II Semester Scheme of Studies - Diploma in Electronics &CommunicationsEngineering [C-20]

Sl. No	Course Category / Teaching Department	Course Code	Course Title	Hours per week			Total contact hrs/week	Credits	CIE Marks		SEE Marks		Total Marks	Min Marks for Passing	Assigned Grade	Grade Point	SGPA and
				L	T	P			Max	Min	Max	Min					
THEORY COURSES																	SGPA & CGPA of 2nd Semester
1	SC/EC	20PM01T	Project Management Skills	2	0	4	6	4	50	20	50	20	100	40			
2	BS/SC	20SC01T	Engineering Mathematics	4	0	0	4	4	50	20	50	20	100	40			
PRACTICAL COURSES																	
3	EG/SC /EC	20EG01P	Communication Skills	2	0	4	6	4	60	24	40	16	100	40			
4	ES/CS	20CS01P	IT Skills	2	0	4	6	4	60	24	40	16	100	40			
5	ES/EC	20EC21P	Electronic Components & Devices	2	0	4	6	4	60	24	40	16	100	40			
AUDIT COURSES																	
6	AU/KA	20KA21T	Kannada-I/ಸಾಹಿತ್ಯಸಿಂಚನ I /ಬಳಕೆಕನ್ನಡ - I	2	0	0	2	2	50	20	-	-	50	20			
Total				**12**	**0**	**20**	**32**	**22**	**340**	**136**	**210**	**84**	**550**	**220**			

T:- Theory P:- Practical D:- Drawing E:- Elective BS- Basic Science:: ES-Engineering Science:: HS-Humanities & Social Science:: AU-Audit Course:: EG: English ::SC: Science

Note:

1. Assigned Grade, Grade Point, SGPA and CGPA to be recorded in the Grade/Marks card.
2. Theory course Semester End Examination (SEE) is conducted for 100 marks (3 Hours duration)
3. Practical course CIE and SEE is conducted for 100 marks (3 Hours duration)

Government of Karnataka
Department of Collegiate and Technical Education
Board of Technical Examinations, Bangalore

Course Code	20PM01T	**Semester**	II
Course Title	**Project Management Skills**	**Course Group**	PM
No. of Credits	4	**Type of Course**	Activity based study
Course Category	Theory with Activities	**Total Contact Hours**	6 Hrs Per Week (2Theory +4 hrs of classroom activities) 78 Hrs Per Semester
Prerequisites	10thLevel Mathematics	**Teaching Scheme**	4 hrs per week classroom sessions dedicated to case studies & activities
CIE Marks	50	**SEE Marks**	50

RATIONALE

Project Management is a confluence of Management principles and Engineering subject area. This course enables the students to develop conceptualisation of Engineering Management principles and apply the same for their engineering projects, in their domains, example, Software Development project or Construction Project and so on. The course integrates three core areas of Planning, Execution and Auditing of Projects.

1. COURSE SKILL SET

Student will be able to:

8. Understand what constitutes a project, Plan for the execution of the project by breaking into manageable work units, and Prepare necessary project artifacts
9. Track and control the Project while preparing verifiable records for Project Inspections and Audits
10. Inspect and Audit projects for Milestones or other project completion criteria and other metrics, Defects and remediation, Project learnings
11. Gain knowledge and develop curiosity on latest technology trends in Project management

2. COURSE OUT COMES

At the end of the course, student will be able to

CO1	Apply the concepts of Project Management to real projects which are expressed in the form of the Project reports or Engineering drawings
CO2	Estimate Project resources needed Time, Material and Effort, and Plan for execution
CO3	Understand, analyse and assess the risks involved in a project and plan for managing them
CO4	Use Project Management Software and processes to track and control Projects
CO5	Conduct inspection of Projects and audit progress and bills
CO6	Understand the Digital Technology trends in Project management and concepts like Smart cities

3. SUGGESTED SPECIFICATION TABLE WITH HOURS & MARKS

UNIT NO	UNIT TITLE	TEACHING HOURS (L-T-P)	MARKS DISTRIBUTION(THEORY)			
			R LEVEL	U LEVEL	A LEVEL	TOTAL
1	Introduction	02-00-04	8	8	4	20
2	Project Administration	06-00-12	8	12	20	40
3	Project Lifecycle	04-00-08	8	12	20	40
4	Project Planning, Scheduling and Monitoring	06-00-12	8	12	20	40
5	Project Control, Review and Audit	06-00-12	8	12	20	40
6	Digital Project Management	02-00-04	8	8	4	20
	Total	26-00-52=78	**48**	**64**	**88**	**200**

Legends: R = Remember; U = Understand; A = Apply and above levels (Bloom's revised taxonomy)

4. DETAILS OF COURSE CONTENT

The following topics/subtopics is to be taught and assessed in order to develop Unit Skill sets for achieving CO to attain identified skill sets.

UNIT NO	Unit skill set (In cognitive domain)	Topics / Subtopics	Hours L-T-P
1 Introduction	Use Basic Science, Maths skills to understand Project management and project planning, execution and control.	Introduction and definition, Features of a Project, Types of Projects, Benefits and Obstacles in Project Management, Project Management Profession, Role of Project manager, Consultants, Project and Operation, Project Management Process, Project Scope	02-00-04
2 Project Administration	Able to develop WBS, PEP and PM processes for Project with given inputs	Project Administration, Project Team, Project Design, Work Breakdown Structure (WBS), Project Execution Plan (PEP), Systems and Procedure Plan, Project Direction, Communication and Co-ordination, Project Success Case Study I	06-00-12
3 Project Lifecycle	Use project administration and project lifecycle knowledge to Assess and plan for project risk	Project Life Cycle, Phases - Project Planning, Project Execution, Project Closure, Project Risks, Project Cost Risk Analysis, Time and Cost overruns Case Study 2a	04-00-08
4. Project Planning, Project Scheduling and Project Monitoring and Implementation	Able to develop a detailed project plan given the inputs on manpower, funds availability and time availability	Project Planning Function, Structure, Project Scheduling, Project monitoring and Project evaluation Case Study 2b	06-00-12
5.Project Control, Review and Audit	Use Project Management lifecycle knowledge to Control project parameters, review and audit project performance	Project Control, Problems of Project Control, Gantt Charts, Milestone Charts, Critical Path Method (CPM), Network Technique in Project Scheduling, Crashing Project Duration through Network, Project Review, Initial Review, Performance Evaluation,	06-00-12

		Abandonment Analysis, Project Audit Case Study 2c	
6.Digital Project Management	Understand latest trends of digital technologies impacting the domain of project management and application of the same in multiple scenario	Digital Technology trends in Project management, Cloud Technology, IoT, Smart cities, Data and analytics, case studies Case study 3	02-00-04

5. MAPPING OF CO WITH PO

CO	Course Outcome	PO Mapped	UNIT Linked	CL R/U/A	Sessions in Hrs	TOTAL - Marks
CO1	Understand the concepts of Project Management in relation to real projects which are expressed in the form of the Project reports or Engineering drawings Case Study - I	**1, 2, 5, 7**	**1, 2**	**R/U/A**	**06**	10
CO2	Estimate Project resources needed Time, Material and Effort, and Plan for execution Case study 2a	**1, 2, 3, 7**	2, 3	**R/U/A**	**18**	**20**
CO3	Evaluate the risks involved in a project and Plan for managing them Case Study - 2a	**1,2,3,7**	2,3	**R/U/A**	**12**	**20**

CO4	Use Project Management methods with Software and/or processes to track and control Projects Case Study 2b	**1, 4, 6, 7**	4	**R/U/A**	18	20
CO5	Conduct inspection of Projects and audit progress and bills Case Study 2c	**1, 2, 5, 7**	5	**R/U/A**	18	20
CO6	Understand the Digital Technology trends in Project management, and Engineering Industries Case Study 3	**1, 5, 7**	6	**R/U/A**	06	**10**
					78	**100**

	CO's	**Programme Outcomes s) (PO**						
		1	**2**	**3**	**4**	**5**	**6**	**7**
Project Management	CO1	3	3	0	0	2	0	1
	CO2	3	3	3	0	0	0	1
	CO3	3	0	0	3	0	3	1
	CO4	3	0	0	3	0	3	1
	CO5	3	2	0	0	2	0	1
	CO6	3	0	0	0	2	0	2

Level 3- Highly Mapped, Level 2-Moderately Mapped, Level 1-Low Mapped, Level 0-Not Mapped

7. INSTRUCTIONAL STRATEGY

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes

1. Explicit instruction will be provided in intervention classes or by using different differentiation strategies in the main classroom.

2. Lecturer method (L) does not mean only traditional lecture method, but different type of teaching method and media that are employed to develop the outcomes.
3. Observing the way their more proficient peers use prior knowledge to solve current challenges and persevere in problem solving will help struggling students to improve their approach to engaging with rich contextual problems.
4. Topics be introduced always with a reallife example and then answering What, how, why and when.
5. The teacher is able to show different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them.
6. In a perfect world, teacher would always be able to demonstrate how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding. When a concept cannot be applied in that manner, we can still share how it might be applied within mathematics.

8. SUGGESTED LEARNING RESOURCES:

SlNo.	Author	Title of Books	Publication/Year
1	**Dr. Lalitha Balakrishnan & Dr. Gowri Ramachandran**	**Project Management**	**Himalaya Publishing, 2019**
2	Shailesh Kumar Shivakumar	Complete Guide to Digital Project Management	Apress, 2019
3	Prasanna Chandra	Project planning, analysis, selection, implementation and review	Tata McGraw Hill
4	Gopala Krishnan	Project Management	Mcmillan India Ltd.

9. COURSE ASSESSMENT AND EVALUATION CHART

Sl.No	Assessment	Duration	Max marks	Conversion
1	CIE Assessment 1 (Written Test -1) At the end of 3rd week	80 minutes	30	Average of three written tests 30
2	CIE Assessment 2 (Written Test -2) At the end of 7th week	80 minutes	30	

Sl.No	Assessment	Duration	Max marks	Conversion
3	CIE Assessment 3 (Written Test -3) At the end of 13th week	80 minutes	30	
4	CIE Assessment 4 (Group Assignment -1) At the end of 5th week	60 minutes	20	Average of three 20
5	CIE Assessment 5 (Group Assignment -2) At the end of 9th week	60 minutes	20	
6	CIE Assessment 6 (Individual Student activity/Assignment) At the end of 11th week	60 minutes	20	
Total Continuous Internal Evaluation (CIE) Assessment				**50**
8	Semester End Examination (SEE) Assessment (Written Test)	3 Hrs	100	**50**
Total Marks				**100**

Note:

1. SEE (Semester End Examination) is conducted for 100 Marks theory course for a time duration of 3 Hrs
2. Three CIE (written test), each of 30 marks for a time duration of 80 minutes shall be conducted. Also, three CIE (MCQ or Quiz/Group Assignment/Individual student activity or assignment) each of 20 marks for the time duration of 60 minutes shall be conducted. Any fraction at any stage during evaluation will be rounded off to the next higher digit
3. Assessment of assignment and student activity is evaluated through appropriate rubrics by the respective course coordinator. The secured mark in each case is rounded off to the next higher digit.

10 DETAILED COURSE CONTENT

Unit No And Name	DETAILED COURSE CONTENT	CONTACT HRS	TOTAL
	1.1 Introduction	3	

Unit No And Name	DETAILED COURSE CONTENT	CONTACT HRS	TOTAL
1. Introduction	1.2 Meaning of Project		6
	1.3 Definition and No Change Mode		
	1.4 Features of a Project		
	1.5 Types of Projects		
	1.6 Benefits of Project Management		
	1.7 Obstacles in Project Management		
	1.8 Project Management A Profession		
	1.9 Project Manager and His Role		
	1.10 Project Consultants		
	1.11 What is Operation?	**3**	
	1.12 Difference between Project and Operation		
	1.13 What is Process in Project Management and Process Groups?		
	1.14 What is Scope? Difference between Project Group Objectives and		
	1.15 Project Scope		
2. Project Administration	2.1 Essentials of Project Administration	3	**18**
	2.2 Project Team		
	2.3 Project Design		
	2.4 Work Breakdown Structure (WBS)		
	2.5 Project Execution Plan (PEP)	6	
	2.6 Contracting Plan		
	2.7 Work Packing Plan		
	2.8 Organisation Plan	3	
	2.9 Systems and Procedure Plan		
	2.10 Project Procedure Manual		
	2.11 Project Diary	**3**	
	2.12 Project Execution System		
	2.13 Project Direction		
	2.14 Communication in a Project	**3**	
	2.15 Project Co-ordination		

	2.16 Pre-requisites for Successful Project Implementation		
3. Project Lifecycle	3.1 Introduction	6	12
	3.2 Phases of Project Life Cycle		
	3.3 Project Management Life Cycle General		
	3.4 Project Planning		
	3.5 Project Execution		
	3.6 Project Closure		
	3.7 Project Risks	3	
	3.8 Types of Risks: Illustrations		
	3.9 Risk Assessment Techniques with Illustrations		
	3.10 Project Cost Risk Analysis	**3**	
	3.11 Estimating Time and Cost Overrun Risks		
	3.12 Organisation/Procedural/Systemic Reasons for Project Cost Overruns		
	3.13 Time Overruns		
4. Project Planning, Scheduling and Monitoring	4.1 Introduction	6	**18**
	4.2 Nature of Project Planning		
	4.3 Need for Project Planning		
	4.4 Functions of Project Planning		
	4.5 Steps in Project Planning		
	4.6 Project Planning Structure		
	4.7 Project Objectives and Policies		
	4.8 Tools of Project Planning		
	4.9 Project Scheduling	**6**	
	4.10 Time Monitoring Efforts		
	4.11 Bounding Schedules		
	4.12 Scheduling to Match Availability of Manpower		
	4.13 Scheduling to Match Release of Funds		
	4.14 Problems in Scheduling Real-life Projects		
	4.15 Introduction	**3**	

	4.16 Situation Analysis and Problem Definition		
	4.17 Setting Goals and Objectives		
	4.18 Generating Structures and Strategies		
	4.19 Implementation		
	4.20 What is Project Evaluation?	**3**	
	4.21 Why is Project Evaluation Important?		
	4.22 What are the Challenges in Monitoring and Evaluation?		
5. Project Control, Review and Audit	5.1 Introduction	6	**18**
	5.2 Projected Control Purposes		
	5.3 Problems of Project Control		
	5.4 Gantt Charts		
	5.5 Milestone Charts		
	5.6 Critical Path Method (CPM)	6	
	5.7 Construction of a Network		
	5.8 Network Technique in Project Scheduling		
	5.9 Crashing Project Duration through Network		
	5.10 Project Review	3	
	5.11 Initial Review		
	5.12 Post Audit		
	5.13 Performance Evaluation		
	5.14 Abandonment Analysis		
	5.15 Objectives of Project Audit	**3**	
	5.16 Functions of Project Auditor		
	5.17 Project Audit Programme		
	5.18 Difficulties in Establishing Audit Purpose and Scope		
6. Digital Project Management	6.1 Digital Technology trends in Project management	**1**	6
	6.2 Cloud Technology, IoT, AR and VR applications in Project management, Smart Cities	**1**	

	6.3 Data Science and Analytics in Project Management	**1**	
	6.4 Case Studies	3	

Case Studies:

Please note: The Tutors can either use the following Case studies and activities or Design on their own, with the overall Learning Outcomes being met.

Case Study I: Residential House – Project Execution Plan

1. Dr. Sunil Kulkarni wants to build a house on his 9000 square feet (90x100) vacant plot in Bengaluru. His requirements were given below.

   i) He lives with his wife, parents and two college going children.
   ii) He likes open space around his house and likes to do gardening during free time
   iii) His wife teaches Yoga and about 30 middle aged and old people attend the daily sessions.
   iv) He has a budget limitation of INR 230,00,000 for this project and wants to present to his wife on their 20th wedding anniversary which is 18 months away.
   v) His parents can not climb stairs and hence prefer a ground floor room
   vi) All the rooms should have attached bathrooms

How-ever the Civil contractor who took the work, overshot the time and money available and hence Dr Sunil was unhappy with the Architect firm who recommended the Contractor.

Task:

- Split the class into groups of three
- Ask them to prepare 2D drawings with Plan, Elevation, Sections and perspectives.
- Prepare the detailed WBS, a Project execution plan and Project communication plan for contractors
- Estimate the quantities
- Discuss on the possible reasons for delay and methods with which performance to both time and budget could have been achieved
- Present it in a seminar, with each group getting 5-10 minutes to present their idea.

Case Study 2a:

The Columbus Hospital proposed in Hubli is a 200 bed speciality private hospital for treatment of Cancer. The hospital will come up on a 12 acre plot between Hubli-Dharwad. A leading construction company has come forward to complete the hospital works from concept to commissioning in 9 months. The promoters are willing to spend a premium to complete the hospital in 9 month time and are not particular about type of construction, ie, RCC, Steel frame etc. The key requirements are as follows:

vi) 200 bed hospital of which 40 are for critical care (ICU), 40 for pre and post Operative care
vii) 4 Operation Theatres - 2 Major (Minimum 800 SFT each) and 2 minor (minimum 400 sft each)
viii) One full fledged Diagnostic laboratory (1500 Sft)
ix) One 24x7 pharmacy (360 Sft min)
x) Doctors rooms, Nurses enclosures, Change rooms
xi) Office with billing counters (min 2000 sft) for all administrative staff
xii) Wheel chair parking bays, Stretcher parking bays in all floors
xiii) One Cafetaria with 50 person capacity
xiv) One conference room with Multimedia equipment (300 sft min)
xv) Parking for ambulances, 4 wheelers, two wheelers
xvi) Reception and enquiry counter
xvii) All amenities should be accessible for disabled persons
xviii) Incinerator, Waste storage and disposal area
xix) Generator and fuel storage area

Discuss

vii) The various alternative approaches available to complete the hospital.
viii) Look into National Building Code and BIS standards for arriving at approximate (+/- 10%) super built-up area required, amenities to be planned
ix) The various phases of the project according to Project lifecycle and durations
x) Prepare the detailed WBS, Project Organisation required and Project Dairy template
xi) Prepare a Project Plan with risks involved and the risk management plan.
xii) Estimate the cost of time overrun if the project is delayed by 114 calendar days due to issues with approvals

Case Study 2b:

For case study 2 above, prepare an Implementation Plan using a spreadsheet software.

Discuss

i) What happens if a pandemic affects the project in its 7thMonth. How do you mitigate the possible issues in implementation?
ii) What happens if during the fourth month of projects the client decides to reduce funds for the month by 50% ?

Case Study 2c:

For case study 2 above, prepare a Critical Path method Chart (CPM) showing all main activities in the WBS with milestones.

Discuss

xix) What happens if the client decides to complete the ground floor roof 15 days earlier ?
xx) What happens if the client reduces the inflow of project funds by 50% for the month 4 ?
xxi) Write an Audit report for the project at the end of 6th month

Case Study 3:

This will be done as a student activity and has two components.

xiv) Research on 3D printing in any industry and prepare a three page article
xv) Study usage of Drones in different Industries and evaluate the Cost benefits of using the same for any one scenario.

Model Question Paper

I A Test (CIE)

Programme:	**Semester: I**
Course:	**Max Marks: 30**
Course Code:	**Duration: 1 Hr 20 minutes**
Name of the course coordinator:	**Test: I/II/III**

Note: Answer one full question from each section. One full question carries 10 marks.

Qn.No	Question	CL	CO	PO	Marks
	Section-1				
1.a)					
b)					
c)					

2.a)					
b)					
c)					
Section-2					
3.a)					
b)					
c)					
4.a)					
b)					
c)					
Section-3					
5.a)					
b)					
c)					
6.a)					
b)					
c)					

Model Question Paper
Semester End Examination

Programme:	**Semester: I**
Course:	**Max Marks: 100**
Course Code:	**Duration: 3 Hrs**

Instruction to the Candidate:
Answer one full question from each section. One full question carries 20 marks.

Qn.No	Question	CL	CO	Marks
	Section-1			
1.a)				
b)				
2.a)				
b)				
	Section-2			
3.a)				
b)				
4.a)				
b)				
	Section- 3			
5.a)				
b)				
6.a)				
b)				
	Section-4			
7.a)				
b)				
8.a)				
b)				
	Section-5			
9.a)				
b)				
10.a)				
b)				

Government of Karnataka
Department of Collegiate and Technical Education
Board of Technical Examinations, Bangalore

Course Code	20SC01T	**Semester**	I/II
Course Title	**ENGINEERING MATHEMATICS**	**Course Group**	Core
No. of Credits	4	**Type of Course**	Lecture
Course Category	Theory	**Total Contact Hours**	4Hrs Per Week
			52Hrs Per Semester
Prerequisites	10 Level Mathematics	**Teaching Scheme**	(L:T:P) = 4:0:0
CIE Marks	50	**SEE Marks**	50

RATIONALE

Engineering Mathematics specification provides students with access to important mathematical ideas to develop the mathematical knowledge and skills that they will draw on in their personal and work lives. The course enables students to develop mathematical conceptualization, inquiry, reasoning, and communication skills and the ability to use mathematics to formulate and solve problems in everyday life, as well as in mathematical contexts. At this level, the mathematics curriculum further integrates the three content areas taught in the higher grades into three main learning areas: Algebra; Measurement of angles and Trigonometry and Calculus.

1. COURSE SKILL SET

Student will be able to:

1. Solve system of linear equations arise in different engineering fields
2. Incorporate the knowledge of calculus to support their concurrent and subsequent engineering studies
3. Adept at solving quantitative problems
4. Ability to understand both concrete and abstract problems
5. Proficient in communicating mathematical ideas
6. Detail-oriented

2. COURSE OUT COMES

At the end of the course, student will be able to

CO1	Determine the inverse of a square matrix using matrix algebra. Apply the concepts of matrices and determinants to solve system of linear equations and find eigen values associated with the square matrix.
CO2	Find the equation of straight line in different forms. Determine the parallelism and perpendicularity of lines.
CO3	Calculate trigonometric ratios of allied angles and compound angles. Transform sum or difference of trigonometric ratios into product and vice versa.

CO4	Differentiate various continuous functions and apply the concept in real life situations.
CO5	Integrate various continuous functions and apply the concept in evaluating the area and volume through definite integrals.

3. SUGGESTED SPECIFICATION TABLE WITH HOURS & MARKS

UNIT NO	UNIT TITLE	TEACHING HOURS	DISTRIBUTION(THEORY)			
			R LEVEL	U LEVEL	A LEVEL	TOTAL
1	Matrices and Determinants	10	8	20	12	40
2	Straight lines	10	8	20	12	40
3	Trigonometry	10	8	20	12	40
4	Differential Calculus and applications	11	8	20	12	40
5	Integral Calculus and applications	11	8	20	12	40
	Total	52	40	100	60	**200**

Legends: R = Remember; U = Understand; A = Apply and above levels (Bloom's revised taxonomy)

4. DETAILS OF COURSE CONTENT

The following topics/subtopics is to be taught and assessed in order to develop Unit Skill sets for achieving CO to attain identified skill sets.

UNIT NO	Unit skill set (In cognitive domain)	Topics/Subtopics	Hours L-T-P
UNIT-1 MATRICES AND DETERMINANTS	➢ Use algebraic skills which are essential for the study of systems of linear equations, matrix algebra and eigen values	1.1 Matrix and types 1.2 Algebra of Matrices (addition, subtraction, scalar multiplication and multiplication) 1.3 Evaluation of determinants of a square matrix of order 2 and 3. Singular matrices 1.4 Cramer's rule for solving system of linear equations involving 2 and 3 variables 1.5 Adjoint and Inverse of the non-singular matrices of order 2 and 3 1.6 Characteristic equation and Eigen values of a square matrix of order 2	10-0-0

UNIT-2 STRAIGHT LINES	➢ Able to find the equation of a straight line in different forms ➢ Determine whether the lines are parallel or perpendicular	2.1 Slope of a straight line 2.2 Intercepts of a straight line 2.3 Intercept form of a straight line 2.4 Slope-intercept form of a straight line 2.5 Slope-point form of a straight line 2.6 Two-point form of a straight line 2.7 General form of a straight line 2.8 Angle between two lines and conditions for lines to be parallel and perpendicular 2.9 Equation of a straight line parallel to the given line 2.10 Equation of a straight line perpendicular to the given line	10-0-0
UNIT-3 TRIGONOMETRY	➢ Use basic trigonometric skills in finding the trigonometric ratios of allied and compound angles ➢ Able to find all the measurable dimensions of a triangle	3.1 Concept of angles, their measurement, Radian measure and related conversions. 3.2 Signs of trigonometric ratios in different quadrants (ASTC rule) 3.3 Trigonometric ratios of allied angles (definition and the table of trigonometric ratios of standard allied angles say $90^0 \pm \Theta$, $180^0 \pm \Theta$, $270^0 \pm \Theta$ and $360^0 \pm \Theta$) 3.4 Trigonometric ratios of compound angles (without proof) 3.5 Trigonometric ratios of multiple angles 3.6 Transformation formulae	10-0-0
UNIT-4 DIFFERENTIAL CALCULUS AND APPLICATIONS	➢ Able to differentiate algebraic, exponential, trigonometric, logarithmic and composite functions ➢ Able to find higher order derivatives ➢ Understand and work with derivatives as rates of change in mathematical models ➢ Find local maxima and minima of a function	4.1 Derivatives of continuous functions in an interval (List of formulae) 4.2 Rules of differentiation 4.3 Successive differentiation (up to second order) 4.4 Applications of differentiation	11-0-0
UNIT-5 INTEGRAL CALCULUS AND APPLICATIONS	➢ Understand the basic rules of integration and Evaluate integrals with basic integrands. ➢ Identify the methods to evaluate integrands ➢ Apply the skills to evaluate integrals representing areas and volumes	5.1 List of standard integrals and Basic rules of integration 5.2 Evaluation of integrals of simple function and their combination 5.3 Methods of integration 5.4 Concept of definite integrals 5.5 Applications of definite integrals	11-0-0

5. MAPPING OF CO WITH PO

CO	Course Outcome	PO Mapped	UNIT Linked	CL R/U/A	Theory in Hrs	TOTAL
CO1	Determine the inverse of a square matrix using matrix algebra. Apply the concepts of matrices and determinants to solve system of linear equations and find eigen values associated with the square matrix.	1, 7	1	R/U/A	10	**40**
CO2	Find the equation of straight line in different forms. Determine the parallelism and perpendicularity of lines.	1, 7	2	R/U/A	10	**40**
CO3	Calculate trigonometric ratios of allied angles and compound angles. Transform sum (difference) of trigonometric ratios into product and vice versa.	1, 7	3	R/U/A	10	**40**
CO4	Differentiate various continuous functions and apply the concept in real life situations.	1, 3, 7	4	R/U/A	11	**40**
CO5	Integrate various continuous functions and apply the concept in evaluating the area and volume through definite integrals.	1, 3, 7	5	R/U/A	11	**40**
					52	**200**

Course	CO's	Programme Outcomes (PO's)						
		1	**2**	**3**	**4**	**5**	**6**	**7**
ENGINEERING MATHEMATICS	CO1	3	1	0	0	0	0	3
	CO2	3	1	0	0	0	0	3
	CO3	3	1	0	0	0	0	3
	CO4	3	1	3	0	0	0	3
	CO5	3	1	3	0	0	0	3
Level 3- Highly Mapped, Level 2-Moderately Mapped, Level 1-Low Mapped, Level 0- Not Mapped								

7. INSTRUCTIONAL STRATEGY

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes

1. Explicit instruction will be provided in intervention classes or by using different differentiation strategies in the main classroom.
2. Lecturer method (L) does not mean only traditional lecture method, but different type of teaching method and media that are employed to develop the outcomes.
3. Observing the way their more proficient peers use prior knowledge to solve current challenges and persevere in problem solving will help struggling students to improve their approach to engaging with rich contextual problems.
4. Ten minutes a day in homeroom, at the end of class, or as a station in a series of math activities will help students build speed and confidence.
5. Topics will be introduced in a multiple representation.
6. The teacher is able to show different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them.
7. In a perfect world, teacher would always be able to demonstrate how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding. When a concept cannot be applied in that manner, we can still share how it might be applied within mathematics.

8. SUGGESTED LEARNING RESOURCES:

Sl. No.	Author	Title of Books	Publication/Year
1	B.S. Grewal	Higher Engineering Mathematics	Khanna Publishers, New Delhi, 40th Edition,2007
2	G. B. Thomas, R. L. Finney	Calculus and Analytic Geometry	Addison Wesley, 9th Edition, 1995
3	S.S. Sabharwal, Sunita Jain, Eagle Parkashan	Applied Mathematics, Vol. I & II	Jalandhar.
4	Comprehensive Mathematics	Comprehensive Mathematics Vol. I & II	Laxmi Publications, Delhi
5	ReenaGarg&Chandrika Prasad	Advanced Engineering Mathematics	Khanna Publishing House, New Delhi

9. COURSE ASSESSMENT AND EVALUATION CHART

Sl.No.	Assessment	Duration	Max marks	Conversion
1	CIE Assessment 1 (Written Test -1) At the end of 3 d week	80 minutes	30	Average of three written tests 30
2	CIE Assessment 2 (Written Test -2) At the end of 7 week	80 minutes	30	
3	CIE Assessment 3 (Written Test -3) At the end of 13 week	80 minutes	30	
4	CIE Assessment 4 (MCQ/Quiz) At the end of 5 week	60 minutes	20	Average of three 20
5	CIE Assessment 5 (Open book Test) At the end of 9 week	60 minutes	20	
6	CIE Assessment 6 (Student activity/Assignment) At the end of 11 week	60 minutes	20	
Total Continuous Internal Evaluation (CIE) Assessment				**50**
8	Semester End Examination (SEE) Assessment (Written Test)	3 Hours	100	**50**
Total Marks				**100**

Note:

1. SEE (Semester End Examination) is conducted for 100 Marks theory courses for a time duration of 3 Hours.
2. Three CIE (written test), each of 30 marks for a time duration of 80 minutes shall be conducted. Also, three CIE (MCQ or Quiz/Open book test/student activity or assignment) each of 20 marks for the time duration of 60 minutes shall be conducted. Any fraction at any stage during evaluation will be rounded off to the next higher digit
3. Assessment of assignment and student activity is evaluated through appropriate rubrics by the respective course coordinator. The secured mark in each case is rounded off to the next higher digit.

10 DETAILED COURSE CONTENT

UNIT NO AND NAME	DETAILED COURSE CONTENT	CO	PO	CONTACT HRS	TOTAL
1 MATRICES AND DETERMINANTS	Definition and types of matrices	1	1,7	1	10
	Algebra of Matrices (addition, subtraction and scalar multiplication) problems	1	1,7	1	
	Multiplication of Matrices(problems)	1	1,7	1	
	Evaluation of 2x2 ,3x3 determinants and Singular matrices and problems in finding unknown variable	1	1,7	1	
	Cramer's rule to solve system of linear equation with 2 and 3 variables	1	1,7	1	
	Cramer's rule to solve system of linear equation with 2 and 3 variables.problems	1	1,7	1	
	Minors, Cofactors of elements of square matrices of order 2 and 3	1	1,7	1	
	Adjoint of a square matrix(2x2 and 3x3),Inverse of a non singular square matrix	1	1,7	1	
	Adjoint of a square matrix(2x2 and 3x3),Inverse of a non singular square matrix and problems	1	1,7	1	
	Characteristic equation and eigen values of a 2x2 matirx and problems	1	1,7	1	
2 STRAIGHTLINES	Slope of the straight line(provided with inclination and two points on the line as well) and problems	2	1,7	1	10
	Intercepts of a straight line and problems	2	1,7	1	
	Intercept form of a straight line and problems	2	1,7	1	
	Slope-intercept form of a straight line and problems	2	1,7	1	
	Slope-point form of the straight line and problems	2	1,7	1	
	Two-point form of a straight line and problems	2	1,7	1	
	General form of a straight line.problems on finding slope and intercepts.	2	1,7	1	
	Angle between two straight lines and conditions for the lines to be parallel and perpendicular and problems	2	1,7	1	
	Equation of a line parellel to the given line and problems	2	1,7	1	
	Equation of a line perpendicular to the given line.problems	2	1,7	1	

3 TRIGONOMETRY	Concept of angles and their measurement. Radian measures and related conversions (degree to radian and vice-versa) and problems	3	1,7	1	10
	Signs of trigonometric ratios in different quadrants (ASTC rule)	3	1,7	1	
	Trigonometric ratios of allied angles (definition and the table of trigonometric ratios of standard allied angles say $90^0 \pm \theta$, $180^0 \pm \theta$, $270^0 \pm \theta$ and $360^0 \pm \theta$)	3	1,7	1	
	Problems on allied angles. (proving identities)	3	1,7	1	
	Problems on allied angles. (Finding values of x in an identity)	3	1,7	1	
	Trigonometric ratios of compound angles (without proof)	3	1,7	1	
	Trigonometric ratios of multiple angles (sin2A, cos2A, tan2A, sin3A, cos3A and tan3A)	3	1,7	1	
	Problems on multiple angles sin2A, cos2A, tan2A, sin3A, cos3A and tan3A	3	1,7	1	
	Transformation formulae (without proof) as sum to product. (Simple problems)	3	1,7	1	
	Transformation formulae (without proof) as product to sum. (Simple problems)	3	1,7	1	
4 DIFFERENTIAL CALCULUS AND APPLICATIONS	Definition of a derivative of a function. Listing the derivatives of standard functions. (Algebraic, trigonometric, exponential, logarithmic and inverse trigonometric functions)	4	1,3,7	1	11
	Addition and subtraction rule of differentiation and problems	4	1,3,7	1	
	Product rule and quotient rule of differentiation and problems	4	1,3,7	1	
	Product rule and quotient rule of differentiation and problems	4	1,3,7	1	
	Composite functions and their derivatives. (CHAIN RULE)	4	1,3,7	1	
	Composite functions and their derivatives. (CHAIN RULE). Problems	4	1,3,7	1	
	Successive differentiation up to second order	4	1,3,7	1	
	Slope of the tangent and normal to the given curve and their equations and problems	4	1,3,7	1	

	Rate measure: velocity and acceleration at a point of time and problems	**4**	**1,3,7**	**1**	
	Local Maxima and Minima of a function	**4**	**1,3,7**	**1**	
	Local Maxima and Minima of a function. Problems	**4**	**1,3,7**	**1**	
5 INTEGRAL CALCULUS AND APPLICATIONS	Definition of an indefinite integral. Listing the Integrals of standard functions. (Algebraic, trigonometric, exponential, logarithmic and inverse trigonometric functions)	**5**	**1,3,7**	**1**	11
	Rules of Integration. Evaluation of integrals with simple integrands and their combinations	**5**	**1,3,7**	**1**	
	Rules of Integration. Evaluation of integrals with simple integrands and their combinations. Problems	**5**	**1,3,7**	**1**	
	Evaluation of integrals with simple integrands and their combinations. Problems	**5**	**1,3,7**	**1**	
	Evaluation of integrals by Substitution method	**5**	**1,3,7**	**1**	
	Evaluation of integrals by Integration by parts	**5**	**1,3,7**	**1**	
	Evaluation of integrals by Integration by parts. Problems	**5**	**1,3,7**	**1**	
	Definition of definite integrals and their evaluation	**5**	**1,3,7**	**1**	
	Evaluation of Definite integrals. Problems	**5**	**1,3,7**	**1**	
	Area enclosed by the curves by integral method	**5**	**1,3,7**	**1**	
	Volume generated by the curve rotated about an axis by integral method	**5**	**1,3,7**	**1**	

First Semester Examination, Model Question Paper – 2020

Engineering Mathematics

Duration: 3Hours] **Subject Code: 20SC01T** **[Max. Marks:100**

Instruction: Answer one full question from each section. One full question carries 20 marks.

SECTION – 1

1

a If the matrix $\begin{bmatrix} 2 & 4 & 6 \\ 2 & x & 2 \\ 6 & 8 & 14 \end{bmatrix}$ is singular then find x . **4**

b Find the A^2 for the matrix $\begin{bmatrix} 1 & 3 & 4 \\ -1 & 2 & 1 \\ 0 & 3 & 3 \end{bmatrix}$. **5**

c Solve $2x - y = 3$ and $x + 2y = 4$ by using determinant method. **5**

d Find the inverse ofthe matrix $\begin{bmatrix} 2 & 3 & 1 \\ -1 & 2 & 1 \\ 5 & 4 & 3 \end{bmatrix}$. **6**

2

a If $A = \begin{bmatrix} 2 & -1 \\ 4 & 0 \\ 1 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & -3 & 4 \\ -1 & -1 & 1 \\ 0 & 4 & 2 \end{bmatrix}$ then find $(AB)^T$. **4**

b Verify whether AB=BA for the matrices $A = \begin{bmatrix} 1 & 0 & 5 \\ -1 & 2 & 1 \\ 5 & 4 & 3 \end{bmatrix}$ and

$B = \begin{bmatrix} 3 & -1 & 4 \\ 0 & -1 & 1 \\ 2 & 4 & -2 \end{bmatrix}$. **5**

c Find the Adjoint of the matrix $A = \begin{bmatrix} 1 & 3 & 4 \\ -1 & 2 & 1 \\ 0 & 3 & 3 \end{bmatrix}$. **5**

d Find the charcteristic equation and eigen values for the matrix $\begin{bmatrix} 1 & 2 \\ 3 & 1 \end{bmatrix}$. **6**

SECTION – 2

3			
	a	If the straight line is passing through the points (1, 2) and (3, 5) then find the slope of the line.	4
	b	Write the standard intercept form of the straight line and hence find the equation of the straight line whose x and y intercepts are 2 and 3 respectively.	5
	c	Write the standard slope-intercept form of a straight line. Find the equation of the straight line passing through the point (3, 5) and slope 4 units.	5
	d	Find the equation of the straight line parallel to the line passing through the points (1, 3) and (4, 6).	6
4			
	a	i) If a line inclined at 45° with x-axis find its slope. ii) Write the x and y intercept of the line 2x+3y=10.	2+2
	b	Find the equation of the straight line whose angle of inclination is 45^0 and passingthrough the origin.	5
	c	Find the equation of the straight line perpendicular to the line 2x+6y=3 and with the y intercept 2 units.	5
	d	Find the acute angle between the lines 7x-4y=0 and 3x-11y +5=0.	6

SECTION – 3

5	a	Express 75° in radian measure and $3\pi/2$ in degree.	4
	b	Prove that $\cos(A+B)\cos(A-B) = \cos^2 A - \sin^2 B$.	5
	c	Show that $\cos 2\theta = 2\cos^2\theta - 1$.	5
	d	Find the value of $\sin 120^\circ \cdot \cos 330^\circ - \sin 240^\circ \cdot \cos 390^\circ$ without using calculator.	6
6	a	Find the value of $\sin 15^\circ$.	4

	b	Simplify $\frac{\cos(360^\circ - A)\tan(360^\circ + A)}{\cot(270^\circ - A)\sin(90^\circ + A)}$.	**5**
	c	Prove that $\sin 3\theta = \sin 3\theta - 4\sin^3\theta$.	**5**
	d	Prove that $\sin 20^\circ \cdot \sin 40^\circ \cdot \sin 80^\circ = \frac{\sqrt{3}}{8}$.	**6**

SECTION – 4

7	**a**	Find the derivative of $y = x^2 + e^{2x} + \cos 2x - 2\log x$ with respect to x.	**4**
	b	Find dy/dx of $y = \frac{\sec x + \tan x}{\sec x - \tan x}$.	**5**
	c	Find dy/dx of $y = \tan^{-1}\left(\frac{1+x}{1-x}\right)$.	**5**
	d	If the $s = 2x^3 + 3x + 4$ repersents the displacement of the particle in motion at time x, then find the velocity of the particle at $x = 2$ secs and acceleration at $x = 3$ secs.	**6**
8	**a**	Find $\frac{dy}{dx}$ of $y = 3x^4 + 4\log x + 2e^{3x} + \tan^{-1} x$.	**4**
	b	If $y = e^{2x}\sin 3x$ then find $\frac{dy}{dx}$.	**5**
	c	Find $\frac{d^2y}{dx^2}$ if $y = 3\sin x + 4\cos x$ at $x = 1$.	**5**
	d	Find the equation of tangent and normal to the curve $y = x^2$ at the point (1, 1).	**6**

SECTION – 5

9	a	Evaluate $\int (x-1)(x+1)dx$.	4
	b	Evaluate $\int_0^{p/2} \sin^2 x \, dx$	5
	c	Evaluate $\int x \sin x dx$.	5
	d	Find the area bounded by the curve $y = 4x - x^2 - 3$, x-axis and ordinates $x = 1$ and $x = 3$.	6
10	a	Evaluate $\int_0^2 e^x dx$.	4
	b	Evaluate $\int \frac{4\cos(\log x)}{x} dx$.	5
	c	Evaluate $\int x e^x \, dx$.	5
	d	Find the volume of the solid generated by revolving the curve $y = \sqrt{x^2 + 5x}$ between $x = 1$ and $x = 2$.	6

****

Government of Karnataka
Department of Collegiate and Technical Education
Board of Technical Examinations, Bangalore

Course Code	20EG01P	**Semester**	I/II
Course Title	**COMMUNICATION SKILLS**	**Course Group**	Core
No. of Credits	4	**Type of Course**	Tutorial + Practice
Course Category	Workplace Skills / Humanities & Social Sciences	**Total Contact Hours**	6Hrs Per Week 78Hrs Per Semester
Prerequisites	Nil	**Teaching Scheme**	(L:T:P)= 0:1:2
CIE Marks	60	**SEE Marks**	40

Preamble

Today, Communication is a very important skill for the success of every millennial student. Millennials affinity to use digital media for communication, changing career and working landscapes, and greater competition in colleges and workplaces makes enhancing student communication skills beyond language a must. Rote learning a few tips or tricks the night before an interview or performance review won't do the job if students are trying to make an impression in highly collaborative workplaces of the future. Expectations from students aspiring to be part of such future workplaces are that they have not just good verbal and non-verbal communication skills but also a good understanding of how to use modern tools for effective communication.

Scope

To enable students to communicate clearly and effectively, by improving their verbal and non-verbal communication skills, as well as enhancing interpersonal skills and knowledge of appropriate tools for specific communication strategies.

Course Objectives

The objectives of communication skills course are:

- Build better communication skills: oral and written expressions and body language
- Enable critical thinking
- Empower with active listening skills
- Enable team work/collaboration

Instructional Strategy

To achieve course objectives, it is important to provide the blended mode of instruction for each of the concepts. This blended mode of instruction enables and empowers students with:

- **Understanding of Concept (Theory):**
  - Through definitions, discussions, explanation, conclusions.
  - Through demonstrations: Show films or other workplace clips that model various conversation skills. This provides greater clarity of the concept by

        - Enabling observation skills
        - Helping in expression of gesture
        - building confidence
- **Application of Concept (Learning by doing):** It is imperative that to become a good communicator, the skills have to be built by applying the concept in the hypothetically created real life situations. Students are encouraged to participate in each of these activities during lab session to help build the effective communication skills.
    - Use of technology tools like audio books, apps like voice thread or paper telephone, etc.
        - To help in workplace conversions.
        - To increase active listening, pronunciation
        - To help in voice modulation
    - Group discussion
        - Reinforce active listening
        - Enable group debate to imbibe healthy communication strategies
        - Sharpen the skills of "Asking clarifying questions"
        - Sharpen Feedback / Response skills
        - Time management skills
    - Group presentations/peer reviews
        - Enable team work
        - Assess concept understanding
        - Sharpen both oral and written communication skills
    - Group activities:
        - foster critical thinking
        - enable reflective learning
    - Tools usage:
        - Understand the difference between a Dictionary and a Thesaurus
        - Understand "When" and "How" to use these tools for communication

Course Outcomes

After completion of this course, the student shall be able to;

- Communicate
    - Identify audience (colleagues, management, customers/vendors)and use the right methodologies for communication using the right terminology, names, grades and other nomenclature pertaining to the trade, tools and specific equipment.
- Write
    - in at least one language correctly
    - basic level notes and observations
    - job cards, work sheets, basic report writing and responding to emails, simple presentations, job applications, resume
- Read
    - Technical manuals, task sheets/job orders, policies and regulations pertinent to the job, including OEM guidelines.
    - all instructions given in memos, manuals, documents or those put up as posters across the premises
    - safety precautions mentioned in equipment manuals and panels to understand the potential risks associated
- Question
    - Ask right questions
    - Use different ways of asking questions
        - Clarifying/Open ended (What, Why, When, Who, Where, How)
        - Close ended

- Present
    - With right Posture & Gesture
    - With greater concept/content clarity
    - With high confidence
    - With voice modulation to capture the attention of audience

- Use technology tools
    - Office productivity
        - Word : Report writing
        - PowerPoint : Creating effective presentations
        - Excel : Data handling/Charts

Course Content

The following are the various units to be taught and assessed in order to ensure the student is able to demonstrate the Course Outcomes mentioned in the **Course Outcome** section.

Pre-assessment:

Teachers are required to administer pre-assessment before starting the actual instruction. This helps in gathering information about students' like their attitude, beliefs, interests, and learning abilities.

Pre assessment expectations:

- To assess current language skill (Pronunciation, usage, sentence formation)
- To assess their ability to comprehend and respond to the instruction
- To assess their interest towards accepting ideas and learning
- To assess their current communication skills: asking questions, listening, communicating with confidence

<table>
<tr><td colspan="4">UNIT 1: English – Introduction
Learning outcome:
Learn English pronunciation, functional grammar concepts& Reading. To gain confidence in spoken English.This section also covers phonemic awareness, grammar rules to set a strong base for application mode of communication.</td></tr>
<tr><td>Phonemic awareness</td><td>Going over 42 sounds</td><td>Examining the understanding of sounds
Spelling patterns (Consonant and Vowel blending: CVC words)
Pronunciation
o List of words given above (Commonly used words)
o Diction (speech)</td><td>0:2:2</td></tr>
<tr><td>Functional Grammar Concepts</td><td>Revision of Grammar concepts</td><td>Parts of speech
Sentence structure
Examples of right sentences
Gender, Singular, Plural
Usage of voice (active and passive) and tenses</td><td>2:0:0
0:1:0

0:1:0
0:2:0</td></tr>
<tr><td>Comprehension activities</td><td>Reading conversations (check the unitwise activity table)</td><td>Written test for each comprehension</td><td>0:0:2</td></tr>
<tr><td colspan="4"></td></tr>
<tr><td colspan="4">UNIT 2: Communication
Lesson outcome:
At the end of the session:
• Students should be able to
o Understand the communication process, influence of voice/tone, logical organization of thought, comprehension, listening skills.
o Understand the basic building blocks of communication and strategies for working with each of these blocks.
o Learn about carrying self, etiquettes of communication.
o Build positive attitude about self and towards handling communication.
o Learn the process for effective communication, problem solving techniques, to be confident communicator.</td></tr>
<tr><td>INTRODUCTION:</td><td>What is communication?
Why communication?
How do we communicate?
Communication Theory and Process</td><td>How communication happens?
• Pictorial representation of communication framework</td><td>1: 2:0

0:2:2</td></tr>
</table>

	Barriers to communication	• Elements of communication: sender, receiver, message • Refer to activity in Unit activity section. ***Language*** • Lack of linguistic ability • Grammar ***Context*** • Psychology • Physiology ***Systematic*** • inefficient or inappropriate information systems • Lack of communication channel • lack of understanding of the roles and responsibilities ***Attitude*** • Perceptions • Preconceived notions	0:2:2 (video clip play, content tutorial, role play)

Building blocks of communication	**People** **Message** **Context** **Listening**	***People:*** • Empathising with sender's or receiver's perception • Intent & Impact on the sender/receiver • Think – Feel – Do model ***Message:*** Message channels: ○ Inperson, **email**, memo, report Be aware of Mental Filters ○ Level of understanding/knowledge ○ Personal concerns ○ Pre conceived notions Organize message: ○ Critical thinking: organize your thoughts? Use following strategy: ▪ Who ▪ What ▪ When ▪ Why ▪ How ○ Bundle Primary and Secondary information ○ Mindful about non-verbal message ○ Tone of voice Examples of Types of messages: ○ Inform ○ Persuade ○ Cyclical Avoiding Miscommunication: • Evaluate (Checking for) understanding of the intent of the message with the receiver – by asking clarifying questions? ***Context:*** Define context Importance of context Tune into context • Timing • Location • Relationship	0:4:4

		Listening: Importance of listening Barrier to listening: • Mental filters • Multitasking • Information overload Strategies for listening: • Recall • Acknowledge • Summarize • Listen with eyes for connecting to non-verbal connection • Empathize • Pay attention • Ask clarifying questions Effective Listening Behaviors: • Maintaining relaxed body posture • Leaning slightly forward if sitting • Facing person squarely at eye level • Maintaining an open posture • Maintaining appropriate distance • Offering simple acknowledgements • Reflecting meaning (paraphrase) • Reflecting emotions • Using eye contact • Providing non-distracting environment Behaviors that hinder effective listening • Acting distracted • Autobiographical (Telling your own story without acknowledging theirs first) • No response • Invalidating response, put downs • Interrupting • Criticizing • Judging • Giving advice/solutions • Changing the subject • Reassuring without acknowledgment	

UNIT 3: Verbal Communication

Lesson outcome:

At the end of this session, Students should be able to:

- Understand and define the communication framework structure for each of the verbal communication(in person/telephonic/video conference).
- Understand and apply the verbal communication techniques.
- Use technical jargons in communication.
- Use right body language during verbal communication
- Understand and practice the Active Listening techniques
- Confidently articulate or present the content

Different types of verbal communication:	***In person*** ***Telephonic*** ***Video conference***	Use ABC's : Accuracy, Brevity, Clarity o Introduction o Main body of the content o Summary • Use voice/tone effectively • Reinforcement of Listening skills: Active and Empathetic listening skills • Body language o Eye contact o Body posture o Gesture o Facial expression o Space	**0:2:4**
Listening Skills	***Effective Listening behaviors***	Effective Listening Behaviours**:** • Maintaining relaxed body posture • Leaning slightly forward if sitting • Facing person squarely at eye level • Maintaining an open posture • Maintaining appropriate distance • Offering simple acknowledgements • Reflecting meaning (paraphrase) • Reflecting emotions • Using eye contact • Providing non-distracting environment	
	Behaviours that hinder effective listening	Behaviours that hinder effective listening • Acting distracted • Autobiographical (Telling your own story without acknowledging theirs first) • No response • Invalidating response, put downs • Interrupting • Criticizing • Judging • Giving advice/solutions • Changing the subject • Reassuring without acknowledgment	
Using technical Jargons:	*Assignment based project encouraging pupil to use the technical terms in*		

	the written and verbal communication. This requires understanding of the core concepts (from subject teacher) and integrating the concept with communication concepts to gain the real time application knowledge.		

UNIT4: Non-Verbal Communication:

Lesson outcome:

At the end of this unit, students should be able to:

- Understand the importance of Body language and its impact.
- Use the strategies for effective body language.
- Understand the relevance of different elements of emails and how to use them.
- Develop the confidence in presenting written content in logical and organized manner with a definitive email framework.
- Write different email formats confidently: Job application, Request email, apology email, email responses/feedback.
- Confidently write Resume/Curriculum-vitae, Reports, Formal letters and portfolio.
- Confidently communicate using technical jargons and with increased vocabulary.

Body Language	***Strategies***	Body language tips: • Keep appropriate distance • Take care of your appearance • Maintain eye contact • Smile genuinely Do's and Don'ts: dos: • smile • stand up confident and straight • use appropriate hand gestures • Make eye contact with audience • Hold neat note cards while presenting content Don'ts • point at anyone • rock backwards and forwards • pace across front of room • read off slides read off notes	0:3:4
Art of Professional writing:	***Written communication*** ***Emails:*** • Structured framework for writing formal emails to emphasize on professional communication in English	Different types of emails: Job application, request letter, letter writing and quick notes Structure of email text: • Introduction – Beginning of the letter and this plays crucial role as it provides first impression to the reader. o Who: author (name + position and organisation) o what: purpose - controlling idea (what author does or feels) • Development: Expand on the Controlling Idea/purpose of the email by answering relevant WH questions o what, when, where, who, whom, which, whose, why, and how • Conclusion: Positive words o Verb: thank, appreciate, hope, wish	0:2:4

		○ Phrases: be glad about, look forward to Email writing samples and practice content in the activity section. Additional essential writing skills – Framework will be provided and assignments will be advised: • Resume writing /CurriculumVitae • Report Writing • Portfolio writing • Formal letters	
UNIT5: English - Reading Skills, Grammar & Vocabulary **Lesson Outcome:** At the end of the session, student should be able to: • Read sentences with punctuation. • Understand the techniques of reading complex words. • Understand and apply the reading techniques for efficient reading. • Understand the usage of communication tools like Thesaurus and Dictionary that aids in improving vocabulary and reading. • Understand and apply the functional grammar aspects in day today communication.			
	Comprehension activities ***Techniques for smart reading***	Passage comprehension Conversation comprehension Strategies for smart reading: • Skimming and scanning through the text, inferring the meaning • Questioning, summarizing	0:2: 2
	List of Commonly confused words and how to use/avoid them	Set of words to accelerate the English language learning and usage. Strategies to use these words effectively	0:1: 2
	Sentences: ○ Declarative sentence ○ Imperative sentence	Techniques of categorizing sentences, understanding how to build with punctuation and effectively use in the verbal and non-verbal communication.	0:1: 2

Reading skills **Functional Grammar** **Vocabulary**	○ Interrogative sentence ○ Exclamatory sentence ***Punctuation, Content organization and Comprehension*** ***Techniques:*** • Learning new words from comprehension by way of repetition and usage of these words in communication • Listing technical jargons and repeatedly using in the communication with peers and teachers • Chunking and reading words ***Tools*** • Understand the difference between a Dictionary and a Thesaurus • Understand "When" and "How" to use these tools for communication	This involves more of hands on activities. Comprehension remains as a main activity to accelerate the learning of spoken and written English language Increases vocabulary, builds confidence and helps in becoming a good communicator. Activities are done, tips are provided to efficiently implement these strategies.	0:1: 2 0:1:0

Unit 6 - Communication Tools

Lesson Outcome:

At the end of the session, student should be able to:

- Use Email technology efficiently for communication
- Present content in the PPT format efficiently
- Understand different platforms available for web conferencing and efficiently work with them.
- Create reports and data management.

Introduction	Evolution of communication tools	Traditional vs. modern communication tools Advantages and Disadvantages	1:0:0
One-to-One	***Email using Gmail***	How to use the tools effectively? Formatting, layout Including attachment Working with "To, CC, BCC" and Subject fields effectively Using signature	0:1:1
One-to-Many	***Presentation using PowerPoint***	Creating, Editing, Saving slides Using Animation Formatting options	0:1:2
	Webinar / Web Presentation (zoom, Google meet, Skype)	Hosting online meeting using online meeting tools Inviting people Sharing screen	0:1:1
Other	***Reports using MS Word***	Open, close, Edit and Save usage with documents Layout and strategies for creating report Sample report creation demo with follow on assignment Core subject project report submission assignment	0:1: 2
	Data & Graphs using MS Excel	Open, close, save and edit the excel document Creating data Using basic maths operation in Excel for working with data Creating simple graphs Assignment: For example, creating statistics of subject wise activities completed for 6 months in the credit course	0:1: 2
			4:34:40

Course Class Activity List (Unit-wise)

The following are the various activities that faculty could conduct for each unit are presented below;

Unit No.	Unit Title	Unit Activities
UNIT 1: Activities:	**English – Introduction**	1. 42 sounds revision:

		1. s, a, t, i, p, n 2. c k, e, h, r, m, d 3. g, o, u, l, f, b 4. ai, j, oa, ie, ee, or 5. z, w, ng, v, oo, oo 6. y, x, ch, sh, th, th 7. qu, ou, oi, ue, er, ar • This helps in reducing the native language impact • Helps in understanding Short and Long vowel words • Helps in spelling • Helps in pronunciation 2. Reading commonly used words loud from the list (list will be provided in the workbook): • This helps in getting familiarity with the word pronunciation and helps in reading. 3. Blending words activity: • Write simple three letter words (CVC/CVCC/CVCV) pattern words: Can, Cap, Snap, cape (list will be provided in the workbook) • Show how to blend with the sound. • Starting with 3 letter words and continuing to 6 to 8 letter words. *Note: Remember before going through big words, it is always important to assess and ensure the student is aware of all the 42 sounds and are comfortable making small words.* Parts of Speech: building sentence using parts of speech: Demonstration by teacher: (Will be explained in the book as an example) Jumbled parts of speech: Student should pick the right order to build meaningful sentence: (More samples will be provided in the workbook) • College go to youeveryday. • Makes spider web the a Gender, Singular and Plurals: • Match the following activity for singular and plural • Fill in the blanks activity for genders

		Reading & Comprehension: Conversation • Conversation at the bank (provided in the workbook along with few more conversation samples) • Questions based on this conversation will be provided in the workbook
Unit 2	**Communication**	Oral: • Introduce yourself? Visual: • Video clip on communication etiquette • Pictures (in addendum section): do's and don'ts of communication Group of students, one participant whispers in another participant's ear, and this message has to be passed on in a circle until it reaches back the sender. Making a note of process of message conveyed and how it was perceived. o Identify the communication gap if any. o Discuss and conclude the communication framework importance o Discuss/reiterate how to make communication framework strong. 1. Role play to assess the understanding of building blocks of communication: (can be tapered to the core skills of diploma courses, following are just few of the examples) a. Announcing the result of students in the class or b. Announcing the job placement of students (people, context, message, form of message) c. Discussing the guidelines of examination (listening skills) d. Listening to the weather forecast without seeing and making note of the listening ability (play video of weather forecast) – Assess based on how much the student is able to recall.

		2. Run National geography/Discovery Video clip/subject related technical video clip on YouTube: Check: ○ if the student has not understood what a speaker expressed ○ about work or safety related issues ○ seeking clarification or advice appropriately from colleague, customer, management or vendor
Unit 3	**Verbal communication**	1. Voice/tone modulation: Showcase video Discussion: What was right? What was wrong? How it should have been better? 2. Picture description activity (memory test): Class split into groups A, B C,D: (two or four groups of at least 5 people each): Teacher shows different picture to each group for three minutes. Now each group has to remember what was on the picture and discuss with each other, write down the elements on a piece of sheet and share it with the teacher. Group that remembers more will be the winner. Teacher to observe the body language of a student in the group, listening skills of a student, presentation skill, comprehension skill, content delivery skill, confidence level, team work. And reiterate the concepts, dos and don'ts, and discuss what could have been done better. (details of pictures will be given in the workbook) 3. Telephonic conversation: Role play by a teacher: Call Airtel/Vodafone department and asking for the phone number portability process. After teacher demonstrates, teacher divides the class in to small groups of three people. • Each group will be given a different telephone conversation assignment (samples will be provided in workbook).

		• Two people in the group pretend to converse over the phone, and the third person makes a note of right and wrong approaches during the communication.
Unit 4:	**Non-verbal communication**	Body language Simon Says: Instructions and set up : 1. Series of instructions to the group that are to be copied/reproduced. Start slowly and increase the pace 2. State the following actions as YOU do them: ○ Put your hand to your nose ○ Clap your hands ○ Stand up ○ Turn around ○ Touch your shoulder ○ Sit down ○ Stamp your foot ○ Cross your arms ○ Put your hand to your forehead – <u>BUT WHILE SAYING THIS PUT YOUR HAND TO YOUR NOSE</u> 3. Observe the number of group members who copy what you did rather than what you said. **Outcome of this activity:** Discuss how body language can reinforce/influence verbal communication and drive the importance of body language and how to work on it • Email communication & Using technical jargons: Sample letter writing as assignment to students. (list will be provided in the text book – Request, apology, job application and relevant email formats that are useful for students post diploma course) • There will be at least one assignment that utilizes technical jargons in email communication.

UNIT 5:	**English - Reading Skills, Grammar & Vocabulary**	• Reading passage (Provided in workbook) • Reading passage from the text book • Comprehension: Passage & Conversation (will be provided in workbook) • Chunking words and reading activities
Unit 6:	**Communication tools**	• Email writing activities: Writing emails using email provider. Theme based email writing • Report writing assignment Writing about a machinery tool/interior designing plan? Related to the diploma stream. • Resume writing assignment • Data handling: Collecting data about machines/number of students passed out of college for last three years and creating graph about it. • Presentation: o About learning in the communication class o Concept presentation

Course Assessment Strategies

Assessment Methodology

a. Observation (role play activities, team activities, demonstration)
b. Questions & Answer – Periodic Assessment

Assessment Grading RUBRICS

Language Basics	
Beginner	Doesn't know / understand
Intermediate	can read and identify commonly used words
Good	Confident , able to communicate well with known people
Advanced	Confident , able to communicate well with anyone using a English
Expert	Can read, understand; Also comprehend & can train others
Reading	
Beginner	Beginning to read, has native language impact
Intermediate	can read, identify words, build simple 3/4/5 letter words easily
Good	Can read, understand, build words, read simple sentences ; Also comprehend
Advanced	Can read, understand, build words, read simple sentences ; Also comprehend
Expert	Confident , read simple and complex sentences with punctuation, comprehend, spell also build words
Inter personal communication	
Beginner	is shy, doesn't talk/express

Intermediate	hesitates to communicate – due to lack of confidence / ability, can talk to known people
Good	can talk to unknown people, less confident, does not express, has hard time working as a team
Advanced	can talk to unknown people, confident, can't express, has hard time working as a team
Expert	confident, can talk to anyone, express well, works well in the team
Body language	
Beginner	Is shy, not open to communicate, has hard time making friends
Intermediate	Knows basics of Body language, practices sometimes
Good	Knows basics of Body language, practices most times, has less confidence in presenting content
Advanced	Knows and practices good body language all times, can present content
Expert	Knows and practices good body language all times, is an example, Leads the pack to get better
Listening Skills	
Beginner	Just hears, no attention
Intermediate	Listens, pays attention, does not ask any question
Good	Listens, pays attention, ask questions
Advanced	listens, pays attention, asks questions, cannot empathize
Expert	Listens, pays attention, asks clarifying questions, able to understand the message communicated
Acceptability to Learn	
Low	is not receiving to information
Average	receives information but resists to implement
Good , Above Average	receives information and implements per instructions
Strong	receives information and proactively implements and seeks feedback
Verbal Communication	
Beginner	Does not communicate, shy, low on confidence: has problem expressing in his/her native language or English language
Intermediate	Can communicate in native language, low confidence, shy, yet to try in English language
Good	Can communicate in native language, good confidence, tries to communicate in English language
Advanced	Can communicate in native language, express view points, good confidence, comfortable talking to people in the team, tries to communicate in English language aswell
Expert	Can communicate in native language, express view points, very good confidence, can communicate with anyone without any fear, asks clarifying questions, communicates well in English, or tries hard to communicate in English language as well
Non-Verbal Communication	
Beginner	Struggles to understand the non-verbal cues, has to work on body language, has hard time understanding the written communication aspects

Intermediate	Can understand the non-verbal cues, has to practice, tries to apply written communication aspects
Good	Can understand non-verbal cues, practices well, works hard to get hold on written communication skills, exhibits confidence in whatever task is given
Advanced	Can understand non-verbal cues, can work on written communication aspects, exhibits confidence, practices well, help others to identify non-verbal cues
Expert	Can understand non-verbal cues, train others, confident, exhibits good non-verbal cues at all times, can train the pack, has good hold on written communication as well.
Comprehension	
Beginner	Tries to read the passage, has hard time to comprehend
Intermediate	Can read the conversation passage, has hard time understanding the regular passage
Good	Can read the conversation passage, regular passage, but stutters in answering questions if there are technical jargons
Advanced	Can read the conversation passage, comprehend but regular passage comprehension is good
Expert	Can read the conversation passage, comprehend but regular passage comprehension is good, explain better to others, help others, lead the pack
Writing Communication	
Beginner	Has trouble forming right sentences for written communication
Intermediate	Can form sentences, has problem with the layout, gets confused between layout for different form of written communication
Good	Can form sentences, has fair understanding of the layout to be used for particular type of written communication, but stutters for words and expression
Advanced	Can form sentences, has good understanding of the layout to be used for particular type of written communication, confident, can express thoughts well
Expert	Can form sentences, has good understanding of the layout to be used for particular type of written communication, confident, can express thoughts well and train others and lead the pack

Recommended Learning Resources

https://www.englishclub.com/grammar/parts-of-speech.htm
Watch Amy Cuddy's TED Talk: Your Body Language Shapes Who You Are
Additional Reading: http://money.cnn.com/2000/05/03/career/q_body_language/

Pre-assessment:

Activity 1:
Make a group, read random words from the list, build sentence for few words from the list.

Create a group of 3 or 5 students. Randomly pick 5 words from the word list write down on the board/show them as a chart if you have created a word chart/make chit of words and ask them to pick one chit and READ the word.

Main idea: Testing the pronunciation ability, language ability, confidence in speaking, ability to understand and accept the instruction

Activity 2:
Simple reading test – Reading passages (Simple passage from the current course book)
Show the reading passage, let each one of them read 2 lines, after first student is done with reading two lines, then the next student must pick up from there and read next two lines. This process has to be followed until the entire class is done with reading or at least ten students are done with reading.

Main idea: Testing listening skills, attentiveness, language ability, pronunciation ability

Activity 3:
Students getting to know each other. Create a group of 3 or 5 students. Each student gets chance to talk to another student, introduce him/herself to the student, ask question, make a note of the answer against the name of the student who is answering the question on a sheet of paper.

Main idea: To assess current communication level, body language when students talk with each other, and confidence.

Commonly Used Word List

When	Today	For	Off	Yes	To	Girl	This		
Give	Stop	There	Often	On	Am	A	Could		
Again	Little	Than	Myself	Been	Where	You	Now		
Do	Large	At	Over	Of	Way	Be	Fun		
From	Both	Like	Along	He	Which	Were	Only		
Him	Name	Said	Why	It	Write	Or	Much		
Can	Few	They	Has	More	Goes	One	Tell		
Go	Home	Look	Bring	My	Great	All	Out		
But	Big	Know	Part	Any	Number		That	Fast	
Old	Should	Done	By	Their	First	Cat	Is		
Not	Once	High	As	We	Find	His	Small		
Her	Thought		So Into	She	Me	Have	Dog		
Time	Better	Them	Away	Did	In	How	See		
Long	Many	Does	No	Went	Before	Water	Here		
Had	Get	Always	Other	Full	Saw	And	People		
Word	Please	These	With	Some	Never	Use	School		
Very	Ask	Last	An	Then	Boy	Take	Two		
Your	Say	Got	What	If	Right	The	Call		
Make	Ten	Next	Come	Night	After	Will	Might		
Day	I	Those	Would	Made	About	Was	May		
Each	Show	Play	Who	Up	Far	Are	Walk		

To assess current communication skill: Activity based

Activity 3:

Making a group of students and getting to know each other with a predefined expectation for example:

Name:
I have performed on stage:
I'm good at sports:
I can speak more than 3 languages:
I'm always cheerful:
I like my mother tongue:

Course Assessment and Evaluation

Continuous Internal Evaluation (CIE)

Sl.No	Assessment	Schedule	Duration	Max. Test marks
1	Skill Test 1	At the end of 3rd week of the sem	2 Hrs	20
2	Skill Test 2	At the end of 7th week of the sem	2 Hrs	20
3	Skill Test 3	At the end of 13th week of the sem	2 Hrs	20
			Total	60

Scheme of Valuation for CIE

Serial no	Assessment	Marks
1	**Portfolio Evaluation of activities / exercises conducted upto the schedule of Skill Test. (Work Book Based)**	**10**
2	**Assessment of any one through qualitative assessment (Rubrics)**	**10**
	TOTAL	**20**

RUBRICS FOR ASSESSMENT OF ACTIVITY (10marks) (Qualitative Assessment)						
Dimension	Beginner	Intermediate	Good	Advanced	Expert	**Student Score**
	2	**4**	**6**	**8**	**10**	
	Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	
	Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	
	Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	
	Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	
					Average / Total Marks:	

Example Only
RUBRICS FOR ASSESSMENT OF ACTIVITY (10marks)
Faculty need to develop appropriate rubrics as per the assigned activity for assessment

Dimension	Beginner	Intermediate	Good	Advanced	Expert	**Student Score**
	2	**4**	**6**	**8**	**10**	
Language Basics	Doesn't know / understand	Can read and identify commonly used words	Confident , able to communicate well with known people	Confident , able to communicate well with anyone using a English	Can read, understand; Also comprehend & can train others	8
Reading	Beginning to read, has native language impact	Can read, identify words, build simple 3/4/5 letter words easily	Can read, understand, build words, read simple sentences ; Also comprehend	Can read, understand, build words, read simple sentences ; Also comprehend	Confident , read simple and complex sentences with punctuation, comprehend, spell also build words	6
Inter personal communication	Is shy, doesn't talk/express	Hesitates to communicate – due to lack of confidence / ability, can talk to known people	Can talk to unknown people, less confident, does not express, has hard time working as a team	Can talk to unknown people, confident, can't express, has hard time working as a team	Confident, can talk to anyone, express well, works well in the team	8
Body language	Is shy, not open to communicate, has hard time making friends	Knows basics of Body language, practices sometimes	Knows basics of Body language, practices most times, has less confidence in presenting content	Knows and practices good body language all times, can present content	Knows and practices good body language all times, is an example, Leads the pack to get better	8
				Average / Total Marks: (8+6+8+8)/4		**7.5 = 8 marks**

Scheme of Valuation for Semester End Examination (SEE)

Serial no	Assessment	Evidence	Marks	Conversion
1	**Portfolio Evaluation- UNIT 1: English – Introduction**	**Work Book**	**15**	**40 Marks**
2	**Portfolio Evaluation- UNIT 2: Communication**	**Work Book**	**15**	
3	**Portfolio Evaluation- UNIT 3: Verbal Communication**	**Work Book**	**15**	
4	**Portfolio Evaluation- UNIT-4: Non-Verbal Communication:**	**Work Book**	**15**	
5	**Portfolio Evaluation- UNIT-5: English - Reading Skills, Grammar & Vocabulary**	**Work Book**	**15**	
6	**Any one activity through communication tools- By qualitative assessment (Rubrics).**	**BTE Answer scripts**	**25**	
		TOTAL	**100**	

Government of Karnataka

Department of Collegiate and Technical Education

Board of Technical Examinations, Bangalore

Course Code	20CS01P	**Semester**	I/II
Course Title	**IT SKILLS**	**Course Group**	ES/CS
No. of Credits	4	**Type of Course**	Lecture + Practice
Course Category	ES	**Total Contact Hours**	6Hrs Per Week 78Hrs Per Semester
Prerequisites	Basic Computer Skills	**Teaching Scheme**	(L:T:P)= 1:0:2
CIE Marks	60	**SEE Marks**	40

1. RATIONALE

Information Technology is crucial to the majority of the business and has a great influence on innovation and engineering. Every branch of engineering and every organization opt for computers and IT skills for business automation, communication/connectivity, resource planning, work automation and securing information etc. All engineering diploma students must be conversant with the basic IT skills which empower them to learn new technologies, adapt to changes, business development, communication etc.

2. COURSE SKILL SET

The aim of the course is to help the student to attain the following industry identified competency through various teaching –learning experiences.

Perform jobs related to web design and maintenance, business process automation tool management, cyber security and safety and program assistant.

3. COURSE OBJECTIVES

1. Demonstrate the basics of coding.
2. Design and develop web pages that include static and dynamic content.
3. Describe the basic concepts of Cloud and IoT.
4. Express the workflow and business automation
5. Recognize the best practices of Cyber Safety and security.

4. JOB ROLE

SL.NO	LEVEL	JOB ROLES
1	3	Junior software developer - web.
2	3	Junior Creative Designer/Digital Artist

5. PREREQUISITES

STUDENT	Basic Computer skills (Students without basic computer skills should be taught basic skills)
TEACHER	Computer science faculty with required knowledge of IT Skills.

6. COURSE OUT COMES

On successful completion of the course, the students will be able to demonstrate industry oriented Cos associated with the above mentioned competency:

COURSE OUTCOME		UNIT LINKED	CL	LINKED PO	TEACHING HOURS
CO1	Illustrate the basics of coding and develop simple applications for android phones.	1	U, A	1,4,7	15
CO2	Design and Develop websites.	2	U, A	1,4,7	30
CO3	Identify Cloud Services IoT applications	3	U	1,4,7	12
CO4	Apply workflow and use ERP for a simple project plan	4	U	1,4,7	09
CO5	Implement best practices of cyber safety and security in the workplace.	5	U, A	1,4,7	12
	TOTAL				**78**

8. INSTRUCTIONAL STRATERGY

These are sample strategies, which teacher can use to accelerate the attainment of the various course outcomes

1. Lecturer method(L) does not mean only traditional lecture method, but different type of teaching method and media visual/graphical content that are employed to develop the outcomes
2. Massive Open on-line courses (MOOCS) can be used to teach various topics/sub topics.
3. Online coding platform wherever mentioned.
4. Hands on coding should be practiced.
5. About 15 to 20% of the topics/sub topics which are relatively simpler or descriptive in nature is to be given to the students for self-directed learning

9. DETAILS OF COURSE CONTENT

The following topics/sub topics is to be taught and assessed in order to develop Unit Skill sets for achieving CO to attain identified skill sets

UNIT NO	Topics/Sub topics	Unit skill set/Learning outcomes (In cognitive domain)	Hours L-T-P
1	**UNIT 1 - INTRODUCTION TO BASICS OF CODING**		05-0-10
	1.1 Introduction to computer programming 1.2 Algorithms –With sufficient examples 1.3 Flowcharts – With sufficient examples 1.4 Execute simple programs **Note: Below listed or any other suitable online/offline coding platforms should be used to demonstrate and provide coding experience to students.** **a. https://scratch.mit.edu/** **b. https://studio.code.org/projects** Suggested programs are listed in Table 1	1. Understand computer programming 2. Create and write Algorithm for programmable problems. 3. Design Flowchart for programmable problems. 4. Develop simple Android application.	

	1.5 Introduction to Application development 1.6 Simple android application development (No knowledge of programming language is required). **Note:** ***i. The purpose of application development is to ignite and promote programming skills.*** ***ii. Application development should be done using any App builder platforms such as*** ***iii. MITApp Inventor: https://appinventor.mit.edu/*** ***iv. Thunkable: https://thunkable.com/*** ***v. ibuildapp: https://ibuildapp.com/*** ***vi. The student should be introduced to the android application development environment for further research and learninghttps://developer.android.com/*** 1.7 Activity: create a simple Android application (Unique for each student) publish on the learning management system.		
2	**UNIT 2 - DESIGN AND DEVELOP WEB PAGES**		10-0-20
2	2.1 Basic web technologies ▪ Browser ▪ Web –Server ▪ Client-Server Model ▪ URL ▪ SEO techniques ▪ Domain names and domain name system. 2.2 Creating Web-pages with HTML5 - Static web pages. ▪ Introduction, Editors ▪ Tags, Attributes, Elements, Headings	1. Understand and examine basic web technologies 2. Creating static web pages 3. Formatting Webpages with cascading style sheets (CSS) 4. Creating Dynamic web pages with JavaScript 5. Creating and launching dashboard based personal website.	

	▪ Links, Images, List, Tables, Forms ▪ Formatting, Layout, Iframes. 2.3 Formatting web pages with style sheets (CSS3). ▪ Introduction to CSS ▪ Inline CSS, Internal CSS, Classes and IDs ▪ div, Color, Floating, Positioning ▪ Margins, Padding, Borders ▪ Fonts, Aligning Text, Styling Links 2.4 Creating a web page dynamic using JavaScript. ▪ Dynamic web page and Introduction to JS ▪ Basic syntax ▪ Functions ▪ Events Note: Refer https://www.w3schools.com **2.6** Creating dashboards in websites. **2.6 Activity: Personal website design and launch with a free platform or Create a Blogging website.** ▪ **Online platforms (Learning and executing)** ▪ **https://www.w3schools.com/** ▪ **https://studio.code.org** ▪ **https://www.khanacademy.org** **Note:** **1) The student must be introduced to website development platforms - worldpress.com.** **2) The student must be made familiar with launching websites .** Certification available: • HTML - W3schools		

	• CSS - W3schools • JavaScript - W3schools		
3	**UNIT 3 -BUSINESS PROCESS AUTOMATION/ERP**		03:0:06
3	3.1 Introduction to business process automation. 3.2 Organization structure and functions composition-Properties and applications ▪ Structure ▪ Types ▪ Functional Units **Note: Students should be made familiar with organization, types and components of a big enterprise to make him understand the working of organization keeping him as part of org.** 3.3 Workflows ▪ Introduction ▪ Components ▪ Use and use cases **Note: Use free and open-source platform to demonstrate and create workflows.** **Example:** **https://airflow.apache.org/** **https://taverna.incubator.apache.org/** **https://trello.com/** **https://www.processmaker.com/** 3.4 Enterprise resource planning ▪ History ▪ Evolution ▪ Uses of ERP ▪ ERP software tools. **Note: The student should be introduced into Enterprise resource planning software tools**	1. Identify and examine the needs of business process automation. 2. Understand Organization structure and functions 3. Create and use workflows 4. Use Enterprise resource planning in workplace.	

	to understand importance of ERP. **Examples:** ▪ **https://erpnext.com/** ▪ **www.bitrix24.com** ▪ **https://www.odoo.com/** **3.5 Activity:** ▪ **Project plan for summer internship - use open source ERP Software** ▪ **Identify different components of nearby organization with recourse plan and workflow design.** ▪ **Identify types of ERP software available with their market share.**		
4	**UNIT 4 - INTRODUCTION TO CLOUD AND IOT CONCEPTS**		04-0-8
	4.1 Fundamentals of cloud 4.2 Cloud service models ▪ IaaS (Infrastructure-as-a-Service) ▪ PaaS (Platform-as-a-Service) ▪ SaaS (Software-as-a-Service) 4.3 Cloud deployment types ▪ Public, ▪ Private, ▪ Hybrid ▪ Community Cloud 4.4 Cloud services: ▪ Google Drive - file storage and synchronization service developed by Google; ▪ Google docs- bring your documents to life with smart editing and styling tools to help you easily format text and paragraphs; ▪ Google Co-lab (Usage of Jupyter Notebook): *Colab* notebooks allow you to combine executable code and rich text in a single document, along with images, HTML, LaTeX, and more.	1. Understand Cloud concepts 2. Identify and use Cloud services 3. UnderstandIoT concepts 4. Identify IoT applications	

	▪ Google App Engine: Google App Engine is a Platform as a Service and cloud computing platform for developing and hosting web applications in Google-managed data centers. Applications are sandboxed and run across multiple servers. **Note: Above cloud services are not compulsory for all branches; teacher can recommend other cloud service based on need of engineering branch.** 4.5 Working of IoT and IoT components (Only brief introduction and demonstration through videos) 4.6 Explain concept of Internet of Things with examples ▪ Smart home ▪ Smart city ▪ Smart farming **Note:** **a. Teacher can also select specific area of work where Things (autonomous computing devices) could be interconnected over TCP/IP to establish IoT.** b. **The students should be introduced to the IoT environment for further research and study**. **Example:** ▪ **https://www.raspberrypi.org/** ▪ **https://www.arduino.cc/** **4.7 Activity:** **Create your cloud service account and demonstrate using cloud services.** **Identify cloud service provider with respect**		

	to service models and deployment types. Identify areas where Internet of Things could bring positive changes.		
5	**UNIT 5 - CYBERSECURITY AND SAFETY**		**4-0-8**
	5.1 Introduction to Cyber security and cyber safety. ▪ Brief awareness on cyber safety measures ▪ Identification of basic security issues in mobile phones and personal computers ▪ Installation of Antivirus software ▪ Firewall concepts ▪ Browser settings ▪ Importance of privacy and Password policy (Best practices). 5.2 Common threats - Demonstration ▪ Phishing ▪ DoS attack ▪ Man in the middle attack ▪ Eavesdropping ▪ Spamming **5.3 Activity** ▪ **Identification of basic security issues in computers of your college and fixing the same.** ▪ **Visit nearby government organization.** ▪ **Identify basic cybersecurity issues and fixing the same** ▪ **Demonstrate the importance of cybersecurity, password policy, and cyber safety.**	1. Identify need for Cyber security and cyber safety 2. Identify basic security issues in mobile phones and personal computers 3. Examine Importance of privacy, Password policy 4. Implement best practices of cyber safety and security in work place	

10. SUGGESTED PRACTICAL SKILL EXERCISES

TABLE-I

Sl. No.	Practical Out Comes/Practical exercises	Unit No.	PO	CO
1	Write an algorithm for programmable problems	1	1,4,7	1

	Example for Reference: • Add/subtract two numbers • Find the largest/smallest of 3 numbers • Calculate and print sum of 'N' numbers			
2	Design a flowchart for programmable problems Example for Reference: Add/subtract two numbers Find the largest/smallest of 3 numbers Calculate and print sum of 'N' numbers	1	1,4,7	1
3	Design and create simple game using MIT-scratch/Code.org	1	1,4,7	1
4	Design and create simple android application (MIT App Inventor)	1	1,4,7	1
5	Design and create webpage for displaying your poem (Title, header, paragraph, formatting tags)	2	1,4,7	2
6	Design and create webpage for your wish list (What you want to do). Also list challenges and opportunities along with images to present your dreams (List ordered and unordered, Image, table)	2	1,4,7	2
7	Design and create webpage using HTML and CSS about an awesome animal (Use necessary CSS tags)	2	1,4,7	2
8	Design and create web page for a travel book/recipe book with more than 3 pages, table to list places/recipes (iframe, hyperlink)	2	1,47	2
9	Design and create web page with JavaScript to design a simple calculator to perform the following operations: sum, product, difference and quotient	2	1,4,7	2
10	Design and create a personal webpage with dashboard	2	1,4,7	2
11	Design and create web page about advantages of business process automation with respect to your branch of engineering	2,3	1,4,7	2,3
12	Create a workflow for education loan approval in bank/diploma admission process (Use any tool)	3	1,4,7	3
13	Demonstrate ERP with ERPNext Demo for manufacturing, retail and service sector (Use any other ERP tools)	3	1,4,7	3
14	Create user account and demonstrate use of Google drive, Google docs, Google Co-lab (Usage of Jupyter Notebook)	4	1,4,7	4
15	1.1 Demonstrate Internet of Things using with examples a. Smart home	4	1,4,7	4

	b. Smart city c. Smart farming Note: Teacher can also select specific area of work where Things (autonomous computing devices) could be interconnected over TCP/IP to establish IoT.			
16	Installation of Antivirus software	5	1,4,7	5
17	Demonstration and hands on browser settings	5	1,4,7	5
18	Demonstration and hands on privacy settings and password policy	5	1,4,7	5
19	Demonstration of common security threats (using videos) a. Phishing b. DoS attack c. Man in the middle attack d. Spamming e. Virus	5	1,4,7	5

The suggested practical activities (TABLE-I) in this section are demonstrated for the attainment of the competency. These practical activities can also be used for the student assessment in portfolio mode for awarding CIE marks. **The lecturer can enhance the competency level of the students by sketching more practical exercises.**

NOTES:

1. It is compulsory to prepare log book/record of exercises. It is also required to get each exercise recorded in logbook, checked and duly dated signed by the teacher
2. Student activities are compulsory and are also required to be performed and noted in logbook.
3. Student activity is compulsory and part of skill assessment. The activity enable student to explore the course, help student to demonstrate creativity & critical thinking.
4. Student activity report is compulsory part to be submitted at the time of practical ESE
5. Term work report is compulsory part to be submitted at the time of practical ESE.
6. Student activity and student activity reports must be uploaded to Learning management system.
7. For CIE, students are to be assessed for Skills/competencies achieved.

11. MAPPING OF CO WITH PO

COURSE	CO'S	PROGRAMME OUTCOMES (PO'S)						
		1	2	3	4	5	6	7
IT SKILLS	CO1	3	0	0	3	0	0	3
	CO2	3	0	0	3	0	0	3

	CO3	3	0	0	3	0	0	0
	CO4	3	0	0	3	0	0	3
	CO5	3	0	0	3	0	0	0
Level 3- Highly Mapped, Level 2-Moderately Mapped, Level 1-Low Mapped, Level 0- Not Mapped								

12 SUGGESTED LEARNING RESOURCES

BOOKS	
1	The Art of Programming Through Flowcharts & Algorithms, A. B. Chaudhuri, Firewall Media publication
2	HTML5 Black Book, by Publishing company Limited. Kogent Learning Solutions Inc.
3	"World Wide Web design with HTML", Xavier, Tata McGraw-Hill
4	Internet of Things – A Hands on Approach, By ArshdeepBahga and Vijay Madisetti Universities Press, ISBN: 9788173719547
URL'S	
1	https://scratch.mit.edu
2	https://studio.code.org
3	http://ai2.appinventor.mit.edu
4	https://www.w3schools.com
5	https://www.tutorialspoint.com/javascript/index.htm
6	https://www.geeksforgeeks.org/html-tutorials/
7	Android https://developer.android.com
8	https://www.khanacademy.org
9	Tools for Web Development a. https://www.wix.com b. https://atom.io/ c. https://www.openelement.com/ d. https://www.layoutit.com

13. SUGGESTED LIST OF PROPOSED STUDENTS ACTIVITY

Note: Refer activities mentioned in DETAILS OF COURSE CONTENT table

14. COURSE ASSESSMENT AND EVALUATION CHART

SL.NO	ASSESSMENT	DURATION (in minutes)	MAX MARKS	CONVERSION
1	CIE Assessment 1 (Written Test -1 TH) - At the end of 3 d week	**60**	**20**	Average of two written tests 20
2	CIE Assessment 2 (Written Test -2 TH) - At the end of 13 week	**60**	**20**	
3	CIE Assessment 3 (Skill Test) - At the end of 5 week	**3 hrs**	**20**	Average of three skill test 20
4	CIE Assessment 4 (Skill Test) - At the end of 7 week	**3 hrs**	**20**	
5	CIE Assessment 5 (Skill Test) - At the end of 9 week	**3 hrs**	**20**	
6	CIE Assessment 6 (Student activity)- At the end of 11 week	**-**	**20**	**20**
7	**Total Continuous Internal Evaluation (CIE) Assessment**			**60**
8	Semester End Examination(SEE) Assessment (Practical Test)	**3 hrs**	**100**	**40**
TOAL MARKS				**100**
Note: CIE written test is conducted for 20 marks (Two sections). Each section shall have two full questions of same CL, CO. Student shall answer one full question from each section.				

15. RUBRICS FOR ACTIVITY

RUBRICS FOR ACTIVITY (Example Only) Appropriate rubrics shall be developed by the concerned faculty						
Dimension	**Poor**	**Below Average**	**Average**	**Good**	**Exemplary**	**Student Score**
	4	**8**	**12**	**16**	**20**	

Concept	Does not collect any information relating to the concept	Collects very limited information; some relate to the concept	Collect much information; but very limited relate to the concept	Collects some basic information; most refer to the concept	Collects a great deal of information; all refer to the concept	8
Design	Design is not acceptable/very poorly structured	Design is poor and not well structured.	Design Fallowed layout samples and well structured	Design & convey both content and context	Design considered all aspect of concept, concept and presentation (UI)	6
Creativity	Very little creativity in design/implementation	Creativity in concept or design or implementation	Creativity in concept /design/implementation	Creativity in concept /design/implementation which complements each other	Creative concept, content, presentation and implementation	8
Implementation	Poorly implemented	Partially implemented	Implemented on time with results (content)	Product convey both content and context	Product is creative with easy-to-use UI, structure	8
					Average / Total Marks: (8+6+8+8)/4	**7.5 = 8**

16. RUBRICS for Skill Test Evaluation (Both for CIE & SEE)

Sl No	Parameter to be Observed	Marks Allotted
1	Design-Written Skill Test 1: Algorithm / Flowchart/Visual Design Skill Test 2: Web site visual design Skill Test 3: Work flow or Project plan or cyber security plan or Cloud service Concept	30
2	Implementation Skill Test 1: Android application Skill Test 2: Web site / Web pages Skill Test 3: Create or use cloud service account or Cyber safety and security- Antivirus Installation or browser settings	50
3	Appeal and Presentation	20
Total		**100**

17. SYSTEM REQUIREMENTS:

Sl. No.	Specification	Quantity
1.	Computers with HD Graphics Card	20
2.	Software: GIMP, KRETA, BLENDER, PHOTOSHOP or any other relevant open-source software.	-
3.	Internet Connectivity	-

Note: Above specification is for a batch of 20 students

Government of Karnataka

Department of Collegiate and Technical Education

Board of Technical Examinations, Bangalore

Course Code	20EC21P	**Semester**	II
Course Title	**Electronics Components and Devices (ECD)**	**Course Group**	Core
No. of Credits	4	**Type of Course**	Lecturing & Practice
Course Category	EC	**Total Contact Hours**	6Hrs Per Week
			78Hrs Per Semester
Prerequisites	Arithmetic, basic of electronics	**Teaching Scheme**	(L: T:P) = 1:0:2
CIE Marks	60	**SEE Marks**	40

RATIONALE

An electronic circuit is a structure that directs and controls electric current to perform various functions including signal amplification, computation, and data transfer. It comprises several semiconductor devices & components such as resistors, transistors, capacitors, inductors, and diodes. These Semiconductor devices supply themselves in integrating into complex and are readily manufacturable into microelectronic circuits. They also find a good scope in the future in forming key components for the majority of electrical and electronic instruments and systems in various fields such as communications, data-processing, consumer electronics & robots and also in industrial control equipment.

COURSE SKILL SET

The goal of the course is to help the student to attain the following industry-need competencies through various teaching-learning processes.

- Identifying various components and semiconductor devices used in industrial applications.
- Interpretation of datasheets and usage of instruments.
- Basic knowledge of components, devices and simple applications.
- Perform soldering job, build and test analog electronic circuits for simple applications.
- Testing and experimentation under simulated and real environments.

INSTRUCTIONAL STRATEGY

1. This is theory-practice course with 1:2 time-share. Normally, the Lecturer is expected essentially to teach the relevant theoretical parts in one hour prior to the 2-hour lab session so that at the end the class the student attains the specified class-outcome. This requires well planning from Lecturer side to adhere to the schedules.
2. The Lecturer is expected to emphasize only the essential concepts/components/circuit/topics in respect of the practicing experiment in one-hour.
3. Normally in industrial environments, experiments are conducted under simulated environments before real-environment experimentation owing to the benefits of simulation. Same procedure is adapted here too with a few exceptions.
4. Awareness and safety-precautions on use of instruments/laboratory resources is mandatory for all students prior to the experimentation.
5. Lecturers shall advise repetition of experiments wherever possible and necessary.
6. Pre-reading of the content and experiment-procedure will have a greater impact on effectiveness and taking forward of this course and hence students shall be advised to do so.
7. The intent of the activity is to integrate multiple concepts learnt in the course and to create interest in students to face the integrating-challenge; hence, the Lecturer is advised to assign only such the activities.
8. Activity project need not be designed by student, teacher may provide or guide to search; however, it has to be simulated, fabricated and tested by the students.

LEVELS OF COURSE SKILL – SETS

Sl. No.	LEVEL	SKILL SET/S To be Attained
1	Level-1	Identification of components and semiconductor devices. Testing electronics components and semiconductor devices. Adaption of the best soldering methods/practices for fabrication of circuits.
2	Level-2	Experimenting to observe characteristics/behaviour/working of semiconductor devices.

		Building simple application development using components and semiconductor devices.
3	**Level-3**	Application, circuit simulation, testing and implementation.

COURSE OUT COMES

On successful completion of the course, the students will be able to

CO1	Identify and select the electronic components and devices and instruments.
CO2	Test electronic components and devices.
CO3	Fabricate/construct discrete circuits.
CO4	Select and analyse electronic circuits for characteristics and/or simple applications.
CO5	Experiment the circuit characteristics/simple applications under simulated and real environment.

Course Outcomes CO, PO, Cognitive-level and Teaching hours map

Course Outcomes	CL	Linked PO
CO1: Identify and select the electronic components and devices and instruments.	U/A	1,2,4,5
CO2: Test electronic components and devices.	U/A	1,4,5
CO3: Fabricate/construct discrete circuits.	U/A	1,4,5
CO4: Select and analyse electronic circuits for characteristics and/or simple applications.	U/A	1,3,4,5
CO5: Experiment the circuit characteristics/simple applications under simulated and real environment.	U/A	1,3,4,5,7

COURSE CONTENTS

The following topics/subtopics is to be taught and assessed in order to develop Unit Skill sets for achieving CO to attain identified skill sets

Sl. No	Content	Experiment	Method/ Class Outcome	L: T:P
UNIT 01: BASICS OF ELECTRONIC COMPONENTS				
Note: Demonstrations are hand-on and can be supported by videos/animation wherever possible to see that the students understand the concepts. Real experimentation is after simulation.				
1	Passive components (Resistor, Inductors and capacitors): Introduction, role, symbols, units, types/classification, identification, selection and applications.	Identification and finding/assessing values/tolerances (using color codes, labels) of passive components of different packages.	Demonstration, examples and exercises. **Identify and ascertain roles and values of components.**	**1:0:2**
2	Usage of electronic instruments: Multi-meter and LCR meter.	Verification of the values of passive components using multimeter and LCR meters (for the same components used in Expt.1)	Demonstration and exercises. **Use meters to assess values and to test components.**	**1:0:2**
3	Active components(Diode, Zener Diode, BJT): Introduction, list, role/function, symbols, types/packages, and applications	Identification of the active components, terminals, packages, and testing them for working, using multimeter.	Demonstration and exercises. **Identify terminals, packages and test the active components.**	**1:0:2**
4	Active components (MOSFET, SCR, DIAC, TRIAC): Role/function symbols, types and applications.	Identification of the active components, terminals, packages, and testing them for working, using multimeter.	Demonstration and experiment **Identify terminals, packages and test the active components.**	**1:0:2**

5	Packing, Stocking, Handling of components and their electrostatic safety. Understand the data/ specification sheets of all components Selection criterion of components. Soldering types and precautions.	Preparation of components, use of soldering iron and lead and flux. Standard Soldering practice to connect the components on base-board /PCB/assembly board (follow soldering standard).	Videos, demonstration and exercises. **Identify specifications from component data-sheets and perform standard soldering.**	**1:0:2**
6	Atomic structure and energy-band diagram of conductors, insulators and semiconductors- comparison and examples.	Soldering practice (continued) and de-soldering.	Videos, demonstration and exercises. **Compare the features of conductors, insulators and semiconductors**. **Solder and de-solder the components on PCBs/Baseboards.**	**1:0:2**
7	Simulators: Concept, advantages and features. Prominent simulation softwares and their features.	Using simulator/editors: Identification, selection and use of sources, components, devices and instruments. Component specifications and properties, schematic preparation. Component foot-print/3D views.	Demonstration. **Use simulator for experimentation.**	**1:0:2**
8	Semiconductor- Covalent bond, intrinsic and extrinsic SC: N type & P type, PN junction, biasing, current conduction, effect of temperature, and diode.	Usage of electronic Equipments: power supply, CRO and signal generator. Both in real and simulated environment.	Videos, demonstration and exercises. **Understand the current conduction in PN**	**1:0:2**

			junction. Use CROs, RPS and Sig. generators.	
UNIT 02: BASICS OF SEMICONDUCTOR DEVICES				
9	PN Junction Diode: Formation of PN junction. Potential barrier. Depletion region. Forward and Reverse biasing of diode and VI characteristics. Diode ratings and parameters.	Plot VI characteristics of Diode and ascertain Ri and cut-in voltage using simulator.	Animation/Video/ Visuals to show the working of PN junction/ diode. Experiment, graph and calculations. **Know the behavior of PN junction for biasing voltages.**	**1:0:2**
10	Zener diode: Working principle, constructional features, Avalanche and Zener breakdown. Reverse VI characteristics and applications.	Plot reverse VI characteristics of Zener ascertain Zener voltage using simulator.	Animation/Video/ Visuals to show the working of Zener Diode. Experiment and graph. **Know the behavior of Zener diode for reverse biasing.**	
11	Simple problems on diode circuits/selection of different biasing voltages to illustrate FB and RB of diode.	VI characteristics of diode (expt. 9) in real environment. Plot reverse VI characteristics of Zener diode (expt.10) in real environment.	Experiment and comparison with simulated results. **Compare real and simulated results.**	
12	AC-to-DC conversion: Need, rectification, half-wave and full-wave rectification. Half-wave rectifier: waveform, efficiency and ripple factor.	Experiment to obtain half-wave rectification under simulated environment: Obtain waveform, ripple factor, efficiency and PIV.	Experiment, waveforms and calculations. **Apply diode-switch to convert AC to DC.**	

13	Bridge Rectifier: efficiency and its ripple factor. Filter components and their role in reducing ripple.	Experiment to obtain full-wave rectification (using bridge) and filtering under simulated environment: Obtain waveform, ripple factor, efficiency and PIV, without and Full wave rectifier with C-filter	Experiment, waveform and calculations. **Apply diode-switches and filter to convert AC to DC more efficiently.**	**1:0:2**
14	Simple problems on half-wave, full-wave rectifier and filter circuits.	Conduct Expt. 13 under real environment.	Experiment, graph/waveforms and calculations. **Compare simulated and real-experiment results.**	**1:0:2**
15	Voltage regulation: Concept, need, Zener diode as voltage regulator. Voltage regulator circuit working. Condition and types of regulation.	Show how Zener diode can be used as voltage regulator in simulated and real environments.	Experiment and interpretation of result. **Use of Zener diode for regulated voltage supply.**	**1:0:2**
16	BJT: Types, construction, symbols, functions of base, emitter and collector, Current gain in CE mode.	Obtain output characteristics of BJT in CE configuration under simulated environment. Calculate input resistance, and mark the different regions on output characteristics and calculate current gain.	Experiment, graph and calculations **Understand the** **behaviour of BJT**	**1:0:2**
17	BJT: Modes of operation-comparison.BJT packages and specifications. Data sheet interpretation.	Experiments 16 under real environment.	Experiment, graph and calculations. **Compare with simulated results.**	

18	Operating regions of BJT, BJT as a switch and amplifier. Thermal runaway and need for heat sink.	Experiment BJT as a switch under simulation environment. (This is linked to experiment 21)	Experiment **Use BJT as a current-controlled electronic switch**	**1:0:2**
19	MOSFET: Field effect, types, construction, working and applications. MOSFET applications. MOSFET as switch. Comparison of BJT and MOSFET.	Show how MOSFET can be used as a switch under simulated environment. (This is linked to experiment 21)	Experiment **Use MOSFET as a voltage-controlled switch**	**1:0:2**
20	SCR: Construction, Working, Operating modes, definition of triggering and commutation.	Forward VI characteristics of SCR simulation and real environment.	Experiment **Understand the behavior of controlled switch**	**1:0:2**
UNIT 03: OPTO ELECTRONIC DEVICES				
21	Opto-electronic devices: Introduction, principle of photo emission, photoconduction and photovoltaic effects. LED: Construction features, role, biasing, packages, and ratings.	Switching to blink an LED using BJT or MOSFET. Experiment under simulated and real environment. This is extension of Expt. 18 and 19)	Experiment. **Use electronic switch and LED in application development.**	**1:0:2**
22	LDR: Construction features, role, package, specifications, and application. Explanation of automatic street-light control circuit.	Conduct a simple experiment to automatically control street-light using LDR and SCR in simulated environment.	Experiment. **Use electronic components and devices to solve simple real-world problem**	**1:0:2**

23	Photodiode and Phototransistor: Construction features, role, specifications, packages, and applications.	Conduct experiment 22 in real environment.	Experiment. **Compare real and simulated results.**	**1:0:2**
UNIT 04: SENSORS AND ACTUATORS				
24	Sensors: Principle and classification. List passive sensors, their working principle/role, packages, specifications, and applications. Anyone passive-sensor-based simple application in detail.	Experiment any passive-sensor-based simple application to under simulated environments to illustrate use of sensor for solving simple real-world problem.	Experiment. **Use electronic components and/or devices (sensor) to solve simple real-world problem**	**1:0:2**
25	Active sensors: List active sensors, their working principle/role, packages, specifications, and applications. Anyone active-sensor-based simple application in detail.	Experiment 24 under real environment	Experiment, **Use electronic components and/or devices (sensors) to solve simple real-world problem**	**1:0:2**
26	Actuators: Basic principle/role and types/classification. Roles/applications of different actuators. Simple application involving actuator in detail.	Conduct a simple application involving actuator under simulated and/or real environment.	Experiment, **Use electronic components and/or devices (actuator) to solve simple real-world problem**	**1:0:2**

Mapping of COs, POs, Cognitive-levels and Teaching Hours

CO	Course Outcome	PO Mapping	Experiential	Cognitive	Lecture	Tutorial &	TOTAL

CO1	Identify and select the electronic components and devices and instruments	1,2,4, 5	**U1**	U/A	8	16	24
CO2	Test electronic components and devices.	1,4,5					
CO3	Fabricate/construct discrete circuits.	1,4,5	**U2, U3 & U4**	**U/A**	18	36	54
CO4	Select and analyse electronic circuits for characteristics and/or simple applications.	1,3,4, 5					
CO5	Experiment the circuit characteristics/simple applications under simulated and real environment.	1,3,4, 5,7					
					26	**52**	**78**

Course	**COs**	**Program Outcomes (POs)**						
		1	**2**	**3**	**4**	**5**	**6**	**7**
Electronic Components and Devices	CO1	3	1	0	2	1	0	0
	CO2	3	0	0	2	1	0	0
	CO3	3	0	0	2	1	0	0
	CO4	3	0	1	2	1	0	0
	CO5	3	0	1	2	1	0	2
Legends: Level 3- Highly Mapped, Level 2-Moderately Mapped, Level 1-Low Mapped, Level 0- Not Mapped								

SUGGESTED LEARNING RESOURCES

Reference Books:

6. Principles of Electronics, Rohit Mehta & V K Mehta, S. Chand Publishing ISBN: 9788121924504
7. Fundamentals of Electrical and Electronics Engineering, B. L. Theraja, S. Chand and Company. REPRINT 2013, ISBN 8121926602
8. Electronic Components, Dr. K. Padmanabhan and P. Swaminathan, Lakshmi Publications, 2006.
9. Electronic Devices and Circuits, David A. Bell, Oxford University Press, ISBN: 9780195693409

10. Sensors Handbook-SabrieSoloman-McGraw Hill publication, Second Edition.
11. Handbook of Modern Sensors: Physics, Designs, and Applications, Jacob Fraden, Springer Publications, Third Edition.

E-Resources

1. http://www.electronics-tutorials.ws
2. http://electrical4u.com/

Student Activities (CIE 20 marks)

Introduction

Group of 4(maximum) students should conduct **UNIQUE** activity. Suggestive activities are as follow, but not limited to these only, any similar activity can be assigned. Each activity can be carried out off-class hours in the laboratory. Choose the activity for which circuits, boards and components are easily available with the guidance of the teacher, and the activity shall have the scope to integrate multiple concepts. Students are advised plan and start the activity in 7th week and complete it by 11th week.

a. Example activities

SL. No.	Activities
1.	Fire detector application.
2.	Intruder detector
3.	LED serial-sets
4.	Clapp/sound detector application
5.	Smoke detector application
6.	LED bulb
7.	And all such simple circuits/projects that have scope to integrate multiple concepts learnt and for which circuits/boards/components are easily available.

10.3 Execution details

1.Maximum of 4 students in each batch.

2. Write qualitative report not exceeding 8 pages; one report per batch.
3. Each of the activity can be carried off-class, and shall be presented to the teacher using suitable presentation mode

4. Assessment shall be made based on information collection, integration of concepts involved, execution (simulation/fabrication/testing/results), report, presentation, and role in the team.

10.4 Activity Assessment Scheme

Sl. No.	Parameter to be Observed for Activity Assessment	Marks Allotted
1	Information collection	4
2	Level of integration of concepts/creativity	4
3	Simulation, testing and result	4
4	Fabrication, testing and result	4
5	Report Presentation Role in the team	4
	Total	**20**

COURSE ASSESSMENT AND EVALUATION CHART

Sl.No	Assessment	Duration	Max marks	Conversion
1.	CIE Assessment 1 (Written Test -1-theory) - At the end of **3rd week**	60 minutes	20	Average of two written tests 20
2.	CIE Assessment 2 (Written Test -2-theory) - At the end of **13th week**	60 minutes	20	
3.	CIE Assessment 3 (Skill test) - At the end of **5th week**	3 Hours	20	Average of three skill tests 20
4	CIE Assessment 4 (Skill test) - At the end of **7th week**	3 Hours	20	
5	CIE Assessment 5 (Skill test) - At the end of **9th week**	3 Hours	20	
6	CIE Assessment 6 (Student activity) - At the end of **11th week**	-	20	20
7.	**Total Continuous Internal Evaluation (CIE) Assessment**			**60**

8.	**Semester End Examination (SEE) Assessment** **(Practical Test)**	**3 Hours**	**100**	**40**
Marks			**Total**	**100**

Note:

1. CIE written test is conducted for 20 marks (Two sections). Each section shall have two full questions of same CL, CO. Student shall answer one full question (10 marks) from each section.
2. CIE Skill test is conducted for 100 marks (3 Hours duration) as per scheme of evaluation and the obtained marks are scaled down to 20 marks

Scheme of Evaluation for CIE and SEE (Skill test)

(CONTINOUS INTERNAL EVALUATION & SEMESTER END EXAMINATION)

Sl. No.	Particulars	Marks
1	Understanding of the problem, identification and selection of components/devices/equipment, inputs and expected outputs.	10
2	Experimentation/Execution under simulated environment	20
3	Circuit building using soldering and board (Assessment indicators: correctness, quality, effective use of space and soldering in conformance with standards)	20
4	Experimentation and recording the observed readings in real environment	30
5	Results interpretation (Calculation/accuracy/graph/table)	10
6	Viva-voice	10
Total		**100**

NOTE:

- Both CIE &SEE is conducted for 100 marks (3 Hrsduration).
- Examiner is suggested to assign the question randomly and uniformly so as to avoid resource shortage in the laboratory.
- Reasonable opportunities shall be given to the student to write the circuit. Until and unless correct circuit is written he should not be allowed to rig-up/fabricate the circuit; however, student can be allowed to work under simulation environment. Then he can rig-up/fabricate the circuit for real execution.
- Normally, the experiment is simulated first, then moving on to real experimentation.

However, order of simulation and real experimentation can be interchanged in theexamination for the purpose of resource and time management during the examination.

RUBRICS FOR ACTIVITY

RUBRICS FOR ACTIVITY (Example only) Faculty need to develop appropriate rubrics for respective activity						
Dimension	**Beginning**	**Developing**	**Satisfactory**	**Good**	**Exemplary**	**Student Score**
	1	**2**	**3**	**4**	**5**	
Collection of data	Does not collect any information relating to the topic	Collects very limited information; some relate to the topic	Collect much information; but very limited relate to the topic	Collects some basic information; most refer to the topic	Collects a great deal of information; all refer to the topic	8
Fulfil team's roles & duties	Does not perform any duties assigned to the team role	Performs very little duties but unreliable.	Performs very little duties	Performs nearly all duties	Performs all duties of assigned team roles	6
Shares work equally	Always relies on others to do the work	Rarely does the assigned work; often needs reminding	Usually does the assigned work; rarely needs reminding	Normally does the assigned work	Always does the assigned work without having to be reminded.	8
Listen to other Team mates	Is always talking; never allows anyone else to speak	Usually does most of the talking; rarely allows others to speak	Talks good; but never show interest in listening others	Listens, but sometimes talk too much	Listens and speaks a fair amount	8
					Average / Total Marks:(8+6+8+8)/4	**7.5=8**

Model Question Paper FOR CIE (WRITTEN TEST)

Programme:	**Semester: II**
Course Name :	**Max Marks :20**
CourseCode :	**Duration: 60minutes**
Name of thecoursecoordinator:	**Test: I/II**

Note: Answer one full question from each section. One full question carries 10 marks.

Qn. No	Question	CL	CO	PO	Marks
	Section-1				
1.a)					
b)					
c)					
2.a)					
b)					
c)					
	Section-2				
3.a)					
b)					
c)					
4.a)					
b)					
c)					
	Section-3				
5.a)					
b)					
c)					
6.a)					
b)					
c)					

Equipment List (For a batch of 20 students)

Sl. No.	NAME OF THE EQUIPMENT	Quantity
01	Dual Channel 0-30V at 2/1A RPS with short-circuit protection	10
02	0-30V at 2/1A RPS with short circuit protection	10
03	Function Generator (0-10MHz)	10
04	Dual Trace Oscilloscope (20MHz)	10
05	Digital multimeters.	20
06	Decade resistance boxes	10
07	Decade capacitance boxes	10
08	Decade inductance boxes	10
09	LCR meter	05

10	Electronic components/Consumables resistors, inductors, capacitors, transformers, hookupwires ,SCR, MOSFET, DIAC,TRIAC, BJT, Photo transistor, Photo diode, JFET, diode, Zener diode, soldering lead etc	10
11	Bread boards, Soldering Gun, Tag Board, 9V battery cells, Bulbs.	10
12	Computer System for Circuit simulation (having Electronics Circuit Simulation Software installed in each computer).	20

ದ್ವಿತೀಯ ಸೆಮಿಸ್ಟರ್ ಕನ್ನಡ ಬಾರದ / ಕನ್ನಡೇತರ ಡಿಪ್ಲೋಮಾ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ನಿಗಧಿಪಡಿಸಿದ ಪಠ್ಯಕ್ರಮ

ಬಳಕೆ ಕನ್ನಡ – 1

Course Code	20KA21T	Semester : II	Course Group – AU/KA
Course Title	**ಬಳಕೆ ಕನ್ನಡ – I**	Category : AU	Lecture Course
No. of Credits	2	Type of Course	CIE Marks : 50
Total Contact Hours	2 Hrs Per Week 26Hrs Per Semester	Teaching Scheme (L:T:P)= 2:0:0	SEE Marks : Nil

Table of Contents (ಪರಿವಿಡಿ)

Part – 1	**Teaching Hour**
Introduction to the Book, Necessity of learning a local language, Tips to learn the language with easy methods. Easy learning of a Kannada Language: A few tips. Hints for correct and polite conservation. Instructions to Teachers for Listening and Speaking Activities.	**02**
Part – II	
Key to Transcription for Correct Pronunciation of Kannada Language, Instructions to Teachers to teach Kannada Language	**02**
Part – III Lessons to teach Kannada Language - Listening and Speaking Activities	
Lesson – 1 Personal Pronouns, Possessive Forms, Interrogative words	**02**
Lesson – 2 Possessive forms of nouns, dubitive question and Relative nouns	**02**
Lesson – 3 Qualitative, Quantitative and Colour Adjectives, Numerals	**02**
Lesson – 4 Predictive Forms, Locative Case	**02**
Lesson – 5 Dative Cases, and Numerals	**02**
Lesson – 6 Ordinal numerals and Plural markers	**02**
Lesson – 7 Defective / Negative Verbs and Colour Adjectives	**02**
Lesson – 8 Permission, Commands, encouraging and Urging words (Imperative words and sentences)	**02**
Lesson – 9 Accusative Cases and Potential Forms used in General Communication	**02**
Lesson – 10 Helping Verbs “iru and iralla”, Corresponding Future and Negation Verbs	**02**
Lesson – 11 Do's and Don'ts in Learning of Kannada Language (Any Language in General)	**01**
Lesson – 12 Kannada Vocabulary List : ಸಂಭಾಷಣೆಯಲ್ಲಿ ದಿನೋಪಯೋಗಿ ಕನ್ನಡ ಪದಗಳು - Kannada Words in Conversation	**01**
Total Teaching Hours	**26 Hours**

ದ್ವಿತೀಯ ಸೆಮಿಸ್ಟರ್ ಕನ್ನಡ ಬಲ್ಲ ಡಿಪ್ಲೋಮಾ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ನಿಗಧಿಪಡಿಸಿದ ಪಠ್ಯಕ್ರಮ

(ಕನ್ನಡ ಭಾಷೆ, ಸಾಹಿತ್ಯ, ಸಂಸ್ಕೃತಿ ಮತ್ತು ಪರಂಪರೆ ಕುರಿತು)

Course Code	**20KA21T**	Semester : II	Course Group – AU/KA
Course Title	**ಸಾಹಿತ್ಯ ಸಿಂಚನ** – ೧	Category : AU	Lecture Course
No. of Credits	2	Type of Course	CIE Marks : 50
Total Contact Hours	2 Hrs per Week 26 Hrs per Semester	Teaching Scheme (L:T:P)= 2:0:0	SEE Marks : Nil

ಸಾಹಿತ್ಯ ಸಿಂಚನ – ೧ (ಕಾರ್ಯಪುಸ್ತಕ) (20KA21T)

ಪಠ್ಯಪುಸ್ತಕದ ಪರಿವಿಡಿ	ಬೋಧನಾ ಅವಧಿ
1. ಕರ್ನಾಟಕದ ಸಂಕ್ಷಿಪ್ತ ಇತಿಹಾಸ ಮತ್ತು ಸಾಹಿತ್ಯದ ಬೆಳವಣಿಗೆ	**01 ಗಂಟೆ**
2. ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಸಂಕ್ಷಿಪ್ತ ಚರಿತ್ರೆ	**01 ಗಂಟೆ**
3. ಹಳೆಗನ್ನಡ ಸಾಹಿತ್ಯ - ಪಂಪ ಪೂರ್ವ ಯುಗ	
ಕನ್ನಡ ಸಾಹಿತ್ಯದ ರಚನೆಗೆ ಪ್ರಮುಖ ಪ್ರೇರಣೆಗಳು ಮತ್ತು ಪ್ರಭಾವಗಳು ಕನ್ನಡ ಸಾಹಿತ್ಯ ಪರಂಪರೆ ಮತ್ತು ರಾಜಾಶ್ರಯ ಕವಿರಾಜಮಾರ್ಗ ಮತ್ತು ವಡ್ಡಾರಾಧನೆ	**03 ಗಂಟೆ**
4. ಪಂಪ / ಚಂಪೂ ಯುಗದ ಕನ್ನಡ ಸಾಹಿತ್ಯ ಮತ್ತು ಪರಂಪರೆ	
ಆದಿಕವಿ ಪಂಪ, ರನ್ನ, ಪೊನ್ನ, ಜನ್ನ. ಒಂದನೇ ನಾಗವರ್ಮ ಮತ್ತು ನಾಗಚಂದ್ರ 10 ಮತ್ತು 11ನೇ ಶತಮಾನದ ಸಮಕಾಲೀನ ಪ್ರಮುಖ ಕವಿಗಳು	**04 ಗಂಟೆ**
5. ನಡುಗನ್ನಡ ಸಾಹಿತ್ಯ - ವಚನ ಸಾಹಿತ್ಯ / ಬಸವ ಯುಗ	
ವಚನ ಸಾಹಿತ್ಯದ ಬೆಳವಣಿಗೆಗೆ ಕಾರಣಗಳು ಮತ್ತು ಅದರ ಮಹತ್ವ ಪ್ರಮುಖ ವಚನಕಾರರು, ವಚನ ಸಾಹಿತ್ಯದಲ್ಲಿ ವೈಚಾರಿಕತೆ ಮತ್ತು ಕಾಯಕ ತತ್ತ್ವ	**04 ಗಂಟೆ**
6. ಕುಮಾರವ್ಯಾಸ ಯುಗ ಮತ್ತು ಸಾಹಿತ್ಯದ ಇತರೆ ರೂಪಗಳು	
ರಗಳೆ – ಹರಿಹರ, **ಷಟ್ಪದಿ –** ಕುಮಾರವ್ಯಾಸ, ಲಕ್ಷ್ಮೀಶ ಮತ್ತು ರಾಘವಾಂಕ **ಸಾಂಗತ್ಯ -** ರತ್ನಾಕರವರ್ಣಿ,	**04 ಗಂಟೆ**
7. ದಾಸ ಸಾಹಿತ್ಯ / ಕೀರ್ತನೆಗಳು ಪುರಂದರದಾಸರು, ಕನಕದಾಸರು ಮತ್ತು ಇತರೆ ಕೀರ್ತನೆಕಾರಾರು	**02 ಗಂಟೆ**
8. ಇತರೆ ಸಾಹಿತ್ಯದ ಪ್ರಕಾರಗಳು **ತ್ರಿಪದಿ** - ಸರ್ವಜ್ಞ, **ಜಾನಪದ ಸಾಹಿತ್ಯ,** **ತತ್ತ್ವಪದಗಳು** - ಶಿಶುನಾಳ ಶರೀಫರು	**04 ಗಂಟೆ**
9. ಮಹಿಳಾ ಸಾಹಿತ್ಯ : ಹೆಳವನಕಟ್ಟೆ ಗಿರಿಯಮ್ಮ ಮತ್ತು ಸಂಚಿಹೊನ್ನಮ್ಮ, **ಆಧುನಿಕ ಪೂರ್ವ ಕನ್ನಡ ಸಾಹಿತ್ಯ :** ಕೆಂಪುನಾರಾಯಣ ಮತ್ತು ಮುದ್ದಣ	**02 ಗಂಟೆ**
10. ಹಳೆಗನ್ನಡ ಮತ್ತು ನಡುಗನ್ನಡ ಸಾಹಿತ್ಯ ಚರಿತ್ರೆಯ ಒಂದು ಅವಲೋಕನ	**01 ಗಂಟೆ**
ಒಟ್ಟು ಬೋಧನಾ ಅವಧಿ 26 ಗಂಟೆಗಳು	**26 ಗಂಟೆ**

ಬಳಕೆ ಕನ್ನಡ -I ಮತ್ತು ಸಾಹಿತ್ಯ ಸಿಂಚನ -೦೧ ಪಠ್ಯಕ್ರಮಗಳಿಗೆ ನಿರಂತರ ಆಂತರಿಕ ಮೌಲ್ಯಮಾಪನದ ಮಾರ್ಗಸೂಚಿಗಳು

(COURSE ASSESSMENTS AND EVALUATION CHART- CIE ONLY)

Sl.No	Assessment	Type	Time frame in semester	Duration	Max marks	Conversion
1.	CIE Assessment 1	Written test-1	- At the end of 3rd week	80 minutes	30	Average of three written tests-1,2,3 for 30 marks
2	CIE Assessment 2	Written test-2	- At the end of 7th week	80 minutes	30	
3	CIE Assessment 3	Written test-3	- At the end of 13th week	80 minutes	30	
4	CIE Assessment 4	MCQ/Quiz	- At the end of 5th week	60 minutes	20	Average of three Assessment 4,5,6 for 20 marks
5	CIE Assessment 5	Open book test	- At the end of 9th week	60 minutes	20	
6	CIE Assessment 6	Student activity & presentation	- At the end of 11th week	60 minutes	20	
	Total Continuous Internal Evaluation (CIE) Assessment					**50**
				Total Marks		**50**