# *Chhattisgarh Swami Vivekanand Technical University, Bhilai*

**Scheme of Teaching and Examination**

## B.E. VIII Semester Electronics & Telecommunication Engineering

| Sl. No. | Board of Study | Code No. | Theory Subjects | Period Per Week | | | Scheme of Exam | | | Total Marks | Credit L+(T+P) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Theory/ Practical | | | | |
| | | | | L | T | P | ESE | CT | TA | | |
| 1 | Electronics & Telecom. | 328831(28) | Advanced Communication Systems | 3 | 1 | - | 80 | 20 | 20 | **120** | 4 |
| 2 | Electronics & Telecom. | 328832(28) | Consumer Electronics | 3 | 1 | - | 80 | 20 | 20 | **120** | 4 |
| 3 | Electronics & Telecom. | 328833(28) | Power Electronics | 3 | 1 | - | 80 | 20 | 20 | **120** | 4 |
| 4 | Refer Table -3 | | Professional Elective - III | 3 | 1 | - | 80 | 20 | 20 | **120** | 4 |
| 5 | Refer Table -4 | | Open Elective - IV | 3 | 1 | - | 80 | 20 | 20 | **120** | 4 |
| 6 | Electronics & Telecom. | 328861(28) | Optical Communication Lab | - | - | 4 | 40 | - | 20 | **60** | 2 |
| 7 | Electronics & Telecom. | 328862(28) | Digital Circuit Simulation Lab | - | - | 4 | 40 | - | 20 | **60** | 2 |
| 8 | Electronics & Telecom. | 328863(28) | Power Electronics Lab | - | - | 4 | 40 | - | 20 | **60** | 2 |
| 9 | Electronics & Telecom. | 328864(28) | Major Project | - | - | 5 | 100 | - | 80 | **180** | 3 |
| 10 | Electronics & Telecom. | 328865(28) | Project Management & Report writing | - | - | 2 | - | - | 40 | **40** | 1 |
| 11 | | | Library & Seminar | - | - | 1 | - | - | - | - | - |
| **TOTAL** | | | | **15** | **5** | **20** | **620** | **100** | **280** | **1000** | **30** |

L-Lecture, T- Tutorial, P - Practical, ESE- End Semester Examination, CT - Class Test, TA - Teacher's Assessment

**Table-3**
**Professional Elective - III**

| Sl. No. | Board of Study | Code | Subject |
|---|---|---|---|
| 1 | Electronics & Telecom. | 328840(28) | Cryptography & Secure Communication |
| 2 | Electronics & Telecom. | 328841(28) | MEMS in Communication Engineering |
| 3 | Electronics & Telecom. | 328842(28) | Embedded Systems & RTOS |
| 4 | Electronics & Telecom. | 328843(28) | CMOS Mixed Signal Circuit Design |
| 5 | Electronics & Telecom. | 328844(28) | Microelectronic Devices & VLSI Technology |
| 6 | Electronics & Telecom. | 328845(28) | Biometric Techniques |
| 7 | Electronics & Telecom. | 328846(28) | RISC Microcontrollers & DSP Processors |
| 8 | Electronics & Telecom. | 328847(28) | Artificial Intelligence & Expert Systems |
| 9 | Electronics & Telecom. | 328848(28) | Telecommunication Switching Circuits & Networks |
| 10 | Electronics & Telecom | 328849(28) | Speech Signal Processing |

Note (1)- 1/4th of total strength of students subject to minimum of twenty students is required to offer an elective in the college in a particular academic session.

Note (2) - Choice of elective course once made for an examination cannot be changed in future examinations.

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

**Table - IV**

| Open Elective –IV | | |
|---|---|---|
| S.No. Board of Studies | Code | Name of Subject |
| Management | 300851(76) | Enterprise Resource Planning |
| Information Technology | 300852(33) | E-Commerce & strategic IT |
| Management | 300853(76) | Technology Management |
| Information Technology | 300854(33) | Decision Support & Executive Information system |
| Computer Science & Engg. | 300855(22) | Software Technology |
| Management | 300856(76) | Knowledge Entrepreneurship |
| Management | 300857(76) | Finance Management |
| Management | 300858(76) | Project Planning, Management & Evaluation |
| Mechanical Engg. | 300859(37) | Safety Engineering |
| Computer Science & Engg. | 300801(22) | Bio Informatics |
| Mechanical Engg. | 300802(37) | Energy Conservation & Management |
| Nanotechnology | 300803(47) | Nanotechnology |
| Management | 300804(76) | Intellectual Property Rights |
| Mechanical Engg. | 300805(37) | Value Engineering |
| Civil Engg. | 300806(20) | Disaster Management |
| Civil Engg. | 300807(20) | Construction Management |
| Civil Engg. | 300808(20) | Ecology and Sustainable Development |
| Chem. Engg. | 300809(19) | Non Conventional Energy Sources |
| Electrical Engg. | 300810(24) | Energy Auditing and Management |
| Mechanical Engg. | 300811(37) | Managing Innovation & Entrepreneurship |
| Information Technology | 300812(33) | Biometrics |
| Information Technolgy | 300813(33) | Information Theory & Control |
| Computer Science & Engg. | 300814(22) | Supply Chain Management |

| | | |
|---|---|---|
| Computer Science & Engg. | 300815(22) | Internet & Web Technology |
| Electrical Engg. | 300816(24) | Electrical Estimation and Costing |
| Electrical& Electronics Engg. | 300817(25) | Non Conventional Energy Sources |

ote (1)-1/4th of total strength of students subject to minimum

Note -1/4$^{th}$ of total strength of students is required to offer an elective in thecollege in a particular academic session.

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**

Branch: **Electronics & Telecommunication** Semester: **VII1**

Subject: **Advanced Communication Systems** Code: 328831(28)

Total Theory Periods: **40** Total Tutorial Periods: **12**
Class Tests: **Two (Minimum)** Assignments: **Two (Minimum)**
ESE Duration: **Three Hours** **Maximum Marks: 80** **Minimum Marks: 28**

**Course Objectives:**
1. To become familiar with fundamentals of satellite communication
2. To learn about the satellite link design
3. To gain knowledge about the different access techniques used in satellite communication.
4. To understand the concepts of Optical communication.
5. To learn about optical transmitters and receivers.

**UNIT- I** **Introduction to Satellite:** Synchronous Satellite, Synchronous Orbit, Orbital Parameters, Satellite Location with respect to Earth, Look Angles, Earth Coverage and Slant Range, Eclipse Effect, Satellite Frequency Allocation and Band Spectrum, General and Technical Characteristics of Satellite Communication System, Advantages of the Satellite Communication, Active and Passive Satellite Systems, Current trends in Satellite Communication.

**UNIT-II** **Communication Satellite Link Design:** Link Design Equation, System Noise Temperature, C/N, G/T Ratio, Atmosphere and Ionosphere Effects on Link Design, Uplink Deign, Complete Link Design, Interference effects on complete Link Design, Earth Station Parameters, Satellite Communication Links: Analog Baseband Signal, FDM Techniques, SNR and CNR in FM in Satellite link.

**UNIT-III** **Multiple Access Techniques:** TDMA-Frame and Burst Structure, Frame Efficiency, Superframe, TDMA Frame Acquisition and Synchronization, FDMA compared to TDMA, TDMA burst TME Plan, Multiple Beam TDMA Satellite System, Beam Hopping TDMA, CDMA and Hybrid Access Techniques, CSMA.

**UNIT-IV** **Optical Fiber Fundamentals:** Numerical Aperture, Optical Fiber Modes and Propagation, Single Mode and Multi-Mode Fibers, Step Index and Graded Index Fibers Structures, Different types of Attenuations in Optical Fiber Communication.

**UNIT-V** **Light Sources, Detectors & Optical Networks:** Light Emitting Diodes, LASER Principles, Laser Diode, Operating Characteristics and Modulation Circuits of LED and LASER Diodes Principle of Photo- Detection, Semiconductor Photodiode, PIN Photodiode, Avalanche Photodiode, Optical Networks: SONET/SDH Networks.

***Text Books:***

1. Fundamentals of Satellite Communication by Raja Rao, Pearson.
2. Satellite Communication by Monojit,Mitra, PHI.
3. Optical Fiber Communication by Keiser, TMH.
4. Fiber Optic Communications by Palais, 4th Edition, Pearson Education.


***Reference Books:***

1. Satellite Communications by Dr. D.C. Agarwal, Khanna Publisher.
2. Satellite Communication System Engineering by Pritchard, Pearson Education.
3. Satellite Communication, Timothy Pratt, John Wiley & sons
4. Opto Electronics and Fiber Optic Communication by Sarkar & Sarkar, New Age International Publishers
5. Fundamentals of Optical Fiber Communication by Satish Kumar, PHI
6. Optical Fiber Communication-Principles and Practice by John Senior, PHI


**Course Outcomes:**
1. Understand the basic concepts of Satellite.
2. Able to calculate the complete C/N ratio of satellite link design.
3. Able to understand multiple access techniques related to satellite.
4. Able to understand the concepts of optical fiber communication.
5. Student gains knowledge how optical signal is transmitted and received
6. Student gets an insight into SONET/SDH networks.

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**

Branch: **Electronics & Telecommunication** Semester: **VIII**

Subject: **Consumer Electronics** Code: 328832(28)

| | | | |
|---|---|---|---|
| Total Theory Periods: | **40** | Total Tutorial Periods: | **12** |
| Class Tests: | **Two (Minimum)** | Assignments: | **Two (Minimum)** |
| ESE Duration: | **Three Hours** | **Maximum Marks: 80** | **Minimum Marks: 28** |

**Course Objectives:**

1. To understand fundamentals of television.
2. To gain knowledge of color TV fundamentals.
3. To understand working of microphones and know concepts of optical recording.
4. To gain knowledge of public address system.
5. To gain knowledge of use of electronics in home and automobiles.

**UNIT-I** **Fundamentals of Television:** Elements of Television system, Scanning Process, Scanning Methods and Aspect Ratio, Persistence of Vision and Flicker, Vertical Resolution, Picture Elements, Kell Factor, Horizontal Resolution and Video Bandwidth, Interlacing of Scanning Lines, Video Signals, Control Pulses, Composite Video Signal, TV Standards: 625 Line System.

**UNIT-II** **Color TV:** Introduction, Color Spectrum, Compatibility Consideration, Color TV Signal, Luminance Signal, Chrominance Signal, Luminance and Chrominance, Recombination to Natural Color Voltages, Interleaving Process, Color Subcarrier Frequency, Phase Errors, Composite Color Signal, High Definition TV, Digital TV.

**UNIT-III** **Microphone and Optical Recording: Microphone:** Characteristics of Microphones, Construction and working Principles of Microphones, Carbon Microphone, Dynamic Microphone, Capacitor Microphone, Tie Clip Microphone, Wireless Microphone.
**Optical Recording of Audio Signal:** Disc, Processing of Audio signal, Readout from the Disc, Reconstitution of the Audio Signal.

**UNIT-IV** **Public Address System: Loudspeaker:** Ideal Loudspeaker, Basic Loudspeaker, Capacitor Loudspeaker, Permanent Magnet Loudspeaker, Voice coil, Loudspeaker Impedance, Acoustic Impedance and Resonance, Woofers, Horn Type Tweeters. **Loudspeaker System:** Horns, Indoor Acoustics.
**Public Address system:** Introduction to PA system, Planning a PA System, Speaker Matching System, PA System Characteristics, PA Amplifiers.

**UNIT-V** **Electronics in Home Appliances and Automobiles: Microwave Oven:** Block diagram, LCD Timer with Alarm, Single Chip Controller, **Washing Machine:** Electronic Controller for Washing Machine, Washing Machine Hardware, Washing Cycles-Hardware and Software Development, Fuzzy Logic Washing Machine, **Electronics in Automobiles**: In Car Computers: Applications, Electronic Ignition, Electronic Ignition Lock System, Anti Lock Braking System, Electronically Control Suspension, Instruments Panel Displays, Ultrasonic Car Safety Belt System Air Bag System, Vehicle Proximity Detection System, Car Navigation System.

***Text books:***

1. Consumer Electronics by S. P Bali, Pearson Publication
2. Color Television by S.P Bali, McGraw Hill.

***Reference books:***

1. Monochrome and color TV by R.R. Gulati, 3rd Edition, New Age International.
2. Basic TV and video systems by Benard Globb.
3. Audio and Video System by R.G. Gupta, 2nd Edition, McGraw Hill.

***Course Outcome:***

1. Students will be able to understand the concepts of television.
2. Students gain a deep insight into concepts of color television.
3. Students will be able to know about various microphones and also optical recording technique.
4. Students learn the design aspect of PA system.
5. Students will be able to get complete knowledge of working of microwave oven, washing machine and in car computers.

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**

Branch: **Electronics & Telecommunication** Semester: **VII1**

Subject: **Power Electronics** Code: 328833(28)

Total Theory Periods: **40** Total Tutorial Periods: **12**
Class Tests: **Two (Minimum)** Assignments: **Two (Minimum)**
ESE Duration: **Three Hours** **Maximum Marks: 80** **Minimum Marks: 28**

***Course Objectives:***

1. To understand basic knowledge of Thyristor family members.
2. To understand the various firing schemes for convertors.
3. To understand the operation of power conditioning circuits.

**UNIT – I** **Silicon Controlled Rectifiers:** Introduction to SCR and its Construction, Principle of Operation, Characteristics & SCR Terminologies, Two-Transistor Analogy of SCR,
**General idea of Modern Power Semiconductor Devices:** Power Diode, Power BJT, Power MOSFET, GTO, DIAC, TRAIC, IGBT, SIT, SITH, MCT, SUS, SBS, SCS.

**UNIT – II** **Switching and Triggering of SCRs:** Different Methods of Turning-ON & Turning-OFF of SCRs, Types of Triggering Circuits, Series & Parallel Operation of SCRs.

**Phase Controlled Rectifier I:** Phase Angle Control Techniques, Classification of Converter, Single Phase Half and Full Wave Converters with R, RL and RLE Loads.

**UNIT – III** **Phase Controlled Rectifier II:** Symmetrical and Asymmetrical Bridge Converters with R and RL Load, Three-Phase three and six pulse Converters, Three-phase fully Controlled Bridge Converters, Dual Converters: Phase Controlled Dual Converter, Single-Phase Dual Converter, Three-Phase Dual Converter, Circulating Current Type Dual Converter: Mid-Point Configuration & Dual Bridge Configuration.

**UNIT – IV** **Power Conditioning Circuits I: Inverters: S**ingle Phase - Half and Full Bridge Inverter with R and RL Load, 3-Phase Bridge Inverter, Mcmurray Full Bridge Inverter. **Choppers**: Principle of Operation, Chopper Control Technique, Voltage Step-Down (Buck) Chopper & Step-Up (Boost) Chopper, Buck-Boost Chopper, Jones Chopper.

**UNIT – V** **Power Conditioning Circuits II: A C Voltage Controller:** Types of Power Control, Integral Cycle Control, Full Wave AC Voltage Regulator with R and RL, TRIAC based AC Voltage Regulators,

**Cycloconverters:** Single Phase to Single Phase: Midpoint Configuration & Bridge Configuration, Three Phase to Single Phase Cycloconverter: Circulating Current Type, Non-Circulating Current Type.

***Text Books:***

1. Industrial Electronics & Control by B. Paul, PHI.
2. Power Electronics by M. D. Singh, Khanchandani, TMH.
3. Power Electronics by P.S Bhimbra, Khanna publications.

***Reference Books:***

1. Industrial & Power Electronics by H.C. Rai, Umesh Publications.
2. Power Electronics by K. Hari Babu, SCITECH Publications.
3. Power Electronics by P.C. Sen, TMH.

***Course Outcomes:***

1. Students will be able to understand the controlled and uncontrolled rectifications.
2. Students will be able to understand phase control operation of different power electronics devices.
3. Students will be able to understand mechanism of invertors and choppers.
4. Students will be able to understand mechanism of cyclo converters and AC voltage controllers.

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Electronics & Telecommunication** | Semester: | **VIII** |
| Subject: | **Optical Communication Lab** | Code: 328861 (28) | |
| Total Lab Period: | **50** | Batch Size: | 30 |
| Maximum Marks: | **40** | Minimum Marks | 20 |

**Experiments to be performed:**

1. To measure bending loss of a fiber.
2. To measure propagation or attenuation loss in a fiber.
3. To obtain amplitude modulation and to transmit the same over fiber optic cable and to demodulate the same at the receiver end.
4. To determine the numerical aperture of a fiber.
5. To measure various types of losses occur in an optical fiber.
6. To study the AC characteristics of intensity modulation of laser and fiber optic system.
7. To measure optical power of a laser diode vs forward current.
8. To monitor photo diode current vs laser optical output.
9. Demonstration of voice transmission through optical fiber using FM.
10. Communication between two computers using RS232 interface via optical fiber.
11. To measure plastic fiber patch cord loss for various lengths of fiber.
12. To study voice transmission through fiber optic cable using PWM.
13. To transmit and receive text files over fiber optic cable.
14. To transmit, receive and observe digital signals over fiber optic cable.
15. To measure rise time, fall time, pulse width distortion of a laser and to determine transmission delay.

List of Equipments/Machine Required:

Fiber optic trainer kit, Optical fiber, Splicing unit, Data Acquisition card for optical signal, O/E & E/O Converter, CRO.

Recommended Books:

1. Fundamentals of Optical Fiber Communication – Sathish Kumar, PHI

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

| | | | |
|---|---|---|---|
| Branch: | **Electronics & Telecommunication** | Semester: | **VIII** |
| Subject: | **Power Electronics Lab** | Code: 328862 (28) | |
| Total Lab Period: | **50** | Batch Size: | 30 |
| Maximum Marks: | **40** | Minimum Marks | 20 |

**List of Experiments: - (To be performed minimum 10 experiments)**

1. Study of VI characteristic of a silicon controlled Rectifier (SCR).
2. Study of VI characteristic of a DIAC.
3. Study of VI characteristic of a TRIAC.
4. Study of VI characteristic of a UJT.
5. Application of UJT as relaxation Oscillator.
6. Study of Half wave gate controlled rectifier-using SCR.
7. RC triggering Scheme of SCR.
8. Study of Voltage Commutation.
9. Study of Current Commutation.
10. Study of single-phase, Half –controlled, full-wave rectifier using two SCRs, and two diodes.
11. Speed controls of a dc shunt Motor using SCR.
12. Study of a three –phase rectifier using power diodes.
13. Study of a three phase full-wave half –controlled rectifier.
14. To study a TRIAC power control circuit (i) use to control the speed of a fan (ii) used as a dimmer.
15. To observe how a Photoconductive cell may be used to trigger an SCR.

Apparatus required:

1. Diodes
2. SPST switch.
3. Transformer
4. Oscilloscope
5. Photo cells
6. CRO
7. Voltmeter, Ammeter
8. DC shunt motor

Reference books:-


1. Fundamentals of Power Electronics ISTE S .K Bhattacharrya.
2. Fundamentals of Power Electronics by S.Rama Raddy.
3. Industrial and Power Electronics by Harish C. Rai.

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Branch: **Electronics & Telecommunication** Semester: **VIII**

Subject: **Digital Circuit Simulation Lab** Code: 328863(28)

Total Lab Period: **50** Batch Size: 30

Maximum Marks: **40** Minimum Marks 20

**Experiments to be performed:**

1. To design, implement and simulate the combinational logic circuit for the function f{A,B,C) = ∑(0,4,5,8,II,I5) + d (1)
2. To design, implement and simulate the Full adder using two half adder.
3. To design, implement and simulate the 8 bit adder using Full adder.
4. To design, implement and simulate the 3 : 8 Decoder.
5. To design, implement and simulate the 16 : 1 Multiplexer using 4 : 1 Multiplexer.
6. To design, implement and simulate the Binary to BCD code Converter by Showing BCD No. on7segment Display.
7. To design, implement and simulate the Look ahead carry.
8. To design, implement and simulate the Flip-Flop.
9. To design, implement and simulate the Ring Counter.
10. To design, implement and simulate the Decade counter using D-Flip-Flop.
11. To design, implement and simulate the Divide by 32 (+32) digital logic by counter and flip-flop.
12. To design, implement and simulate the Hamming code converter.
13. To design, implement and simulate the 4 bit comparator.
14. To design, implement and simulate the Finite State Machine by Moore method.
15. To design, implement and simulate the Finite State Machine by Mealy circuit.
16. To design, implement and simulate the Digital clock.

List of Equipments/Machine Required:

1. PCs with simulation software like MULTISIM, COMSIM, MATLAB, TINA PRO installed

Recommended Books:

1. D. V. Bout : The Practical Digital Circuit Designer Lab Book ; Prentice-Hall., 1999.

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Branch: **Electronics & Telecommunication** Semester: **VIII**

Subject: **Major Project** Code:328864(28)

Total Practical Period :**60** **Total Marks in End Semester Examination: 100**

1. The students are expected to take up a Project under the guidance of a faculty from the Institute. This may be an extension of the Minor project undertaken in VII semester or a new one.
2. The topic of the project should be justified for the degree of BE (Electronics & Telecommunication)
3. The project selected should ensure the satisfaction of the urgent need to establish a direct link between education, Industrial application, national development and productivities.
4. The students may be asked to work individually or in a group having not more than FOUR students.
5. The student/group of student should collect all necessary information from literature on selected topic/project.
6. It should include the scope of project, identification of necessary data, source of data, development of design method and identification, methodology, software analysis (if any).
7. Students should deliver a seminar on the selected Project/topic.
8. The students are expected to submit the report in standard format approved by the University in partial fulfillment of the requirement for the degree of B.E. (Electronics & Telecommunication).
9. There will be an external viva-voce at the end of the semester and the students are to demonstrate the project at the time of viva-voce.
10. The project report should contain the following:

    A cover page mentioning the project title, names of the students, Affiliated Institute/College, Session, Batch and the name of the University.

    A bonafide certificate to be issued by the Head of the Institute.

    A forwarding certificate from the Head of the Department.

    A completion certificate from the Project guide.

    A certificate of Approval from both Internal and External Examiner.

    Acknowledgement from the students

    Abstract

    Contents

    Description of the Project (to be divided in chapters)

    Conclusion

    Bibliography

    A CD containing the Software/Program used in the project.

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**

Branch: **Electronics & Telecommunication** Semester: **VII1**

Subject: **Project Management & Report Writing** Code: 328865 (28)

Total No. of Periods: **2 per week** Total Tutorial Periods: **NIL**

Class Tests: **Two (Minimum)** Teacher's Assessment: **40**

**UNIT -I** **Identification of Projects -** Generation and screening of idea, Monitoring corporate appraisal, Preparing project profiles and Project Rating Index.
**Feasibility studies:** Introduction to the Market and demand analysis, Technical analysis, Financial analysis and Economic viability.

**UNIT- II** **Project Selection Criteria:** Criterion: Discounting and Non-Discounting, Net Present Value, Internal Rate of Return, Pay Back Period and Accounting Rate of Return methods.

**UNIT -III** **Project Management and Implementation:** Project planning, project control, prerequisites of implementation.
**Network Techniques of Project Management:** Project Evaluation and Review Technique (PERT) and Critical Path Method (CPM).

**UNIT –IV** **Proposals & Presentation:** Title page, Cover letter, Table of Content, list of illustrations, summary, discussion, conclusion, references, glossary, appendix, Case Studies. Oral Presentation/ Seminar.

**UNIT –V** **Report Writing:** Criteria for report writing, Types of Report: Trip report, Progress report, lab report, Feasibility report, project report, incident report, etc., Case Studies.

***Text books:***


1. Project Planning, Analysis, Selection, Implementation and Review by Prasanna Chandra, TMH.
2. Sharon J. Gerson & Steven M. Gerson "Technical Writing -Process& Product", Pearson Education.


***Reference Books:***


1. Project Management by Dr. Harold Kerzner. 2nd Edition, Wiley

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**

Branch: **Electronics & Telecommunication** Semester: **VIII**

Subject: **Cryptography and Secure Communication** Code: **328840(28)**

Total Theory Periods: **40** Total Tutorial Periods: **12**
Class Tests: **Two (Minimum)** Assignments: **Two (Minimum)**
ESE Duration: **Three Hours** **Maximum Marks: 80** **Minimum Marks: 28**

***Course Objectives:***

1. To emphasize students the importance of modular arithmetic, and some algorithms required in cryptography.
2. To make students understand the symmetric and asymmetric cryptosystem.
3. To provide a broad overview of the requirements of authentication, digital signature, algorithms to achieve this aim.
4. To teach the students about IP-level security, its architecture and about the threats to computer system and its countermeasures.
5. To get students idea about general requirements for web security and focus on two standard schemes for web commerce SSL/TLS and SET.

**UNIT -I** **Mathematics of Cryptography:** Greatest Common Divisor(GCD),Euclidean Algorithm, Extended Euclidean Algorithm, Group, Modular Arithmetic : Modulo operator, Set of residues, Congruence, Operations in $Z_n$, Inverses: Additive inverse, Multiplicative inverse, Linear Congruence: Solution of Linear Equations, Primes, Euler's Phi-Function, Fermet's Theorem, Euler's Theorem. Groups: Order of group, Finite group, Exponentiation and Logarithm: Fast Exponentiation, Discrete Logarithm.

**UNIT-II** **Introduction and Symmetric Cipher:** The OSI Security Architecture: Security Attack, Security Mechanism, Security Service, Symmetric Cipher Model(Conventional Cryptosystem), Cryptyanalysis, Substitution Techniques, Monoalphabetic Cipher, Playfair Cipher, Hill Cipher, Polyalphabetic Ciphers, Transpositional Techniques, Block Cipher and DES-Stream Cipher and Block cipher: The Fiestel Cipher and The DES: Encyption and Decryption. Stream cipher: LFSR; Public Key Cryptography: Principles of Public Key Cryptosystems, The RSA Algorithm, Key Management, D-H key Exchange, Man-in the-Middle Attack.

**UNIT-III** **Message Authentication, Hash Functions, Hash and MAC Algorithms:** Authentication Requirements, Authentication Functions, Message Authentication Codes, Hash functions, Security of hash functions and MAC, Secure Hash Algorithm: MD-5, SHA-512, HMAC, Digital Signatures: Requirements, Direct Digital Signature, Arbitrated Digital Signature, Digital Signature Algorithm.

**UNIT-IV** **IP Security, Malicious Software and Firewalls:** IP Security Overview, IP Security architecture, Authentication Header, Encapsulating Security Payload, Viruses and Related Threats, Virus Countermeasures, Trojans, Firewalls: Characteristics, Types, Configurations, Trusted Systems.

**UNIT-V** **Web Security:** Web Security Threats, Secure Socket Layer and Transport Layer Security: SSL Architecture, SSL Record Protocol, Change Cipher Spec Protocol, Alert Protocol, Handshake Protocol, TLS, Secure Electronic Transaction: SET Overview, Key features of SET, Dual Signature.

***Text Books***


1. Cryptography and Network Security by B.A. Forouzan, TMH
2. Cryptography and Network Security by William Stallings,4th Edition, Pearson


***Reference Books***


1. Cryptography and Network Security by Atul Kahate, McGrawHill
2. Computer Networks by Tannenbum , PHI


***Course Outcomes:***

1. The students will be able to calculate gcd, discrete logarithm, exponents etc. on the basis of discrete mathematics used in cryptography.
2. The students will be able apply the knowledge of symmetric and asymmetric ciphers for encryption and decryption.
3. The students will be able to understand the practical use of authentication and various algorithms for producing hash and MAC.
4. The students will be able to see the need of IP Security ,malicious software's , their countermeasures and also briefly understand the use of Firewall.
5. The students will get the idea about need for security services at transport layer of the Internet model SSL architecture and use of SET to protect credit card transactions.

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**

Branch: **Electronics & Telecommunication** Semester: **VIII**

Subject: **MEMS in Communication Engineering** Code: **328841(28)**

Total Theory Periods: **40** Total Tutorial Periods: **12**
Class Tests: **Two (Minimum)** Assignments: **Two (Minimum)**
ESE Duration: **Three Hours** **Maximum Marks: 80** **Minimum Marks: 28**

**Course Objectives:**
1. To enable the students to acquire knowledge about the principles of MEMS & MOEMS.
2. To understand the designing of MEMS.
3. To get an idea about what all materials are used in MEMS.
4. To give an insight to the working of RF MEMS Technology.
5. To understand the concepts of Optical MEMS & its application in communication.

**UNIT- I** **Introduction to MEMS Technology :** Basic Concepts of MEMS, Scaling in Microdomain: Scaling Laws in Electrostatic, Electromagnetic, Structures etc.
MEMS working Principles and Design: Transduction Principles in Microdomain.
MEMS Modeling and Simulation: Modeling Elements in Electrical, Mechanical, Thermal and Fluid Systems. Modeling Elastic, Electrostatic, Electromagnetic Systems.

**UNIT-II** **Microfabrication/Micromachining:** Overview of Micro Fabrication, Review of Microelectronics Fabrication Processes like Photolithography, Deposition, Doping, Etching, Structural and Sacrificial Materials, and other Lithography Methods, MEMS Fabrication Methods like Surface, Bulk, LIGA and wafer bonding methods.

**UNIT-III** **Radio Frequency (RF) MEMS:** Introduction, Review of RF-based communication systems, RF-MEMS like switches and relay, MEMS inductors and Capacitors, RF filters, resonators, phase shifters, transmission lines, micromachined antenna (Qualitative treatment only)

**UNIT-IV** **Optical MEMS:** Preview, passive optical components like lenses and mirrors, actuators for active optical MEMS, Basic optical communication network using MOEMS devices.

**UNIT-V** **Case Studies:** Case studies of Microsystems including micro-cantilever based sensors and actuators with appropriate selection of material properties: thermal, mechanical properties, Static and dynamic mechanical response with different force mechanisms: electrostatic, electromagnetic, thermal.

***Text Books:***

1. MEMS Nitaigour Mahalik, Tata McGraw Hill.
2. MEMS and MOEMS Technology and Applications, Rai Choudhary, PHI Learning.
3. MEMS, Vijay Vardan, Wiley Publication.
4. MEMS and Microsyostems Design and Manufacture, Tai-Ran Hsu, Tata McGraw Hill


***Reference Books:***

1. Stephen D. Senturia. Microsystem Design, Kluwer Academic Publishers.
2. Marc Madou. Fundamentals of Microfabrication, CRC Press.
3. Kovaes. Micromachined Transducers Sourcebook. WCB McGraw-Hill, Boston
4. M-H Bao, Elsevier, Micromechanical Transducers: Pressure sensors, accelerometers and gyroscopes. New York, 2000


***Course Outcomes:***
After completing the course students will –
1. have knowledge of the operation of MEMS & MOEMS.
2. have knowledge of design and analyse MEMS devices using suitable mechanical/electrical engineering principles.
3. able to apply knowledge of MEMS & Optical MEMS in Communication area.

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**

Branch: **Electronics & Telecommunication** Semester: **VIII**

Subject: **Embedded System and RTOS** Code: **328842(28)**

Total Theory Periods: **40** Total Tutorial Periods: **12**
Class Tests: **Two (Minimum)** Assignments: **Two (Minimum)**
ESE Duration: **Three Hours** **Maximum Marks: 80** **Minimum Marks: 28**

***Course Objectives:***

1. To understand the fundamental of Embedded system
2. To know about characteristics, hardware, software, computational model
3. To get the knowledge of RTOS, different types task process and trades.
4. To know about multimicroprocessor based system and different modeling.
5. To know the RTOS and operating system concepts.
6. To make the student familiar with the industrial aspects of embedded system using case study.

**UNIT I** **Hardware Software Codesign And Programme Modeling:** Characteristics of an Embedded System, Quality Attributes of Embedded Systems, Fundamental Issues in Hardware Software Co -Design, Computational Models in Embedded Design, Introduction to Unified Modelling Language (UML), Hardware Software Tradeoffs.

**UNIT II** **Real-Time Operating Systems (RTOS) Based Embedded System** DESIGN: Operating System Basics, Types of Operating Systems, Tasks, Process and Threads, Multiprocessing and Multitasking, Task Scheduling, Threads, Processes and Scheduling :Putting them Altogether, Task Communication, Task Synchronization, Device Drivers, How to Choose an RTOS.

**UNIT III** **Program Modeling Concepts**: Program Models, DFG Models, state Machine Programming Models for Event controlled Program Flow, Modeling of Multiprocessor Systems, UML Modeling.

**UNIT IV** **Real Time Operating Systems:** OS Services, Process Management, Timer junctions, Event Functions, Memory Management, Device, File and IO Subsystems Management, Interrupt Routines in RTOS Environment and Handling of Interrupt, Source Calls, Real time Operating Systems, Basic Design an RTOS, RTOS Task Scheduling Models, Interrupt Latency and Response of the Tasks as Performance Matrices, OS Security Issues.

**UNIT V** **Design Examples And Case Studies Of Progam Modeling And Programming With Rtos:** Case study of Communication between Orchestra Robots, Embedded Systems in Automobile, Case study of an Embedded System for an Adaptive Cruise Control(ACC) System in a Car, Case study of an Embedded System for a Smart Card, Case study of a Mobile Phone Software for Key Inputs.

**Text Books**:


1. Introduction to Embedded System by Shibu K V, McGraw Hill Higher Edition.
2. Embedded Systems Architecture, Programming and Design by Raj Kamal, Second Edition, McGraw Hill Companies.
3. Embedded System Design by Peter Marwedel, Springer.


**Reference Books**:


1. Embedded System Design – A Unified Hardware/Software Introduction, by Frank Vahid, Tony D. Givargis, John Wiley.
2. Embedded/ Real Time Systems, by KVKK Prasad, Dreamtech Press.


***Course Outcomes:***

1. To let the student able to understand the concept the embedded system.
2. To unable the student to understand the application and characteristics of RTOs.
3. Student understand program modeling concept.
4. Student learn about RTOs services environments and security issues.
5. Student gain the knowledge of industrial requirement of embedded system by case study.

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**

Branch: **Electronics & Telecommunication** Semester: **VIII**

Subject: **CMOS Mixed Signal Circuit Design** Code: **328843(28)**

Total Theory Periods: **40** Total Tutorial Periods: **12**
Class Tests: **Two (Minimum)** Assignments: **Two (Minimum)**
ESE Duration: **Three Hours** **Maximum Marks: 80** **Minimum Marks: 28**

**Course Objectives:**

1. To understand concepts of Switched Capacitor Circuits.
2. To understand Basics of Phased Lock Loop (PLL)
3. To understand concepts of Data Converter.
4. To gain Knowledge of Nyquist Rate A/D and Oversampling Converter.

**UNIT -I** **Switched Capacitor Circuits:** Introduction to Switched Capacitor circuits- basic building blocks, Operation and Analysis, Non-ideal effects in switched capacitor circuits, Switched capacitor integrators first order filters, Switch sharing, biquad filters.

**UNIT –II** **Phased Lock Loop (PLL):** Basic PLL topology, Dynamics of simple PLL, Charge pump PLLs-Lock acquisition, Phase/Frequency detector and charge pump, Basic charge pump PLL, Non-ideal effects in PLLs-PFD/CP non-idealities, Jitter in PLLs, Delay locked loops, applications

**UNIT-III** **Data Converter Fundamentals:** DC and dynamic specifications, Quantization noise, Nyquist rate D/A converters- Decoder based converters, Binary-Scaled converters, Thermometer-code converters, Hybrid converters

**UNIT-IV** **Nyquist Rate A/D Converters:** Successive approximation converters, Flash converter, Two-step A/D converters, Interpolating A/D converters, Folding A/D converters, Pipelined A/D converters, Time -interleaved converters.

**UNI -V** **Oversampling Converters:** Noise shaping modulators, Decimating filters and interpolating filters, Higher order modulators, Delta sigma modulators with multibit quantizers, Delta sigma D/A

***Text Books:***


1. Design of Analog CMOS Integrated Circuits by Behzad Razavi, TMH.
2. CMOS Analog Circuit Design by Philip E. Allen and Douglas R. Holberg, 2nd Edition/Indian Edition, Oxford University Press.
3. Analog Integrated Circuit Design by David A. Johns, Ken Martin, Wiley.


***Reference Books:***


1. CMOS Integrated Analog-to- Digital and Digital-to-Analog converters by Rudy Van De Plassche, Kluwer Academic Publishers.
2. Understanding Delta-Sigma Data converters by Richard Schreier, Wiley.
3. CMOS Mixed-Signal Circuit Design by R. Jacob Baker, Wiley.


***Course Outcome:***

1. Student is able to understand operation of Switched Capacitor Circuits.
2. Student is able to understand operation of PLL and its application..
3. Student is able to understand Data Converter Fundamentals
4. Student is able to understand Nyquist rate and oversampling Converter .

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**

Branch: **Electronics & Telecommunication** Semester: **VIII**

Subject: **Microelectronic Devices & VLSI Technology** Code: **328844(28)**

Total Theory Periods: **40** Total Tutorial Periods: **12**
Class Tests: **Two (Minimum)** Assignments: **Two (Minimum)**
ESE Duration: **Three Hours** **Maximum Marks: 80** **Minimum Marks: 28**

**Course Objectives:**
1. To get and overview of the field of integrated circuit design.
2. To understand various oxidation techniques.
3. To understand diffusion and ion implantation methods.
4. To understand steps of wafer preparation.
5. To understand MOSFET technology.

**UNIT – I** **Introduction:** The Historical Prospect of Integrated Circuits, Silicon Wafers, Wafer Terminology. Crystal Growth: The Czochralski Technique, Bridgeman Technique, Float Zone Process.

**UNIT – II** **Oxidation:** Thermal Oxidation, Kinetics of Thermal Oxidation, Film Deposition, Dielectric Deposition, Polysilicon Deposition.

**UNIT – III** **Diffusion:** Diffusion Mechanics, Diffusion Equation, Diffusion Profile. **Ion Implantation:** Implantation Mechanism, Ion Implantation System, Low Energy Implantation, High Energy Implantation.

**UNIT – IV** **Epitaxy:** Vapour Phase Epitaxy, Liquid Phase Epitaxy, Molecular Beam Epitaxy. **Lithography:** Optical Lithography, Electron Beam Lithography, X-Ray Lithography, Ion Beam Lithography. **Etching:** Wet Chemical Etching, Reactive Chemical Etching. **Metallization:** Physical Vapour deposition, Chemical Vapour deposition, Aluminum Metallization, Metallization with Silicides. **Process Simulation and Integration**

**UNIT – V** **MOSFET Technology:** Introduction, MOS Structure. MOS Transistor: MOSFET Structure, Enhancement MOSFET, Threshold Voltage, Depletion MOSFET, Operation of MOSFET. MOSFET Characteristics: Gradual Channel Approximation, Charge Control Model, Velocity Saturation Effects, Channel Length Modulation, Subthreshold region. MOS Capacitance and Equivalent Circuit. Scaling of MOSFET: Short channel Effects, SPICE model for MOSFETs. MOSFET Fabrication.

***Text Book:***
1. VLSI Design by Sujata Pandey & Manoj Pandey, Dhanpat Rai & co.
2. VLSI Technology by S.M. Sze, TMH Book Company

***Reference Book:***
1. VLSI Fabrication Principles by Sorab K. Gandhi, Wiley & Sons, New York.
2. Physics & Technology of Semiconductor Devices by A.S. Grove, Wiley & Sons, New York.

***Course Outcomes***
1. Student gets brief historical overview specific to VLSI design field.
2. Student learns about oxidation techniques.
3. Student gets an insight into diffusion and ion implantation mechanism.
4. Student is able to understand different steps of wafer preparation.
5. Student gets an overview of microelectronics devices and MOSFET technology.

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**

Branch: **Electronics & Telecommunication** Semester: **VIII**

Subject: **Biometric Techniques** Code: **328845(28)**

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|---|---|---|---|
| Total Theory Periods: | **40** | Total Tutorial Periods: | **12** |
| Class Tests: | **Two (Minimum)** | Assignments: | **Two (Minimum)** |
| ESE Duration: | **Three Hours** | **Maximum Marks: 80** | **Minimum Marks: 28** |

**Course Objectives:**

The basic objective in offering this course is to study the state-of-the-art in biometrics technology can explore the way to improve the current technology. The students can learn and implement various biometrics technologies using advanced algorithm.

**UNIT-I** **Introduction of Biometrics:** Biometrics: definition, history, basic working architecture, types; Performance measures of biometrics; applications and benefits of biometrics; design of biometrics; biometric identification versus verification.

**UNIT-II** **Face and Iris Biometrics:** Background of face and iris recognition; Face recognition methods: Eigen face methods, contractive transformation method; Challenges of face biometrics; Design of iris biometrics: image segmentation, image preprocessing, determination of iris region; Advantages and disadvantages of face and iris biometrics.

**UNIT-III** **Fingerprint and Sign Language Biometrics:** Fingerprint matching: image acquisition, image enhancement and segmentation, image binarization, minutiae extraction and matching; Sign language biometrics: Indian sign language (ISL) biometrics, SIFT algorithm, advantages and disadvantages of ISL and fingerprint biometrics.

**UNIT-IV** **Biometric Cryptography and Privacy Enhancement:** Introduction to biometric cryptography; general purpose cryptosystems; Cryptographic algorithms: DES and RSA; Privacy concerns and issues related to biometrics; biometrics with privacy enhancement; soft biometrics; comparison of various biometrics; Identity and privacy.

**UNIT-V** **Scope of Biometrics and Biometric Standards:** Multimodal biometrics: basic architecture and fusion scheme, application, example of AADHAAR; scope and future market of biometrics; role of biometrics in enterprise and border security; DNA biometrics; biometric standards; biometric APIs.

***References Books***


1. Biometrics: concepts and applications by Dr G R Sinha and Sandeep B. Patil, Wiley India Publications, 2013.
2. Introduction to biometrics by Anil K Jain, Arun Ross and Karthik Nandakumar, Springer, 2011.
3. Biometrics Identity verification in a networked world by Samir nanawati, Michael Thieme and Raj Nanawati, US edition of Wiley India, 2012.


***Course Outcomes:***

On completion of this program student will:

1. Understand the basic definition of 'Biometric Recognition' and the distinctive of this form of biometrics.
2. Be able to state precisely what functions these systems perform.
3. Be able to draw a system-level diagram for any biometric system and discuss its components.
4. Be able to solve verification, identification, and synthesis problems for a variety of biometrics such as fingerprint, face, iris, hand gestures and cryptography.
5. Be able to use the biometrics ingredients of existing system to obtain a given security goal.
6. Judge the appropriateness of proposal in research papers for a given applications.
7. Be able to design a biometric solution for a given application.

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**

Branch: **Electronics & Telecommunication** Semester: **VIII**

Subject: **RISC Microcontrollers and DSP Processors** Code: **328846(28)**

Total Theory Periods: **40** Total Tutorial Periods: **12**
Class Tests: **Two (Minimum)** Assignments: **Two (Minimum)**
ESE Duration: **Three Hours** **Maximum Marks: 80** **Minimum Marks: 28**

***Course Objectives:***

1. To get knowledge of RISC and DSP processor.
2. To understand the Internal Architecture Design.
3. To unable to student to know about memory mapping and pipeline and BUS interface.
4. To understand the fault exception handling and interrupts.
5. To understand the need of ADC UART and serial interface.

**UNIT - I** **The Cortex-M3 processor:** Applications, Simplified view – block diagram, programming model – Registers, Operation modes, Exceptions and Interrupts, Reset Sequence.

**UNIT - II** **Architectural Detail:** Instruction Set, Unified Assembler Language, Memory Maps, Memory Access Attributes, Permissions, Bit-Band Operations, Unaligned and Exclusive Transfers. Pipeline, Bus Interfaces.

**UNIT - III** **Exception Handling:** Exceptions, Types, Priority, Vector Tables, Interrupt Inputs and Pending behavior, Fault Exceptions, Supervisor and Pendable Service Call, Nested Vectored Interrupt Controller, Basic Configuration, SYSTICK Timer, Interrupt Sequences, Exits, Tail Chaining, Interrupt Latency.

**UNIT - IV** **LPC 17xx microcontroller-** Internal memory, GPIOs, Timers, ADC, UART and other serial interfaces, PWM, RTC, WDT .

**UNIT - V** **Programmable DSP (P-DSP) Processors -** Harvard architecture, Multi port memory, architectural structure of P-DSP- MAC unit, Barrel shifters, Introduction to TI DSP processor family.

***Text books:***


1. The definitive guide to ARM Cortex-M3 by Joseph Yiu, 2nd Edition Elsevier,.
2. Digital Signal Processors: Architecture, Programming and Applications by Venkatramani B. and Bhaskar M. 2nd Edition TMH.


***Reference books:***


1. ARM System Developer's Guide: Designing and Optimizing, by Sloss Andrew N, Symes Dominic, Wright Chris, Morgan Kaufman Publication.
3. ARM System-on-Chip Architecture by Steve furber, Pearson Education.
4. Embedded System Design, by Frank Vahid and Tony Givargis, Wiley.
5. DSP Processor Fundamentals-Architecture and Features by Lapsley P., Bier J., Shoham A., Lee E.A. (IEEE Press).
6. Digital Signal Processing and Applications, by Dag Stranneby and William Walker, 2nd edition, Elsevier.


***Course Outcome:***

1. Student learn about RISC and DSP processor.
2. The student understand the Architecture pipeline and BUS interface of the DSP processor.
3. The student get the knowledge of ADC, UART and serial interface .
4. The student get the knowledge of architecture of DSP processor family.

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**

Branch: **Electronics & Telecommunication** Semester: **VIII**

Subject: **Artificial Intelligence And Expert Systems** Code: **328847(28)**

Total Theory Periods: **40** Total Tutorial Periods: **12**
Class Tests: **Two (Minimum)** Assignments: **Two (Minimum)**
ESE Duration: **Three Hours** **Maximum Marks: 80** **Minimum Marks: 28**

***Course Objectives:***

1. To make students learn to define problem of complex nature , state space of problem domain and searching techniques to solve them.
2. To make students understand concept of heuristic and how it is applied to solve AI based problem along with mechanism to represent knowledge structures and inference procedure.
3. To make student learn processing of natural language and challenges associated with it.
4. To make students understand concept of Expert System, its design issues and applications
5. To make students aware with fundamental concept of Neural Network and Fuzzy logic and its use for solving complex problem domain

**UNIT-I** **General Issues and overview of AI:** The AI problems; what is an AI technique; Characteristics of AI applications Problem Solving, Search and Control Strategies General Problem solving; Production systems; Control strategies: forward and backward chaining Exhaustive searches: Depth first Breadth first search.

**UNIT-II** **Heuristic Search techniques:** Hill climbing; Branch and Bound technique; Best first search and A* algorithm; AND/OR Graphs; Problem reduction and AO* algorithm; Constraint Satisfaction problems Game Playing Minmax search procedure; Alpha-Betacutoffs; Additional Refinements

**UNIT-III** **Knowledge Representation:** First Order Predicate Calculus; Skolemnisation; Resolution Principle and Unification; Inference Mechanisms Horn's Clauses; Semantic Networks; Frame Systems and Value Inheritance; Scripts; Conceptual Dependency AI Programming Languages Introduction to LISP, Syntax and Numeric Functions; List manipulation functions; Iteration and Recursion; Property list and Arrays, Introduction to PROLOG.

**UNIT-IV** **Natural Language Processing and Parsing Techniques**: Context - free Grammar; Recursive Transition Nets (RTN); Augmented Transition Nets (ATN); Semantic Analysis, Case and Logic Grammars; Planning Overview - An Example Domain: The Blocks Word; Component of Planning Systems; Goal Stack Planning (linear planning); Non-linear Planning using constraint posting ; Probabilistic Reasoning and Uncertainty; Probability theory; Bayes Theorem and Bayesian networks; Certainty Factor.

**UNIT-V** **Expert Systems**: Introduction to Expert Systems, Architecture of Expert Systems; Expert System Shells; Knowledge Acquisition; Case Studies: MYCIN, Learning, Rote Learning; Learning by Induction; Explanation based learning.

***Text Book:***


1. Elaine Rich and Kevin Knight: Artificial Intelligence- Tata McGraw Hill.
2. Dan W.Patterson, Introduction to Artificial Intelligence and Expert Systems- Prentice Hall of India.


***Reference Books:***


1. Nils J.Nilsson: Principles of Artificial Intelligence- Narosa Publishing house.
2. Artificial Intelligence : A Modern Approach, Stuart Rusell, Peter Norvig, Pearson Education.,
3. Artificial Intelligence, Winston, Patrick, Henry, Pearson Education.


***Course Outcome:***

1. Student will have ability to understand and define different AI problem and apply suitable problem solving technique.
2. Student will have ability to define the heuristics and apply them for solving complex problem with understanding of different heuristic based search techniques.
3. Student will develop an understanding of game playing techniques
4. Student will have understanding of different knowledge structure and inference mechanism with ability to apply them in intelligent solutions of complex problem .
5. Students will develop skills needed for processing of natural language at syntactic and semantic level.
6. Student will understand the existence of uncertainty in problem solving and how mathematical /statistical models are used to overcome these problems.
7. Students will understand planning system and different types of planning required for problem solving process
8. Student will be able to understand working of Expert system.
9. Student will have fundamental concept of Artificial Neural Networks and Fuzzy Logic.

# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**

Branch: **Electronics & Telecommunication** Semester: **VIII**

Subject: **Telecommunication Switching Circuits & Networks** Code: **328848(28)**

Total Theory Periods: **40** Total Tutorial Periods: **12**
Class Tests: **Two (Minimum)** Assignments: **Two (Minimum)**
ESE Duration: **Three Hours** **Maximum Marks: 80** **Minimum Marks: 28**

**Course Objectives:**

1. To study the working of different Telecommunication switching system.
2. To learn and understand the digital switching system.
3. To study the hardware configuration and software organization of CCSS.
4. To understand the telephone network management with switching hierarchy and routing.
5. To know the switching techniques for data transmission in PSTNs.
6. To study and acquire the knowledge of ISDN standards and signaling techniques.

**UNIT – I** **Evolution Of Telecommunication Switching Systems:** Basics of Switching Systems, Strowger switching System: Rotary Dial Telephone, Signalling Tones, Stroger Switching Components, Step-by-step Switching, Design Parameters,100-line Switching System. Cross-bar switching: Principles of Common Control, Principles of Cross-bar Switching, Cross-bar Switch Configurations, Crosspoint Technology, Crossbar Exchange Organisation. Electronic Space division switching: Stored Program Control, Centralised SPC, Distributed SPC.

**UNIT – II** **Digital Switching System:** Time Division Switching, Two Dimensional Digital Switching, Computer Controlled Switching Systems: Call Processing, Hardware Configuration, Software Organization, History of CCSS, Early Electronic Switching System, Popular Digital Switching Systems, Electronic Exchanges in India.

**UNIT – III** **Telephone Network Management:** Traffic Engineering: Network Traffic Load and Parameters, Grade of Service and Blocking Probability, Blocking Models and Loss Estimates, Telephone Network: Subscriber loop system, switching hierarchy & routing. Transmission plan, Transmission System, Numbering Plan, Charging plan, Signaling Technique, In-Channel signaling.

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**UNIT –IV** **Data Through Telephone Networks:** Data transmission in PSTNs, Switching technique for Data transmission, Data communication Architecture, Link-to-Link Layers, End-to-End Layers, Satellite Based Data Network.

**UNIT – V** **ISDN:** Motivation for ISDN, New services, Network and Protocol Architecture, Transmission Channel, User-Network interface, Signaling, Numbering & Addressing, Service characterization, ISDN standards.

***Text Books:***


1. Telecommunication Switching and Network, Thyagarajan and Viswanathan - PHI
2. Telecommunication Switching and Networks, P. Gnanasivam, New Age International Publishers


***Reference Books:***


1. Data and Computer Communications, William Stalling; Pearson Education.
2. Telecommunication Switching, Traffic and Networks, Flood, Pearson Education


***Course Outcomes:***

1. The student will be able to understand the working of different switching system.
2. The student will understand the processing of digital switching system.
3. The student will acquire the knowledge of hardware configuration and software organization of CCSS.
4. The student will understand telephone network management.
5. The student will be able to know and used to various switching techniques for data transmission PSTNs.
6. Student will know about ISDN standards and signaling techniques.

| | | | |
|---|---|---|---|
| Name of program: | **Bachelor of Engineering** | | |
| Branch: | **Electronics & Telecommunication** | Semester: | **VIII** |
| Subject: | **Speech Signal Processing** | Code: | **328849(28)** |
| Total Theory Periods: | **40** | Total Tutorial Periods: | **12** |
| Class Tests: | **Two (Minimum)** | Assignments: | **Two (Minimum)** |
| ESE Duration: | **Three Hours** | **Maximum Marks: 80** | **Minimum Marks: 28** |

***Course Objectives:***

1. Fundamental concepts of speech production and speech perception
2. Mathematical foundations of signal processing and pattern recognition
3. Computational methods for speech analysis, recognition, synthesis and modification

**UNIT- I** **Speech: Production, Perception And Acoustic-Phonetic Characterization:** Introduction, Speech production process, Time and frequency domain representation of speech, Speech sounds and features, The vowels, Diphthongs, Semivowels, Nasal Consonants, Unvoiced Fricatives, Voiced Fricatives, Voiced & Unvoiced Stops, Acoustic-Phonetic Approach to Speech Recognition..

**UNIT- II** **Spectral Analysis Of Speech:** Short time Fourier analysis, filter bank design, speech coding, subband coding of speech, transform coding, channel vocoder, formant vocoder, cepstral vocoder, vector quantizer coder.

**UNIT- III** **Speech Synthesis:** Pitch extraction algorithms, Gold Rabiner pitch trackers, autocorrelation pitch trackers, voice/unvoiced detection, homomorphic speech processing, homomorphic systems for convolution, complex cepstrums, pitch extraction using homomorphic speech processing.

**UNIT- IV** **Automatic Speech Recognition Systems:** Isolated word recognition, connected word recognition, large vocabulary word recognition systems, pattern classification, DTW, HMM, speaker recognition systems, speaker verification systems, speaker identification systems.

**UNIT- V** **Hidden Markov Models:** Discrete-Time Markov Processes, Extensions to HMMs, Coin-toss Models, The Urnand-Ball Model, Elements of an HMM, HMM generator of observations. Three Basic problems for HMMs and their solutions, Probability Evaluation, 'Optimal' State sequence, Parameter estimation, Re - estimation procedure. HMM types, continuous observation densities in HMMs, Autoregressive HMMs, Variants on HMM structures, Inclusion of Explicit State Duration Density in HMMs.

***Text Books:***


1. Fundamentals of Speech Recognition, Rabiner L. and Juang B., Pearson Education
2. Signal Processing of Speech, Owens F.J., Macmillan New Electronics


***Reference Books:***


1. Speech and Language Processing, Jurafsky, Pearson Education
2. Discrete Time Speech Signal processing: Principles and Practice, Quatieri, Pearson Education
3. Fundamentals of Speech Signal Processing, Saito S. & Nakata K., Academic Press
4. Voice and Speech Processing, Thomas Parsons, McGraw Hill Series.


***Course Outcomes:***

1. Manipulate, visualize, and analyze speech signals
2. Perform various decompositions, codifications, and modifications of speech signals
3. Build a complete speech recognition system using state of the art tools