New Syllabus

STATE COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING, ODISHA

TEACHING AND EVALUATION SCHEME FOR 5th SEMESTER DIPLOMA IN

COMPUTER SCIENCE & ENGINEERING and INFORMATION TECHNOLOGY

Sl. No.	Subject Code	Subject	Periods/week			Evaluation Scheme					
			L	T	P	Sessional Exams			End Sem Exams	Practical exams	Term Work
						TA	CT	Total			
		Theory									
1	BST-501	Environmental Studies	5	-	-	10	20	30	70	-	-
2	CST-501	Computer Graphics & Multimedia	4	-	-	10	20	30	70	-	-
3	CST-502	Software Engineering	4	-	-	10	20	30	70	-	-
4	CST-503	Computer Network & Data Communication	4	-	-	10	20	30	70	-	-
5	CST-504	Database Management System	4	-	-	10	20	30	70	-	-
		Total	*21*	-	-	*50*	*100*	*150*	*350*	-	-
		Practical/ Term Work									
6	CSP-501	Graphics & Multimedia Lab	-	-	6	-	-	-	-	50	50
7	CSP-502	Database Management System Lab	-	-	6	-	-	-	-	50	25
8	CSP-503	Programming in Java Lab	-	-	6	-	-	-	-	50	25
		Total	-	-	*18*	-	-	-	-	*150*	*100*
		Grand Total	**21**	-	**18**	**50**	**100**	**150**	**350**	**150**	**100**

Abbreviations: L-Lecturer, T-Tutorial, P-Practical, TA-Teachers Assessment, CT-Class Test

Minimum Pass Mark in each Theory subject is 35% and in each Practical subject is 50%

ENVIRONMENTAL STUDIES

Course Code:	BST-501	Teachers Assessment :	10 Marks
Theory:	5 Periods per Week	Class Test :	20 Marks
Total Periods:	75 Periods per Semester	End Semester Exam :	70marks
Examination:	3 Hours	TOTAL MARKS :	100 Marks

Rationale:

Due to various aspects of human developments including the demand of different kinds of technological innovations, most people have been forgetting that, the Environment in which they are living is to be maintained under various living standards for the preservation of better health. The degradation of environment due to industrial growth is very much alarming due to environmental pollution beyond permissible limits in respect of air, water industrial waste, noise etc. Therefore, the subject of Environmental Studies to be learnt by every Engineering student in order to take care of the environmental aspect in each and every activity in the best possible manner.

OBJECTIVES:

After completion of study of environmental studies, the student will be able to:

1. Gather adequate knowledge of different pollutants, their sources and shall be aware of solid waste management systems and hazardous waste and their effects.
2. Develop awareness towards preservation of environment.

Unit 1: The Multidisciplinary nature of environmental studies (04 periods)

Definition, scope and importance, Need for public awareness.

Unit 2: Natural Resources (12 periods)

Renewable and non renewable resources:

a) Natural resources and associated problems.
   - Forest resources: Use and over-exploitation, deforestation, case studies, Timber extraction mining, dams and their effects on forests and tribal people.
   - Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dam's benefits and problems.
   - Mineral Resources: Use and exploitation, environmental effects of extracting and using mineral resources.
   - Food Resources: World food problems, changes caused by agriculture and over grazing, effects of modern agriculture, fertilizers- pesticides problems, water logging, salinity, .
   - Energy Resources: Growing energy need, renewable and non-renewable energy sources, use of alternate energy sources, case studies.
   - Land Resources: Land as a resource, land degradation, man induces land slides, soil erosion, and desertification.

b) Role of individual in conservation of natural resources.

c) Equitable use of resources for sustainable life styles.

Unit 3: Systems

- Concept of an eco system.
- Structure and function of an eco system.
- Producers, consumers, decomposers.
- Energy flow in the eco systems.
- Ecological succession.
- Food chains, food webs and ecological pyramids.
- Introduction, types, characteristic features, structure and function of the following eco system:
- Forest ecosystem:
- Aquatic eco systems (ponds, streams, lakes, rivers, oceans, estuaries).

Unit 4: Biodiversity and it's Conservation **(08 periods)**

- Introduction-Definition: genetics, species and ecosystem diversity.
- Biogeographically classification of India.
- Value of biodiversity: consumptive use, productive use, social ethical, aesthetic and optin values.
- Biodiversity at global, national and local level.
- Threats to biodiversity: Habitats loss, poaching of wild life, man wildlife conflicts.

Unit 5: Environmental Pollution. **(18 periods)**

Definition Causes, effects and control measures of:

a) Air pollution.
b) Water pollution.
c) Soil pollution
d) Marine pollution
e) Noise pollution.
f) Thermal pollution
g) Nuclear hazards.

Solid waste Management: Causes, effects and control measures of urban and industrial wastes.
Role of an individual in prevention of pollution.
Disaster management: Floods, earth quake, cyclone and landslides.

Unit 6: Social issues and the Environment **(12 periods)**

- Form unsustainable to sustainable development.
- Urban problems related to energy.
- Water conservation, rain water harvesting, water shed management.
- Resettlement and rehabilitation of people; its problems nd concern.
- Environmental ethics: issue and possible solutions.
- Climate change, global warming, acid rain, ozone layer depletion nuclear accidents and holocaust, case studies.
- Air (prevention and control of pollution) Act.
- Water (prevention and control of pollution) Act.
- Public awareness.

Unit 7: Human population and the environment **(09 periods)**

- Population growth and variation among nations.
- Population explosion- family welfare program.
- Environment and human health.
- Human rights.
- Value education
- Role of information technology in environment and human health.

Recommended Books:

1. Textbook of Environmental studies, Erach Bharucha, #UGC
2. Fundamental concepts in Environmental Studies, D.D. Mishra, S.Chand & Co-Ltd,
3. Text book of Environmental Studies by K.Raghavan Nambiar, SCITECH Publication Pvt. Ltd.
4. Environmental Engineering by V.M.Domkundwar- Dhanpat Rai & Co.
5. Environmental Engineering & Safety by B.K.Mohapatra.

Computer Graphics & Multimedia

Course Code:	CST-501	Teachers Assessment	10 Marks
Theory:	4 Periods per Week	Class Test	20 Marks
Total Periods:	60 Periods per Semester	End Semester Exam	70marks
Examination:	3 Hours	TOTAL MARKS	100 Marks

RATIONALE

Graphics and Multimedia-now a day probably the most talked about technology in the field of computer. This technology is nowadays largely adopted by most computer based applications to bridge the gap between a human user & the computer. By this, multiple media are implemented and used in computer based application to enhance their understanding ability before a common man. This multiple media include text, sound, video, graphics animation etc. This paper will expense the students to the various concepts of these media and their implementation in computer based application. This will also expose the students to various multimedia implementation techniques like data compression, & various multimedia standards.

Course Content

		Periods
1.	**Applications of Computer Graphics & Multimedia**	
1.1	Computer graphics in CAD	02
1.2	Presentation Graphics	
1.3	Computer Art	
1.4	Entertainment	
1.5	Education & Training	
1.6	Visualization	
1.7	Image Processing	
1.8	Graphic User Interface	
1.9	Multimedia Concepts.	
2.	**Overview of Graphics System**	
2.1	Graphics System	05
2.2	Raster Scan Display	
2.3	Random Scan Display	
2.4	Graphics Input Devices	
2.5	Graphics Software.	
3.	**Graphics Output primitive**	
3.1	Points & Lines	05
3.2	DDA Line Drawing Algorithm	
3.3	Bresenham's Line drawing Algorithm	
3.4	Mid Point Circle algorithm	
3.5	Filled Area Primitives	
3.6	Boundary fill algorithm, Flood fill algorithm	
4.	**Two Dimensional Geometric Transformations**	
4.1	Translation	03
4.2	Rotation	
4.3	Scaling	
4.4	Reflection	
4.5	Shear	
4.6	Matrix representation and Homoge	

4.7 Composite transformation

5. Two Dimensional Viewing 04

5.1 Viewing pipeline
5.2 Viewing coordinate reference frame
5.3 Window to view port coordinate transformation
5.4 Line clipping concept
5.5 Polygon clipping concept.

6. Three Dimensional Object Representations 10

6.1 Polygon surface
6.2 Polygon table
6.3 Plane equation
6.4 Polygon mesh
6.5 Quadric surfaces
6.6 Sphere, Ellipsoid
6.7 Spline representation
6.8 Bezier curves & Surfaces
6.9 B-Spline curves & surfaces.

7. Three Dimensional Geometric & Modeling Transformations 04

7.1 Translation
7.2 Rotation
7.3 Scaling
7.4 Reflection
7.5 Shear
7.6 Composite transformation
7.7 Modeling & Coordinate transformation.

8. Three Dimensional Viewing 06

8.1 Viewing pipeline
8.2 Viewing coordinates
8.3 Parallel projection
8.4 Perspective projection
8.5 Concept of 3D clipping.

9. Illumination Model & Surface Rendering Methods 04

9.1 Different light sources used in 3D modeling
9.2 Basic Illumination model
9.3 Ambient light
9.4 Diffuse reflection
9.5 Specular reflection,

10. Introduction to Digital Audio 06

10.1 Basics of Acoustics, Psychoacoustics
10.2 Musical sound and noise, elementary sound system
10.3 Microphones, Amplifiers, digital audio formats
10.4 Audio compression (LPC, Sub Band Encoding)

11. Introduction to Digital Image 06

11.1 Vector and raster Graphics
11.2 Digital representation of image, colour, 16 bit, 24 bit colour depth

11.3 Colour Characteristics-Hue, saturation, Luminance
11.4 Colour Palette
11.5 Image formats-JPEG, BMP, TIFF, GIFF
11.6 Image evaluation
11.7Layers
11.8 Filters
11.9 Image manipulation-scaling, cropping, rotation

12. Introduction to Video

12.1Video in Multimedia
12.2 Basics of Motion-Video
12.3 Sources of Motion-Video
12.4 Video formats, lines, frames, fields
12.5 TV Broadcast standards-PAL, NTSC, SECAM
12.6 MPEG Compression

Text Book :

1. Computer Graphics ; Donald Hearn , M.Pauline Baker ; PHI
2. Multimedia Systems; Buford; Pearson
3. Multimedia: Sound and Video by Jose Lozano, PHI
4. Multimedia Systems,Tech. & Communications; S.Pandey, M.Pandey; Katson

Software Engineering

Course Code:	CST-502	Teachers Assessment	10 Marks
Theory:	4 Periods per Week	Class Test :	20 Marks
Total Periods:	60 Periods per Semester	End Semester Exam :	70marks
Examination:	3 Hours	TOTAL MARKS :	100 Marks

RATIONALE

Software Engineering technology is now a days largely adopted by most computer based applications to bridge the gap between a human user & the computer. By this multiple media are implemented and used in computer based application to enhance their understanding ability before a common man. This will expose the students to various project building and testing techniques which they will encounter during there professional life as a software engineer or manager.

Course Content	Periods
1.0 Introduction to Software Engineering	**06**
1.1 Program vrs. Software product 1.2 Emergence of Software Engineering. 1.3 Computer Systems Engineering 1.4 Software Life Cycle Models 1.4.1 Classical Water fall model 1.4.2 Iterative Water fall model 1.4.3 Prototyping model 1.4.4 Evolutionary model 1.4.5 Spiral model	
2.0 Software Project Management	**10**
2.1 Responsibility of Project Manager 2.2 Project Planning 2.3 Metrics for Project size estimation (LOC and FP) 2.4 Project Estimation Techniques 2.5 COCOMO Models, Basic, Intermediate and complete 2.6 Scheduling 2.7 Organization and Team structure 2.8 Staffing 2.9 Risk Management 2.10 Configuration Management	
3.0 Requirement Analysis and specification	**06**
3.1 Requirements gathering and analysis 3.2 Software Requirements Specification 3.2.1 Contents of SRS 3.2.2 Characteristics of Good SRS 3.2.3 Organization of SRS 3.2.4 Techniques for representing complexing logic	
4.0 Software Design	**10**
4.1 What is a Good S/W design 4.2 Cohesion and coupling 4.3 Neat arrangement 4.4 S/W Design approaches 4.7 Structured analysis	

4.8 Data Flow Diagrams
4.9 Symbols used in DFD
4.10 Designing DFD
4.11 Developing DFD model of a system
4.11 Shortcomings of DFD
4.12 Structured design
4.13 Principles of transformation of DFD to Structure Chart
4.14 Transform analysis and Transaction Analysis
4.15 Design Review

08

5.0 User Interface Design

5.1 Characteristics of Good Interface
5.2 Basic concepts of UID
5.2 Types of User interfaces
5.3 Components based GUI development

12

6.0 Software Coding & Testing

6.1 Coding
6.2 Code Review
    6.2.1 Code walk through
    6.2.2 Code inspections and software Documentation
6.3 Testing
6.4 Unit testing
6.5 Black Box Testing
6.6 Equivalence class partitioning and boundary value analysis
6.7 White Box Testing
6.8 Different White Box methodologies statement coverage branch coverage condition coverage, path coverage, cyclomatic complexity data flow based testing and mutation testing
6.9 Debugging approaches
6.10 Debugging guidelines
6.11 Integration Testing
6.12 Phased and incremental integration testing
6.13 System testing alphas beta and acceptance testing
6.14 Performance Testing, Error seeding
6.15 General issues associated with testing

08

7.0 Software Reliability

7.1 Software Reliability
7.2 Different reliability metrics
7.3 Reliability growth modeling
7.4 Software quality
7.5 Software Quality Management System

BOOKS

1. Fundamentals of Software Engineering - Rajib Mall. Prentice hall of India
2. Software Engineering: Principles and Practice- Deepak Jain, Oxford university press
3. Software Engineering: A Primer – Jawadekar, TMH

Computer Network & Data Communication

Course Code:	CST-503	Teachers Assessment :	10 Marks
Theory:	4 Periods per Week	Class Test :	20 Marks
Total Periods:	60 Periods per Semester	End Semester Exam :	70marks
Examination:	3 Hours	TOTAL MARKS :	100 Marks

RATIONALE

Computer Network & Data Communication is the prime area of computers. Now days nothing can be thought of without considering networking of computers. Computer network ranges from LAN to WAN. With the advent of Internet it has become a day to day tool to be used by different kinds of users.

Course Content	Periods
1. Network& Protocol	08
1.1 Data Communication 1.2 Networks 1.3 Protocol & Architecture; Standards, OSI, TCP/IP	
2. Data Transmission & Media	08
2.1 Data transmission Concepts and Terminology 2.2 Analog and Digital Data transmission 2.3 Transmission impairments, Channel capacity 2.4 Transmission media, Guided Transmission, Wireless Transmission	
3. Data Encoding	08
3.1 Data encoding 3.2 Digital data digital signals, 3.3 Digital data analog signals 3.4 Analog data digital signals 3.5 Analog data analog signals	
4. Data Communication & Data link control	08
4.1 Asynchronous and Synchronous Transmission 4.2 Error Detection 4.3 Lline configuration 4.4 Flow Control, 4.5 Error Control 4.6 Multiplexing 4.7 FDM synchronous TDM 4.8 Statistical TDM	
5. Switching & Routing	10
5.1 Circuit Switching networks 5.2 Packet Switching principles 5.3 X.25 5.4 Routing in Packet switching 5.5 Congestion	

5.6 Effects of congestion, congestion control
5.7 Ttraffic Management
5.8 Congestion Control in Packet Switching Network.

6. LAN Technology

6.1. Topology and Transmission Media
6.2 LAN protocol architecture
6.3. Medium Access control
6.4 Bridges, Hub, Switch
6.5 Ethernet (CSMA/CD), Fibre Channel
6.6 Wireless LAN Technology..

7. TCP/IP

7.1 TCP/IP Protocol Suite
7.2 Basic Protocol functions
7.3 Principles of Internetworking
7.3 Internet Protocol operations
7.4 Internet Protocol

BOOKS:

1. Data Communication & Computer Networks by W.Stallings (PHI)

2 Introduction to Comp. Network by M.Bhatia, Unv. S. Press

3 Data Communication & Network by Forouzen, TMH

Database Management System

Course Code:	CST-504	Teachers Assessment :	10 Marks
Theory:	4 Periods per Week	Class Test :	20 Marks
Total Periods:	60 Periods per Semester	End Semester Exam :	70marks
Examination:	3 Hours	TOTAL MARKS :	100 Marks

RATIONALE

Database is the prime area of Application Development. Business applications need to store and process large volume of data. This paper teaches the methodology of storing & processing da for commercial application. It also deals in the security & other aspects of DBMS.

Course Content **Periods**

1.0 BASIC CONCPETS OF DBMS **05**

1.1 Purpose of database Systems
1.2 Explain Data abstraction
1.3 Database users
1.4 Data definition language
1.5 Data Dictionary

2.0 DATA MODELS **08**

2.1 Data independence
2.2 Entity relationship models
2.3 Entity sets and Relationship sets 2.4 Explain Attributes
2.5 Mapping constraints
2.6 E-R Diagram
2.7 Relational model
2.8 Hierarchical model
2.9 Network model

3.0 RELATIONAL DATABASE **06**

3.1 Relational algebra
3.2 Different operators select, project, join , simple Examples

4.0 NORMALIZATION IN RELATIONAL SYSTEM **08**

4.1 Functional Dependencies
4.2 Lossless join
4.3 Importance of normalization
4.4 Compare First second and third normal forms 4.5 Explain BCNF

5.0 STRUCTURED QUERY LANGUAGE **09**

5.1 Elementary idea of Query language
5.2 Queries in SQL
5.3 Simple queries to create, update, insert in SQL

6.0 TRANSACTION PROCESSING CONCEPTS **08**

6.1 Idea about transaction processing
6.2 Transaction & system concept
6.3 Desirable properties of transaction
6.4 Schedules and recoverability

7.0 CONCURRENCY CONTROL CONCEPTS 08

7.1 Basic concepts,
7.2 Locks, Live Lock, Dead Lock,
7.3 Serializability(only fundamentals)

8.0 SECURITY AND INTEGRITY 08

8.1 Authorization and views
8.2 Security constraints
8.3 Integrity Constraints 8.4 Discuss Encryption

BOOKS:

1. An Introduction to Database Systems by:- C.J. Date
2. DATABASE System Concepts by A. Silberschatz, H.F. Korth,
3. The Database book: Principles & Practices, Unv. SC. Press
4. Database System Concepts; Rog,Cornel; Cengage Learning
5. Data Base System by B. Desai; Galgotia Publication

Graphics & Multimedia Lab

Course Code:	CSP-501	Practical Exam :	50 Marks
Practical:	6 Periods per Week	Term Work :	50 Marks
Total Periods:	90 Periods per Semester	TOTAL MARKS :	100 Marks
Examination:	4 Hours		

1.0 Implementing DDA, Bresenham Line generation algorithm.

2.0 Implementing mid point circle generation algorithm.

3.0 Implementing area fill algorithm.

4.0 Working with Sound Forge

5.0 Working with Photoshop

6.0 Working with Flash

Graphics & Multimedia Lab

Course Code:	CSP-501	Practical Exam:	50 Marks
Practical:	6 Periods per Week	Term Work:	50 Marks
Total Periods:	90 Periods per Semester	TOTAL MARKS:	100 Marks
Examination:	4 Hours		

1.0 Implementing DDA, Bresenham Line generation algorithm.

2.0 Implementing mid point circle generation algorithm.

3.0 Implementing area fill algorithm.

4.0 Working with Sound Forge

5.0 Working with Photoshop

6.0 Working with Flash

1. Introduction to flash
2. 3D Graphics
3. Animation
4. Motion Twenning
5. Introduction to Photoshop
6. Programming
7. Working with sound

8 x 2 = 16

5 x 2 = 10

7 x 2 = 14

7 x 2 = 14

4 x 3 = 12

9 x 2 = 18

6 x 2 = 12

96

Database Management System Lab

Course Code	CSP-502	Practical Exam :	50 Marks
Practical	6 Periods per Week	Term Work :	25 Marks
Total Periods	90 Periods per Semester	TOTAL MARKS :	75 Marks
Examination	4 Hours		

1. **INTORODUCTION IN ORACLE**
   Organization of Data, Accessing Data , Core Package, DBMS Tools

2. **WORKING WITH SQL**
   SQL Operators , Rules of SQL, Creating Table, inserting into Table, Altering , Updating Table, Query using SELECT Clause, Use of HAVING, GROUP BY, ANY, ALL, SOME etc.

3. **VIEWS, INDEX, SYNONYMS**
   Creating VIEW, using, Updating, Altering View, Creating and Dropping Index, Synonyms for Table and View

4. **USING PL/SQL BLOCKS IN SQL**
   The PL/SQL execution environment, the PL /SQL syntax, Data type, understanding the PL/SQL block structure, Error handling in PL/SQL

1. Introduction to Oracle — 4 x 2 = 8
2. SQL — 10 x 2 = 20
3. Data constraint — 10 x 2 = 20
4. Operators — 2 x 2 = 4
5. Function — 3 x 2 = 6
6. Index — 2 x 2 = 4
7. View — 2 x 2 = 4
8. PL SQL — 2 x 2 = 4
9. PL SQL programming — 10 x 2 = 20

90

Programming in Java Lab

Course Code:	CSP-503	Practical Exam :	50 Marks
Practical:	6 Periods per Week	Term Work :	25 Marks
Total Periods:	90 Periods per Semester	TOTAL MARKS :	75 Marks
Examination:	4 Hours		

1. Data type

1.1 Arrays

1.2 Abstract or Derived Data Type

2. Variables Operators And Control Statement

2.1 Variable

2.2 Control Statements

2.3 Conditional Statements

2.4 Looping Statements

2.5 Branching Statements

2.6 The Arithmetic Operators

2.7 Unary Operators

2.8 Conditional Operators

2.9 Type wise Operators

2.10 Bitwise Operator

3. Basics of Object Oriented Programming

3.1 Basics of OOp

3.2 Object

3.3 Package

3.4 Constructor

3.5 Information hiding

3.6 Polymorphism

3.7 Inheritance

3.8 Function Overriding

3.9 Super Keyword

3.10 Multilevel Inheritance

3.11 Dynamic Method Dispatch

3.12 Interface

3.13 Final Class

3.14 Abstract Class

3.15 Nested Class