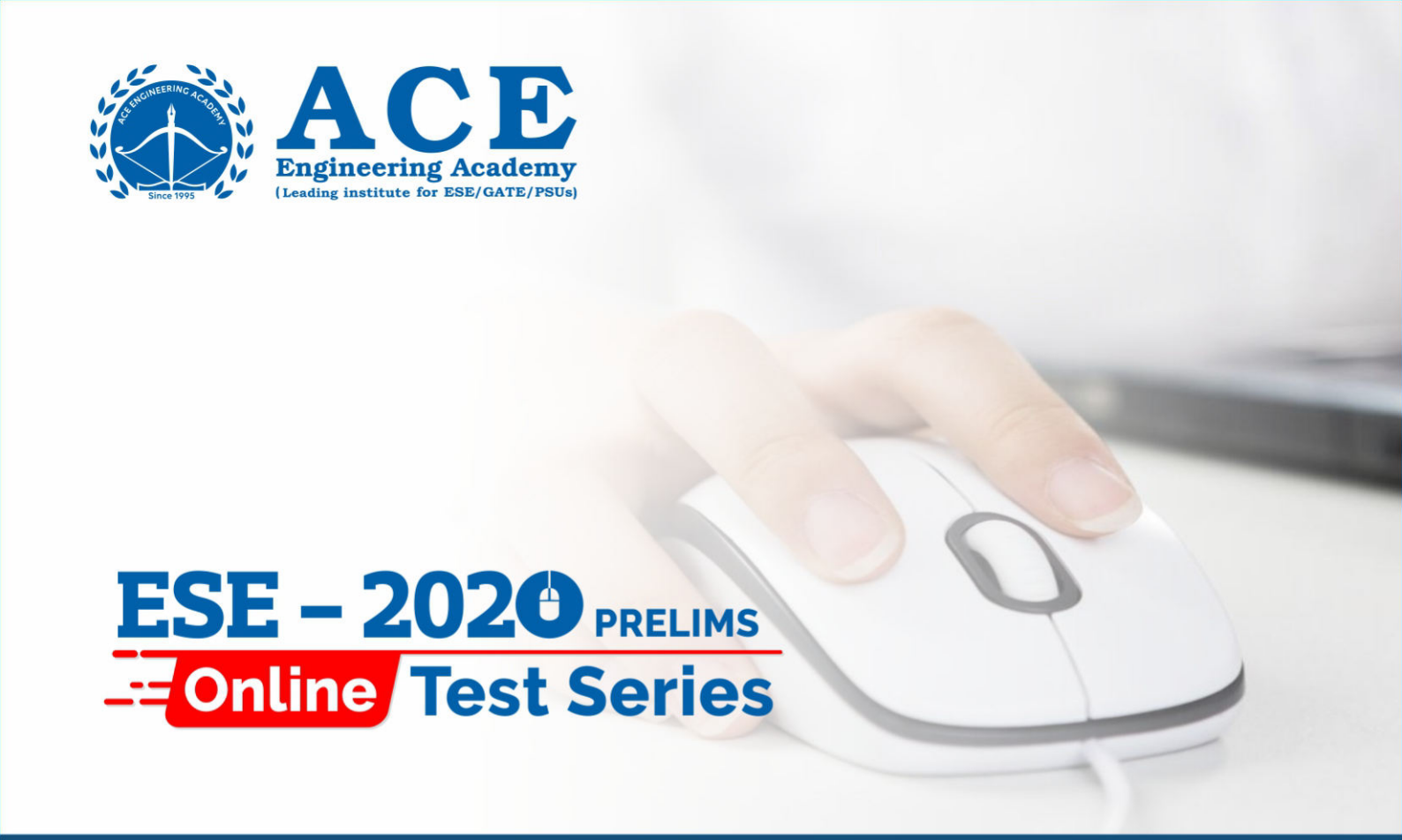
ACE Engineering Academy
(Leading institute for ESE/GATE/PSUs)



ESE – 2020 PRELIMS
Online Test Series

ELECTRONICS & TELECOMMUNICATION ENGINEERING (E&T)

No. of Tests : 44 + Free 30 Practice Tests of ESE - 2019 Online Test Series

	ESE- 2020 Test Series	Practice Tests ESE - 2019 Test Series
Subject Wise Grand Tests	22	22
Multi Subject Grand Tests	10	-
Full Length Mock Tests	12	8

All tests will be available till ESE -2020 (Prelims) Examination.

TEST SERIES HIGHLIGHTS

- ★ All India Rank will be given for each test.
- ★ Test wise and overall statistics.
- ★ Comparison with toppers.
- ★ Question wise and test wise time analysis & comparison with toppers on time management.

Subject-wise Tests

Tests will be activated at 06:00 pm on scheduled day

Test No	Subject Name	No. of Questions	Max Marks	Duration	Date of Activation
EC-01	Control Systems	50	100	60 Min	15-05-2019
EC-02	Signals & Systems	50	100	60 Min	
EC-03	Digital Electronics and Micro-Processors	50	100	60 Min	20-05-2019
EC-04	Engineering Mathematics and Numerical Analysis	33	66	40 Min	
EC-05	Network Theory	50	100	60 Min	27-05-2019
EC-06	Basics of Energy and Environment	33	66	40 Min	
EC-07	Basic Electronics Engineering (Electronic Devices & VLSI) & Advanced Electronics	50	100	60 Min	03-06-2019
EC-08	General Principles of Design, Drawing, Importance of Safety	33	66	40 Min	
EC-09	Analog Electronics	50	100	60 Min	10-06-2019
EC-10	Ethics and values in Engineering profession	33	66	40 Min	
EC-11	Analog and Digital Communication Systems & Advanced communication	50	100	60 Min	17-06-2019
EC-12	Information and Communication Technologies (ICT)	33	66	40 Min	
EC-13	Electromagnetics	50	100	60 Min	24-06-2019
EC-14	Engineering Aptitude covering Logical reasoning and Analytical ability	33	66	40 Min	
EC-15	Materials Science	50	100	60 Min	01-07-2019
EC-16	Basics of Material Science and Engineering	33	66	40 Min	
EC-17	Electronic Measurements and Instrumentation	50	100	60 Min	08-07-2019
EC-18	Standards and Quality practices in production, construction, maintenance and services	33	66	40 Min	
EC-19	Computer Organization and Architecture	50	100	60 Min	15-07-2019
EC-20	Basics of Project Management	33	66	40 Min	
EC-21	Basic Electrical Engineering	50	100	60 Min	22-07-2019
EC-22	Current Issues of National and International importance related to social, Economic and Industrial Development	33	66	40 Min	

Full Length Mock Tests -1st Series

Test No	Mock codes	No. of Questions	Max Marks	Duration	Date of Activation
EC-23	Mock-1 PAPER-1	100	200	2 Hours	04-08-2019
EC-24	Mock-1 PAPER-2	150	300	3 Hours	
EC-25	Mock-2 PAPER-1	100	200	2 Hours	11-08-2019
EC-26	Mock-2 PAPER-2	150	300	3 Hours	

Multi Subject Grand Tests

Test No	Subjects codes	No. of Questions	Max Marks	Duration	Date of Activation
EC-27	Network Theory + Control Systems	50	100	60 Min	19-08-2019
EC-28	Basics of Energy and Environment + Engineering Aptitude covering Logical reasoning and Analytical ability	33	66	40 Min	
EC-29	Signals & Systems + Basic Electronics Engineering (Electronic Devices & VLSI) + Electronic Measurements and Instrumentation	50	100	60 Min	26-08-2019
EC-30	Engineering Mathematics and Numerical Analysis + Current Issues of National and International importance related to social, Economic and Industrial Development	33	66	40 Min	
EC-31	Materials Science + Analog Electronics + Digital Electronics and Micro-Processors	50	100	60 Min	02-09-2019
EC-32	Basics of Project Management + Basics of Material Science and Engineering	33	66	40 Min	
EC-33	Computer Organization and Architecture + Electromagnetics + Basic Electrical Engineering	50	100	60 Min	09-09-2019
EC-34	Information and Communication Technologies (ICT) + General Principles of Design, Drawing, Importance of Safety	33	66	40 Min	
EC-35	Analog and Digital Communication Systems + Advanced communication + Advanced Electronics	50	100	60 Min	16-09-2019
EC-36	Ethics and values in Engineering profession + Standards and Quality practices in production, construction, maintenance and services	33	66	40 Min	

Full Length Mock Tests -2nd Series

Test No	Mock codes	No. of Questions	Max Marks	Duration	Date of Activation
EC-37	Mock-3 PAPER-1	100	200	2 Hours	29-09-2019
EC-38	Mock-3 PAPER-2	150	300	3 Hours	
EC-39	Mock-4 PAPER-1	100	200	2 Hours	13-10-2019
EC-40	Mock-4 PAPER-2	150	300	3 Hours	
EC-41	Mock-5 PAPER-1	100	200	2 Hours	17-12-2019
EC-42	Mock-5 PAPER-2	150	300	3 Hours	
EC-43	Mock-6 PAPER-1	100	200	2 Hours	24-12-2019
EC-44	Mock-6 PAPER-2	150	300	3 Hours	

NOTE: The Dates of above MOCK Tests may Change according to the ESE – 2020(Prelims) Exam schedule.

Free Practice Tests of ESE (Prelims)-2019 Online Test Series

Subject-wise Tests

Test No	Subject Name	No. of Questions	Max Marks	Duration	Date of Activation
EC-P1	Network Theory	50	100	60 Min	15-05-2019
EC-P2	Control Systems	50	100	60 Min	
EC-P3	Signals & Systems	50	100	60 Min	
EC-P4	Digital Electronics and Micro-Processors	50	100	60 Min	
EC-P5	Analog and Digital Communication Systems & Advanced communication	50	100	60 Min	
EC-P6	Basic Electronics Engineering (Electronic Devices & VLSI) & Advanced Electronics	50	100	60 Min	
EC-P7	Electronic Measurements and Instrumentation	50	100	60 Min	
EC-P8	Computer Organization and Architecture	50	100	60 Min	
EC-P9	Analog Electronics	50	100	60 Min	
EC-P10	Materials Science	50	100	60 Min	
EC-P11	Electromagnetics	50	100	60 Min	
EC-P12	Basic Electrical Engineering	50	100	60 Min	
EC-P13	Basics of Energy and Environment	33	66	40 Min	30-05-2019
EC-P14	Standards and Quality practices in production, construction, maintenance and services	33	66	40 Min	
EC-P15	Basics of Project Management	33	66	40 Min	
EC-P16	Information and Communication Technologies (ICT)	33	66	40 Min	
EC-P17	Ethics and values in Engineering profession	33	66	40 Min	
EC-P18	Engineering Aptitude covering Logical reasoning and Analytical ability	33	66	40 Min	
EC-P19	Basics of Material Science and Engineering	33	66	40 Min	
EC-P20	General Principles of Design, Drawing, Importance of Safety	33	66	40 Min	
EC-P21	Engineering Mathematics and Numerical Analysis	33	66	40 Min	
EC-P22	Current Issues of National and International importance related to social, Economic and Industrial Development	33	66	40 Min	

Full Length Mock Tests

Test No	Mock codes	No. of Questions	Max Marks	Duration	Date of Activation
EC-P23	Mock-1 PAPER-1	100	200	2 Hours	20-06-2019
EC-P24	Mock-1 PAPER-2	150	300	3 Hours	
EC-P25	Mock-2 PAPER-1	100	200	2 Hours	
EC-P26	Mock-2 PAPER-2	150	300	3 Hours	
EC-P27	Mock-3 PAPER-1	100	200	2 Hours	
EC-P28	Mock-3 PAPER-2	150	300	3 Hours	
EC-P29	Mock-4 PAPER-1	100	200	2 Hours	
EC-P30	Mock-4 PAPER-2	150	300	3 Hours	

Syllabus for ESE (Prelims), Paper-1

Subject Name	Syllabus
Basics of Energy and Environment : Conservation, environmental pollution and degradation, Climate Change, Environmental impact assessment	**Energy –Basics of Environment– Conservation** **Energy:** Concept of Energy, Classification of Energy Resources , Energy Resources in India Energy Policies and Acts in India. **Basics of Environment:** Components of Ecosystem, Ecosystem, Types of Ecosystem, Structure of Ecosystem, Terminology of Species, Nutrient Cycles. **Conservation:** ***Biodiversity*** **-** Types of Biodiversity, Value of Biodiversity, Loss of Biodiversity, Threat to Biodiversity, Conservation of Biodiversity, International & National Policies of Biodiversity, International & National Organizations related to Biodiversity, Acts related to biodiversity. ***Sustainable Development***- Concept of Sustainable Development, Carrying Capacity, Ecological Foot Print, Earth Debt day, Principles of Sustainable Development, Initiatives of Sustainable Development , Millennium Development Goals,Sustainable Development Goal, Sustainable Agriculture. **Climate Change – Degradation– Pollution** ***Climate Change:*** Introduction- Basic of Climate Change-Green House Effect, Causes , Impacts. Ozone Depletion-Causes, Impacts , International & National Measures to Control Ozone Depletion. Acid Rains-Causes, Effects, International & National Measures to Control Climate Change. ***Degradation:*** Deforestation-Causes, Impact, Preventive measures, Soil erosion-Causes, Impact, Preventive measures, Desertification-Causes, Impact, Preventive measures. ***Pollution:*** Basic Concepts- Types of Pollution, Air Pollution, Sources, Impacts, Controls, Water Pollution, Sources, Impacts, Controls, Noise Pollution, Sources, Impacts, Controls , Soil Pollution, Sources, Impacts, Controls, Radiation Pollution, Sources, Impacts, Controls, Solid Waste, Sources, Impacts, Controls. **Environmental Impact Assessment(EIA):** Concept; Principles; Process; stakeholders; Projects requiring EIA; Social Impact Assessment; Merits and Demerits of EIA;
Engineering Aptitude covering Logical reasoning and Analytical ability	Engineering Aptitude . Logical reasoning & Analytical ability.
Engineering Mathematics and Numerical Analysis	Matrix theory, Eigen values & Eigen vectors, system of linear equations, Numerical methods for solution of non-linear algebraic equations and differential equations, integral calculus, partial derivatives, maxima and minima, Line, Surface and Volume Integrals . Fourier series, linear, nonlinear and partial differential equations, initial and boundary value problems, complex variables, Taylor's and Laurent's series, residue theorem, probability and statistics fundamentals, Sampling theorem, random variables, Normal and Poisson distributions, correlation and regression analysis.

Subject Name	Syllabus
Current Issues of National and International importance related to social, Economic and Industrial Development	**Background Concepts** ***Economic and Industrial Development*** Development - Growth; three Sectors of Economy - Agriculture, Industry and Services; National Income; Inflation; Banking; Financial Markets; Public Finance; External Sector ; Economic Infrastructure; and Related Policies and Schemes of Govt. ***Social Development :*** Planning-NITI Ayog; Poverty-Unemployment; Rural and Urban Development; Education; Welfare; Women and Childern; International Issues: Indias bilateral and Multilateral issues; UNO- Agencies, Funds; Economic Institutions-World Bank, IMF,WTO,ADB,AIIB; Agreements and Summits. **Current Affairs:**
Basics of Project Management	**Intoduction:** Project and project management, classification of project, project life cycle, tools & techniques in Project management. **Project Planning:** Selection of a project, objective and goals, work break down structure (WBS). **Project Scheduling:** Scheduling tools, charts, network diagrams, CPM Networks, PERT Networks **Resource Allocation:** project crashing, resource leveling & smoothening. **Project Monitoring & Controlling:** Monitoring tools, project controlling. **Project Auditing & Termination:** Purpose of auditing-goals of the system, project termination (Closeout), project procurement and materials management.
Basics of Material Science and Engineering	**Crystal structures and Defects:-**Primary bonds, Space lattice, unit cell, lattice parameters, crystal structures, coordination number and packing factor of SC, BCC, FCC, Diamond structures, point defects, line defects, crystallographic planes and directions. Crystalline materials and amorphous materials. **Electrical Materials:-** Conductors – Ohm's Law, specific resistance, high conductivity materials, Low conductivity materials, contact materials, alloy conductors and applications, semiconductors, Energy band gap theory, Insulators and super conductors. **Nano materials:-** definition, preparation and properties, Graphite, CNT, Fulerene, Graphene, Quantum dots and their properties and applications, MEMS, NEMS. **Iron-Carbon Diagram and Steel alloys:-** Basics of phase diagram, Types of steels and steel alloys, properties of steel **Polymers:-** Structure and Types of polymers, characteristics and applications of polymers. **Nuclear materials:-** Basics of Nuclear Physics (Fission, Fussion), applications. **Dielectric Materials:-** Polarization, dielectric strength, break down, polar, non polar solids, Ferroelectrics, Piezo electrics, pyro electrics and their materials and applications. **Magnetic Materials:-** Magnetization, susceptibility and classification of magnetic materials – dia, para, ferro, anti ferro and ferri magnetic materials, hard and soft magnetic materials, influence of temperature on magnetic materials. **Ceramic materials:-** Types and application of different ceramics and their advanced types. **Composite materials:-** Types and their applications. **Material Properties and Testing:-** Elasticity, plasticity, ductility, Stiffness, malleability, fatigue, Toughness, creep, hardness etc.Material Testing methods, Non destructive testing methods.
General Principles of Design, Drawing, Importance of Safety	Design Process, Team Behavior, Problem Definition-Customer Requirements, Concept Generation, Decision Making & Concepts Evaluation, Embodiment Design, Detail Design, Introduction to Scales and Curves, Orthographic Projections, Isometric & Perspective Projections, Conventional Representation, AUTO CAD and Importance of Safety

Subject Name	Syllabus
Ethics and values in Engineering profession	Introduction to Ethics and Values in Engineering Profession, Moral Reasoning and Ethical Theories, Codes of Ethics, Engineering-Social Experimentation, Engineer's Responsibility for Safety and Risk, Responsibilities and Rights of Engineers, Global Issues, Ethical Audit & Ethical Governance and Public Servants
Information and Communication Technologies (ICT) based tools and their applications in Engineering such as networking, e-governance and technology based education.	**Information and Communication Technologies** **ICT & Networks:** Introduction to ICT and Networks, Network Typologies: PAN, LAN, MAN,WAN, Internet; Modems, ASDL, Ethernet; Inter-networking: Repeaters, switches, routers, gateways, IPv4, IPv6;DNS, e-mail, WWW; **Modern wireless technologies:** RFID, Near Field Communication, Bluetooth, Wi-Fi, WIMAX, Li-Fi, White-Fi etc. **Cellular Network Technologies:** 1G,2G,3G,4G, 5G, GSM, CDMA, EDGE, GPRS, UMTS, LTE. Satellite technologies :types of satellite , orbits **Cyber Security:** Types, Threats: E-Mail Tracking , Social Engineering, Identity Theft, Phishing, Trojans, Backdoors, Viruses, Worms, DoS and DDoS Attacks, BOTs/BOTNETs; Defenses: Digital Signatures, Firewall, Virtual Private Networks (VPN) etc.; **Computing:** Parallel, Distributed, Grid, Cloud, Super computers etc **Computer Data Storage Devices:** Types and Technologies like magnetic storage devices, optical storage devices CD, DVD, Blu-ray Disc, USB Flash Drive etc,holostore **Advanced Topics and Recent trends:** Social networks, Big data, Project Loon, White Spaces, Internet of Things; Social Networking and its platforms like Facebook, Twitter, Google Talk, Skype and e-commerce; Internet Governance: Digital Divide, Net Neutrality, Internet.org;virtual reality , augmented reality ,software engineering , **Government Policies and Schemes on ICT.** **e -Governance and Technology based Education** **e-Governance:** Meaning, Models, Scope, Advantages, Challenges; Good Governance and e-Governance; **e-governance in India:** NeGP, e-Governance Infrastructure, GoI Cloud Initiative – Meghraj; Digital India: Broadband Highways, e-Kranti, Digital Locker, BAS, eSign, National Digital Literacy Mission, Bharat Net (National Optical Fibre Network (NOFN)), e-Hospital, e-Education etc. eNAM, e-District, e-Haat; **Technology based Education:** Concept, mechanisms, merits and demerits; Applications; International practices like MOOC, Open Course Ware Consortium, Open Learn Project; ICT tools: MatLab, Mathematica, AutoCAD, SkyDrive, MS Office 365, Google Docs, etc. **e-education in India:** National Mission on Education through Information and Communication Technology (NMEICT), National Programme on Technology Enhanced Learning (NPTEL), e-Shodh Sindhu, Virtual Labs, EDUSAT, eBasta, Digital Library of India (DLI), National Digital Library(NDL), ENVIS, Indian Sign Language Education and Recognition System etc.
Standards and Quality practices in production, construction, maintenance and services	Introduction, Quality costs, Quality philosophy, Service Quality, Tools of Quality Control, Continuous Improvement Techniques, Maintenance, ISO and TQM & Construction Quality

Syllabus for ESE (Prelims), Paper-2

Subject Name	Syllabus
Signals & Systems	**Extracted from Control System:** Classification of signals and systems; Application of signal and system theory; System realization; Transforms& their applications **Extracted from Advanced Electronics:** DSP: Discrete time signals/systems , uses; Digital filters: FIR/IIR types, design, speech/audio/radar signal processing uses
Control Systems	Signal flow graphs, Routh-Hurwitz criteria, root loci, Nyquist/Bode plots; Feedback systems-open &close loop types, stability analysis, steady state, transient and frequency response analysis; Design of control systems, compensators, elements of lead/lag compensation, PID and industrial controllers
Network Theory	Network graphs & matrices; Wye-Delta transformation; Linear constant coefficient differential equations- time domain analysis of RLC circuits; Solution of network equations using Laplace transforms- frequency domain analysis of RLC circuits; 2-port network parameters-driving point & transfer functions; State equations for networks; Steady state sinusoidal analysis. **Extracted from Basic Electrical Engineering:** DC circuits-Ohm's & Kirchoff's laws, mesh and nodal analysis, circuit theorems; Single phase ac circuits.
Basic Electrical Engineering	Electro-magnetism, Faraday's & Lenz's laws, induced EMF and its uses; Transformers, efficiency; Basics- DC machines, induction machines, and synchronous machines; Electrical power sources- basics: hydroelectric, thermal, nuclear, wind, solar; Basics of batteries and their uses.
Electromagnetics	Elements of vector calculus, Maxwell's equations-basic concepts; Gauss', Stokes' theorems; Wave propagation through different media; Transmission lines-different types, basics, Smith's chart, impedance matching/transformation, S-parameters, pulse excitation, uses; Waveguides-basics, rectangular types, modes, cut-off frequency, dispersion, dielectric types; Antennas-radiation pattern, monopoles/dipoles, gain, arrays-active/passive, theory, uses. **Extracted from Basic Electrical Engineering:** Electro-magnetism, Faraday's & Lenz's laws, induced EMF and its uses;
Basic Electronics Engineering (Electronic Devices & VLSI)	Basics of semiconductors; Diode/Transistor basics and characteristics; Diodes for different uses; Junction & Field Effect Transistors (BJTs, JFETs, MOSFETs); Transistor amplifiers of different types, Basics of Integrated Circuits (ICs); Bipolar, MOS and CMOS ICs; Optical sources/detectors; Basics of Opto electronics and its applications.
Advanced Electronics	VLSI technology: Processing, lithography, interconnects, packaging, testing; VLSI design: Principles; Pipeline concepts & functions; Design for testability, examples;

Subject Name	Syllabus
Analog Electronics	Small signal equivalent circuits of diodes, BJTS and FETs; Diode circuits for different uses; Biasing & stability of BJT and JFET amplifier circuits; Analysis/design of amplifier- single/multi-stage; Feedback & uses; Active filters, timers, multipliers, wave shaping **Extracted from Basic Electronics Engineering:** Basics of linear ICs, operational amplifiers and their applications-linear/non-linear. Oscillators and other circuits;
Digital Electronics and Micro-Processors	Boolean Algebra & uses; Logic gates, Digital IC families, Combinational/sequential circuits; Basics of multiplexers, counters/registers/ memories/microprocessors, design & applications. A/D-D/A converters; **Extracted from Advanced Electronics:** MUX/ROM/PLA-based design, Moore & Mealy circuit design; Microprocessors & microcontrollers, basics, interrupts, DMA, instruction sets, interfacing; controllers & uses; Embedded systems.
Materials Science	Electrical Engineering materials; Crystal structure & defects: Ceramic materials-structures, composites, processing and uses; Insulating laminates for electronics, structures, properties and uses; Magnetic materials, basics, classification, ferrites, ferro/para-magnetic materials and components; Nano materials-basics, preparation, purification, sintering, nano particles and uses; Nano-optical/magnetic/electronic materials and uses; Superconductivity, uses.
Electronic Measurements and Instrumentation	Principles of measurement, accuracy, precision and standards; Analog and Digital systems for measurement, measuring instruments for different applications; Static/dynamic characteristics of measurement systems, errors, statistical analysis and curve fitting; Measurement systems for non-electrical quantities; Basics of telemetry; Different types of transducers and displays; Data acquisition system basics.
Analog and Digital Communication Systems	Random signals, noise, probability theory, information theory; Analog versus digital communication & applications: Systems - AM, FM, transmitters/receivers, theory/practice/ standards, SNR comparison; Digital communication basics: Sampling, quantizing, coding, PCM, DPCM, multiplexing-audio/video; Digital modulation: ASK, FSK, PSK; Multiple access: TDMA, FDMA, CDMA;
Advanced communication	Communication networks: Principles /practices /technologies /uses /OSI model/security; Basic packet multiplexed streams/scheduling; Cellular networks, types, analysis, protocols (TCP/TCPIP); Microwave & satellite communication: Terrestrial/space type LOS systems, block schematics link calculations, system design; Communication satellites, orbits, characteristics, systems, uses; Fibre-optic communication systems, block schematics, link calculations, system design. Optical communication: fiber optics, theory, practice/standards
Computer Organization and Architecture	Basic architecture, CPU, I/O organisation, memory organisation, peripheral devices, trends; Hardware /software issues; Data representation & Programming; Operating systems-basics, processes, characteristics, applications; Memory management, virtual memory, file systems, protection & security; Data bases, different types, characteristics and design; Transactions and concurrency control; Elements of programming languages, typical examples.