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SCHOOL OF ENGINEERING & TECHNOLOGY

ITM University Gwalior Campus, NH-44, Turari, Gwalior, (M.P.) - 475 001 INDIA
mail: info@itmuniversity.ac.in, web: www.itmuniversity.ac.in

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DEPARTMENT OF CIVIL ENGINEERING

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Department of Civil Engineering

Minutes of BOS Meeting

In order to review the scheme of B. Tech. Civil Engineering, a meeting of BOS was conducted in online mode on 24th of September 2020 due to COVID-19 pandemic. This meeting is in continuation of BOS meeting previously held on 14th of June 2019.

The following members were present in the meeting:

Sr. No.	Name	Designation
1	Dr. Ranjeet Singh Tomar	Dean
2	Dr. Mukesh Kumar Pandey	Chairman
3	Mr. Sohit Agrawal	Member
4	Mr. Aditya Sharma	Member
5	Mr. Deepak Rastogi	Expert
6	Dr. Manish Sharma	Invitee

Following decisions were taken after discussion:

1. Approval of minutes of the last BOS meeting held on 22nd July2023.
2. The scheme of B. Tech. Civil Engineering II semester, IV semester, VI semester, VIII semester for batch of 2020-24 have been approved
3. Based on suggestions given by the members, it is resolved to approve the syllabi with the following modification

- In CEL0101 few new topics were introduced in Unit 1- Different types of foundations, shallow, pile, well, and machine foundation, site investigation and sub soil exploration, advanced measuring instruments and in Unit-4 few topics were replaced admixture and chemicals in concrete with destructive and non-destructive testing.
- In 2nd semester a new course was introduced structural materials. (See Annexure 2)
- In CEL0302 in Unit-1 new topics were introduced Complex Stresses & Strains: Two-dimensional analyses of stresses and strains with graphical representation and in Unit-3 conjugate beam method were introduced and in Unit-4 topics like Eccentric loading on columns, slender column were added.
- In CEL0303 in Unit-1 topic of stone was replaced with new topics like Basics of concrete: Historical background, composition of concrete, general note on strength mechanism, recent practice and future trends and in Unit-5 topics Rubble concrete, Resin concrete, Heat resistant concrete, Mass concrete, Temperature control of mass concrete were added.

- In CEL0313 in Unit-1 new topics geometric design were added and in Unit-2 topics vertical curve were added, In unit-3 topic tie bar added, in Unit-4 topic mechanical stabilization were added, in unit-5 mental factor affecting reaction time were added.

- In CEL0331 in Unit-1 new topics mechanism of load transfer, importance of RCC construction, its advantages & disadvantages were added. In unit-4 topic design problem of soft storey were added, in Unit-5 topic like discussion of various IS codes were added.

- In CEL0407 in Unit-1 topic reduction of levels were added, in unit-3 direct reading tachometer was introduced, in unit-5 computation of sides were introduced.

- In CEL0408 in unit-5 topics effects of surcharge, wall friction were replaced with stabilization and types of stabilization.

- In CEL0409 in unit-3 two hinge arch is introduced and fixed arch is removed.

- In CEL0432, in unit-1 partial load factor, bolted, riveted, welded connection were introduced.

- In CEL0510 in Unit 1 Types of drag, drag on sphere, flat plate were introduced.

- In CEL0511 in Unit 5 full topic of remote sensing is introduced in place of tachometry.

- In CEL617 in Unit 1 topic partial load factor is introduced, in Unit 2 topic flexural members, codal provisions of IS 800-2007 were added while in Unit 3 geometry of truss, different type of truss, lateral stability of truss.

- In CEL 619 in Unit 1 portal & Cantilever method were introduced.

- In CEL621 in Unit 1 topic mode of measurement, in Unit 3 labor requirement for various trade, in Unit 5 topic gross and net income were introduced.

- In Cel0725 in Unit 3 earnest money, in Unit 4 impressed account while in Unit 5 topic safety engineering were introduced.

The Board of Studies recommended above discussed points further for approval by Academic Council of the University.

Dr. Ranjeet Singh Tomar Dean	Dr. Manish Sharma Invitee	Dr. Mukesh Pandey Chairman
Mr. Aditya Sharma Member	Mr. Sohit Agrawal Member	Mr. Deepak Rastogi Expert

ANNEXURE I

Course Code	Course Name	Semester	Number of topics	Change in the number of topics	Change Percentage	Remarks
CEL0101[T]	Introduction to Structural Engineering	I	46	10	21.7391304	
CEL0233[T]	Structural Materials	II	45	45	100	Newly Added
CEL0302[T]	Strength of Materials	III	35	8	22.8571429	
CEL0303[T]	Concrete Technology	III	50	14	28	
CEL0313[T]	Highway and Traffic Engineering	III	53	5	9.43396226	
CEL0331[T]	Elementary design of structures (RCC)	III	34	4	11.7647059	
CEL0406[T]	Fluid Mechanics	IV	50	0	0	
CEL0407[T]	Fundamentals of Surveying	IV	58	6	10.3448276	
CEL0408[T]	Fundamentals of Geotechnical Engineering	IV	59	4	6.77966102	
CEL0409[T]	Basic Methods of Structural Analysis	IV	42	5	11.9047619	
CEL0432[T]	Elementary Design of Structures (Steel)	V	20	5	25	
CEL0510[T]	Hydraulics & fluid machine	V	80	4	5	
CEL0511[T]	Advanced Surveying	V	45	12	26.6666667	
CEL0512[T]	Fundamentals of Structural design(RCC)	V	30	0	0	
CEL0514[T]	Advanced Methods of Structural Analysis	V	20	4	20	
CEL0515[T]	Advanced Geotech Engineering	V	69	0	0	
CEL0617[T]	Basic of Structural Design (Steel)	VI	30	0	0	
CEL0618[T]	Water Resource & Irrigation Engineering	VI	44	0	0	
CEL0619[T]	Advanced Structural Design (RCC)	VI	30	5	16.6666667	
CEL0620[T]	Railway, Bridges and tunnel engineering	VI	45	0	0	
CEL0621[T]	Quantity Surveying & Costing	VI	31	5	16.1290323	
CEL0723[T]	Advanced Structural Design(Steel)	VII	42	0	0	
CEL0724[T]	Environment Engineering -I	VII	51	0	0	
CEL0725[T]	Introduction to Construction Planning and Management	VII	39	3	7.69230769	
CEE0701[T]	MATRIX ANALYSIS OF STRUCTURES	VII	42	0	0	
CEE0702[T]	Advanced Foundation Engineering	VII	51	0	0	
CEE0703[T]	Pavement Design	VII	43	0	0	
CEE0704[T]	Seismic analysis of structures	VII	50	0	0	
CEE0705[T]	Fundamentals of Remote Sensing & GIS	VII	45	0	0	
CEE0706[T]	Fluid Dynamics	VII	46	0	0	
CEE0707[T]	Wastewater Treatment and Recycling	VII	44	0	0	
CEE0708[T]	Sustainable Construction Methods	VII	48	0	0	
CEL0826[T]	Environment Engineering -II	VIII	48	0	0	
CEL0827[T]	Design of Hydraulic Structures	VIII	57	7	12.2807018	
CEE0807[T]	Plastic design of steel structure	VIII	48	0	0	
CEE0808[T]	Building Environment & Services	VIII	45	0	0	
CEE0809[T]	Design of Pre stressed Concrete Structure	VIII	45	0	0	
CEE0810[T]	Traffic Engineering	VIII	48	0	0	
CEE0811[T]	Energy Efficient and Green Building	VIII	47	0	0	
CEE0812[T]	Airport Engineering	VIII	46	0	0	

CEE0813[T]	Solid Waste Management	VIII	52	0	0	
CEE0814[T]	Urban Transportation Planning	VIII	42	0	0	

Total Percentage Change **8.39%**

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Syllabus-2020-2021

(SOET)(BTech-CivilEngineering)

Title of the Course	Structural Materials
Course Code	CEL0233[T]

Part A

Year		**Semester**		**Credits**	L	T	P	C
					2	1	0	3

Course Type	Embedded theory and lab		
Course Category	Discipline Core		
Pre-Requisite/s	Basics of Civil Engineering	**Co-Requisite/s**	
Course Outcomes & Bloom's Level	CO1- Students will get knowledge of Basic Structural Materials(**BL1-Remember**) CO2- To understand the materials use in Civil Engineering industry(**BL2-Understand**) CO3- Students are able to apply the details of Innovative Textures(**BL3-Apply**) CO4- To analyse different Admixtures & other adhesives(**BL4-Analyze**) CO5- To evaluate the behavior of different Structural materials in different purposes(**BL5-Evaluate**) CO6- To Create adequate type of Construction material (**BL6-Create**)		
Coures	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professional Ethics ✗ Gender ✗ Human Values ✗	SDG (Goals)	SDG9(Industry Innovation and Infrastructure) SDG11(Sustainable cities and economies)

Modules	Contents	Pedagogy	Hours
1	Mud:- Stabilization and use for walling and terracing, Stones:- Classification, Availability, Characteristics, Test and Uses. Lime: Availability, Preparation and Uses. Brick:- Manufacture , Properties, Classification, Testing & Defects. Qualities of good brick.	Lectures with Seminars, PBL and Case Studies	8
2	Timbers: - Varieties of Indian timbers , Characteristics, Defects and decay, seasoning and preservation. Roof Covering Materials:- Clay Tiles (Country, Allahabad, Mangalore tiles etc.), Concrete Tiles, Asbestos	Lectures with Seminars, PBL and Case Studies	8
3	Glass & Glass Products: Plain, Special Glasses & Glass Products. Surface Finishing:- Plastering, Painting & varnishing. Floor Finishing: - Hard & Soft Floorings. Bamboo:- Properties, uses	Lectures with Seminars, PBL and Case Studies	8
4	Cement:- Types of cement, composition, properties and uses, brief study on manufacture of Portland cement , tests for cement.	Lectures with Seminars, PBL and Case Studies	8
5	Metals :- Ferrous – Iron (Pig, Cast & Wrought), Steel, Structural, Sheet and Alloys. Non Ferrous: Aluminium, copper & copper based alloys (brass & bronze), tin, cadmium, chromium, zinc, lead, nickel.	Lectures with Seminars, PBL and Case Studies	8

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	40	12	60	
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	40	12	60	20

Books	Rangwala, Engineering Materials, Charotar Publication
Articles	
References Books	S. K. Duggal, Building Materials, New Age Publication
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	2	2	1	1	-	2	-	2	2	3	2	2
CO2	3	3	2	2	2	-	1	-	-	-	2	2	3	3	3
CO3	2	2	2	3	1	1	-	-	2	-	-	2	2	2	1
CO4	3	2	3	2	2	-	1	-	-	-	2	1	1	2	2
CO5	2	2	2	3	1	1	-	-	2	1	2	3	1	3	3
CO6	3	2	3	2	2	1	1	-	2	1	3	2	1	1	2

Sahil.

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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

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Department of Electronics & Communication Engineering, School of Engineering & Technology (SOET)
ITM University, Gwalior
Session 2020-2021

Minutes of the Board of Studies Meeting

Dated: 10/05/2020

Agenda:

- Approval of the Scheme of Examination for B. Tech. (I Semester to VIII Semester) for the batch 2020.
- Approval of the Syllabi for B. Tech. (I Semester to VIII Semester) for the batch 2020.
- Review of Syllabi for B. Tech. Electronics & Communication Engineering for the batches 2019, 2018, 2017.
- Approval of new courses as Mandatory, Open Elective, & Program Elective courses.
- Inclusion of PO, PSO, PEOs etc.
- Approval of revisions proposed in existing courses.

Meeting of Board of Studies of **Department of Electronics & Communication Engineering, School of Engineering & Technology,** ITM University Gwalior was held on **10/05/2020** via Online platform.

The following members were present in the meeting:

S. No.	Name	Designation	Signature
1.	Dr. Ranjeet Singh Tomar	HOD and Chairman BOS	
2.	Dr. Shyam Akashe	Dean Research, Member	
3.	Dr. Sadhana Mishra	Assistant Professor, Member	
4.	Mr. Shailendra Ojha	Assistant Professor, Member	
5.	Mr. Bhupendra Dhakad	Assistant Professor, Member	
6.	Mr. Mayank Sharma	Assistant Professor, Member	

7.	Mr. Mahendra Singh Bhadoria	Assistant Professor, Member	
8.	Dr. Manish Sharma	Invitee Member, Professor and COE	
9.	Dr. Dinesh Singh Tomar	Invitee Member, Professor Maths Department	
10.	Dr. Rakesh Saxena	Expert, Director & Professor, SGSITS, Indore (MP)	

Following decisions were taken in the BOS meeting:

1. Minutes of last BOS meeting dated July 18, 2019 has been approved.
2. Following Schemes of examination and Syllabus of B. Tech (Electronics & Communication Engineering) have been reviewed and approved.

i. B. Tech. + M. Tech. (Integrated) / B. Tech. + MBA (Integrated) (Electronics & Communication Engineering) Batch (2016-2021) IX and X Semester.

ii. B. Tech. / B. Tech. (Honors) / B. Tech. + M. Tech. (Integrated) / B. Tech. + MBA (Integrated) (Electronics & Communication Engineering) Batch (2017-2021 / 2017-2022) VII and VIII Semester.

iii. B. Tech. / B. Tech. (Honors) (Electronics & Communication Engineering) Batch (2018-2022) V and VI Semester.

iv. B. Tech. / B. Tech. (Honors) (Electronics & Communication Engineering) Batch (2019-2023) III and IV Semester.

v. B. Tech. / B. Tech. (Honors) (Electronics & Communication Engineering) Batch (2020-2024) I and II Semester.

vi. B. Tech. + M. Tech. (Integrated) / B. Tech. + MBA (Integrated) (Electronics & Communication Engineering) Batch (2020-2025) I and II Semester.

vii. M. Tech. (Communication Systems) / M. Tech. (VLSI) Batch (2019-2021) III and IV Semester.

viii. M. Tech. (Communication Systems) / M. Tech. (VLSI) Batch (2020-2022) I and II Semester.

3. Newly added course as suggested by experts to be introduced in the first year

S. No.	Newly added course Name	Course Code	Semester
1.	Fundamentals of Arduino Programming	ECL0261[T]	II

4. Revisions were carried out in ECL0201 Principles of Sensors and IoT which was running in second semester from this year it's code has been revised with contents revision to be 40%

Year	Course Name	Course Code	Semester
Year 2019-20	Principles of Sensors & IoT	ECL0201	II
Year 2020-21	Principles of Sensors & IoT	ECL0102	I

- The Board of Studies recommended the discussed points for further approval by the Academic Council of the University.

Note: Annexure 1 is containing syllabus of new courses introduced

Annexure 2 is containing details of revisions carried out in the courses.

Prof.(DR.) Ranjeet Singh Tomar
Head of Department
Electronics & Communication Engg.
ITM University
Gwalior (M.P.)
Head and Chairman BOS
Department of Electronics & Communication Engineering
School of Engineering & Technology
ITM University Gwalior (MP)

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Annexure 1: Syllabus of new courses

Syllabus-2020-2021

(SOET)(BTech-Electronics_and_Communication)

Title of the Course	Fundamentals of Arduino Programming
Course Code	ECL0261[T]

Part A

Year		**Semester**		**Credits**	L	T	P	C
					2	1	1	4
Course Type	Embedded theory and lab							
Course Category	Disciplinary Major							
Pre-Requisite/s	Basic understanding of Sensors, Actuators, Interfacing of devices etc.			**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember the basic definitions, key terminologies of Arduino IDE, actuators, Sensors & IoT**(BL1-Remember)** **CO2-** To understand the working principles, concepts, & circuit designs of various Sensors & Actuators for IoT. **(BL2-Understand)** **CO3-** To apply that how to interface with and interpret the data obtained from various IoT applications **(BL3-Apply)** **CO4-** To analyse various smart systems using simulation or performing experiments on IoT builder kit**(BL4-Analyze)** **CO5-** Evaluate performance of various logics & designs of sensors with IoT systems for various applications. **(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✗ Employability ✗ Professional Ethics ✗ Gender ✗ Human Values ✗ Environment ✗		**SDG (Goals)**	SDG1(No poverty) SDG2(Zero hunger) SDG4(Quality education)				

Dr. Sadhana Mishra

Part B

Modules	Contents	Pedagogy	Hours
I	Arduino Boards, Arduino IDE, programming setup, Arduino Programming concepts: Syntax, Program flow, serial, Serial.begin, Arduino functions, data types variables, Arduino Array, Delay, Arduino if, loops. Arduino Sensors, control motors, Arduino Shields.	Lecture Method/Video	12
II	Introduction & Programming with IoT boards Introduction to IoT Prototype and product, IoT development boards: Arduino, Architecture of Arduino Uno, Micro duino, NodeMCU, Beagle bone Board, Intel Edison, Intel Galileo, Raspberry pi Pin configuration, different functions of Raspberry pi, Samsung ARTIK, and how to program.	Lecture Method/Video	10
III	Technologies behind IoT: Communication Technologies for IoT: ZigBee, RF links, Bluetooth, Bluetooth 4.0 LE, Wi-Fi, 6LoWPAN, Z-Wave and a comparison.	Lecture Method/Video	10
IV	IoT Enabling Technologies: Wireless sensor Networks, Examples of WSNs used in IoT Systems, Cloud computing, cloud computing services, Big Data Analytics, Examples of big data generated by IoT systems, characteristics of big data.	Lecture Method/Video/Group Discussion	10
V	Arduion Web Connecting: Arduino Shields, Ethernet Shields, Ethernet library, Ethernet client, Client Examples. Ethernet Server, WiFi Shield, WiFi Shield Demo, Arduino Libraries, EEPROM, I2C communication, Sending bits.	Lecture Method/Video/Group Discussion	10

Jain

Dr. Sadhana Mishra.

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	To study 37 in one sensors.	Experiments	BL2-Understand	2
3	To implement an Arduino program for Analog Read.	Experiments	BL3-Apply	2
3	To a interface and programming of Magnetic Reed switch	Experiments	BL4-Analyze	2
4	To compile an Arduino program for Digital and Analog Sensor interfacing.	Experiments	BL4-Analyze	2
3	To compile an Arduino program for interfacing and programming of Buzzer Module.	Experiments	BL4-Analyze	2
2	To implement an Arduino program to interface Bluetooth Module with Arduino UNO	PBL	BL5-Evaluate	2
2	Automation with Arduino system for Smart Agriculture	PBL	BL6-Create	30
3	Automation with Sensors like Smart Lock System, Smart Waste Management System	PBL	BL6-Create	30

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	40	12	60	
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	50	40	20	60	

Part E

Books	1. Arshdeep Bahga and Vijay Madisetti "Internet of Things – A Hand-on Approach " Universities press, 2015 2. Donald Norris The Internet of Things: Do-It Yourself at Home Projects for Arduino, Raspberry Pi and Beagle Bone Black McGraw Hill Publication. 3. Jeeva Jose Internet of Things Khanna publication, AICTE approved
Articles	1. Adeleke, O. J., & Ogbogbono, C. O. Smart Fan Control: A Comprehensive Study on Designing and Implementing an Arduino-Based Wireless Fan Speed Control System with Smartphone Integration. Available at SSRN 4735449. 2. Rodriguez-Sanchez, C., Orellana, R., Fernandez Barbosa, P. R., Borromeo, S., & Vaquero, J. (2024). Insights 4.0: Transformative learning in industrial engineering through problem-based learning and project-based learning. Computer Applications in Engineering Education, e22736.
References Books	Raj Kamal Internet of Things TMH, New Delhi.
MOOC Courses	https://onlinecourses.swayam2.ac.in/aic20_sp04/preview https://onlinecourses.nptel.ac.in/noc19_cs65/preview
Videos	http://www.iot-a.eu/public https://www.tinkercad.com/projects/Basics-of-Arduino-TINKERCAD Online Simulator

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	-	1	2	-	-	-	-	2	3	-	-	-	2	-
CO2	2	-	-	-	3	-	-	-	1	-	-	-	-	-	2
CO3	-	-	1	-	1	-	-	-	-	-	-	-	1	2	-
CO4	-	-	-	2	-	-	-	-	1	2	-	-	-	-	3
CO5	-	-	2	1	2	-	-	-	3	-	-	-	2	1	-
CO6	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-

Annexure 2: Details of revisions carried out in the courses.

ECE syllabus revision for the year 2020-21

Scheme 2019-20 and 2020-21

STUDY AND EVALUATION SCHEME (2019-2020)
(SUBJECT-WISE DISTRIBUTION OF MARKS AND CORRESPONDING CREDITS)

Programme:BTech(Electronics_and_Communication) Semester:2nd

S.No.	Course Code	Course Name	Maximum Marks Allotted							Credits Allotted			Total Credits
			Theory			Practical			Total Marks				
			End Sem. Exam	Mid Sem. Exam	Class Participation	End Sem. Exam	Progressive Evaluation	Internal Viva		L	T	P	
1	CSL0201[T]	Essentials of Information Technology	40	30	30	0	0	0	100	2	0	0	2
2	ECL0202[T]	Principles of Sensors & IoT	40	30	30	0	0	0	100	2	1	0	3
3	EEL0201[T]	Principles of Electrical Engineering	40	30	30	0	0	0	100	2	1	0	3
4	MAL0203[T]	Statistics for Engineers	40	30	30	0	0	0	100	2	1	0	3
5	MCL0201[T]	Environmental Pollution & Global Issues	40	30	30	0	0	0	100	3	1	0	4
6	MEL0202[T]	Engineering Graphics	40	30	30	0	0	0	100	2	1	0	3
7	CSL0201[P]	Essentials of Information Technology	0	0	0	40	30	30	100	0	0	1	1
8	CSP0201[P]	Programming Logics	0	0	0	40	30	30	100	0	0	2	2
9	ECL0202[P]	Principles of Sensors & IoT	0	0	0	40	30	30	100	0	0	1	1
10	EEL0201[P]	Principles of Electrical Engineering	0	0	0	40	30	30	100	0	0	1	1
11	MAL0203[P]	Statistics for Engineers	0	0	0	40	30	30	100	0	0	1	1
12	MEL0202[P]	Engineering Graphics	0	0	0	40	30	30	100	0	0	1	1
												Total Credits	25

*Newly Added Courses

STUDY AND EVALUATION SCHEME (2020-2021)
SUBJECT-WISE DISTRIBUTION OF MARKS AND CORRESPONDING CREDITS

Program:BTech(Electronics_and_Communication) Semester:1st

S.No.	Course Code	Course Name	Maximum Marks Allotted							Credits Allotted			Total Credits
			Theory			Practical			Total Marks				
			End Sem. Exam	Mid Sem. Exam	Class Participation	End Sem. Exam	Progressive Evaluation	Internal Viva		L	T	P	
1	ECL0101[T]	Basic Electronics	40	30	30	0	0	0	100	2	1	0	3
2	ECL0102[T]	Principles of Sensors & IoT	40	30	30	0	0	0	100	2	1	0	3
3	HUL0101[T]	Communication Skills & Colloquim	40	30	30	0	0	0	100	3	0	0	3
4	MAL0101[T]	Calculus For Engineers	40	30	30	0	0	0	100	2	1	0	3
5	MEL0101[T]	Engineering Mechanics	40	30	30	0	0	0	100	2	1	0	3
6	ECL0101[P]	Basic Electronics	0	0	0	40	30	30	100	0	0	1	1
7	ECL0102[P]	Principles of Sensors & IoT	0	0	0	40	30	30	100	0	0	1	1
8	ECP0101[P]	Electronics Workshop Practice	0	0	0	40	30	30	100	0	0	2	2
9	HUL0101[P]	Communication Skills & Colloquim	0	0	0	40	30	30	100	0	0	1	1
10	MAL0101[P]	Calculus For Engineers	0	0	0	40	30	30	100	0	0	1	1
11	MEL0101[P]	Engineering Mechanics	0	0	0	40	30	30	100	0	0	1	1
												Total Credits	22

*Newly Added Courses

Syllabus previous and current year

Previous Syllabus: 2019-20

Part B

Modules	Contents	Pedagogy	Hours
1	Introduction to Sensors, Architecture of sensor node, Components of Sensor, Transducers, Sensors classes: analog sensors, digital sensors, scalar sensors, vectored sensors. Different types of sensors: Temperature sensors: Thermocouple-measuring principle and its applications, Resistive temperature detectors (RTD): used materials and construction and its applications. Thermistors: Principle and application. Monolithic Temperature Sensors (IC sensor).	Lecture Method/Audio, Video clip/Group discussion/Field visit	12
2	Semiconductor Sensors: working principle and its applications. Optical Sensors: Photodiodes, Photoresistor, PIN diode, Position Sensitive photo detectors, Pressure sensors. Chemical sensors: Electrochemical sensor, Amperometric and voltammetric sensors, potentiometric sensor, Bio sensors and applications.	Lecture Method/Audio, Video clip/Group discussion/Research/Field visit	12
3	Smart Sensors and Actuators: Architecture of sensor node, Components of Sensor, Participatory Sensing. Wireless sensor motes and its applications: Mica2/MicaZ Motes, TelosB Motes, XM1000 wireless mote, Indriya, IRIS, iSense, Preon32, Wasp Mote, WiSense Mote, panStamp NRG Mote . Actuators: Principle, Types and Examples of Actuators, Sensor Data Communication Protocols.	Lecture Method/Audio, Video clip/Group discussion	12
4	Internet of things (IoT): An Overview: Basics, definition and vision of IOT, IoT Conceptual Framework, IoT Architectural View, Physical Design of IoT, Logical Design of IoT, Applications of IoT. RFID: features, working principle, and applications.	Lecture Method/Audio, Video clip/Group discussion	10
5	Technologies behind IoT: Communication Technologies for IoT: ZigBee, RF links, Bluetooth, Bluetooth 4.0 LE, Wi-FI, 6LoWPAN, Z-Wave and a comparison. Arduino an Overview: Features of Arduino, Types of Arduino Boards, Arduino IDE, programming setup, Examples. Integration of Sensors and Actuators with Arduino. Basic Architecture of Raspberry pi,	Lecture Method//Audio, Video clip/Group discussion/Field visit	10

	Raspberry pi Pin configuration, different functions of Raspberry pi.		

Revised Syllabus 2020-21

Part B

Modules	Contents	Pedagogy	Hours
1	Introduction to Sensors: Sensors, Transducers, Difference between Sensor & Transducer, Different criteria to choose a sensor, Classification of Sensors: analog sensors, digital sensors, scalar sensors, vectored sensors, Need of Sensors. Temperature Sensors: Thermocouple- measuring principle and its applications, Resistive temperature detectors (RTD): used materials and construction and its applications, Thermistors: Principle and application, Comparison among Thermistor, Thermocouple, & RTD.	Lecture Method, dio, Video clip/Group discussion/Research/Field visit	12
2	Different types of Sensors: PIR sensor, Ultrasonic sensor, Gas Sensors, Proximity Sensor, Rain sensor, Touch Sensor, IR Sensor, Humidity Sensor, Semiconductor Sensors: working principle and its applications. Optical Sensors: Photodiodes, Photoresistor, PIN diode, Position Sensitive photo detectors, Pressure sensors. Chemical sensors: Electrochemical sensor, Amperometric and voltammetric sensors, potentiometric sensor, Bio sensors and applications	Lecture Method, Audio, Video clip/Group discussion/Research/Field visit	12
3	Smart Sensors and Actuators: Architecture of sensor node, Components of Sensor, Participatory Sensing, Wireless sensor motes and its applications: Mica2/MicaZ Motes, TelosB Motes, XM1000 wireless mote, Indriya, IRIS, iSense, Preon32, Wasp Mote, WiSense Mote, panStamp NRG Mote . Actuators: Principle, Types and Examples of Actuators, Sensor Data Communication Protocols.	Lecture Method, Audio, Video clip/Group discussion/Research/Field visit	12
4	Internet of things (IoT): An Overview: Basics, definition and vision of IOT, IoT Conceptual Framework, IoT Architectural View, Physical Design of IoT, Logical Design of IoT, Applications of IoT. RFID: features, working principle, and applications.	Lecture Method, Audio, Video clip/Group discussion/Research/Field visit	10

5	IoT Practical Applications: Definition & Essentials of IoT & IoT applications for: Home, Cities, Environment, Energy Systems, Retail, Logistics, Industry, Agriculture, Health & Lifestyle	Lecture Method, Audio, Video clip/Group discussion/Research/Field visit	10

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
4	IOT based Smart specs	PBL	BL6-Create	30
2	smart dustbin based on iot	PBL	BL6-Create	30
1	To familiarize with various sensors such as LM 35 Temperature Sensor, PIR Sensor, Soil Sensor, Thermistor Sensor.	Experiments	BL6-Create	2
1	To study characteristics of Platinum RTD (Resistance Temperature Detector) sensor	Experiments	BL6-Create	2
1	To study Characteristics of NTC Thermistor sensor	Experiments	BL5-Evaluate	2
1	Study the Characteristics of K Type Thermocouple.	Experiments	BL6-Create	2
1	Study the characteristics of Pressure Transducer/ Sensor.	Experiments	BL6-Create	2
2	To make a touch sensor using 555 Timer IC on Breadboard	Experiments	BL4-Analyze	2

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
4	IOT based Smart specs	PBL	BL6-Create	30
2	smart dustbin based on iot	PBL	BL6-Create	30
1	To familiarize with various sensors such as LM 35 Temperature Sensor, PIR Sensor, Soil Sensor, Thermistor Sensor.	Experiments	BL6-Create	2
1	To study characteristics of Platinum RTD (Resistance Temperature Detector) sensor	Experiments	BL6-Create	2
1	To study Characteristics of NTC Thermistor sensor.	Experiments	BL5-Evaluate	2
1	Study the Characteristics of K Type Thermocouple.	Experiments	BL6-Create	2
1	Study the characteristics of Pressure Transducer/ Sensor.	Experiments	BL6-Create	2
2	To make a touch sensor using 555 Timer IC on Breadboard	Experiments	BL4-Analyze	2

Part D(Marks Distribution)

Theory					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
100	40	40	12	60	
Practical					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
100	50	40	20	60	

Part E

Books	1) Arshdeep Bahga and Vijay Madisetti Internet of Things – A Hand-on Approach Universities press, 2015 2) Shantanu Bhattacharya, A K Agarwal, Environmental, Chemical and Medical Sensors. Springer Nature Singapore Pvt. Ltd. 2018
Articles	10.1088/978-0-7503-2707-7ch1
References Books	1) Donald Norris, The Internet of Things: Do-It-Yourself at Home Projects for Arduino, Raspberry Pi and Beagle Bone Black, McGraw Hill Publication Raj Kamal, Internet of Things, TMH, New Delhi.
MOOC Courses	https://courses.mooc.fi/org/uh-cs/courses/introduction-to-the-internet-of-things-mooc
Videos	http://www.iot-a.eu/public NPTEL Lectures for Introduction to IoT

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	-	-	2	2	-	-	3	3	-	-	3	2	2
CO2	3	1	2	1	1	2	2	1	2	3	1	-	3	3	3
CO3	-	1	3	2	1	2	2	2	-	1	-	3	3	3	2
CO4	1	2	2	3	2	-	-	2	-	-	2	1	3	2	2
CO5	-	-	-	-	1	2	-	-	-	-	2	-	3	-	3
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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DEPARTMENT OF MECHANICAL ENGINEERING

UNIVERSITY
GWALIOR - MP - INDIA
"CELEBRATING DREAMS"

Date: 12/08/2020

Department of Mechanical Engineering
Minutes of BOS Meeting

A meeting of Board of Studies of Mechanical Engineering Department for B. Tech. Mechanical Engineering and M.Tech. Production and Industrial Engineering was held on 12th Aug 2020 online via video conference due to COVID-19 pandemic.

The following members were present in the meeting:

Sr. No.	Name	Designation
1	Dr. Ranjeet Singh Tomar	Dean
2	Dr. Mukesh Kumar Pandey	Chairman
3	Dr. M. L Jain	Expert
4	Dr. R.K. Jain	Convener
5	Mr. Rajendra Singh Rajput	Member
6	Mr. Arun Kushwah	Member
7	Mr. Trilok Chauhan	Member
8	Mr. Sateesh Kumar	Member
9	Mr. Jai Kumar	Member
10	Mr. Nadeem Faisal	Member
11	Mr. GauravVerma	Member
12	Dr. Manish Sharma	Invitee Member
13	Dr. Dinesh Singh Tomar	Invitee Member

The Board of Studies discussed and resolved following points which are recommended further for approval by Academic Council of the University:

1. The scheme and syllabus of –

- Review/approval of last BoS minutes of meeting held on 09 May 2020 was done.
- B. Tech. Mechanical Engineering(Specialization in Manufacturing Technology) for I-VIII semester for batch of 2020 have been approved.
- B. Tech. Mechanical Engineering (Specialization in Manufacturing Technology) the scheme and syllabus of batch of 2019-23 have been reviewed.
- The syllabus revision was carried out in the subjects of 2020-24 batch.

Dr. Mukesh Kumar Pandey | Dr. M. L. Jain | Dr. Rajendra Singh Rajput | Mr. Arun Kushwah | Dr. R. K. Jain | Dr. Ranjeet Singh Tomar

Mr. Sateesh Kumar | Mr. Jai Kumar | Mr. Nadeem Faisal | Dr. Manish Sharma | Dr. Dinesh Tomar | Mr. Trilok Chauhan

Mr. Gaurav Verma

2. In the scheme of 2020-24 batch, the MEL0410 Mechanics of Solids has been shifted from IV semester to III semester in place of MEL0307 Fluid Mechanics and MEL0307 is shifted from III semester to IV semester as MEL0407.
3. MEL0304 Materials science from 3 sem is shifted to I sem as MEL0104.
4. In place of MEL0304 Materials science, MAL0308 Engineering mathematics has been introduced as new subject.
5. MEL0409 Industrial engineering has been introduced as new subject.
6. Following new subjects and subject's syllabus revision in the B. Tech. Mechanical Engineering (Specialization in Manufacturing Technology) have been incorporated in the scheme of 2020-24 batch as recommended by the BOS.

Sr. No.	Subject Code	Subject name	% Change of syllabus
1	MAL0308	Engineering Mathematics	100
2	MEL0409	Industrial Engineering	100
3	[illegible]	Engineering Mechanics	40
4	MEL0140[T]	Manufacturing Technology-I	23
5	MEL0202[T]	Engineering Graphics	27.27
6	MEL 0341[T]	Manufacturing Technology –II	27.27
7	MEL 0310[T]	Mechanics of Solids	44.44
8	MEL0305[T]	Basic Thermodynamics	20
9	MEL0407[T]	Fluid mechanics	25
10	MEL0415[T]	Kinematics of Machines	20
11	MEL0442[T]	Machining processes	25
12	MEL0515[T]	Machine Design-I	30
13	MEL0516[T]	IC Engines	44.44
14	MEL0518[T]	Dynamics of Machines	24
15	MEL0521[T]	Fluid Machinery	25
16	MEL0522[T]	Advanced Manufacturing	40
17	MEL0825[T]	Automobile Engineering	27.27
	Overall revision in syllabus		**14%**

Dr. Mukesh Kumar Pandey
Dr. M. L. Jain
Dr. Rajendra Singh Rajput
Mr. Arun Kushwah
Dr. R. K. Jain
Dr. Ranjeet Singh Tomar
Mr. Sateesh Kumar
Mr. Jai Kumar
Mr. Nadeem Faisal
Dr. Manish Sharma
Dr. Dinesh Tomar
Mr. Trilok Chauhan
Mr. Gaurav Verma

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Syllabus-2020-2021

(SOET)(BTech-Mechanical Engineering)

Title of the Course	Industrial Engineering
Course Code	MEL0409[T]

Part A

Year		**Semester**		**Credits**	L	T	P	C
					2	1	0	3
Course Type	Theory only							
Course Category	Discipline Core							
Pre-Requisite/s	Knowledge of basic science and production engineering.		**Co-Requisite/s**					
Course Outcomes & Bloom's Level	**CO1-** Understand the concepts of work and motion study**(BL2-Understand)** **CO2-** Apply the concepts of work and motion study to improve productivity.**(BL3-Apply)** **CO3-** Describe the methods of job evaluation and wage incentive.**(BL5-Evaluate)** **CO4-** Understand and apply methods of inspection and quality control.**(BL3-Apply)** **CO5-** Understand and apply PERT and CPM.**(BL3-Apply)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✕ Professional Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG9(Industry Innovation and Infrastructure)				

Dr. Mukesh Kumar Pandey

Dr. M. L. Jain

Dr. Rajendra Singh Rajput

Mr. Arun Kushwah

Dr. R. K. Jain

Dr. Ranjeet Singh Tomar

Mr. Sateesh Kumar

Mr. Jai Kumar

Mr. Nadeem Faisal

Dr. Manish Sharma

Dr. Dinesh Tomar

Mr. Trilok Chauhan

Mr. Gaurav Verma

Part B

Modules	Contents	Pedagogy	Hours
Unit-1	Productivity & Work Study Definition of productivity, work content, ineffective time, productivity and standard of living, introduction to work Study Method Study: Objectives and procedure for methods analysis, recording techniques, principles of motion economy, micro-motion and Macro-motion study, Therbligs and SIMO Chart.	Lectures with whiteboard/PPT, Quiz, Group discussion	8
Unit-2	Work Measurement Objectives, work measurement techniques, time study, work sampling, pre-determined motion time standards (PMTS), determination of time standards, observed time, basic time, normal time, rating factors, allowances, and standard time. Introduction to ergonomics.	Lectures with whiteboard/PPT, Quiz, Group discussion	8
Unit-3	Job Evaluation and Wage Plan Objective, methods of job evaluation, job evaluation procedure, merit rating (performance appraisal), method of merit rating, wage and wage incentive plans.	Lectures with whiteboard/PPT, Quiz, Group discussion	8
Unit-4	Inspection and Statistical Quality Control: Quality, quality control, costs of quality, inspection and quality control, SQC concept, variable and attributes, normal distribution curves and control charts for variable and attributes and their applications and interpretation (Analysis) process capability. Acceptance sampling, sampling plans, OC Curves and AOQ curves.	Lectures with whiteboard/PPT, Quiz, Group discussion	8

Dr. Mukesh Kumar Pandey

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Dr. Rajendra Singh Rajput

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Mr. Sateesh Kumar

Mr. Jai Kumar

Mr. Nadeem Faisal

Dr. Manish Sharma

Dr. Dinesh Tomar

Mr. Trilok Chauhan

Mr. Gaurav Verma

Unit-5	Project Management Introduction to project management Collaborative working, CAE Tutorials, Product development cycle overview, Market demands and trends for products, Product Lifecycle Management (PLM), Intellectual Property Rights (IPRs),	Lectures with white board/PPT, Quiz, Group discussion	8

Dr. Mukesh Kumar Pandey

Dr. M. L. Jain

Dr. Rajendra Singh Rajput

Mr. Arun Kushwah

Dr. R. K. Jain

Dr. Ranjeet Singh Tomar

M. Sateesh Kumar

M. Jai Kumar

M. Nadeem Faisal

Dr. Manish Sharma

Dr. Dinesh Tomar

Mr. Tilok Chauhan

M. Gaurav Verma

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	40	12	60	
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**

Part E

Books	1. O.P. Khanna Industrial Engineering and Management Dhanpat Rai Publishing Co Pvt Ltd, 2. Ravi Shankar Industrial Engineering and Management Galgotia Publications Pvt Ltd, 3. Martand Telsang Industrial Engineering and Management Schand Publications
Articles	
References Books	1 Jay Heizer and Barry Render Operations Management Pearson Education, 2000 2 Mikell P. Groover and Michael M. Grieve Work Systems: The Methods, Measurement & Management of Work Pearson Education, 2013
MOOC Courses	https://onlinecourses.nptel.ac.in/noc22_me04/preview
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	3	3	3	2	3	2	3	3	3	-	2	3	3
CO2	1	2	3	3	3	2	3	2	3	3	3	-	2	3	3
CO3	1	3	2	3	-	-	-	-	-	3	-	-	2	3	3
CO4	-	3	-	3	2	-	2	-	3	3	3	1	3	3	3
CO5	1	3	2	3	-	-	-	-	-	3	3	-	3	3	3
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Dr. Mukesh Kumar Pandey

Dr. M. L. Jain

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Mr. Gaurav Verma

DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS

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NOTICE

The board of studies for the Department of Computer Science & Applications will be held on 04/05/2020. All the BOS members are requested to attend the BOS meeting.

Agenda :

1. Review and approval of the following schemes of examination and syllabus –
2. B.Tech.(CSE) Batch(2017-2021) VII and VIII semester
3. B.Tech.(CSE) Batch(2018-2022) V and VI semester
4. B.Tech.(Hons.)(CSE) Batch(2018-2022) V and VI semester
5. B.Tech.(CSE) Batch(2019-2023) III and IV semester
6. B.Tech.(CSE) Batch(2020-2024) I and II semester
7. B.Tech.+M.Tech(Int)(CSE) Batch(2020-2025) I and II semester
8. B. Tech(CSE) -Specialization in Data Science and Machine learning- Batch(2018-2022) V and VI semester
9. B. Tech(CSE) -Specialization in Data Science and Machine learning- Batch(2019-2023) III and IV semester
10. B. Tech(CSE) -Specialization in Data Science and Machine learning- Batch(2020-2024) I and II semester
11. B. Tech(CSE) -Specialization in Cloud Computing- Batch(2020-2024) I and II semester
12. B. Tech(CSE) -Specialization in Cyber Security - Batch(2020-2024) I and II semester
13. Scheme of Examination and Syllabus of M. Tech(CSE) for batch 2020-2022 have been reviewed and approved.
14. Scheme of Examination and Syllabus of MCA, BCA and BCA (Hons) for batch 2020-2023 have been reviewed and approved. Specializations in data science and cyber security have been introduced in the MCA and BCA(Hons) courses.
15. New courses for B.Tech., BCA, BCA(Hons) and MCA.

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Dated: 04/05/2020

Minutes of Meeting (BOS)

Meeting of Board of Studies of**Department of CSA, School ofEngineering & Technology,** ITM University Gwalior was held on **04/05/2020**via Online platform.The following members were present in the meeting:

S.No.	Name	Designation	Signature
1.	Dr. Ranjeet Singh Tomar	Dean, SOET	
2.	Dr. Sanjay Jain	Chairman, BOS, Dept. of CSA	
3.	Dr. Pallavi Khatri	Member	
4.	Mrs. Geetanjali Surange	Member	
5.	Dr. Shashikant Gupta	Member	
6.	Dr. Arun Yadav	Member	
7.	Dr. Kapil Dave	Member	
8.	Dr. Deepak Motwani		
9.	Mrs.Nidhi Birthare	Member	
10.	Mr. K.K. Joshi	Member	
11.	Mr. H.N. Verma	Member	
12.	Mrs. Kirti Shrivastava	Member	
13.	Mr. Ashish Tripathi	Member	
14.	Mr. Arun Agrawal	Member	
15.	Mr. Neeraj Goyal	Member	
16.	Mr. Pankaj Gugnani	Member	
17.	Dr. Manish Sharma	Invitee Member	

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18.	Dr. Dinesh Singh Tomar	Invitee Member	
19.	Dr. R.S. Jadon, Professor, Dept. of MCA MITS, Gwalior	Expert	
20.	Dr. Vrijendra Singh, Professor Dept. of IT, IIITA	Expert	
21.	Mr. Vishal Jain CEO & Founder, Samatrix Consulting Pvt Ltd Gurgaon, India	Expert	

Following decisions were taken in the BOS meeting:

1. Minutes of last BOS meeting dated 28/01/2019 has been approved.
2. Following Schemes of examination and Syllabus of B.Tech(CSE) have been reviewed and approved.

- B.Tech.(CSE) Batch(2017-2021) VII and VIII semester
- B.Tech.(CSE) Batch(2018-2022) V and VI semester
- B.Tech.(Hons.)(CSE) Batch(2018-2022) V and VI semester
- B.Tech.(CSE) Batch(2019-2023) III and IV semester
- B.Tech.(CSE) Batch(2020-2024) I and II semester
- B.Tech.+M.Tech(Int)(CSE) Batch(2020-2025) I and II semester
- B. Tech(CSE) -Specialization in Data Science and Machine learning- Batch(2018-2022) V and VI semester
- B. Tech(CSE) -Specialization in Data Science and Machine learning- Batch(2019-2023) III and IV semester
- B. Tech(CSE) -Specialization in Data Science and Machine learning- Batch(2020-2024) I and II semester
- B. Tech(CSE) -Specialization in Cloud Computing- Batch(2020-2024) I and II semester
- B. Tech(CSE) -Specialization in Cyber Security - Batch(2020-2024) I and II semester
- Scheme of Examination and Syllabus of M. Tech(CSE) for batch 2020-2022 have been reviewed and approved.
- Scheme of Examination and Syllabus of MCA, BCA and BCA (Hons) for batch 2020-2023 have been reviewed and approved. Specializations in data science and cyber security have been introduced in the MCA and BCA(Hons) courses.
- Scheme and Syllabus of the following new courses are approved :

a. **New Courses in BCA**

Web Designing with PHP	V Semester

Advanced Cloud Computing	VI Semester
Cryptography & Network Security	VI Semester
Data Science Using Python	VI Semester

b. New Courses in BCA(H)

Data Science	V Semester
Cyber Security Fundamentals & Cyber Audit Essentials	V Semester
Digital Forensics & Analytics	VI Semester
Machine Learning	VI Semester

c. New Courses in B.Tech. CSE

Indian Constitution and Traditional Knowledge	III Semester
Universal Human Values	IV Semester
Big Data Analysis	VII Semester
**MOOC	V Semester

Syllabus of new courses are attached in annexure-I.

Note: Further changes in any course introduced by the regularity bodies will be incorporated after the approval of BOS/Academic Council.

(Dr. Sanjay Jain)
Chairman, BOS
Dept. of CSA
ITM University, Gwalior

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Syllabus-2020-2021

(SOET)(BCA)

of the Course	Python Programming
Course Code	BCA-404(T)

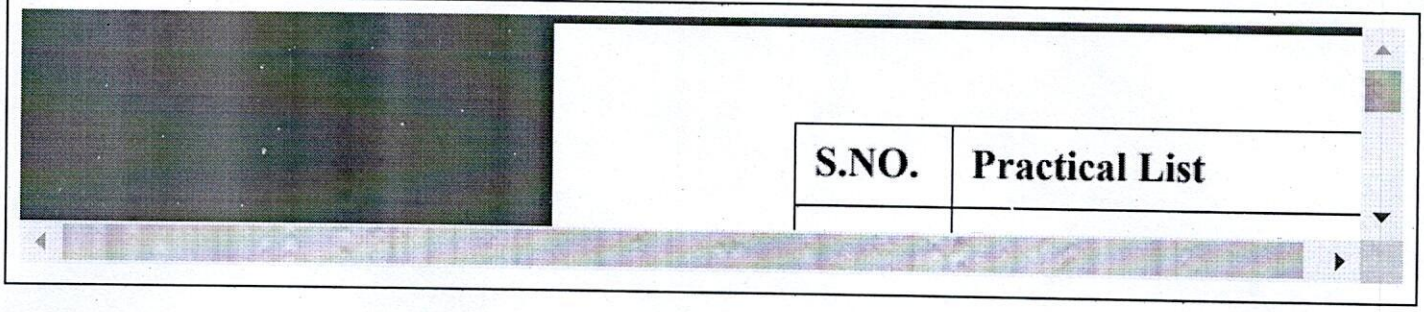
Part A

Year		**Semester**		**Credits**	L	T	P	C
					3	1	2	6
Course Type	Embedded theory and lab							
Course Category	Disciplinary Major							
-Requisite/s				**Co-Requisite/s**				
urse Outcomes Bloom's Level	**CO1-** To remember the basic programming concept.**(BL1-Remember)** **CO2-** Understand the basics of Python like python origin downloading and installing and basic concepts of python.**(BL2-Understand)** **CO3-** Apply the various conditional and looping statement and functional programming. **(BL3-Apply)** **CO4-** Explain various objects numbers and sequence in python Analyze the concept of regular expression**(BL4-Analyze)** **CO5-** Evaluate the concept of object-oriented programming for better utilization of language**(BL5-Evaluate)**							
ures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professional Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG1(No poverty) SDG2(Zero hunger) SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours
Unit 1	Introduction, what is Python, Origin. Overview of programming paradigms Imperative,Functional, logic and object oriented Introduction to Python programming Language Features, Downloading and Installing, Running Python, Python Documentation, Python Basics The print statement, comment, statements and syntax, variable assignments,identifier.	Lectures	6
Unit 2	Python Objects Standard types, other built in types, Internal types Numbers Integer, Double precision floating point, complex numbers, operators Sequences String, List and Tuple. Regular Expressions Introduction/motivation, special symbols and characters for REs, REs and Python.	Lectures	6
Unit 3	If, else, elif, conditional expressions, while, for, break continue, pass, File objects, File built in functions, standards files, command line arguments.Functional programming Creating Functions, Passing Functions, Functional Programming, Scope of variables,introduction to Modules, Modules and Files, Importing Modules, Module Built in functions,packages, and other features of modules.	Experiments	6
Unit 4	Classes, Classes attributes, Instances, Instance attributes, Binding and Method Invocation,Static and Class methods, Inheritance, Built in functions for classes, instances and other	Experiments	6
Unit -5	Introduction, Creating Simple Web Client, Advanced Web Clients, CGI, Building CGI Applications.	PBL	6

Part C



S.NO.	Practical List

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	40	12	60	
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	50	40	20	60	

Part E

Books	Gondaliya, V. (2019, August 30). Programming With Python. Vaibhav Gondaliya.
Articles	
References Books	Hetland, M. L. (2006, November 7). Beginning Python. Apress
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	-	-	2	2	-	-	-	-	1	-	1	-	1
CO2	1	1	-	2	2	2	-	-	-	2	-	-	1	2	3
CO3	-	2	-	-	-	-	-	-	-	-	-	-	3	2	3
CO4	-	2	-	2	1	-	-	-	-	-	-	-	3	2	3
CO5	-	2	-	2	1	-	-	-	-	-	-	-	3	2	3
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Syllabus-2020-2021

(SOET)(BCA)

Title of the Course	Web Designing with PHP
Course Code	BCA-503(T)

Part A

Year		**Semester**		**Credits**	L	T	P	C
					3	1	2	6
Course Type	Lab only							
Course Category	Discipline Electives							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember various syntax rules of any of programming language such as c/C++ **(BL1-Remember)** **CO2-** To understand Object Oriented concepts of PHP and various web development concepts including design a web, Execution of web pages on server and request handling and response. Generation.**(BL2-Understand)** **CO3-** To implement Html, PHP and java script for Programming and mysql for database connectivity and file system.**(BL3-Apply)** **CO4-** To analyze various Database error Handling techniques to learn how to improve the performance of the PHP application.**(BL4-Analyze)** **CO5-** To evaluate and compare various web application Development techniques using PHP concepts.**(BL5-Evaluate)** **CO6-** To develop solutions for real world problems using php and mysql programming.**(BL6-Create)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professional Ethics ✗ Gender ✗ Human Values ✗ Environment ✗		**SDG (Goals)**	SDG1(No poverty) SDG2(Zero hunger) SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours
1	Introducing PHP – history and Basic development Concepts, PHP delimiters, creating user defined variables, data types with php, type casting – Creating first PHP Scripts ,declaring and using constants, Using Variable and Operators ,– Storing Data in variable -Setting and Checking variables Data types, comments with php, useful readymade function of php. Controlling Program Flow: making decision with if, else and switch- writing More Complex Conditional Statements – Repeating Action with Loops and super global variables.	Lectures with whiteboard/PPT, Recorded video, Demonstrations Simulations lab	8
2	Use of html for web design-, html scripts and form elements, embedding php with html ,redirecting web pages, adding dynamic contents, Working with Numeric Functions. Working with Arrays: Storing Data in Arrays –Numerically index array, associative and multi-decisional, array Processing Arrays with Loops and Iterations – Using Arrays with Forms - Working with Array Functions, Array sorting, converting array to scalar variables – Working with Dates and Times.	Lectures with whiteboard/PPT, Recorded video, Demonstrations Simulations lab	8
3	Introduction to file system- file system and uses, saving program data for later using for file system, opening a file, creating and writing to a file closing a file and deletion operation on file, reading data from a file, file handling functions. Processing Directories. String Handling: formatting strings, joining and splitting a string comparing strings matching and replacing substrings, string functions, introduction of php regular expression. Exception Handling: exception handling structure, try…catch…throw	Lectures with whiteboard/PPT, Recorded video, Demonstrations Simulations lab	8
4	Using php Functions and Classes: Introduction to functions. Creating User defined Functions-using parameters, returning values, calling by values versus calling by reference, use of include () and require () functions. Creating php Classes – Using Advanced OOP Concept, creating a php class, object and methods, operations, class attributes, class method invocation, php static hinting, object cloning, inheritance, final keyword, php abstract class and interface.	Lectures with whiteboard/PPT, Recorded video, Demonstrations Simulations lab	8

5	Working with Database : working on MYSQL database, connection php with mysql, creating database tables ,implementing insert delete, update and select query using php script, Session Handling: understanding basic session theory, setting cookies with php, starting a session, registration of session variables, accessing parameter using sessions, destroying variable and session.	Lectures with whiteboard/PPT, Recorded video, Demonstrations Simulations lab	10

Part C

PBL TOPICS

PHP

1. **Simple CMS (Content Management System):**
- Build a basic CMS using PHP where users can create, edit, delete, and manage content (e.g., articles, blog posts).
- Include features like user authentication, role-based access control, and a WYSIWYG editor for content creation.

2. **Online Quiz System:**
- Develop an online quiz application where users can take quizzes on various topics.
- Implement features such as user registration, quiz creation, multiple-choice questions, scoring, and result display.

3. **Online Task Management System:**
- Create a task management application where users can create tasks, assign them to others, set deadlines, and track progress.
- Include features like user authentication, task categorization, priority levels, and status updates.

4. **E-commerce Website:**
- Build a simple e-commerce platform using PHP where users can browse products, add them to cart, and make purchases.
- Implement features like user registration, product catalog, shopping cart functionality, and payment integration (e.g., PayPal).

5. **OnlineStudent Information System:**
- Develop a student information system for managing student records, course details, grades, and attendance.
- Include features such as user authentication, student enrolment, course registration, and grade management.

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	40	12	60	
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	50	40	20	60	

Part E

Books	VIKRAM VASWANI PHP A Beginner's Guide Tata McGraw Hill
Articles	Steven Holzner The PHP Complete Reference – Tata McGraw Hill
References Books	Lynn Beighley (Author), Michael Morrison (Author) Head Fist PHP & MySQL: A Brain-Friendly Guide O'Reilly Publication
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	1	-	-	-	-	-	-	-	-	-	1	2	3
CO2	1	3	-	1	-	-	-	-	-	-	-	-	2	1	2
CO3	-	-	2	1	-	-	-	-	-	-	-	-	3	2	1
CO4	1	2	-	2	-	-	-	-	-	-	-	-	2	2	1
CO5	-	2	1	1	-	-	-	-	-	-	-	-	2	1	1
CO6	-	2	-	-	-	-	-	-	-	-	-	-	3	1	1

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CELEBRATING DREAMS

Syllabus-2020-2021

(SOET)(BCA)

Title of the Course	Advanced Cloud Computing
Course Code	BCA-604-A(T)

Part A

Year		**Semester**		**Credits**	L	T	P	C
					3	1	1	5
Course Type	Theory only							
Course Category	Discipline Core							
Pre-Requisite/s	Concepts of Information Technology, Database Management Systems, Data Structures and Operating System.			**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** CO1: To remember the concepts of Cloud Computing, Virtualization, and data intensive cloud computing. **(BL1-Remember)** **CO2-** CO2: To understand the Basic concept of Computer networks, Cloud Computing, BigData and various Cloud Web Services for different applications. **(BL2-Understand)** **CO3-** CO3: To apply various virtualization tools in cloud computing.**(BL3-Apply)** **CO4-** CO4: To analyze the current issues in cloud computing like its security, energy efficiency and data handling for different business areas.**(BL4-Analyze)** **CO5-** CO5: To evaluate and deploy various applications in Cloud Computing environment to solve real world problems.**(BL6-Create)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professional Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG1(No poverty) SDG2(Zero hunger) SDG3(Good health and well-being) SDG4(Quality education) SDG6(Clean water and sanitation) SDG7(Affordable and clean energy) SDG11(Sustainable cities and economies) SDG13(Climate action)				

Part B

Modules	Contents	Pedagogy	Hours
Unit I	Overview of Cloud Computing - Vision of cloud computing, Defining a cloud, cloud computing reference model, Historical developments, Cloud computing services, types of clouds, Characteristics, benefits and cloud computing challenges.	interactive lectures and case studies	7
Unit II	Virtualization - Introduction, Characteristics of virtualized environments, Taxonomy of virtualization techniques, Pros and cons of virtualization, Technology- Xen, VMware, Microsoft Hyper-V, Economics of the cloud, Federation, Presence, Identity, and Privacy in the Cloud-Federation in the Cloud, Presence in the Cloud, Privacy and Its relation to Cloud-Based Information Systems, Secure Software Development Life Cycle (SecSDLC).	interactive Lectures, Case Study	10
Unit III	High throughput Computing - Data-Intensive Computing-Introduction, characterizing data-intensive computations, Historical perspective, Challenges ahead, Technologies for data-intensive computing, Concept of multi-cloud management, Challenges in managing heterogeneous clouds, benefits and advantages of multi-cloud management systems. Implementing Multi-Cloud Management System (e.g. RightScale Cloud Management System).	Case Based Assignments, Report Writing, Case Study	10
Unit IV	Business Clouds - Cloud Computing in Business, Various Biz Clouds focused on industry domains, Amazon Web Services, Google AppEngine, Microsoft Azure. Scientific Applications-Healthcare: ECG Analysis in the Cloud, Geoscience: Satellite Image Processing, Business and Consumer Applications- CRM and ERP, Productivity, Social Networking, Media Applications, Multiplayer Online Gaming.	Application Based Activity, Project Based Activity, Online Certification	10
Unit V	Future directions in Cloud Computing - Future technology trends in Cloud Computing with a focus on Cloud service models, deployment models, cloud applications, and cloud security. Energy efficiency in clouds, Market-based management of clouds, Third-party cloud services, Current issues in cloud computing leading to future research directions.	Research Articles, case study	8

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Unit I-V	Review Paper	Research Paper Presentation	BL4-Analyze	30
Unit I-V	Case Study	Case Study	BL3-Apply	10

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	40	12	60	0
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	50	40	20	60	

Part E

Books	Buyya, R. K., Vecchiola, C., & Selvi, S. T. (2013). Mastering Cloud Computing. Tata McGraw-Hill. Rittinghouse, J. W., & Ransome, J. F. (2010). Cloud Computing. CRC Press.
Articles	Srivastava, P., & Khan, R. (2018). A review paper on cloud computing. International Journal of Advanced Research in Computer Science and Software Engineering, 8(6), 17-20. Birje, M. N., Challagidad, P. S., Goudar, R. H., & Tapale, M. T. (2017). Cloud computing review: concepts, technology, challenges and security. International Journal of Cloud Computing, 6(1), 32-57.
References Books	Hwang, K., Fox, G. C., & Dongarra, J. J. (2012). Distributed and Cloud Computing. Elsevier India.
MOOC Courses	https://onlinecourses.nptel.ac.in/noc24_cs118/preview
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	-	-	-	2	2	-	-	-	1	-	-	3	2	3
CO2	3	1	1	2	2	3	-	-	-	1	-	-	3	-	3
CO3	3	3	1	-	2	2	-	-	-	-	-	-	3	3	3
CO4	3	3	-	2	2	-	-	-	-	-	1	-	3	3	3
CO5	2	3	-	1	2	-	-	-	-	-	1	-	3	3	3
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Syllabus-2020-2021

(SOET)(BCA)

Title of the Course	Cryptography & Network Security
Course Code	BCA-604-B(T)

Part A

Year		**Semester**		**Credits**	L	T	P	C
					3	1	1	5
Course Type	Embedded theory and lab							
Course Category	Discipline Electives							
Pre-Requisite/s	A strong understanding of mathematical principles, such as linear algebra, number theory, and combinatorics.			**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** : Remembering/Revising the basics of computer system, Computer networks and network security**(BL1-Remember)** **CO2-** : Understand the Cryptography and Encryption techniques and the concepts of Hashing **(BL2-Understand)** **CO3-** : Apply the various Symmetric and Asymmetric Key Encryption algorithms**(BL3-Apply)** **CO4-** : Explain the various Encryption and Hashing techniques and analyze the concept of Digital Signatures, IP Security**(BL4-Analyze)** **CO5-** : Evaluating the various methods of Cryptography, Hash functions, Substitution and Transposition techniques**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✕ Professional Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG1(No poverty) SDG2(Zero hunger) SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours
1	Introduction and History of Cryptography: Cryptography, History of Cryptography, Mono-Alphabet Substitution, Multi-Alphabet Substitution, Homophonic Substitution, Null Ciphers, Book Ciphers, Rail Fence Ciphers, Vernam Cipher, The Enigma Machine	Lecturing	8
2	Symmetric Cryptography and Hashes: Symmetric Cryptography,Information Theory,Kerckhoffs's Principle,Substitution,Transposition,Binary Math,Block Cipher vs. Stream Cipher,Symmetric Block Cipher Algorithms,Basic Facts of the Feistel Function,S-Box,Data Encryption Standard (DES),Advanced Encryption Standard (AES),International Data Encryption Algorithm (IDEA),Tiny Encryption Algorithm (TEA),Symmetric Algorithm Methods,Symmetric Stream Ciphers,Hash Function	Lecturing, Experiments	8
3	Symmetric Cryptography and Hashes: Symmetric Cryptography,Information Theory,Kerckhoffs's Principle,Substitution,Transposition,Binary Math,Block Cipher vs. Stream Cipher,Symmetric Block Cipher Algorithms,Basic Facts of the Feistel Function,S-Box,Data Encryption Standard (DES),Advanced Encryption Standard (AES),International Data Encryption Algorithm (IDEA),Tiny Encryption Algorithm (TEA),Symmetric Algorithm Methods,Symmetric Stream Ciphers,Hash Function	Lecturing, Experiments	8
4	Applications of Cryptography: Digital Signatures, Certificate Authority (CA), Registration Authority (RA) , Certificate Authority – Verisign, Certificate Types, Public Key Infrastructure (PKI), Digital Certificate Terminology, Server-based Certificate Digital Certificate Management, Trust Models, Certificates and Web Servers, Microsoft Certificate Services, Windows Certificates: certmgr.msc, Authentication, Kerberos, PGP Certificates, Wi- Fi Encryption, SSL,TLS, Virtual Private Network (VPN), Split Tunneling, VPN Modes, Encrypting Files, BitLocker, Common Cryptography: Mistakes, Steganography, Steganalysis, Unbreakable Encryption	Lecturing, Experiments	8
5	Cryptanalysis, Quantum Computing and Cryptography: Breaking Ciphers, Cryptanalysis, Frequency Analysis, Kasiski, Cracking Modern Cryptography, Linear Cryptanalysis, Differential Cryptanalysis,	Lecturing	8

	Integral Cryptanalysis, Cryptanalysis Resources, Cryptanalysis Success Rainbow Tables, Password Cracking Quantum Computing and Cryptography, Timeline, Issues for QC, Two Branches, NIST, Lattice Based Crypto, GGH, NTRU		

Part C

Activity I

(Cryptography and Network Security)

Activity type: Review Article

Individual Activity

Mode of submission: online & Hard Copy

Maximum Marks: 15

Guidelines:

1. Each student must prepare a review article and presentation on the assigned topic / Domain.
2. Student Can Search Article at Following Link –
   a. Google Scholar - https://scholar.google.com/
   b. Web of Science - https://mjl.clarivate.com/search-results
   c. SCI Hub - https://sci-hub.sc/
3. Each student has to prepare the review article in IEEE paper format in a word file with at least 10 pages and 20 references and a power point presentation having at least 15 slides.
   Source : https://www.ieee.org/conferences/publishing/templates.html
4. The article must have plagiarism less than 15% checked using Turnitin Tool (Consult the faculty coordinator for the same)
5. Each paper should have at least 20 research paper references, all the references must be cited in IEEE format.
   (source : https://researchmethod.net/references-in-research/)
6. All the figures, diagrams, images or tables must also be cited.
7. This is an individual activity so each student has to work on a different topic.

Activity II

(Cryptography and Network Security)

Activity type: Seminar & Presentation

Individual Activity

Mode of submission: online & Hard Copy **Maximum marks: 10**

Guidelines:

1. Each student must select a topic for presentation from the syllabus of MCA-205 cryptography.
2. Student must prepare a report and a presentation in power point on the selected topic coveringthe syllabus.
3. Each student has to prepare a report in word file with at least 10 pages and a power pointpresentation having at least 15 slides.
4. The time allocated for presentation to each of the student is 7 mins. And for Q/A 3 minutes.
5. The student must carry or arrange from the lab, the equipment / software / tools required forpresentation on the day of respective activity.
6. The final hard copy submitted should be a file carrying all Introduction, Report and print out ofppt.
7. This is an individual activity so each student has to work on a different topic.

(Cryptography and Network Security)

Practical List

Set – A

Marks : 20

***Submit their program code with screenshots of output by taking different- different inputs.**

[1] Implement Caesar cipher (K=2) in any preferred language.

[2] Implement monoalphabetic cipher in any preferred language.

[3] W.A.P to implement Euclidean Algorithm

[4] Implement Playfair cipher in any preferred language.

[5] Implement Rail Fence technique (rail=2) in any preferred language.

[6] W.A.P to implement Vigenère Algorithm

[7] W.A.P to implement the DES Logic,

[8] Implement the MD5 Algorithm.

[9] W.A.P to implement the Digital Signature Algorithm

[10] W.A.P to create a tool for encryption and decryption technique with time calculation.

Set – B

Marks : 20

***Submit their program code with screenshots of output by taking different- different inputs.**

[1] Implement Caesar cipher (K=2) in any preferred language.

[2] Implement monoalphabetic cipher in any preferred language.

[3] W.A.P to implement Euclidean Algorithm

[4] Implement Playfair cipher in any preferred language.

[5] Implement Rail Fence technique (rail=2) in any preferred language.

[6] W.A.P to implement Vigenère Algorithm

[7] W.A.P to implement the DES Logic,

[8] Implement the MD5 Algorithm.

[9] W.A.P to implement the Digital Signature Algorithm

[10] W.A.P to create a tool for encryption and decryption technique with time calculation.

Set – C

Marks : 20

***Submit their program code with screenshots of output by taking different- different inputs.**

[1] Implement Caesar cipher (K=5) in any preferred language.

[2] Implement Column Transposition in any preferred language.

[3] W.A.P to implement Diffie Hellman key exchange.

[4] Implement Polyalphabetic cipher in any preferred language.

[5] Implement Rail Fence technique (rail=4) in any preferred language.

[6] W.A.P to implement vernam Algorithm

[7] W.A.P to implement the IDEA algorithm.

[8] Implement the SHA-512 Algorithm.

[9] W.A.P to implement the RSA Algorithm

[10] W.A.P to create a tool for encryption and decryption technique with time calculation.

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	40	12	60	
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	50	40	20	60	

Part E

Books	Stallings, W. (2011). Cryptography and network security principles and practices. Prentice Hall.
Articles	Forouzan, B. A., & Mukhopadhyay, D. (2011). Cryptography and network security. Tata Mcgraw Hill Education Private Ltd.
References Books	Kahate, A. (2011). Cryptography and network security. Tata Mcgraw Hill education Private Ltd.
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	1	-	1	1	-	-	-	-	-	-	-	1	-	1
CO2	-	1	2	-	3	-	-	1	-	-	-	-	1	-	2
CO3	-	1	-	-	1	-	-	1	-	-	-	-	3	-	3
CO4	-	-	-	-	1	-	1	-	-	-	-	-	2	1	2
CO5	-	1	-	-	2	2	1	-	-	-	-	-	2	2	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Syllabus-2020-2021

(SOET)(BCA)

Title of the Course	Data Science Using Python
Course Code	BCA-604-C(P)

Part A

Year		**Semester**		**Credits**	L	T	P	C
					3	1	1	5
Course Type	Embedded theory and lab							
Course Category	Discipline Electives							
Pre-Requisite/s			**Co-Requisite/s**					
Course Outcomes & Bloom's Level	**CO1-** To remember the basic programming concept.**(BL1-Remember)** **CO2-** To understand the Basic concept of Data science, application areas and tools for data science**(BL2-Understand)** **CO3-** To implement Numpy for handling numerical data, pandas for handling data and basic and advanced visualization techniques to visualize the data. **(BL3-Apply)** **CO4-** To analyze the different domains of data, and perform cleaning and other preprocessing tasks on the data. **(BL4-Analyze)** **CO5-** To evaluate and summarize the data using statistical & visualization tools;**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✗ Employability ✓ Professional Ethics ✗ Gender ✗ Human Values ✗ Environment ✗		**SDG (Goals)**	SDG1(No poverty) SDG12(Responsible consuption and production)				

Part B

Modules	Contents	Pedagogy	Hours
1	Introduction to Data Science, Ontology of Data Science , Difference between types of Analytics , Requirement gathering, Applications and tolls of Data Science project management , Data Structures, Functions, OOP and Time Complexity	lecturing	1
2	Probability and Stats, Central tendency theorem, Types of distribution, Bayes Theorem, SciPy Stack NumPy, pandas	lecturing,Experiment	1
3	Statistics, Probability, Calculus and Linear Algebra, Analysis of Variance-Anova.	lecturing,Experiment	1
4	Data Visualization- matplotlib, Seaborn, ggplot, Data Visualization-plotly,diffrent types of charts,module,packages for data science and cleaning KDD Process	lecturing,Experiment	1
5	Descriptive Statistics, Univariate and Multivariate Exploratory Data Analysis,Different types of Machine leaning	PBL	1

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	40	12	60	
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	50	40	20	60	

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Syllabus-2020-2021

(SOET)(BTech-ComputerScience)

Title of the Course	Big Data Analysis
Course Code	CSE0778[T]

Part A

Year		**Semester**		**Credits**	L	T	P	C
					3	0	1	4
Course Type	Embedded theory and lab							
Course Category	Discipline Core							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** Understand the concept and challenges of Big data.**(BL1-Remember)** **CO2-** Demonstrate knowledge of big data analytics.**(BL2-Understand)** **CO3-** develop Big Data Solutions using Hadoop Eco System**(BL3-Apply)** **CO4-** analyze gain hands-on experience on large-scale analytics tools.**(BL4-Analyze)** **CO5-** analyze the social network graphs.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professional Ethics ✕ Gender ✕ Human Values ✕ Environment ✕	**SDG (Goals)**	SDG1(No poverty) SDG2(Zero hunger) SDG4(Quality education)					

Part B

Modules	Contents	Pedagogy	Hours
1	Introduction to Big data, Big data characteristics, Types of big data, Traditional versusBig data, Evolution of Big data, challenges with Big Data, Technologies available for BigData, Infrastructure for Big data, Use of Data Analytics, Desired properties of Big Data system.	Whiteboard, PPT, Programming Labs	8
2	: Introduction to Hadoop, Core Hadoop components, Hadoop Eco system, HivePhysical Architecture, Hadoop limitations, RDBMS Versus Hadoop, Hadoop Distributed Filesystem, Processing Data with Hadoop, Managing Resources and Application with HadoopYARN, MapReduce programming.	Whiteboard, PPT, Programming Labs	8
3	Introduction to Hive Hive Architecture, Hive Data types, Hive Query Language, Introduction to Pig, Anatomy of Pig, Pig on Hadoop, Use Case for Pig, ETL Processing, Datatypes in Pig running Pig, Execution model of Pig, Operators, functions, Data types of Pig.	Whiteboard, PPT, Programming Labs	8
4	Introduction to NoSQL, NoSQL Business Drivers, NoSQL Data architectural patterns,Variations of NOSQL architectural patterns using NoSQL to Manage Big Data, Introductionto MangoDB	Whiteboard, PPT, Programming Labs	8
5	Mining social Network Graphs: Introduction Applications of social Network mining,Social Networks as a Graph, Types of social Networks, Clustering of social Graphs DirectDiscovery of communities in a social graph, Introduction to recommender system.	Whiteboard, PPT, Programming Labs	8

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1-2	Assignment	Experiments	BL2-Understand	7
3-4	Activity	Experiments	BL3-Apply	8
1-5	Project	PBL	BL6-Create	20

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	40	20	60	0
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	50	40	20	60	0

Part E

Books	RadhaShankarmani, M. Vijaylakshmi Big Data Analytics Wiley, Second edition
Articles	Seema Acharya, SubhashiniChellappan Big Data and Analytics Wiley, Firstedition
References Books	KaiHwang,Geoffrey C., Fox. Jack, J. Dongarra Distributed and Cloud Computing Elsevier, Firstedition
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	1	-	1	-	-	-	-	-	-	-	2	1	3
CO2	1	1	1	3	-	-	-	-	-	-	-	-	1	2	1
CO3	1	2	1	-	1	-	-	-	-	-	-	-	3	1	1
CO4	2	1	1	2	-	-	-	-	-	-	-	-	2	3	3
CO5	-	2	1	-	2	-	-	-	-	-	-	-	3	3	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	2	3	1

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Syllabus-2020-2021

(SOET)(BTech-ComputerScience)

Title of the Course	Machine learning
Course Code	CSL0777[T]

Part A

Year		**Semester**		**Credits**	L	T	P	C
					3	1	1	5
Course Type	Embedded theory and lab							
Course Category	Discipline Core							
Pre-Requisite/s	Basic understanding of Statistical Data Analysis and visualization methods, and Python Programming.			**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To understand Basic concept of machine learning, various machine learning models**(BL1-Remember)** **CO2-** To understand various Performance evaluation techniques of Machine Learning models. **(BL2-Understand)** **CO3-** To implement various supervised, unsupervised and reinforcement machine Learning Models **(BL3-Apply)** **CO4-** To train & test various machine Learning models using different domains of dataset. **(BL4-Analyze)** **CO5-** To evaluate and summarize the performance of various machine learning models using statistical & visualization tools**(BL5-Evaluate)** **CO6-** To create machine learning models to solve real world problems.**(BL6-Create)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professional Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG1(No poverty) SDG2(Zero hunger) SDG4(Quality education) SDG5(Gender equality) SDG8(Decent work and economic growth)				

Part B

Modules	Contents	Pedagogy	Hours
1	**Introduction of Machine Learning**: What is Machine Learning, Need for Machine Learning, Why & When to Make Machines Learn?, Machine Learning Model, Challenges in Machines Learning, Applications of Machines Learning, Overview of various machine Learning Algorithms, Performance evaluation measures for machine learning algorithms, the curse of dimensionality, Data Feature Selection, Training Data vs. Validation Data vs. Test Data for ML Algorithms, bias-variance trade off, over fitting vs under fitting	Lectures with PPT, Experiments	9
2	Supervised Learning-I Regression: Introduction to Regression, Types of Regression Models, Introduction to Linear Regression, Simple Linear Regression, Least square regression, Gradient Descent , Multiple Linear Regression (MLR), Regularization in Linear Regression, Ridge regression, Lasso regression, Polynomial Regression, Support Vector for Regression (SVR).	Lectures with PPT, Experiments	10
3	**Supervised Learning-II** **Classification –** Introduction to Classification, Types of Learners in Classification, Logistic Regression, K-Nearest Neighbors (K-NN), Support Vector Machine (SVM), Kernel SVM, Naive Bayes, Decision Tree Classification, Random Forest Classification	Lectures with PPT, Experiments	9
4	**Unsupervised Learning** **Clustering-** Introduction to Clustering, Types of Clustering, Types of Clustering Algorithms, K-Means Clustering, Hierarchical Clustering, DBSCAN Clustering, **Association Rule Learning :** Introduction to Association Rule Learning, Types of Association Rule Learning, Apriori Algorithm, Eclat Algorithm, F-P Growth Algorithm, Applications of Association Rule Learning	Lectures with PPT, Experiments	9

5	Reinforcement Learning: Introduction of Reinforcement Learning, Terms used in Reinforcement Learning, Key Features, Elements of Reinforcement Learning, How does Reinforcement Learning Work?, The Bellman Equation, Types of Reinforcement learning, Markov Decision Process, Reinforcement Learning Algorithms, Reinforcement Learning Applications Performance Improvement ofML Models: Performance Improvement with Ensembles, Ensemble Learning Methods, Bagging Ensemble Algorithms, Boosting Ensemble Algorithms ,Voting Ensemble Algorithms,	Lectures with PPT, Experiments	8

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	**Experiment** 1. Data Preprocessing using Pandas and numpy library in Python. 2. Performance evaluation of Supervised Learning Regression techniques. 3. Performance evaluation of Supervised Learning Classification techniques. 4. Data Features Selection Techniques Lab using Python. 5. Implementation of Linear Regression using Least Squares method using Python 6. Implementation of Linear Regression using Gradient Descent using Python 7. Implementation of Simple Linear Regression using Python 8. Implementation of Multiple Linear Regression using Python 9. Implementation of Regularization with Lasso and Ridge regression using Python 10. Implementation of Polynomial Regression using Python 11. Implementation of Support Vector Regression using Python 12. Implementation of Logistic Regression for classification problem using Python 13. Implementation of KNN for classification problem using Python 14. Implementation of SVM for classification problem using Python 15. Implementation of Naïve Bayes Classifier for classification problem using Python 16. Implementation of Decision Tree Classifier for classification problem using Python 17. Implementation of Random Forest Classifier for classification problem using Python 18. Implementation of K-mean Clustering for unlabeled dataset using Python 19. Implementation of Agglomerative Hierarchical Clustering for unlabeled dataset using Python 20. Implementation of DBSCAN Clustering for unlabeled dataset using Python 21. Implementation of Apriori Algorithm for Market Basket Analysis using Python 22. Implementation of Q learning reinforcement learning algorithm.	Experiments	BL3-Apply	02

2	Implementation of various regression models of machine learning	Experiments	BL3-Apply	04
3	Implementation of various classification models of machine learning	Experiments	BL3-Apply	03
4	Implementation of various clustering models of machine learning	Experiments	BL3-Apply	03
5	Implementation of RL, bagging and boosting models of machine learning	Experiments	BL3-Apply	03
1-5	Problem Based Learning based on real world problems	PBL	BL6-Create	15

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	40	12	60	
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	50	40	20	60	

Part E

Books	Andreas C. Müller, Sarah Guido.(2016).Introduction to Machine Learning with Python: A Guide for Data Scientists.1st ed.O'Reilly Media.
Articles	
References Books	Tom M. Mitchell.(2017).Machine Learning.1st ed.McGraw Hill Education. Dr S. Sridhar, Dr M. Vijayalakshmi.(2021).Machine Learning.1st ed. Oxford University Press. Manaranjan Pradhan, U Dinesh Kumar.(2019).Machine Learning using Python.1st ed. Wiley India.
MOOC Courses	Prof. S. Sarkar.(2023).Introduction to Machine Learning, IIT Kharagpur.https://nptel.ac.in/courses/106105152 Dr. Balaraman Ravindran.(2024).Introduction to Machine Learning, IIT Madras.https://nptel.ac.in/courses/106106139
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	-	-	-	2	2	-	-	-	2	-	-	1	-	1
CO2	1	2	1	2	2	2	-	-	-	2	-	-	1	-	3
CO3	2	1	1	-	1	-	-	-	-	-	-	-	3	2	3
CO4	2	2	-	2	1	-	-	-	-	-	-	-	2	3	3
CO5	2	2	-	2	1	-	-	-	-	-	-	-	2	2	3
CO6	2	1	1	2	2	-	-	-	-	2	-	-	2	2	3

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CELEBRATING DREAMS

Syllabus-2020-2021

(SOET)(BTech-ComputerScience)

Title of the Course	Indian Constitution and Traditional Knowledge
Course Code	MCL0303[T]

Part A

Year		**Semester**		**Credits**	L	T	P	C
					2	1	0	3
Course Type	Theory only							
Course Category	Ability Enhancement Courses							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** CO1: To familiarize the students with the key elements of the Indian constitution **(BL2-Understand)** **CO2-** CO2: To enable students to grasp the constitutional provisions and values**(BL2-Understand)** **CO3-** CO3: To acquaint the students with the powers and functions of various constitutional offices and institutions**(BL3-Apply)** **CO4-** CO4: To make students understand the basic premises of Indian politics and role of constitution and citizen-oriented measures in a democracy**(BL2-Understand)**							
Coures Elements	Skill Development ✕ Entrepreneurship ✕ Employability ✕ Professional Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG5(Gender equality) SDG17(Partnerships for the goals)				

Part B

Modules	Contents	Pedagogy	Hours
I	Introduction: Indian Constitution: Making and basic premise • Meaning and Significance of Constitution. • Preamble and Salient features of the Indian Constitution. • Sources of Indian constitution. • Fundamental Rights, Fundamental Duties. Directive Principles	Whiteboard, PPT, Video	6
II	Union and State Government • President of India- Election, Powers and functions • Prime Minister and Cabinet – Structure and functions • Governor- Powers and functions • Chief Minister and Council of Ministers – Functions	Whiteboard, PPT, Programming Labs	6
III	Legislature and Judiciary • Parliament – Lok Sabha and Rajya Sabha – Composition and powers • State Legislative Assembly and Legislative Council – Composition and powers • Judicial System in India – Structure and features • Supreme Court and High Court: Composition, Jurisdiction.	Whiteboard, PPT, Programming Labs	6
IV	Governance and Constitution • Federalism in India – Features • Local Government - Panchayats –Powers and functions; 73rd and 74th amendments • Election Commission – Composition, Powers and Functions; Electoral Reforms • Citizen oriented measures – RTI and PIL – Provisions and significance.	Whiteboard, PPT, Programming Labs	6
V	Miscellaneous • Emergency Provision • Amendment of Constitution • Special Provisions regarding some states • Center-State Relationship • Writs	Whiteboard, PPT, Programming Labs	6

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
I	Industrial Visit and Final Presentation and Report	Internships	BL5-Evaluate	150

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	40	12	60	0
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**

Part E

Books	Pandey, J. N. (2018). The Constitutional Law of India (55th ed.). Allahabad: Central Law Agency. Basu, D. D. (2018). Introduction to the Constitution of India (23rd ed.). Gurgaon: LexisNexis.
Articles	
References Books	Jain, M. P. (2017). Indian Constitutional Law (1st ed.). McGraw Hill Education.
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	-	-	-	2	1	-	-	2	-	-	-	-	-
CO2	1	1	-	-	-	1	-	1	-	-	2	-	-	-	-
CO3	2	1	-	-	-	2	-	2	-	-	1	-	-	-	-
CO4	1	2	-	-	-	1	-	1	-	-	2	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Syllabus-2020-2021

(SOET)(BTech-ComputerScience)

Title of the Course	Universal Human Values
Course Code	MCL0402[T]

Part A

Year		**Semester**		**Credits**	L	T	P	C
					2	1	0	3
Course Type	Theory only							
Course Category	Humanities, Social Sciences and Management							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** CO1: To help the students appreciate the essential complimentarily between "VALUES" and "SKILLS" to ensure sustained happiness and prosperity which are the core aspirations of all human beings.**(BL2-Understand)** **CO2-** CO2: To facilitate the development of a holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the human reality and the rest of existence. **(BL2-Understand)** **CO3-** CO3: To highlight plausible implications of such a holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behavior and enriching interactions with nature. **(BL3-Apply)** **CO4-** CO4: To provide a much-needed orientation input in value education to the young enquiring minds.**(BL4-Analyze)**							
Coures Elements	Skill Development ✕ Entrepreneurship ✕ Employability ✕ Professional Ethics ✕ Gender ✕ Human Values ✓ Environment ✕		**SDG (Goals)**	SDG1(No poverty) SDG3(Good health and well-being) SDG4(Quality education) SDG5(Gender equality) SDG10(Reduced inequalities)				

Part B

Modules	Contents	Pedagogy	Hours
I	Introduction to Value Education • Value education: Concept, Need and Process • Self-Exploration- what is it? – its content and process • The basic human aspirations- continuous happiness and prosperity • Method to fulfill the basic human aspiration • Right understanding, Relationship and Physical facility	Whiteboard, PPT, Video	6
II	Understanding Harmony in the Human Being- Harmony in Myself • Understanding human being as a co-existence of sentient 'I' and material 'Body' • Understanding the needs of ('I') and 'Body' – 'Sukh' and 'Suvidha' • Understanding body as an instrument of 'I' ('I' being the seer, doer and enjoyer) • Understanding the Harmony of 'I' with the Body- 'Sanyam' and 'Swasthya';correct appraisal of physical needs, meaning of prosperity in detail. • Program to ensure Sanyam and Swasthya.	Whiteboard, PPT, Programming Labs	6
III	Understanding the Harmony in Family and Society- harmony in Human-Human Relationship • Family as basic unit of human interactions and values in Relationships. • Understanding the harmony in Society (society being extension of family): Resolution, Prosperity, fearlessness(trust) and co-existence as comprehensive Human Goals. • Vision of the Universal Human Order • Understanding the meaning of Trust; difference between Intention and Competence. • Understanding the meaning of Respect, difference between Respect and Differentiation; the other salient values in relationship.	Whiteboard, PPT, Programming Labs	6
IV	Understanding the Harmony in the Nature and Existence – Whole Existence as Coexistence • Understanding the harmony in Nature • Interconnectedness and mutual fulfilment among the four orders of nature recyclability and self-regulation in Nature • Understanding Existence as Co-existence of mutually interacting units in all-pervasive space • Holistic perception of harmony at all levels of existence	Whiteboard, PPT, Programming Labs	6
V	Professional Ethics • Definitiveness of Ethical Human Conduct • Providing the basis for Universal Human Values and ethical Human conduct • Professional ethics in the light of right Understanding • Competence in Professional ethics • Strategies for transition towards Value-based life and profession.	Whiteboard, PPT, Programming Labs	6

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100		40	12	60	0
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
	0				

Part E

Books	Naagarazan, R. S. (2020). A Textbook on Professional Ethics and Human Values (1st ed.). New Age International Private Limited. Gaur, R. R., Asthana, R., & Bagaria, G. P. (2019). A Foundation in Human Values and Professional Ethics (2nd ed.). Excel Books.
Articles	
References Books	Mazumdar, Prof. (2013). Values and Ethics in Profession (3rd ed.). Everest Publishing House. Tripathi, A. N. (2004). Human Values. New Age International Publishers.
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	-	-	-	-	-	-	-	2	-	-	1	1	1	2
CO2	-	2	-	-	-	-	-	-	-	-	2	2	1	2	-
CO3	1	-	-	-	-	-	-	-	2	-	-	1	-	1	1
CO4	-	2	-	-	-	-	-	-	-	-	2	2	1	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Syllabus-2020-2021

(SOET)(BTech-ComputerScience)

Title of the Course	**MOOC
Course Code	MOOC-05[P]

Part A

Year		**Semester**		**Credits**	L	T	P	C
					0	0	1	1
Course Type	Theory only							
Course Category	Generic Elective							
Pre-Requisite/s	Should be acquainted with the basics knowledge of General Awareness about Leadership Quality, Personality Development, Defense system etc.		**Co-Requisite/s**					
Course Outcomes & Bloom's Level	**CO1-** To Remember about the history of NCC, its organization, and incentives of NCC for their career prospects and the concept of national integration and its importance.**(BL1-Remember)** **CO2-** To Understand the concept of critical & creative thinking and the concept of self-awareness and emotional intelligence.**(BL2-Understand)** **CO3-** To Acquire knowledge of duties and conduct of NCC cadets.**(BL3-Apply)** **CO4-** To analyze the concept of team and its functioning.**(BL4-Analyze)** **CO5-** To Evaluate the process of decision making & problem solving.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✗ Entrepreneurship ✗ Employability ✗ Professional Ethics ✓ Gender ✗ Human Values ✓ Environment ✗		**SDG (Goals)**	SDG1(No poverty) SDG6(Clean water and sanitation) SDG15(Life on land)				

Part B

Modules	Contents	Pedagogy	Hours
Unit 1- NCC General (N)	History of NCC, Aims and Objectives of NCC. Organization &Training. NCC Song, Motto of NCC - Motivation of Cadets.	Lecture with ppt., Diagrams, Flowchart depiction on whiteboard during online/offline lectures, Audio/Video clips, discussion (questions & answers section)	6
Unit 2- NCC Organization	NCC as Organization, Incentives of NCC, Duties of NCC Cadet. NCC Camps: Types & Conduct. Preparation and participation. Rank of officers and cadets.	Whiteboard, PPT, Video Case Study, Project Based Activity, Application Based Activity	6
Unit 3- National Integration (NI) & Awareness	National Integration: Importance & Necessity, Factors Affecting National Integration, Unity in Diversity & Role of NCC in Nation Building, Threats to National Security	Audio/Video clips, group discussion, lecture with ppt, classroom presentations	6
Unit 4- Personality Development	Intra & Interpersonal skills - Self-Awareness- &Analysis, Empathy, Critical & creative thinking, Decision making and problem solving.	Lecture with ppt., Diagrams, Flowchart depiction on whiteboard during online/offline lectures, Audio/Video clips, Group discussion.	6
Unit 5- Social Service and Community Development	Basics of social service and its need, Types of social service activities, Objectives of rural development programs and its importance, NGO's and their contribution in social welfare, contribution of youth and NCC in Social welfare.	Lecture with ppt., Diagrams, Flowchart depiction on whiteboard during online/offline lectures, Audio/Video clips, Group discussion.	6

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1-5	PBL	PBL	BL5-Evaluate	45

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	40	12	60	0
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	50	40	20	60	0

Part E

Books	Cadets training handbook common subjects (2017), D.G NCC Delhi-110030
Articles	https://indiancc.mygov.in/activity/snehahoro/article-on-ncc-camp-and-training/
References Books	DG, NCC Training directive
MOOC Courses	
Videos	https://www.youtube.com/watch?v=Am1Cs0DHMZ4

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Syllabus-2020-2021

(SOET)(BTech-ComputerScience)

Title of the Course	MOOC
Course Code	MOOC06[P]

Part A

<table>
<tr><td rowspan="2">Year</td><td rowspan="2"></td><td rowspan="2">Semester</td><td rowspan="2"></td><td rowspan="2">Credits</td><td>L</td><td>T</td><td>P</td><td>C</td></tr>
<tr><td>0</td><td>0</td><td>1</td><td>1</td></tr>
<tr><td>Course Type</td><td colspan="8">Theory only</td></tr>
<tr><td>Course Category</td><td colspan="8">Generic Elective</td></tr>
<tr><td>Pre-Requisite/s</td><td colspan="3">Should be acquainted with the basics knowledge of General Awareness about Leadership Quality, Personality Development, Defense system etc</td><td>Co-Requisite/s</td><td colspan="4"></td></tr>
<tr><td>Course Outcomes & Bloom's Level</td><td colspan="8">CO1- Understand individaul responsibilities & role in meetings the security challenges on Border/Coastal areas. ()
CO2- Write their CV effective and appealing. ()
CO3- Imbibe the feeling of patriotism. ()
CO4- Communicate more effectively.()
CO5- Face SSB interview effectively in their future. ()</td></tr>
<tr><td>Coures Elements</td><td colspan="3">Skill Development ✕
Entrepreneurship ✕
Employability ✕
Professional Ethics ✓
Gender ✕
Human Values ✓
Environment ✕</td><td>SDG (Goals)</td><td colspan="4">SDG3(Good health and well-being)
SDG4(Quality education)
SDG6(Clean water and sanitation)</td></tr>
</table>

Part B

Modules	Contents	Pedagogy	Hours
Unit 1. Personality Development	(i) Career Counselling. (ii) SSB Procedure. (iii) Interview Skills.	Lecture, Tutorials, Group discussion, Collaborative work, self-study, Seminar presentations by students, individual and group drills, group and individual field-based assignments, Educational Excursion	5
Unit 2. Border & Coastal Areas	Security Challenges & Role of cadets in Border management.	Lecture, Tutorials, Group discussion, Collaborative work, self-study, Seminar presentations by students, individual and group drills, group and individual field-based assignments, Educational Excursion	5
Unit 3. Armed Forces	Modes of Entry into Army, Police and CAPF.	Lecture, Tutorials, Group discussion, Collaborative work, self-study, Seminar presentations by students, individual and group drills, group and individual field-based assignments, Educational Excursion	5
Unit 4. Military History	(i) Biographies of Renowned Generals. (ii) War Heroes : Param Veer Chakra Awardees. (iii) Study of Battles of Kargil. (iv) War Movies.	Lecture, Tutorials, Group discussion, Collaborative work, self-study, Seminar presentations by students, individual and group drills, group and individual field-based assignments, Educational Excursion	5
Unit- 5.Communication	Introduction to Communication & Latest Trends.	Lecture, Tutorials, Group discussion, Collaborative work, self-study, Seminar presentations by students, individual and group drills, group and individual field-based assignments, Educational Excursion	5

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1-2	PBL	PBL	BL5-Evaluate	20

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	60	18	40	0
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	50	60	30	40	

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Syllabus-2020-2021

(SOET)(BCA_Hons)

Title of the Course	Data Science
Course Code	BCAH-506-B(T)

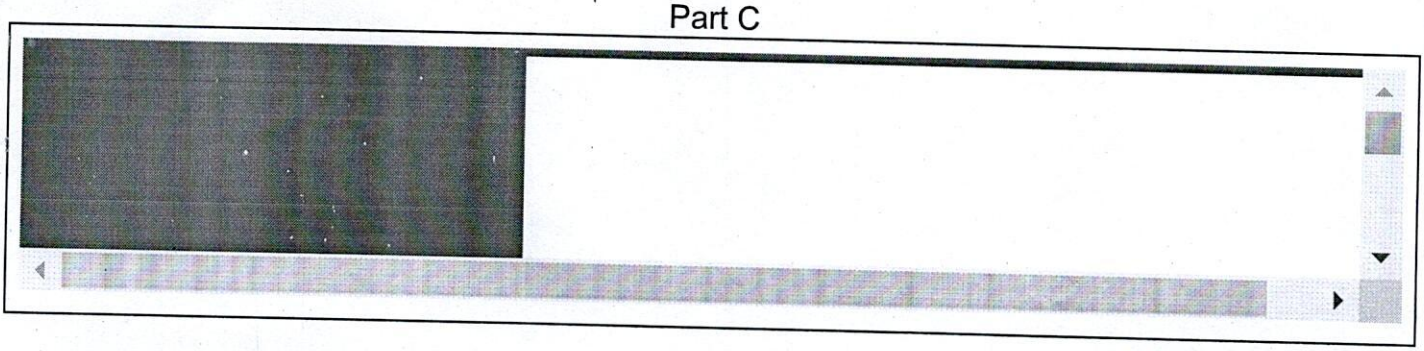
Part A

Year		**Semester**		**Credits**	L	T	P	C
					3	1	1	5
Course Type	Embedded theory and lab							
Course Category	Vocational Courses							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO2-** Understand the importance of and be able to formulate a data analysis problem statement that is clear, concise, and measurable**(BL1-Remember)** **CO3-** Apply appropriate descriptive and inferential methods to summarize data and identify associations and relationships**(BL2-Understand)** **CO4-** Apply appropriate tools and technology to collect, process, transform, summarize, and visualize data**(BL3-Apply)** **CO5-** Analyze Effectively communicate methods and findings in a variety of modes..**(BL4-Analyze)** **CO6-** Analyze categorical and/or numerical data types in a given data set**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professional Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**					

Part B

Modules	Contents	Pedagogy	Hours
1	Introduction to Data Science , Evolution of Data Science , Data Science Roles , Stages in a Data Science Project , Applications of Data Science in various fields , Data Security Issues.	Lecture with White Board	8
2	Data Collection Strategies , Data Pre,Processing Overview , Data Cleaning , Data Integration and Transformation , Data Reduction , Data Discretization.	Case Study	8
3	Descriptive Statistics , Mean, Standard Deviation, Skewness and Kurtosis , Box Plots , Pivot Table , Heat Map , Correlation Statistics , ANOVA.	PBL	8
4	Simple and Multiple Regression , Model Evaluation using Visualization , Residual Plot , Distribution Plot , Polynomial Regression and Pipelines , Measures for In,sample Evaluation , Prediction and Decision Making.	PBL	8
5	Generalization Error , Out,of,Sample Evaluation Metrics , Cross Validation , Overfitting , Under Fitting and Model Selection , Prediction by using Ridge Regression , Testing Multiple Parameters by using Grid Search.	PBL	8

Part C



Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	40	12	60	
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	50	40	20	60	

Part E

Books	Dietrich, D., Heller, B., & Yang, B. (2013). Data Science and Big Data Analytics. EMC.
Articles	
References Books	Pethuru, R. (Ed.). Handbook of Research on Cloud Infrastructures for Big Data Analytics. IGI Global.
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	-	-	1	-	-	1	-	-	1	1	1	-	-	-
CO2	1	-	1	-	1	-	-	-	1	1	1	-	-	-	-
CO3	1	1	1	1	-	-	-	-	-	1	1	1	-	-	-
CO4	1	1	1	1	1	-	1	-	1	-	1	1	-	-	-
CO5	1	1	1	-	1	-	1	-	1	-	1	1	-	1	-
CO6	-	-	-	1	-	1	-	1	-	1	-	1	-	1	-

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Syllabus-2020-2021

(SOET)(BCA_Hons)

Title of the Course	Cryptography & Network Security
Course Code	BCAH-404-A(T)

Part A

Year		**Semester**		**Credits**	L	T	P	C
					3	1	1	5
Course Type	Embedded theory and lab							
Course Category	Discipline Electives							
Pre-Requisite/s	A strong understanding of mathematical principles, such as linear algebra, number theory, and combinatorics.			**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** : Remembering/Revising the basics of computer system, Computer networks and network security**(BL1-Remember)** **CO2-** : Understand the Cryptography and Encryption techniques and the concepts of Hashing **(BL2-Understand)** **CO3-** : Apply the various Symmetric and Asymmetric Key Encryption algorithms**(BL3-Apply)** **CO4-** : Explain the various Encryption and Hashing techniques and analyze the concept of Digital Signatures, IP Security**(BL4-Analyze)** **CO5-** : Evaluating the various methods of Cryptography, Hash functions, Substitution and Transposition techniques**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✕ Professional Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG1(No poverty) SDG2(Zero hunger) SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours
1	Introduction and History of Cryptography: Cryptography, History of Cryptography, Mono-Alphabet Substitution, Multi-Alphabet Substitution, Homophonic Substitution, Null Ciphers, Book Ciphers, Rail Fence Ciphers, Vernam Cipher, The Enigma Machine	Lecturing	8
2	Symmetric Cryptography and Hashes: Symmetric Cryptography,Information Theory,Kerckhoffs's Principle,Substitution,Transposition,Binary Math,Block Cipher vs. Stream Cipher,Symmetric Block Cipher Algorithms,Basic Facts of the Feistel Function,S-Box,Data Encryption Standard (DES),Advanced Encryption Standard (AES),International Data Encryption Algorithm (IDEA),Tiny Encryption Algorithm (TEA),Symmetric Algorithm Methods,Symmetric Stream Ciphers,Hash Function	Lecturing, Experiments	8
3	Symmetric Cryptography and Hashes: Symmetric Cryptography,Information Theory,Kerckhoffs's Principle,Substitution,Transposition,Binary Math,Block Cipher vs. Stream Cipher,Symmetric Block Cipher Algorithms,Basic Facts of the Feistel Function,S-Box,Data Encryption Standard (DES),Advanced Encryption Standard (AES),International Data Encryption Algorithm (IDEA),Tiny Encryption Algorithm (TEA),Symmetric Algorithm Methods,Symmetric Stream Ciphers,Hash Function	Lecturing, Experiments	8
4	Applications of Cryptography: Digital Signatures, Certificate Authority (CA), Registration Authority (RA) , Certificate Authority – Verisign, Certificate Types, Public Key Infrastructure (PKI), Digital Certificate Terminology, Server-based Certificate Digital Certificate Management, Trust Models, Certificates and Web Servers, Microsoft Certificate Services, Windows Certificates: certmgr.msc, Authentication, Kerberos, PGP Certificates, Wi- Fi Encryption, SSL,TLS, Virtual Private Network (VPN), Split Tunneling, VPN Modes, Encrypting Files, BitLocker, Common Cryptography: Mistakes, Steganography, Steganalysis, Unbreakable Encryption	Lecturing, Experiments	8
5	Cryptanalysis, Quantum Computing and Cryptography: Breaking Ciphers, Cryptanalysis, Frequency Analysis, Kasiski, Cracking Modern Cryptography, Linear Cryptanalysis, Differential Cryptanalysis,	Lecturing	8

	Integral Cryptanalysis, Cryptanalysis Resources, Cryptanalysis Success Rainbow Tables, Password Cracking Quantum Computing and Cryptography, Timeline, Issues for QC, Two Branches, NIST, Lattice Based Crypto, GGH, NTRU		

Activity I

(Cryptography and Network Security)

Activity type: Review Article

Individual Activity

Mode of submission: online & Hard Copy

Maximum Marks: 15

Guidelines:

1. Each student must prepare a review article and presentation on the assigned topic / Domain.
2. Student Can Search Article at Following Link –
    a. Google Scholar - https://scholar.google.com/
    b. Web of Science - https://mjl.clarivate.com/search-results
    c. SCI Hub - https://sci-hub.sc/
3. Each student has to prepare the review article in IEEE paper format in a word file with at least 10 pages and 20 references and a power point presentation having at least 15 slides.
   Source : https://www.ieee.org/conferences/publishing/templates.html
4. The article must have plagiarism less than 15% checked using Turnitin Tool (Consult the faculty coordinator for the same)
5. Each paper should have at least 20 research paper references, all the references must be cited in IEEE format.
   (source : https://researchmethod.net/references-in-research/)
6. All the figures, diagrams, images or tables must also be cited.
7. This is an individual activity so each student has to work on a different topic.

Activity II

(Cryptography and Network Security)

Activity type: Seminar & Presentation

Individual Activity

Mode of submission: online & Hard Copy **Maximum marks: 10**

Guidelines:

1. Each student must select a topic for presentation from the syllabus of MCA-205 cryptography.
2. Student must prepare a report and a presentation in power point on the selected topic coveringthe syllabus.
3. Each student has to prepare a report in word file with at least 10 pages and a power pointpresentation having at least 15 slides.
4. The time allocated for presentation to each of the student is 7 mins. And for Q/A 3 minutes.
5. The student must carry or arrange from the lab, the equipment / software / tools required forpresentation on the day of respective activity.
6. The final hard copy submitted should be a file carrying all Introduction, Report and print out ofppt.
7. This is an individual activity so each student has to work on a different topic.

(Cryptography and Network Security)

Practical List

Set – A

Marks : 20

***Submit their program code with screenshots of output by taking different- different inputs.**

[1] Implement Caesar cipher (K=2) in any preferred language.

[2] Implement monoalphabetic cipher in any preferred language.

[3] W.A.P to implement Euclidean Algorithm

[4] Implement Playfair cipher in any preferred language.

[5] Implement Rail Fence technique (rail=2) in any preferred language.

[6] W.A.P to implement Vigenère Algorithm

[7] W.A.P to implement the DES Logic,

[8] Implement the MD5 Algorithm.

[9] W.A.P to implement the Digital Signature Algorithm

[10] W.A.P to create a tool for encryption and decryption technique with time calculation.

Set – B

Marks : 20

***Submit their program code with screenshots of output by taking different- different inputs.**

[1] Implement Caesar cipher (K=2) in any preferred language.

[2] Implement monoalphabetic cipher in any preferred language.

[3] W.A.P to implement Euclidean Algorithm

[4] Implement Playfair cipher in any preferred language.

[5] Implement Rail Fence technique (rail=2) in any preferred language.

[6] W.A.P to implement Vigenère Algorithm

[7] W.A.P to implement the DES Logic,

[8] Implement the MD5 Algorithm.

[9] W.A.P to implement the Digital Signature Algorithm

[10] W.A.P to create a tool for encryption and decryption technique with time calculation.

Set – C

Marks : 20

***Submit their program code with screenshots of output by taking different- different inputs.**

[1] Implement Caesar cipher (K=5) in any preferred language.

[2] Implement Column Transposition in any preferred language.

[3] W.A.P to implement Diffie Hellman key exchange.

[4] Implement Polyalphabetic cipher in any preferred language.

[5] Implement Rail Fence technique (rail=4) in any preferred language.

[6] W.A.P to implement vernam Algorithm

[7] W.A.P to implement the IDEA algorithm.

[8] Implement the SHA-512 Algorithm.

[9] W.A.P to implement the RSA Algorithm

[10] W.A.P to create a tool for encryption and decryption technique with time calculation.

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	40	12	60	
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	50	40	20	60	

Part E

Books	Stallings, W. (2011). Cryptography and network security principles and practices. Prentice Hall.
Articles	Forouzan, B. A., & Mukhopadhyay, D. (2011). Cryptography and network security. Tata Mcgraw Hill Education Private Ltd.
References Books	Kahate, A. (2011). Cryptography and network security. Tata Mcgraw Hill education Private Ltd.
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	1	-	1	1	-	-	-	-	-	-	-	1	-	1
CO2	-	1	2	-	3	-	-	1	-	-	-	-	1	-	2
CO3	-	1	-	-	1	-	-	1	-	-	-	-	3	-	3
CO4	-	-	-	-	1	-	1	-	-	-	-	-	2	1	2
CO5	-	1	-	-	2	2	1	-	-	-	-	-	2	2	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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CELEBRATING DREAMS

Syllabus-2020-2021

(SOET)(BCA_Hons)

Title of the Course	Cyber Security Fundamentals & Cyber Audit Essentials
Course Code	BCAH-506-A(T)

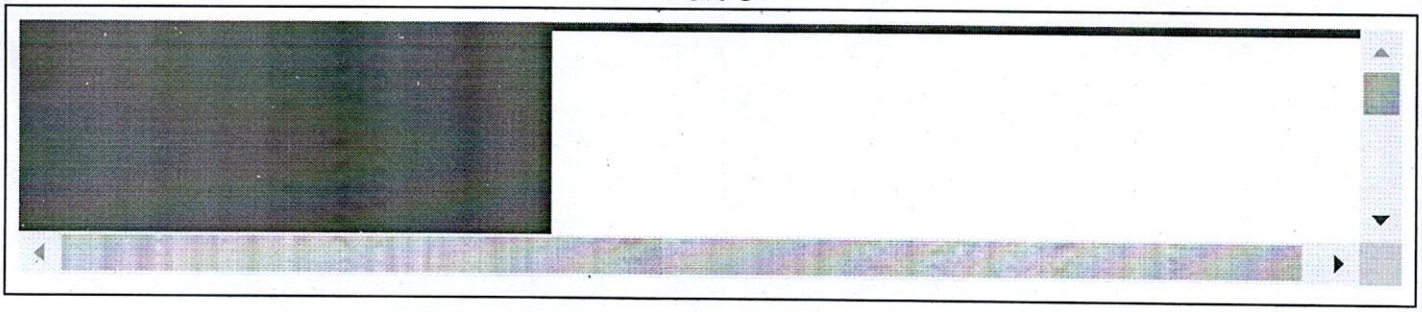
Part A

Year		**Semester**		**Credits**	L	T	P	C
					3	1	1	5
Course Type	Embedded theory and lab							
Course Category	Discipline Electives							
Pre-Requisite/s	Knowledge of Computer Network , Computer Architecture , Digital principals is essential		**Co-Requisite/s**	Knowledge of internet browsers and virtual eenvironment creation is must				
Course Outcomes & Bloom's Level	**CO1-** Understand the cybercrimes, Various attacks performed on network and technique of auditing the digital devices **(BL1-Remember)** **CO2-** Apply the principles of identification of crimes and apply it to prepare the audit report. **(BL2-Understand)** **CO3-** Analyze the data from digital devices for forensic analysis and finalize the audit report **(BL4-Analyze)** **CO4-** Evaluation of various crimes and the techniques applied to perform the crimes in digital world. **(BL5-Evaluate)** **CO5-** Create automated applications for detection of crimes **(BL6-Create)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✕ Professional Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours
Unit I	Introduction to Cyber Crime and Cyber Laws Cyber Crimes, Types of Cybercrime, Hacking, Attack vectors, Cyberspace and Criminal Behavior, Clarification of Terms, Traditional Problems Associated with Computer Crime, Computer Language, Network Language, Realms of the Cyber world, A Brief History of the Internet, Recognizing and Defining Computer Crime, Contemporary Crimes, Computers as Targets, Contaminants and Destruction of Data, Cyber Laws and Ethics.	Lectures with whiteboard/PPT, Recorded video/interactive videos	10
Unit II	Cyber Crime Issues and Investigation Unauthorized Access, Computer Intrusions, White collar Crimes, Viruses and Malicious Code, Internet Hacking and Cracking, Virus Attacks, Pornography, Software Piracy, Intellectual Property, Mail Bombs, Exploitation, Stalking and Obscenity in Internet, Digital laws and legislation, Law Enforcement Roles and Responses, Investigation Tools, E-Mail Investigation, E-Mail Tracking, IP Tracking, E-Mail Recovery, Search and Seizure of Computers, Password Cracking .	Lectures with whiteboard/PPT, Recorded video/interactive videos, programming labs	12
Unit III	Biometric Systems and its Security Biometric fundamentals, Biometric technologies, Biometrics Vs traditional techniques, Biometric System and Security essentials, Privacy Issues in Biometric Security, Standards in Biometric security,	Lectures with whiteboard/PPT, Recorded video/interactive videos, Case sTudy	9
Unit IV	Digital Evidence Cyber crime and digital evidence: what is cyber crime, types of cyber crimes, digital evidence, Digital Vs Physical Evidence, Nature of Digital Evidence, Precautions while dealing with Digital Evidence, Digital Evidence Collection, Evidence Preservation, Recovering Deleted Evidences,	Lectures with whiteboard/PPT, Recorded video/interactive videos, programming labs	11
Unit V	Digital Auditing Cyber Audit Essentials, Compliance Audit, International Standards, ISO27001, Audit of Windows Systems, Audit of Linux systems, Audit of network devices (Switch/Servers), Audit of Websites and Web Applications. Steps for hardening your System. Preparation of an Audit Report.	Lectures with whiteboard/PPT, Recorded video/interactive videos, programming labs	10

Part C



Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	40	12	60	
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	50	40	20	60	

Part E

Books	1. Digital Forensics, DSCI - Nasscom, 2012. 2. Cyber Crime Investigation, DSCI - Nasscom, 2013. 3. John R Vacca, "Biometric Technologies and Verification Systems", Elsevier Inc, 2007
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	-	2	2	3	2	1	-	2	-	-	-	2	2
CO2	1	-	-	3	3	2	-	2	-	1	-	-	2	3	2
CO3	1	2	2	3	3	2	3	2	-	3	-	1	3	3	2
CO4	-	2	2	3	2	-	-	-	-	-	-	1	1	-	3
CO5	-	2	2	1	-	-	-	-	-	-	-	-	3	2	3
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Syllabus-2020-2021

(SOET)(BCA_Hons)

Title of the Course	Digital Forensics & Analytics
Course Code	BCAH-604-A(T)

Part A

Year		**Semester**		**Credits**	L	T	P	C
					3	1	1	5
Course Type	Embedded theory and lab							
Course Category	Discipline Specific Elective							
Pre-Requisite/s	Basic knowledge of computer fundamentals, hardware, algorithms and basic concepts of network.			**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** Remembering Computer Network basics and Network Defense Essentials**(BL1-Remember)** **CO2-** Understand the concepts of Digital Forensics Digital investigation, Digital crime scene Evaluation process**(BL2-Understand)** **CO3-** Apply to the identification of crime and investigate (apply).**(BL3-Apply)** **CO4-** Analyze the data from digital devices for forensic analysis and finalize the audit report(Analyse)**(BL4-Analyze)** **CO5-** Evaluating Evaluation of various crimes and the techniques applied to perform the crimes in digital world.(Investigate)**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✕ Professional Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG1(No poverty) SDG2(Zero hunger) SDG3(Good health and well-being) SDG4(Quality education) SDG11(Sustainable cities and economies)				

Part B

Modules	Contents	Pedagogy	Hours
1	Introduction to Digital Forensics Digital investigation, Digital crime scene evaluation process, Search & Seizure, Digital Forensic Lab Setup, Dead v/s Live Forensics, Types of Digital Evidences, Disk Imaging, Write Blockers, Data Recovery, Chain of Custody, Standard Operating Procedures, Investigation Guidelines, overview of tools, Slack Space, Virtual paging, Volatile Evidence Acquisition, Collection & Analysis	Lecturing, Experiments	7
2	Volume Analysis & File Systems Introduction, PC based partitions- DOS partitions, UNIX partitions, RAW partition, UNIX Console Log, Removable media, Server based partitions- BSD partitions, GPT & MBR partitions, multiple disk volumes- RAID, Disk Spanning, file system, File system category, FAT concepts and analysis, FAT data structure- Boot sector, FAT 32 FS info, Directory entries, Long file name directory entries, NTFS File System concepts, NTFS Analysis, NTFS data structure, Standard file attributes, Index attributes and data structures	Lecturing, Experiments, Case Study	8
3	Digital Evidence Analysis Potential Evidences, Evidence collection form different devices, Artifact interpretation, Operating System artifacts analysis, Network Artifacts analysis, File Signatures, Registry Forensics, Last user Activity, MRU, NTUSER.DAT, MFT concepts, MFT Forensics,Multimedia Forensics, Metadata Analysis, Browser Forensics, History Extraction, Cookies based artifacts, Autofill Forms, Cache, Temp file, MAC OS Artifacts analysis, Linux OS Artifact Analysis	Lecturing, Experiments, Case Study	10
4	NIX File Systems UNIX, Ext2 and Ext3 data structures, iNodes, Super block, group descriptor tables, Block bitmap, Extended attributes, Directory Entry, Symbolic Link, Hash trees, Journal data structures, UFS1 and UFS2 concepts and analysis, NFS Files Systems, HFS File Systems, CDF File systems, Hadoop File systems	Lecturing, Experiments, Case Study	10
5	Forensic Tools :Forensic tools collection, Automated v/s manual techniques, Open source forensic tools, Developing scripted tools for basic level investigation, Usage tools for disk imaging and Data recovery, Encase and FTK tools, Autopsy, UFED, XRY, Volatility, Rekall, RedLine, NetworkMiner, Anti forensics Techniques, Counter anti forensics.	Lecturing, Experiments, Case Study	10

Activity I

(Digital Forensic Essentials)

Activity type: Survey

Individual Activity

Guidelines:

1. Create a questionnaire for testing general cyber security measures a layman should adopt . Each question in the questionnaire should contain one mark and should have four options for answer. No descriptive questions should be there in the questionnaire.

2. The questionnaire should contain 25 questions related to using safety measures an individual should take to safe guard his / her laptop / mobile/ tab etc.

3. In addition to these questions the questionnaire should also contain following questions which should have descriptive questions: Name, City, state, age as on 1.07.2023, gender, profession (This should be a dropdown list having following options: home maker, Service, Self-employed, student, teacher), phone no./ email id

4. The questionnaire should be shared with at least 50 people and at least 40 entries should be recorded.

5. This assignment should be created as a goggle form and the form as well as the excel sheet of responses should be uploaded as submission.

6. This is an individual activity and not a group activity.

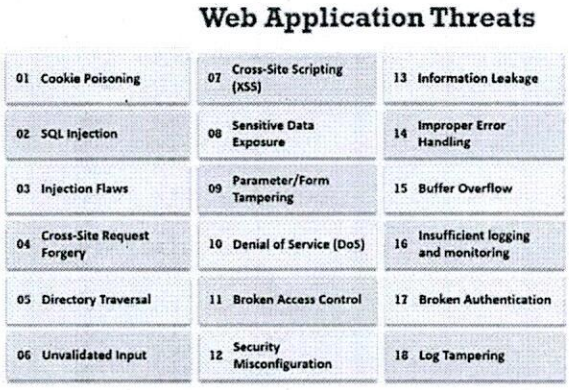
Activity II

(Digital Forensic Essentials)

Case Study

Guidelines:

1. This is an individual activity.
2. Please refer to the following list of web application threats and select any three of them:



3. Document the following about the threats selected:
    a. Attack Surface(s)
    b. Attack Vector(s)
    c. Methodology used for attack in form of block diagram
    d. An example or case study of this kind of attack performed
    e. Ways/methods/ tools/ command to detect the attacks in following environment:
        i. Window's
        ii. Linux
4. Comparative analysis of the attacks under consideration on following parameters:
    a. Attack surfaces used
    b. IOC
    c. Possible Damage level
5. The report should be in MS- word format on an A-4 size paper.
6. The report should be submitted in soft copy online as well as hard copy

Practical List

(Digital Forensic Essentials)

1. Study of Computer Forensics and different tools used for forensic investigation
2. How to Recover Deleted Files using Forensics Tools
3. How to make the forensic image of the hard drive using FTK Forensics.
4. How to used sniffer tool in network forensics.
5. How to View Last Activity of Your PC
6. How to prepared the RAM Dump using FTK Tool
7. How to Collect Email Evidence in Victim PC
8. Find Last Connected USB on your system (USB Forensics)
9. Live Forensics Case Investigation using Autopsy
10. Comparison of two Files for forensics investigation by Compare IT software

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	40	12	60	
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	50	40	20	60	

Part E

Books	Carvey, H. A. (2014). Windows Forensic Analysis Toolkit: Advanced Analysis Techniques for Windows 7. Syngress.
Articles	
References Books	Marshall, A. M. (2008). Digital Forensics: Digital Evidence in Criminal Investigation. Wiley-Blackwell.
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	-	1	2	-	-	-	-	-	-	-	-	2	1	1
CO2	-	1	1	1	2	-	-	-	-	-	-	-	1	2	1
CO3	2	2	1	1	2	-	-	-	-	-	-	-	3	2	3
CO4	-	2	1	2	-	-	-	-	-	-	-	-	2	1	3
CO5	2	2	1	-	1	-	-	-	-	-	-	-	1	2	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Syllabus-2020-2021

(SOET)(BCA_Hons)

Title of the Course	Machine Learning
Course Code	BCAH-604-B(T)

Part A

Year		**Semester**		**Credits**	L	T	P	C
					3	1	1	5
Course Type	Embedded theory and lab							
Course Category	Discipline Specific Elective							
Pre-Requisite/s	Basic understanding of Statistical Data Analysis and visualization methods, and Python Programming.			**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember various concept of data science.**(BL1-Remember)** **CO2-** To understand various Performance evaluation techniques of Machine Learning models. **(BL2-Understand)** **CO3-** To implement various supervised, unsupervised and reinforcement machine Learning Models **(BL3-Apply)** **CO4-** To train & test various machine Learning models using different domains of dataset. **(BL4-Analyze)** **CO5-** To evaluate and summarize the performance of various machine learning models using statistical & visualization tools**(BL5-Evaluate)** **CO6-** To create machine learning models to solve real world problems.**(BL6-Create)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professional Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours
1	Introduction of Machine Learning: What is Machine Learning, Need for Machine Learning, Why & When to Make Machines Learn?, Machine Learning Model, Challenges in Machines Learning, Applications of Machines Learning, Overview of various machine Learning Algorithms, Performance evaluation measures for machine learning algorithms, the curse of dimensionality, Data Feature Selection, Training Data vs. Validation Data vs. Test Data for ML Algorithms, bias-variance trade off, over fitting vs under fitting.	Lecturing, Experiments	12
2	Supervised Learning-I Regression: Introduction to Regression, Types of Regression Models, Introduction to Linear Regression, Simple Linear Regression, Least square regression, Gradient Descent , Multiple Linear Regression (MLR), Regularization in Linear Regression, Ridge regression, Lasso regression, Polynomial Regression, Support Vector for Regression (SVR).	Lecturing,Experiments	12
3	Supervised Learning-II Classification – Introduction to Classification, Types of Learners in Classification, Logistic Regression, K-Nearest Neighbors (K-NN), Support Vector Machine (SVM), Kernel SVM, Naive Bayes, Decision Tree Classification, Random Forest Classification.	Lecturing, Experiments	12
4	Unsupervised Learning Clustering-Introduction to Clustering, Types of Clustering, Types of Clustering Algorithms, K-Means Clustering, Hierarchical Clustering, DBSCAN Clustering, Association Rule Learning: Introduction to Association Rule Learning, Types of Association Rule Learning, Apriori Algorithm, Eclat Algorithm, F-P Growth Algorithm, Applications of Association Rule Learning.	Lecturing, Experiments,PBL	12
5	Reinforcement Learning: Introduction of Reinforcement Learning, Terms used in Reinforcement Learning, Key Features, Elements of Reinforcement Learning, How does Reinforcement Learning Work?, The Bellman Equation, Types of Reinforcement learning, Markov Decision Process, Reinforcement Learning Algorithms, Reinforcement Learning Applications Performance Improvement of ML Models: Performance Improvement with Ensembles, Ensemble Learning Methods, Bagging Ensemble Algorithms, Boosting Ensemble Algorithms, Voting Ensemble Algorithms.	Lecturing, Experiments,PBL	12

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Implementation of various performance evaluation techniques of machine learning	Experiments	BL3-Apply	02
2	Implementation of various regression models of machine learning	Experiments	BL3-Apply	04
3	Implementation of various classification models of machine learning	Experiments	BL3-Apply	03
4	Implementation of various clustering models of machine learning	Experiments	BL3-Apply	03
5	Implementation of RL, bagging and boosting models of machine learning	Experiments	BL3-Apply	03
1-5	Problem Based Learning on real world problems	PBL	BL6-Create	15

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	40	12	60	
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	50	40	20	60	

Part E

Books	Andreas C. Müller, Sarah Guido.(2016).Introduction to Machine Learning with Python: A Guide for Data Scientists.1st ed.O'Reilly Media.
Articles	
References Books	Tom M. Mitchell.(2017).Machine Learning.1st ed.McGraw Hill Education. Dr S. Sridhar, Dr M. Vijayalakshmi.(2021).Machine Learning.1st ed. Oxford University Press. Manaranjan Pradhan, U Dinesh Kumar.(2019).Machine Learning using Python.1st ed. Wiley India.
MOOC Courses	Prof. S. Sarkar.(2023).Introduction to Machine Learning, IIT Kharagpur.https://nptel.ac.in/courses/106105152 Dr. Balaraman Ravindran.(2024).Introduction to Machine Learning, IIT Madras.https://nptel.ac.in/courses/106106139
Videos	

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Syllabus-2021-2022

(SOET)(BTech-ComputerScience)

Title of the Course	Making of Modern India
Course Code	MCL0305[T]

Part A

Year		Semester		Credits	L	T	P	C
					2	0	0	2
Course Type	Theory only							
Course Category	Ability Enhancement Courses							
Pre-Requisite/s	1. *Understanding of Indian Culture and History*: Before delving into the idea of India in a historical perspective, readers should have a foundational understanding of Indian culture, including its commonalities, diversities, and the concept of unity in diversity. Familiarity with cultural accommodations and conflicts within India's historical context is essential, along with an understanding of the role of Indian intelligentsia in shaping these concepts. 2. *Knowledge of Indian Nationalism's Foundations*: To grasp the emergence and growth of Indian nationalism, readers should be acquainted with its anti-colonial basis, economic nationalism, and the dynamics of communalism and nationalism. Understanding revivalism, Enlightenment values, and the influence of European nationalism on Indian nationalism provides crucial context. 3. *Awareness of Social Reform Movements*: Before studying social reform movements in India, readers should have knowledge of the British colonial rule's impact on Indian society and the introspection it prompted. Familiarity with key figures such as Raja Rammohan Roy, Swami Vivekananda, and the issues of women's rights and the caste system is necessary. 4. *Understanding of the Indian National Movement*: Readers should have a basic understanding of the Indian National Movement, including early revolts, the significance of the 1857 revolt, and the role of early nationalists. Knowledge of movements led by Gandhi, socialist and left trends, and the integration of princely states into the nation is crucial, as is an understanding of the partition and India's journey to independence. 5. *Knowledge of Post-Independence India*: To comprehend India after independence, readers should understand the making of the Indian Constitution and the post-independence Nehru era. Familiarity with India's experiences facing wars, its economic trajectory from planning to the liberalization, privatization, and	**Co-Requisite/s**	1. *Understanding of Colonialism and Imperialism*: Before delving into Indian nationalism and social reform movements, readers should have a grasp of colonialism and imperialism, particularly their impact on India. Knowledge of how colonial powers governed and exploited colonized nations provides context for understanding the emergence of nationalist sentiments and the need for social reforms. 2. *Familiarity with Global History and Movements*: Readers should have a basic understanding of global history and movements, including the Enlightenment, industrialization, and the rise of nationalist movements worldwide. This broader perspective helps contextualize India's historical developments within the global framework of political and social change. 3. *Knowledge of Political Philosophy and Ideologies*: To comprehend Indian nationalism and the Indian National Movement, readers should be familiar with political philosophies and ideologies such as liberalism, socialism, and nationalism. Understanding these ideologies helps in analyzing the motivations, goals, and strategies of Indian nationalist leaders and movements. 4. *Awareness of Socio-Economic Structures*: Before studying post-

	globalization (LPG) era, along with its achievements and challenges in the 21st century, provides essential context for understanding contemporary India.		independence India and its economic trajectory, readers should have an understanding of socio-economic structures and systems, including feudalism, capitalism, and socialism. This knowledge provides insights into the challenges and strategies involved in India's economic development and policy-making. 5. *Understanding of International Relations*: To understand post-independence India's experiences facing wars and its role in the global arena, readers should have a basic understanding of international relations theories and concepts. Knowledge of geopolitics, alliances, and global conflicts helps in analyzing India's foreign policy decisions and its place in the international community.

Course Outcomes & Bloom's Level	**CO1-** 1. : Students will gain a comprehensive understanding of India's historical evolution, including its cultural diversity, unity in diversity, accommodations, conflicts, and the role of the Indian intelligentsia. They will grasp how these factors shaped the idea of India, particularly in the context of British rule.**(BL2-Understand)** **CO2-** 2. : Students will critically analyze the development of Indian nationalism, exploring its anti-colonial basis, economic nationalism, communalism, revivalism, and the influences of Enlightenment values and European nationalism. They will understand the complex factors contributing to the emergence and growth of Indian nationalism.**(BL4-Analyze)** **CO3-** 3. Students will appreciate the significance of social reform movements in 19th-century India, understanding the contributions of key figures such as Raja Rammohan Roy and Swami Vivekananda. They will recognize the importance of addressing issues like women's rights and the caste system within the context of British rule and Indian introspection.**(BL5-Evaluate)** **CO4-** 4. : Students will understand the dynamics of the Indian National Movement, including early revolts, the 1857 revolt, the role of early nationalists, Gandhi-led mass movements, socialist and left trends, and the integration of princely states. They will comprehend the complexities and strategies involved in India's journey to independence.**(BL2-Understand)** **CO5-** 5. Students will analyze the trajectory of India after independence, examining the making of the Indian Constitution, the post-independent Nehru era, India's experiences facing wars, and its economic transition. They will evaluate India's achievements and challenges in the 21st century, gaining insights into its socio-economic and political landscape.**(BL3-Apply)**		
Coures Elements	Skill Development ✕ Entrepreneurship ✕ Employability ✕ Professional Ethics ✕ Gender ✕ Human Values ✓ Environment ✕	**SDG (Goals)**	SDG1(No poverty) SDG3(Good health and well-being) SDG4(Quality education) SDG5(Gender equality) SDG10(Reduced inequalities) SDG15(Life on land)

Part B

Modules	Contents	Pedagogy	Hours
1	Idea of India in historical perspective a) Indian culture, b) cultural commonness, c)cultural diversities, d)unity in diversity, e) cultural accommodations ,f) cultural conflicts, g)Idea of India and British Rule , h) Role of Indian Intelligentsia.		6
2	Emergence and growth of Indian Nationalism a) Anti-colonial basis, b) Economic Nationalism, c) communalism and nationalism, d) revivalism and Indian nationalism, e)Enlightenment values, f)European Nationalism and Indian Nationalism.		6
3	Social Reform Movements (a) British Rule and Indian introspection, (b) Raja Rammohan Roy, (c) social reform movements in 19th century, (d)Swami Vivekanand, (e)The women issue, (f)Caste system.		6
4	Indian National Movement (a) Early Revolts and 1857 Revolt, (b)Early Nationalists, (c) Bang Bhang Movement ,(d) Gandhi led Mass Movements, (e) Socialist and Left trends, (f) Princely States and their integration into nation, (h)Partition and Independence .		6
5	India after independence a) Making of Indian Constitution, (b) Post Independent Nehru Era, (c) India facing Wars, (d) Indian economy- From Planning to LPG, (e) Achievements, (f) Challenges in 21st century India.		6

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	40	12	60	28
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
	0	0			

Part E

Books	1. Bipan Chandra and others: India's Struggle For Independence , Penguine Publishers. 2. Bipan Chandra: History Of Modern India, Orient Blackswan publishers. 3. Sunil Khilnani: The Idea of India, Penguine publishers. 4. Shekhar Bandopadhyay: From Plastic to Partition and After, A History of Modern India, Orient Blackswan publishers. 5. Rakesh Batabyal: The Penguine Book of Modern Indian Speeches,1878 to Present, Penguine Publishers. 6. A R Desai:Social Background of Indian Nationalism, Popular Prakashan . 7. B R Nanda: Mahatma Gandhi ,A Biography,London.
Articles	
References Books	1. B.R.Nanda:Gandhi and His Critics, Oxford 2. Girja Shankar: Socialist Trends in Indian National Movement ,Meerut 3. Urmila Phadnis:Towards the integration of Indian States,1919-1947,Mumbai 4. Bimal Prasad: Gandhi,Nehru and JP,A Study in Leadership,New Delhi 5. Bipan Chandra and others:India Since Independence ,Penguine 6. Ramchandra Guha:Makers of Modern India, Penguine. 7. Austin Granville: The Indian Constitution, Oxford.
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	-	1	-	-	-	-	-	-	-	-	1	2	1
CO2	-	-	2	-	-	1	-	1	-	-	-	-	1	1	1
CO3	-	-	-	-	-	-	1	-	-	1	-	-	-	1	-
CO4	-	-	-	-	-	-	-	-	2	-	-	2	1	-	-
CO5	-	-	-	-	-	-	-	-	-	-	2	-	-	1	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-

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DEPARTMENT OF ELECTRICAL ENGINEERING

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Dated: 10/05/2020

Minutes of Meeting (BOS)

Meeting of Board of Studies of **Department of Electrical Engineering, School of Engineering & Technology,** ITM University Gwalior was held on **10/05/2020** via Online platform. The following members were present in the meeting:

S. No.	Name	Designation	Signature
1.	Dr. Ranjeet Singh Tomar	Dean and Chairman BOS	
2.	Mr. Abhishek Saxena	Member	
3.	Mr. Abhishek Tripathi	Member	
4.	Mr. Upendra Bhushan	Member	
5.	Mr. Ashirwad Dubey	Member	
6.	Dr. Manish Sharma	Invitee Member	
7.	Dr. Rakesh Saxena Director & Professor, SGSITS, Indore (MP)	Expert	

Following decisions were taken in the BOS meeting:

1. Minutes of last BOS meeting dated July 06, 2019 has been approved.
2. Following Schemes of examination and Syllabus of B. Tech (Electrical Engineering) have been reviewed and approved.

   i. B. Tech. / B. Tech. (Honors) (Electrical Engineering) Batch (2018-2022) V and VI Semester.

   ii. B. Tech. / B. Tech. (Honors) (Electrical Engineering Specialization in IOT & Sensors) Batch (2019-2023) III and IV Semester.

   iii. B. Tech. / B. Tech. (Honors) (Electrical Engineering Specialization in IOT & Sensors) Batch (2020-2024) I and II Semester.

3. Following papers in the B. Tech. (Electrical Engineering Specialization in IOT & Sensors) have been incorporated in the scheme as recommended by the expert.

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Proposed Subjects By the Experts	Approved Subjects by the BOS with credits	Old Subjects with credits	Changes
Principles of IOT and Sensors	Principles of Sensors and IOT 4(2-1-2)	Engineering Chemistry 5(3-1-2)	Syllabus Designed
Architect ring Smart IOT Devices	Architect ring Smart IOT Devices 5(3-1-2)	Electrical Instrumentation 5(3-1-2)	Syllabus Designed
Wireless Sensor Networks & IOT	Wireless Sensor Networks & IOT 4(3-0-2)	Signal & System 4(3-1-0)	Syllabus Designed

3. Industrial Training as a new subject has been introduced in III and V semester of all the B. Tech. / B. Tech. (Honors) courses.

4. Syllabi of all the Mathematics courses of the Department of Electrical Engineering were reviewed by the committee. Recommendations of committee have been incorporated in the syllabus of Mathematics and it will be approved by the BOS of Mathematics Department also.

Note: Further changes in any course introduced by the regularity bodies will be incorporated after the approval of BOS / Academic Council.

Syllabus attached in Annexture-1

(Dr. Ranjeet Singh Tomar)
Dean and Chairman BOS
Department of Electrical Engineering
School of Engineering & Technology
ITM University Gwalior (MP)

OMVEER SINGH

Digitally signed by OMVEER SINGH
DN: cn=OMVEER SINGH c=IN o=Personal
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