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(Accredited by NAAC with Grade A+)

GU/Acad –PG/BoS - GU-ART /2025-26/598 Date: 28.11.2025

CIRCULAR

The syllabus for the Goa University–Admission Ranking Test (GU-ART) of **Master of Science in Electronics** and **B.Ed. in Electronics** Programmes, approved by the Academic Council in its meeting held on 7th November 2025 is attached.

The Dean/Vice-Dean (Academic) of the School of Physical and Applied Sciences and the Principals of all the affiliated Colleges are requested to take note of the above and bring the contents of this Circular to the notice of all concerned, including students aspiring to pursue the Master's and B.Ed. Programmes.

ASHWIN VYAS LAWANDE
Digitally signed by ASHWIN VYAS LAWANDE
Date: 2025.11.28 14:49:15 +05'30'

(Ashwin V. Lawande)
Deputy Registrar – Academic

To,
1. The Dean, School of Physical and Applied Sciences, Goa University.
2. The Vice-Dean (Academic), School of Physical and Applied Sciences, Goa University.
3. Principals of all the affiliated Colleges.

Copy to:
1. Controller of Examinations, Goa University.
2. Assistant Registrar (Admissions), Goa University.
3. Assistant Registrar Examinations (UG/PG), Goa University.
4. Director, Directorate of Internal Quality Assurance, Goa University for uploading the Syllabus on the University website.

GOA UNIVERSITY

SYLLABUS FOR GOA UNIVERSITY-ADMISSIONS RANKING TEST (GU-ART) FOR MASTER'S & B.Ed. IN ELECTRONICS PROGRAMMES

Effective from: 2026-27

Modules	Content
Module 1:	**Electronics Devices and Circuits**
	Conduction in Semiconductors, P type & N-type, Semiconductor, PN junction diode, Depletion Layer, Diode Equation and I-V characteristics, Rectifiers - Half wave rectifier, Full wave rectifiers (Centre tapped and bridge), Ripple factor and efficiency, Power supply, Line and Load Regulation, Bipolar Junction Transistor, Transistor in CB, CC and CE configurations, Regions of operation (active, cut off and saturation), Current gains, JFET Construction, working and I-V characteristics (output and transfer), Amplifier types(Class A, B and C), Amplifier frequency response, Transistor as an amplifier (single-stage CE amplifier), Oscillators (Barkhausen criterion for sustained oscillations. Phase shift and Colpitt's oscillator)
Module 2:	**Circuit Theory and Network Analysis**
	Concept of Voltage and Current Sources, Kirchhoff's Current Law, Kirchhoff's Voltage Law, Thevenin's Theorem, Norton's Theorem, Superposition Theorem, Maximum Power Transfer Theorem, Laplace Transform, Network function for one-port and two-port, Poles and Zeros of Network functions, Significance of Poles and Zeros, Steady State and Transient Response, DC Response of an RL, RC, and RLC networks.
Module 3:	**Linear Integrated Circuits**
	Introduction of Op-Amp, Characteristics of an Ideal and Practical Op-Amp, Block diagram, Input offset voltage, differential input resistance, offset voltage, CMRR and CMR, Slew rate, virtual ground, Open and closed loop configuration, Gain, Bandwidth, Inverting and non-inverting amplifiers, Differential amplifier, 555 Timers (Block diagram, Pin diagram and working principle, Astable, Monostable, Bistable, multivibrator, Schmitt trigger), Regulated IC **(**78XX & 79XX series, IC723, LM317, Line regulation, Load regulation, Crowbar protection)
Module 4:	**Digital Electronics**
	Boolean Algebra and truth table, Basic gates (AND, OR, NAND, NOR, etc.), number system (Decimal, Hexadecimal, Octal), Digital Logic Families, Standard representation of logic functions (SOP and POS), Minimization

Approved by: Academic Council on 7th November 2025

	Techniques (Karnaugh map), SR and JK flip-flop, Sequential Circuits (shift registers and counters), combinational circuits (multiplexer, demultiplexer, encoder and decoder), A/D and D/A converters,
Module 5:	**Microprocessor and Microcontroller** Introduction to Microcontrollers and microprocessors, CISC and RISC processors, Harvard and Von Neumann architecture., 8085 Microprocessor architecture and its operations, 8085 Memory map and addresses, 8085 Instruction set and Assembly Programming, 8051 Microcontroller architecture and its operations, Memory organization, 8051 Addressing Modes and Instructions set, 8051 Operation.
Module 6:	**Electronic Communication** Analog Modulation: Amplitude Modulation, modulation index and frequency spectrum. Generation of AM, Frequency Modulation (FM) and Phase Modulation (PM), modulation index and frequency spectrum, Analog Pulse Modulation: PAM, PWM, PPM, Digital Pulse Modulation: PCM, Amplitude Shift Keying (ASK), Frequency Shift Keying (FSK), Phase Shift Keying (PSK)
Module 7:	**Robotics and Instrumentations** Classification of robots: General purpose autonomous robots, Mobile robot, Industrial robot, Service robot, Education robot; Anatomy of a Robot, Robot configurations: polar, cylindrical, Cartesian, and jointed arm configurations, Robot links and joints, Degrees of freedom: types of movements, vertical, radial and rotational traverse, roll, pitch and yaw, Work volume/envelope, Robot kinematics: Introduction to direct and inverse kinematics, transformations and rotation matrix. Electrical transducer: Characteristics, advantages, Selecting a Transducer Resistive Transducer, Inductive transducer, Temperature Transducer, Oscilloscope and Multimeter.
Module 8:	**Programming in C** Basics of C: Structure of a C program, Variables, data types, and constants, Input and output in C, Control Flow Statements Conditional statements (if, else if, else), Switch statement, looping constructs (while, for, do-while), Functions in C.
References/ Readings:	1. Floyd Thomas "Electronic Devices", 5th Edition, Pearson Education Publication, 2022. 2. B.L. Theraja and A.K Theraja "A Textbook of Electrical Technology - Volume I (Basic Electrical Engineering)", S. Chand Publishing, 2005. 3. Ramakant A. Gayakwad, Op-Amps and Linear Integrated Circuits, 4th Edition, PHI/ Pearson Education. 4. R P Jain, 'Modern Digital Electronics', Tata McGraw Hill, 4th Edition. 5. M.A.Mazadi, J.G.Mazadi & R.D.McKinlay, 'The 8051 Microcontroller and Embedded systems',Prentice Hall, 2000. 6. Ramesh Gaonkar, Microprocessor Architecture, Programming And Applications With The 8085, 6th Edition, Penram Publications. 7. Ghosal, A., 'Robotics: Fundamental Concepts and Analysis', Oxford

	University Press, 9 th reprint, 2013. 8. Yashavant Kanetkar "Let Us C: Authentic guide to C programming language" - 19th Edition, BPB Publication 2022. 9. H. S. Kalsi, Electronics Instrumentation, 2nd Edition, Tata Mc Graw Hill. 10. Electronic Communications, D. Roddy and J. Coolen, Pearson Education India.