POLYTECHNIC ENGINEERING

Sri Satya Sai University of Technology And Medical Sciences, Sehore (M.P.)

Syllabus of Examination - AICTE Pattern

Undergraduate Diploma Courses in Engineering & Technology

Department of Computer Science and Engineering

Semester-V

Course Code	DCSA-501
Course Title	Introduction to e-Governance
Number of Credits	3 (L:3; T:0; P:0)

Course Objectives:

To cover the concepts of e-Governance and to understand how technologies and business models shape the contours of government for improving citizen services and bringing in transparency.

Course outcomes:

Through exposure to introductory ideas and practices followed in a selected number of e-Governance initiatives in India, the course will help students to understand and appreciate the essence of e-Governance.

UNIT 1:
Exposure to emerging trends in ICT for development; Understanding of design and implementation of e-Government projects, e-governance lifecycle.

UNIT 2:
Need for Government Process Re-engineering (GPR); National e-Governance Plan(NeGP) for India; SMART Governments & Thumb Rules

UNIT 3:
Architecture and models of e-Governance, including Public Private Partnership (PPP); Need for Innovation and Change Management in eGovernance; Critical Success Factors; Major issue including corruption, resistance for change, e-Security and Cyber laws

UNIT 4:
Focusing on Indian initiatives and their impact on citizens; Sharing of case studies to highlight best practices in managing e-Governance projects in Indian context. Visits to local e-governance sites (CSC, eSeva, Post Office, Passport Seva Kendra, etc) as part of Tutorials.

UNIT 5:
Mini Projects by students in groups – primarily evaluation of various e-governance projects.

Reference Books:

1. Managing Transformation –Objectives to Outcomes. J Satyanarayana, Prentice Hall India
2. The State, IT and Development. Kenneth Kenniston, RK Bagga and Rohit Raj Mathur, Sage Publications India Pvt Ltd.
3. e-Government -The Science of the Possible. J Satyanarayana, Prentice Hall, India
4. http://www.csi-sigegov.org/publications.php
5. https://negd.gov.in
6. https://www.nisg.org/case-studies-on-e-governance-in-india

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Undergraduate Diploma Courses in Engineering & Technology
Department of Computer Science and Engineering
Semester-V

Course Code	DCSA-501
Course Title	Introduction to e-Governance lab
Number of Credits	1 (L:0; T:0; P:2)

Course outcomes:

1 Apply theoretical knowledge to real-world e-Governance systems
2 Analyze the effectiveness of ICT in improving government processes
3 Assess critical success factors and challenges in e-Governance implementation
4 Develop collaborative research, reporting, and presentation skills

List of practical to be performed:

1. Evaluation of Common Service Centres (CSCs) in Rural Areas

- Activities:
    - Field visit to a CSC
    - Interview with operators and users
    - Evaluate services offered, digital literacy, challenges, user satisfaction

2. Digital India Mission: Impact Assessment on Local Governance

- Activities:
    - Select a specific scheme (e.g., DigiLocker, UMANG, e-Hospital)
    - Analyze usage statistics, accessibility, and awareness among citizens
    - Compare urban vs. rural impact

3. Analysis of Government Process Re-engineering (GPR) through e-Services

- Activities:
    - Choose a government department (e.g., transport, revenue, or health)
    - Study before-and-after process flow (manual vs. digital)
    - Identify improvements and bottlenecks

4. Security and Privacy Audit of a Citizen-Facing e-Governance Portal

- Activities:
    - Choose a portal like Passport Seva, e-District, or Income Tax
    - Evaluate login security, data encryption, privacy policy, and cyber law compliance
    - Identify gaps or suggest improvements

5. Comparative Study of State e-Governance Portals

- Activities:
    - Pick 2–3 state government portals (e.g., Rajasthan's eMitra vs. Kerala's eDistrict)
    - Compare UI/UX, accessibility, features, language support, and feedback mechanisms
    - Provide recommendations

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Sri Satya Sai University of Technology And Medical Sciences, Sehore (M.P.)

Syllabus of Examination - AICTE Pattern

Undergraduate Diploma Courses in Engineering & Technology

Department of Computer Science and Engineering

Semester-V

Course Code	DCSA-502
Course Title	Internet of Things
Number of Credits	3 (L:3; T:0; P:0)

Course Objectives:

Internet of Things (IoT) is presently an important technology with wide ranging interest from Government, academia and industry. IoT cuts across different application domain verticals ranging from civilian to defence sectors which includes agriculture, space, health care, manufacturing, construction, water, mining, etc. Today it is possible to build different IoT solutions such as shopping system, infrastructure management in both urban and rural areas, remote health monitoring and emergency notification systems, and transportation systems. Therefore, it is very important to learn the fundamentals of this emerging technology.

Course outcomes:

Students will have good understanding of various aspect of IoT, know some tools and have basic implementation skills..

UNIT 1:
Introduction to IoT; Sensing; Actuation

UNIT 2 :
Basics of IoT Networking, Communication Protocols, Sensor networks

UNIT 3:
Introduction to Arduino programming, Integration of Sensors/Actuators to Arduino

UNIT 4:
Implementation of IoT with Raspberry Pi; Data Handling Analytics

UNIT 5:
Case Studies: Agriculture, Healthcare, Activity Monitoring

Reference Books:

1. https://nptel.ac.in/noc/individual_course.php?id=noc17-cs22
2. "The Internet of Things: Enabling Technologies, Platforms, and Use Cases", by Pethuru Raj and Anupama C. Raman
3. Internet of Things by Dr. Jeeva Jose, Khanna Publishing House (Edition 2017)
4. "Internet of Things: A Hands-on Approach", by Arshdeep Bahga and Vijay Madisetti (Universities Press)
5. *Internet of Things: Architecture and Design Principles, Raj Kamal,* McGraw Hill
6. Research papers

POLYTECHNIC ENGINEERING

Sri Satya Sai University of Technology And Medical Sciences, Sehore (M.P.)

Syllabus of Examination - AICTE Pattern

Undergraduate Diploma Courses in Engineering & Technology

Department of Computer Science and Engineering

Semester-V

Course Code	DCSA-502
Course Title	Internet of Things LAB
Number of Credits	1 (L:0; T:0; P:2)

Course outcomes:

- Understand and apply the working of sensors, actuators, and microcontrollers
- Design and build basic IoT systems using real-world hardware components
- Analyze and visualize real-time sensor data using IoT tools
- Implement domain-specific IoT solutions for agriculture, healthcare, and automation

List of practical to be performed:

1 Temperature and Humidity Monitoring System using Arduino and DHT11 Sensor

2 Home Automation using IoT – Control Lights and Appliances via Smartphone

3 IoT-based Soil Moisture Monitoring System for Smart Agriculture

4 Health Monitoring System: Heart Rate and SpO_2 Detection with Raspberry Pi

5 Real-Time Activity Monitoring using Motion Sensors and Cloud Integration

POLYTECHNIC ENGINEERING

Sri Satya Sai University of Technology And Medical Sciences, Sehore (M.P.)

Syllabus of Examination - AICTE Pattern

Undergraduate Diploma Courses in Engineering & Technology

Department of Computer Science and Engineering

Semester-V

Course Code	DCSA-503
Course Title	Elective – II (A) Fundamentals of AI
Number of Credits	3 (L:3; T:0; P:0)

Course Objectives:

To introduce students to the domain of Artificial Intelligence.

Course outcomes:

Student will have general idea about Artificial Intelligence, will be able to explore AI tools effectively

UNIT 1: Introduction

Overview and Historical Perspective, Turing test, Physical Symbol Systems and the scope of Symbolic AI, Agents.

UNIT 2: Search

Heuristic Search: Best First Search, Hill Climbing, Beam Search, Tabu Search Randomized Search: Simulated Annealing, Genetic Algorithms, Ant Colony Optimization.

UNIT 3:

Finding Optimal Paths: Branch and Bound, A*, IDA*, Divide and Conquer approaches, Beam Stack Search. Problem Decomposition: Goal Trees, AO*, Rule Based Systems, Rete Net. Game Playing**:** Minimax Algorithm, AlphaBeta Algorithm, SSS*.

UNIT 4:

Planning and Constraint Satisfaction: Domains, Forward and Backward Search, Goal Stack Planning, Plan Space Planning, Graphplan, Constraint Propagation.

UNIT 5:

Logic and Inferences: Propositional Logic, First Order Logic, Soundness and Completeness, Forward and Backward chaining.

Reference Books:

1. Deepak Khemani. A First Course in Artificial Intelligence, McGraw Hill Education (India)
2. https://nptel.ac.in/courses/106106126/
3. Stefan Edelkamp and Stefan Schroedl. Heuristic Search, Morgan Kaufmann.
4. Pamela McCorduck, Machines Who Think: A Personal Inquiry into the History and Prospects of Artificial Intelligence, A K Peters/CRC Press
5. Elaine Rich and Kevin Knight. Artificial Intelligence, Tata McGraw Hill.
6. Stuart Russell and Peter Norvig. Artificial Intelligence: A Modern Approach, Prentice Hall
7. M.C. Trivedi, A classical approach to Artificial Intelligence, Khanna Publishing House

POLYTECHNIC ENGINEERING

Sri Satya Sai University of Technology And Medical Sciences, Sehore (M.P.)

Syllabus of Examination - AICTE Pattern

Undergraduate Diploma Courses in Engineering & Technology

Department of Computer Science and Engineering

Semester-V

Course Code	DCSA-503
Course Title	Elective – II (B) Advance Computer Networks
Number of Credits	3 (L:3: T:0: P:0)

Course Objectives:

Introduce Advance Networking Concepts, Theories and Tools.

Course outcomes:

1. Understanding core concepts/theories/algorithms of computer networks
2. Some hands-on capability on various network devices and tools
3. Capability to design and implement a computer network.

UNIT 1:

Review of Networking Basics; Advance Topics in IPv4 – Subnetting, Multicasting, Multicast Routing Protocols (IGMP, PIM, DVMRP); Advance Topics in TCP – flow management, congestion avoidance, protocol spoofing; IPv6

UNIT 2:

Telecom Networks, Switching Techniques; Introduction to Frame Relay, ATM, MPLS; VSAT Communication – Star and Mesh architectures, bandwidth reservation; Wireless Networks – WiFi, WiMax, Cellular Phone Technologies – GSM, CDMA, 3G, 4G

UNIT 3:

Network Redundancy, Load Balancers, Caching, Storage Networks; QoS; Network Monitoring – SNMP, RMON;

UNIT 4:

Introduction to Network Security – VLAN, VPN, Firewall, IPS, Proxy Servers

UNIT 5:

Network Simulation, Network design case studies and exercises, IP Addressing schema, Protocol Analysers (Wireshark, etc)

Reference Books:

1. RFCs and Standards Documents (www.ietf.org and other standard body websites)
2. Communication Networking – An Analytical Approach, Anurag-Manjunath-Joy
3. TCP/IP Illustrated (Vol.1,2), Stevens
4. Data Networks, Bertsekas-Gallager
5. An Engineering Approach to Computer Networking, S. Keshav

POLYTECHNIC ENGINEERING

Sri Satya Sai University of Technology And Medical Sciences, Sehore (M.P.)

Syllabus of Examination - AICTE Pattern

Undergraduate Diploma Courses in Engineering & Technology

Department of Computer Science and Engineering

Semester-V

Course Code	DCSA-504
Course Title	Elective – III (A) Information Security
Number of Credits	3 (L:3: T:0: P:0)

Course Objectives:

To learn how to evaluate and enhance information security of IT infrastructure and organisations **.**

Course outcomes:

Understanding of security needs and issues of IT infrastructure. Have basic skills on security audit of networks, operating systems and application software.

UNIT 1:

Introduction to Information Security, Various aspects of information security (PAIN), Security Features of Operating Systems – Authentication, Logs, Audit Features, File System Protection, User Privileges, RAID options, Anti-Virus Software, etc.

UNIT 2:

Understanding security weaknesses in popular networking protocols – IP, TCP, UDP, RIP, OSPF, HTTP, SMTP, etc.; security weaknesses in common networking devices – Hub, switch, router, WiFi; Security solutions to mitigate security risk of networking protocols (IPSec, HTTPS, etc) and devices (VLAN, VPN, Ingress Filtering, etc)

UNIT 3:

Basics of Cryptography, PKI, Security considerations while developing softwares

UNIT 4:

Network Security Products – Firewall, IDS/IPS, VPN Concentrator, Content Screening Gateways, etc.

UNIT 5:

Introduction to Security Standards – ISO 27001, Indian IT Act, IPR Laws; Security Audit procedures; Developing Security Policies; Disaster Recovery, Business Continuity Planning

Reference Books:

1. Information Security and Cyber Laws, Sarika Gupta, Khanna Publishing House
2. RFCs of protocols listed in content (https://www.ietf.org)
3. Various Acts, Laws and Standards (IT Act, ISO27001 Standard, IPR and Copyright Laws, etc.)
4. Security Guideline documents of Operating Systems (OS Manual, Man Pages, etc)
5. https://www.cert-in.org.in/
6. https://www.sans.org/

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Sri Satya Sai University of Technology And Medical Sciences, Sehore (M.P.)
Syllabus of Examination - AICTE Pattern
Undergraduate Diploma Courses in Engineering & Technology
Department of Computer Science and Engineering
Semester-V

Course Code	DCSA-504
Course Title	Elective – III (B) Network Forensics
Number of Credits	3 (L:3: T:0: P:0)

Course Objectives:
To understand various network forensic aspects for analysing network security breach

Course outcomes:
Student will understand basic concepts of network forensics, learn tools, and will be able to do basic forensic investigations and handle security incidents.

UNIT 1:
Review of Networking concepts and Protocols, Introduction to Network Forensics, various aspects of Network Forensics

UNIT 2:
Introduction to Network Forensic Tools and techniques: Wireshark, TCP Dump, Syslog, NMS, Promiscuous Mode, Network Port Mirroring, snooping, scanning tools, etc.

UNIT 3:
Understanding and Examining Data Link Layer, Physical Layer, Ethernet Switch Logs, MAC Table, ARP Table, etc. Understanding and Examining Network Layer, Router Logs, WiFi Device logs, Firewall logs,

UNIT 4:
Understanding audit features of OS and applications; Enabling and Examining Server logs, User activity logs, Browser history analysis, Proxy server logs, Antivirus logs, Email logs

UNIT 5:
Limitations and challenges of network forensics due to encryption, spoofing, mobility, storage limitations, privacy laws, etc.

Reference Books:

1. Manuals of OS, application software, network devices
2. RFCs of various networking protocols (https://www.ietf.org/)
3. https://www.sans.org/
4. https://www.cert-in.org.in/
5. Handbook of Digital Forensics and Investigation, Eoghan Casey, Elsevier Academic Press
6. Cyber Forensics, Albert Marcella and Doug Menendez, CRC Press
7. Computer Forensics (5 volume Set) mapping to CHFI (Certified Hacking Forensics Investigator), by EC-Council

POLYTECHNIC ENGINEERING

Sri Satya Sai University of Technology And Medical Sciences, Sehore (M.P.)

Syllabus of Examination - AICTE Pattern

Undergraduate Diploma Courses in Engineering & Technology

Department of Computer Science and Engineering

Semester-V

Course Code	DOE-505
Course Title	Open Elective –I (A) Economic Policies In India
Number of Credits	3 (L:3: T:0: P:0)

Course Outcomes:

The objective of this course is to familiarize the students of different streams with the basic concepts, structure, problems and issues concerning Indian economy.

Course outcomes:

At the end of the course, the student will be able to:
1 Understand Indian economics policy, planning strategies
2 It will enable to students to comprehend theoretical and empirical development across countries and region for policy purposes
3 Development Economics as a discipline encompasses different approaches to the problems of unemployment, poverty, income generation, industrialization from different perspectives
4 Able to identify the problems and capable to decide the application for future development
5 Analyze economic issues and find solutions to complex economic problems and take correct economic judgment

UNIT-I: Basic features and problems of Indian Economy: Economic History of India; Nature of Indian Economy, demographic features and Human Development Index, Problems of Poverty, Unemployment, Inflation, income inequality, Black money in India.

UNIT-II: Sectoral composition of Indian Economy: Issues in Agriculture sector in India, land reforms Green Revolution and agriculture policies of India,

UNIT-III: Industrial development, small scale and cottage industries, industrial Policy, Public sector in India, service sector in India.

UNIT-IV: Economic Policies: Economic Planning in India, Planning commission v/s NITI Aayog, Five Year Plans, monetary policy in India, Fiscal Policy in India, Centre state Finance Relations, Finance commission in India. LPG policy in India

UNIT-V: External sector in India: - India's foreign trade value composition and direction, India Balance of payment since 1991, FDI in India, Impact of Globalization on Indian Economy, WTO and India.

Reference Books:
1. Dutt Rudder and K.P.M Sunderam (2017). Indian Economy. S Chand & Co. Ltd. New Delhi.
2. Mishra S.K & V.K Puri (2017). Indian Economy and –Its Development Experience. Himalaya
Publishing House.
3. Singh, Ramesh, (2016): Indian Economy, Tata-McGraw Hill Publications, New Delhi.
4. Dhingra, I.C., (2017): March of the Indian Economy, Heed Publications Pvt. Ltd.
5. Karam Singh Gill, (1978): Evolution of the Indian Economy, NCERT, New Delhi
6. Kaushik Basu (2007): The Oxford Companion to Economics of India, Oxford University Press.

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Syllabus of Examination - AICTE Pattern

Undergraduate Diploma Courses in Engineering & Technology

Department of Computer Science and Engineering

Semester-V

Course Code	DOE-505
Course Title	Open Elective –I (B) Disaster Management
Number of Credits	3 (L:3: T:0: P:0)

Course Objectives:

Following are the objectives of this course:
1 To learn about various types of natural and man-made disasters.
2 To know pre- and post-disaster management for some of the disasters.
3 To know about various information and organisations in disaster management in India.
4 To get exposed to technological tools and their role in disaster management..

Course outcomes:

After competing this course, student will be:
1 Acquainted with basic information on various types of disasters
2 Knowing the precautions and awareness regarding various disasters
3 Decide first action to be taken under various disasters
4 Familiarised with organisation in India which are dealing with disasters
5 Able to select IT tools to help in disaster management

Unit – I: Understanding Disaster

Understanding the Concepts and definitions of Disaster, Hazard, Vulnerability, Risk, Capacity– Disaster and Development, and disaster management.

Unit – II: Types, Trends, Causes, Consequences and Control of Disasters

Geological Disasters (earthquakes, landslides, tsunami, mining); Hydro-Meteorological Disasters (floods, cyclones, lightning, thunder-storms, hail storms, avalanches, droughts, cold and heat waves) Biological Disasters (epidemics, pest attacks, forest fire)
Technological Disasters (chemical, industrial, radiological, nuclear) and Manmade Disasters
(building collapse, rural and urban fire, road and rail accidents, nuclear, radiological, chemicals and biological disasters) Global Disaster Trends – Emerging Risks of Disasters – Climate Change and Urban Disasters.

Unit- III: Disaster Management Cycle and Framework

Disaster Management Cycle – Paradigm Shift in Disaster Management.
Pre-Disaster – Risk Assessment and Analysis, Risk Mapping, zonation and Microzonation, Prevention and Mitigation of Disasters, Early Warning System; Preparedness, Capacity Development; Awareness.
During Disaster – Evacuation-Disaster Communication-Search and Rescue -Emergency Operation Centre Incident Command System – Relief and Rehabilitation
Post-disaster – Damage and Needs Assessment, Restoration of Critical Infrastructure
Early Recovery – Reconstruction and Redevelopment; IDNDR, Yokohama Stretegy, Hyogo Framework of Action.

Unit– IV: Disaster Management in India

Disaster Profile of India – Mega Disasters of India and Lessons Learnt.
Disaster Management Act 2005 – Institutional and Financial Mechanism,
National Policy on Disaster Management, National Guidelines and Plans on Disaster Management; Role of Government (local, state and national),Non-Government and Inter Governmental Agencies

Unit– V: Applications of Science and Technology for Disaster Management
Geo-informatics in Disaster Management (RS, GIS, GPS and RS).
Disaster Communication System (Early Warning and Its Dissemination).
Land Use Planning and Development Regulations, Disaster Safe Designs and Constructions,
Structural and Non Structural Mitigation of Disasters
S&T Institutions for Disaster Management in India

Reference Books:

1. Publications of National Disaster Management Authority (NDMA) on Various Templates and Guidelines for Disaster Management
2. Bhandani, R. K., An overview on natural & man-made disasters and their reduction, CSIR, New Delhi
3. Srivastava, H. N., and Gupta G. D., Management of Natural Disasters in developing countries, Daya Publishers, Delhi
4. Alexander, David, Natural Disasters, Kluwer Academic London
5. Ghosh, G. K., Disaster Management, A P H Publishing Corporation
6. Murthy, D. B. N., Disaster Management: Text & Case Studies, Deep & Deep Pvt. Ltd.

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Undergraduate Diploma Courses in Engineering & Technology
Department of Computer Science and Engineering
Semester-V

Course Code	DCSA-506
Course Title	Summer Internship-II
Number of Credits	2 (L:0: T:0: P:0)

Course Outcomes:

At the end of this course students will gain the ability to

1 Analyze the response application software used in industries
2 Learn about various measures , and techniques for different operation performed in application software
3 Understand statistical data analysis
4 Understand computerized data acquisition.
5 Conceive a problem statement either from rigorous literature survey or from the requirements raised from need analysis.
6 Learn design, implement and test the prototype/algorithm in order to solve the conceived problem.
7 Write comprehensive report on training work.

Guidelines:

1.The industrial training is also a kind of team activity. Here development and design work with a focus on learning application environment.
2.The software analysis in industries should be 50% of the total work.
3 Industrial training cater a system required in laboratory or real life.
4 Student is expected to learn out specifications, methodology, resources required, critical issues involved in design and implementation of software.
5 The student is expected to exert on testing of the proposed results as per the industry

POLYTECHNIC ENGINEERING

Sri Satya Sai University of Technology And Medical Sciences, Sehore (M.P.)

Syllabus of Examination - AICTE Pattern

Undergraduate Diploma Courses in Engineering & Technology

Department of Computer Science and Engineering

Semester-V

Course Code	DCSA-507
Course Title	Major Project-I
Number of Credits	1 (L:0: T:0: P:2)

Course Outcomes:

Build projects as per industry and society demands.

Guidelines:

Major Project should cater to a small system required in laboratory or real life.

1 After interactions with course coordinator and based on comprehensive literature survey/need analysis, the student shall identify the title and define the aim and Preambles of Minor project.

2 Student is expected to detail out specifications, methodology, resources required, critical issues involved in design and implementation and submit the proposal within first week of the semester.

3 The student is expected to exert on design, development and testing of the proposed work as per the schedule.

THE END