crystal growth, epitaxy, oxidation, lithography, doping, etching, isolation methods, metalization, bonding, Thin film active and passive devices.

Unit-II: Superposition, Thevenin, Norton and Maximum Power Transfer Theorems, Network elements, Network graphs, Nodal and Mesh analysis, Zero and Poles, Bode Plots, Laplace, Fourier and Z-transforms. Time and frequency domain responses. Image impedance and passive filters. Twoport Network Parameters. Transfer functions, Signal representation. State variable method of circuit analysis, AC circuit analysis, Transient analysis.

Unit-III: Rectifiers, Voltage regulated ICs and regulated power supply, Biasing of Bipolar junction transistors and JFET. Single stage amplifiers, Multistage amplifiers, Feedback in amplifiers, oscillators, function generators, multivibrators, Operational Amplifiers (OP AMP) -characteristics and Applications, Computational Applications, Integrator, Differentiator, Wave shaping circuits, F to V and V to F converters. Active filters, Schmitt trigger, Phase locked loop.

Unit-IV: Logic families, flip-flops, Gates, Boolean algebra and minimization techniques, Multivibrators and clock circuits, Counters-Ring, Ripple. Synchronous, Asynchronous, Up and down shift registers, multiplexers and demultiplexers, Arithmetic circuits, Memories, A/D and D/A converters.

Unit-V: Modulation index, frequency spectrum, generation of AM (balanced modulator, collector modulator), Amplitude Demodulation (diode detector Other forms of AM: Double side band suppressed carrier, DSBSC generation (balanced modulator), Single side band suppressed carrier, SSBSC generation (filter method, phase cancellation method, third method), SSB detection, Frequency and Phase modulation, modulation index and frequency spectrum, equivalence between FM and PM, Generation of FM (direct and indirect methods), FM detector (slope detector)

16. SPECIAL CENTRE FOR DISASTER RESEARCH

The pattern of JNUEE 2020-21 will be based on Multiple Choice Questions (MCQs) through Computer Based Test (CBT)

M.A. Programme

Sl. No.	Name of Centre	Sub. Code & Sub. Code (Number)	Syllabus for Entrance Examination
1	Special Centre For Disaster Research (SCDR)	Disaster Studies - DSSM (239)	• Social Science Perspectives of Disasters, Constitution, Law, Governance and Sustainable Development Goals(SDGs) • Definition, Concepts and Theories around the key terms in disaster studies [Understanding of 'Disaster', 'Risk', 'Hazard', 'Vulnerability', 'Resilience'] • Development and Disasters, Geography of Disasters and GIS Application [Regional Imbalance, Health Issues, Fragile areas and Critically Endangered Zones] • Computer, Information and Communication Technologies, Artificial Intelligence, Database Systems [Application of modern scientific tools in early warning systems, relief, rehabilitation and appropriate measurement of damages and losses] • Ecology and Environment [Dams, Pollution, Climate Change, Effluent Discharges, Human Consumption as cause of environmental destruction and increased vulnerability of ecosystems]

Ph.D.

Sl. No.	Name of Centre	Sub. Code & Sub. Code (Number)	Syllabus for Entrance Examination
1	Special Centre For Disaster Research (SCDR)	Disaster Studies - DSSH (911)	**Syllabus for Entrance Exam:** *PART A*: Research Methodology in Disaster Studies, Surveys, Statistical Tools & Analysis, Data Management, Techniques of pre and post-disaster needs assessment (PDNA), Comparative Case Study Methods for evaluating governance and community capacity for last mile service delivery. *PART B*: 1. Constitutional Law, Laws related to Disasters, Governance and Implementation of Disaster Risk Reduction Policies. 2. Social Sciences and Anthropology of Disasters; Vulnerable communities in fragile environmental and ecological regions; Geography, Environment and Disasters; Geospatial Mapping and human security. 3. Disaster Economics, Planning and Preparing against economic losses, Role of Macro and Micro level economic institutions. 4. Database, Artificial Intelligence and Early Warning Systems in the management of rescue and relief operations. 5. Public Health, Emergency Preparedness and Disasters.