D. Y. PATIL COLLEGE OF ENGINEERING & TECHNOLOGY

Kasaba Bawada, Kolhapur

(Approved by AICTE, New Delhi, Govt. of Maharashtra and Affiliated to Shivaji University Kolhapur)

(An Autonomous Institute)

Accredited by NAAC with 'A' Grade

Accredited by NBA

Structure and Curriculum

(As Per National Education Policy 2020)

For

First Year B.Tech.

in

Department of Computer Science and Engineering

Artificial Intelligence & Machine Learning

w. e. f. A.Y.: 2024-25

PRINCIPAL
D. Y. PATIL College of Engineering
And Technology
Kasaba Bawada, Kolhapur.
(An Autonomous Institute)

HEAD
Dept. of First Year Engg.
D. Y. Patil College of Engg. & Tech
Kasaba Bawada, Kolhapur

D. Y. PATIL COLLEGE OF ENGINEERING & TECHNOLOGY

(An Autonomous Institute)

Department of Computer Science and Engineering – Artificial Intelligence and Machine Learning

F. Y. B. Tech. Structure

Scheme of Teaching and Evaluation w. e. f. A. Y. 2024-2025

(As Per National Education Policy 2020)

Semester-I (Physics Cycle)

Sr. No	Course Code	Course Type	Name of the Course	Teaching Scheme Per Week			Credits	Total Marks	Evaluation Scheme			
				L	T	P			Type	Max. Marks	Minimum Marks For Passing	
Students Induction Program As Per AICTE Guidelines												
1	241AIMLBSCL101	BSC	Mathematics-I for AIML	03	--	--	03	100	ISE	20	20	40
									MSE	30		
									ESE	50	20	
2	241AIMLBSCL102	BSC	Applied Physics	03	--	--	03	100	ISE	20	20	40
									MSE	30		
									ESE	50	20	
3	241AIMLESCL101	ESC	Computer Programming and Problem Solving	03	--	--	03	100	ISE	20	20	40
									MSE	30		
									ESE	50	20	
4	241AIMLESCL102	ESC	Digital Electronics and Microprocessor	03	--	--	03	100	ISE	20	20	40
									MSE	30		
									ESE	50	20	
5	241AIMLVSECL101	VSEC	Design Thinking Through Innovation	01	--	--	01	25	ISE	25	10	10
6	241AIML IKS L 101	IKS	Historical Places in and Around Kolhapur District	02	--	--	02	50	ISE	20	20	20
									MSE	30		
7	241AIMLBSCT101	BSC	Mathematics-I for AIML Tutorial	--	01	--	01	25	ISE	25	10	10
8	241AIMLBSCP102	BSC	Applied Physics Laboratory	--	--	02	01	25	ISE	25	10	10
9	241AIMLESCP101	ESC	Computer Programming and Problem Solving Laboratory	--	--	02	01	25	ISE	25	10	10
10	241AIMLESCL102	ESC	Digital Electronics and Microprocessor Laboratory	--	--	02	01	25	ISE	25	10	10
11	241AIMLVSECP101	VSEC	Design Thinking Through Innovation Laboratory	--	--	02	01	25	ISE	25	10	10
12	241AIMLCCAP101	CCA	Liberal Learning	--	--	04	02	50	ISE	50	20	20
			Total	**15**	**01**	**12**	**22**	**650**	--	--	--	--
Non-Credits Mandatory Courses												
1	241AIMLMCL101	MC	Finishing School Training I	03	--	--	--	50	ISE	50	20	Grade
2	241AIMLMCP102	MC	Social/ Rural Internship	--	--	--	--	50	ISE	50	20	Grade

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Department of Computer Science and Engineering – Artificial Intelligence and Machine Learning

F. Y. B. Tech. Structure

Scheme of Teaching and Evaluation w. e. f. A. Y. 2024-2025

(As Per National Education Policy 2020)

Semester-II (Physics Cycle)

Sr. No	Course Code	Course Type	Name of the Course	Teaching Scheme Per Week			Credits	Total Marks	Evaluation Scheme			
				L	T	P			Type	Max. Marks	Minimum Marks For Passing	
1	241AIMLBSCL103	BSC	Mathematics-II for AIML	03	--	--	03	100	ISE	20	20	40
									MSE	30		
									ESE	50	20	
2	241AIMLBSCL104	BSC	Applied Chemistry	03	--	--	03	100	ISE	20	20	40
									MSE	30		
									ESE	50	20	
3	241AIMLESCL103	ESC	Generative AI	03	--	--	03	100	ISE	20	20	40
									MSE	30		
									ESE	50	20	
4	241AIMLAECL 101	AEC	Professional Communication	01	--	--	01	25	ISE	25	10	10
5	241AIMLVSECL102	VSEC	Computer Workshop	01	--	--	01	25	ISE	25	10	10
6	241AIMLPCCL101	PCC	Python Programming	02	--	--	02	50	ISE	20	20	20
									MSE	30		
7	241AIMLBSCT103	BSC	Mathematics-II for AIML Tutorial	--	01	--	01	25	ISE	25	10	10
8	241AIMLBSCP104	BSC	Applied Chemistry Laboratory	--	--	02	01	25	ISE	25	10	10
9	241AIMLESCP103	ESC	Generative AI Laboratory	--	--	02	01	25	ISE	25	10	10
10	241AIMLAECP 101	AEC	Professional Communication Laboratory	--	--	02	01	25	ISE	25	10	10
11	241AIMLVSECP102	VSEC	Computer Workshop Laboratory	--	--	02	01	25	ISE	25	10	10
12	241AIMLCCAP102	CCA	Liberal Learning	--	--	04	02	50	ISE	50	20	20
Total				**13**	**01**	**12**	**20**	**575**	--	--	--	--
Non Credits Mandatory Courses												
1	241AIMLMCL103	MC	Finishing School Training II	03	--	--	--	50	ISE	50	20	Grade
2	241AIMLMCP104	MC	Capstone Project	--	--	--	--	50	ISE	50	20	Grade

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Department of Computer Science and Engineering-

Artificial Intelligence and Machine Learning

F. Y. B. Tech. Curriculum

w.e.f. A.Y. 2024-2025

Course Title: Mathematics-I for AIML	
Course Code: 241AIMLBSCL101	**Semester:** I
Teaching Scheme: L-T-P: 03-00-00	**Credits:** 03
Evaluation Scheme: ISE-I/MSE/ISE-II: 10/30/10	**ESE Marks:** 50

Prior Knowledge of:	Matrices, Derivatives

Course Objectives:

1	To teach mathematical methodology
2	To develop mathematical skills and enhance logical thinking power of students
3	To provide students with skills in Linear Algebra and Calculus
4	To imbibe graduates with mathematical knowledge, computational skills and the ability to deploy these skills effectively in solution of engineering problems

Curriculum Details

Course Contents	Duration
Unit 1: Unit-I Linear Algebra –I • Introduction to matrices, types of matrices • Rank of matrix by normal form and echelon form • Solution of simultaneous linear non-homogenous equations • Solution of simultaneous linear homogenous equations	**07 Hrs**
Unit 2: Numerical Solutions of Linear Algebra • Introduction • Gauss–Elimination method • Gauss –Jordan method • Gauss –Seidel method • Jacobi's iterative method • Power method	**07 Hrs**
Unit 3: Linear Algebra –II • Definition of linear combination of vectors • Dependence and independence of vectors	**07 Hrs**

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Course Contents	Duration
• Eigen values and its properties • Eigen vectors and its properties • Cayley-Hamilton theorem	
Unit 4: Differential Calculus • Introduction. • Partial derivatives • Total derivatives • Euler's theorem on homogeneous functions • Jacobian and its properties	**07 Hrs**
Unit 5: Numerical Solutions of Algebraic & Transcendental equations • Introduction of algebraic and transcendental equations • Bisection method • Newton-Raphson method • Regula-Falsi method • Secant method	**07 Hrs**
Unit 6: Vector Spaces • The Euclidean space and vector space, subspace • Linear combination, linear span, linear dependence and independence • Basis, dimensions of finite dimensional vector space • Subspace- Row and column spaces • Rank and nullity Theorem	**07 Hrs**

Course Outcomes (CO): After successful completion of the course, students will be able to

CO	Statements
101.1	**Reduce** matrices to echelon form and **apply** the concept of rank of matrices to solve system of linear equations
101.2	**Solve** linear equations by numerical methods
101.3	**Identify** Eigen values & **make use of** it for finding Eigen vectors
101.4	**Apply** the knowledge of partial differentiation
101.5	**Apply** the numerical techniques to solve algebraic & transcendental equations

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CO	Statements
101.6	**Recognize and use** basic properties of subspace and vector space

Course Articulation Matrix: Mapping of Course Outcomes (CO) with Program Outcomes (PO)

PO / CO	BTL	1	2	3	4	5	6	7	8	9	10	11	12
101.1	2, 3	3	2	--	--	1	--	--	--	--	--	--	1
101.2	3	3	2	--	--	1	--	--	--	--	--	--	1
101.3	2, 3	3	2	--	--	1	--	--	--	--	--	--	1
101.4	3	2	2	--	--	--	--	--	--	--	--	--	1
101.5	3	2	2	--	--	--	--	--	--	--	--	--	1
101.6	3	2	2	--	--	1	--	--	--	--	--	--	1

Text Books:

Sr. No	Title	Edition	Author(s)	Publisher	Year
1	Advanced Engineering Mathematics	7th	Peter V. O'Neil	Cengage Learning	2012
2	Advanced Engineering Mathematics	1st	H. K. Dass	S. Chand Publications, New Delhi	2011
3	A Text Book of Applied Mathematics	7th	P.N.Wartikar, J.N.Wartikar	Vidyarthi Griha Prakashan, Pune.	2006
4	Higher Engineering Mathematics	36th	B.S. Grewal	Khanna Publishers	2001
5	Linear Algebra	2nd	Jin Ho Kwak and Sungpyo Hong	Springer	2004
6	Numerical Methods in Engineering and Science	11th	B.S. Grewal	Khanna Publishers	2023

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Reference Books:

Sr. No	Title	Edition	Author(s)	Publisher	Year
1	Advanced Engineering Mathematics	5th	Erwin Kreyszig	India Pvt, Ltd.	2014
2	Higher Engineering Mathematics	6th	B.V.Ramana	Tata M/c Graw-Hill Publication	2010
3	Numerical Methods for Scientific and Engineering Computation	5th	M.K.Jain	New Age International Pvt. Ltd New Delhi	2007
4	A Textbook of Engineering Mathematics	6th	N.P.Bali, Iyengar	Laxmi Publication	2004
5	Elementary Linear Algebra	5th	Stephen Andrilli and David Hecker	Academic Press	2016

Useful Link /Web Resources:

1. DELNET- http://www.delnet.in
2. NDL-http://ndl.iitkgp.ac.in
3. N-LIST- http://www.nlist.inflib.ac.in
4. https://www.youtube.com/results?search_query=Dr+Navneet+Sangle

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Department of Computer Science and Engineering-

Artificial Intelligence and Machine Learning

F. Y. B. Tech. Curriculum

w.e.f. A.Y. 2024-2025

Course Title: Tutorials of Mathematics-I for CSE -AIML	
Course Code: 241AIMLBSCT101	**Semester:** I
Teaching Scheme: L-T-P: 00-01-00	**Credits:** 01
Evaluation Scheme: ISE-25	**ESE Marks:** 00

Prior Knowledge of:	Matrices, Derivatives

Course Objectives:

1	**To teach** mathematical methodology
2	**To develop** mathematical skills and enhance logical thinking power of students
3	**To provide** students with skills in Linear Algebra and Calculus
4	**To imbibe** graduates with mathematical knowledge, computational skills and the ability to deploy these skills effectively in solution of engineering problems

List of Tutorials

Tut. No.	Title of Tutorials	Duration
01	**Linear Algebra–I:** Rank of Matrix, Solutions of Non-homogenous simultaneous linear equations	**01 Hr**
02	**Linear Algebra–I:** Solutions of simultaneous linear homogeneous equations	**01 Hr**
03	**Numerical Solutions of Linear Equations:** Gauss–Elimination method, Gauss–Jordan method.	**01 Hr**
04	**Numerical Solutions of Linear Equations:** Gauss–Seidel method, Jacobi's iterative method.	**01 Hr**
05	**Linear Algebra:** Linear Algebra using SCILAB /MATLAB	**01 Hr**
06	**Linear Algebra –II:** Dependence and Independence of vectors	**01 Hr**
07	**Linear Algebra –II:** Eigen values and Eigen vectors of Matrix, Cayley-Hamilton Theorem	**01 Hr**
08	**Differential Calculus:** Euler's theorem on homogeneous functions.	**01 Hr**

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Tut. No.	Title of Tutorials	Duration
09	**Differential Calculus:** Partial derivatives, Jacobian and its properties.	**01 Hr**
10	**Numerical Solutions** of Bisection Method and Newton Rapson Method	**01 Hr**
11	**Vector Spaces: V**ector space, Span, Basis, dimensions, subspace- Row and column spaces, Rank and nullity Theorem	**01 Hr**
12	**Vector Spaces:** Vector Spaces using SCILAB /MATLAB	**01 Hr**

Course Outcomes (CO): After successful completion of the course, students will be able to:

CO	Statements
101.1	**Reduce** matrices to echelon form and **apply** the concept of rank of matrices to solve system of linear equations
101.2	**Solve** linear equations by numerical methods
101.3	**Identify** Eigen values & **make use of** it for finding Eigen vectors
101.4	**Apply** the knowledge of partial differentiation
101.5	**Apply** the numerical techniques to solve algebraic & transcendental equations
101.6	**Recognize and use** basic properties of subspace and vector space

Course Articulation Matrix: Mapping of Course Outcomes (CO) with Program Outcomes (PO)

PO / CO	BTL	1	2	3	4	5	6	7	8	9	10	11	12
101.1	2, 3	3	2	--	--	1	--	--	--	--	--	--	1
101.2	3	3	2	--	--	1	--	--	--	--	--	--	1
101.3	2, 3	3	2	--	--	1	--	--	--	--	--	--	1
101.4	3	2	2	--	--	--	--	--	--	--	--	--	1
101.5	3	2	2	--	--	--	--	--	--	--	--	--	1
101.6	3	2	2	--	--	1	--	--	--	--	--	--	1

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Text Books:

Sr. No	Title	Edition	Author(s)	Publisher	Year
1	Advanced Engineering Mathematics	7th	Peter V. O'Neil	Cengage Learning	2012
2	Advanced Engineering Mathematics	1st	H. K. Dass	S. Chand Publications, New Delhi	2011
3	A Text Book of Applied Mathematics	7th	P.N.Wartikar, J.N.Wartikar	Vidyarthi Griha Prakashan, Pune.	2006
4	Higher Engineering Mathematics	36th	B.S. Grewal	Khanna Publishers	2001
5	Linear Algebra	2nd	Jin Ho Kwak and Sungpyo Hong	Springer	2004
6	Numerical Methods in Engineering and Science	11th	B.S. Grewal	Khanna Publishers	2023

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Sr. No	Title	Edition	Author(s)	Publisher	Year
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2	Higher Engineering Mathematics	6th	B.V.Ramana	Tata M/c Graw-Hill Publication	2010
3	Numerical Methods for Scientific and Engineering Computation	5th	M.K.Jain	New Age International Pvt. Ltd New Delhi	2007
4	A Textbook of Engineering Mathematics	6th	N.P.Bali, Iyengar	Laxmi Publication	2004
5	Elementary Linear Algebra	5th	Stephen Andrilli and David Hecker	Academic Press	2016

Useful Link /Web Resources:

1. DELNET- http://www.delnet.in
2. NDL-http://ndl.iitkgp.ac.in
3. N-LIST- http://www.nlist.inflib.ac.in
4. https://www.youtube.com/results?search_query=Dr+Navneet+Sangle

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Department of Computer Science and Engineering-

Artificial Intelligence and Machine Learning

F. Y. B. Tech. Curriculum

w.e.f. A.Y. 2024-2025

Course Title: Applied Physics	
Course Code:241AIMLBSCL102	**Semester:** I
Teaching Scheme: L-T-P:03-00-00	**Credits:** 03
Evaluation Scheme: ISE-I/MSE/ISE-II: 10/30/10	**ESE Marks:** 50

Prior Knowledge of:	Fundamentals of optics, semiconductors and diodes, resonance, nature of radiation

Course Objectives:

1	**To provide** a basic concept of modern optics and Quantum Physics
2	**To expose** electronic properties of materials for semiconductors & V-I Characteristics
3	**To make** the students grasp the working principles of LASER and its applications

Curriculum Details

Course Contents	Duration
Unit 1: Physics for Optics • Introduction: interference, diffraction, review of geometric path, optical path • Theory of plane diffraction grating and grating equation • Resolving power of plane diffraction grating • Newton's ring: experimental arrangement • Diameter of bright and • Diameter of dark ring • Determination of wavelength of monochromatic light using Newtons ring	**07 Hrs.**
Unit 2: Ultrasonics and Oscillation • Simple Harmonic Motion • Differential equation for Simple Harmonic Motion (No derivation), • Sprig mass and its applications • Theory of damped oscillations (Derivation) • Types of damping (Graphical Approach) • Engineering applications of damped oscillations • Theory of forced oscillations (Qualitative)	**07 Hrs.**
Unit 3: Solid State Physics • Fermi Dirac distribution • Fermi energy and Fermi level in intrinsic	**07 Hrs.**

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Course Contents	Duration
• Fermi energy in extrinsic semiconductors (n, p type) • Hall effect: equation for Hall voltage and Hall coefficient and the relation between them • Optical Fibres: Propagation mechanism, numerical aperture • Optical fibres sensors • Numerical	
Unit 4: Quantum Physics • Introduction to quantum physics • De Broglie wavelength of matter waves and its different forms • Physical significance wave function • Schrodinger's time-independent wave equation, • Schrodinger's time-dependent wave equation (1-D) • Energy of particle in 1-D potential well • Numerical	**07 Hrs.**
Unit 5: LASER and Optical Fibre • Lasers: Einstein's coefficients, absorption, spontaneous emission • Stimulated emission, population inversion • Types of LASERS: He-Ne LASER • Applications of LASER: Bar code scanner, laser printer, laser cooling (Qualitative) • Optical Fibers: Total Internal Reflection for signal propagation, • Numerical aperture (Definition) of Optical fibre for signal propagation • Optical fiber as a fire sensor	**07 Hrs.**
Unit 6: Physics for Electronic Devices • Diodes: Direct and Indirect band gap, • P-N junction diode-forward and reverse bias, diode equation • V-I characteristic, Avalanche breakdown • Zener breakdown regulator • Transistors: Bi-junction polar transistor • V-I characteristics in Common Emitter • V-I characteristics Common Base and Common Collector configuration	**07 Hrs.**

Self-Learning Topic: Fire temperature sensor (TIR-based)

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Course Outcomes (CO): After successful completion of the course, students will be able to

CO	Statements
102.1	**Apply** the principle of interference and relate concepts in various engineering applications
102.2	**Determine** the frequency of ultrasonic & explain the solution of damped wave equation in applied physics
102.3	**Illustrate** the electronic properties of semiconductors
102.4	**Solve** 1-D potential well problems using principles of quantum mechanical phenomenon
102.5	**Describe** the working mechanism and applications of LASER and Optical Fibre
102.6	**Explain** the working mechanism of electronic devices

Course Articulation Matrix: Mapping of Course Outcomes (CO) with Program Outcomes (PO)

PO / CO	BTL	1	2	3	4	5	6	7	8	9	10	11	12
102.1	3	3	2	--	--	--	--	--	--	--	--	--	1
102.2	3	3	2	--	--	--	--	--	--	--	--	--	1
102.3	3	3	2	--	--	--	--	--	--	--	--	--	1
102.4	3	3	2	--	--	--	--	--	--	--	--	--	1
102.5	3	3	2	--	--	--	--	--	--	1	--	--	1
102.6	3	3	2	--	--	--	--	--	--	1	--	--	1

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Text Books:

Sr. No	Title	Edition	Author(s)	Publisher	Year
1	Engineering Physics	1st	H. K. Malik	Tata McGraw Hill Education	2019
2	A Text Book of Engineering Physics	Revised	M. N. Avadhanulu, P. G. Kshirasagar	S. Chand Publications	2018
3	Engineering Physics	Revised	L.N. Singh	Synergy Knowledge Ware	2016
4	Engineering Physics	Revised	V. Rajendran	Tata McGraw Hill Education	2010
5	Engineering Physics	1st	R.K. Gaur, S.L. Gupta	Dhanpat Rai Publications	1993

Reference Books:

Sr. No	Title	Edition	Author(s)	Publisher	Year
1	Fundamentals of Physics	Revised	J. Walker, D. Halliday, R. Resnick	Wiley Publications	2018
2	Engineering Physics	1st	B.K. Pandey and Chaturvedi	Cengage learning Publications	2017
3	Nanotechnology- Principles & Practices	3rd	Sulabha K. Kulkarni	Capital Publication Co. New Delhi	2014
4	Introduction to Solid State Physics	8th	Charles Kittel	John Willey and Sons Inc.	2009
5	Solid State Physics	6th	S.O.Pillai	New edge Internationals	2009

Useful Link /Web Resources:

1. http://hyperphysics.phy-astr.gsu.edu/hbase/index.html
2. https://en.wikipedia.org/wiki/Wave_interference
3. https://en.wikipedia.org/wiki/Introduction_to_quantum_mechanics

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Course Title: Applied Physics Laboratory	
Course Code:241AIMLBSCP102	**Semester:** I
Teaching Scheme: L-T-P: 00-00-02	**Credit:** 01
Evaluation Scheme: ISE-25	**ESE Marks:** 00

Prior Knowledge of:	Optics, magnetic materials, semiconductor basics, graph plotting, slope calculation

Course Objectives:

1	To make the students understand the concept of physics for the effective application in the field of engineering and technology
2	To use the knowledge of electron transport in semiconductors
3	To summarize the factors affecting the speed of ultrasound through liquids

List of Experiments:

Exp. No	Title of Experiments	Duration
1	To determine Resolving power of diffraction grating	**02 Hrs.**
2	To calculate radius of curvature of Plano convex lens using Newton's ring	**02 Hrs.**
3	To compute diameter of cylindrical obstacle using mono chromatic Source	**02 Hrs.**
4	To determine wavelength of LASER using diffraction grating	**02 Hrs.**
5	To calculate the Resolving power of telescope	**02 Hrs.**
6	To determine the velocity of the ultrasonic wave in water using ultrasonic Interferometer	**02 Hrs.**
7	To decide band gap energy of P-N junction diode	**02 Hrs.**
8	To determine divergence of LASER beam	**02 Hrs.**
9	To recognize carrier concentration of semiconductor using Hall effect	**02 Hrs.**
10	To study physical Significance of wave function in Quantum Mechanics	**02 Hrs.**
11	Four probe experiment to calculate Band gap energy	**02 Hrs.**
12	Photo Diode for light response to current	**02 Hrs.**
13	Exp. Eyes experiment: Wavelength of LED and I-V characteristics of Zener diode.	**02 Hrs.**

A minimum of 12 experiments shall be conducted.

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Course Outcomes (CO): After successful completion of the course, students will be able to

CO	Statements
102.1	**Interpret** knowledge related to optics to use for suitable purposes in applied physics
102.2	**Identify** theory of semiconductor in terms of band gap energy and carrier concentration
102.3	**Explain** ultrasonic interferometer to study velocity of ultrasound in given Liquid
102.4	**Interpret** knowledge related to LASER for suitable purposes in applied physics

Course Articulation Matrix: Mapping of Course Outcomes (CO) with Program Outcomes (PO)

CO \ PO	BTL	1	`2	3	4	5	6	7	8	9	10	11	12
102.1	2	3	--	--	--	1	--	--	--	--	--	--	1
102.2	2	3	--	--	--	1	--	--	--	--	--	--	1
102.3	2	3	--	--	--	1	--	--	--	--	--	--	1
102.4	2	3	--	--	--	1	--	--	--	--	--	--	1

Suggested Learning Resources:
Text Books:

Sr. No	Title	Edition	Author(s)	Publisher	Year
1	Engineering Physics	1st	H.K. Malik	Tata McGraw Hill Education	2019
2	A Text Book of Engineering Physics	Revised	M. N. Avadhanulu, P. G. Kshirasagar	S. Chand Publications	2018
3	Engineering Physics	Revised	L. N. Singh	Synergy Knowledge Ware	2016
4	Engineering Physics	Revised	V. Rajendran	Tata McGraw Hill Education	2010
5	Engineering Physics	1st	R.K. Gaur, S.L. Gupta	Dhanpat Rai Publications	1993

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Reference Books:

Sr. No	Title	Edition	Author(s)	Publisher	Year
1	Fundamentals of Physics	Revised	J.Walker, D.Halliday, R.Resnick	Wiley Publication	2018
2	Engineering Physics	1st	B.K. Pandey and Chaturvedi	Cengage Learning Publications	2017
3	Nanotechnology- Principles and Practices	3rd	Sulabha K. Kulkarni	Capital Publication Co. New Delhi	2014
4	Introduction to Solid State Physics	8th	C.Kittel	John Willey and Sons Inc.	2009
5	Solid State Physics	6th	S.O.Pillai	New edge Internationals	2009

Useful Link /Web Resources:

1. https://vlab.amrita.edu/?sub=1
2. http://vlabs.iitb.ac.in/vlab/labsps.html

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Course Title: Computer Programming and Problem Solving	
Course Code:241AIMLESCL101	**Semester:** I
Teaching Scheme: L-T-P : 03-00-00	**Credits:** 03
Evaluation Scheme ISE-I, MSE, ISE-II:10/30/10	**ESE Marks:** 50

Prior Knowledge of:	Basic knowledge of computers.

Course Objectives:

1.	Acquire basic principles of problem-solving using computers.
2.	Learn and use syntax of C programming language to solve basic science and engineering problems.
3.	Select appropriate programming constructs, data structures and functions to build solutions to variety of problems.

Curriculum Details

Course Contents	Duration
Unit 1: Introduction to C programming: • Fundamentals of algorithms, flowcharts. • **Getting started with C**- Basic structure of C program, features of C language, Character set, C tokens, Keywords and Identifiers, Data types and Format Specifier. • Managing Input and Output operations. • **Variables**-Local and Global variables, rules for defining a variable name, variableInitialization-Run time and compile time, variable declaration. • **Constants**-Defining Constant by using preprocessor directive and keyword const. • **Operators-** Arithmetic operators, Relational operators, Logical Operators, Assignmentoperators, Increment and Decrement operators, Conditional operators, Bit-wiseoperators, Special operators. Operator precedence and Associativity.	**07 Hrs**
Unit 2: Programming Constructs: • **Need of Decision-making statements-** Simple 'if' statement, the 'if...else' statement, nesting of 'if...else' statements, the 'else if' ladder, the 'switch' statement, break statement, the 'go to' statement	**07 Hrs**

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Course Contents	Duration
• **Need of looping statements**: The 'for','while','do-while' loop with examples	
Unit 3: Arrays& Strings: • **Arrays**-Types of arrays, declaration arrays, initializing arrays (One Dimensional and Two-Dimensional Array)-Run time Initialization and Compile time Initialization with examples. • **Character Arrays and Strings**- Declaration and Initialization- Run time Initialization and Compile time Initialization with examples, reading string from terminal and writing strings to screen, String handling Functions-strcpy(),strcmp(),strlen(),strcat().	**07 Hrs**
Unit 4: Structures and Unions: • **Structures**-Elements of Structure: Structure definition, declaring structure variables,Structureinitialization. Accessing structure members by using '.' Operator, Arrays of structure, Arrays within structures. • **Unions**- Elements of Union: Union definition, declaring union variables, Union initialization, Comparison of Structure and Unions.	**07 Hrs**
Unit 5: Functions: • Need for Functions, Types of functions (User Defined and Built –In). • **User defined Function**-Elements of UDF-Function Definition, Function declaration, Function call. Actual Parameters, Formal Parameters. • **Categories of functions**-With Argument and with return value, No Argument and with return value, With Argument and No return value, No Argument and No return value.Storage classes (Automatic, Static, Extern, and Register). Passing arrays toa function, Structures and Functions. **Recursion.**	**07 Hrs**
Unit 6: Pointers: • Introduction to Pointers, accessing a value of variable by using Pointers-Declaration ofPointer variable, Initialization of pointer variables, Dereference operator. • Pointers as function arguments-Call by value and call by reference. • Pointers Expression, • Pointersand Arrays, Pointers and Strings, Pointers to Functions, Pointers and structures	**07 Hrs**

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Self-learning topics: Recent trends in IT.

Course Outcomes (CO): After successful completion of the course, students will be able to

CO	Statements
101.1	**Describe** the basic structure of C program and use of different data type.
101.2	**Develop** conditional and Loop statements to write C programs.
101.3	**Explain** the concept of arrays and strings to store homogeneous data.
101.4	**Use** functions to break programs into small module.
101.5	**Explain** concept of structures and union.
101.6	**Use** pointers to access memory location.

Course Articulation Matrix: Mapping of Course Outcomes (CO) with Program Outcomes (PO)

CO \ PO	BTL	1	2	3	4	5	6	7	8	9	10	11	12
101.1	2	3	3	2	--	--	--	--	--	--	--	--	1
101.2	2	3	3	2	--	--	--	--	--	--	--	--	1
101.3	2	3	3	2	--	--	--	--	--	--	--	--	1
101.4	2	3	3	2	--	--	--	--	--	--	--	--	1
101.5	2	3	3	2	--	--	--	--	--	--	--	--	1
101.6	2	2	2	2	--	--	--	--	--	--	--	--	1

Text Books:

Sr.No	Title	Edition	Author(s)	Publisher	Year
1	Programming in ANSI C	8th	E. Balagurusamy	McGraw Hill Education	2019
2	Let Us C	16th	Yashwant Kanetkar	BPB Publication	2017

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Reference Books:

Sr.No	Title	Edition	Author(s)	Publisher	Year
1	Programming with ANSIAnd Turbo C	-	Ashok Kamthane	Pearson Education	2002
2	Programming in C	2nd	J.B Dixit	Firewal Media	2011
3	The Complete ReferenceEdition	4th	Herbert Schildt	McGraw-Hill Education	2017

Useful Link /Web Resources:

1. https://nptel.ac.in/courses/1061041282
2. https://www.udemy.com/courses
3. https://www.coursera.org

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Course Title: Computer Programming and Problem Solving Laboratory	
Course Code :241AIMLESCP101	**Semester:** I
Teaching Scheme: L-T-P: 00-00-02	**Credit:** 01
Evaluation Scheme: ISE: 25	**ESE Marks:** 00

Prior Knowledge of:	Basic knowledge of computers.

Course Objectives:

1.	To Develop the ability to analyze a problem, develop an algorithm to solve it
2.	To Understand the concept of a program in a high-level language how it is being translated by a compiler into machine language and then executed
3.	To impart concept like looping, array, functions, structure and unions

List of Experiments:

Exp. No	Title of Experiments	Duration
01	Study different IDE's used for C programming	02 Hrs
02	Write C Program/s to explore data types.	02 Hrs
03	Write C Program/s to explore constants and variables.	02 Hrs
04	Write C Program to perform arithmetic, logical and relational operators.	02 Hrs
05	Write C Program using simple control statements: If-else, Do-while.	02 Hrs
06	Write C Program using loops statement.	02 Hrs
07	Write C Program using switch statement.	02 Hrs
08	Write C Program using arrays: Declare and initialization of arrays.	02 Hrs
09	Write C Program to demonstrate User defined Functions.	02 Hrs
10	Write C Program to demonstrate structures.	02 Hrs
11	Write C Program to demonstrate unions.	02 Hrs
12	Write C Program to demonstrate use of Pointers.	02 Hrs

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Course Outcomes (CO): After successful completion of the course, students will be able to

CO	Statements
101.1	Understand the logic for given problem and provide the solution.
101.2	Explain syntax and construction of C programming.
101.3	Describe the methods of iteration or looping and branching.
101.4	Make use of different data structures like Arrays, Structures, and Unions.

Course Articulation Matrix: Mapping of Course Outcomes (CO) with Program Outcomes PO)

PO / CO	BTL	1	2	3	4	5	6	7	8	9	10	11	12
101.1	2	1	1	1	--	--	--	--	--	--	--	--	1
101.2	2	1	1	1	--	--	--	--	--	--	--	--	1
101.3	2	1	1	1	--	--	--	--	--	--	--	--	1
101.4	2	1	1	1	--	--	--	--	--	--	--	--	1

Text Books:

Sr. No	Title	Edition	Authors	Publisher	Year
1	Programming in ANSI C	Eight Edition	E. Balagurusamy	McGraw Hill Education	2019
2	Let Us C	16th	Yashwant Kanetkar	BPB Publication	2017

Reference Books:

Sr. No	Title	Edition	Authors	Publisher	Year
1	Programming with ANSI And Turbo C	--	Ashok Kamthane	Pearson Educati on	2002
2	Programming in C	2nd	J.B Dixit	Firewal Media	2011
3	The Complete Reference Edition	4th	Herbert Schildt	McGraw-Hill Education	2017

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Course Title: Digital Electronics and Microprocessor	
Course Code:241AIMLESCL102	**Semester:** I
Teaching Scheme: L-T-P :03-00-00	**Credits:** 03
Evaluation Scheme ISE-I/MSE/ISE-II: 10/30/10	**ESE Marks:** 50

Prior Knowledge of:	Basic knowledge of Number Systems.

Course Objectives:

1.	Understand Numbering system in digital electronics and interpret logic expression
2.	Understand principles, characteristics and operations of combinational & sequential logic circuits
3.	Design, implement and analyse combinational circuits
4.	Understand operation of various memory devices
5.	Understand architecture of 8085 and 8086 Microprocessors
6.	Understand interfacing using 8255 PPI

Curriculum Details

Course Contents	Duration
Unit 1: Number Systems: • **Number systems-** Base/Radix, Most significant bit (MSB), Least significant bit (LSB), Bit, Nibble, Byte. Types of Number Systems-Binary, Octal, Decimal, Hexadecimal-Conversion between Number systems. Binary addition and subtraction, 1's and 2's complement representation. • **Binary Codes:** Weighted Binary Codes, Non-Weighted Binary Codes, ASCII code.	**07 Hrs**
Unit 2: Logic Gates and Boolean Algebra: • **Logic Gates** -Basic logic circuits: AND, OR, NOT, and their truth tables. Derived logic gates-NAND, NOR, Ex-OR, Ex-NOR. NAND and NOR as Universal gate. • **Boolean Algebra** -Laws of Boolean algebra, De-Morgan's theorem, Min term, Max term, POS, SOP, and K-Map (up to 4 variables).	**07 Hrs**

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Unit 3: Combinational logic circuit and Sequential logic circuit: • **Combinational logic circuit-** Half adder, Full adder, Half sub-tractor, Multiplexer, De-multiplexer, Encoder, Decoder. • **Sequential logic circuit:** Flip Flops and its operation (S-R, D, T, J K Flip Flop).	**07 Hrs**
Unit 4: 8085 Microprocessor: • Microprocessor - 8085 Architecture ,8085 Pin Configuration , Addressing Modes & Interrupts ,8085 Instruction Sets.	**07 Hrs**
Unit 5: 8086 Microprocessor • Microprocessor - 8086 Architecture, 8086 Functional Units, 8086 Pin Configuration, Addressing Modes & Interrupts ,8086 Instruction Sets.	**07 Hrs**
Unit 6: 8255 - Programmable Peripheral Interface • 8255 Internal Architecture Working Modes of 8255, Operation of Different 8255 Modes, Interfacing Examples Using 8255 PPI.	**07 Hrs**

Self-learning topics: Conversion of Flip-Flops

Course Outcomes (CO): After successful completion of the course, students will be able to

CO	Statements
102.1	Understand Number System.
102.2	Interpret Boolean Logic Expressions.
102.3	Design Combination Logic Circuits.
102.4	Understand Sequential logic circuits and Memory devices.
102.5	Understand architecture of Microprocessors.
102.6	Understand architecture of 8255 PPI.

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Course Articulation Matrix: Mapping of Course Outcomes (CO) with Program Outcomes (PO)

PO / Co	BTL	1	2	3	4	5	6	7	8	9	10	11	12
102.1	2	3	3	2	--	--	--	--	--	--	--	--	1
102.2	2	3	3	2	--	--	--	--	--	--	--	--	1
102.3	2	3	3	2	--	--	--	--	--	--	--	--	1
102.4	2	3	3	2	--	--	--	--	--	--	--	--	1
102.5	2	3	3	2	--	--	--	--	--	--	--	--	1
102.6	2	2	2	2	--	--	--	--	--	--	--	--	1

Text Books:

Sr. No	Title	Edition	Author(s)	Publisher	Year
1	Digital Design	5th Edition	M. Moris Mano and Michael D Ciletti	Pearson Education	2012
2	Advanced Microprocessors and Peripherals	3rd Edition.	A.K. Ray and K.M. Bhurchandi	TMH	2013
3	Microprocessor Architecture, Programming and Applications with 8085	5th Edition	Ramesh S. Goankar	Prentice Hall	2011
4	Microprocessor and Interfacing	3rd Edition	Douglas V Hall, SSSP Rao	TMH	2012

Reference Books:

Sr. No	Title	Edition	Author(s)	Publisher	Year
1	Approach to Digital Design'	3rd	Willim I. Fletcher.'An Engineering	PHI/ Pearson	2011
2	'Digital Logic Design Principals'	--	Norman Balabanian Bradle Carlson.	Wiley Publication.	2012

Useful Link /Web Resources:

1. https://nptel.ac.in/courses/1061041282.
2. https://www.udemy.com/courses
3. https://www.coursera.org
4. https://www.vlab.co.in/

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Department of Computer Science and Engineering- Artificial Intelligence and Machine Learning

F. Y. B. Tech. Curriculum

w.e.f. A.Y. 2024-2025

Course Title: Digital Electronics and Microprocessor Laboratory	
Course Code:241DSESCP102	**Semester:** I
Teaching Scheme: L-T-P: 00-00-02	**Credit :**01
Evaluation Scheme: ISE:25	**ESE Marks:** 00

Prior Knowledge of:	Basic knowledge of Number systems.

Course Objectives:

1.	To acquire basic knowledge of digital logic levels and apply to understand digital logic circuits
2.	To make students conversant with the designing of digital systems, and programmable aspects of microprocessors

List of Experiments:

Exp. No	Title of Experiments	Duration
01	Introduction to Digital IC trainer kit and IC tester	02 Hrs
02	Verification of truth tables of the Basic, Universal and derived Logic gates	02 Hrs
03	Implementation of basic gates using universal gates	02 Hrs
04	Implementation of Half and Full Adder	02 Hrs
05	Implementation of 4:1 Multiplexers using logic gates	02 Hrs
06	Implementation of 1:4 De-multiplexers using logic gates	02 Hrs
07	Implementation of S-R Flip Flop/J-K flips flop	02 Hrs
08	Brief Introduction of 8085 Microprocessor and its Trainer Kit	02 Hrs
09	Write an assembly language program to add, subtract, multiply and divide two 8 bit numbers	02 Hrs

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Exp. No	Title of Experiments	Duration
10	To find largest and smallest of numbers by using 8085	02 Hrs
11	Find 1's & 2's complement of a 8 bit number	02 Hrs
12	Transfer Block of data bytes from one memory location to another	02 Hrs

Course Outcomes (CO): After successful completion of the course, students will be able to

CO	Statements
102.1	Understand use of Different IC's
102.2	Demonstrate different Digital Circuits
102.3	Execute Assembly language program
102.4	Application of 8085 using interfacing

Course Articulation Matrix: Mapping of Course Outcomes (CO) with Program Outcomes (PO)

PO / CO	BTL	1	2	3	4	5	6	7	8	9	10	11	12
102.1	2	2	2	2	--	--	--	--	--	--	--	--	1
102.2	2	2	2	2	--	--	--	--	--	--	--	--	1
102.3	2	2	2	2	--	--	--	--	--	--	--	--	1
102.4	2	2	2	2	--	--	--	--	--	--	--	--	1

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Suggested Learning Resources

Text Books:

Sr. No	Title	Edition	Authors	Publisher	Year
1	Digital Design	5th edition	M. Moris Mano and Michael D Ciletti	Pearson Education	2012
2	Advanced Microprocessors and Peripherals	3rd Edition	A.K. Ray and K.M. Bhurchandi	TMH	2013
3	Microprocessor Architecture, Programming and Applications with 8085	5th edition	Ramesh S. Goankar	Prentice Hall	2011
4	Microprocessor and Interfacing	3rd edition	Douglas V Hall, SSSP Rao	TMH	2012

Reference Books:

Sr. No	Title	Edition	Author(s)	Publisher	Year
1	Approach to Digital Design	3rd	Willim I. Fletcher.'An Engineering	PHI/ Pearson	1
2	Digital Logic Design Principals	--	Norman Balabanian Bradle Carlson.	Wiley Publication.	--

Useful Link /Web Resources:

1. https://nptel.ac.in/courses/1061041282
2. https://www.udemy.com/courses
3. https://www.coursera.org
4. https://www.vlab.co.in/

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F. Y. B. Tech. Curriculum

w.e.f. A.Y. 2024-2025

Course Title: Historical Places in and Around Kolhapur District	
Course Code : 241AIMLIKSL101	**Semester**: I
Teaching Scheme L-T-P : 02-00-00	**Credits:** 02
Evaluation Scheme ISE-I, MSE, ISE-II: 20/30/00	**ESE Marks:** 00

Contents	Duration
Unit 01: Chhatrapati Shahu Maharaj: A King for Society • Introduction • Life History • Contribution of Rajarshi Shahu Maharaj in various fields as a modern Social Reformer as Women Empowerment in 19th Century • Development in Education • Social Reservation and equality • Agriculture • Industry • Initiation for Radhanagai Village and Dam	**07 Hrs**
Unit 02: A Study of Khidrapur- Kopeshwar • Life History of Khidrapur Kopeshwar Temple • The Wonder of Khidrapur Kopeshwar Temple • Swarga Mandap in Kopeshwar Temple • Sabha Mandap, Antaral Kaksha of Kopeshwar Temple • Beauty of Exterior Architecture of Kopeshwar Temple • Mystery of Black stone • Measures Suggested to Development of Khidrapur	**07 Hrs**
Unit 03 : A Study of Panhala Fort and Pawankhind • History of Panhala Fort • Major Features: Andhar Bawadi • Major Features: Kalavanticha Mahal, Ambarkhana • Major Features: Dharma Koti, Sajja Koti	**07 Hrs**

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Contents	Duration
• Teen Darwaja, Raj Darwaja • Rajdindi Bastion • Journey from Panhalgad to Pawankhind by Chhatrapati Shivaji Raje	
Unit 04: A Study of Mahalaxmi Temple • History and construction of Temple • The Main Shrines Doorway • Darshan and Kurma Mandap • Ganapati Chowk, Garud Mandap • Boundary wall, Entrances and complex • Mahalaxmi Temple Timings • Kiranostav Celebrations	**07 Hrs**

References:

1. Social Movements in India: A Review of Literature – Ghanshy am ShahISBN 0761995145 New Delhi ; Thousand Oaks : Sage Publications, 2004.
2. Rajarshi Shahu Maharaj – Jeevan Vakarya, editor – Ramesh Patnage.
3. Shahu Chhatrapati - Royal Revolutionary – DhananjayKeer.
4. Samajik SanshodhanPadnativaTantre – Dr. Pradeep Aaglave.
5. Kalasekar. T. L: Khidrapur: Khojurao of Maharashtra.
6. Chothe R.G: Temples of Khidrapur, A heritage of India.
7. Kulkarni A. B: Kopeshwar temple of Khidrapur.
8. Gazetteer of Kolhapur District.
9. Eaton, Richard Maxwell (2005). The New Cambridge History of India.
10. "Translations of Panhala inscriptions". Government of Maharashtra. Retrieved 19 March 2009.
11. "Mahalakshmi Temple - Jewel Among Kolhapur Temples.
12. "Inside Temples". mahalaxmikolhapur.com.

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Department of Computer Science and Engineering- Artificial Intelligence and Machine Learning

F. Y. B. Tech. Curriculum

w.e.f. A.Y. 2024-2025

Course Title : Liberal Learning Course	
Course Code: 241AIMLCCAP101 & 241AIMLCCAP102	**Semester:** I / II
Teaching Scheme L-T-P : 00-00-04	**Credits :** 02
Evaluation Scheme ISE: 50	**ESE Marks :**00

- Liberal Learning Through Students Clubs and particular areas is a Two-credit course run for First Year B.Tech .
- Students are required to go through the list of liberal learning courses and rank their preferences through google form/JUNO software provided by department at the beginning of semester.
- They will be allocated one area from the list. Experts from particular areas (club) conduct sessions once a week for each area on campus through activities, discussions, presentations, and lecture methods and evaluation out of 50 per area is done for each area throughout the semester.
- Evaluation pattern may differ according to the nature of each area (Club).
- Although there is no pre-defined syllabus, there is an outline which experts normally develop and follow for the sessions.
- However, students may approach the faculty to cover certain topics of their interest in that area during sessions based on students' interest and experts'.
- List of liberal learning courses will get display at the beginning of odd semester.

List of Liberal Learning Courses

Sr. No	Name of the Course
1.	Coding & Programming Club
2.	Photography Club
3.	Art, Craft and Culture Club
4.	German Language Club

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Sr. No	Name of the Course
5.	Yoga
6.	Meditation
7.	Adventure Club
8.	Interior Design
9.	Guitar
10.	Film Making
11.	Music
12.	Painting
13.	Dance
14.	Agriculture Club
15.	Corporate Culture Club
16.	Hotel Management Club
17.	Medical Club
18.	Art of Living Club
19.	Drama
20.	LinguLeads
21.	NCC/NSS
22.	Microsoft Club
23.	Robotics Club
24.	Health & Fitness Club
25.	Bookfast Club (Reading Club)
26.	Media Club
27.	Ted Club-GD, Public Speaking, Debate

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Course Title: Finishing School Training-I	
Course Code: 241AIMLMCL101	**Semester:** I
Teaching Scheme: L-T-P :3-0-0	**Credits:** 00
Evaluation Scheme ISE: 50 Grade	**ESE Marks:** 00

Curriculum Details

Course Contents	Duration
UNIT-I: Learning Basic Aptitude Module-1: Percentage Module-2: Average & Its Applications	**04 Hrs**
UNIT-II: Series Completion Module-1: Number Series Module-2: Letter Series Module-3: Alphanumeric Series	**04 Hrs**
UNIT-III: LSRW-I Module-1. Listening Introduction & Activities Module- 2. Speaking Introduction & Activities Module-3. Reading Introduction & Activities Module-4. Writing Introduction	**05 Hrs**
UNIT-IV: Career Management-1 Module-1: SWOT Analysis Module-2: Goal Setting(Why & How of SMART goals) Module-3: Personality Traits & Self-Assessment Module-4: Competency Mapping	**05 Hrs**
UNIT-V: Interpersonal Skills Module-1: Team Management Module-2: Attitude Building Module-3: Time Management	**05 Hrs**
UNIT VI: Technical Training Module-1: Introduction to C Language Module-2: Identifiers & Data types,Operations Module-3: Control Instructions, Function, Recursion Module-4: Array, Strings, Pointers Module-5: Structure & Union Module-6: Memory Allocation Module-7: Enumeration, Pre-processor Module-8:Command Line Arguments	**18 Hrs**

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Course Title: Rural/Social Internship	
Course Code: 241AIMLMCP102	**Semester:** I
Teaching Scheme: L-T-P :0-0-0	**Credits:** Grade (Mandatory Course)
Evaluation Scheme ISE: 50	**ESE Marks:** 00

Course Objectives:

1	To provide possible opportunities to learn, understand and sharpen the real time technical / managerial skills required at the job.
2	To exposure to the current technological developments relevant to the subject area of training.
3	To expose students to the engineer's responsibilities and ethics.
4	To understand the social, economic and administrative considerations that influence the working environment of industrial organizations
5	To gain experience in writing technical reports/projects.
6	To understand the social, economic and administrative considerations that influence the working environment of industrial organizations

Curriculum Details

As per the approved structure of curriculum, students will be allowed to do internship during first semester of B. Tech. program. During internship students are required to be visit village/ward/small industry/organization etc

For following activities

1. Prepare and implement plan to create local job opportunities.
2. Prepare and implement plan to improve education quality in village.
3. Preparing an actionable DPR for Doubling the village Income.
4. Developing Sustainable Water Management system.
5. Prepare and Improve a plan to improve health parameters of villagers.
6. Developing and implementing of Low Cost Sanitation facilities
7. Prepare and implement plan to promote Local Tourism through Innovative Approaches
8. Implement/Develop Technology solutions which will improve quality of life.
9. Prepare and implement solution for energy conservation.
10. Prepare and implement plan to Skill village youth and provide employment.
11. Develop localized techniques for Reduction in construction Cost.
12. Prepare and implement plan of sustainable growth of village.
13. Setting of Information imparting club for women leading to contribution in social and economic issues.
14. Developing and managing Efficient garbage disposable system.
15. Contribution to any national level initiative of Government of India. For eg. Digital India/ Skill India/ Swachh Bharat Internship etc

Every student is required to prepare a file containing documentary proofs of the activities done by him. The evaluation will be done by expert committee constituted by HoD/Departmental Internship In-charge/ faculty mentor.

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Course Title: Mathematics-II for AIML	
Course Code: 241AIMLBSCL103	**Semester**: II
Teaching Scheme: L-T-P: 03-00-00	**Credits:** 03
Evaluation Scheme: ISE-I/MSE/ISE-II:10/30/10	**ESE Marks:** 50

Prior Knowledge of:	Formulae of Derivatives and Integration, Differential Equation, Statistics

Course Objectives:

1	To teach mathematical methodology
2	To develop mathematical skills and enhance logical thinking power of students
3	To provide students with skills in differential equations and numerical techniques
4	To imbibe graduates with mathematical knowledge, computational skills and the ability to deploy these skills effectively in solution of engineering problems

Curriculum Details

Course Contents	Duration
Unit 1: Ordinary Differential Equations of First Order and First Degree • Definition of differential equation, order and degree of differential equation • Exact differential equations • Non - exact differential equations • Linear differential equations • Bernoulli's differential equations	**07 Hrs**
Unit 2: Applications of Ordinary Differential Equations • Introduction of variable separable form. • Orthogonal trajectories. (Cartesian form) • Applications to simple electrical circuits • Newton's law of cooling • Rate of decay and growth	**07 Hrs**
Unit 3 Numerical methods to solve Ordinary Differential Equations	**07 Hrs**

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Course Contents	Duration
• Introduction • Picard's method • Taylor's series method • Euler's method • Runge - Kutta's method (Fourth order)	
Unit 4: Frequency distribution and measure of central Tendency • Frequency distribution, continuous frequency distribution • Graphical representation of a frequency distribution- histogram, frequency polygon • Measure of central tendency- arithmetic mean, median and mode • Range, quartile deviation • Mean deviation, standard deviation	**07 Hrs**
Unit 5: Correlation and Regression • Introduction, types of correlation, Karl Pearson's coefficient of correlation • Interpretation of the coefficients of corrections • Computation of coefficient of correlation for ungroup data • Lines of regression • Calculations of equations of the lines of regression	**07 Hrs**
Unit 6: Curve Fitting • Introduction • Curve fitting by method of least squares: • Fitting of straight line • Fitting of second-degree parabolic curves • Exponential curve	**07 Hrs**

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Course Outcomes (CO): After successful completion of the course, students will be able to

CO	Statements
103.1	**Solve** ordinary differential equations of first order and first degree
103.2	**Apply** the knowledge of ordinary differential equation of first order and first degree
103.3	**Use** the numerical methods to solve ordinary differential equations
103.4	**Apply** the knowledge to study the data given with respect to dispersion and measure of central tendency
103.5	**Describe** the statistical data numerically by using correlation and regression
103.6	**Apply** the acquired knowledge of curve fitting to solve problems in engineering

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs)

PO / CO	BTL	1	2	3	4	5	6	7	8	9	10	11	12
103.1	2, 3	3	2	--	--	--	--	--	--	--	--	--	1
103.2	3	3	2	--	--	--	--	--	--	--	--	--	1
103.3	2,3	3	2	--	--	1	--	--	--	--	--	--	1
103.4	3	2	2	--	--	1	--	--	--	--	--	--	1
103.5	3	2	2	--	--	1	--	--	--	--	--	--	1
103.6	3	2	2	--	--	1	--	--	--	--	--	--	1

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Text Books:

Sr. No	Title	Edition	Author(s)	Publisher	Year
1	Advanced Engineering Mathematics	7th	Peter V.O'Neil	Cengage Learning	2012
2	Advanced Engineering Mathematics	1st	H.K. Dass	S. Chand Publications, New Delhi	2011
3	A Text Book of Applied Mathematics	7th	P.N.Wartikar, J.N.Wartikar	Vidyarthi Griha Prakashan, Pune.	2006
4	Higher Engineering Mathematics	36th	B.S. Grewal	Khanna Publishers	2001

Reference Books:

Sr. No	Title	Edition	Author(s)	Publisher	Year
1	Advanced Engineering Mathematics	5th	Erwin Kreyszig	India Pvt, Ltd.	2014
2	Higher Engineering Mathematics	6th	B.V.Ramana	Tata M/c Graw- Hill Publication	2010
3	Numerical Methods for Scientific and Engineering Computation	5th	M.K.Jain	New Age International Pvt. Ltd New Delhi	2007
4	A Textbook of Engineering Mathematics	6th	N.P.Bali, Iyengar	Laxmi Publication	2004

Useful Link /Web Resources:

1. DELNET- http://www.delnet.in
2. NDL-http://ndl.iitkgp.ac.in
3. N-LIST- http://www.nlist.inflib.ac.in
4. https://www.youtube.com/results?search_query=Dr+Navneet+Sangle

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(An Autonomous Institute)

Department of Computer Science and Engineering-

Artificial Intelligence and Machine Learning

F. Y. B. Tech. Curriculum

w.e.f. A.Y. 2024-2025

Course Title: Mathematics-II for AIML Tutorial	
Course Code: 241AIMLBSCT103	**Semester:** II
Teaching Scheme: L-T-P: 00-01-00	**Credits:** 01
Evaluation Scheme: ISE:25	**ESE Marks:** 00

Prior Knowledge of:	Formulae of Derivatives and Integration, Differential Equation, Statistics

Course Objectives:

1	To teach mathematical methodology
2	To develop mathematical skills and enhance logical thinking power of students
3	To provide students with skills in differential equations and numerical techniques
4	To imbibe graduates with mathematical knowledge, computational skills and the ability to deploy these skills effectively in solution of engineering problems

List of Tutorials:

Tut. No.	Title of Tutorial	Duration
01	**Ordinary Differential Equations:** Exact and non-exact differential equations.	**01 Hr**
02	**Ordinary Differential Equations:** Linear and non-linear differential equations.	**01 Hr**
03	**Applications of Ordinary Differential Equations:** Orthogonal Trajectories. (Cartesian curves), Applications to Simple Electrical Circuits.	**01 Hr**
04	**Applications of Ordinary Differential Equations:** Newton's law of cooling, Rate of Decay, and growth	**01 Hr**
05	**Numerical Solution of Ordinary Differentia Equations First Order and First Degree:** Picard's method, Taylor's series method.	**01 Hr**
06	**Numerical Solution of Ordinary Differential Equations of First Order and First Degree:** Euler's method, Runge-Kutta's method.	**01 Hr**
07	**Numerical Solutions**: Numerical Solutions using SCILAB/MATLAB	**01 Hr**
08	**Frequency distribution and measure of central Tendency:** Mean deviation, Standard deviation	**01 Hr**

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Tut. No.	Title of Tutorial	Duration
09	**Measure of central Tendency:** Measure of central Tendency using SCILAB/MATLAB	**01 Hr**
10	**Correlation and Regression:** Computation of Correlation, Lines of regression	**01 Hr**
11	**Curve fitting:** Fitting of straight line and exponential curve	**01 Hr**
12	**Curve fitting:** Fitting of second degree curve	**01 Hr**

Course Outcomes (CO): After successful completion of the course, students will be able to:

CO	Statements
103.1	**Solve** ordinary differential equations of first order and first degree
103.2	**Apply** the knowledge of ordinary differential equation of first order and first degree
103.3	**Use** the numerical methods to solve ordinary differential equations
103.4	**Apply** the knowledge to study the data given with respect to dispersion and measure of central tendency
103.5	**Describe** the statistical data numerically by using correlation and regression
103.6	**Apply** the acquired knowledge of curve fitting to solve problems in engineering

Course Articulation Matrix: Mapping of Course Outcomes (CO) with Program Outcomes (PO)

PO / CO	BTL	1	2	3	4	5	6	7	8	9	10	11	12
103.1	2, 3	3	2	--	--	--	--	--	--	--	--	--	1
103.2	3	3	2	--	--	--	--	--	--	--	--	--	1
103.3	2,3	3	2	--	--	1	--	--	--	--	--	--	1
103.4	3	2	2	--	--	1	--	--	--	--	--	--	1
103.5	3	2	2	--	--	1	--	--	--	--	--	--	1
103.6	3	2	2	--	--	1	--	--	--	--	--	--	1

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Text Books:

Sr. No	Title	Edition	Author(s)	Publisher	Year
1	Advanced Engineering Mathematics	7th	Peter V.O'Neil	Cengage Learning	2012
2	Advanced Engineering Mathematics	1st	H.K. Dass	S. Chand Publications, New Delhi	2011
3	A Text Book of Applied Mathematics	7th	P.N.Wartikar, J.N.Wartikar	Vidyarthi Griha Prakashan, Pune.	2006
4	Higher Engineering Mathematics	36th	B.S. Grewal	Khanna Publishers	2001

Reference Books:

Sr. No	Title	Edition	Author(s)	Publisher	Year
1	Advanced Engineering Mathematics	5th	Erwin Kreyszig	India Pvt, Ltd.	2014
2	Higher Engineering Mathematics	6th	B.V.Ramana	Tata M/c Graw-Hill Publication	2010
3	Numerical Methods for Scientific and Engineering Computation	5th	M.K.Jain	New Age International Pvt. Ltd New Delhi	2007
4	A Textbook of Engineering Mathematics	6th	N.P.Bali, Iyengar	Laxmi Publication	2004

Useful Link /Web Resources:

1. DELNET- http://www.delnet.in
2. NDL-http://ndl.iitkgp.ac.in
3. N-LIST- http://www.nlist.inflib.ac.in
4. https://www.youtube.com/results?search_query=Dr+Navneet+Sangle

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Department of Computer Science and Engineering – Artificial Intelligence and Machine Learning

F. Y. B. Tech. Curriculum

w.e.f. A.Y. 2024-2025

Course Title: Applied Chemistry	
Course Code: 241AIMLBSCL104	**Semester:** II
Teaching Scheme: L-T-P: 03-00-00	**Credits:** 03
Evaluation Scheme: ISE-I/MSE/ISE-II: 10/30/10	**ESE Marks:** 50

Prior Knowledge of:	Periodic properties of elements, basics of organic, inorganic, physical and analytical chemistry

Course Objectives

1.	To Apply the theoretical aspect for understanding the water chemistry
2.	To understand the basic principle and applications of senser and memory device
3.	Evaluate the electrochemical energy storage systems such as lithium batteries and design for usage in electrical and electronic applications
4.	Illustrate general synthesis and mechanisms of some advanced polymeric Materials and e-waste management

Curriculum Details

Course Contents	Duration
Unit 1: Water Chemistry • Introduction, Types of impurities in natural water • Water quality parameters total solids, acidity, alkalinity, chlorides, COD and BOD (definition, causes, significance) • Hardness of water, types of hardness, units of hardness, numerical on hardness • Ill effects of hard water in steam generation in boilers (scale & sludge formation, caustic embrittlement and boiler corrosion) • Treatment of hard water (Ion exchange and reverse osmosis process)	**07 Hrs.**
Unit 2: Sensors • Introduction, working, principle and applications of conductometric sensors, electrochemical sensors, thermometric sensors (Flame photometry) and optical sensors (colorimetry)	**07 Hrs.**

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Course Contents	Duration
• Hydrated gel sensor (p^H meter) • Sensors for the measurement of dissolved oxygen (DO) • Electrochemical gas sensors for SOx and NOx • Disposable sensors (DS): Introduction, principle, characteristics of disposable sensors, Advantages of DS over Classical sensors	
Unit 3: Materials for Memory and Display Systems **Memory Devices**: • Introduction, basic concepts of electronic memory, Classification of electronic memory devices (organic, polymeric and hybrid material) • Manufacturing of semiconducting chips • Green computing: Bio-composite based memory devices **Display Systems**: • Nanomaterials and organic materials for display technology (Light absorbing and emitting materials) used in optoelectronic devices • Liquid crystals display (LC's) –Introduction, classification, properties and application in Liquid Crystal Displays (LCD's) • Properties and application of Organic Light Emitting Diodes (OLED's) and light emitting electrochemical cells	**07 Hrs.**
Unit 4: Energy System and Battery Technology • Introduction, Classification of batteries (primary and secondary batteries) • Construction, working, advantages and applications of carbon-zinc cell, Ni-Cd and Li-ion battery as an electrochemical cell • Principle, Properties and applications of Quantum dots sensitized solar cells (QDSSC's) • Fuel cells**:** Concept, types of fuel cells and merits • Construction, working and applications phosphoric acid fuel cell and Hydrogen-oxygen fuel cell	**07 Hrs.**
Unit 5: **Sustainable chemistry and E-waste management:**	**07 Hrs.**

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Course Contents	Duration
• Introduction, sources of e-waste, Composition, Characteristics, and Need of e-waste management • Toxic materials used in manufacturing electronic and electrical products, health hazards due to exposure to e-waste • Recycling and Recovery: Different approaches of recycling (separation, thermal treatments, hydrometallurgical extraction, direct recycling) • Extraction of Metal from E-waste. Role of stakeholders in environmental management of e-waste (producers, consumers, recyclers, and statutory bodies)	
Unit 6: Engineering Advanced Materials and Green Chemistry **Advanced Materials:** • Introduction, classifications of polymer • Introduction, synthesis, properties & applications of Bakelite and Urea-formaldehyde resin • Conducting Polymers: Introduction, synthesis and mechanism of conduction in polyaniline • Biodegradable polymers: Introduction and their requirements. synthesis, properties and applications of polylactic acid **Green Chemistry:** • Introduction, Aims, goals and applications • Twelve principles of green chemistry • Green Fuels: Introduction, construction and working of solar photovoltaic cell, advantages, and disadvantages	**07 Hrs.**

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Course Outcomes (CO): After successful completion of the course, students will be able to

CO	Statements
104.1	**Apply** the theoretical aspects for understanding the water chemistry
104.2	**Understand** the principles and applications of sensors
104.3	**Discuss and assess** the Basic concepts of electronic memory and display Systems
104.4	**Evaluate** the electrochemical energy storage systems such as lithium batteries and design for usage in electrical and electronic applications
104.5	**Interpret** the extraction of metal from e-waste and role of stakeholders in environmental management of e-waste.
104.6	**Illustrate** general synthesis and mechanisms of some advanced polymeric Materials and green chemistry

Course Articulation Matrix: Mapping of Course Outcomes (CO) with Program Outcomes (PO)

CO \ PO	BTL	1	2	3	4	5	6	7	8	9	10	11	12
104.1	3	3	2	--	--	--	--	--	--	--	--	--	1
104.2	2	3	--	--	--	--	--	--	--	--	--	--	1
104.3	2	3	--	--	--	--	--	--	--	--	--	--	1
104.4	2	3	--	--	--	--	--	--	--	--	--	--	1
104.5	2	3	--	--	--	--	--	--	--	--	--	--	1
104.6	2	3	--	--	--	--	--	--	--	--	--	--	1

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Text Books:

Sr. No	Title	Edition	Author(s)	Publisher	Year
1	Functional and smart materials,	--	Chander Prakash, Sunpreet Singh, J. Paulo Davim	CRC Press, ISBN: 978-036-727-510	2020
2	A Textbook of Engineering Chemistry	12th	S. S. Dara, S. S. Umare	S. Chand & Company Ltd., New Delhi.	2011
3	A Text Book of Engineering Chemistry	--	Shashi Chawla	Dhanpat Rai & Co.	2017
4	A textbook of Engineering Chemistry	--	Jain and Jain,	Dhanpatrai Publication.	2015

Reference Books:

Sr. No	Title	Edition	Author(s)	Publisher	Year
1	Energy storage and conversion devices: Super capacitors, batteries and hydroelectric cells,	1st	Anurag Gaur, A. L. Sharma, Anil Arya.	CRC press, ISBN: 978-1-003-14176-1	2021
2	E-waste recycling and management: present scenarios and environmental issues	Vol. 33	Khan, Anish, and Abdullah M. Asiri.	Springer, ISBN: 978-3-030-14186-8.	2019
3	Functional and smart materials,	--	Chander Prakash, Sunpreet Singh, J. Paulo Davim	CRC Press, ISBN: 978-036-727-510	2020
4	A Textbook of Engineering Chemistry	12th	S. S. Dara, S. S. Umare	S. Chand & Company Ltd., New Delhi.	2011

Useful Link /Web Resources:

1. https://ndl.iitkgp.ac.in/
2. https://www.youtube.com/watch?v=faESCxAWR9k

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Course Title: Applied Chemistry Laboratory	
Course Code:241AIMLBSCP104	**Semester:** II
Teaching Scheme: L-T-P: 00-00-02	**Credit:** 01
Evaluation Scheme: ISE: 25	**ESE Marks:**00

Prior Knowledge of:	Experiments based on titration, Handling of Glassware's and Chemicals, Preparation of Solutions

Course Objectives:

1	To test water quality parameters using various titration analysis methods
2	To synthesize simple advanced materials and estimate concentration of elements in material's
3	To know handling of glassware's and simple equipment's for chemical analysis.

List of Experiments

Exp. No	Title of Experiments	Duration
01	Determination of total hardness of water sample by EDTA method (Complex metric Titration)	02 Hrs.
02	To determine the normality of given strong acid by titrating against strong alkali solution by conductmeter	02 Hrs.
03	To determine the normality of given weak acid by titrating against strong alkali solution by conductometer	02 Hrs.
04	Determination pH of given solutions by pH meter	02 Hrs.
05	Estimation of Iron from a solution by colorimetry	02 Hrs.
06	Estimation of Nickel from a solution by colorimetry	02 Hrs.
07	To determine the approximate analysis of coal	02 Hrs.
08	To study the Construction and working of Galvanic cell	02 Hrs.
09	To estimate amount of calcium from waste chalk	02 Hrs.
10	Estimation of zinc metal from brass solution	02 Hrs.
11	Preparation of urea-formaldehyde resin	02 Hrs.
12	Preparation of phenol formaldehyde resin	02 Hrs.

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Course Outcomes (CO): After successful completion of the course, students will be able to

CO	Statements
104.1	**Analyze** hardness, acidity, alkalinity and chloride content of water and percentage of elements in some alloys
104.2	**Produce** various advanced materials and analyze aqueous solutions using instruments
104.3	**Perform** various experiments by following written instructions
104.4	**Express** involvement by understanding concepts in applied chemistry

Course Articulation Matrix: Mapping of Course Outcomes (CO) with Program Outcomes (PO)

CO \ PO	BTL	1	2	3	4	5	6	7	8	9	10	11	12	12
104.1	3	3	--	--	--	--	--	--	--	1	--	--	1	1
104.2	3	3	--	--	--	--	--	--	--	1	--	--	1	1
104.3	3	3	--	--	--	--	--	--	--	1	--	--	1	1
104.4	3	3	--	--	--	--	--	--	--	1	--	--	1	1

Reference Books:

Sr. No	Title	Edition	Author(s)	Publisher	Year
1	Laboratory manual on engineering chemistry	1st	S. K. Bashin, Dr.Sudha Rani	Dhanpat Rai Publishingcompany Ltd.,New Delhi	2012
2	Engineering Chemistry	15th	P. C. Jain,	Dhanpat Rai Publishing Company Ltd., New Delhi	2014

Useful Link /Web Resource:

1. https://www.vlab.co.in/broad-area-chemical-science

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Department of Computer Science and Engineering- Artificial Intelligence and Machine Learning

F. Y. B. Tech. Curriculum

w.e.f. A.Y. 2024-2025

Course Title: Professional Communication	
Course Code: 241AIMLAECL101	**Semester:** II
Teaching Scheme L-T-P: 01-00-00	**Credits:** 01
Evaluation Scheme: ISE: 25	**ESE:** 00

Prior knowledge of:	Basic English grammar, Basics of communication

Course Objectives:

1.	To **make** students learn important communicative situations, the basics of communication, and its significance in the corporate sector
2.	To **sharpen** their listening, speaking, reading, writing skills
3.	To **facilitate** them to draft office documents effectively
4.	To **enhance** career skills to prepare students industry-ready

Curriculum Details

Course Contents	Duration
Unit 1 Language and Communication • Need for effective communication • The process and levels of communication • Professional communication • Communication networks/ flows • Forms and methods (verbal and non-verbal) of communication • Barriers to communication and solutions	**04 Hrs**
Unit 2 Introduction to LSRW • **Listening Skills:** Hearing and listening, Listening as an active skill; Types of Listening; Barriers to effective listening skills • **Speaking Skills**: Importance, Various oral business contexts/situations, Group communication, Preparing effective public speeches (Impromptu and Prepared) • **Reading Skills**: Benefits of effective reading, Types of reading (Skimming; Scanning, Intensive reading, Extensive reading) Overcoming common obstacles, Reading comprehension • **Writing Skills:** Importance, Paragraph writing techniques	**03Hrs**

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Course Contents	Duration
Unit 3 Professional Correspondence • **Official correspondence** Principles, structure (elements) Layout (complete block, modified block, semi-block), Types (enquiry and reply, order, claim and adjustment) • **Office drafting** Writing notice, agenda, and minutes of the meeting • **Email writing** Advantages and limitations Style, structure, and content Email etiquette	**04 Hrs**
Unit 4 Career Skills and Ethics • **Resume and cover letter writing** Types of resume Important features of selling resume Cover letter writing • **Job Interviews** Interview preparation FAQs (Frequently Asked Questions) • **Guidance for IELTS, TOFEL and GRE** • **Corporate etiquette and ethics**	**03 Hrs**

Course Outcomes (CO): After successful completion of the course, students will be able to

CO	Statements
101.1	**Implement** verbal and non-verbal codes for effective communication
101.2	**Demonstrate** language learning skills-LSRW (Listening, Speaking, Reading, and Writing)
101.3	**Draft** business documents competently
101.4	**Improve** employability and readiness for industry demand and career advancement

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Course Articulation Matrix: Mapping of Course Outcomes (CO) with Program Outcomes (PO)

CO \ PO	BTL	1	2	3	4	5	6	7	8	9	10	11	12
101.1	3	-	-	-	-	-	-	-	2	3	3	-	1
101.2	3	-	-	-	-	-	-	-	2	3	3	-	1
101.3	3	-	-	-	-	-	-	-	2	3	3	-	1
101.4	3	-	-	-	-	-	-	-	2	3	3	-	1

Suggested Learning Resources:
Text Books:

Sr. No	Title	Edition	Author(s)	Publisher	Year
1	Technical Communication: Principles and Practice	4th	Meenakshi Raman & Sangita Sharma	Oxford University Press	2022
2	Personality Development and Soft- Skills	2nd	Barun K. Mitra	Oxford University Press	2016
3	Communication Skills	2nd	Sanjay Kumar & Pushp Lata	Oxford University Press	2015
4	Communication Skills	3rd	Meenakshi Raman & Sangeeta Sharma	Oxford University Press	2013

Reference Books:

Sr. No	Title	Edition	Author(s)	Publisher	Year
1	Business Communication	2nd	Urmila Rai and S.M. Rai	Himalaya Publishing House Pvt. Ltd.	2014
2	A University Grammar of English	1st	Randolph Quirk and S Greenbaum	Pearson	2007
3	Effective Technical Communication	2nd	B. K.Mitra	Oxford University Press	2006
4	Effective Technical Communication	2nd	M.Ashraf Rizvi	McGraw Hill Education	2005

Useful Links/Web Resources:

1. https://www.skillsyouneed.com
2. https://www.psychologytoday.com
3. https://www.britishcouncil.in
4. https://www.udemy.com
5. https://www.englishclub.com

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Course Title: Professional Communication Laboratory	
Course Code: 241AIMLAECP101	**Semester:** II
Teaching Scheme L-T-P: 00-00-02	**Credit:** 01
Evaluation Scheme: ISE: 25	**ESE Marks:** 00

Prior knowledge of:	Basic language learning and people skills

Course Objectives:

102.1	To **familiarize** students with English phonology and improve their pronunciation
102.2	To **improve** language learning skills (LSRW) by providing ample practice
102.3	To **develop** students' verbal and non-verbal communication
102.4	To **cultivate** creative thinking and workplace skills

List of Lab Sessions

Session No	Title of Activities	Duration
01	**Icebreaking: Introducing self and others** Different ways of introducing self and others: demonstration	02 Hrs
02	**Phonetics** Introduction to phonetics - consonants, vowels and diphthongs, stress, intonation in English with video samples	02 Hrs
03	**Remedial English** Vocabulary-building games and identifying errors revising rules of English grammar	02 Hrs
04	**Listening Practice** Listening comprehension, strategies for effective listening with audio/video samples	02 Hrs
05	**Reading Practice** Improving Comprehension Skills, Techniques for good comprehension	02 Hrs
06	**Technical Writing Practice** Paragraph writing, writing notices, agenda minutes of the meeting, email writing	02 Hrs
07	**Public Speaking** Practicing extempore and prepared speeches	02 Hrs
08	**Group discussion** Group discussions on current topics	02 Hrs
09	**Mock Meetings**	02 Hrs

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Session No	Title of Activities	Duration
	Purposes, preparation, and procedure for conducting effective meetings	
10	**Mock Interviews** Preparing for FAQs and facing mock interviews	02 Hrs
11	**Creative Writing** Blog Writing	02 Hrs
12	**Film/Book Appreciation** Showing short films and appreciation of them. Reading novels or short stories and critical analysis of them.	02 Hrs

Course Outcomes (CO): After successful completion of the course, students will be able to

CO	Statements
101.1	**Demonstrate** effective LSRW skills
101.2	**Articulate** words accurately and prepare grammatically correct sentences
101.3	**Deliver** speeches and participate in GDs, business meetings, and mock interviews effectively
101.4	**Draft** business documents and blogs by following writing ethics

Course Articulation Matrix: Mapping of Course Outcomes (CO) with Program Outcomes (PO)

CO \ PO	BTL	1	`2	3	4	5	6	7	8	9	10	11	12
101.1	3	-	-	-	-	-	-	-	2	3	3	-	1
101.2	3	-	-	-	-	-	-	-	2	3	3	-	1
101.3	3	-	-	-	-	-	-	-	2	3	3	-	1
101.4	3	-	-	-	-	-	-	-	2	3	3	-	1

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Suggested Learning Resources:

Text Books:

Sr. No	Title	Edition	Authors	Publisher	Year
1	A Practical Course in Spoken English	1st	J.K. Gangaj	PHI Learning Pvt. Ltd	2014
2	English Language Laboratories	2nd	Nira Konar	PHI Learning Pvt. Ltd	2014
3	Better English Pronunciation	2nd	J.D.O Connor	Cambridge University Press,	1980

Reference Books:

Sr. No	Title	Edition	Authors	Publisher	Year
1	Communication Skills	2nd	Sanjay Kumar & Pushp Lata	Oxford University Press	2015
2	Technical Communication: Principles and Practice	2nd	Meenakshi Raman & Sangita Sharma	Oxford University Press	2011

Useful Links /Web Resources:

1. https://www.indiabix.com
2. https://www.skillsyouneed.com
3. https://interviewbuddy.in
4. https://learnenglish.britishcouncil.org
5. https://www.fluentu.com

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Course Title: Computer Workshop	
Course Code: 241AIMLVSECL102	**Semester:** II
Teaching Scheme: L-T-P: 01-00-00	**Credits:** 01
Evaluation Scheme: ISE: 25	**ESE Marks:** 00

Prior Knowledge of:	Basic computer knowledge

Course Objectives:

1.	To get familiar with various hardware, software, operating systems and networking
2.	To identify and rectify the onboard computer hardware, software and network related problems
3.	To understand the hardware specifications that are required to run operating system and various application programs

Course Content:

Content	Duration
Unit 1: Computer Architecture **Assembly of Computer** • Introduction to hardware peripherals like RAM, ROM, keyboard, Mouse, processors, etc. • Generation of processors • Working of SMPS • Study of various ports • Steps and precautions to assemble compute **Computer Network Tools** r • Introduction to computer network • Study of various topologies • Preparing the network cable using crimping tools and connectors • Study of various network environments	**07 Hrs**
Unit 2: Operating System, Server and Internet **Operating System and Software Installations**	**07 Hrs**

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Content	Duration
• Introduction to operating system • Types of operating system (Windows and Linux). • Window:-Evolution of operating system • Introduction to software. Types of software (MS office, VLC media player, Win RAR), etc. • Linux: Evolution of operating system • Introduction to software • Types of software (open office, web browser, etc.) • Case study of Installations step for operating system and application software's **Server** • Introduction to server • Difference between server and normal desktop • Evolution of servers • Study of various servers like Email, data, domain, etc. **Internet** • Introduction and evolution of internet • Study of various internet-based services like Email, social network, chat • Introduction to cyber security and cyber laws **Driver software installation**	

Course Outcomes (CO): At the end of the course, the students should be able to

CO	Statements
102.1	**Understand** the basic concept and structure of computer hardware and networking
102.2	**Identify** the existing configuration of the computer and various restore operations on computer and update application software

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Course Articulation Matrix: Mapping of course outcomes (CO) with program outcomes (PO)

CO \ PO	BTL	1	2	3	4	5	6	7	8	9	10	11	12
102.1	1	--	--	--	--	1	--	--	--	1	--	--	1
102.2	2	--	--	--	--	2	--	--	--	1	--	--	1

Suggested Learning Resources:

Text Books:

Sr. No	Title	Edition	Author(s)	Publisher	Year
1.	Hardware and Software of Personal Computers	1st	Sanjay K. Bose	New Age International Private Limited	2014
2.	Fundamentals of Computers	6th	V. Raja Raman	PHI Learning	2014
3.	Hardware Bible	6th	Winn L. Rosch	QUE	2003

Reference Books:

Sr. No	Title	Edition	Author(s)	Publisher	Year
1.	Introduction to Information Technology	2nd	ITL Education Solutions limited	Pearson Education India	2012
2.	PC Hardware and A +Handbook	1st	Kate Chase, Wiley Dreamtech	Microsoft Press US	2004
3.	Complete computer upgrade and Repair book	3rd	Cheryl A Schmidt	Wiley Dreamtech	2002
4.	Introduction to Computers with MS-Office 2000	1st	Alexis Leon & Mathews Leon	McGraw Hill Education	2001

Useful Link /Web Resources:

1. https://turbofuture.com/computers/Dissassembling-and-Assembling-the-computer-system
2. https://www.computerhope.com/jargon/c/computer.html
3. https://www.pluralsight.com/blog/tutorials/troubleshooting-hardware
4. http://business.toshiba.com/downloads/KB/f1Ulds/14047/SoftwareTrouble_EN_(EBN)_Ver01F.pdf
5. https://oer.nios.ac.in/wiki/index.php/TYPES_OF_INTERNET_CONNECTIONS

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(An Autonomous Institute)
Department of Computer Science and Engineering-
Artificial Intelligence and Machine Learning
F. Y. B.Tech. Curriculum

Course Title: Computer Workshop Laboratory	
Course Code: 241AIMLVSECP102	**Semester:** II
Teaching Scheme: L-T-P: 00-00-01	**Credit:** 01
Evaluation Scheme: ISE: 25	**ESE Marks:** 00

Prior Knowledge of:	Basic computer knowledge

Course Objectives:

1.	To get familiar with various hardware, software, operating systems and networking
2.	To identify and rectify the onboard computer hardware, software and network related problems.
3.	To understand the hardware specifications that are required to run operating system and various application programs.

List of Experiments

Sr. No.	Title of Experiments	Duration
01	Desktop/laptop/server type identification and its specification.	**02 Hrs**
02	Introduction of computer architecture and components.	**02 Hrs**
03	Study of peripherals of a computer, components in a CPU and its functions.	**02 Hrs**
04	Study and demonstration of storage devices.	**02 Hrs**
05	A case study on Power Supply Unit (PSU) and its components.	**02 Hrs**
06	Introduction to basics of networking.	**02 Hrs**
07	Study of computer assembly and configuration.	**02 Hrs**
08	Assembling and disassembling of PC.	**02 Hrs**
09	Introduction to Operating System.	**02 Hrs**
10	Installation of Operating Systems – Windows.	**02 Hrs**
11	Installation of Operating Systems –LINUX.	**02 Hrs**
12	Installation of local and network printer.	**02 Hrs**
13	Configuring firewalls and installation of Antivirus software.	**02 Hrs**
14	Introduction to office automation software like MS Word, MS Excel, MS Power Point.	**02 Hrs**

Minimum 12 Experiments shall be conducted from above list.

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Course Outcomes (CO): At the end of the course, the student should be able to

CO	Statements
102.1	Understand the basic concept and structure of computer hardware and networking
102.2	Identify the existing configuration of the computer and various restore operations on computer and update application software

Course Articulation Matrix: Mapping of course outcomes (CO) with program outcomes (PO)

CO \ PO	BTL	1	2	3	4	5	6	7	8	9	10	11	12
102.1	1	--	--	--	--	1	--	--	--	1	--	--	1
102.2	2	--	--	--	--	2	--	--	--	1	--	--	1

Suggested Learning Resources:

Text Books:

Sr. No	Title	Edition	Author(s)	Publisher	Year
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2.	Fundamentals of Computers	6th	V. Raja Raman	PHI Learning	2014
3.	Hardware Bible	6th	Winn L. Rosch	QUE	2003

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1.	Introduction to Information Technology	2nd	ITL Education Solutions limited	Pearson Education, India	2012
2.	PC Hardware and A +Handbook	1st	Kate Chase, Wiley Dreamtech	Microsoft Press, US	2004
3.	Complete computer upgrade and Repair book	3rd	Cheryl A Schmidt	Wiley Dreamtech	2002
4.	Introduction to Computers with MS-Office 2000	1st	Alexis Leon & Mathews Leon	McGraw Hill Education	2001

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Course Title: Python Programming	
Course Code: 241AIMLPCCL101	**Semester:** II
Teaching Scheme: L-T-P: 02-00-00	**Credits:** 02
Evaluation Scheme ISE-I/MSE/ISE-II: 10/30/10	**ESE Marks:** 00

Prior Knowledge of:	Basic Understanding of Computer, Object Oriented Programming

Course Objectives:

1	To know the basics of algorithmic problem solving
2	To read and write simple Python programs
3	To develop Python programs with conditionals and loops
4	To use Python libraries for Machine Learning & Neural network
5	To define Python functions and call them
6	To use Python data structures – lists, tuples, dictionaries

Curriculum Details

Course Contents	Duration
Unit 1: Introduction & hands on to Python programming • Introduction to programming, Algorithms, Pseudocode & Flow chart • History of Python, Features of Python, Basic Structure of Python Program. • Downloading and installing Python, run a simple program on Python interpreter Jupyter, Anaconda, Google Collaboratory.	**05 Hrs**
Unit 2: Variables & Expressions • Python variables, keywords, literals, data types, • Operators & expressions, Precedence of operators, expressions, • Comments • Managing input output operations • Functions: IF, AND, OR	**06Hrs**
Unit 3: Control Flow	**05 Hrs**

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Course Contents	Duration
• **Decision making & Branching**- if, if-else, nested, elif. • **Decision Making & Looping** - while, for, nested loop, break, continue, pass, • Illustrative Problems for branching & looping- Palindrome, Strong & Armstrong number.	
Unit 4: LISTS, TUPLES, DICTIONARIES • **Lists:** list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters • **Tuples:** tuple assignment, tuple operations, tuple as return value • **Dictionaries:** Basic operations and methods, sorting items, nested dictionaries, advanced list processing – list comprehension; Illustrative programs	**06 Hrs**
Unit 5: FUNCTIONS & STRING • **Functions:** function definition, function call, more on defining functions, recursive functions, optional arguments, default values, Passing functions as arguments. • **Strings:** Introduction, built-in string methods and functions, slice operation, immutability, string functions and methods; Illustrative programs: square root, GCD, sum an array of numbers, linear search.	**06 Hrs**

Course Outcomes (CO): After successful completion of the course, students will be able to

CO	Statements
101.1	Develop algorithmic solutions to simple computational problems Read, write, execute by hand simple Python programs.
101.2	Structure simple Python programs for solving problems.
101.3	Design a simple Machine Learning & Neural Network model using python libraries.
101.4	Decompose a Python program into functions.

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CO	Statements
101.5	Represent compound data using Python lists, tuples, dictionaries.
101.6	Read and write data from/to files in Python Programs.

Course Articulation Matrix: Mapping of Course Outcomes (CO) with Program Outcomes (PO)

POs / Cos	BTL	1	2	3	4	5	6	7	8	9	10	11	12
101.1	2	3	3	2	-	-	-	-	-	-	-	-	1
101.2	2	3	3	2	-	-	-	-	-	-	-	-	1
101.3	2	3	3	2	-	-	-	-	-	-	-	-	1
101.4	2	3	3	2	-	-	-	-	-	-	-	-	1
101.5	2	3	3	2	-	-	-	-	-	-	-	-	1
101.6	2	2	2	2	-	-	-	-	-	-	-	-	1

Text Books:

Sr. No	Title	Edition	Author(s)	Publisher	Year
1	"Think Python: How to Think Like a Computer Scientist"	2nd	Allen B. Downey	Shroff/O'Reilly Publishers	2016
2	An Introduction to Python – Revised and updated for Python 3.2	-	Guido van Rossum and Fred L. Drake Jr	Network Theory Ltd	2011

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Reference Books:

Sr. No	Title	Edition	Author(s)	Publisher	Year
1	Introduction to Computation and Programming Using Python	Revised and expanded Edition	John V Guttag	MIT Press	2013
2	Introduction to Programming in Python: An Inter-disciplinary Approach	2nd	Robert Sedgewick, Kevin Wayne, Robert Dondero,	Pearson India Education Services Pvt. Ltd	2016
3	Exploring Python	4th	Timothy A. Budd	Mc-Graw Hill Education (India) Private Ltd	2015
4	Practical Programming: An Introduction to Computer Science using Python 3	2nd	Paul Gries, Jennifer Campbell and Jason Montojo	Pragmatic Programmers , LLC	2013

Useful Link /Web Resources:

https://nptel.ac.in/courses/1061041282.

https://www.udemy.com/courses

https://www.coursera.org

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Department of Computer Science and Engineering- Artificial Intelligence and Machine Learning

F. Y. B. Tech. Curriculum

w.e.f. A.Y. 2024-2025

Course Title: Finishing School Training-II	
Course Code: 241AIMLMCL103	**Semester:** II
Teaching Scheme: L-T-P :3-0-0	**Credits:** 00
Evaluation Scheme ISE: 50 Grade	**ESE Marks:** 00

Curriculum Details

Course Contents	Duration
UNIT-I: Learning Basic Aptitude Module-1: Ratio & Proportion Module-2: Mixture & Alligation Module-3: HCF & LCM	**06 Hrs**
UNIT-II: Logical Reasoning Module-1: Blood Relations Module-2: Seating Arrangement Module-3: Pattern Completion	**06Hrs**
UNIT-III: Functional English Module-1: Spotting Errors, Sentence Correction/ Sentence Improvement Module-2: Sentence completion Module-3: Sentence Formation/ Ordering of words Module-4: One word Substitution Module-5: Para jumbles	**10 Hrs**
UNIT-IV: Attitude Building-I Module-1. Focus & Discipline Module-2. ASK Model- Corporate Expectations Module-3. Change Management (Changing & Developing habits)	**06 Hrs**
UNIT-V: Technical Training Module-1: C++ Introduction-History of C++,C++ specifications and keywords, Data type and its type, type modifiers and qualifiers,Structure in C/C++, access specifier, Memory Allocation Functions-simple programs. Module-2: Creating Classes and Objects-Access Specifiers,Constructor,Types of Functions Member Functions-Internally Defined, Externally Defined,Inline Function,Friend Function Virtual Function Introduction,Nesting of Member Functions Module-3 - Functions-Function Arguments- Call by Value, Call by Reference,Object as Function Argument, Array of Objects Module-4-Constructor and Destructor Constructor Types-Default, Parameterized, Copy Constructor,Destructor,Concept of Pointers Shallow Copy,Deep Copy Module-5- Exception Handling-Static members,Static functions,Exception Handling	**14 Hrs**

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Course Title: Capstone Project	
Course Code: 241AIMLMCL104	**Semester:** II
Teaching Scheme: L-T-P: 0-0-0	**Credits:** 00
Evaluation Scheme ISE: 50 Grade	**ESE Marks:** 00

Course Objectives:

1	To inculcate independent learning by problem solving with social context.
2	To engages students in rich and authentic learning experiences.
3	To emphasizes learning activities that are long-term, interdisciplinary and student-centric.
4	To provide every student the opportunity to get involved either individually or as a group so as to develop team skills and learn professionalism.

Curriculum Details

As per the approved structure of curriculum, students will be allowed to do capstone project during second semester of B. Tech. program.

Topics:

Capstone Project may be a theoretical analysis, modeling & simulation, experimentation & analysis, prototype design, fabrication of new equipment, correlation and analysis of data, software development, etc. or a combination of these.

Group Structure:

Working in supervisor/mentor monitored groups; the students plan, manage, and complete a task/project/activity which addresses the stated problem.

1. There should be team/group of 4 -5 students
2. A supervisor/mentor teacher assigned to individual groups

Selection of Project:

The project demo model for learning is recommended. The model begins with the identifying of a problem, often growing out of a question or "wondering". This formulated problem then stands as the starting point for learning. Students design and analyze the problem within an articulated interdisciplinary or subject frame or based on Rural/Social internship.

A problem can be theoretical, practical, social, technical, symbolic, cultural, and/or scientific and grows out of students' wondering within different disciplines and professional environments. A chosen problem has to be exemplary. The problem may involve an interdisciplinary approach in both the analysis and solving phases.

By exemplarity, a problem needs to refer back to a particular practical, scientific, social and/or technical domain. The problem should stand as one specific example or manifestation

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of more general learning outcomes related to knowledge and/or modes of inquiry.
There are no commonly shared criteria for what constitutes an acceptable project. Projects vary greatly in the depth of the questions explored, the clarity of the learning goals, the content, and structure of the activity.

1. A few hands-on activities that may or may not be multidisciplinary.
2. Use of technology in meaningful ways to help them investigate, collaborate, analyze, synthesize, and present their learning.
3. Activities may include- Solving real life problem, investigation, /study and Writing reports of in-depth study, fieldwork.

Recommended Guidelines and phases:

Capstone project is learning through activity. One of the teachers can be appointed as guide for capstone project group. Following are the recommended guidelines that will work as an initiator and facilitator in process of completion of Capstone project.

1. In first week of commencement of 2nd semester, let the guide create awareness about capstone project (what, why, and how) among the students. Convey students expected outcomes, assessment process and evaluation criteria.
2. Get groups of students registered preferably 4-5 students per group.
3. Assign guide to each group.
4. Provide guidelines for title identification (Problem can be some real-life situation that needs technology solutions. This situation can be identified by rural/social internship, by meeting people around, visiting various industries, society, and institutes. The solution can be prototype, model, convertible solutions, survey and analysis, simulation, and similar).
5. Let students submit the problem identified in prescribed format (Problem Statement, Initial Survey for topic finalization, Abstract, Software, Hardware required, Title)
6. Guide can approve the problem statements based on feasibility and learning outcomes expected for first year engineering students
7. Guide is to monitor progress of the task during phases of project work. Broadly phases may include- requirements gathering, preparing a solution, technology design for the solution.
8. Weekly monitoring and continuous assessment record are to be maintained by guide.
9. Get the report submitted at the end of semester.

Student is required to prepare a capstone project and file containing documentary proofs of the activities done by him. The evaluation will be done by expert committee constituted by HoD/Departmental capstone project In-charge/ faculty mentor.

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