Veermata Jijabai Technological Institute (V.J.T.I)

(Central Technological Institute, Maharashtra State, INDIA)

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Programme Name: Diploma In Electronics Engineering

Programme Code	: DELNE	**With Effect From Academic Year**	: 2023-24
Duration of Programme	: 6 Semester	**Duration**	: 16 Weeks
Semester	: Third	**Scheme**	: R-2023

Sr No	Course Title	Abbreviation	Course Type	Course Code	Total IKS Hrs for Sem.	Learning Scheme					Credits	Assessment Scheme												
						Actual Contact Hrs./Week			Self-Learning (Term Work + Assignment)	Notional Learning Hrs. /Week		Paper Duration (hrs.)	Theory					Based on LL & TL				Based on Self Learning		Total Marks
																		Practical						
						CL	TL	LL					FA-TH (MST)	SA-TH (ESE)		Total		FA-PR		SA-PR		SLA		
													Max	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	
1	APPLIED MATHEMATICS	MA-III	AEC	233MA31	2	3	2	-	-	5	2.5	3	30	70	28	100	40	25@	10	-	-	-	-	125
2	NETWORK ANALYSIS	NA	DSC	233EX32	0	3	1	2	-	6	3	3	30	70	28	100	40	25@	10	25#	10	-	-	150
3	ELECTRONICS- I	EC- I	DSC	233EX33	0	3	-	2	-	5	2.5	3	30	70	28	100	40	25@	10	25#	10	-	-	150
4	ELECTRONICS MEASUREMENT AND INSTRUMENTATION	EMI	DSC	233EX34	0	3	-	2	-	5	2.5	3	30	70	28	100	40	25@	10	25#	10	-	-	150
5	DIGITAL ELECTRONICS	DE	DSC	233EX35	0	3	1	2	-	6	3	3	30	70	28	100	40	25@	10	25#	10	-	-	150
6	ELECTRONICS WORKSHOP	EW- I	SEC	233EX36	0	1	-	2	2	5	2.5	-	-	-		-	-	25@	10			25@	10	50
7	INTRODUCTION TO PYTHON (ONLINE)	IP	SEC	233EX37	0	1	-	2	3	6	3	-	-	-		-	-	50@	20			25@	10	75
8	ESSENCE OF INDIAN CONSTITUTION	EC	VEC	233EX38	0	1	-	-	1	2	1	-	-	-		-	-	-	-			50@	20	50
Total					**2**	**18**	**4**	**12**	**6**	**40**	**20**		**150**	**350**		**500**		**200**		**100**		**100**		**900**

Abbreviations: CL- Classroom Learning, TL- Tutorial Learning, LL-Laboratory Learning, FA - Formative Assessment, SA -Summative Assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination, @$ Internal Online Examination

Course Category: Discipline Specific Course Core (DSC): 2, Discipline Specific Elective (DSE): 0, Value Education Course (VEC): 1, Intern. /Apprentice /Project /Community (INP): 0, Ability Enhancement Course (AEC): 2, Skill Enhancement Course (SEC): 2, Generic Elective (GE): 0

Curriculum Coordinator

Head Diploma in Electronics Engineering

VEERMATA JIJABAI TECHNOLOGICAL INSTITUTE DIP EXAM MATUNGA MUMBAI-19

Dean - Diploma

DIPLOMA PROGRAMME	: DIPLOMA IN ELECTRONICS ENGINEERING
PROGRAMME CODE	: DELNE
SEMESTER	: III
COURSE TITLE	: APPLIED MATHEMATICS
COURSE CODE	: 233EX31

I. TEACHING AND EXAMINATION SCHEME

TEACHING SCHEME						ASSESSMENT SCHEME												
CL	TL	LL	Self-learning	CR	Total IKS Hrs for Sem	PAPER HRS	FA-TH (MST)	SA-TH (ESE)	TOTAL		Based on LL & TL Practical				Based on Self-learning		TOTAL MARKS
											FA-PR (CA)		SA-PR (PR/OR)		SLA		
							Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	
3	1	-	-	2	-	3	30	70	100	40	25	10	-	-	-	-	125

II. RATIONAL

To teach students basic facts, concepts and principles of Mathematics as a tool to analyze engineering problems. To make students well versed in the prerequisites for further studies in electronics engineering.

III. COURSE OUTCOMES (COS)

Students will be able to achieve the following COS on completion of course based learning

CO1:	Apply mathematical techniques to solve problems involving Matrices, Laplace Transforms, Fourier Transforms and vectors to understand the concepts.
CO2:	Apply the concept of transforms, vectors, and Linear algebra to solve the real-life problems.
CO3:	Apply concept of matrix algebra, vectors and transforms to electrical and control systems.

IV. COURSE CONTENTS WITH SPECIFICATION TABLE

SECTION-I								
Unit & Sub-Unit		Topics/Sub-topics	Hrs	Marks	CO	R Level	U Level	A Level
1		**Linear Algebra : Matrix Theory**	**08**	**10**	**1,2,3**	**20%**	**20%**	**60%**
	1.1	Characteristic equation, Eigen values and Eigen vectors, Example based on properties of Eigen values and Eigen vectors.			1,2,3			

	1.2	Cayley-Hamilton theorem (Without proof), Examples based on verification of Cayley- Hamilton theorem and compute inverse of Matrix			1,2,3			
	1.3	Diagonalization of matrices			1,2			
	1.4	Derogatory and non-derogatory matrices.			1,3			
	1.5	Rank of a matrix.			1,3			
2		**Laplace Transform**	**09**	**15**	**1,2,3**	**20**	**20**	**60%**
	2.1	Definition of Laplace transform, Condition of Existence of Laplace Transform			1,2,3			
	2.2	Laplace Transform (L) of standard functions like eat , $sin(at)$, $cos(at)$, $sinh(at)$, $cosh(at)$ and tn , $n \geq 0$.			1,2,3			
	2.3	Properties of Laplace Transform: Linearity, First Shifting Theorem, Second Shifting Theorem, Change of Scale Property, Multiplication by t, Division by t, Laplace Transform of derivatives and integrals (Properties without proof).			1.2,3			
	2.4	Application of Laplace transform to simple electrical circuit analysis and basic control systems problems.			1,2,3			
3.		**Inverse Laplace Transform**	**07**	**10**	**1,2,3**	**20**	**20**	**60%**
	3.1	Use of standard formulae to find inverse Laplace Transform			1,2,3			
	3.2	Partial fractions method to find inverse Laplace Transform.			1,3			
	3.3	Applications to solve initial and boundary value problems involving ordinary differential equations in control systems.			1,2,3			

SECTION-II

Unit & Sub-Unit		Topics/Sub-topics	Hrs	Marks	CO	R Level	U Level	A Level
4.		**Vector algebra**	**08**	**10**	**1,2,3**	**20**	**20**	**60%**
	4.1	Basics of vectors, vector addition and subtraction , dot product and cross product of vectors, angle between the vectors.			1,2,3			
	4.2	Direction cosines and ratios of vectors.			1,2			
	4.3	Vector differentiation: Basics of Gradient, Divergence and Curl of a vector.			1,3			
	4.4	Properties of vector field: Solenoidal and Irrotational (conservative) vector fields			1,2,3			
5		**Fourier series and transform.**	**09**	**15**	**1,2,3**	**20%**	**20%**	**60%**
	5.1	Dirichlet's conditions, Definition of Fourier series			1.2,3			
		Fourier series of periodic function with			1,2,3			

		period 2π and 2l, even and odd functions.						
	5.2	Definition of fourier transform, Properties of fourier transform – Linearity, Time shifting ,frequency shifting and differentiation property.Application of Fourier transforms to electrical and control problems.			1,2,3			
	5.3	Dirichlet's conditions, Definition of Fourier series			1,2,3			
6		**Z transform**	**07**	**10**	**1,2,3**	**20%**	**20%**	**60%**
	6.1	Definition and Region of Convergence, Z Transform of Standard Functions			1,3			
	6.2	Properties of Z Transform: Linearity property, Time shifting property, differentiation property and convolution property.			1,2			
	6.3	Inverse Z transform by partial fraction method.			1,3			
Legends: R- Remember, U – Understand, A – Apply and above levels (Blooms's Revised Taxanomy).								

V. LIST OF TUTORIALS

Sr. No.	Unit	Practical/Assignment	Approx. Hours	Relevant COS
1	1	Tutorial on Eigen values and Eigen vectors of matrix, problems based on Cayley Hamilton theorem.	1	1
2	1	Tutorial on diagonalisation of matrices, derogatory/non derogatory matrices and rank of a matrix.	1	1
3	2	Tutorial on Laplace transform.	1	2
4	2	Tutorial on application of Laplace Transform.	1	2
5	3	Tutorial on inverse Laplace Transform.	1	2
6	4	Tutorial on vector calculus.	1	3
7	5	Tutorial on Fourier series.	1	2
8	5	Tutorial on Fourier Transform.	1	2
9	6	Tutorial on Z transform.	1	2
* Minimum 7 and maximum 8 practical/experiment sessions to be included in a course in a term				

VI. SUGGESTED SELF LEARNING ASSIGNMENTS/MICROPROJECT/ACTIVITIES

Assignments

- Solve assignments suggested by teacher.
- Application of Laplace transform to electrical circuits.
- Application of Laplace Transform to control systems.
- Application of Fourier transform to signal processing.
- Application of Z transform to digital signal processing.

Micro Project (if any)

- Simple projects on application of Laplace Transform/ Z transform on mat lab.

VII. ASSESMENTS METHODOLOGIES /TOOLS

Formative assessment (Assessment for Learning)

- Tutorial performance and completion.
- Midterm Test Exam
- Class Test.
- Term Work
- Seminar/Presentation

Summative Assessment (Assessment of Learning)

- End Term Exam
- Micro-project/Assignments

VIII. SUGGESTED COS-POS MATRIX FORM

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	2	3	1	1	-	-	1	2	1	0
CO2	2	3	1	1	-	-	1	2	1	0
CO3	2	3	1	1	-	-	1	2	1	0

Legends :- High:03, Medium:02,Low:01, No Mapping: -

IX. SUGGESTED LEARNING MATERIALS TEXTBOOKS/REFRENCE BOOKS

No	Author	Title	Publisher
1	H.K. Das	Advanced engineering mathematics, H.K. Das	S.Chand, Publications
2	B. V. Ramana	Higher Engineering Mathematics,	Tata Mc-Graw Hill Publication

3	Murry R. Spiegel	Vector Analysis Schaum's outline series	Mc-Graw Hill Publication
4	Dr. B. S.Grewal	Higher Engineering Mathematics	Khanna Publication
5	Dutta. D	A text book of Engineering Mathematics	New age publication New Delhi, 2006 ISBN: 978- 81-224-1689-3

X. LEARNING WEBSITES AND PORTALS

Sr.No	Link / Portal	Description
1	http://nptel.ac.in/courses/106102064/1	Vector analysis
2	https://www.khanacademy.org/math?gclid=CNqHuabCys4CFdOJaddHo Pig	Laplace Transforms; Z transforms.
3	https://www.wolframalpha.com/	Laplace transform
4	https://www.coursera.org/	Cousera- Matrix problems.

Curriculum Coordinator

Head of the Department

Dean Diploma

VEERMATA JIJABAI TECHNOLOGICAL INSTITUTE DIP. EXAM MATUNGA MUMBAI-19

DIPLOMA PROGRAMME	: DIPLOMA IN ELECTRONICS ENGINEERING
PROGRAMME CODE	: DELNE
SEMESTER	: THIRD
COURSE TITLE	: NETWORK ANALYSIS
COURSE CODE	: 233EX32

I. TEACHING AND EXAMINATION SCHEME

TEACHING SCHEME						ASSESSMENT SCHEME											
CL	TL	LL	Self-learning	CR	Total IKS Hrs for Sem	PAPER HRS	FA-TH (MST)	SA-TH (ESE)	TOTAL		Based on LL & TL Practical				Based on Self-learning		TOTAL MARKS
											FA-PR (CA)		SA-PR (PR/OR)		SLA		
							Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	
3	1	2	-	3	6	3	30	70	100	40	25	10	25@	10	-	-	150

II. RATIONAL:

To teach students, basic facts of circuit analysis on present of dependent sources. To analyse the first and second order system response with dc inputs using differential equation technique and Laplace Transform. To understand the one and two port network circuits with their various parameters and concept of transfer function.

III. COURSE OUTCOMES (COS)

Students will be able to achieve the following COS on completion of course based learning

CO1:	Analyze electrical networks using Kirchhoff's law, various Theorems and dependent sources.
CO2:	Analyze and apply the transient and steady state behavior of circuits.
CO3:	Represent a network in terms of its two port network parameters.

IV. COURSE CONTENTS WITH SPECIFICATION TABLE

SECTION - I							
Unit & Sub-Unit	Topics/Sub-topics	Hours	Marks	COs	R Level	U Level	A Level
1	**Analysis of resistive Circuits Using Dependent sources:**	8	10	1	10%	60%	30%
1.1	Source Transformation for circuits with Dependent sources, Nodal Analysis of Circuits Containing			1			

	Resistors and Dependent Sources,						
1.2	Mesh Analysis of Circuits with Resistors and Dependent Sources.			1			
1.3	Network Theorems (Thevenin's Theorem, Norton's Theorem, Superposition Theorem using Dependent sources):			1			
2	**Initial & Final Conditions in Networks**	4	5	2	25%	25%	50%
2.1	Concept of initial condition.			2			
2.2	Concept of final (steady-state) conditions.			2			
2.3	Calculation of initial value and final value on RL, RC and RLC network.			2			
3	**Transient Analysis using differential equation technique:**	12	20	1,2	25%	25%	50%
3.1	Transient Response of Series/parallel RL and RC circuit with D.C. Excitation			1,2			
3.2	Transient Response of series and parallel RLC Circuit with D.C. Excitation.			1,2			
3.3	Concept of Different Types of Second Order Responses: Under-damped, Critically and over-damped Network system.			1,2			

SECTION – II							
Unit & Sub-Unit	**Topics/Sub-topics**	**Hours**	**Marks**	**CO**	**R Level**	**U Level**	**A Level**
4	**The Laplace Transformation & its application in circuit analysis:**	10	16	1,2	20%	40%	40%
4.1	Introduction to Laplace transform, Inverse Laplace and properties of Laplace Transform related to circuit analysis			1,2			
4.2	Concept of Initial value and final value.			1,2			
4.3	Laplace transforms of standard time signals: Unit step, Unit Ramp, and Unit Impulse functions.			1,2			
4.4	Step, Ramp & impulse Response of R-L & R-C and RLC Circuit.			1,2			
5	**Network Functions and Synthesis:**	6	7	3	30%	30%	40%
5.1	Network functions for one port and two port networks.			3			
5.2	Driving point function, Concept of transfer functions			3			
5.3	Poles and zeros of network functions, Representation of Pole and zero plot.			3			
5.4	Herwitz polynomial, positive real functions			3			
6	**Two –Port Networks**	8	12	3	25%	50%	25%
6.1	Two port admittance Parameters (y parameters)			3			
6.2	Two port impedance Parameters (z-parameters)			3			
6.3	Hybrid parameters (h parameters)			3			

6.4	Transmission parameters (ABCD parameters)			3			
6.5	Relationship between parameter sets. Various Combinations of Two-Port Network (series, parallel & cascade combinations)			1,3			

V. LIST OF PRACTICALS/ASSIGNBMENTS/TUTORIALS

Sr. No.	Practical/Assignment/Tutorial Title	Approx. Hours	Relevant COS
1	The application of mesh analysis to analyze electrical circuits by determining mesh currents and solving simultaneous equations derived from Kirchhoff's voltage law.	2	1
2	Verification of Kirchhoff's current law (KCL), which states that the sum of currents entering a node in an electrical circuit is equal to the sum of currents leaving the node, and employs it to analyze nodal voltages and currents in complex circuits..	2	1
3	Verification of superposition theorem, which states that in a linear circuit containing multiple independent sources, the response (voltage or current) across any element is the algebraic sum of the responses caused by individual sources acting alone, facilitating circuit analysis and troubleshooting.	2	1
4	Investigates Thevenin's theorem, which simplifies complex linear circuits into an equivalent circuit comprising a single voltage source and a single series resistor, facilitating easier analysis and circuit design.	2	1
5	Norton's theorem, an electrical circuit analysis technique that simplifies complex circuits into an equivalent circuit with a single current source and a single parallel resistor, aiding in circuit analysis and design.	2	1
6	Analysis of capacitor charging in electrical circuits, understanding the time-dependent behavior of capacitors as they charge up.	2	2
7	Investigation of capacitor discharging, exploring the time-dependent discharge process of capacitors in electrical circuits.	2	2
8	Introduction to Multisim simulation software for electronic circuits, enabling practical experimentation and analysis of circuit behavior.	2	1,2,3
9	Using Multisim to simulate the behavior of complex circuits, verifying theoretical concepts and analyzing real-world circuit performance.	2	1,2,3
* Minimum 8 and maximum 12 practical's/ experiment sessions to be included in a course in a term			

VI. SUGGESTED SELF LEARNING ASSIGNMENTS/MICROPROJECT/ACTIVITIES

Assignments:

- Assignments based on Nodal and Mesh analysis using Depended source only.
- Assignments on DC transient using Differential equation technique and Laplace transform method.
- Assignment based on two port network analysis.

ASSESMENTS METHODOLOGIES /TOOLS

Formative assessment (Assessment for Learning)

- Assignments/ Tutorials
- Midterm Test Exam
- Term Work
- Observational Assessment

Summative Assessment (Assessment of Learning)

- End Term Exam.
- Oral Examinations/Vivas.
- Practical Examinations.

VII. SUGGESTED COS-POS MATRIX FORM

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	3	2	-	-	-	-	1	3	3	-
CO2	3	3	1	2	-	-	2	2	2	-
CO3	2	1	1	1	-	-	1	1	-	-
Legends :- High:03, Medium:02,Low:01, No Mapping: - 0										

VIII. SUGGESTED LEARNING MATERIALS TEXTBOOKS/REFRENCE BOOKS / WEBSITES

Sr. No.	Author	Title	Publisher and Edition
1	M. E. Van Valkenburg	Network Analysis	3rd Edition, PHI Learning
2	W H Hayt, S M Durbin, J E Kemmerly	Engineering Circuit Analysis	7th Edition, Tata McGraw-Hill Education.
3	D. Roy Choudhury	Networks and Systems	2nd Edition, New Age International.
4	F. F. Kuo,' John Wiley & sons	Network Analysis and synthesis	
5	N Balabanian & T.A. Bickart,	Linear Network Theory: Analysis, Properties, Design and Synthesis'	Matrix Publishers, Inc.
6	C. L.Wadhwa	Network Analysis & synthesis	New Age international.
7	B. Somanathan Nair	Network Analysis & synthesis	Elsevier Publications

IX. LEARNING WEBSITES & PORTALS

Sr. No.	Link/Portal	Description
1	https://www.hansrajcollege.ac.in/hCPanel/uploads/elearning/elearning_do cument/bsc-2nd_year_unit-2.pdf	Electrical Circuits & network Skills
2	https://www.electronicshub.org/introduction-to-transformers/	Basics of Transformer
3	https://www.iqsdirectory.com/articles/electric-motor/dc-motors.html	DC Motors
4	https://nptel.ac.in/courses/108105112	NPTEL Study Materials
5	https://www.electrical4U.com	All about Electrical Circuits

Curriculum Coordinator

Head of the Department

Dean Diploma

VEERMATA JIJABAI TECHNOLOGICAL INSTITUTE DIP EXAM MATUNGA MUMBAI-19

BOS VJTI Approval Dt. 01/08/2023

DIPLOMA PROGRAMME	: DIPLOMA IN ELECTRONICS ENGINEERING
PROGRAMME CODE	: DELNE
SEMESTER	: THIRD
COURSE TITLE	: ELECTRONICS-I
COURSE CODE	: 233EX33

I. TEACHING AND EXAMINATION SCHEME:

TEACHING SCHEME						ASSESSMENT SCHEME											
CL	TL	LL	Self-learning	CR	Total IKS Hrs for Sem	PAPER HRS	FA-TH (MST)	SA-TH (ESE)	TOTAL		Based on LL & TL Practical				Based on Self-learning		TOTAL MARKS
											FA-PR (CA)		SA-PR (PR/OR)		SLA		
							Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	
3	-	2	-	2.5	-	3	30	70	100	40	25	10	25	10	-	-	150

II. RATIONALE

To teach students facts, concepts and principles of basic electronic devices used for various applications as a tool to analyze and design electronic circuits. To make students well versed in the prerequisites for further studies in Electronics engineering.

III. COURSE OUTCOMES (COS)

Students will be able to achieve the following COS on completion of course based learning

CO1:	Describe the concepts of different types of filters, special diodes and transistor (BJT).
CO2:	Understand the application of transistor (BJT) and diodes.
CO3:	Analyze and implement the diodes and transistors (BJT) in circuit.

IV. COURSE CONTENTS WITH SPECIFICATION TABLE

SECTION-I								
Unit & Sub-Unit		Topics/Sub-topics	Hrs	Marks	CO	R Level	U Level	A Level
1		**Rectifier and Filter**	**12**	**18**		**40%**	**30%**	**30%**
	1.1	Half Wave Rectifier (HWR): operation, waveforms, average (dc) value of current and voltage, Rectification efficiency, peak inverse voltage, advantages and disadvantages.			1,3			

	1.2	Center tap transformer Full Wave Rectifier (FWR): operation, waveforms, average (dc) value of current and voltage, transformer utilization factor, rectification efficiency, peak inverse voltage.			1,3			
	1.3	Bridge type Full Wave Rectifier (FWR): operation, waveforms, average (dc) value of current and voltage, transformer utilization factor, rectification efficiency, peak inverse voltage, advantages and disadvantages.			1,3			
	1.4	Filter types – High pass, Low pass, Band pass. Comparison, merits & demerits			1			
2		**Clipper and clamper circuit**	**07**	**10**		**20%**	**40%**	**40%**
	2.1	Clipper : Basic Clippers, Biased Clipper circuits, Combinational Clippers			2			
	2.2	Clamper: Basic Clamper Biased Clamper(Positive and Negative Biased Clamper)			2			
	2.3	Voltage multiplier circuit.			3			
3		**Special Purpose Diodes**	**05**	**07**		**40%**	**20%**	**40%**
	3.1	Varactor Diode : VI characteristics, Applications, advantages and disadvantages.			1,3			
	3.2	Shockley Diode: VI characteristics, Applications, advantages and disadvantages			1,3			
	3.3	Tunnel diodes : VI characteristics, Applications, advantages and disadvantages			1,3			

SECTION-II								
Unit & Sub-Unit		**Topics/Sub-topics**	**Hrs**	**Marks**	**CO**	**R Level**	**U Level**	**A Level**
4		**Bipolar Junction Transistor (BJT)**	**08**	**12**		**40%**	**40%**	**20%**
	4.1	Construction, working principle of NPN and PNP transistors and their symbols.			1			
	4.2	Mode of BJT operation: active, cutoff, saturation. Reverse active and application. Concept of DC load line, operating point (Q), stabilization, thermal runaway			1,2			
	4.3	Characteristics of CB, CE and CC configurations, DC and AC current gains α, β, γ.			1,3			
5		**Biasing of BJT**	**06**	**11**		**40%**	**30%**	**30%**
	5.1	Introduction to BJT biasing.			1,3			
	5.2	Different types of biasing circuits i.e. fixed biascircuit with emitter resistor, collector to base biasing circuit, voltage divider biasing circuit and			3			

		emitter bias circuit.						
	5.3	Advantage and Disadvantages of different transistor biasing circuit			1			
	5.4	Thermal stability factor. Comparison of each on the basis of thermal stability. Transistor Specifications,			1,3			
6		**Single and Multistage Transistor**	**10**	**12**		**40%**	**40%**	**20%**
	6.1	Introduction to hybrid model for transistor.			1,2			
	6.2	Analysis of CE single stage Small Signal Amplifier using hybrid equivalent circuit.			3			
	6.3	Need of multistage amplifier			2			
	6.4	Gain of multistage amplifier						
	6.5	Different types of multistage amplifier.			2			
Legends: R- Remember, U – Understand, A – Apply and above levels (Blooms's Revised Taxanomy).								

Notes: *This specification table shall be treated as a general guideline and actual distribution of marks may slightly vary from table. But the questions from each topic should be asked as per marks weightage.*

V. LIST OF PRACTICALS/ASSIGNBMENTS/TUTORIALS

Sr. No.	Unit	Practical/Assignment	Approx. Hours	Relevant COS
1	1	To study diode(1N4007) as a switch and its VI Characteristics.	2	1 & 3
2	3	To verify Characteristics of varactor or tunnel Diode.	2	2 & 3
3	1	To study conversion of AC to DC using diode half wave rectifier.	2	1 & 3
4	1	To study conversion of AC to DC using diode full wave rectifier.	2	1 & 3
5	2	To study diode as a Clipping circuits.	2	2 & 3
6	2	To study diode as a Clamping circuits.	2	2 & 3
7	4	To verify Input and Output characteristics of Common Emitter BJT configuration.	2	1 & 3
8	4	To verify Input and Output characteristics of Common Base BJT configuration.	2	1 & 3
9	4	To verify Input and Output characteristics of Common Collector BJT configuration	2	1 & 3
10	5	To study BJT CE switch application.	2	2 & 3
* Minimum 7 and maximum 8 practical /experiment sessions to be included in a course in a term				

VI. ASSESMENTS METHODOLOGIES /TOOLS

Formative assessment (Assessment for Learning)

- Midterm Test Exam
- Term Work
- Self-Learning

Summative Assessment (Assessment of Learning)

- End Term Exam
- Practicals

VII. SUGGESTED COS-POS MATRIX FORM

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO- 1	PSO- 2	PSO- 3
CO1	3	2	1	1	1	1	2	3	2	1
CO2	3	2	2	1	1	2	1	3	2	2
CO3	1	2	3	1	1	2	3	2	3	2
Legends :- High:03, Medium:02,Low:01, No Mapping: - 0										

VIII. SUGGESTED LEARNING MATERIALS TEXTBOOKS/REFRENCE BOOKS/WEBSITES

Sr. No	Author	Title	Publisher
1	Bhargava, Kulshrestha and Gupta	Basic Electronics and Linear Circuits	4th Edition,Tata McGraw-Hill Publishing Company Limited
2	V.K .Mehta	Principles of Electronics	S.Chand Publication
3	R.S. Sedha	Applied Electronics	S.Chand and Company Limited
4	David Bell	Electrical and Electronics Materials	Oxford University Press
5	Boylestead & Nashelsky	Electronic devices and Circuits Theory	9th edition, PHI.

IX. LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	www.nptel.com	-
2	http://learn.sparkfun.com/tutorials/transistors	Basic idea about Transistor
3	http://www.technologystudent.com/elec1/transis1.htm	Manufacturing of Transistor

Curriculum Coordinator **Head of the Department** **Dean Diploma**

BOS VJTI Approval Dt. 01/08/2023

VEERMATA JIJABAI TECHNOLOGICAL INSTITUTE DIP. EVAM MATUNGA MUMBAI-19

DIPLOMA PROGRAMME	: DIPLOMA IN ELECTRONICS ENGINEERING
PROGRAMME CODE	: DEINE
SEMESTER	: THIRD
COURSE TITLE	: ELECTRONICS MEASUREMENT AND INSTRUMENTATION
COURSE CODE	: 233EX34

I. TEACHING AND EXAMINATION SCHEME:

TEACHING SCHEME						ASSESSMENT SCHEME											
CL	TL	LL	Self-learning	CR	Total IKS Hrs for Sem	PAPER HRS	FA-TH (MST)	SA-TH (ESE)	TOTAL		Based on LL & TL Practical				Based on Self-learning		TOTAL MARKS
											FA-PR (CA)		SA-PR (PR/OR)		SLA		
							Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	
3	-	2	-	2.5	0	3	30	70	100	40	25	10	25	10	-	-	150

II. RATIONALE

To teach students basic facts, concepts and principles of various measurement devices and instrumentation as a tool to analyze engineering problems. To make students well versed in the prerequisites for further studies in instrumentation.

III. COURSE OUTCOMES (COS)

Students will be able to achieve the following COS on completion of course based learning

CO1:	Describe the concept of measurement and working of various measuring devices
CO2:	Select the suitable transducer based on its characteristics for specific measurement.
CO3:	Analyze performance of various bridges, oscilloscope and transducer.

IV. COURSE CONTENTS WITH SPECIFICATION TABLE

SECTION-I								
Unit & Sub-Unit		Topics/Sub-topics	Hrs	Marks	CO	R Level	U Level	A Level
1		**Measurement and Error**	06	10	1,2,3	40%	40%	20%
	1.1	Block diagram of Measurement System.			2			
	1.2	**Static characteristics**- Accuracy, Precision, Sensitivity, Linearity, Repeatability,			1			

		Reproducibility, Resolution, Threshold, Drift, Stability, Dead zone, hysteresis.						
	1.3	**Dynamic Characteristics**- speed of response, measuring lag, fidelity, dynamic error.			1			
	1.4	**Types of Errors** – Gross error, systematic errors, Random errors.			3			
2		**Introduction to Ammeter and Voltmeter**	9	12	1,2,3	30%	40%	30%
	2.1	Construction and working of **Permanent Magnet Moving Coil Instrument** (PMMC).			1,2			
	2.2	Ammeter and Voltmeter (DC), **Multi-range Ammeters, Multi-range Voltmeters.**			2, 3			
	2.3	Extension of range of DC voltmeter and ammeter. Numerical based on it.			2,3			
	2.4	Extension of range of AC Ammeters and Voltmeters using Current and Voltage.			2,3			
3.		**Introduction to Bridges and Data Acquisition System**	09	13	1,2,3	20%	40%	40%
	3.1	**DC Bridge**- Wheatstone bridge, Kelvin's Double Bridge.			2,3			
	3.2	**AC Bridge**- Maxwell's Bridge, Schering bridge and Wien's Bridge.			1,3			
	3.3	Components of Analog and **Digital Data Acquisition System.**			1,2			
	3.4	Uses of Data Acquisition system.			1,2			

SECTION-II

Unit & Sub-Unit		Topics/Sub-topics	Hrs	Marks	CO	R Level	U Level	A Level
4.		**Temperature Measurement**	09	15	1,2,3	30%	40%	30%
	4.1	**Thermocouples**: Seeback & Peltier Effect, Law of Intermediate Metals and Temperatures, Cold Junction compensation (CJC).			1,2			
	4.2	**Resistance Temperature Detectors (RTD):** Construction of RTD and Types of RTD.			2			
	4.3	**Thermistor**- Construction of Thermistor and Types (NTC and PTC).			2			
	4.4	**Pyrometers**- Radiation and Optical type.			2,3			

5		**Displacement and Strain measurement**	**07**	**10**	**1,2,3**	**30%**	**30%**	**40%**
	5.1	Working principle of **LVDT and RVDT.**			2			
	5.2	Types of electrical **Strain Gauge.**			2,3			
	5.3	Theory of operation of Resistance Wire Strain Gauge.			1,2			
	5.4	Basic working principle of Hall Effect Transducer.			1,2			
6		**CRO and DSO**	**08**	**10**	**1,2,3**	**30%**	**40%**	**30%**
	6.1	**Cathode Ray Oscilloscope (CRO)**: Cathode Ray Tube (CRT), CRT connections, Basic CRO Block diagram, Modes of operation of CRO.			2,3			
	6.2	**CRO Measurements**: Measurement of voltages and currents. Measurements of phase and frequency (Lissajous Pattern).			1,3			
	6.3	**Digital Storage Oscilloscope (DSO):** DSO Fundamentals, DSO Block diagram, Modes of Operations, how to use DSO.			1,3			
	6.4	Applications of CRO and DSO.			1,2			

Legends: R- Remember, U – Understand, A – Apply and above levels (Bloom's Revised Taxonomy).

Notes: *This specification table shall be treated as a general guideline and actual distribution of marks may slightly vary from table. But the questions from each topic should be asked as per marks weightage.*

V. LIST OF PRACTICALS /ASSIGNMENTS / TUTORIALS

Sr. No.	Unit	Practical/ Assignment	Approx. Hours	Relevant COS
1	2	To measure medium resistance using V-I method.	2	1 & 3
2	2	To perform extension of range of voltmeter.	2	1 & 3
3	2	To perform extension of range of ammeters.	2	1 & 3
4	3	To Measure Unknown Resistance using D.C. Bridge.	2	1 & 3
5	3	To measure Inductance using A.C. Bridge	2	1 & 3
6	3	To measure Capacitance using A.C. Bridge.	2	1 & 3
7	5	To study use of LVDT for Displacement Measurement.	2	2 & 3
8	5	To study characteristics of resistance wire strain gauge.	2	2 & 3
9	4	To plot the Characteristics of Thermocouple.	2	2 & 3
10	4	To plot the Characteristics of RTD.	2	2 & 3
11	4	To plot the Characteristics of Thermistor.	2	2 & 3
12	6	To Study Cathode Ray Oscilloscope.	2	1 & 3
13	6	To Study Digital Storage Oscilloscope.	2	1 & 3

* Minimum 7 and maximum 8 practical's/experiment sessions to be included in a course in a term

VI. ASSESSMENTS METHODOLOGIES /TOOLS

Formative assessment (Assessment for Learning)

- Midterm Test Exam
- Term Work

Summative Assessment (Assessment of Learning)

- End Term Exam
- Practical's

VII. SUGGESTED COS-POS MATRIX FORM

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO- 1	PSO- 2	PSO- 3
CO1	3	1	1	-	1	-	2	3	2	2
CO2	3	3	3	2	1	2	1	2	3	2
CO3	3	2	3	2	1	-	1	1	2	1
Legends: - High:03, Medium:02, Low:01, No Mapping: - 0										

VIII. SUGGESTED LEARNING MATERIALS TEXTBOOKS/REFRENCE BOOKS/ WEBSITES

Sr. No	Author	Title	Publisher
1	A.K. Sawhney	A course in Electrical and Electronics Measurements and Instrumentation	Dhanpat Rai Publications, New Delhi
2	D.V.S. Murthy	Transducers and Instrumentation	PHI Learning Private limited.
3	Rangan Mani Sharma	Modern Control Engineering, 2nd Edition	Tata McGraw – Hill.
4	S.K.Singh	Industrial Instrumentation and Control, 3rd Edition	Industrial Instrumentation and Cont
5	D.Patranabis	Principles of Industrial Instrumentation, 2nd Edition	Tata McGraw – Hill.
6	B.C.Nakra, &K.K.Chawdhry,	Instrumentation Measurement and Analysis, 2nd Edition	Tata McGraw – Hill.

IX. LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	https://archive.nptel.ac.in/courses/108/105/108105153/	Course on electronic measurement.
2	https://www.khanacademy.org/	Basics of Measurement
3	https://www.tutorialspoint.com/electronic_measuring_instruments/index.htm	Basics of Instrumentation

Curriculum Coordinator **Head of the Department** **Dean Diploma**

VEERMATA JIJABAI TECHNOLOGICAL INSTITUTE DIP. EXAM MATUNGA MUMBAI-19

DIPLOMA PROGRAMME	: DIPLOMA IN ELECTRONICS ENGINEERING
PROGRAMME CODE	: DELNE
SEMESTER	: THIRD
COURSE TITLE	: DIGITAL ELECTRONICS
COURSE CODE	: 233EX35

I. TEACHING AND EXAMINATION SCHEME:

TEACHING SCHEME						ASSESSMENT SCHEME											
CL	TL	LL	Self-learning	CR	Total IKS Hrs for Sem	PAPER HRS	FA-TH (MST)	SA-TH (ESE)	TOTAL		Based on LL & TL Practical				Based on Self-learning		TOTAL MARKS
											FA-PR (CA)		SA-PR (PR/OR)		SLA		
							Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	
3	1	2	-	3	-	3	30	70	100	40	25	10	25	10	-	-	150

II. RATIONALE

To teach students facts, concepts and principles of digital electronics used for various applications as a tool to analyze and design digital circuits. Prepare students to innovate in digital electronics by mastering advanced concepts and techniques for future applications.

III. COURSE OUTCOMES (COS)

Students will be able to achieve the following COS on completion of course based learning

CO1:	Recollect the concept of logic gates (Basic gates, Universal gates, Special gates) and k-map to build basic digital circuits.
CO2:	Understand the concepts and types of logic families, logic circuits, special ICs and timer Circuits.
CO3:	Design and analyze the function of combinational and sequential logic circuits.

IV. COURSE CONTENTS WITH SPECIFICATION TABLE

SECTION-I								
Unit & Sub-Unit		Topics/Sub-topics	Hrs	Marks	CO	R Level	U Level	A Level
1		**Applications of Combinational Logic Circuits**	**13**	**17**		**10%**	**50%**	**40%**
	1.1	Arithmetic circuits: Half adder, Full adder, Half subtractor, & Full subtractor, Serial and Parallel 4 bit adders.			1,2			

	1.2	Seven segment Decoder: Definition, Logic circuit, truth table. Octal to binary decoder. Decimal to BCD Decoder, BCD to seven segments decoder. Code Converter: Grey to binary and binary to grey code converter.			2,3			
	1.3	Encoders and comparators: BCD to decimal Priority Encoders, Digital Comparators. Introduction to Parity Generators/Checkers circuits.			1,2			
2		**Multiplexers and De-multiplexers**	**07**	**12**		**30%**	**40**	**30%**
	2.1	Multiplexer (2:1, 4:1, 8:1).			1,2			
	2.2	De-multiplexer (1:2, 1:4, 1:8).			1,2			
	2.3	Implementation of Boolean expression using Multiplexer and De-multiplexer.			3			
3		**Logic Families**	**04**	**06**		**50%**	**50**	**-**
	3.1	Introduction to Logic Families, Various logic families and categories according to the IC fabrication, Study and compare TTL and CMOS			2			
	3.2	Characteristics of TTL and CMOS logic families: Propagation delay time, power dissipation, fan-out, input/output logic levels, and DC supply voltage and speed-power product.			2			

SECTION-II

Unit & Sub-Unit		Topics/Sub-topics	Hrs	Marks	CO	R Level	U Level	A Level
4		**555 Timer Circuits**	**07**	**11**		**20%**	**50**	**30%**
	4.1	Internal Block diagram and working of Timer 555.			1,2			
	4.2	Working of A-stable, Mono-stable and Bi-stable multi-vibrator as application of timer IC.			2			
	4.3	Concept of Schmitt trigger, Ramp generator using IC 555 as triggering circuits.			2			
5		**Sequential Logic Circuits**	**07**	**11**		**20%**	**40%**	**40%**
	5.1	Comparison of combinational and sequential circuits. Concept and classification of various triggering methods.			1,2			
	5.2	Principles of flip-flops operation, its type. Working of S-R, J-K, T and D flip-flops. Flip-flops with clear			2,3			

		and preset inputs. Derive characteristics and excitation table for each flip-flop.						
	5.3	Concept of Race around condition and how it can be avoided. J-K Master Slave flip-flop.			2,3			
6		**Applications of Sequential Circuits as Counters and Shift Registers.**	08	13		20%	40%	40%
	6.1	Introduction to counters, its types and application.			2			
	6.2	Binary Counter, Asynchronous and Synchronous counters (Up and Down), Ring counter, Twisted ring counter.			2,3			
	6.3	Introduction to Register. Buffer and controller buffer register.			1,2			
	6.4	SISO, SIPO, PIPO, PISO shift registers.			1,2			
Legends: R- Remember, U – Understand, A – Apply and above levels (Blooms's Revised Taxanomy).								

Notes: *This specification table shall be treated as a general guideline and actual distribution of marks may slightly vary from table. But the questions from each topic should be asked as per marks weightage.*

V. LIST OF PRACTICALS/ASSIGNBMENTS/TUTORIALS

Sr. No.	Unit	Practical/Assignment	Approx. Hours	Relevant COS
1	1	To study and verify Half Adder and full adder circuit using basic gates.	2	1 & 2
2	1	To study and verify Half subtractor and full subtractor circuit using basic gates.	2	1 & 2
3	2	To study 8:1 Multiplexer using IC 74151.	2	1 & 2
4	1	To study even and odd parity bit generator circuit using Logic gates.	2	2 & 3
5	4	Assemble Astable multivibrator using IC 555.	2	1 & 2
6	5	To build S-R latch using TTL 7400 NAND and 7402 NOR gate IC's.	2	1 & 3
7	5	To build transparent (D) latch using S-R latch and basic gate IC's.	2	1 & 3
8	1	To study 4-bit parallel adder using IC 7483.	2	1 & 3
9	2	Implementation of Boolean expression using Mux-Demux.	2	2 & 3
10	1	To study 4-bit comparator using IC 7485	2	1 & 2
* Minimum 7 and maximum 8 practicals/experiment sessions to be included in a course in a term				

VI. ASSESMENTS METHODOLOGIES /TOOLS

Formative assessment (Assessment for Learning)

- Midterm Test Exam
- Term Work
- Tutorials

Summative Assessment (Assessment of Learning)

- End Term Exam
- Practicals

VII. SUGGESTED COS-POS MATRIX FORM

Course Outcomes (COs)	Programme Outcomes (POs)							ProgrammeSpecific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	3	2	1	1	1	1	1	3	3	1
CO2	2	1	1	1	1	2	2	3	2	2
CO3	2	3	2	1	1	1	1	3	2	2
Legends :- High:03, Medium:02,Low:01, No Mapping: - 0										

VIII. SUGGESTED LEARNING MATERIALS TEXTBOOKS/REFRENCE BOOKS/ WEBSITES

Sr. No	Author	Title	Publisher
1	A. Anand Kumar	Fundamentals of Digital Circuits	3rd Edition, Prentice Hall India Private Limited
2	R.P. Jain	Modern Digital Electronics	Tata McGraw - Hill Publishing Company Limited), 4th Edition
3	Ramakant Gaikwad	Integrated Circuits	4 th edition, Dhanpat Rai Publicatior Delhi
4	K.R. Botkar	Integrated Circuits	Khanna
5	Thomas L. Floyd	Digital Fundamentals	8th Edition, Pearson Education Inc.
6	Malvino	Digital Principles & Applications	5th Edition Tata McGraw Hil Publishing Company Limited
7	R.J. Tocci	Digital Systems: Principles & Applications	8th Edition, Prentice HallIndia.

IX. LEARNING WEBSITES & PORTALS

Sr. No	Link / Portal	Description
1	https://youtu.be/NAqR-OGjgoQ?feature=shared	Arithmetic Circuits
2	https://www.youtube.com/watch?v=-cplctDeMg8	Sequential Circuits
3	https://www.youtube.com/watch?v=WFsPI8_ZKbc	Timer Circuits

Curriculum Coordinator **Head of the Department** **Dean Diploma**

VEERMATA JIJABAI TECHNOLOGICAL INSTITUTE DIP. EXAM MATUNGA MUMBAI-19

DIPLOMA PROGRAMME	: DIPLOMA IN ELECTRONICS ENGINEERING
PROGRAMME CODE	: DELNE
SEMESTER	: THIRD
COURSE TITLE	: ELECTRONIC WORKSHOP-I
COURSE CODE	: 233EX36

I. TEACHING AND EXAMINATION SCHEME:

TEACHING SCHEME						ASSESSMENT SCHEME												
CL	TL	LL	Self-learning	CR	Total IKS Hrs for Sem	PAPER HRS	FA-TH (MST)	SA-TH (ESE)	TOTAL		Based on LL & TL Practical				Based on Self-learning		TOTAL MARKS
											FA-PR (CA)		SA-PR (PR/OR)		SLA		
							Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	
1	-	2	2	2.5	-	-	-	-	-	-	25	10	-	-	25	10	50

II. RATIONALE

To teach students facts, concepts and principles of basic electronic devices used for various applications as a tool to analyze and design electronic circuits. To make students well versed in the prerequisites for further studies in Electronics engineering.

III. COURSE OUTCOMES (COS)

Students will be able to achieve the following COS on completion of course based learning

CO1:	Explain the functions & working of Electronics devices.
CO2:	Identify various types of Switches, Relays, and Connectors. Understand different networks and data cables.
CO3:	Implement different electrical circuits using Timer IC 555 and BJT.

IV. COURSE CONTENTS WITH SPECIFICATION TABLE

SECTION-I								
Unit & Sub-Unit		Topics/Sub-topics	Hrs	Marks	CO	R Level	U Level	A Level
1		**Electronics Component Testing**	**02**			**10%**	**60%**	**30%**
	1.1	Use of Multi-meter						

	1.2	Identification of all active & passivecomponents.						
	1.3	Testing of CRO/DSO, Function/Signal Generator						
2		**Cables/Wires:**	02			30%	60%	10%
	2.1	Identification of different cables: flexible, hook-up, coaxial and fiber optic. Multi-core,Power and Control cables with its applications.						
3		**Connectors, Relays & Switches**	02			40%	50%	10%
	3.1	Need, types, identifications & application connector, relay & switches						
	3.2	Construction, rating & workingprinciple of purpose relay, Reed relay.						

SECTION-II								
Unit & Sub-Unit		**Topics/Sub-topics**	**Hrs**	**Marks**	**CO**	**R Level**	**U Level**	**A Level**
4		**BJT Switches Circuit with Relay Load**	03			10%	60%	30%
	4.1	Introduction of BJT & LED						
5		**Signal Generator:**	02			20%	50%	30%
	5.1	Square Wave Generator (Clock Signal) circuit (Astable Multivibrator IC555)						
6		**Astable multi-vibrator and itsApplication.**	03			10%	30%	60%
	6.1	Study of IC 555 Astable Multivibrator circuit.						
	6.2	Modulated Tone Generator & LED flasher application						
7		**Monostable Timer**	02			10%	40%	50%
	7.1	Study of monostable timer using IC555.						
Legends: R- Remember, U – Understand, A – Apply and above levels (Blooms's Revised Taxanomy).								

Notes: *This specification table shall be treated as a general guideline and actual distribution of marks may slightly vary from table. But the questions from each topic should be asked as per marks weightage. Numerical questions are to be asked only if specified.*

V. LIST OF PRACTICALS/ASSIGNMENTS/TUTORIALS

Sr. No.	Unit	Practical/Assignment	Approx. Hours	Relevant COS
1	1	Study of different types of Cables/Wires.	2	2
2	4	To study VI characteristics of LED.	2	1 & 3
3	1	To study and verify the waveform of Inverting amplifier using IC 741.	2	1 & 2
4	5	To construct LED flasher circuit using IC 555 Astable multivibrator.	2	1 & 3
5	6	To construct a clock signal (square waveform generator) using IC 555.	2	1 & 3
6	6	To study Frequency modulation using IC 555.	2	2 & 3
7	1	To design Voltage Regulator using IC LM317.	2	1 & 2
8	7	To construct Monostable timer circuit using IC 555.	2	2 & 3
9	7,3	To construct Bistable timer circuit using IC 555.	2	2 & 3
10	4	To construct a CE BJT switch with LED and relay as a load.	2	3
* Minimum 7 and maximum 8 practicals/experiment sessions to be included in a course in a term				

VI. ASSESMENTS METHODOLOGIES /TOOLS

Formative assessment (Assessment for Learning)

- Term Work
- Self-Learning
- Seminar/Presentation

Suggested Self Learning Assignments/Mini Project

- Practicals
- Mini Project
  - Design a Light Sensor Circuit using 555 Timer IC.
  - Design a relay based circuit to turn ON and OFF the LED.
  - Water level indicator project using 555 Timer IC.
- Assignment
  - Prepare report on mini project

VII. SUGGESTED COS-POS MATRIX FORM

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO- 1	PSO- 2	PSO- 3
CO1	3	2	1	1	1	2	2	2	1	2
CO2	3	2	1	1	1	2	1	2	2	1
CO3	2	3	2	1	1	3	1	3	3	3
Legends :- High:03, Medium:02,Low:01, No Mapping: - 0										

VIII. SUGGESTED LEARNING MATERIALS TEXTBOOKS/ REFRENCE BOOKS/ WEBSITES

Sr. No	Author	Title	Publisher
1	Electronics For You Group	Electronic Project, Volume 1 to Volume27, Edition onwards	BPB Publications.
2	Michael H Tooley	Electronic Circuits Handbook, 3rd Edition	BPB Publications.
3	Michael H Tooley Kreysizg, Ervin	Practical Digital Electronics Handbook,1st Edition	BPB Publications.
4	Jones, Thomas H	Electronic Components Handbook	Reston Publishing, US, ISBN: 978-0879092221
5	Paul Horowitz andWinfield Hill	The Art of Electronics, 2nd Edition	Cambridge University Press.

IX. LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	https://www.digimat.in/nptel/courses/video/108105153/L77.html	555 Timer IC
2	http://learn.sparkfun.com/tutorials/transistors	Working of BJT
3	http://www.technologystudent.com/elec1/transis1.htm	Transistor Basics

Curriculum Coordinator **Head of the Department** **Dean Diploma**

VEERMATA JIJABAI TECHNOLOGICAL INSTITUTE DIP EXAM MATUNGA MUMBAI-19

DIPLOMA PROGRAMME	: DIPLOMA IN ELECTRONICS ENGINEERING
PROGRAMME CODE	: DELNE
SEMESTER	: THIRD
COURSE TITLE	: INTRODUCTION TO PYTHON (ONLINE)
COURSE CODE	:233EX37

I. TEACHING AND EXAMINATION SCHEME

TEACHING SCHEME						ASSESSMENT SCHEME											
CL	TL	LL	Self-learning	CR	Total IKS Hrs for Sem	PAPER HRS	FA-TH (MST)	SA-TH (ESE)	TOTAL		Based on LL & TL Practical				Based on Self-learning		TOTAL MARKS
											FA-PR (CA)		SA-PR (PR/OR)		SLA		
							Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	
1		2	3	3	-	3	-	-	-	-	50	20	-	-	25	10	75

II. RATIONAL

To teach students basic facts, concepts and principles of Python programming as a tool to analyze engineering problems. To make students well versed in the prerequisites for further studies in electronics engineering.

III. COURSE OUTCOMES (COS)

CO1:	To understand fundamentals of python programming.
CO2:	Analyze/understand logical structure of computer program and interpret program output.
CO3:	To develop python programming skills on real world engineering problems.

IV. COURSE CONTENTS WITH SPECIFICATION TABLE

SECTION-I								
Unit & Sub-Unit		Topics/Sub-topics	Hrs	Marks	CO	R Level	U Level	A Level
1		**Introduction to Python**	04	-	1,2,3	20%	40%	60%
	1.1	Introduction to Python, Installation and			1,2,3			
	1.2	Identifiers and Keywords, Comments, Indentation and Multi-lining, Variables (Local and Global)			1,2,3			

	1.3	Data types, Arithmetic, Comparative, Logical and Identity Operators, Bitwise Operators, Expressions, Print statement & Formats, Input Statements			1,2,3			
	1.4	Strings, Lists, Tuples, Dictionaries, Sets, Accessing Elements, Properties, Operations and methods on these data structures.			1,2,3			
		Decision Flow Control Statement: if & else statement, Nested If statement, Loop Statement: While Loop, do & while loop, for loop statement, Continue, Break & pass Statement, Conditional Statements.			1,2,3			
2		**Functions and File I/O Handling**	**04**	**-**	1,2,3	**20%**	**40%**	**60%**
	2.1	Functions: Built-in-functions, library functions, Defining and calling the functions, Return statements, Passing the arguments.			1,2,3			
	2.2	Lambda Functions, Recursive functions			1,2,3			
	2.3	Modules and importing packages in python code.			1,2,3			
	2.4	File Input/Output: Files I/O operations, Read / Write Operations, File Opening Modes, with keywords, Moving within a file.			1,2,3			
	2.5	Manipulating files & directories, OS and SYS modules			1,2,3			

SECTION-II

Unit & Sub-Unit		**Topics/Sub-topics**	**Hrs**	**Marks**	**CO**	**R Level**	**U Level**	**A Level**
3		**Object Oriented Programming**	**04**	**-**	1,2,3	**20%**	**40%**	**60%**
	3.1	Classes & Objects, Public & Private Members, Class Declaration & Object Creation, Object Initialization, Class Variables & methods, Accessing Object & Class Attributes			1,2,3			
	3.2	Inheritance, Constructor in Inheritance			1,2,3			
	3.3	Exception Handling			1,2,3			
4		**Numpy, Pandas, Matplotlib, Seaborn**	**04**	**-**	1,2,3	**20%**	**40%**	**60%**
	4.1	Basics of Numpy, Creating and Printing Ndarray, Class and Attributesof Ndarray, Basic operation, Copy andview, Mathematical Functions of Numpy			1,2,3			
	4.2	Introduction to Pandas, Understanding Dataframe, View and Select Data, Missing Values, Data Operations, File read and write operation			1,2,3			
	4.3	Introduction to Matplotlib library, Lineproperties, Plots & subplots, Types of Plots, Introduction to Seaborn			1,2,3			

Legends: R- Remember, U – Understand, A – Apply and above levels (Blooms's Revised Taxanomy).

V. LIST OF PRACTICALS/ASSIGNBMENTS/TUTORIALS

Sr. No.	Unit	Practical/Assignment	Approx. Hours	Relevant COS
1	1	To print any character line '$' or our college name on output window.	2	1 & 2
2	1	Write/compile/execute simple program: using constant, variables, arithmetic expression	2	1 & 2
3	1	Write/compile/execute simple program: increment, decrement operator, exhibiting data type converter.	2	1 & 2
4	1	Write/compile/execute simple program: To convert temperature Fahrenheit degrees to Centigrade degrees	2	1 & 2
5	1	Write/compile/execute simple program: To calculate the area and perimeter of the rectangle, circumference, and area of the circle.	2	1 & 2
6	1	Decision making and branching using: if-else structure.	2	1 & 2
7	1	To Find the greatest and smallest of the given three numbers.	2	1 & 2
8	1	Write python program to understand different File handling operations	2	1 & 2
9	1	Write a program that defines a function count_lower_upper ( ) that accepts a string and calculates the number of uppercase and lowercase alphabets in it. It should return these values as a dictionary. Call this function for some sample strings.	2	1 & 2
10	2	A 5-digit positive integer is entered through the keyboard, write a recursive function to calculate sum of digits of 5-digit number.	2	1 & 2
11	2	Program to demonstrate tuples in python.	2	1 & 2
12	2	Program to demonstrate list in python.	2	1 & 2
13	2	Program to demonstrate classes and objects in python.	2	1 & 2
14	2	Program to demonstrate inheritance in python.	2	1 & 2
15	2	Program on data analysis using numpy and pandas libraries.	2	1 & 3
16	2	Plot various plots using seaborn, matplotlib libraries in python.	2	1 & 3
* Minimum 7 and maximum 8 practicals/experiment sessions to be included in a course in a term				

VI. SUGGESTED SELF LEARNING ASSIGNMENTS/MICROPROJECT/ACTIVITIES

Assignments

- Develop Python language code for relevant topics suggested by teacher.
- Solve an assignment on any relevant topic given by teacher.

Micro Project (if any)

- Develop some simple real world applications projects.

VII. ASSESMENTS METHODOLOGIES /TOOLS

Formative assessment (Assessment for Learning)

- Experiments performance and journal completion.
- Class Test
- Self-learning
- Term Work
- Seminar/Presentation

Summative Assessment (Assessment of Learning)

- End Term Exam
- Micro-project.
- Assignments.

VIII. SUGGESTED COS-POS MATRIX FORM

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	3	-	-	3	-	-	3	3	1	1
CO2	3	2	1	3	1	1	3	3	1	1
CO3	3	2	3	3	-	1	3	3	1	3
Legends :- High:03, Medium:02,Low:01, No Mapping: -										

IX. SUGGESTED LEARNING MATERIALS TEXTBOOKS/REFRENCE BOOKS/WEBSITES

Sr.No	Author	Title	Publisher
1	Yashvant Kanetkar	"Let us Python: Python is Future, Embrace it fast"	BPB Publications; 1st edition (8 July 2019).
2	Dr. R. Nageswara Rao	Core Python Programming	Dreamtech Press
3	E Balagurusamy	Introduction to computing and problem solving using python	McGraw Hill Education

X. LEARNING WEBSITES AND PORTALS

SR NO	LINK /PORTAL	DESCRIPTION
1	https://nptel.ac.in/courses/106/106/106106182/	Python Programming
2	http://spoken-tutorial.org/	Python Programming
3	Python 3 Documentation: https://docs.python.org/3/	Python Programming
4	https://www.programiz.com/python-programming	Python Programming
5	https://www.javatpoint.com/python-programming-language-tutorial	Python Programming tutorial
6	Numpy Documentation: https://numpy.org/doc/	Numpy library
7	Matplotlib Documentation: https://matplotlib.org/3.2.1/contents.html	Plots in python
8	Pandas Documentation: https://pandas.pydata.org/docs/	Pandas library

Curriculum Coordinator

Head of the Department

Dean Diploma

VEERMATA JIJABAI TECHNOLOGICAL INSTITUTE DIR. EXAM MATUNGA MUMBAI-19

IPLOMA PROGRAMME	: DIPLOMA IN ELECTRONICS ENGINEERING
PROGRAMME CODE	: DELNE
SEMESTER	: THIRD
COURSE TITLE	: PRODUCT EVALUATION AND MARKET RESEARCH
COURSE CODE	: 233EX38

I. TEACHING AND EXAMINATION SCHEME

TEACHING SCHEME						ASSESSMENT SCHEME											
CL	TL	LL	Self-learning	CR	Total IKS Hrs for Sem	PAPER HRS	FA-TH (MST)	SA-TH (ESE)	TOTAL		Based on LL & TL Practical				Based on Self-learning		TOTAL MARKS
											FA-PR (CA)		SA-PR (PR/OR)		SLA		
							Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	
-	-	2	1	1.5	3	-	-	-	-	-	-	-	25	10	-	-	25

II. RATIONAL:

This course explores the processes and methodologies involved in the evolution of products and the critical role of market research in guiding this evolution. Students will learn how to develop and refine products based on consumer needs, market trends, and competitive analysis. The course combines theoretical frameworks with practical applications, equipping students with the skills necessary to succeed in product management and marketing roles.

III. COURSE OUTCOMES (COS)

Students will be able to achieve the following COS on completion of course based learning

CO1:	Understand and apply the stages of the product development lifecycle, conduct comprehensive market research, and analyze consumer data to guide product evolution.
CO2:	Identify and analyze market trends and consumer behavior, and develop strategies to adapt products to meet changing consumer needs and preferences.
CO3:	Identify and analyze market trends and consumer behavior, and develop strategies to adapt products to meet changing consumer needs and preferences.

IV. COURSE CONTENTS WITH SPECIFICATION TABLE

SECTION - I								
Unit & Sub-Unit		Topics/Sub-topics	Hrs	Marks	COS	R Level	U Level	A Level
1		**Introduction to Product Evolution**	6		1	20%	20%	60%
	1.1	Definition and stages of product evolution						
	1.2	Historical examples of successful product evolution						
	1.3	The role of innovation in product development						
	1.4	Key stakeholders in the product evolution process						
2		**Consumer Behavior and Market Segmentation**	6		2	20%	20%	60%
	2.1	Understanding consumer behavior						
	2.2	Theories and models of consumer decision-making						
	2.3	Market segmentation strategies						
	2.4	Targeting and positioning						
3		**Applying Market Research to Product Evolution**	6		3	20%	20%	60%
	3.1	Integrating market research into product development						
	3.2	Case studies of product evolution driven by market research						
	3.3	Real-world application of market research methods						
	3.4	Measuring the success of product changes and improvements						

SECTION – II								
Unit & Sub-Unit		Topics/Sub-topics	Hrs	Marks	CO	R Level	U Level	A Level
4		**Market Survey**	20		1,2,3	20%	20%	60%
	4.1	A group of four to six students should collect information from the market regarding specification, brand name, application and cost of any three products from different fields, such as Consumer Electronics, Smart IOT Devices, Equipment related to Medical fields, Industry 4.0, Smart Electronics product used on Agriculture field, Smart equipment						

		required for home automation and security, etc.						
	4.2	Product report: A report is to be prepare by each group based on the market survey and submitted as term-work.						
	4.3	Seminar: Individual student from each group has to give seminar in the classroom on their surveyed product and submit the seminar report as term-work.						

V. SUGGESTED SELF LEARNING ASSIGNMENTS/MINI PROJECT

Assignments

- Prepare a report on various products, related to Electronics field.
- Prepare a comparative chart for different types of products. Prepare report

VI. ASSESMENTS METHODOLOGIES /TOOLS

Formative assessment

- Self-learning
- Term Work
- Seminar/Presentation

VII. SUGGESTED COS-POS MATRIX FORM

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	3	1	1	2	1	2	2	3	1	2
CO2	2	2	2	2	1	2	1	3	3	2
CO3	2	2	2	2	1	2	1	3	2	2
Legends :- High:03, Medium:02,Low:01, No Mapping: -										

VIII. SUGGESTED LEARNING MATERIALS / BOOKS

Sr. No	Author	Title	Publisher
1	Karl Ulrich, Steven Eppinger	Product Design & Development	-
2	Robert R Reeder, Edward G Brierty, Betty H Reeder	Industrial Marketing Analysis, Planning and control	Prentice Hall India
3	Havalder, Krishna K	Industrial Marketing	Tata McGraw Hill

Curriculum Coordinator

Head of the Department

Dean Diploma

VEERMATA JIJABAI TECHNOLOGICAL INSTITUTE DIP. EXAM MATUNGA MUMBAI-19

BOS VJTI Approval Dt. 01/08/2023

DIPLOMA PROGRAMME	: DIPLOMA IN ELECTRONICS ENGINEERING
PROGRAMME CODE	: DELNE
SEMESTER	: THIRD
COURSE TITLE	: ESSENCE OF INDIAN CONSTITUTION
COURSE CODE	: 233EX38

I. TEACHING AND EXAMINATION SCHEME

TEACHING SCHEME						ASSESSMENT SCHEME											
CL	TL	LL	Self-learning	CR	Total IKS Hrs for Sem	PAPER HRS	FA-TH (MST)	SA-TH (ESE)	TOTAL		Based on LL & TL Practical				Based on Self-learning		TOTAL MARKS
											FA-PR (CA)		SA-PR (PR/OR)		SLA		
							Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	
1	-	-	1	1	3	-	-	-	-	-	-	-	-	-	50	20	50

II. RATIONALE

This course will focus on the basic structure and operative dimensions of Indian Constitution. It will explore various aspects of the Indian political and legal system from a historical perspective highlighting the various events that led to the making of the Indian Constitution. The Constitution of India is the supreme law of India. The document lays down the framework demarcating the fundamental political code, structure, procedures, powers, and sets out fundamental rights, directive principles, and the duties of citizens. The course on constitution of India highlights key features of Indian Constitution that makes the students a responsible citizen. In this online course, we shall make an effort to understand the history of our constitution, the Constituent Assembly, the drafting of the constitution, the preamble of the constitution that defines the destination that we want to reach through our constitution, the fundamental right constitution guarantees through the great rights revolution, the relationship between fundamental rights and fundamental duties, the futurist goals of the constitution as incorporated in directive principles and the relationship between fundamental rights and directive principles.

III. COURSE OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course basedlearning

CO1	List salient features and characteristics of the constitution of India.

CO2	Follow fundamental rights and duties as responsible citizen of the country.
CO3	Analyze major constitutional amendments in the constitution.
CO4	Follow procedure to cast vote using voter-id.

IV. COURSE CONTENTS WITH SPECIFICATION TABLE

SECTION - I								
Unit & Sub-Unit		**Topics/Sub-topics**	**Hours**	**Marks**	**COS**	**R Level**	**U Level**	**A Level**
1		**Constitution and Preamble**	**04**		**1**	**0%**	**0%**	**0%**
	1.1	Meaning of the constitution of India.						
	1.2	Historical perspectives of the Constitution of India.						
	1.3	Salient features and characteristics of the Constitution of India.						
	1.4	Preamble of the Constitution of India.						
2		**Fundamental Rights and Directive Principles**	**04**		**2**	**0%**	**0%**	**0%**
	2.1	Fundamental Rights under Part-III.						
	2.2	Fundamental duties and their significance underpart-IV-A.						
	2.3	Relevance of Directive Principles of State Policy under part-IV A.						

SECTION – II								
Unit & Sub-Unit		**Topics/Sub-topics**	**Hours**	**Marks**	**CO**	**R Level**	**U Level**	**A Level**
3		**Governance and Amendments**	**04**		**3**	**0%**	**0%**	**0%**
	3.1	Amendment procedure of the Constitution andtheir types - simple and special procedures.						
	3.2	The Principle of Federalism and its contemporary significance along with special committees that were setup.						
	3.3	Major Constitutional Amendment procedure - 1st, 7th, 42nd, 44th, 73rd & 74th, 76th, 86th, 52nd & 91st, 102nd						

4		**Electoral Literacy and Voter's Education**	**04**		**4**	**0%**	**0%**	**0%**
	4.1	Electoral rights, Electoral process of registration						
	4.2	Ethical electoral participation						
	4.3	Motivation and facilitation for electoral participation						
	4.4	Voter's guide						
	4.5	Prospective empowered voter						
	4.6	Voting procedure						
	4.7	Voter awareness						
	4.8	Voter online registration https: / /www.ceodelhi.gov.in/ELCdetails.aspx						
Legends: R- Remember, U – Understand, A – Apply and above levels (Blooms's Revised Taxonomy).								

V. SUGGESTED SELF LEARNING ASSIGNMENTS/MICROPROJECT/ACTIVITIES

Assignments (if any)

- Outline the procedure to submit application for Voter-id
- Assignments are to be provided by the course teacher in line with the targeted COs.A1. Prepare an essay on Constitution of India.
- A2 Prepare a comparative chart of Unique features of Indian Constitution of India and Constitution of USA
- Assignments are to be provided by the course teacher in line with the targeted COs. A1. Prepare an essay on Constitution of India. A2 Prepare a comparative chart of Unique featuresof Indian Constitution of India and Constitution of USA A3. Self-learning topics: Parts of theconstitution and a brief discussion of each part Right to education and girl enrollment in schools. GER of Girls and Boys. Right to equality. Social Democracy. Women Representation in Parliament and State Assemblies. LGBTQIA+

Micro Project (if any)

- Organize a workshop-cum discussions for spreading awareness regarding FundamentalRights of the citizen of the country.
- Prepare elaborations where directive principle of State policy has prevailed over Fundamental rights with relevant Supreme Court Judgments.
- Organize a debate on 42nd, 97th and 103rd Constitutional Amendment Acts of Constitution of India.

Seminar

- Differences in the ideals of Social democracy and Political democracy.
- Democracy and Women's Political Participation in India.
- Khap Panchayat - an unconstitutional institution infringing upon Constitutional ethos.
- Situations where directive principles prevail over fundamental rights.

Group discussions on current print articles.

- Art 356 and its working in Post-Independent India.
- Women's Reservation in Panchayat leading to Pati Panchayats - Problems and Solutions.
- Adoption of Article 365 in India.
- Need of Amendments in the constitution.
- Is India moving towards a Unitary State Model?

Activity

- Arrange Mock Parliament debates.

Prepare collage/posters on current constitutional issues.

i. National (Art 352) & State Emergencies (Art 356) declared in India.

ii. Seven fundamental rights.

iii. Land Reforms and its effectiveness - Case study of West-Bengal and Kerala.

VI. ASSESSMENT METHODOLOGIES/TOOLS

Formative Assessment (Assessment of Learning)

ASSESSMENT

- Assignment, Self-learning
- Terms work Seminar/Presentation

Summative Assessment (Assessment of Learning)

VII. SUGGESTED COS - POS MATRIX FORM

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)	
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainabilityand Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO- 1	PSO- 2
CO1	1	-	-	-	2	-	-	-	2
CO2	1	-	-	-	2	-	-	-	2
CO3	1	2	-	-	2	-	1	-	2
CO4	-	-	-	1	-	-	-	-	2

Legends: - High: 03, Medium: 02, Low: 01, No Mapping: -

PSO1: Ability to apply knowledge of selecting raw materials, machines and process parameters using standard methods and engineering tools for designing solutions to meet specific needs of the chemical industry.

PSO2: Understand the impact of chemical processes in societal and environmental context and demonstrate theknowledge for sustainable development through teamwork and effective communication for lifelong learning.

VIII. SUGGESTED LEARNING MATERIALS / BOOKS

Sr. No	Author	Title	Publisher
1	P. M. Bakshi	The Constitution of India	Universal Law Publishing, New Delhi 15th edition, 2018, ISBN: 9386515105 (Check thenew edition)
2	D. D. Basu	Introduction to Indian Constitution	Lexis Nexis Publisher, New Delhi, 2015,ISBN:935143446X
3	B. K. Sharma	Introduction to Constitution of India	PHI, New Delhi, 6thedition, 2011, ISBN:8120344197
4	MORE READS:	Oxford Short Introductions - The Indian Constitutionby Madhav Khosla.	Extra Read
5	B.L. Fadia	The Constitution of India	Sahitya Bhawan, Agra, 2017, ISBN:8193413768

IX. LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	http://www.legislative.gov.in/constitution-of-india	Constitution overview
2	https://en.wikipedia.org/wiki/Constitution_of_India	Parts of constitution
3	https://www.toppr.com/guides/civics/the-indian-constitution/the-constitution-of-india/	Fundamental rights and duties

Curriculum Coordinator **Head of the Department** **Dean Diploma**

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