GOVT. POLYTECHNIC DIGLIPUR

DEMO TOPICS FOR GUEST FACULTY SELECTION PROCESS FOR THE SESSION 2024-25 (EVEN SEM)

S.NO.	DEPARTMENT	DEMO TOPIC	
		THEORY	PRACTICAL
1	CIVIL (GL)	**GEOTECHNICAL ENGINEERING** (a) Physical / Index properties of soil. (b) Strength test in soil. (c) Compaction & sonsolidation of soil.	(a) Sieve analysis of sol. (b) Consistency limits of soil.
		CONCRETE TECHNOLOGY (a) Properties of concrete. (b) Method of testing. (c) Mix design.	(a) Test for aggregates (course and find) (b) Test for cement. (c) Test for concrete.
		ENGINEERING MECHANICS (a) Simple lifting machine. (b) Analysis of forces. (c) Equilibrium of forces.	(a) Chain surveying. (b) Compass surveying. (c) Leveling. (d) Plane table surveying. (f)Theodolite surveying.
2	CSE (GL)	**Programming with Python:** (a) Data structures in Python - list, set, tuple & dictionary (b) Python packages - NumPy, Pandas, Matplotlib, Scipy	a. Create and execute DDL commands b. Create and execute DML commands c. Solve queries using operators, functions, etc. d. Implement programs in C using array & structures e. Implement C prgram to demonstrate user defined functions f. Prepare and test straight & cross cable
		Database Management: (a) Entity and relationship model - entities, relationships, attributes (b)Transaction in DBMS - ACID properties, states of transaction (c) Database Backup - types of failure, causes of failure, database backup	
		Data Communication & Computer Network: (a) TCP/IP model (b) Multiplexing (FDM & TDM) (c)Switching (circuit switching and packet switching)	
		Computer Network: (a) Network laye protocols: ARP, RARP (b) Transport layer protocols - TCP, UDP	
		Programming in C: (a) Function (Call by value & call by reference) (b) Array & structures (c) Pointers	
3	EE (GL)	Mesh/ Nodal Analysis	Verification of Kirchoff's laws
		RLC series ciruit & circuit resonance	Measurement of power in single phase AC circuit
		Measurement of single phase power using dynamometer wattmeter	Measurement of three phase power by two wattmeter method
		Construction and working principle of transformer	Determine the megnetising charactertistic of an alternator at different loads
		parallel operation of transformer	Open circuit and short circuit test of single phase transformer to determine efficiency
		SF6 Circuit Breaker	Load test on three phase induction motor to determine efficiency
		Construction and working of Buchholz Relay	Perform an experiment to reverse the direction od DC Shunt motor
		Different types of line insulators in transmission & distribution system	Staircase wiring & Go down wiring
		Different types of single phase induction motors	Wiring of electrical circuit to control lamp, fan and socket on wiring practice board
		Over current and earth fault protection of alternators	Starting and running of single phase induction motro in formward & reverse direction

4	ECE (GL)	**DIGITAL TECHNIQUES** (a) Digital Commuication System & Coding methods: Elements of basic digital communication system with its block diagram, source encoder , channel encoder & decoder, mosulation and demodulation, advantage and disadvantages. (b) Communication channel characteristic: Bit rate, baud rate, bandwidth, repeater distance.	(a) Determine error code by VRC technique using suitable simulation tool. (b) Generation of Hamming Code for 4 bit data. (c) Generation of natural and flat top signal.
		WIRELESS & MOBILE NETWORKS (a) Wireless Local loop architecture. (b) GPRS architecture.	(a) Use AT Commands to understand working of 3G Networking using 3 G Mobile phone & trainer kit. (b) Simulate the Delta modulation using MAT LAB and Simulink.
		DIGITAL ELECTRONICS & MICROCONTROLLER APPLICATION (a) Implement - 4 Bit ripple counter using 7476. (b) Perform 8 bit addition.	(a) 8051 archtecture. (b) Master Slave JK flipflop. (c) 4 Bit Asynochronous counter.
		ELEMENTS OF ELECTRONICS (a) DC regulated power supply. (b) PN junction & Zener diode characteristic.	(a) Build / test zener voltage regulator for the given voltage. (b) Chracteristic of Zener diode.
		MICROPROCESSOR (a) 8086 micorprocessor - silent features pin description. (b) Memory segmentation, Physical memory address generation. (c) Machine language instruction format, adressing mode. (d) Model 8086 assembly language program. (e) Programming using assembler: Arithmetic operation on Hex and BCD number, sum of series, smallest and largest number from array, sorting numbers in Ascending and Decending order.	(a) Write an Assembly Language Program (ALP) to substract two given 8 and 16 bit numbers. (b) Write an ALP to performblock transfer data using string instructions. (c) Write an ALP to find sum of series of hexadecimal nembers. (d) Write an assembly language program using macros: (i) Write an ALP for addition, substraction, multiplication and division.
		BASIC ELECTRICAL & ELECTRONICS ENGG (a) PN Junction diode, symbol construction working & application. (b) Rectifire: Half wave, full wave and bridge rectifier, performancxe, parameter, PIV, ripple factor, efficiency.	(a) Test the performance of PN Junction diode. (b) Test the performance of Zener diode. (c) Identify the three terminal of transistor using digital multimeter.
5	Physics (GAP)	1. Ultrasonic Wave Production 2. Lasers and fibre optics 3. Air wedge- Michelsion's interferometer 4. concept of double refraction 5. Nanomaterials- its synthesis, Properties and Application 6. Non destructive testing of materials 7. Nuclear Reactor 8. Application of Hall effect in the semiconductor 9. Super conductors and its application 10. Magnetic field and magnetic field Intensity	1. To study the coefficient of thermal conductivity of bad conductor by using Lee's disc method/ 2. Determination of thickness of given piece of sample by airwedge method 3. Determination of wavelength of monochromatic light by using diffraction grating 4. Determination of elasticity of a metallic wire by using searle's apparatus 5. Determination of law resistance by using meter bridge\determination of velocity of sound by resonance column 6. To determine the radius of curvature of a planoconvex lens using newton's ring apparatus 7. To determine the refractive index of glass prism by using Pin method 8. To determine the buoyancy force on solid immersed in liquid(Archemedies principle) 9. To determine the internal resistance of primary cell by using potentiometer 10. To calculate the magnetic moment and polestrenth of a bar magnet by using vibration magnetometer.

6	Chemistry (GL)	1. Conducting polymers – classification and application 2. Protective coating and its types in terms of corrosion 3. Vulcanization –Synthetic Rubber 4. Super conductivity 5. Desalination process- reverse osmosis and Electrodyalisis 6. Moulding constituent of plastics and moulding techniques 7. Different types of crystal structures with angle. 8. Qualititive idea of line, point surface and volume defect 9. How to calculate Co-ordination number and atomic radius of FCP and HCC unit cells 10. Dielectric polarization and Mechanism	1. To determine the pH value of solution using pH meter and universal Indicator 2. Determine thinner content in oil paint 3. Estimation of vinegar 4. Estimation of available chlorine in Bleaching powder 5. Estimate the chlorine content of given water sample 6. Estimation of magnesium by EDTA 7. Determination of carbonates and bi carbonates in water 8. determination of percentage of iron present given Hematite ore by KMno4 Solytion 9. Determination of Hardness of the sample water by EDTA method 10. Estimation of ferrous by permagnometry
7	MATHS (GL)	1. Differentiation of implicit function 2. Lagrange method of undetermined multipliers 3. Area by double integration and volume by triple integration 4. First order linear differential equations 5. Partial fraction of proper and improper fraction. 6. Reduction of quadratic form into conical by orthogonal transformation 7. Expansion of periodic function into Fourier series 8. Solutions of linear simultaneous in the three variables by crammers rule. 9. Point of intersection of two lines, equation of line passing through point of intersection with given condition 10. Fourier's Transforms and its transverse	
8	English (GL)	1. Strategies of effective communication 2. Importance of public speaking 3. passage in written and spoken form 4. comprehension of technical and non technical materials 5. Active and Passive Voice 6. Importance Of Comprehension 7. Phonetics 8. use of modern office equipments and gadgets 9. Types of communication 10. Use of articles in formulating sentences.	
9	MANAGEMENT (GL)	1. Needs for instruction and direction to subordinates 2. Preparation of balance sheet and profit-loss statement 3. needs for safety management measures 4. Planning at supervisory level-planning , detailing and following each step 5. types of Organization –steps in organizing 6. Business plan preparation 7. Incubation centre- Role and Procedure 8. Intrapreuner and Entrepreuner 9. Market study procedures 10. Total quality management	