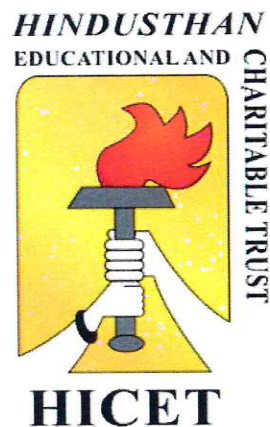


HINDUSTHAN COLLEGE OF ENGINEERING AND TECHNOLOGY

(An Autonomous Institution, Affiliated to Anna University, Chennai
Approved by AICTE, New Delhi & Accredited by NAAC with 'A' Grade)
Coimbatore – 641 032

B.TECH. ARTIFICIAL INTELLIGENCE & MACHINE LEARNING



Curriculum & Syllabus

2020-2021

CHOICE BASED CREDIT SYSTEM

VISION AND MISSION OF THE INSTITUTION

VISION

To become a premier institution by producing professionals with strong technical knowledge, innovative research skills and high ethical values.

MISSION

IM1: To provide academic excellence in technical education through novel teaching methods.

IM2: To empower students with creative skills and leadership qualities.

IM3: To produce dedicated professionals with social responsibility.


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VISION AND MISSION OF THE DEPARTMENT

VISION

To impart quality education for students in the field of Artificial Intelligence and human-machine partnership in the technological-embedded world and create competent professionals who serve the greater cause of society.

MISSION

DM1: To provide a student-centric learning environment to create competent professionals with knowledge in artificial intelligence, machine learning techniques, natural language processing, deep-learning and computer vision.

DM2: To facilitate the students to develop the necessary skills to sustain in today's globalised technological society, in pursuit of excellence by keeping high personal and professional values and ethics.

DM3: To nurture their skills in research and innovation that contributes to the development of society.


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PROGRAM OUTCOMES (POs)

Engineering Graduates will be able to:

PO1. **Engineering Knowledge** - Ability to apply knowledge of mathematics, science, mechanical engineering fundamentals and specialization to the solutions of complex engineering problems;

PO2. **Problem Analysis** - Ability to identify, formulate, conduct research literature and analyze complex engineering problems using principles of mathematics, natural sciences and mechanical engineering sciences;

PO3. **Design/Development of Solutions** - Ability to design mechanical solutions for complex engineering problems and systems, components or processes that meet specified needs;

PO4. **Investigation** - Ability to conduct investigation of complex problems using research based knowledge and research methods to provide valid conclusions;

PO5. **Modern Tool Usage** - Ability to develop and apply appropriate techniques, resources, and innovative engineering tools to complex mechanical engineering activities;

PO6. **The Engineer and Society** - Ability to apply contextual knowledge to assess societal, health, safety, legal and cultural issues with the awareness of the consequent responsibilities to professional mechanical engineering practice for the betterment of society;

PO7. **Environment and Sustainability** - Ability to understand the impact of professional mechanical engineering solutions in societal, economic and environmental contexts and demonstrate knowledge of and need for sustainable development;

PO8. **Ethics** - Ability to apply ethical principles and demonstrate commitment to professional ethics, responsibilities and norms of mechanical engineering practice;

PO9. **Communication** - Ability to communicate effectively on complex engineering activities with the engineering community and with society at large;


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PO10. Individual and Team Work - Ability to demonstrate knowledge and understanding of mechanical engineering and management principles and apply these effectively as an individual, a member or a leader in diverse teams and in multidisciplinary settings.

PO11. Life Long Learning - Ability to recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change in mechanical engineering practice.

PO12. Project Management and Finance - Ability to demonstrate knowledge and understanding of project management, finance principles, business development within the scope of mechanical engineering practices.

PROGRAM SPECIFIC OUTCOMES (PSOs)

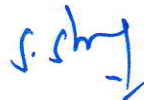
PSO1	An ability to apply advanced core AI technologies, to extract information and provide knowledge to intelligent decision-making systems and human-AI collaboration
PSO2	An ability to develop a principled and thoughtful approach to the machine learning tools that can address complex cognitive tasks for the betterment of society.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO1: To acquire strong knowledge in the domain of artificial intelligence and machine learning theory and principles for identifying, analyzing and solving problems.

PEO2: To enable students to build intelligent machines, software, or applications with a cutting-edge combination of machine learning, analytics, and visualization technologies.

PEO 3: To improve students' ability to work effectively within a team and apply appropriate practices within a professional, legal and ethical framework for societal needs, and accomplish sustainable progress through lifelong learning and research.


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CURRICULUM



Hindusthan College of Engineering and Technology

(An Autonomous Institution, Affiliated to Anna University, Chennai Approved by AICTE, New Delhi & Accredited by NAAC with 'A' Grade)

Valley Campus, Pollachi Highways, Coimbatore, Tamil Nadu.



DETAILS OF CHANGES CARRIED OUT IN CURRICULUM & SYLLABUS

CBCS PATTERN

UNDERGRADUATE PROGRAMMES

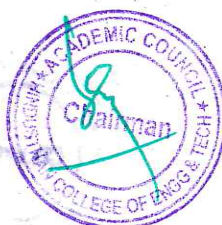
B.TECH. ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

REGULATION-2019

(For the students admitted during the academic year 2020-2021 and onwards)

SEMESTER I

S.No	Course Code	Course Title	Course Category	L	T	P	C	CIA	ESE	TOTAL
THEORY										
1	19HE1101	Technical English	HS	2	1	0	3	25	75	100
2	19MA1101R	Calculus	BS	3	1	0	4	25	75	100
THEORY & LAB COMPONENT										
3	19PH1151	Applied Physics	BS	2	0	2	3	50	50	100
4	19CY1151	Chemistry for Engineers	BS	2	0	2	3	50	50	100
5	19CS1152	Object Oriented Programming using Python	IC	2	0	2	3	50	50	100
6	19EC1154	Basics of Electron devices and Electric Circuits	ES	2	0	2	3	50	50	100
PRACTICAL										
7	19HE1071	Language Competency Enhancement Course - I	HS	0	0	2	1	100	0	100
MANDATORY										
8	19MC1191	Induction Program	MC	0	0	0	0	0	0	0
9	19HE1072	Career Guidance Level - I	EEC	2	0	0	0	100	0	100
10	19HE1073	Entrepreneurship & Innovation	EEC	1	0	0	0	100	0	100
Total Credits				16	2	10	20	550	350	900



SEMESTER II

S.No	Course Code	Course Title	Course Category	L	T	P	C	CIA	ESE	TOTAL
THEORY										
1	19HE2101	Business English for Engineers	HS	2	1	0	3	25	75	100
2	19MA2104	Differential Equations And Linear Algebra	BS	3	1	0	4	25	75	100
THEORY & LAB COMPONENT										
3	19PH2151	Material Science	BS	2	0	2	3	50	50	100
4	19CY2151	Environmental Studies	BS	2	0	2	3	50	50	100
5	19CS2153	Java Fundamentals	IC	2	0	2	3	50	50	100
6	19ME2154	Engineering Graphics	ES	1	0	4	3	50	50	100
PRACTICAL										
7	19ME2001	Engineering Practices	ES	0	0	4	2	50	50	100
8	19HE2071	Language Competency Enhancement Course - II	HS	0	0	2	1	100	0	100
MANDATORY										
9	19HE2072	Career Guidance Level II	EEC	2	0	0	0	100	0	100
Total Credits				14	2	16	22	500	400	900

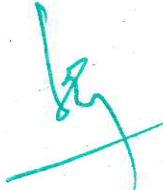
CREDIT DISTRIBUTION

Semester	I	II	III	IV	V	VI	VII	VIII	Total
Credits	20	22	21	19	24	24	21	14	165

* Student can earn extra credit 35 over and above the total credits


Chairman, Board of Studies


Dean - Academics


Principal

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PRINCIPAL
Hindusthan College of Engineering & Technology
COIMBATORE - 641 032



SYLLABUS

Programme B.TECH.	Course Code 19HE1101	Name of the Course TECHNICAL ENGLISH	L 2	T 1	P 0	C 3
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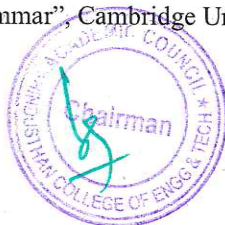
- Course Objective**
1. To facilitate students to communicate effectively with coherence.
 2. To train the learners in descriptive communication.
 3. To introduce professional communication.
 4. To enhance knowledge and to provide the information on corporate environment.
 5. To equip the trainers with the necessary skills on critical thinking.

Unit	Description	Instructional Hours
I	Listening and Speaking – Opening a conversation, maintaining coherence, turn taking, closing a conversation (excuse, general wishes, positive comments and thanks) Reading – Reading articles from newspaper, Reading comprehension Writing Chart analysis, process description, Writing instructions Grammar and Vocabulary - Tenses, Regular and irregular verb, technical vocabulary.	9
II	Listening and Speaking - listening to product description, equipment & work place (purpose, appearance, function) Reading - Reading technical articles Writing - Letter phrases, writing personal letters, Grammar and Vocabulary -articles, Cause & effect, Prepositions.	9
III	Listening and Speaking - - listening to announcements Reading - Reading about technical inventions, research and development Writing - Letter inviting a candidate for interview, Job application and resume preparation Grammar and Vocabulary - Homophones and Homonyms.	9
IV	Listening and Speaking - - Practice telephone skills and telephone etiquette (listening and responding, asking questions). Reading - Reading short texts and memos Writing - invitation letters, accepting an invitation and declining an invitation Grammar and Vocabulary - Modal verbs, Collocation, Conditionals, Subject verb agreement and Pronoun-Antecedent agreement.	9
V	Listening and Speaking - listening to technical group discussions and participating in GDs Reading - reading biographical writing - Writing - Proposal writing, Writing definitions, Grammar and Vocabulary - Abbreviation and Acronym, Prefixes & suffixes, phrasal verbs.	9
Total Instructional Hours		45

- Course Outcome**
- CO1- Trained to maintain coherence and communicate effectively.
 - CO2- Practiced to create and interpret descriptive communication.
 - CO3- Introduced to gain information of the professional world.
 - CO4- acquired various types of communication and etiquette.
 - CO5- Taught to improve interpersonal and intrapersonal skills.

TEXT BOOKS:

- T1- Norman Whitby, “Business Benchmark-Pre-intermediate to Intermediate”, Cambridge University Press, 2016.
- T2- Raymond Murphy, “Essential English Grammar”, Cambridge University Press, 2019.



REFERENCE BOOKS :

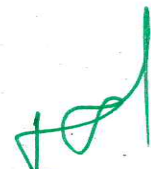
R1- Meenakshi Raman and Sangeetha Sharma. "Technical Communication- Principles and Practice", Oxford University Press, 2009.

R2- Raymond Murphy, "English Grammar in Use"- 4th edition Cambridge University Press, 2004.

R3- Kamalesh Sadanan "A Foundation Course for the Speakers of Tamil-Part-I &II", Orient Blackswan, 2010.



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Programme B.TECH.	Course Code 19MA1101R	Name of the Course CALCULUS	L 3	T 1	P 0	C 4
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- Course Objective**
1. Understand the concept of differentiation
 2. Evaluate the functions of several variables which are needed in many branches of engineering.
 3. Understand the concept of double integrals.
 4. Understand the concept of triple integrals.
 5. Interpret in the area of infinite series and their convergence.

Unit	Description	Instructional Hours
DIFFERENTIAL CALCULUS		
I	Rolle's Theorem – Lagrange's Mean Value Theorem- Maxima and Minima –Taylor's and Maclaurin's Theorem	12
MULTIVARIATE CALCULUS (DIFFERENTIATION)		
II	Total derivatives - Jacobians – Maxima, Minima and Saddle points - Lagrange's method of undetermined multipliers – Gradient, divergence, curl and derivatives.	12
DOUBLE INTEGRATION		
III	Double integrals in Cartesian coordinates – Area enclosed by the plane curves (excluding surface area) – Green's Theorem (Simple Application) - Stoke's Theorem – Simple Application involving cubes and rectangular parallelepiped.	12
TRIPLE INTEGRATION		
IV	Triple integrals in Cartesian co-ordinates – Volume of solids (Sphere, Ellipsoid, Tetrahedron) using Cartesian co-ordinates. Gauss Divergence Theorem – Simple Application involving cubes and rectangular parallelepiped.	12
SEQUENCES & SERIES		
V	Sequences: Definition and examples – Series: Types and Convergence – Series of positive terms – Tests of convergence: Comparison test and D'Alembert's ratio test – Alternating series – Leibnitz's test – Absolute and conditional convergence.	12
Total Instructional Hours		60

- Course Outcome**
- CO1: Apply the concept of differentiation in any curve.
CO2: Identify the maximum and minimum values of surfaces.
CO3: Apply double integrals to compute area of plane curves.
CO4: Evaluation of triple integrals to compute volume of solids.
CO5: Evaluation of infinite series approximations for problems arising in mathematical modeling.

TEXT BOOKS:

- T1 - Erwin Kreyszig, "Advanced Engineering Mathematics", 10th Edition, Wiley India Private Ltd., New Delhi, 2018.
T2 - Veerarajan T, "Engineering Mathematics", McGraw Hill Education(India) Pvt Ltd, New Delhi, 2016.




REFERENCE BOOKS :

R1- Thomas & Finney “ Calculus and Analytic Geometry” , Sixth Edition,,Narosa Publishing House, New Delhi.

R2 - Weir,M.D and Joel Hass, ‘ Thomas Calculus” 12th Edition,Pearson India 2016..

R3 - Grewal B.S, “Higher Engineering Mathematics”, 42nd Edition, Khanna Publications, Delhi, 2012.


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Programme B.TECH.	Course Code 19PH1151	Name of the Course APPLIED PHYSICS	L 2	T 0	P 2	C 3
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The student should be able to

- Course Objective**
1. Enhance the fundamental knowledge in properties of matter
 2. Analysis the oscillatory motions of particles
 3. Extend the knowledge about wave optics
 4. Gain knowledge about laser and their applications
 5. Conversant with principles of optical fiber, types and applications of optical fiber

Unit	Description	Instructional Hours
	PROPERTIES OF MATTER	
I	Elasticity – Hooke’s law – Stress-strain diagram - Poisson’s ratio – Bending moment – Depression of a cantilever – Derivation of Young’s modulus of the material of the beam by Uniform bending theory and experiment. Determination of Young’s modulus by uniform bending method.	6+3=9
	OSCILLATIONS	
II	Translation motion –Vibration motion – Simple Harmonic motion – Differential Equation of SHM and its solution – Damped harmonic oscillation - Torsion stress and deformations – Torsion pendulum: theory and experiment. Determination of Rigidity modulus – Torsion pendulum.	6+3=9
	WAVE OPTICS	
III	Conditions for sustained Interference – air wedge and it’s applications - Diffraction of light – Fresnel and Fraunhofer diffraction at single slit –Diffraction grating – Rayleigh’s criterion of resolution power - resolving power of grating. Determination of wavelength of mercury spectrum – spectrometer grating. Determination of thickness of a thin wire – Air wedge method.	6+6=12
	LASER AND APPLICATIONS	
IV	Spontaneous emission and stimulated emission – Population inversion – Pumping methods – Derivation of Einstein’s coefficients (A&B) – Type of lasers – Nd:YAG laser and CO ₂ laser- Laser Applications – Holography – Construction and reconstruction of images. Determination of Wavelength and particle size using Laser.	6+3=9
	FIBER OPTICS AND APPLICATIONS	
V	Principle and propagation of light through optical fibers – Derivation of numerical aperture and acceptance angle – Classification of optical fibers (based on refractive index, modes and materials) – Fiber optical communication link – Fiber optic sensors – Temperature and displacement sensors.	6
Total Instructional Hours		45



After completion of the course the learner will be able to

Course	CO1: Illustrate the fundamental properties of matter
Outcome	CO2: Discuss the Oscillatory motions of particles
	CO3: Analyze the wavelength of different colors
	CO4: Understand the advanced technology of LASER in the field of Engineering
	CO5: Develop the technology of fiber optical communication in engineering field

TEXT BOOKS:

T1 - Rajendran V, Applied Physics, Tata McGraw Hill Publishing Company Limited, New Delhi, 2017.


T2- Gaur R.K. and Gupta S.L., Engineering Physics, 8th edition, Dhanpat Rai Publications (P) Ltd., New Delhi, 2015.

REFERENCE BOOKS:

R1 - Arthur Beiser "Concepts of Modern Physics" Tata McGraw Hill, New Delhi – 2015

R2 - M.N Avadhanulu and PG Kshirsagar "A Text Book of Engineering physics" S. Chand and Company Ltd., New Delhi 2016

R3 - Dr. G. Senthilkumar "Engineering Physics – I" VRB publishers Pvt Ltd., 2016


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Programme	Course Code	Name of the Course	L	T	P	C
BE/B.Tech	19CY1151	CHEMISTRY FOR ENGINEERS (COMMON TO ALL BRANCHES)	2	0	2	3

Course Objective

1. The boiler feed water requirements, related problems and water treatment techniques.
2. The principles of polymer chemistry and engineering applications of polymers and composites.
3. The principles of electrochemistry and with the mechanism of corrosion and its control.
4. The principles and generation of energy in batteries, nuclear reactors, solar cells, wind mills and fuel cells.
5. The important concepts of spectroscopy and its applications.

Unit	Description	Instructional Hours
I	WATER TECHNOLOGY Hard water and soft water- Disadvantages of hard water- Hardness: types of hardness, simple calculations, estimation of hardness of water – EDTA method – Boiler troubles - Conditioning methods of hard water – External conditioning - demineralization process - desalination: definition, reverse osmosis – Potable water treatment – breakpoint chlorination. Estimation of total, permanent and temporary hardness of water by EDTA.	6 +3=9
II	POLYMER & COMPOSITES Polymerization – types of polymerization – addition and condensation polymerization – mechanism of free radical addition polymerization – copolymers – plastics: classification – thermoplastics and thermosetting plastics, preparation, properties and uses of commercial plastics – PVC, Bakelite – moulding of plastics (extrusion and compression); Composites: definition, types of composites – polymer matrix composites (PMC) –FRP	6
III	ELECTROCHEMISTRY AND CORROSION Electrochemical cells – reversible and irreversible cells - EMF- Single electrode potential – Nernst equation (derivation only) – Conductometric titrations. Chemical corrosion – Pilling – Bedworth rule – electrochemical corrosion – different types –galvanic corrosion – differential aeration corrosion – corrosion control – sacrificial anode and impressed cathodic current methods - protective coatings – paints – constituents and functions. Conductometric titration of strong acid vs strong base (HCl vs NaOH). Conductometric precipitation titration using BaCl₂ and Na₂SO₄. Estimation of Ferrous iron by Potentiometry.	6+9=15
IV	ENERGY SOURCES AND STORAGE DEVICES Introduction- nuclear energy- nuclear fission- controlled nuclear fission- nuclear fusion differences between nuclear fission and fusion- nuclear chain reactions- nuclear reactor power generator- classification of nuclear reactor- light water reactor- breeder reactor. Batteries and fuel cells: Types of batteries- alkaline battery- lead storage battery- lithium battery- fuel cell H ₂ -O ₂ fuel cell applications.	6
V	ANALYTICAL TECHNIQUES Beer-Lambert's law – UV-visible spectroscopy and IR spectroscopy – principle – instrumentation (block diagram only) – flame photometry – principle – instrumentation (block diagram only) – estimation of sodium by flame photometry – atomic absorption spectroscopy – principles – instrumentation (block diagram only) – estimation of nickel by atomic absorption spectroscopy. Determination of iron content of the water sample using spectrophotometer.(1,10 phenanthroline / thiocyanate method).	6+3
Total Instructional Hours		45

Course Outcome

- CO1: Differentiate hard and soft water and to solve the related problems on water purification and its significance in industries and daily life
- CO2: Acquire the basic knowledge of polymers, composites and FRP and their significance.
- CO3: Develop knowledge on the basic principles of electrochemistry and understand the causes of corrosion, its consequences to minimize corrosion to improve industrial design.
- CO4: Develop knowledge about the renewable energy resources and batteries along with the need of new materials to improve energy storage capabilities.
- CO5: Identify the structure and characteristics of unknown/new compound with the help of spectroscopy.

TEXT BOOKS

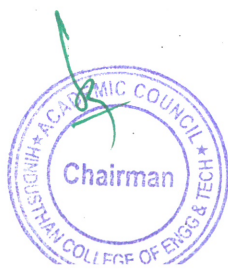
T1 - P.C.Jain and Monica Jain, "Engineering Chemistry" Dhanpat Rai Pub, Co., New Delhi (2018).

REFERENCE BOOKS

R1 - B.Sivasankar "Engineering Chemistry" Tata McGraw-Hill Pub.Co.Ltd, New Delhi (2012).

R2 - S.S.Dara "A Text book of Engineering Chemistry" S.Chand & Co. Ltd., New Delhi (2017).

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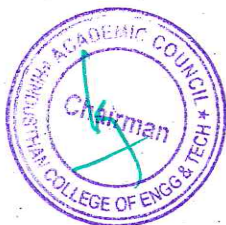
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Programme B.TECH.	Course Code 19CS1152	Name of the Course OBJECT ORIENTED PROGRAMMING USING PYTHON	L 2	T 0	P 2	C 3
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- Course Objective**
1. To read and write simple Python programs.
 2. To develop Python programs with conditionals and loops
 3. To define Python functions and call them
 4. To understand OOP concepts and write programs using classes and objects
 5. To do input/output with files in Python

Unit	Description	Instructional Hours	
	INTRODUCTION TO PYTHON What is Python - Advantages and Disadvantages, Benefits and Limitation- Downloading and Python-installation-Python Versions-Running Python Scripts, I Executing scripts with python launcher-Using interpreter interactively- Using variables-String types: normal, raw and Unicode-String operations and functions- Math operator and functions. <i>Illustrative program: find minimum in a list, insert a card in a list of sorted cards, guess an integer number in a range, Towers of Hanoi.</i>	7+2(P)	
	DATA TYPES, STATEMENTS, CONTROL FLOW Data Types (List, Tuple, string, dictionary, set)-Operators and precedence of operators, expressions, statements, comments; Conditionals: Boolean values and II operators, conditional (if), alternative (if -else), chained conditional (if -elif-else); Iteration: state, while, for, break, continue, pass. <i>Illustrative programs: Find the square root of a number, To find the given number is Prime or not, Write a Python program which accepts a sequence of comma-separated numbers from user, generate a list and find the sum and average of the numbers.</i>	5+4(P)	
	PYTHON FUNCTIONS Introduction to functions-Global and local variable in python-Decorators in python- III Python lamda functions-Exception handling in python. <i>Illustrative programs: Square root, GCD, exponentiation, linear search, binary search, Write a menu driven program to perform the following task:a) A function Sum_DigN() to find the sum of the digits of a given number, b) A recursive function Sum_DigR() to find the same.</i>	5+4(P)	
	PYTHON OOPS Introduction to oops concept-Python class and objects-Constructor in python- Inheritance-Types of inheritance-Encapsulation in python-Polymorphism in python. <i>Illustrative programs: Illustrative programs: Write a Python program using class for the calculation of telephone bill. The charges for the calls are fixed as follows:</i>		
IV	Unit Call Below 100 calls 100-150 calls 151-300 calls 301-600 calls Above 600	Cost/unit No Charge, only rental amount Rs. 250 Rs. 1.00 Rs. 2.50 Rs. 4.50 Rs. 6.00.	5+4(P)
	FILES, PACKAGES File handling in python-Open a file in python-How to read from a file in python- V writing to file in python-Python numpy-Python pandas. <i>Illustrative programs: How to display the contents of text file in reverse order? Write the code for the same, not exceeding 10 lines of code, Creating Modules and Packages for arithmetic Operations.</i>	5+4(P)	

Total Instructional Hours (27 + 18) 45



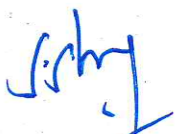
Course Outcome	CO1: Understanding the basic concepts to read, write and execute simple python programs.
	CO2: Apply the conditional and looping concepts for solving problems
	CO3: Apply functions to decompose larger complex programs
	CO4: Understanding the OOPS concepts and writing programs using classes and objects
	CO5: Understand to read and write data from/to files in Python Programs.

TEXT BOOKS:

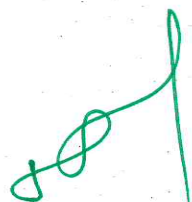
T1: Guido van Rossum and Fred L. Drake Jr, An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2011.

REFERENCE BOOKS:

- R1: Charles Dierbach, —Introduction to Computer Science using Python: A Computational Problem-Solving Focus, Wiley India Edition, 2013.
- R2: Timothy A. Budd, —Exploring Python, Mc-Graw Hill Education (India) Private Ltd., 2015
- R3: Robert Sedgewick, Kevin Wayne, Robert Dondero, —Introduction to Programming in Python: An Inter-disciplinary Approach, Pearson India Education Services Pvt. Ltd., 2016


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Programme	Course Code	Name of the Course	L	T	P	C
B.TECH.	19EC1154	BASICS OF ELECTRON DEVICES AND ELECTRIC CIRCUITS	2	0	2	3

- Course Objective**
1. To introduce the fundamental concepts of electrical circuits and theorems.
 2. To introduce the concept of circuit transients and resonance.
 3. To understand the basics theory, operational characteristics of diodes and transistors.
 4. To study the operating principles of special semiconductor devices..
 5. To create awareness on the methods for electrical safety and protection.

Unit	Description	Instructional Hours
I	UNIT I : ELECTRICAL CIRCUITS AND ANALYSIS Ohm's law, DC and AC circuits fundamentals, Kirchhoff's laws, Mesh and Nodal analysis-Theorems and simple problems: Superposition, Maximum power transfer theorem - Experimental study -Verification of superposition theorem.	6+3
II	UNIT II : CIRCUIT TRANSIENTS AND RESONANCES Basic RL, RC and RLC circuits and their responses to DC and sinusoidal inputs – frequency response – Parallel and series resonances – Q factor. Experimental verification of series resonance. Experimental study-Determination of Resonance Frequency of Series RLC Circuits	6+3
III	UNIT III : DIODE AND TRANSISTOR Characteristics of PN Junction Diode – Zener Diode and its Characteristics – Zener Effect– Zener Voltage Regulator.Bipolar Junction Transistor (BJT) Construction – CB, CE, CC Configurations and Characteristics- Experimental study-PN Junction Diode Characteristics,Zener Diode Characteristics	6+3
IV	UNIT IV : SPECIAL SEMICONDUCTOR DEVICES Construction, Characteristics and Applications of FET - UJT – SCR, Photo diode, Photo Transistor - LED and LCD- Implementation of Photo diode application. Experimental study- FET Characteristics	6+3
V	UNIT V : BASICS OF POWER SUPPLY AND ELECTRICAL WIRING Introduction to Power supply circuits: Half wave, Full wave Rectifier –SMPS - UPS (online & offline).Cable and wire types and applications – Two way and three way control- Experimental study- Implementation of simple wiring circuit for a Computer network.	6+3
Total Instructional Hours		45

- Course Outcome**
- CO1: Apply network theorems for AC and DC Circuits.
 - CO2: Understand the concept of transient response of circuits.
 - CO3: Ability to explain the theory, construction, and operation of diodes and BJT.
 - CO4: Ability to explain the theory, construction, and operation of FET and special semiconductor diodes.
 - CO5: Ability to apply the methods to ensure electrical safety.



TEXT BOOKS:

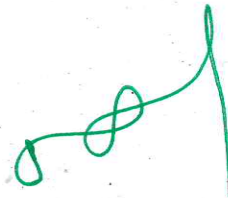
- T1 - W David A. Bell, "Electronic Devices and Circuits", Oxford University Press, 5Th Edition,(2008).
- T2 - Sudhakar A and Shyam Mohan SP, "Circuits and Network Analysis and Synthesis",Tata McGraw Hill, (2007).

REFERENCES BOOKS:

- R1 - M.Robert T. Paynter, "Introducing Electronics Devices and Circuits", PearsonEducation, 7thEdition, (2006).
- R2 - J. Millman&Halkins, SatyabrantaJit, "Electronic Devices &Circuits",Tata McGraw Hill, 2nd Edition, 2008
- R3 - William H. Hayt, J.V. Jack, E. Kemmebly and steven M. Durbin, "Engineering Circuit Analysis",Tata McGraw Hill, 6th Edition, 2002.
- R4 - Robert Boylestad and Louis Nashelsky, "Electron Devices and Circuit Theory" Prentice Hall, 10th edition, July 2008



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AIML - HiCEI**



**Dean (Academics)
HiCET**



PROGRAMME	COURSE CODE	NAME OF THE COURSE	L	T	P	C
B.TECH.	19HE1071	LANGUAGE COMPETENCY ENHANCEMENT COURSE- I (COMMON TO ALL BRANCHES)	0	0	2	1

Course Objective	✓ To enhance student language competency
	✓ To identify individual students level of communication skills
	✓ To develop English Vocabulary and spoken communication skills.
	✓ To revive the fundamentals of English Grammar.

Unit	Description	Instructional Hours
I	Listening Language of Communication- English listening- Hearing Vs Listening- Verbal and Non-verbal communication – Listening strategies-Sounds of English.	3
III	Reading English Language Enhancement – Indianism in English – Role of Reading in effective communication – Techniques for good reading (skimming and scanning) Reading articles from newspaper, magazine. Reading and interpreting a passage.	3
III	Speaking Common errors in Pronunciation – Signposts in English (Role play) – Public Speaking skills – Social Phobia – Eliminating fear – Common etiquette of speaking - Debate and Discuss.	3
IV	Writing Writing genre – Enhancement of basic English Vocabulary; Parts of Speech, Noun, Verbs, and Tenses – combining sentences, sentence formation and completion.	3
V	Art of Communication Communication process – Word building and roleplay – Exercise on English Language for various situations through online and offline activities.	3
Total Instructional Hours		15

Course Outcome	CO1- Trained to maintain coherence and communicate effectively.
	CO2- Practiced to create and interpret descriptive communication.
	CO3- Introduced to gain information of the professional world.
	CO4- acquired various types of communication and etiquette.
	CO5- Taught to improve interpersonal and intrapersonal skills.

REFERENCE BOOKS :

1. Verbal Ability and Reading Comprehension by Arun Sharma, 9th edition, Tata Mc graw Hill
2. Word Power Made Easy by Norman Lewis, – Print, 1 June 2011.
3. High School English Grammar by Wren and Martin, S.CHAND Publications, 1 January 2017.
4. Practical course in Spoken English by J.K. Gangal, PHI Learning , Second edition, 1 January 2018.

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Dean (Academics)
BICET

Programme B.TECH.	Course Code 19HE1072	Name of the Course CAREER GUIDANCE LEVEL - I Personality, Aptitude and Career Guidance	L 2	T 0	P 0	C 0
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- Course Objective**
1. To develop and nurture the soft skills of the students through instruction, knowledge acquisition, demonstration and practice
 2. To enhance the students ability to deal with numerical and quantitative skills.
 3. To identify the core skills associated with critical thinking.
 4. To develop and integrate the use of English language skills

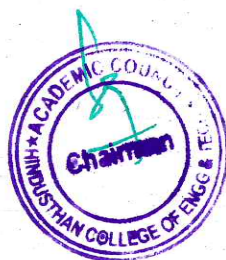
Unit	Description	Instructional Hours
I	LESSONS ON EXCELLENCE Skill introspection, Skill acquisition, consistent practice	2
II	LOGICAL REASONING Problem Solving - Critical Thinking- Lateral Thinking - Coding and Decoding – Series – Analogy – Odd Man Out - Visual Reasoning - Sudoku puzzles -Attention to detail	11
III	QUANTITATIVE APTITUDE Addition and Subtraction of bigger numbers - Square and square roots - Cubes and cube roots – Vedic maths techniques - Multiplication Shortcuts - Multiplication of 3 and higher digit numbers – Simplifications - Comparing fractions - Shortcuts to find HCF and LCM - Divisibility tests shortcuts - Algebra and functions	11
IV	RECRUITMENT ESSENTIALS Resume Building - Impression Management	2
V	VERBAL ABILITY Nouns and Pronouns – Verbs - Subject-Verb Agreement - Pronoun-Antecedent – Agreement - Punctuations	4
Total Instructional Hours		30

- Course Outcome**
- CO1: Students will analyze interpersonal communication skills. public speaking skills.
CO2: Students will exemplify tautology, contradiction and contingency by logical thinking
CO3: Students will be able to develop an appropriate integral form to solve all sorts of quantitative problems.
CO4: Students can produce a resume that describes their education, skills, experiences and measurable achievements with proper grammar, format and brevity.
CO5: Students will be developed to acquire the ability to use English language with an error while making optimum use of grammar.

REFERENCE BOOKS:

- R1: Quantitative Aptitude – Dr. R S Agarwal
R2: Speed Mathematics: Secret Skills for Quick Calculation - Bill Handley
R3: Verbal and Non – Verbal Reasoning – Dr. R S Agarwal
R4: Objective General English – S.P.Bakshi


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Programme	Course Code	Name of the Course	L	T	P	C
B.TECH.	19HE1073	ENTREPRENEURSHIP & INNOVATION	1	0	0	0

- Course Objective**
1. To acquire the knowledge and skills needed to manage the development of innovation.
 2. To recognize and evaluate potential opportunities to monetize these innovations.
 3. To plan specific and detailed method to exploit these opportunities.
 4. To acquire the resources necessary to implement these plans.
 5. To make students understand organizational performance and its importance

Unit	Description
1	Entrepreneurial Thinking
2	Innovation Management
3	Design Thinking
4	Opportunity Spotting / Opportunity Evaluation
5	Industry and Market Research
6	Innovation Strategy and Business Models
7	Financial Forecasting
8	Business Plans/ Business Model Canvas
9	Entrepreneurial Finance
10	Pitching to Resources Providers / Pitch Deck
11	Negotiating Deals
12	New Venture Creation
13	Lean Start-ups
14	Entrepreneurial Ecosystem
15	Velocity Venture

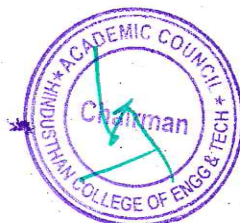
- Course Outcome**
- CO1: Understand the nature of business opportunities, resources, and industries in critical and creative aspects.
- CO2: Understand the processes by which innovation is fostered, managed, and commercialized.
- CO3: Remember effectively and efficiently the potential of new business opportunities.
- CO4: Assess the market potential for a new venture, including customer need, competitors, and industry attractiveness.
- CO5: Develop a business model for a new venture, including revenue. Margins, operations, working capital, and investment.

TEXT BOOKS:

- T1: Arya Kumar "Entrepreneurship – Creating and leading an Entrepreneurial Organization", Pearson, Second Edition (2012)
- T2: Emrah Yayici "Design Thinking Methodology", Artbiztech, First Edition (2016).

REFERENCE BOOKS:

- R1: Christopher Golis "Enterprise & Venture Capital", Allen & Unwin Publication, Fourth Edition (2007).
- R2: Thomas Lock Wood & Edger Papke "Innovation by Design", Career Press.com, Second Edition (2017).
- R3: Jonathan Wilson "Essentials of Business Research", Sage Publication, First Edition (2010)



WEB RESOURCES:

W1: <https://blof.forgeforward.in/tagged/startup-lessons>

W2: <https://blof.forgeforward.in/tagged/entrepreneurship>

W3: <https://blof.forgeforward.in/tagged/minimum-viable-product>

W4: <https://blof.forgeforward.in/tagged/minimum-viable-product>

W5: <https://blof.forgeforward.in/tagged/innovation>

W6: <https://www.youtube.com/watch?v=8vEyL7uKXs&list=PLmP9QrmTNPqBEvKbMSXvwlwn7fdnXe6Lw>



**Chairman - BoS
AIML - HICE I**



**Dean (Academics)
HICE I**

Programme	Course Code	Name of the Course	L	T	P	C
B.TECH.	19HE2101	BUSINESS ENGLISH FOR ENGINEERS	2	1	0	3

- Course Objective**
1. To introduce to business communication.
 2. To train the students to react to different professional situations.
 3. To make the learner familiar with the managerial skills
 4. To empower the trainee in business writing skills.
 5. To learn to interpret and expertise different content.

Unit	Description	Instructional Hours
I	Listening and Speaking – listening and discussing about programme and conference arrangement Reading –reading auto biographies of successful personalities Writing Formal & informal email writing, Recommendations Grammar and Vocabulary - Business vocabulary, Adjectives & adverbs.	9
II	Listening and Speaking - listening to TED talks Reading - Making and interpretation of posters Writing - Business letters: letters giving good and bad news, Thank you letter, Congratulating someone on a success” Grammar and Vocabulary - Active & passive voice, Spotting errors (Tenses, Preposition, Articles).	9
III	Listening and Speaking -travel arrangements and experience Reading - travel reviews Writing - Business letters (Placing an order, making clarification & complaint letters). Grammar and Vocabulary - Direct and Indirect speech.	9
IV	Listening and Speaking - Role play - Reading - Sequencing of sentence Writing - Business report writing (marketing, investigating) Grammar and Vocabulary - Connectors, Gerund & infinitive.	9
V	Listening and Speaking - Listen to Interviews & mock interview Reading - Reading short stories, reading profile of a company - Writing - Descriptive writing (describing one’s own experience) Grammar and Vocabulary - Editing a passage(punctuation, spelling & number rules).	9
Total Instructional Hours		45

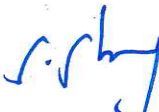
- Course Outcome**
- CO1- Introduced to different modes and types of business communication.
 - CO2- Practiced to face and react to various professional situations efficiently.
 - CO3- learnt to practice managerial skills.
 - CO4- Familiarized with proper guidance to business writing.
 - CO5- Trained to analyze and respond to different types of communication.

TEXT BOOKS:

- T1 - Norman Whitby, “Business Benchmark-Pre-intermediate to Intermediate”, Cambridge University Press, 2016.
T2- Ian Wood and Anne Willams. “Pass Cambridge BEC Preliminary”, Cengage Learning press 2015.

REFERENCE BOOKS :

- R1 - Michael Mc Carthy, “Grammar for Business”, Cambridge University Press, 2009.
R2- Bill Mascull, “Business Vocabulary in use: Advanced 2nd Edition”, Cambridge University Press, 2009.
R3- Frederick T. Wood, “Remedial English Grammar For Foreign Students”, Macmillan publishers, 2001.


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Dean (Academics)
HiCET

Programme	Course Code	Name of the Course	L	T	P	C
B.TECH.	19MA2104	DIFFERENTIAL EQUATIONS AND LINEAR ALGEBRA	3	1	0	4

- Course Objective**
1. Develop the skill to use matrix algebra techniques that is needed by engineers for practical applications
 2. Extend the knowledge of vector spaces
 3. Describe some methods to solve different types of first order differential equations.
 4. Solve ordinary differential equations of certain types using Wronskian technique.
 5. Use the effective mathematical tools for the solutions of partial differential equations

Unit	Description	Instructional Hours
	MATRICES	
I	Eigen values and Eigen vectors of a real matrix – Properties of Eigen values and Eigen vectors (without proof) Cayley - Hamilton Theorem (excluding proof) - Orthogonal matrices – Definition – Reduction of a quadratic form to canonical form by orthogonal transformation.	12
	VECTOR SPACES	
II	Complex matrices – Conjugate of the matrix – Hermitian and Skew Hermitian matrices – Properties (without proof) – Unitary matrix – Properties (without proof) - Inner product spaces – Gram – Schmidt orthogonalization.	12
	FIRST ORDER ORDINARY DIFFERENTIAL EQUATIONS	
III	Equations of the first order and of the first degree – Homogeneous equations – Exact differential equations – Linear equations – Equations reducible to the linear form – Benoulli's equation.	12
	ORDINARY DIFFERENTIAL EQUATIONS OF HIGHER ORDER	
IV	Second order linear differential equations with constant and variable co-efficients – Cauchy – Euler equations – Cauchy – Legendre equation – Method of variation of paramers.	12
	PARTIAL DIFFERENTIAL EQUATIONS	
V	Formation of partial differential equations by the elimination of arbitrary constants and arbitrary functions – Solution of standard types of first order partial differential equations of the form $f(p,q)=0$, Clairaut's type : $z = px+qy +f(p,q)$ – Lagrange's linear equation.	12
Total Instructional Hours		60

- Course Outcome**
- CO1: Calculate Eigen values and Eigen vectors for a matrix which are used to determine the natural frequencies
- CO2: Infer the knowledge of vector spaces
- CO3: Apply few methods to solve different types of first order differential equations.
- CO4: Develop sound knowledge of techniques in solving ordinary differential equations.
- CO5: Solve Partial Differential Equations using various methods.

TEXT BOOKS:

- T1- Grewal B.S, "Higher Engineering Mathematics", 43rd Edition, Khanna Publications, Delhi, 2018.
- T2- Howard Anton, Chris Rorres, Elements of Linear Algebra with Applications, Wiley, New Delhi, 2nd Edition, 2015.



REFERENCE BOOKS :

R1-E. A. Coddington, An Introduction to ordinary Differential Equations, Prentice Hall India, 1995.

R2 - G.F.Simmons and S. G. Krantz, Differential Equations, Tata McGraw Hill, 2007.

R3 - Veerarajan T, "Engineering Mathematics", McGraw Hill Education(India) Pvt Ltd, New Delhi, 2016


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Programme	Course Code	Name of the Course	L	T	P	C
B.TECH.	19PH2151	MATERIAL SCIENCE	2	0	2	3

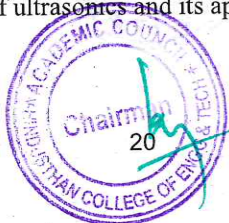
The student should be able to

- Course Objective**
1. Acquire fundamental knowledge of semiconducting materials which is related to the engineering program
 2. Extend the knowledge about the magnetic materials
 3. Explore the behavior of super conducting materials
 4. Gain knowledge about Crystal systems
 5. Understand the importance of ultrasonic waves

Unit	Description	Instructional Hours
I	SEMICONDUCTING MATERIALS Introduction – Intrinsic semiconductor – Compound and elemental semiconductor - direct and indirect band gap of semiconductors. Carrier concentration derivation – Fermi level – Variation of Fermi level with temperature – electrical conductivity – band gap determination. Optical properties of semiconductor – Light through optical fiber(Qualitative). Determination of band gap of a semiconductor. Determination of acceptance angle and numerical aperture in an optical fiber	6+(6)
II	MAGNETIC MATERIALS Origin of magnetic moment – Bohr magneton – comparison of Dia, Para and Ferro magnetism – Domain theory – Hysteresis – soft and hard magnetic materials – anti ferromagnetic materials – Ferrites and its applications. B – H curve by Magnetic hysteresis experiment.	6+(3)
III	SUPERCONDUCTING MATERIALS Superconductivity : properties(Messiner effect, effect of magnetic field, effect of current and isotope effects) – Type I and Type II superconductors – High Tc superconductors – Applications of superconductors –Cryotron and magnetic levitation.	6
IV	CRYSTAL PHYSICS Crystal systems - Bravais lattice - Lattice planes - Miller indices - Interplanar spacing in cubic lattice - Atomic radius, Coordination number and Packing factor for SC, BCC and FCC crystal structures.	6
V	ULTRASONICS Production – Magnetostrictive generator – Piezoelectric generator – Determination of velocity using acoustic grating – Cavitations – Viscous force – co-efficient of viscosity. Industrial applications – Drilling and welding – Non destructive testing – Ultrasonic pulse echo system. Determination of velocity of sound and compressibility of liquid – Ultrasonic wave. Determination of Coefficient of viscosity of a liquid –Poiseuille’s method.	6+(6)
Total Instructional Hours		45

After completion of the course the learner will be able to

- Course Outcome**
- CO1: Understand the purpose of acceptor or donor levels and the band gap of a semiconductor
 - CO2: Interpret the basic idea behind the process of magnetism and its applications in everyday
 - CO3: Discuss the behavior of super conducting materials
 - CO4: Illustrate the types and importance of crystal systems
 - CO5: Evaluate the production of ultrasonics and its applications in NDT



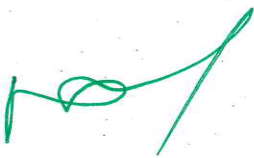
TEXT BOOKS:

- T1 - Rajendran V, Applied Physics, Tata McGraw Hill Publishing Company Limited, New Delhi, 2017.
T2- Gaur R.K. and Gupta S.L., Engineering Physics, 8th edition, Dhanpat Rai Publications (P) Ltd., New Delhi, 2015.

REFERENCE BOOKS:

- R1 - Arthur Beiser "Concepts of Modern Physics" Tata McGraw Hill, New Delhi – 2015
R2 - M.N Avadhanulu and PG Kshirsagar "A Text Book of Engineering physics" S. Chand and Company Ltd., New Delhi 2016.
R3 - Dr. G. Senthilkumar "Engineering Physics – II" VRB publishers Pvt Ltd., 2016


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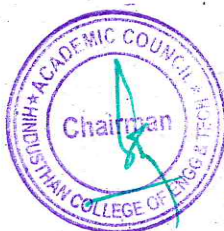
Programme B.TECH.	Course Code 19CY2151	Name of the Course ENVIRONMENTAL STUDIES	L 2	T 0	P 2	C 3
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The student should be conversant with

Course Objective

1. The natural resources, exploitation and its conservation
2. The importance of environmental education, ecosystem and biodiversity.
3. The knowledge about environmental pollution – sources, effects and control measures of environmental pollution.
4. Scientific, technological, economic and political solutions to environmental problems.
5. An awareness of the national and international concern for environment and its protection.

Unit	Description	Instructional Hours
I	NATURAL RESOURCES Renewable and Non renewable resources - Forest resources: Use and over-exploitation, deforestation, timber extraction, mining, dams and their effects on forests and tribal people - Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture – Energy resources: Renewable and non renewable energy sources – Solar energy and wind energy - role of an individual in conservation of natural resources.	6
II	ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY Importance of environment – need for public awareness - concept of an ecosystem – structure and function of an ecosystem - energy flow in the ecosystem – ecological succession processes – Introduction, types, characteristic features, structure and function of the forest and ponds ecosystem – Introduction to biodiversity definition: types and value of biodiversity – hot-spots of biodiversity – threats to biodiversity– endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ conservation of biodiversity.	6
III	ENVIRONMENTAL POLLUTION Definition – causes, effects and control measures of: Air pollution- Water pollution – Water quality parameters- Soil pollution - Noise pollution- Nuclear hazards – role of an individual in prevention of pollution. Determination of Dissolved Oxygen in sewage water by Winkler’s method. Estimation of alkalinity of water sample by indicator method. Determination of chloride content of water sample by argentometric method.	6+9=15
IV	SOCIAL ISSUES AND THE ENVIRONMENT From unsustainable to sustainable development – urban problems related to energy- environmental ethics: Issues and possible solutions – 12 Principles of green chemistry- Municipal solid waste management. Global issues – Climatic change, acid rain, greenhouse effect and ozone layer depletion – Disaster Management – Tsunami and cyclones. Determination of pH in beverages.	6+3=9
V	HUMAN POPULATION AND THE ENVIRONMENT Population growth, variation among nations – population explosion – family welfare programme – environment and human health – effect of heavy metals – human rights – value education – HIV / AIDS – women and child welfare –Environmental impact analysis (EIA)- GIS-remote sensing-role of information technology in environment and human health. Estimation of heavy metal ion (copper) in effluents by EDTA.	6+3=9
Total Instructional Hours		45



After the completion of the course, the learner will be able to

**Course
Outcome**

- CO1: Develop an understanding of different natural resources including renewable resources.
- CO2: Realise the importance of ecosystem and biodiversity for maintaining ecological balance.
- CO3: Understand the causes of environmental pollution and hazards due to manmade activities.
- CO4: Demonstrate an appreciation for need for sustainable development and understand the various social issues and solutions to solve the issues.
- CO5: Gain knowledge about the importance of women and child education and know about the existing technology to protect environment.

TEXT BOOKS:

T1 - Anubha Kaushik and C. P. Kaushik, "Perspectives in Environmental studies", Sixth edition, New Age International Publishers, New Delhi, 2019.

T2 - S. Annadurai and P.N. Magudeswaran, "Environmental studies", Cengage Learning India Pvt.Ltd, Delhi, 2018

REFERENCES:

R1 - Erach Bharucha, "Textbook of environmental studies" University Press (I) Pvt.ltd, Hyderabad, 2015

R2 - G.Tyler Miller, Jr and Scott E. Spoolman "Environmental Science" Thirteenth Edition, Cengage Learning, 2010.

R3 - Gilbert M. Masters and Wendell P. Ela "Introduction to Environmental Engineering and Science", 3rd edition, Pearson Education, 2013.


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**Dean (Academics)
HICET**



Programme B.TECH.	Course Code 19CS2153	Name of the Course JAVA FUNDAMENTALS	L 2	T 0	P 2	C 3
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- Course Objective**
1. To Understand the Basics of java Programming
 2. To discuss the packages and interfaces in java programming.
 3. To learn IO streams and multithreading in java.
 4. To learn generics and collections framework in java
 5. To understand event handling and swing in java.

Unit	Description	Instructional Hours
	INTRODUCTION TO JAVA	
I	JAVA-History of JAVA-Features of JAVA-Hello worlds java program-Setting path JDK, JRV and JVM-JAVA variables-JAVA data types-Keywords-Operators. <i>Illustrative Programs: Java program to swap two numbers using bitwise operator, Java program to find the smallest three numbers using ternary operator..</i>	5+2(P)
	CONTROL STATEMENTS	
II	Introduction to control statements in programming-If-else-switch-for loop-while loop-do while loop-Break-continue-JAVA comments. <i>Illustrative programs: Find the square root of a number, To determine leap year or not, Java program to find the factorial of number using recursion, Create Generic number calculator using Java..</i>	5+6(P)
	JAVA POLYMORPHISM	
III	Introduction to polymorphism concepts-Method overloading-Method overriding-Covariant return type-Super keyword-Instance Initializer block-final keyword- Runtime polymorphism-Dynamic binding-Instance of operator-Abstract class-interface-abstract Vs interface. <i>Illustrative programs: Method overriding, Abstract classes.</i>	7+2(P)
	ENCAPSUALATION, ARRAY	
IV	Java encapsulation-package-access modifier-Encapsulation-Object cloning- call by value-Java array concepts-Single dimension array-Multi dimension array. <i>Illustrative programs: Java program to check the whether the input character is vowels or not.</i>	7+2(P)
	FILES, PACKAGES	
V	File handling in python-Open a file in JAVA-How to read from a file in JAVA writing to file in JAVA-Exception handling-Java swing-java applet-Java AWT and events-Java collection. <i>Illustrative programs: Find the most frequent words in a text read from a file, Linked List implementation using collections, Program that handles all mouse events, Program using swing.</i>	5+4(P)
Total Instructional Hours		45(29+16)

- Course Outcome**
- CO1:** Understanding the OOPS and basic concepts of Java.
CO2: Understand how to program using user defined packages and interfaces.
CO3: Apply multithreading concepts based on appropriate problems.
CO4: Understand generics and collections framework in java.
CO5: Apply event handling classes and swing concepts to create different applications in java.

TEXT BOOKS:

T1: Herbert Schildt, "The complete reference java 2", 11th edition, McGraw – Hill 2019.

T2: "Core Java 2", Vol 2, Advanced Features, Cay S. Horstmann and Gary Cornell, Seventh Edition, Pearson Education.

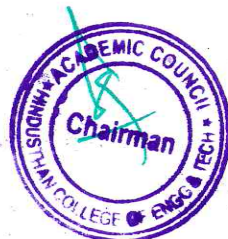


REFERENCE BOOKS:

R1: E.Balagurusamy, "Programming with java A Primer", fifth edition, McGraw – Hill 2014.

R2: H.M.Deitel, P.J.Deitel, "Java: how to program", Eleventh edition, Prentice Hall of India private limited, 2017.


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Programme	Course Code	Name of the Course	L	T	P	C
B.TECH.	19ME2154	ENGINEERING GRAPHICS	1	0	4	3

Course Objective	Description
	1. To gain the knowledge of Engineer's language of expressing complete details about objects and construction of conics and special curves.
	2. To learn about the orthogonal projections of straight lines and planes.
	3. To acquire the knowledge of projections of simple solid objects in plan and elevation.
	4. To learn about the projection of sections of solids and development of surfaces.
	5. To study the isometric projections of different objects.

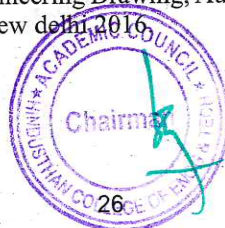
Unit	Description	Instructional Hours
	PLANE CURVES Importance of engineering drawing; drafting instruments; drawing sheets – layout and folding; Lettering and dimensioning, BIS standards, scales.	
I	Geometrical constructions, Engineering Curves Conic sections – Construction of ellipse, parabola and hyperbola by eccentricity method. Construction of cycloids and involutes of square and circle – Drawing of tangents and normal to the above curves.	12
	PROJECTIONS OF POINTS, LINES AND PLANE SURFACES Introduction to Orthographic projections- Projection of points. Projection of straight lines inclined to both the planes, Determination of true lengths and true inclinations by rotating line method.	
II	Projection of planes (polygonal and circular surfaces) inclined to both the planes by rotating object method (First angle projections only).	12
	PROJECTIONS OF SOLIDS Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is perpendicular and inclined to one plane by rotating object method.	
III	SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES Sectioning of simple solids with their axis in vertical position when the cutting plane is inclined to one of the principal planes and perpendicular to the other – Obtaining true shape of section.	12
IV	Development of lateral surfaces of simple and sectioned solids – Prisms, pyramids, cylinder and cone. Development of lateral surfaces of truncated solids.	
	ISOMETRIC AND ORTHOGRAPHIC PROJECTIONS Isometric views and projections simple and truncated solids such as - Prisms, pyramids, cylinders, cones- combination of two solid objects in simple vertical positions.	
V	Free hand sketching of multiple views from a pictorial drawing. Basics of drafting using AutoCAD software.	12
Total Instructional Hours		60

COURSE OUTCOMES:

- CO1: Understand and interpret the engineering drawings in order to visualize the objects and draw the conics and special curves.
- CO2: Draw the orthogonal projections of straight lines and planes.
- CO3: Interpret the projections of simple solid objects in plan and elevation.
- CO4: Draw the projections of section of solids and development of surfaces of solids.
- CO5: Draw the isometric projections and the perspective views of different objects.

TEXT BOOK:

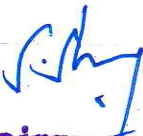
- 1. K.Venugopal, V.Prabu Raja, "Engineering Drawing, AutoCAD, Building Drawings", 5th edition New Age International Publishers, New delhi 2016



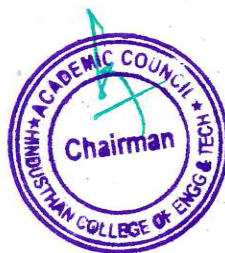
2. K.V.Natarajan, "A textbook of Engineering Graphics", Dhanlaksmi Publishers, Chennai.

REFERENCES:

1. Basant Agrawal and C.M.Agrawal, "Engineering Drawing", Tata McGraw Hill Publishing company Limited, New Delhi 2008.
2. N.S. Parthasarathy, Vela Murali, "Engineering Drawing", Oxford University PRESS, India 2015.


**Chairman - BoS
AIML - HICET**


**Dean (Academics)
HICET**



Programme	Course Code	Name of the Course	L	T	P	C
B.TECH.	19ME2001	ENGINEERING PRACTICES	0	0	4	2

OBJECTIVES:

To provide exposure to the students with hands on experience on various basic engineering practices in Civil, Mechanical and Electrical Engineering.

GROUP A (CIVIL & MECHANICAL)

S.No Description of the Experiments

CIVIL AND MECHANICAL ENGINEERING PRACTICES

- 1 Preparation of Single pipe line and Double pipe line connection by using valves, taps, couplings, unions, reducers and elbows.
- 2 Arrangement of bricks using English bond for 1brick thick wall and 11/2 brick thick wall for right angle corner junction.
- 3 Arrangement of bricks using English bond for 1brick thick wall and 11/2 brick thick wall for T junction.
- 4 Preparation of arc welding of Butt joints, Lap joints and Tee joints.
- 5 Practice on sheet metal Models– Trays and funnels
- 6 Hands-on-exercise in wood work, joints by sawing, planning and cutting.
- 7 Practice on simple step turning, taper turning and drilling.
- 8 Demonstration on Smithy operation.
- 9 Demonstration on Foundry operation.
- 10 Demonstration on Power tools.

GROUP B (ELECTRICAL)

S.No Description of the Experiments

ELECTRICAL ENGINEERING PRACTICES

- 1 Residential house wiring using switches, fuse, indicator, lamp and energy meter.
- 2 Fluorescent lamp wiring.
- 3 Stair case wiring.
- 4 Measurement of Electrical quantities – voltage, current, power & power factor in single phase circuits.
- 5 Measurement of energy using single phase energy meter.
- 6 Soldering practice using general purpose PCB.
- 7 Measurement of Time, Frequency and Peak Value of an Alternating Quantity using CRO and Function Generator.
- 8 Study of Energy Efficient Equipment's and Measuring Instruments.

Total Practical Hours 45



COURSE OUTCOME:

At the end of the course the students shall be able to

CO1: Fabricate wooden components and pipe connections including plumbing works.

CO2: Fabricate simple weld joints.

CO3: Fabricate different electrical wiring circuits and understand the AC Circuits.


**Chairman - BoS
AIML - HICET**


**Dean (Academics)
HICET**



PROGRAMME	COURSE CODE	NAME OF THE COURSE	L	T	P	C
B.TECH.	19HE2071	LANGUAGE COMPETENCY ENHANCEMENT COURSE- II	0	0	2	1

(COMMON TO ALL BRANCHES)

Course Objective	Objectives
	<ul style="list-style-type: none"> ✓ To improve communication skills and Professional Grooming. ✓ To impart deeper knowledge of English Language and its practical application in different facets of life. ✓ To equip the techniques of GD, Public Speaking, debate etc.

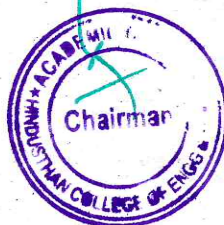
Unit	Description	Instructional Hours
I	Listening Listening for gist and respond – Listen for detail using key words to extract specific meaning – listen for phonological detail – Listen and identify the main points for short explanations and presentation.	3
II	Reading Strategies for effective reading – read and recognize different text types – Genre and Organization of Ideas – Quantifying reading – reading to comprehend – Interpreting sentences – contrasting, summarizing or approximating	3
III	Speaking Speak to communicate – Make requests and ask questions to obtain personal information – use stress and intonation – articulate the sounds of English to make the meaning understood – speaking to present & Interact – opening and closing of speech.	3
IV	Writing Plan before writing – develop a paragraph: topic sentences, supporting sentences – write a descriptive paragraph – elements of good essay – descriptive, narrative, argumentative – writing emails – drafting resumes – project writing – convincing proposals.	3
V	Language Development Demonstration at level understanding of application of grammar rules – revision of common errors : preposition, tenses, conditional sentences –reference words – pronouns and conjunctions.	3
Total Instructional Hours		15

Course Outcome	Outcomes
	CO1- Introduced to different modes and types of communication. CO2- Practiced to face and react to various professional situations efficiently. CO3- learnt to practice managerial skills. CO4- Familiarized with proper guidance to writing. CO5- Trained to analyze and respond to different types of communication.

REFERENCE BOOKS :

1. Verbal Ability and Reading Comprehension by Arun Sharma, 9th edition, Tata Mc graw Hill
2. Word Power Made Easy by Norman Lewis, – Print, 1 June 2011.
3. High School English Grammar by Wren and Martin, S.CHAND Publications, 1 January 2017.
4. Practical course in Spoken English by J.K. Gangal, PHI Learning , Second edition, 1 January 2018.


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Dean (Academics)
HICET

Programme B.TECH.	Course Code 19HE2072	Name of the Course CAREER GUIDANCE LEVEL II Personality, Aptitude and Career Guidance	L 2	T 0	P 0	C 0
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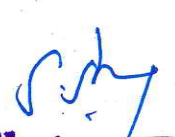
- Course Objective**
1. Solve Logical Reasoning questions of easy to intermediate level
 2. Solve Quantitative Aptitude questions of easy to intermediate level.
 3. Solve Verbal Ability questions of easy to intermediate level.

Unit	Description	Instructional Hours
	LOGICAL REASONING	
I	Word group categorization questions - Cryptarithmic - Data arrangements - Blood relations	8
	QUANTITATIVE APTITUDE	
II	Ratio and Proportion: Ratio, Proportion, Variation, Simple equations, Problems on Ages, Mixtures and alligations - Percentages, Simple and Compound Interest: Percentages as Fractions and Decimals, Percentage Increase / Decrease, Simple Interest, Compound Interest, Relation Between Simple and Compound Interest - Number System	12
	VERBAL ABILITY	
III	Essential grammar for placements: Prepositions, Adjectives and Adverbs, Tenses, Forms and Speech and Voice, Idioms and Phrasal Verbs, Collocations, Gerund and Infinitives – Reading Comprehension for placements: Types of questions, Comprehension strategies - Articles, Prepositions and Interrogatives: Definite and Indefinite Articles, Omission of Articles, Prepositions, Compound Prepositions and Prepositional Phrases, Interrogatives - Vocabulary for placements: Exposure to solving questions of Synonyms, Antonyms, Analogy, Confusing words and Spelling correctness	10
Total Instructional Hours		30

- Course Outcome**
- CO1: Students will analyze and critique logical reasoning, including situations for which the student will recognize underlying assumptions and make reasonable assumptions.
- CO2: Students will be able to make decisions with mathematical, statistical, and quantitative information.
- CO3: Students would have obtained a multitude of opportunities resulting in the refinement of his/her language skills and the ability to use the skills for effective communication.

REFERENCE BOOKS:

- R1: How to Prepare for Quantitative Aptitude for the CAT- Arun Sharma
- R2: How to Prepare for Logical Reasoning for CAT
- R3: Objective General English – S.P.Bakshi


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Dean (Academics)
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AIML - CO'S, PO'S & PSO'S MAPPING

Semester – I

Course Code & Name: 19HE1101 Technical English

PO& PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	1	1	1	2	-	1	2	1	2	3	1	3	3	2
CO2	1	2	1	1	1	2	1	1	1	3	1	2	2	3
CO3	1	2	1	1	1	2	1	1	2	3	1	2	2	2
CO4	1	1	-	1	1	1	1	1	2	3	1	2	3	3
CO5	-	1	1	1	1	1	1	2	2	3	1	2	2	2
Avg	1	1.4	1	1.2	1	1.4	1.2	1.2	1.8	3	1	2.2	2.4	2.4

Course Code & Name: 19MA1101 Calculus

PO& PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	3	3	2	2	-	-	-	-	-	-	2	2	2
CO2	3	3	3	3	3	-	-	-	-	-	-	2	2	3
CO3	3	3	3	3	3	-	-	-	-	-	-	2	1	2
CO4	3	3	3	3	3	-	-	-	-	-	-	2	2	1
CO5	3	3	3	2	3	-	-	-	-	-	-	2	2	2
Avg	3	3	3	2.6	2.8	-	-	-	-	-	-	2	1.8	2

Course Code & Name: 19PH1151 Applied Physics

PO& PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	2	2	1	1	1	-	-	-	-	-	1	2	1
CO2	3	3	1	1	2	-	-	-	-	-	-	1	3	3
CO3	3	2	1	2	2	-	-	-	-	-	-	1	3	3
CO4	3	2	3	2	3	1	-	-	-	-	-	1	2	2
CO5	3	2	3	2	2	2	-	-	-	-	-	1	2	3
Avg	3	2.2	2	1.6	2	1.333333	-	-	-	-	-	1	2.4	2.4

Course Code & Name: 19CY1151 Chemistry for Engineers

PO& PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	2	2	-	2	1	1	-	-	-	-	1	1	1
CO2	3	2	2	-	2	1	-	-	-	-	-	1	1	-
CO3	3	2	2	-	2	1	1	-	-	-	-	1	1	-
CO4	3	2	2	2	2	1	-	-	-	-	-	1	1	1
CO5	3	2	2	-	2	1	-	-	-	-	-	1	1	1
Avg	3	2	2	2	2	1	1	-	-	-	-	1	1	1

Course Code & Name: 19CS1152 Object Oriented Programming using Python

PO& PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	2	3	3	-	2	-	-	-	-	-	-	2	2	2
CO2	2	3	3	-	2	-	-	-	2	-	-	2	2	2
CO3	2	3	3	-	2	-	-	-	2	-	-	2	2	2
CO4	2	3	3	-	2	-	-	-	2	-	-	2	2	2
CO5	2	3	3	-	2	-	-	-	2	-	-	2	2	2
Avg	2	3	3	-	2	-	-	-	2	-	-	2	2	2

Course Code & Name: 19EC1154 Basics of Electron Devices and Electric Circuits

PO& PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	3	3	2	2	1	1				1	2	3	3
CO2	3	3	2	2	2	1	1				1	2	3	2
CO3	3	2	3	2	2	1	1				1	2	2	2
CO4	3	3	3	2	2	1	1				1	2	3	2
CO5	3	3	3	2	2	1	1				1	2	3	2
Avg	3	2.8	2.8	2	2	1	1				1	2	2.8	2.2

Semester – II

Course Code & Name: 19HE2101 Business English for Engineers

PO& PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	1	2	1	1	1	2	1	2	2	3	-	3	1	-
CO2	2	1	1	1	1	2	2	2	2	3	-	2	-	1
CO3	2	2	1	1	1	2	2	2	2	3	1	3	1	-
CO4	2	2	1	1	2	2	2	2	3	3	1	3	1	1
CO5	1	1	1	1	1	2	2	1	2	3	1	3	1	1
Avg	1.6	1.6	1	1	1.2	2	1.8	1.8	2.2	3	1	2.8	1	1

Course Code & Name: 19MA2104 Differential Equations and Linear Algebra

PO& PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	3	3	2	2	-	-	-	-	-	-	2	2	2
CO2	3	3	3	2	2	-	-	-	-	-	-	2	2	3
CO3	3	3	3	3	2	-	-	-	-	-	-	2	2	2
CO4	3	3	3	3	2	-	-	-	-	-	-	2	2	2
CO5	3	3	3	3	2	-	-	-	-	-	-	2	2	2
Avg	3	3	3	2.6	2	-	-	-	-	-	-	2	2	2.2

Course Code & Name: 19PH2151 Material Science

PO& PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	2	1	1	1	1	-	-	-	-	-	1	2	1
CO2	3	3	1	1	2	-	-	-	-	-	-	1	2	2
CO3	3	2	1	2	2	-	-	-	-	-	-	1	2	3
CO4	3	3	1	2	2	1	-	-	-	-	-	1	2	2
CO5	3	2	2	3	2	1	2	-	-	-	-	1	2	3
Avg	3	2.4	1.2	1.8	1.8	1	2	-	-	-	-	1	2	2.2

Course Code & Name: 19CY2151 Environmental Studies

PO& PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	2	-	-	-	-	2	3	3	2	-	-	2	-	-
CO2	2	-	-	-	-	2	3	3	2	-	-	2	-	-
CO3	2	1	1	-	-	2	3	3	2	-	-	2	-	-
CO4	2	1	2	-	-	2	3	3	2	-	-	2	-	-
CO5	2	1	2	-	-	2	3	3	2	-	-	2	-	-
Avg	2	1	1.7	-	-	1	2	3	2	-	-	2	-	-

Course Code & Name: 19CS2153 Java Fundamentals

PO& PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	3	-		3	-	-	1	1	-	2	2	3	3
CO2	3	3	2	2	3	-	-	1	1	-	2	2	2	3
CO3	3	3	2	2	3	-	-	1	1	-	2	2	2	3
CO4	3	3	-	2	3	-	-	1	1	-	2	2	2	3
CO5	3	-	2	2	3	-	-	1	1	-	2	2	2	3
Avg	3	2.4	1.2	1.6	3	0	0	1	1	0	2	2	2.2	3

Course Code & Name: 19ME2154 Engineering Graphics

PO& PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	3	3	2	2	-	-	-	-	-	-	2	1	1
CO2	3	3	3	2	2	-	-	-	-	-	-	3	2	2
CO3	3	3	3	2	2	-	-	-	-	-	-	3	3	3
CO4	3	3	3	2	2	-	-	-	-	-	-	3	1	1

CO5	3	3	3	2	2	-	-	-	-	-	-	3	2	2
Avg	3	3	3	2	2	-	-	-	-	-	-	2.8	1.8	1.8

Course Code & Name: 19ME2001 Engineering Practices Laboratory

PO& PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	-	3	-	3	-	1	-	1	-	-	-	1	2
CO2														
CO3														
CO4														
CO5														
Avg	3		3		3				1				1	2

Semester – III

Course Code & Name: 19MA3152 - Probability and Applied Statistics

PO& PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	3	3	3	3	-	-	-	-	-	-	3	3	3
CO2	3	3	3	3	3	-	-	-	-	-	-	3	2	3
CO3	2	2	2	2	2	-	-	-	-	-	-	2	2	2
CO4	3	3	3	3	3	-	-	-	-	-	-	2	2	2
CO5	3	3	3	3	3	-	-	-	-	-	-	3	3	3
Avg	2.8	2.8	2.8	2.8	2.8	-	-	-	-	-	-	2.6	2.4	2.6

Course Code & Name: 19AI3201 Data Structures and Algorithms

PO& PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	3	3	2	3			3	1		2	2	2	3
CO2	3	3	3	2	3			3	1		2	2	2	3
CO3	3	2	3	2	3			3	1		2	2	2	3
CO4	3	3	3	2	3			3	1		2	2	2	3
CO5	3	3	3	2	3			3	1		2	2	2	3
Avg	3	2.8	3	2	3	-	-	3	1	-	2	2	2	3

Course Code & Name: 19AI3202 - Foundations of Artificial Intelligence

PO& PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	1	1	3	0	1	3	0	0	3	1	1	2	2	1
CO2	2	2	3	1	1	1	0	0	3	1	1	2	2	2
CO3	3	2	3	2	2	0	0	0	1	1	1	2	2	3
CO4	3	1	3	1	1	2	0	0	1	2	1	2	3	3
CO5	1	2	2	1	3	2	1	0	2	3	3	2	3	1
Avg	2	1.6	2.8	1	1.6	1.6	0.2	0	2	1.6	1.4	2	2.4	2

Course Code & Name: 19AI3252 Clean Coding and Devops

PO& PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	3	3	2	3	3	2	3	1	1	2	2	2	3
CO2	3	3	3	2	3	3	2	3	1	1	2	2	2	3
CO3	3	2	3	2	3	3	2	3	1		2	2	2	3
CO4	3	3	3	2	3	3	2	3	1		2	2	2	3
CO5	3	3	3	2	3	3	2	3	1		2	2	2	3
Avg	3	2.8	3	2	3	3	2	3	1	0.4	2	2	2	3

Course Code & Name: 19AI3251 Digital Principles and System Design

PO& PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	3	2	2	1	1	0	1	0	1	1	3	0	0
CO2	3	3	2	2	2	2	0	1	0	1	0	1	0	2
CO3	3	3	2	2	2	2	0	1	0	1	0	2	0	1
CO4	3	3	2	2	2	2	0	1	0	1	1	1	0	1
CO5	3	3	2	2	2	2	0	1	0	1	1	1	0	2
Avg	3	3	2	2	2	2	0	1	0	1	1	2	0	1

Course Code & Name: 19AI3001 – Data Structures and Algorithms Laboratory

PO& PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	0	0	0	1	0	0	0	0	0	1	1	1	0
CO2	3	2	1	1	1	0	0	0	1	0	0	1	1	0
CO3	3	2	1	1	1	0	0	0	1	1	0	1	0	1
CO4	3	2	1	1	0	0	0	0	1	0	1	1	0	1
CO5	3	0	0	0	0	0	0	0	0	1	1	1	1	0
Avg	3	1	1	1	1	0	0	0	1	0	1	1	1	0

Course Code & Name: 19AI3002 Artificial Intelligence Laboratory

PO& PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	1	1	3	0	1	1	0	0	1	1	1	1	2	2
CO2	1	2	3	1	1	1	0	0	1	1	1	1	2	2
CO3	1	2	3	2	2	0	0	0	1	1	1	1	2	2
CO4	1	1	3	1	1	2	0	0	1	2	1	2	2	3
CO5	1	2	2	1	3	2	1	0	2	3	3	2	2	3

Avg	3	2	0	0	1	0	0	0	0	0	1	2	1	0
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Semester – IV

Course Code & Name: 19MA4105 - Discrete Mathematical Structures

PO& PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	2	3	2	1	1	-	-	-	-	-	1	2	2	2
CO2	2	3	2	1	1	-	-	-	-	-	1	2	2	2
CO3	2	2	2	2	1	-	-	-	-	-	1	2	2	2
CO4	2	2	3	1	2	-	-	-	-	-	2	2	3	3
CO5	2	3	3	2	2	-	-	-	-	-	3	2	3	3
Avg	2	2.6	2.4	1.4	1.4	-	-	-	-	-	1.6	2	2.4	2.4

Course Code & Name: 19AI4201 Database Management Systems

PO& PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	2	1	-	-	-	-	-	-	-	-	2	2	-
CO2	2	1	2	1	3	-	-	-	-	-	-	1	3	-
CO3	2	1	2	1	2	-	-	-	-	-	-	1	2	-
CO4	2	3	-	-	1	-	-	-	-	-	-	2	3	-
CO5	1	1	2	1	-	-	-	-	-	-	-	1	2	-
Avg	2	1.6	1.4	0.6	1.2	-	-	-	-	-	-	1.4	2.4	-

Course Code & Name: 19AI4202 Data Visualization

PO& PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	3	3	3	-	2	2	-	3	3	-	3	3	3
CO2	2	3	3	2	2	-	2	2	3	3	2	2	3	3

CO2	3	3	-	2	2	2	-	-	-	-	-	-	3	1
CO3	3	3	-	2	2	2	-	2	-	-	-	-	3	1
CO4	3	3	1	2	2	2	-	-	-	-	-	-	3	1
CO5	3	3	1	2	2	2	-	-	-	-	3	-	3	1
Avg	3	3	0.4	1.6	1.8	1.6	-	0.4	-	-	0.6	-	3	1

Course Code & Name: 19CS4002 Data Visualization Laboratory

PO& PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	3	2	2	1	1	0	1	0	1	1	3	0	0
CO2	3	3	2	2	2	2	0	1	0	1	0	1	0	2
CO3	3	3	2	2	2	2	0	1	0	1	0	2	0	1
CO4	3	3	2	2	2	2	0	1	0	1	1	1	0	1
CO5	3	3	2	2	2	2	0	1	0	1	1	1	0	2
Avg	3	3	2	2	2	2	0	1	0	1	1	2	0	1

DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING


REGULATIONS 2019

Mapping of Course Outcome and Programme Outcome:

Year	Sem	Course code & Name	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2		
I	I	19HE1101- Technical English	1	1.4	1	1.2	1	1.4	1.2	1.2	1.8	3	1	2.2	2.4	2.4		
		19MA1101- Calculus	3	3	3	2.6	2.8	-	-	-	-	-	-	-	2	1.8	2	
		19PH1151 - Applied Physics	3	2.2	2	1.6	2	1.33 3333	-	-	-	-	-	-	1	2.4	2.4	
		19CY1151 -Chemistry for Engineers	3	2	2	2	2	1	1	-	-	-	-	-	1	1	1	
		19CS1152 - Object Oriented Programming using Python	2	3	3	-	2	-	-	-	-	2	-	-	2	2	2	
		19EC1154- Basics of Electron devices And Electric Circuits	3	2.8	2.8	2	2	1	1						1	2	2.8	2.2
		19HE1071 - Language Competency Enhancement Course-I																
		19MC1191 – Induction Program																
	II	19HE2101 - Business English for Engineers	1.6	1.6	1	1	1.2	2	1.8	1.8	2.2	3	1	2.8	1	1		
		19MA2104 – Differential Equations	3	3	3	2.6	2	-	-	-	-	-	-	-	2	2	2.2	

IV	19AI4201 – Database Management System	2	1.6	1.4	0.6	1.2	-	-	-	-	-	-	1.4	2.4	-
	19AI4202- Data Visualization	2.6	2.6	2.6	2.2	2	2	2.25	2	2.666667	2.666667	2.25	2.2	2.4	2.4
	19AI4251– Operating Systems	2.8	1	1.2	0.6	0	0	2.4	0	1.2	0	1.8	1.2	3	0.4
	19MA4105 - Discrete Mathematical Structures	2	2.6	2.4	1.4	1.4	-	-	-	-	-	1.6	2	2.4	2.4
	19AI4252 – Introduction to Machine Learning	3.00	2.80	3.00	0.80	1.00	0.60	1.60	-	0.60	-	0.80	1.80	2.00	1.80
	19AI4001 – Database Management System Laboratory	3	3	0.4	1.6	1.8	1.6	-	0.4	-	-	0.6	-	3	1
	19AI4002- Data Visualization Laboratory	3	3	2	2	2	2	0	1	0	1	1	2	0	1
	19MC4191-Essence of Indian tradition knowledge														

1-Low, 2-Medium, 3-High, - No Correlation


Chairman - BoS
AIML - HICET


Dean (Academics)
HICET