSCILLATORS-Classification. Criterion for oscillation. Tuned collector, Hartley, Colpitts, RC Phase shift, Wien bridge and crystal oscillators, pulse generator. Band Pass Amplifier, Parallel resonant Circuits, Band Width of Parallel resonant circuit. Analysis of Single Tuned Amplifier, Primary & Secondary Tuned Amplifier with BJT & FET, Double Tuned Transformer Coupled Amplifier. Stagger Tuned Amplifier. Pulse Response of such Amplifier, class C tuned amplifiers, Shunt Peaked Circuits for Increased Bandwidth. (Discussion and use as RF and IF stages) Classification, Power transistors & power MOSFET (DMOS, VMOS). Output power, power dissipation and efficiency analysis of Class A, class B, class AB, class C, class D and class E amplifiers as output stages. Push pull amplifiers with and without transformers, Complementary symmetry & quasi complimentary symmetry amplifiers

4	IIIrd	Object Oriented Programming (CSE 303)	Concept of Constructor, Types of Constructors (Parameterized, Copy, Default), Overloaded Constructors (Multiple constructor), Constructor with default arguments, Destructors. Concepts of Inheritance, Types of Inheritance (Single, Multilevel, Multiple, Hierarchical, Hybrid), Virtual Base Class, Abstract Class, Constructor in Derived Class, Member Classes, Concepts of Overriding Concepts of Polymorphism, Types of Polymorphism, Function overloading, Operator Overloading (Unary & Binary Operator), Rules for overloading operators, Virtual Functions, Rules for Virtual Functions, Pure Virtual Function C++ Stream Classes, Formatted & Unformatted I/O Operations, managing output with Manipulators, Classes for file stream operations, Opening and Closing a file, Reading and Writing character from a file (get (), put (), get line (), write (), e of ()), File Pointers and their manipulations, Command-Line Arguments.
5	IIIrd	WEB TECHNOLOGY (CSE 304)	CSS- Introduction to Cascading Style Sheets-Features-Syntax Sheets and HTML Style Rle Cascading and Inheritance-Text Properties-Box Model Normal Flow Box Layout-Beyond the Normal Flow-Other Properties-Case Study. Client- Side Programming: The JavaScript Language-History and Versions Introduction JavaScript in Perspective-Syntax-Variables and Data Types-Statements-Operators- Literals-Functions-Objects-Arrays-Built-in Objects-JavaScript Debuggers. Browsers and the DOM-Introduction to the Document Object Model DOM History and Levels-Intrinsic Event Handling-Modifying Element Style-The Document Tree-DOM Event Handling-Accommodating Noncompliant Browsers Properties of Window-Case Study. Server-Side Programming: Java Serve lets- Architecture - Overview-A Serve Let-Generating Dynamic Content-Life Cycle-Parameter Data-Sessions-Cookies- URL Rewriting-Other Capabilities-Data Storage Serve lets and Concurrency-Case Study- Related Technologies. XML-Documents and Vocabularies-Versions and Declaration Namespaces JavaScript and XML: Ajax-DOM based XML processing Event-oriented Parsing: SAX-Transforming XML Documents-Selecting XML Data: XPATH- Template based Transformations: XSLT- Displaying XML Documents in Browsers-Case Study- Related Technologies
6	Vth	Microprocessors & Microcontrollers (CSE 503)	Introduction to 8085 – Microprocessor architecture, pin out diagram, – Addressing modes - Instruction set, Interrupts and interrupt service routines. 8086 signals – Basic configurations – System bus timing –System design using 8086 – IO programming – Introduction to Multiprogramming – System Bus Structure - Multiprocessor configurations – Coprocessor, Closely coupled and loosely Coupled configurations Memory Interfacing and I/O interfacing - Parallel communication interface – Serial communication interface – D/A and A/D Interface - Timer – Keyboard /display controller – Interrupt controller – DMA controller – Programming and applications Case studies: Traffic Light control, LED display, LCD display, Keyboard display interface and Alarm Controller. Architecture of 8051 – Special Function Registers(SFRs) - I/O Pins Ports and Circuits - Instruction set - Addressing modes - Assembly language programming. Programming 8051 Timers - Serial Port Programming - Interrupts Programming – LCD & Keyboard Interfacing - ADC, DAC & Sensor Interfacing - External Memory Interface- Stepper Motor and Waveform generation
			Defining a class, creating object, accessing class members, Constructor, Methods Overloading, Static Member. Inheritance Extending a Class (Defining a subclass Constructor, Multilevel inheritance, Hierarchical inheritance, Overriding Methods, Final variable and Methods, Final Classes,

7	Vth	Java Programming (CSE 504)	Abstract method and Classes. Visibility Control: - Public access, friend access, Protected access, Private access, Private Protected access. Array, Strings and Vectors: - Arrays, One Dimensional array, Creating an array, Two Dimensional array, Strings, Vectors, Wrapper Classes. Interfaces and Packages: - Interface: Multiple Inheritance Defining interfaces, extending interfaces, implementing interfaces, Accessing Interface variable. Packages: Putting Classes Together System Package, using system Package, Naming Convention, Creating Package, accessing a package, using a package, adding a class to a package Multi-Threading: Creating Thread, extending a thread class, Stopping and Blocking a thread, Life cycle of thread, using thread method, Thread exceptions, Thread priority, Synchronization, Managing Errors and Exceptions Types of errors, Exception. Java Applets and Graphics Programming: - Applet Programming Local and remote applets, How applet differ from application, Preparing to write applets, Building applet code, Applet life cycle, Creating an Executable Applet, Designing a Web page, Applet tag, Adding Applet to HTML file, Running the Applet
8	Vth	Computer Graphics (CSE 505)	Introduction to computer graphics & graphics systems Overview of computer graphics, representing pictures, preparing, presenting & interacting with pictures for presentations; Visualization & image procdisplay, Raster scan display, 3D: Points & lines, Line drawing algorithms; DDA algorithm, Bresenham's line algorithm, Circle generation algorithm; Ellipse generating algorithm; scan line polygon, fill algorithm, boundary fill algorithm, flood fill algorithm. 2D transformation & viewing Basic transformations: translation, rotation, scaling; Matrix representations & homogeneous coordinates, transformations between coordinate systems; reflection shear; Transformation of points, lines, parallel lines, intersecting lines. Viewing pipeline, Window to viewport co-ordinate transformation, clipping operations, point clipping, line clipping, clipping circles, polygons & ellipse. 3D transformation & viewing. 3D transformations: translation, rotation, scaling & other transformations. Rotation about an arbitrary axis in space, reflection through an arbitrary plane; general parallel projection transformation; clipping, viewport clipping, 3D viewing. Curves, Curve representation, surfaces, designs, Bezier curves, B-spline curves, end conditions for periodic. B-spline curves, rational B-spline curves. Hidden surfaces Depth comparison, Z-buffer algorithm, viewing devices, Plotters, printers, digitizers, Light pens etc.; Active & Passive graphics devices; Computer graphics software. Scan conversion
9	Vth	Mobile Computing (CSE 506)	Mobile IP Goals, assumptions, entities and terminology, IP packet delivery, agent advertisement and discovery, registration, tunnelling and encapsulation, Dynamic Host Configuration Protocol (DHCP), Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit/fast recovery, Transmission /time-out freezing, Selective retransmission, Transaction oriented TCP Wireless LAN Overview: MAC issues, IEEE 802.11, Blue Tooth, Wireless multiple access protocols, TCP over wireless, Wireless applications, data broadcasting, Mobile IP, WAP: Architecture, protocol stack, application environment, applications. Mobile Agents computing, security and fault tolerance, transaction processing in mobile computing environment, Mobile Ad hoc Networks (MANETs): Overview, Properties of a MANET, spectrum of MANET applications, routing and various routing algorithms, security in MANETs

10	Vth	E – Commerce (CSE 511)	Business Models of e – commerce: Model Based On Transaction Type, Model Based On Transaction Party - B2B, B2C, C2B, C2C, E – Governance E – strategy: Overview, Strategic Methods for developing E – commerce Four C's: (Convergence, Collaborative Computing, Content Management & Call Centre Convergence: Technological Advances in Convergence – Types, Convergence and its implications, Convergence & Electronic Commerce. Collaborative Computing: Collaborative product development, contract as per CAD, Simultaneous Collaboration, Security Content Management: Definition of content, Authoring Tools & Content Management, Content – partnership, repositories, convergence, providers, Web Traffic & Traffic Management; Content Marketing. Call Center: Definition, Need, Tasks Handled, Mode of Operation, Equipment, Strength & Weaknesses of Call Center, Customer Premises Equipment (CPE E – Payment Mechanism: Payment through card system, E – Cheque, E – Cash, E – Payment Threats & Protections E – Marketing: Home –shopping, E-Marketing, Tele-marketing Electronic Data Interchange (EDI): Meaning, Benefits, Concepts, Application, EDI Model, Protocols (UN EDI FACT / GTDI, ANSI X – 12), Data Encryption (DES / RSA Risk of E – Commerce: Overview, Security for E – Commerce, Security Standards, Firewall, Cryptography, Key Management, Password Systems, Digital certificates, Digital signatures

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BITT DIGITAL 2nd INTERNAL EXAMINATION SYLLABUS (Subject wise)			
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING			
S.NO.	**SEMESTER**	**SUBJECT AND CODE**	**SYLLABUS (PORTION)**
1	IIIrd	Elect & Electronic Measurement (ECE 305)	Introduction to measurements block diagram of measurement system, characteristics of measurement system, accuracy & precision, repeatability, range, linearity and offsets. Errors and its types. Calibration of instruments. Analog instruments construction and principle of operation of moving coil, moving iron, dynamometer, thermal and rectifier type deflecting instruments. Deflecting, controlling and damping torques, extension of instrument ranges using shunts, multipliers and instrument transformers, multi meters, meager, localization of cable faults.. Dc & ac bridges electronic instruments electronic voltmeter, electronic multi meters, digital voltmeter, and component measuring instruments: q meter, vector impedance meter, rf power & voltage measurements, introduction to shielding & grounding. Oscilloscopes basic cro concept, cro probes, techniques of measurement of amplitude, frequency, phase angle, time period, time delay, multi beam, multi trace, storage & sampling oscilloscopes, digital storage oscilloscope. Signal generation and signal analysis sine wave generators, multi function generator, signal analysis - measurement technique, wave analyzers, and frequency - selective wave analyzer, heterodyne wave analyzer, harmonic distortion analyzer, and spectrum analyzer. Transducers transducers and actuators, classification, selection criteria, characteristics, working principles and application of following transducers thermocouples, thermistors, lvdt, strain gauges, bourdon tubes, accelerometers, taco generators, load cell, piezoelectric transducers, ultrasonic flow meter

2	IIIrd	Electrical Technology (ECE 304)	Laws and Theorems applicable to DC networks (KCL & KVL, Node voltage & Mesh current analysis, Star-Delta and Delta-Star conversion, Superposition principle, Thevenin & Norton theorem),Transients in R-L and R-C circuits with DC excitation, Simple problems. Single-Phase AC Circuits: Single-phase EMF Generation, Average and Effective value of periodic ac signals, Peak factor & Form factor, Phasor and Complex representation of sinusoids, Power factor, complex power. Three-Phase AC Circuits: Comparison between single-phase and three-phase systems, three phase EMF Generation, Line and Phase quantities in star and delta networks, Introduction to Magnetic Circuits: Introduction to Electromagnetism, B-H curve, Permeability, Reluctance, Solution of magnetic circuits, Hysteresis and Eddy current loss. Single-Phase Transformers: Construction and principle of operation, EMF Equation, Transformation ratio, Practical and Ideal transformers, Transformer losses, Brief idea on Transformer Phasor diagram and transformer rating, Auto transformer. Introduction to 3 phase transformer. D.C. Machines: Principle of operation, construction, classification of DC machines, EMF equation of DC generator, Speed Equation of DC Motor. Series , shunt and compound dc motors.
3	IIIrd	Math III (301)	Integration: Definition of integration as anti-derivative. Integration of standard function. Rules of integration (Integrals of sum, difference, scalar multiplication). Methods of Integration. Integration by trigonometrically transformation. Integration b y substitution. Integration by parts. Integration of rational and irrational functions. Integration by Partial fractions. Definite Integration. Concept of definite integrations with examples. Properties of definite integral with simple problems. Applications of definite integrals. Area under the curve. Area bounded by two curves. Differential Equation Definition of differential equation, order and degree of differential equation. Formation of differential equation. Solution of differential equations of first order and first Degree such as variable separable form, reducible to Variable separable, Homogeneous and Linear Differential Equation. Applications of Differential equations. Rectilinear motion (motion under constant and variable acceleration) Newton's Law of Cooling. Numerical Methods Solution of algebraic equations Bisection method, Regula-falsi method and Newton Raphson method. Solution of simultaneous equations containing 3 unknowns. Gauss elimination method. Jacobi's Iterative method Gauss Seidal method. Interpolation Concept of interpolation and extrapolation. Different operators (Δ, ∇ &),relation between them, some problems based on operators , formation of Difference Table. Newton's Forward and Backward difference interpolation formulae. Lagrange's interpolation formula. Problems based on above. Numerical Differentiation &Integration. Newton's forward and backward difference formulae for first and second order differentiation at any point. Numerical integration. Trapezoidal rule and Simpson's 1/3rdrule. Probability: Definition of random experiment, sample space, event occurrence of event and types of events (impossible, mutually exclusive, exhaustive, equally likely). Definition of probability, addition and multiplication theorems of probability. Probability Distribution: Binomial distribution. Poisson's distribution. Normal distribution, Simple examples based on above . Laplace Transform Definition of Laplace transforms Laplace transform of standard functions. Properties of Laplace transform such as Linearity, first shifting, second shifting, multiplication b y tn, division by t. Inverse Laplace transforms. Properties-linearly first shifting, second shifting. Method of partial fractions, Fourier Series. Definition of Fourier series (Euler's formula). Series expansion of

			continuous functions in the intervals. Linear Programming: Introduction, Solution of Linear Programming problem (LPP) by Graphical Method.
4	IIIrd	Electromagnetic Field Theory (ECE 306)	The Biot-Savart Law in vector form – Magnetic Field intensity due to a finite and infinite wire carrying a current I – Magnetic field intensity on the axis of a circular and rectangular loop carrying a current I – Ampere's circuital law and simple applications. Magnetic flux density – The Lorentz force equation for a moving charge . – Force on a wire carrying a current I placed in a magnetic field – Torque on a loop carrying a current I – Magnetic moment – Magnetic Vector potential. Poisson's and Laplace's equation – Electric Polarization-Nature of dielectric materials- Definition of Capacitance – Capacitance of various geometries using Laplace's equation – Electrostatic energy and energy density – Boundary conditions for electric fields. Electric current – Current density – point form of ohm's law – continuity equation for current. Definition of Inductance – Inductance of loops and solenoids – Definition of mutual inductance– simple examples. Energy density in magnetic fields– Nature of magnetic materials– magnetization and permeability– magnetic boundary conditions. Faraday's law – Maxwell's first Equation in integral form from Faraday's Law – Equation expressed in point form. Displacement current – Ampere's circuital law in integral form – Modified form of Ampere's circuital law as Maxwell's second equation in integral form – Equation expressed in point form. Maxwell's four equations in integral form and differential form. Pointing theorem .Instantaneous Average and Complex Pointing Vector. Topics: Derivation of Wave Equation – Uniform Plane Waves – Maxwell's equation – Wave equation – Plane waves in free space and in a homogenous material. Wave equation for a conducting medium – Plane waves in lossy dielectrics – Propagation in good conductors – Skin effect. Linear, Elliptical and circular polarization – Reflection of Plane Wave from a conductor – normal incidence – Reflection of Plane Waves by a perfect dielectric – normal and oblique incidence. Dependence on Polarization, Brewster angle.
5	IIIrd	Electronic Devices and Circuits (ECE 303)	Characteristics, Current components, Current gains: alpha and beta. Variation of transistor parameter with temperature and current level, Operating point, Hybrid model, DC model of transistor, h-parameter equivalent circuits. CE, CB and CC configuration. DC and AC an analysis of single stage CE, CC (Emitter follower) and CB amplifiers AC& DC load line, Ebers-Moll model. Biasing & stabilization techniques. Thermal runaway, Thermal stability. Construction and operation, Noise performances of FET, Parasitic of MOSFET, Small signal models of JFET & MOSFET, Biasing of JFET's & MOSFET's, Low frequency single stage CS and CD (source follower) JFET amplifiers, FET as voltage variable resistor and FET as active load, CMOS. Analysis of BJT and FET multistage amplifier, DC and RC coupled amplifiers. Frequency response of single and multistage amplifier, mid-band gain, gains at low and high frequency. Analysis of DC and differential amplifiers, Cascade and cascade configuration of multistage amplifiers (CE-CE, CE-CB, CS-CS and CS-CD), Darlington pair Classification, Feedback concept, Feedback Topologies, Transfer gain with feedback, General characteristics of negative feedback amplifiers. Analysis of voltage-series, voltage-shunt, current-series and current-shunt feedback amplifier. Stability criterion. OSCILLATORS- Classification. Criterion for oscillation. Tuned collector, Hartley, Colpitts, RC Phase shift, Wien bridge and crystal oscillators, pulse generator. Band Pass Amplifier, Parallel resonant Circuits,

			Band Width of Parallel resonant circuit. Analysis of Single Tuned Amplifier, Primary & Secondary Tuned Amplifier with BJT & FET, Double Tuned Transformer Coupled Amplifier. Stagger Tuned Amplifier. Pulse Response of such Amplifier, class C tuned amplifiers, Shunt Peaked Circuits for Increased Bandwidth. Discussion and use as RF and IF stages) Classification, Power transistors & power MOSFET (DMOS, VMOS). Output power, power dissipation and efficiency analysis of Class A, class B, class AB, class C, class D and class E amplifiers as output stages. Push pull amplifiers with and without transformers, Complementary symmetry & quasi complimentary symmetry amplifiers
6	Vth	Instrumentation System (ECE 503)	Necessity of recorders, recording requirements, graphic recorders, strip chart recorders, magnetic tape recorders, digital tape recorders. Electronic indicating instruments, seven segment display, fourteen segmental display Nixie tube Instrumentation for Generation and Analysis of Waveforms: Strain gauge, LVDT, thermocouple, piezoelectric, crystal and photoelectric transducers and their applications. Data acquisition systems. Unit VII Telemetry: Introduction, method of data transmission, types of telemetry systems and applications. Types of Instrumentation systems, Data acquisition system (DAS) and its uses in intelligent Instrumentation system, Detailed study of each block involved in making of DAS, Signal Conditioners: as DA, IA, Signal Converters (ADC & DAC), Sample and hold, Designing of Pressure, Temperature measuring instrumentation system using DAS, Data logger. Introduction about Automation system, Concepts of Control Schemes, Types of Controllers, Components involved in implementation of Automation system i.e., DAS, DOS, Converter (I to P) and Actuators:
7	Vth	Power Electronics (ECE 504)	Uncontrolled and controlled Rectifiers : Single phase and poly phase Bridge rectifiers. Transformer ratings. Inductive load, freewheeling diodes. Converter operation: Overlap, power factor, inversion, regulation, P-pulse converters, power factor control via PWM converters. D.C. line commutation: Series and parallel capacitor turn off, resonant turn off, impulse commutation. D.C. Choppers : Principles, classification, use. Frequency conversion: Cyclo converter single and three phase circuits, blocked group operation, circulating current mode. Single phase and three phase inverters, constant voltage source and constant current source inverters, HF inverters for heating. Application : D.C. and A.C. drives, S.M.P.S., Resonant converters, A.C. Line Filters, ratio, interference suppression. HDVC transmission.
8	Vth	Electronic Waste (ECE 508)	Introduction: Definition and meaning of e waste (WEEE), e waste growth in India, e waste growth in world, e waste generation and mitigation, 4 R concept. E waste toxicity and health perspectives: Introduction, Hazardous, biomedical waste, occupational and environmental health perspective. E Waste regulations: Basel convention, E waste regulation in European Union, Regulating e-waste in international and national legal framework, important legislation in India, Extended Producer responsibility, its impact and mechanisms. Recycling Technologies for e waste : Optimal planning for modernization , Computer wastes, e scrap and its recycling, global opportunities, Recovery technologies from e waste for resource generation, guidelines for environmentally sound management of e waste

9	Vth	Linear Integrated Circuits (ECE 509)	DC and AC amplifiers, Peaking Amp, Summing, Scaling and Averaging Amp, Instrumentation Amplifier, V to I and I and to V converter, Log and Antilog Amp, Integrator, Differentiator. Active filters: First order LP Butterworth filter, Second order LP Butterwor th filter, First order HP Butterworth filter, Second order HP Butterworth filter, Higher order filters, Band pass filter, Band reject filters, All pass filter, Phase shift oscillator, Wein bridge oscillator, Quadrature oscillator, Square wave generator, Triangular wave generator, Sawtooth wave generator, Voltage controlled oscillator, Basic comparator, Zero crossing detector, Schmitt trigger, window detector, V to F and F to V converters, A to D and D to A converters, Peak Detector, Sample and Hold Circuit. IC 555 Timer: Pin configuration, Block diagram, application of IC 555 as Monostable and Astable Multivibrator., Phase Lock Loops: Operating principles & applications of IC 565, Voltage Regulators: Fixed voltage regulators, Adjustable voltage regulators, Switching Regulators.
10	Vth	Programmable Logic Controllers (ECE- 510)	Register - Introduction, general characteristics of registers, module addressing, holding registers, input registers: single & group, output registers: single & group. PLC Timer Functions - Introduction, PLC timer functions, examples of timer function industrial application, industrial process timing application. PLC Counter Functions - Introduction, PLC counters examples of counter function industrial application. PLC Arithmetic Functions - Introduction, PLC addition & subtraction, the PLC repetitive clock, PLC multiplication, division & square-root: PLC trigonometric & log function, other PLC arithmetic functions. PLC Number Comparison Functions - Introduction, PLC basic comparison function, PLC basic comparison function application, PLC advanced comparison function. Numbering Systems and PLC Number Conversion Functions - Introduction, numbering system: decimal, binary & BCD, PLC conversion between decimal & BCD, OCTAL & HEX DECIMAL numbering system, other numbering & code system The PLC SKIP and MASTER CONTROL RELAY Functions - Introduction, the SKIP function & application, the MASTER CNTROL RELAY function & application. Jump Functions - Introduction, jump with non-return, jump with return. PLC Data Move Systems - Introduction, PLC MOVE function & application, moving large blocks of PLC data, PLC table & registers moves, other PLC MOVE functions. Other PLC Data Handling Functions - Introduction, PLC FIFO functions, the FAL function, the one shot (ONS), clear (CLR) & SWEEP functions. . PLC Digital Bit Functions and Applications - Introduction, bit pattern in a register, changing a register bit status, shift register function, shift register application. PLC Sequencer Functions - Introduction, electromechanical sequencing, the basic PLC sequencer function, a basic PLC sequencer application with timing, other PLC sequencer function, cascading sequencer. Controlling a Robot with a PLC - Introduction, basic two axis ROBOT with PLC sequencer control, industrial three axis ROBOT with PLC control. PLC Matrix Functions - Introduction, applying matrix functions to reduce program length, the PLC AND & OR matrix function, the PLC COMPLEMENT & OMPARE matrix function, combination PLC matrix operation

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BITT DIGITAL 2nd INTERNAL EXAMINATION SYLLABUS (Subject wise)			
DEPARTMENT OF CIVIL ENGINEERING			
S.NO.	**SEMESTER**	**SUBJECT AND CODE**	**SYLLABUS (PORTION)**
2	IIIrd	BUILDING MATERIALS (CIV 304)	Stone:: Classification of rock, uses of stone, natural bed of stone, Qualities of good building stone. Stone quarrying- tools for blasting, process of blasting, Precautions in blasting, machines for quarrying, dressing of stone. Characteristics of different type of stone and their uses. Refractory material and clay products: Definition, classification of refractory. Properties and uses of refractory like terracotta, porcelain glazing. Different types of Tile and similar products.. Mortar and concrete: Composition and properties of ingredients in both cement & lime mortar and concrete Properties and uses of cement & lime mortar and concrete Grading of aggregates in concrete. Water-cement ratio. Concreting- mechanical properties of aggregate, mixing of ingredients, placing, compacting and curing of concrete.. Introduction to Ready Mixed Concrete. Factors responsible for deterioration of concrete. Timber: Classification and structure of timber. Defects in timber. Disease and decay of timber Seasoning and preservation of timber. Manufacturing and uses of plywood. Special characteristics of Assam type timber. Substitute building materials of timber. Paint, Varnish and Distemper: Purpose of painting a surface. Characteristics of ideal paint and varnish. Ingredients of paint and varnish. Process of painting and varnishing. Repainting of old surface. Purpose of applying distemper, properties, ingredients, process of distempering. Application of white washing and colour washing
3	IIIrd	Math III (301)	Integration: Definition of integration as anti-derivative. Integration of standard function. Rules of integration (Integrals of sum, difference, scalar multiplication). Methods of Integration. Integration by trigonometrically transformation. Integration b y substitution. Integration by parts. Integration of rational and irrational functions. Integration by Partial fractions. Definite Integration. Concept of definite integrations with examples. Properties of definite integral with simple problems. Applications of definite integrals. Area under the curve. Area bounded by two curves. Differential Equation Definition of differential equation, order and degree of differential equation. Formation of differential equation. Solution of differential equations of first order and first Degree such as variable separable form, reducible to Variable separable, Homogeneous and Linear Differential Equation. Applications of Differential equations. Rectilinear motion (motion under constant and variable acceleration) Newton's Law of Cooling. Numerical Methods Solution of algebraic equations Bisection method, Regula-falsi method and Newton Raphson method. Solution of simultaneous equations containing 3 unknowns. Gauss elimination method. Jacobi's Iterative method Gauss Seidal method. Interpolation Concept of interpolation and extrapolation. Different operators (Δ, ∇ &),relation between them, some problems based on operators , formation of Difference Table. Newton's Forward and Backward difference interpolation formulae. Lagrange's interpolation formula. Problems based on above. Numerical Differentiation &Integration. Newton's forward and backward difference formulae for first and second order

			differentiation at any point. Numerical integration. Trapezoidal rule and Simpson's 1/3rdrule. Probability: Definition of random experiment, sample space, event occurrence of event and types of events (impossible, mutually exclusive, exhaustive, equally likely). Definition of probability, addition and multiplication theorems of probability. Probability Distribution: Binomial distribution. Poisson's distribution. Normal distribution, Simple examples based on above . Laplace Transform Definition of Laplace transforms Laplace transform of standard functions. Properties of Laplace transform such as Linearity, first shifting, second shifting, multiplication b y tn, division by t. Inverse Laplace transforms. Properties-linearly first shifting, second shifting. Method of partial fractions, Fourier Series. Definition of Fourier series (Euler's formula). Series expansion of continuous functions in the intervals. Linear Programming: Introduction, Solution of Linear Programming problem (LPP) by Graphical Method.
4	IIIrd	STRENGTH OF MATERIALS (CIV 305)	Difference between c.g & centroid, Axis of symmetry. Centriod of simple common Figure by 1st principle, Calculation of centroid of composite section M.I. & their Calculation for simple plane shape by 1st principle perpendicular axis theorem. Polar Moment of interia. Parallel axis theorem and their use for calculation M.I. of composite section radius of gyration. Forces, Types, Resolution of forces, Equilibrium of forces. Types of support, load and beam. Shear force and bending moment . Relation between Shear force, bending moment & uniformly distributed load. Shear force diagram and bending moment diagram of simply supported & cantilever beam with concentrated, UDL or combination of them. Introduction of singularity function for calculation SFD & BMD. Assumptions in the theory of pure bending, derivation of bending stress formula, concept of neutral axis, section modulus,, calculation of bending stresses for different types of loading and sections (in SS and Cantilever beam).. Shear stresses in beams – Formula for shear stress in rectangular cross section. Calculate shear stresses at different layers of a given Beam; draw the distribution of shear stress for different structural sections (only application of formula. . Torsional Stresses: Basic assumption for pure torsion, torsion of circular shafts (hollow and solid) – polar moment of inertia, torsional shearing stress, angle of twist, torsional rigidity. Determination of maximum shear stress and angle of twist in shafts transmitting given torque. Horse power transmitted by a shaft. Definition of columns and struts; Buckling load (critical or crippling load); Slenderness ratio, Classification of columns. Euler's Theory – Basic assumptions made in Euler's theory for column buckling. Effective lengths for different end conditions. Factors affecting buckling strength of long column. Limitations of Euler's theory. Other Formulae – Practical deviations from ideal column, Rankine's formula, factor of safety for different column materials, IS - 800 latest edition

5	IIIrd	SURVEYING (CIV 303)	Instruments for measuring distance: Tape and Chains. Equipment and accessories for chaining-description only. Use of chain- unfolding & folding, use of arrows, reading a chain, testing and adjusting of chain. Ranging – purpose, signaling, direct and indirect ranging, line ranger-featuring and use, error due to incorrect ranging. Method of chaining-Role of leader and follower, chaining on flat ground, chaining on sloping ground- stepping method, Clinometers feature and use, slope correction. (Demonstration infield). Field problems- Setting perpendicular with chain & tape, chaining across different type of obstacles) Chaining around obstacle possible: Vision fee but chaining obstructed both vision andchaining obstructed.. b) Chaining around obstacle not possible: Vision free but chaining obstructed, chaining free but vision obstructed. Numerical problem on chaining across obstacles. Error and mistakes in liner measurement-classification, sources of error and remedies.. Correction tomeasured length dueto-incorrect length, temperature variation, pull, sag, numerical problem applying corrections. Precaution duringchaining. Principle of chain surveying-well conditioned and ill conditioned triangles. Field books-single line & double line entry, field book recording. Selection of survey station, base line, Tie line, Check lines.. Types of theodolite and terminologies in theodolite survey. Temporary and permanent adjustment of theodolite. Relation between fundamental lines of theodolite. Measurement of horizontal and vertical angles, base line, extension of base line. Features and use of Total Station and modern survey equipments. Tachometry survey for determination of horizontal distance of plane and slope ground. (numerical problems). Latitude, departure and computation of length and bearing of closed traverse. Bowditch and transit rule. Different instruments used. Different Methods.
6	Vth	Irrigation Engineering (CIV 503)	Investigation And Reservoir Planning ,Survey for irrigation project, data collected for irrigation project. area capacity curve, silting of reservoir, rate of silting , factors affecting silting , methods to control, levels and respective storage in reservoir . Fixing control levels. Dams And Spillways::Types of dams –Earthen dams and Gravity dams (masonry and concrete) Comparison of earthen and gravity dams with respect to foundation, seepage, construction and maintenance. Earthen Dams –Components and their function, typical cross section seepage through embankment and foundation seepage control though embankment and foundation. Methods of constructions, types of failure of earthen dams and remedial measures. Gravity Dams Theoretical and practical profile, typical cross section, stability analysis, drainage gallery, joint in gravity dam, high dam and low dam Spillways-Definition, function, location and components. Emergency and services, ogee spillway and bar type spillway, discharge over spillway. Spillway with and without gates. Diversion Head Works: Weirs –components parts, layout of diversion head works & its components and their function, canal head regular, silt excluders and slit ejectors. Barrages –components and their function. Difference between weir and barrage. CANALS – classification of canals according to alignment and position in the canal network. Design of most economical canal section. Design of canal section by Lacey & Kennedy method, Canal lining. Definition, purpose, types of canal lining advantages of canal lining properties of good canal lining material. CD. works-different C.D. works, canal falls, escapes,

			cross regulators and canal outlets.
7	Vth	RCC Design (CIV 504)	ANALYSIS AND DESIGN OF BEAMS FOR FLEXURE BY L.S.M: Effective span of cantilever, simply Supported and continuous beam-breadth and depth requirement of beam-control of deflection -minimum and maximum reinforcement, spacing for main enforcement and side face reinforcement as per IS 456-2000-design bending moments-design of singly and doubly reinforced rectangular beams - cantilever, simply supported beams. Necessity of providing doubly reinforced Section, reinforcement limitations. Analysis of doubly reinforced section, strain diagram, stress diagram, depth of neutral axis, moment of resistance of the section. Simple numerical problems on finding moment of resistance and design of beam sections. SHEAR, BOND AND DEVELOPMENT LENGTH (LSM): Nominal Shear stress in R.C. Section, design shear strength of concrete, Maximum shear stress, Design of shear reinforcement, Minimum shear reinforcement, forms of shear reinforcement. Bond and types of bond, Bond Stress, check for bond stress, Development length in tension and compression, anchorage value for hooks 90° bend and 45° bend Standard Lapping of bars, check for development length. Simple numerical problems on deciding whether shear reinforcement is required or not, check for adequacy of the section in shear. Design of shear reinforcement; Minimum shear reinforcement in beams; Determination of Development length required for tension reinforcement of cantilevers beam and slab, check for development length. Limit, state of collapse in shear -design shear strength of concrete - design strengths vertical/inclined stirrups and bent up bars in shear - principle of shear design - critical sections shear - nominal shear stress - design of vertical stirrups, inclined stirrups and bent up bars rectangular beams using limit state method - simple problems. DESIGN OF T- BEAM AND CONTINUOUS BEAMS BY L.S.M: General features, advantages, effective width of flange as per IS:456-2000 code provisions. Analysis of singly reinforced T-Beam, strain diagram &stress diagram, depth of neutral axis, moment of resistance of T-beam Section. Design of singly reinforced T-beam -cantilever /simply supported beams -design of continuous beam using B.M coeffts (equal spans & u.d.l only. DESIGN OF SLABS BY L.S.M: Classification of slabs - Effective spans-Imposed loads on slabs (IS: 875) - strength and stiffness requirements - minimum and maximum permitted size, spacing and area of main and second reinforcement as per IS 456 - 2000 Design of cantilever, simply supported, slabs and sunshades limit state method Design of continuous slabs using B.M. coefficients - check for shear and stiffness - curtailment of tension reinforcement . Introduction to two way slab - Effective span - thickness of slab for strength and stiffness requirements Middle and edge strips -B.M. coefficients - design B. Ms. - simply supported and restrained slabs - tension and torsion reinforcement requirement - design of two way slabs using B.M. coefficients curtailment of reinforcement - check for stiffness.

8	Vth	Adv Surveying (CIV 505)	Introduction: Classification of triangulation system, Triangulation figures of system, The strength of figure, Base line measurement, Satellite station: reduction to centre . Introduction, different method of volume computation – cross section method, unit area or borrow pit method and contour method, Cross section method – level section, two level section, side hill two level section, three level section and multilevel section; formula for volume computation -volume average end areas, trapezoidal rule, prismoidal rule (simple numerical problems), Volume through transitions – in highway/railway construction, volume from spot level 9 for foundation of underground reservoir, volume from contour plan, salient features of Mass Haul diagram and its applications. Aerial Survey Introductions, definition, Aerial photograph. No. of photo graphs considering overlap, scale and ground coordinate of vertical photo graph. Displacement due to ground relief. Simple numerical problems, Remote Sensing – Introduction, Electro-Magnetic Energy , Remote sensing system-Passive system , Active system, Application of remote sensing : mineral location, Land use/Land cover, Natural Hazards and Environmental engineering system. Components and Use of one second Micro Optic Theodolite, Digital Theodolite. Features of Electronic Theodolite. Principle and use of Electromagnetic Distance Measurement (E.D.M). Components and Use of Auto level , Digital Level & Total Station Components and Use of G.P.S (Global Positioning System) Penta Graph and Digital Plannimeter, GIS: Introduction and Uses.
9	Vth	Environmental Engineering (CIV 506)	Chlorine Demand, Residual Chlorine, Chlorination – Plain, Pre & Post Chlorination, Double & Re-chlorination, Break Point Chlorination, Super Chlorination, De-chlorination etc. Ortho-tolidine Test, Water Softening, De-fluoridation, Advanced Water Treatment Systems – Electro-dialysis, Reverse Osmosis, Ion-exchange/Zeolite, Nalgonda Method for low cost treatment etc. Chlorine Demand, Residual Chlorine, Chlorination – Plain, Pre & Post Chlorination, Double & Re-chlorination, Break Point Chlorination, Super Chlorination, De-chlorination etc. Ortho-tolidine Test, Water Softening, De-fluoridation, Advanced Water Treatment Systems – Electro-dialysis, Reverse Osmosis, Ion-exchange/Zeolite, Nalgonda Method for low cost treatment etc. Water Distribution System – Components, Methods of Distribution – Gravity, Pumping & Combined System, Distribution Reservoirs – Surface, Elevated Reservoirs etc. Water distribution networks – Dead End/Tree, Grid Iron, Ring/Circular, Radial System, William-hazel Nomo-gram etc. Numerical on – Alum Dose, Copperas & Lime Dose, Chlorine & Sodium Hypo-chloride Dose, Residual Chlorine etc. Sanitary plumbing system components – Water main, Service & Distribution pipes, Ferrule, Goose Neck, Stop cock & Stop valves, Hydrants etc. Water supply to buildings, Piping systems – Direct, O.H Tank, Combined U/G & O.H Tank supply, Deep Bore-well, Types of fitting for pipe connection, Tools & Plants used in plumbing.. Rain Water harvesting – benefits, Metrhods – Storage of Surface Water & Re-charge of U/g aquifer, Recharge Trench & Well, Models of Rain Water Harvesting by RMC.. Sewage Disposal & Sanitary Engg. – Necessity, Terms & definitions – Sewage, sullage, garbage, rubbish, Effluent etc..

10	Vth	Advance Construction Methodology Equipment (CIV 508)	Pre-cast RC Doors, Windows & Wall Panels. Uses & advantages, Types of jointing of Structural members – Bolted, Rivetted & Welded connections & types of joints etc. Soil reinforcement technique – Fill matrix, Reinforcement systems, Geo-synthetics, Methods of improving Bearing Capacity of Soil, Embankment Strengthening, Slope Stabilisation etc. Hoisting equipments – Static & Mobile (Fork lift type), Cranes – Stationary (Derrick Cranes) & Mobile (Self propelled, Lorry mounted, Tele-handlers, Track mounted, Mast Cranes etc. Gantry Cranes, Tower Cranes– Self Supported, Supported, Travelling & Climbing type, Conveying system – Belt, Roller, Screw, Bucket, Chain & Pipe Conveyors, Tipping Trucks, Tractors & Dumpers etc. Earth moving equipts.– Dozer, Scrapper, Grader, Back-hoe, Shovel, Dragline, Loader, Trencher, Roller, Rammer, Jetting & Ponding etc. Methods of proportioning of concrete – Volumetric Mix, Mix Design, Mixing of concrete – Continuous Mixer, Batch or Drum Mixer etc. Types of mixing – Hand, Drum Mixers - Types, Batching Plant – Components of a Concrete Batching Plant & conveying system. Weigh batching equipts., Conveying of Concrete – Wheel Barrow, Bucket & Ropeway, Transit Mixers, Belt Conveyor, Pumping Method, Hoist, Compaction – Vibrators, Curing & formwork removal time etc. Automatic Concrete Batching Plant - Components, Stone Crushers – Types of Stone Crushers – Jaw, Cone, Impact & Roller Crushers. Production of Artificial Sand, Process – Feeding, Crushing, Screening, Washing & Recycling, Equipments used etc. Pile driving equipments – Components - Pile Frames, Pile Hammers, Leads, Winches etc.

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BITT DIGITAL 2nd INTERNAL EXAMINATION SYLLABUS (Subject wise)			
DEPARTMENT OF MECHANICAL ENGINEERING			
S.NO.	**SEMESTER**	**SUBJECT AND CODE**	**SYLLABUS (PORTION)**
1	IIIrd	Math III (301)	Definite Integration. Concept of definite integrations with examples. Properties of definite integral with simple problems. Applications of definite integrals. Area under the curve. Area bounded by two curves. Differential Equation Definition of differential equation, order and degree of differential equation. Formation of differential equation. Solution of differential equations of first order and first Degree such as variable separable form, reducible to Variable separable, Homogeneous and Linear Differential Equation. Applications of Differential equations. Rectilinear motion (motion under constant and variable acceleration) Newton's Law of Cooling. Numerical Methods Solution of algebraic equations Bisection method, Regula-falsi method and Newton Raphson method. Solution of simultaneous equations containing 3 unknowns. Gauss elimination method. Jacobi's Iterative method Gauss Seidal method. Interpolation Concept of interpolation and extrapolation. Different operators (Δ, ∇ &),relation between them, some problems based on operators , formation of Difference Table. Newton's Forward and Backward difference interpolation formulae. Lagrange's interpolation formula. Problems based on above. Numerical Differentiation &Integration. Newton's forward and backward difference formulae for first and second order differentiation at any point. Numerical integration. Trapezoidal rule and Simpson's 1/3rdrule. Probability: Definition of random experiment, sample space, event

			occurrence of event and types of events (impossible, mutually exclusive, exhaustive, equally likely). Definition of probability, addition and multiplication theorems of probability. Probability Distribution: Binomial distribution. Poisson's distribution. Normal distribution, Simple examples based on above . Laplace Transform Definition of Laplace transforms Laplace transform of standard functions. Properties of Laplace transform such as Linearity, first shifting, second shifting, multiplication b y tn, division by t. Inverse Laplace transforms. Properties-linearly first shifting, second shifting. Method of partial fractions, Fourier Series. Definition of Fourier series (Euler's formula). Series expansion of continuous functions in the intervals. Linear Programming: Introduction, Solution of Linear Programming problem (LPP) by Graphical Method.
2	IIIrd	Engineering Materials (MEC 304)	Alloy Steels 2.2.1 Alloy Steels: - Low alloy steel, high alloy steel, tools steel & stainless steel. Effect of various alloying elements such as – Chromium, nickel, manganese, molybdenum, tungsten, vanadium, etc. 2.2.2 Tool Steels: - High speed Steels (HSS), Hot & cold Working dies, shear, punches etc., properties & applications. 2.2.3 Special Cutting Tool Materials – Diamond, Stelites & Tungsten Carbide. 3.1 Properties, applications & chemical compositions of Copper alloys (naval brass, muntz metal, Gun metal & bronzes), Aluminum alloys (Y-alloy & duralumin) 3.2 Various Lead and Zinc alloys. Alloys used for high temperature services. 3.3 Bearing materials like white metals, leaded bronzes & copper lead alloys and their desired properties. 4.1 Basic concept of Heat treatment processes - Annealing, Normalizing, Hardening, Tempering. Aus tempering & Mar tempering. 4.2 Basic concept of Surface Hardening Processes - Flame Hardening, Induction Hardening, Nit riding, Cyaniding, Carburizing, Carbonic trading. 5.1 Polymeric Materials – Introduction to Polymers- types, characteristics, properties and uses. 5.2 Thermoplastic Plastics & Thermosetting Plastics - characteristics and uses of, Acrylics, Nylons polyesters, Epoxies, Melamine's & Bakelite's. 5.4 Rubbers – Neoprene, Butadiene, Buna & Silicones – Properties & applications. 5.5 Properties and applications of following Engineering Materials – Ceramics, Abrasive, Adhesive and Insulating materials such as Cork, Asbestos, Thermocole and Glass Wool 5.6 Introduction to Composite Materials – Laminated & Fiber, reinforced materials - Structure, Properties & Applications. 6.1 Destructive Testing – Types, Concept and processes of Hardness &

			Toughness. 6.2 Importance of Non-destructive testing, Difference between Destructive and Nondestructive testing. 6.3 Nondestructive testing methods - Radiography (X-Ray & Gamma Ray), Ultrasonic crack detection, Dye penetrate test.
3	IIIrd	Engineering Mechanics (MEC 305)	Equilibrium: 8 3.1 Conditions of equilibrium-analytical and graphical conditions of equilibrium for concurrent, parallel force system, non-concurrent nonparallel force system, free body and free body diagram. 3.2 Lami's Theorem–Statement and explanation, Application of Lami's theorem for solving various engineering problem shaving two unknown only. 3.3 Equilibrant–Definition, relation between result and equilibrant, equilibrant of concurrent and non-concurrent force system. 3.4 Collision- Collision of elastic and inelastic bodies, coefficient of restitution, loss of kinetic energy during impact.(simple problem related with collision) 3.5 Truss - Introduction, Reaction at supports, Forces in a member by method of joints and method of section, Simple problems on methods of joints only). 4. Centroid and Centre of Gravity: 6 4.1 Centroid: Definition of centroid & moment of an area about an axis, centroid of basic geometrical figures such as square, rectangle, triangle, circle, semicircle and quarter circle. Centroid of composite Geometrical figures. 4.2 Centre of gravity: Definition, centre of gravity of simple solids such as cylinder, sphere, Hemisphere, Cone, cube, and rectangular block, centre of gravity of composite solids (Any types of hollow solids shall not be considered). Friction: 8 5.1 Definition and basic concept of- friction, force of friction, limiting frictional force, coefficient of friction, angle of friction, angle of repose, relation among angle of friction, angle of repose and coefficient of friction. Cone of friction, types of friction, laws of friction, advantages and disadvantages of friction. 5.2 Equilibrium of bodies on level plane–external force applied horizontal and inclined (Pull & Push) 5.3 Equilibrium of bodies on inclined plane– external forces is applied parallel to the plane. 5.4 Ladder Friction & Wedge Friction (simple numerical only). 6 . Simple Machines: 8 6.1 Basic concept and definition of load, effort, mechanical advantage, velocity ratio and efficiency of a simple lifting machine, relation among mechanical advantage, velocity ratio and efficiency of a machine, Ideal machine, ideal effort and ideal load,

			friction in machines. 6.2 Law of machine, maximum mechanical advantage and maximum efficiency of a machine, reversibility of a machine, condition for reversibility of a machine (no derivation) and self-locking machine.
5	IIIrd	Strength of Materials (MEC 306)	Difference between c.g & centroid, Axis of symmetry. Centriod of simple common Figure by 1st principle, Calculationof centroid of composite section M.I. & their Calculation for simple plane shape by 1st principle perpendicular axis theorem. Polar Moment of interia. Parallel axis theorem and their use for calculation M.I. of composite section radius of gyration. Forces, Types, Resolution of forces, Equilibrium of forces. Types of support, load and beam. Shear force and bending moment . Relation between Shear force, bending moment & uniformly distributed load. Shear force diagram and bending moment diagram of simply supported & cantilever beam with concentrated, UDL or combination of them. Introduction of singularity function for calculation SFD & BMD. Assumptions in the theory of pure bending, derivation of bending stress formula, concept of neutral axis, section modulus,, calculation of bending stresses for different types of loading and sections (in SS and Cantilever beam).. Shear stresses in beams – Formula for shear stress in rectangular cross section. Calculate shear stresses at different layers of a given Beam; draw the distribution of shear stress for different structural sections (only application of formula. . Torsional Stresses: Basic assumption for pure torsion, torsion of circular shafts (hollow and solid) – polar moment of inertia, torsional shearing stress, angle of twist, torsional rigidity. Determination of maximum shear stress and angle of twist in shafts transmitting given torque. Horse power transmitted by a shaft. Definition of columns and struts; Buckling load (critical or crippling load); Slenderness ratio, Classification of columns. Euler's Theory – Basic assumptions made in Euler's theory for column buckling. Effective lengths for different end conditions. Factors affecting buckling strength of long column. Limitations of Euler's theory. Other Formulae – Practical deviations from ideal column, Rankine's formula, factor of safety for different column materials, IS -800 latest edition
6	Vth	Power Engineering (MEC 503)	AIR COMPRESSER Introduction - Classification of air compressors - Definition: - Pressure ratio, Compressor capacity, Free air delivered, Swept volume - Uses of compressed air - Single stage, multi stage, single acting, double acting 2.2 Reciprocating air compressor - Construction and working of single stage and two stage compressor - Efficiency: - Volumetric , Isothermal & Mechanical (Only simple numerical) - Advantages of multi staging. 2.3 Rotary Compressor - Construction and working of screw, lobe, vane, centrifugal compressors &Axial flow compressor (No numerical) - Comparison and applications of reciprocating and rotary compressors 2.4 Methods of energy saving in air compressors. 3Gas Turbine And Jet Propulsion

			3.1 Classification and applications of gas turbine. 3.2 Constant volume and constant pressure gas turbines. - Closed cycle and open cycle gas turbines and their comparison. 3.3 Methods to improve thermal efficiency of gas turbine- Regeneration, inter- cooling, reheating using T- S diagram (no analytical treatment) 3.4 Jet Propulsion - Principles of turbojet, turbo propeller, Ram jet. 3.5 Rocket propulsion - Solid propellants, solid propellant rocket and liquid propellants, components of liquid propellants, liquid propellant Rocket. Refrigeration and Air- Conditioning 4.1 Air Refrigeration cycle 4.1.1 Define Refrigeration 4.1.2 Explain methods of Refrigeration 4.1.3 State unit of Refrigeration, C.O.P. 4.1.4 Explain Carnot cycle, reversed carnot cycle, bell Coleman cycle and derive the C.O.P. with simple problems 4.1.5 Explain open air and closed air refrigeration system 4.2 Vapour compression system 4.2.1 Explain the principle and analysis of vapour comp. Refrigeration system with help of P-H, T-S diagram, simple problem 4.2.2 Write down different types of refrigerant with their properties (Ammonia, CO2, F-11, F-12) 4.2.3 Briefly Explain the working principle of Ice-plant, cold storage, domestic Refrigerator. 4.3 Vapour absorption system Explain the working principle of vapour absorption system 4.4 Psychometric Psychometric Properties of air, Dalton's law of partial pressure psychometric chart & processes. Air conditioning systems Definition of Air conditioning and classification of Air conditioning Systems.(Elementary treatment) Application- Window air conditioner.
7	Vth	Advance Manufacturing Processes (MEC 504)	CNC Lathe Introduction, Classification, advantages, Positioning system Constructional features. Part programming: programming format, word, statement, block, Preparatory and miscellaneous code, Fixed cycles in programming- canned cycle, do- loop, subroutine CNC milling machines Concept of CNC milling machine Vertical and horizontal machining centre: Constructional features, Axis identification, Electronic control system. Automatic tool changer and tool magazine. CNC programming: Preparatory functions (G code), miscellaneous functions (M code), Part programming Including sub routines and canned cycles with comparison (simple programming based on sub routines) Introduction to Computer aided part programming by using APT language.

			Machine Tool Automation: Introduction and Need. Single spindle automates, transfer lines. Elements of control system, Limit switches, Proximity switches, Block diagram for feedback and servo control system, Introduction to PLC, Block diagram of PLC. Internet of things (IoT) Introduction to basic components Different commonly used sensing & Actuating devices Introduction to Artificial Intelligence (AI) & Expert system in relation to IoT. Integration of different system Maintenance of Machine Tools: Types , need and importance of maintenance activity Basic maintenance practices for simple machine element, (Bearing, Coupling, Shaft and pulley etc.) Repair cycle analysis, Repair complexity, Maintenance manual, Maintenance records, Housekeeping. Introduction to Total Productive Maintenance (TPM).
8	Vth	Metrology & Quality Control (MEC 505)	Threads and Gear Metrology 2.1 Screw thread Measurements Types of thread, Errors in threads, Pitch errors, Measurement of different elements such as major diameter, minor diameter, effective diameter, pitch, Two wire methods, Thread gauge micrometer, Working principle of floating carriage dial micrometer. 2.2 Gear Measurement and Testing Analytical and functional inspection, Rolling test, Measurement of tooth thickness, gear tooth vernier, Errors in gears such as backlash, run out, composite Testing Techniques 3.1 Measurement of surface finish Primary and secondary texture, Sampling length, Lay, terminology as per IS 3073- 1967, direction of lay, Sources of lay and its significance, CLA, Ra, RMS, Rz values and their interpretation, Symbol for designating surface finish on drawing, Various techniques of qualitative analysis, 3.2 Machine tool testing Parallelism, Straightness, Squareness, Coaxiallity, roundness, run out, alignment testing of machine tools as per IS standard procedure. Quality Control 4.1) Quality : Definitions, meaning of quality of product & services, Quality characteristics, Quality of design, Quality of conformance, Quality of performance, Concept of reliability, Cost, Quantity assurance, Cost of rework & repair, Quality & Inspection, Inspection stages. 4.2) Total Quality Management : • Principles and concept of total quantity management. • Quality Audit: Concept of audit practices, lead assessor certification. • Six sigma: Statistical meaning, methodology of system Improvement , 4.3) ISO 9000 Series & other standards Concept, ISO 9000 series quality standards, QS14000, Standards in general, Its evaluation & Implications, necessity of ISO certification, other Quality systems. Elementary Statistics & it's application in quality control

			5.1 Statistical Quality Control – Meaning and importance of SQC, Variable and attribute Measurement. control charts – inherent and assignable sources of variation, control charts for variables – X & R charts, control charts for attributes p, 100p np, C, U - charts (simple numerical based on charts), process capability of machine, determination of statistical limits, different possibilities, Rejection area, Statistically capable and incapable processes, 5.2 Acceptance Sampling – Concept, Comparison with 100% inspection, Different types of sampling plans, with merits and demerits.
9	Vth	Electronics Engineering (MEC 506)	Bipolar Junction Transistors (BJTs): Simplified structure and physical operation of n-p-n and p-n-p transistors in the active region, Equivalent circuits, h parameters, Current-voltage characteristics of BJT, BJT as an amplifier and as a switch, BJT Circuits at DC, Biasing in BJT amplifier circuits CE Amplifiers, Voltage follower, Cascading of stages Field Effect Transistor(FET):, Fundamentals of FET Amplifier Circuits and Analysis, Introduction to MOSFET. Operational Amplifier (Op-Amp): The ideal Op-Amp, Inverting and non-inverting configurations, Difference amplifier, CMRR, Application of Op-Amp (Summing amplifier, Integrator and Differentiator). General feedback structure, Properties and advantages of negative feedback, Basic principles of sinusoidal oscillators, The Barkhausen criterion, Oscillator circuits (Wien-Bridge oscillator, RC phase-shift oscillator and Crystal oscillator). Digital Electronic Principles: Introduction, Binary digits, Logic levels and Digital waveforms, Introduction to basic logic operation, Number system, Decimal numbers, Binary numbers, Decimal-to-Binary conversion, Simple binary arithmetic. Logic Gates and Boolean Algebra: The inverter, The AND, OR, NAND NOR, Exclusive-OR and Exclusive-NOR gate, Boolean operations and expressions, Laws and Rules of Boolean algebra, De-Morgan's theorem, Boolean analysis of logic circuits, Standard forms of Boolean expressions, Boolean expression and truth table. Combinational Logic and Their Functions: Basic combinational logic circuits, Implementation of combinational logic, The universal properties of NAND and NOR gates, Basic adders, Multiplexers and Demultiplexers., Elementary treatment of Latches, Basic concepts of Memory (RAMs) . 8085 and 8086 Microprocessor, block diagram, pinout diagrams, interrupt, stack, paging, modes, features, instruction set and programming, 8255, 8279 chips. Introduction to 8 and 16 bit microcontroller, instruction sets and programming introductory concept
10	Vth	Automobile Engineering (MEC 508)	Transmission Systems: 2.1 Need, principle and Requirements of transmission system. Its components and their functions. 2.2 Clutch: Function and purpose of clutch, types and construction of clutches as plate type, Centrifugal and diaphragm type clutch. 2.3 Gearbox-Need, function, types- constant mesh, sliding gear, synchromeshgearboxes,Epicyclicgearboxtheirconstructionandoperation.Overdrive,transfercase,Twowheelergearboxconstructionandoperation

			2.4 Propeller shaft types and construction, functions of universal and slip joints. 2.5 Differential-need,constructionandworking,differentialactionandoperation 2. Axle–Hot chkiss and torque tube drives, Rear-full floating axle, semi floating and three quarter floating axle. Front axle. Control Systems: 3.1 Steering System: Purpose of steering system, steering link age. construction and working of-re circulating ball type and rack and pinion. Wheel Geometry-caster, camber, king pin inclination, Toe In and Toe Out and their effect. Power steering 3.2 Braking System: Need of braking system, types of automotive braking systems for two and four wheeler vehicles– mechanical, hydraulic and air operated Hydraulic braking systems: Layout & components of hydraulic braking systems Construction and working of master cylinder and wheel cylinder. Internal and external Drum braking system, Disc Braking Systems and comparison Air braking system: lay out and working Suspension Systems, Wheels and Tiers 4.1 Necessity and Classification of Suspension System Front and rear suspension system construction and working of Wish bone type, Mac Pherson type, Trailing link type, coiled springs, leaf spring and shock absorbers, air suspension system. Introduction of Air bag in automobile 4.2 Wheels and Tiers types of wheel- spoke,disc,lightalloycast.Typesofrims.Tyres-Desirableproperties,types-redialply,crossply,tubeless.Tyrespecifications.Factorsaffectingtyrelife. Wheelalignmentandbalancing.

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BITT DIGITAL 2nd INTERNAL EXAMINATION SYLLABUS (Subject wise)			
DEPARTMENT OF ELECTRICAL ENGINEERING			
Si.No.	**SEMESTER**	**SUBJECT AND CODE**	**SYLLABUS (PORTION)**
1	IIIrd	Math III (301)	Integration: Definition of integration as anti-derivative. Integration of standard function. Rules of integration (Integrals of sum, difference, scalar multiplication). Methods of Integration. Integration by trigonometrically transformation. Integration b y substitution. Integration by parts. Integration of rational and irrational functions. Integration by Partial fractions. Definite Integration. Concept of definite integrations with examples. Properties of definite integral with simple problems. Applications of definite integrals. Area under the curve. Area bounded by two curves. Differential Equation Definition of differential equation, order and degree of differential equation. Formation of differential equation. Solution of differential equations of first order and first Degree such as variable separable form, reducible to Variable separable, Homogeneous and Linear Differential Equation. Applications of Differential equations. Rectilinear motion (motion under constant and variable acceleration) Newton's Law of Cooling. Numerical Methods Solution of algebraic equations Bisection method, Regula-falsi method and Newton Raphson method. Solution of simultaneous equations containing 3 unknowns. Gauss elimination method. Jacobi's Iterative method Gauss Seidal method. Interpolation Concept of interpolation and extrapolation. Different operators (Δ, ∇ &),relation between them, some problems based on operators , formation of Difference Table. Newton's Forward and Backward difference interpolation formulae. Lagrange's interpolation formula. Problems based on above. Numerical Differentiation &Integration. Newton's forward and backward difference formulae for first and second order differentiation at any point. Numerical integration. Trapezoidal rule and Simpson's 1/3rdrule. Probability: Definition of random experiment, sample space, event occurrence of event and types of events (impossible, mutually exclusive, exhaustive, equally likely). Definition of probability, addition and multiplication theorems of probability. Probability Distribution: Binomial distribution. Poisson's distribution. Normal distribution, Simple examples based on above . Laplace Transform Definition of Laplace transforms Laplace transform of standard functions. Properties of Laplace transform such as Linearity, first shifting, second shifting, multiplication b y tn, division by t. Inverse Laplace transforms. Properties-linearly first shifting, second shifting. Method of partial fractions, Fourier Series. Definition of Fourier series (Euler's formula). Series expansion of continuous functions in the intervals. Linear Programming: Introduction, Solution of Linear Programming problem (LPP) by Graphical Method.

2	IIIrd	Electrical engineering (ELE 303)	Ideal and practical sources, Source Conversion, independent and dependent sources, Energy Stored in Inductor and Capacitor, series, parallel and series and parallel circuit. DC Networks & Theorems: Laws and Theorems applicable to DC networkks (KCL & KVL, Node voltage & Mesh current analysis, Star-Delta and Delta-Star conversion, Superposition theorem, Thevenin & Norton theorem & Maximum power Transfer theorem), Simple problems. AC Fundamentals: Single-Phase AC Circuits: Single-phase EMF Generation, Average and Effective value of periodic ac signals, Peak factor & Form factor, Phasor and Complex representation of sinusoids, Power factor, complex power.Three-Phase AC Circuits: Comparison between single-phase and three-phase systems, three phase EMF Generation, Line and Phase quantities in star and delta networks, Magnetic circuits. Introduction to Magnetic Circuits: Introduction to Electromagnetism, Faradays laws of Electromagnetic Inductions, B-H curve, Permeability, Reluctance, Solution of magnetic circuits, Hysteresis and Eddy current loss. Single Phase A.C. Circuits A.C. Circuits containing resistance only A.C inductance only, A.C. Circuits containing Capacitance only, R-L Series circuits, R-C series circuits, R-L-C Series circuits, Simple Numerical problems. Parallel A.C. Circuits : R-L,R-CandR-L-C circuits. Admittance, susceptance, solution by admittance method, phasor diagram, Parallel resonance, quality factor. Comparison of Series and parallel Circuits.
3	IIIrd	Measurement (ELE 304)	Principle and Construction of single phase & three phase dynamometer type wattmeter. Errors and their compensation. Measurement of single phase power with one wattmeter and 2 wattmeter methods for balanced and unbalanced loads. Three phase power measurement by two wattmeter and three wattmeter for balanced and unbalanced loads. Effect of power factor variation on wattmeter readings in two wattmeter method. Constructional feature & principle of working of single phase induction type energy meter. Constructional feature & principle of working of three-phase induction type energy meter. Different types of errors and their compensation. Concept of Electronic energy meter. Low, medium & high resistance. Measurement of low resistance by potentiometer & Kelvin's double bridge. Measurement of earth resistance by megger. Measurement of medium resistance by Wheatstone bridge method. Measurement of high resistance by loss of charge method. Measurement of inductance by Maxwell Bridge, Andersons Bridge. Hays Bridge. Measurement of capacitance by D-sauty Bridge, Schering Bridge. Self & Mutual inductance Measurement, Digital multimeter, LCR meter. Introduction of different types of transducers. Primary and Secondary, Active and Passive Transducers. LVDT, RVDT, RTD, Thermistor, Piezoelectric, photoelectric, ultra-sonic.

4	IIIrd	Basic Engineering(C&M) (ELE 305)	Surveying & Levelling: Surveying Instruments, Measurements of horizontal distance by chair or table. Measurement of horizontal & Vertical angle. Basic Knowledge of levelling and total station. Foundations for Machines: Fundamental of Mechanical Vibration. Need for Foundation. Martial Required for Foundation. Foundation battz & Sizes. Crilina for design. Joints and Fabrications. Types of joints, necessary precautions for working with metals, fabrication process concept. I. C Engine: Construction & Working of two strokes and four stroke petrol & Diesel Engine. Reasons of Mal functioning & remedial measurement for IC Engine. Construction & Working of Cochran, Babcock & Wilcox Boilers. Construction & Working Principle with velocity diagram of Pelton, impulse & Reaction turbine. Construction & Working principle of steam turbine. Introduction of Thermodynamics. 1st and 2nd Laws of thermodynamics. Basic Knowledge of Enthalpy, Entropy etc. Pumps & Air Compressors:Types of Pumps- Centrifugal Pump, Reciprocating Pump, Their Function. Air Compressors, Classification of compressors, construction & working of single & Two Stage reciprocating compressors.
5	IIIrd	Electronics Engineering (ELE 306)	Rectifiers and Filters, Rectifier, Need of rectifier, Types of rectifier: Half wave rectifier, Full wave rectifier (Bridge and centre tapped). working with waveform (IP/OP) waveforms for voltage and current, Average (DC) value of current and voltage (No derivation). Ripple, ripple factor, ripple frequency, PIV of diode used, transformer utilization factor, efficiency of rectifier. Comparison of three types of rectifiers (HWR, FWR Bridge & Centre Tapped). Filters, Need of Filters, Types of Filters: Shunt capacitor, series inductor, LC filter, filter (circuit diagram, operation, DC O/P voltage, ripple factor (Formula), ripple frequency, dependence of ripple factor on load., I/P and O/P waveforms, Limitations and Advantages of all types of filters. Bipolar Junction Transistor, Types: NPN, PNP Junction transistors (Symbols, operating principle), Transistor configuration: Common emitter (CE), Common Collector (CC), Common base (CB). Characteristics in CE configuration (Circuit diagram, I/P and O/P characteristics, different points of characteristics (Cut-off, Active and Saturation), input resistance, Output resistance, current gain (and β) Transistor Biasing). Need of biasing, DC load line, Operating Point. Types of Biasing Circuits: Fixed bias circuit, Base biased with emitter feedback, Base biased with collector feedback, voltage divider bias, emitter biased. Transistor Model of h-parameters. Transistor as an amplifier (CE configuration only). Graphical representation, Current gain, Voltage gain, Power gain (No derivation), Input Output resistance, Phase Shift between input and output. AC Load Line. Single Stage CE amplifier: Circuit diagram, Function of each component. Frequency response and bandwidth. Need of Cascaded amplifier. Types of coupling: RC couple, Transformer couple, Direct Couple (Circuit diagram and function of each component). Application of each amplifier. Transistor as a switch-(Circuit diagram, Operation, Application). UJT Symbol, characteristics and working principle of UJT. Field

			Effect Transistor (Unipolar Transistor): FET, Types, Symbols and working principle. Characteristics of FET, Circuit diagram for drain characteristics, Operating regions of characteristics. Drain resistance, Mutual capacitance, amplification factor and their relation, Pinch off voltage of FET. Comparison of BJT and FET. (Type of carriers, switching speed, Thermal stability, space in case of IC fabrication, control parameter, input impedance, offset voltage, power gain at audio frequencies). MOSFET, Types, Symbol, working principle. Application of FET and MOSFET. Regulated Power Supply, Definition of regulator, Need of regulator, Voltage regulation factor, Concept of load regulation and line regulation., Zener diode as a voltage regulator, Basic block diagram of DC Power supply, Transistorized Series voltage regulator, Transistorized Shunt Voltage regulator, (Circuit diagram and operation). Regulator IC's, IC's 78XX, 79XX (Functional Pin diagram), IC 723 as fixed, variable and Dual regulator. OP Amp, Block diagram, Basic definition of Terms, Equivalent Circuit, Open Loop & closed Loop, OP Amp, Inverting & Non inverting OP Amp, Adder and Subtractor, Integrator, differentiator & Comparator circuit using OP Amp.
6	Vth	Power System II (ELE 503)	Power transmission systems – Electrical characteristics of overhead lines and cables, Sag & Tension, Proximity, Corona, Skin effect, Bundled conductors, Transposition of conductors, Per unit representation of system quantities. Steady state performance of transmission network – ABCD parameters of short, medium and long lines. Methods of active and reactive power control – use of VAR compensators Elements of economic operations. Electricity tariffs. Distribution systems – feeders and distributors radial and mesh system – distribution sub-station – earthing, Important I.E. rules Indian Electricity Acts. Nature of faults in electrical systems, fault calculations, symmetric and asymmetric faults – method of sequence components – sequence networks. Study of Protective Devices-Isolators, disconnecting switch, lightening arrester, Horn gap, CT, PT, Protective relays and their applications to power apparatus and systems. Principles of circuit breakers – different types, oil circuit breakers, air circuit breakers, vacuum circuit breakers, SF6 – circuit breakers, their uses and comparison.
7	Vth	Electrical Machines II (ELE 504)	Three Phase Alternator 2.1 Definition and construction of three phase Alternator a) Armature b) Rotor- smooth cylindrical & projecting type 2.2 Derivation of e.m.f. equation of Alternator which includes a) Chording factor b) Distribution factor Synchronous Motor 3.1 Principle of working/operation 3.2 Synchronous Motor on load with constant excitation 3.3 Effect of excitation at constant load 3.4 V curve & inverted V curve 3.5 Hunting & phase swinging 3.6 Applications 3.7 Starting of Synchronous Motor

			3.8 Comparison between IM & Synchronous Motor (Numerical on all above) Single phase Motors 4.1 Double field revolving theory 4.2 Types of Single phase IM 4.3 Split phasing principle of starting a) Resistance start induction run b) Capacitor start induction run c) Capacitor start Capacitor run d) Double value Capacitor applications motor 4.4 Shaded pole IM 4.5 Applications Special machines 5.1 Induction Generator: Principle of operation, Construction and Applications 5.2 Linear Induction Motor Principle of operation, Construction and Applications 5.3 AC series motor Principle of operation, Construction and Applications
8	Vth	Traction (ELE 505)	Traction Motors and Their Control 3.1 State the desirable features of traction motors. 3.2 Explain Significance of D.C. series motor over D.C. Shunt motor - Significance of D.C. series motor as traction motor 3.3 Explain working of various A.C. motors as traction motors - A.C. Traction motors – single phase, Three phase, Linear Induction Motor 3.4Comparison between different traction motors 3.5 Apply various control methods applied to traction motors - Series – parallel control, Open circuit, Shunt and bridge transition, Pulse Width Modulation control of induction motors 3.6 Explain different types of electric braking system Electric Locomotives and Auxiliary Equipment 4.1 Classify electric locomotive -Important features of electric locomotives 4.2 Describe the function of auxiliaries in traction system - Different types of locomotives 4.3 Describe the different current collecting methods in locomotives- Current collecting equipment 4.4 Explain different control and auxiliary equipment used in the locomotive 4.5 Describe the power conversion and transmission systems - Power conversion and transmission systems 4.6 Explain Coach wiring and lighting devices-Coach wiring and lighting devices Feeding and Distribution System. 5.1 Explain the distribution & feeder system pertaining to traction- distributions and feeders 5.2 Classify traction substations - Requirements and selection 5.3 Describe different methods of feeding the traction sub-station - Method of feeding the traction sub-station

9	Vth	Illumination Engineering (ELE 506)	Lamps & Lighting Accessories 2.1 Types of lamps: ARC lamps, HPMV lamps, Sodium Lamps, CFL Lamps, Metal halides, LED lamps 2.2 Neon Sign Tubes. 2.3 Neon Lamps. 2.4 Halogen Lamps. 2.5 Construction, working principle, advantages, disadvantages & Application of incandescent & Flurocent 2.6 Lighting accessories. (All fittings, switches, enclosers) 2.7 Illumination Auditing Illumination Control & Control Circuits 3.1 Purpose of lighting control 3.2 Dimmer & Dimmer Transformer & their types 3.3 Electronic Dimmer 3.4 Enhancing Lighting control. 3.5 Control circuits for lamps (refer) : ON/OFF control & Illumination control. Illumination for Interior Applications 4.1 Standard for various situations of Interior Illumination 4.2 Design Techniques 4.3 Design considerations for Interior location of Residential, Commercial, Industrial premises 4.4 Design Illumination scheme for different Interior locations of Residential, Commercial, Industrial unit. Illumination for Outdoor Applications 5.1 Factory Lighting 5.2 Street Lighting (Latest Technology) 5.3 Flood Lighting 5.4 Railway Lighting 5.5 Lighting for Advertisement/Hoardings 5.6 Sports Lighting Lighting for Special Applications 6.1 Agriculture & Horticulture 6.2 Health Care Centers / Hospitals 6.3 Decorating Purposes 6.4 Stage Lighting 6.5 Aquariums & Shipyards 6.6 Special purpose lamps used in photography video films.

10	Vth	Maintenance of electrical machines (ELE 507)	Preventive and routine maintenance of distribution transformers, Periodic checks for replacement of oil, Silica gel, properties of a good transformer oil. Classification of insulating, factors affecting life of insulating materials, measurement of insulation resistance, interpretation of conditions, agents that contaminate insulating oil, tests on insulating oil (a) Acidity test (b) Sludge test (c) Crackle test (d) flash point test Filtration of insulating oil for protection of electrical equipments (insulation) during period of inactivity. Procedure for cleaning, washing and drying insulation and revarnishing Significance of trouble shooting of various electrical machines and describes the procedure for the same. Internal and external causes of failure of equipment, various types of faults (mechanical, electrical of magnetic) in electrical machines, Reason for their occurrences, use of following tools: Bearing puller, Filler gauge, dial indicator, spirit level, megger, earth tester, growler, Trouble shooting charts for 1 & 3 phase induction motor, 1 & 3 Phase transformer. List the common trouble in electrical installation and cables

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EXAMINATION DEPARTMENT

INSTRUCTIONS TO THE CANDIDATES FOR SECOND INTERNAL EXAMINATION

Following procedure and instructions should be strictly followed during online Internal Examination.

1. Students are advised to kindly take print–out of prescribed Answer sheet page 1 Day prior the examination.
2. Students are advised to fill the first page of Answer sheet carefully with correct information.
3. 3rd SEM and 5th SEM students are advice to write their Registration number instead of their Roll number provided in answer sheet.
4. The question paper of all subjects of all branches will be sent in PDF file in the Respective class Digital WhatsApp group on 26/02/2022 & 28/02/2022 as per Examination Scheduled.
5. The question paper of all subject branches wise will be sent by respective department.
6. Students are advised to write the answer on prescribed answer sheet on Own handwriting as per instruction given on question paper.
7. After complete the examination you must upload the answer sheet in PDF Format on given Google Link.
8. Google link for submitting answer sheet provided after starting examination by the department wise on respective digital WhatsApp group.
9. Students are advised to submit the Answer sheet subject wise online on provided Google link till 2:00 pm-5:00pm
10. Online Answer Sheet Submission link will be open on 26/02/2022 (2:00 pm to 5:00 pm) and on 28/02/2022 (1:00 pm- 04:00 pm)
11. Answer sheet must be submitted in prescribed Answer sheet page in PDF format in provided link.
12. Students are advised to arrange the prescribed page as shown below for answering the question 1 Day prior the examination.

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Getlatu, Ranchi - 835 217

INTERNAL ASSESSMENT

Name : .....Roll No. : .....

Course : .....Semester.....Subject : .....

Quiz/Internal Test No. : ..... Date : .....

Student's Signature..... Invigilator's Signature.....

Marks obtained	
Sign. of Examinor	

Process for NOC from Principal (Students having dues only)

1. The students are strictly informed to clear all their dues on or before 25.02.2022 for getting allowed in the 2ND internal exam. No student will be allowed to appear in the Internal Exam with dues unless he/she had NOC from Principal.
2. The Students are required to submit an application in the form of Email at bittpnoc@gmail.com as per attached format marked as annexure-1 on or before 25.02.2022 (In case unable to submit the dues)
3. The submitted application by the student in the form of email is evaluated on the ground of the previous record of the student regarding his/her track record for submission of fee.
4. The track record is the record of the student that the college is having starting from the date of admission till the last date of fee submission as on date.
5. The students are also evaluated on the basis of the various applications he/she had submitted regarding fee submission/clearing dues at the time of submission of examination form, getting the exam result and on other occasions.
6. Providing NOC to the student is the sole discretion of the college the student is advised not to be reactive in case of rejection of application.
7. The students will be provided (whose dues are not clear) an email as NOC/ALLOWED for Internal Exam before 26.02.2022.
8. Appearing in the Internal Exam is mandatory non appearance will be marked as absent in the Internal.

ANNEXURE -1

To
The Principal
BITT Polytechnic
Ranchi (Jharkhand) 835217

Date:

Sub: - Regarding NOC for appearing in the 2nd Internal Exam with dues.

Respected Sir,
This is to request you to that I am …… of session ……., request to kindly provide me the NOC for appearing in the 2nd internal Exam of …… Semester. That I am unable to submit the dues pertaining to me due the reason of …… I would like to mention that I will submit all the dues till ……..

Kindly consider My Application.

Yours Sincerely,

Name:

Father's Name:

Branch:

Session:

Registration Number:

Roll Number:

Mobile Number:

WhatsApp Number:

Email id:

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BITT DIGITAL 2nd INTERNAL EXAM TIME TABLE					
DEPARTMENT OF DIPLOMA IN COMPUTER SCIENCE ENGINEERING					
DATE	**BRANCH**	**SEMESTER**	**SUBJECT/PAPER**	**PAPER CODE**	**TIME**
26/02/2022	CSE	3RD	Math III	301	10:00 TO 11:00 AM
		5TH	Microprocessors & Microcontrollers	CSE 503	
		3RD	Electronic Devices and circuits	ECE 303	12:00 TO 01:00 PM
		5TH	Java Programming	CSE 504	
		3RD	Electrical Technology	ECE 304	02:00 TO 03:00 PM
		5TH	Computer Graphics	CSE 505	
28/02/2022		3RD	Object Oriented Programming	CSE 303	10:00 TO 11:00 AM
		5TH	Mobile Computing	CSE 506	
		3RD	Web Technology	CSE 304	12:00 TO 01:00 PM
		5TH	e- Commerce	CSE 511	

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BITT DIGITAL 2nd INTERNAL EXAM TIME TABLE					
DEPARTMENT OF DIPLOMA IN ELECTRONICS & COMMUNICATION ENGINEERING					
DATE	**BRANCH**	**SEMESTER**	**SUBJECT/PAPER**	**PAPER CODE**	**TIME**
26/02/2022	ECE	3RD	Math III	301	10:00 TO 11:00 AM
		5TH	Instrumentation System	ECE 503	
		3RD	Electronic Devices and circuits	ECE 303	12:00 TO 01:00 PM
		5TH	Power Electronics	ECE 504	
		3RD	Electrical Technology	ECE 304	02:00 TO 03:00 PM
		5TH	Programmable Logic Controller	ECE 505	
28/02/2022		3RD	Elect & Electronic Measurement	ECE 303	10:00 TO 11:00 AM
		5TH	Electronic Waste	ECE 506	
		3RD	Electromagnetic field Theory	ECE 304	12:00 TO 01:00 PM
		5TH	Linear Integrated Circuits	ECE 511	

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BITT DIGITAL 2nd INTERNAL EXAM TIME TABLE					
DEPARTMENT OF DIPLOMA IN ELECTRICAL ENGINEERING					
DATE	**BRANCH**	**SEMESTER**	**SUBJECT/PAPER**	**PAPER CODE**	**TIME**
26/02/2022	EE	3RD	Math III	301	10:00 TO 11:00 AM
		5TH	Power System II	ELE 503	
		3RD	Electrical Engineering	ELE 303	12:00 TO 01:00 PM
		5TH	Electrical Machines II	ELE 504	
		3RD	Measurement	ELE 304	02:00 TO 03:00 PM
		5TH	Traction	ELE 505	
28/02/2022		3RD	Basic Engineering(C&M)	ELE 305	10:00 TO 11:00 AM
		5TH	Illumination Engineering	ELE 506	
		3RD	Electronics Engineering	ELE 306	12:00 TO 01:00 PM
		5TH	Maintenance of Electrical Machines	ELE 507	

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BITT DIGITAL 2nd INTERNAL EXAM TIME TABLE					
DEPARTMENT OF DIPLOMA IN CIVIL ENGINEERING					
DATE	**BRANCH**	**SEMESTER**	**SUBJECT/PAPER**	**PAPER CODE**	**TIME**
26/02/2022	CE	3RD	Math III	301	10:00 TO 11:00 AM
		5TH	Irrigation Engineering	CIV 503	
		3RD	Surveying	CIV 303	12:00 TO 01:00 PM
		5TH	RCC Design	CIV 504	
		3RD	Building Material	CIV 304	02:00 TO 03:00 PM
		5TH	Adv Surveying	CIV 505	
28/02/2022		3RD	Strength of Material	CIV 305	10:00 TO 11:00 AM
		5TH	Environmental Engineering	CIV 506	
		5TH	Adv Construction Methodology & Equipments	CIV 508	12:00 TO 01:00 PM

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BITT DIGITAL 2nd INTERNAL EXAM TIME TABLE					
DEPARTMENT OF DIPLOMA IN MECHANICAL ENGINEERING					
DATE	**BRANCH**	**SEMESTER**	**SUBJECT/PAPER**	**PAPER CODE**	**TIME**
26/02/2022	ME	3RD	Math III	301	10:00 TO 11:00 AM
		5TH	Power Engineering	MEC 503	
		3RD	Engineering Materials	MEC 304	12:00 TO 01:00 PM
		5TH	Adv. Manufacturing Technology	MEC 504	
		3RD	Engineering Mechanics	MEC 305	02:00 TO 03:00 PM
		5TH	Metrology & Quality Control	MEC 505	
28/02/2022		3RD	Strength of Materials	MEC 306	10:00 TO 11:00 AM
		5TH	Electronics Engineering	MEC 506	
		3RD	Machine drawing	MEC 303	12:00 TO 01:00 PM
		5TH	Automobile Engineering	MEC 508	

Principal
BITT Polytechnic
Getlatu, Ranchi

Principal