

# BTech-ComputerScience

Title of the	e Course	Seminar II								
Course	Code	CSD0502[P]								
				Part	A					
Yea		3rd	0	5th		Credits	-	т	Р	С
rea	ar	3ra	Semester	อเท			)	0	1	1
Course	Туре	Lab only								
Course C	ategory	Projects and I	nternship							
Pre-Req	uisite/s				(	Co-Requisite/s				
Course O & Bloom		Apply) CO2- CO2: D (BL4-Analyze CO3- CO3: A CO4- CO4: E	pply theoretical knowledge from emonstrate proficiency in indust enduced and interpret data collect hance critical thinking skills by ompile a comprehensive report	ry-standard tools and te ed during the internship analyzing and evaluatin	chnologies relevant to experience. (e.g., ana g the outcomes of ass	the internship field. (e.g., use d lyze customer feedback to impr igned projects or tasks.(BL5-E)	esign softwa ove product valuate)	are to create g t design) <b>(BL4-</b> /	raphics for a co Analyze)	
Coures E	lements	Skill Developr Entrepreneurs Employability Professsonal Gender X Human Value Environment	ship X ✓ Ethics ✓ s X	SDG (Goals)						
				Part	В					
Mod	ules		Con	tents		Pedagog	у		Ho	urs
				Part	c					
Modules			Title			ative-ABCA/PBL/ iments/Field work/		Bloom's Le	evel	Hours

	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
r		Part D(Marks	Distribution)		
		Theo	orv		

			Theory		
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
			Practical		
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation
100	24	60	30	40	0

	Part E
Books	
Articles	
References Books	
MOOC Courses	
Videos	

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



## вса

			DUA							
Title of the Course	Dissertation									
Course Code	BCA 801	3CA 801								
			Part A							
Year	4th	Semester	8th	Credits	L	т	Р	С		
Tear	401	Semester	oui	Creats	0	0	15	15		
Course Type	Project									
Course Category	Research Proj	ect								
Pre-Requisite/s	Knowledge of	programming languages		Co-Requisite/s						
Course Outcomes & Bloom's Level	Evaluate) CO2- CO2: De CO3- CO3: Im CO4- CO4: Ap Organize) (BL	esign a novel and comprehensive plement the designed solution ef ply project management principle 4-Analyze)	software solution using approp fectively, demonstrating core fu ss to plan, schedule, track prog	in the chosen project area within computer so priate programming languages, frameworks, a inctionalities and addressing potential limitatio ress, manage resources, and mitigate potenti entation details, user manuals, deployment pr	nd tools. (Dons. (Dons. (Dons. (Develo) al risks throu	esign) <b>(BL6-(</b> p) <b>(BL6-Crea</b> ughout the pr	Create) te) oject lifecycle. (F	lan and		
Coures Elements	Skill Developm Entrepreneurs Employability Professsonal E Gender X Human Values Environment >	hip X ✓ Ethics ✓ S X	SDG (Goals)	SDG1(No poverty) SDG2(Zero hunger) SDG8(Decent work and economic growth)						

Part B

Pedagogy

Hours

Contents

Modules

	Par	tC		
Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
I	Literature survey	PBL	BL5-Evaluate	50
I	Synopsis, proposed system methodology	PBL	BL6-Create	50
I	implementation of proposed methodology	PBL	BL6-Create	50
I	Documentation of results and comparisons with similar technologies / methods	PBL		50

	Part D(Marks Distribution)											
	Тнеогу											
Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation												
			Practical									
Total Marks         Minimum Passing Marks         External Evaluation         Min. External Evaluation         Internal Evaluation         Min. Internal Evaluation												
400	200	250	125	150	0							

Books	
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	-	1	-	-	-	-	-	-	-	2	2	2
CO2	1	-	2	-	2	-	-	-	-	-	-	-	1	2	1
CO3	1	2	-	2	1	-	-	-	-	-	-	-	2	2	1
CO4	1	1	-	2	-	-	-	-	1	-	-	-	2	2	1
CO5	-	-	-	-	1	-	-	-	-	1	-	-	2	1	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



## BTech-ComputerScience

Title of the Course	**Seminar								
Course Code	CSD0301[P]								
			Part A						
Year	2nd	Semester	3rd		Credits	L	Т	Р	С
Tear	2110	Semester	514		Cleans	0	0	1	1
Course Type	Lab only								
Course Category	Projects and Ir	nternship							
Pre-Requisite/s				c	o-Requisite/s				
Course Outcomes & Bloom's Level	Apply) CO2- CO2: De (BL4-Analyze) CO3- CO3: An CO4- CO4: En	ply theoretical knowledge from emonstrate proficiency in indust alyze and interpret data collect hance critical thinking skills by empile a comprehensive report of	ry-standard tools and technol ed during the internship exper analyzing and evaluating the	ogies relevant to rience. (e.g., ana outcomes of ass	the internship field. (e.g., use lyze customer feedback to im igned projects or tasks.( <b>BL5</b> -	e design softwa prove product <b>Evaluate)</b>	ire to create gra design) <b>(BL4-A</b>	aphics for a com nalyze)	
Coures Elements	Skill Developm Entrepreneurs Employability Professsonal E Gender X Human Values Environment >	hip X ✓ Ethics ✓	SDG (Goals)			•)			
			Part B						
Modules		Con	tents		Pedago	ogy		Hour	5

Part C

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

	Part D(Marks Distribution)							
Theory								
Total Marks	s Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation							
			Practical					
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation			
100	24	60	30	40	0			

	Part E						
Books							
Articles							
References Books							
MOOC Courses							
Videos							

COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	2	-	1	-	-	-	-	-	-	-	2	2	2
CO2	1	-	2	-	2	-	-	-	-	-	-	-	1	2	1
CO3	1	2	-	2	1	-	-	-	-	-	-	-	2	2	1
CO4	1	1	-	2	-	-	-	-	1	-	-	-	2	2	1
CO5	-	-	-	-	1	-	-	-	-	1	-	-	2	1	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



## BTech-ComputerScience

Title of the Course	Minor Project - I								
Course Code	CSD0603								
			Part A						
Year	3rd	Semester	0.1		Credits	L	т	Р	С
Year	3rd	Semester	6th		Credits	0	0	2	2
Course Type	Project								
Course Category	Projects and Internship								
Pre-Requisite/s	Co-Requisite/s								
Course Outcomes & Bloom's Level	C01- C01: Conduct in-depth research and critically analyze existing solutions in the chosen project area within computer science or information technology. (Evaluate)iples to develop a campaign for a local business)(BL3-Apply) C02- C02: Design a novel and comprehensive software solution using appropriate programming languages, frameworks, and tools. (Design)(BL4-Analyze) C03- C03: Implement the designed solution effectively, demonstrating core functionalities and addressing potential limitations. (Develop)(BL4-Analyze) C04- C04: Apply advanced software engineering principles, project management principles, and design patterns to ensure the solution is robust, scalable, and maintainable in the long term. (Design)(BL5-Evaluate) C05- C05: Utilize database management systems or advanced programming paradigms (e.g., object-oriented, functional, concurrency control) to enable efficient data storage, retrieval, and manipulation within the solution to ootimize the solution's efficiency and performance. (Develop)(BL6-Create)								
Coures Elements	Skill Development ✓     Entrepreneurship X       Entrepreneurship X     SDG (Goals)       Professsonal Ethics ✓     SDG (Goals)       Sonder X     SDG2(Zero hunger)       Human Values X     SDG8(Decent work and economic growth)								
	Part B								
Modules						у		Ho	ours

	Par	t C		
Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
I	Project Design Document	PBL	BL5-Evaluate	50
I	Project Implementation & Testing	PBL	BL6-Create	50
I	Project Documentation	PBL	BL6-Create	50

# Part D(Marks Distribution)

	Theory							
Total Marks	otal Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min.				Min. Internal Evaluation			
	Practical							
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation			
100	24	60	30	40	0			

	r ait L
Books	
Articles	
References Books	
MOOC Courses	
Videos	
· · · · · · · · · · · · · · · · · · ·	

	Course Articulation Matrix														
COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	2	-	1	-	-	-	-	-	-	-	2	2	2
CO2	1	-	2	-	2	-	-	-	-	-	-	-	1	2	1
CO3	1	2	-	2	1	-	-	-	-	-	-	-	2	2	1
CO4	1	1	-	2	-	-	-	-	1	-	-	-	2	2	1
CO5	-	-	-	-	1	-	-	-	-	1	-	-	2	1	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



## BTech-ComputerScience

	The other Occurrence Occurrence III									
Title of the Course	Seminar III									
Course Code	CSD0702[P]									
			Part A							
						L	т	Р	С	
Year	4th	Semester	7th		Credits	0	0	1	1	
Course Type	Lab only									
Course Category	Course Category Projects and Internship									
Pre-Requisite/s			Co-Requisite/s							
Course Outcomes & Bloom's Level	C01- C01: Apply theoretical knowledge from coursework to solve real-world industry problems. (e.g., utilize marketing principles to develop a campaign for a local business)(BL3- Apply) C02- C02: Demonstrate proficiency in industry-standard tools and technologies relevant to the internship field. (e.g., use design software to create graphics for a company website) (BL4-Analyze) C03- C03: Analyze and interpret data collected during the internship experience. (e.g., analyze customer feedback to improve product design)(BL4-Analyze) C04- C04: Enhance critical thinking skills by analyzing and evaluating the outcomes of assigned projects or tasks.(BL5-Evaluate) C05- C05: Compile a comprehensive report documenting the learning experiences, challenges, and achievements during the internship period.(BL6-Create)									
Coures Elements	Skill Development J     Entrepreneurship X       Entrepreneurship X     SDG1(No poverty)       Employability J     SDG2(Zero hunger)       Professsonal Ethics J     SDG8(Decent work and economic growth)       Human Values X     Environment X									
Part B										
Modules		Conte	ents		Pedagog	у		Hou	rs	
L			Part C		*					
			i ait O	- 11- مرا						

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	al Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal				Min. Internal Evaluation					
			Practical							
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation					
100	24	60	30	40	0					

	Part E
Books	
Articles	
References Books	
MOOC Courses	
Videos	

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



## BTech-ComputerScience

Title of the Course	Major Project – I							
Course Code	CSD0703[P]							
	Part A							
Year	4th	Semester	7th	Credits	L	т	Р	С
Tear	401	Gemester	701	oreuta	0	0	3	3
Course Type	Project							
Course Category	Projects and I	nternship						
Pre-Requisite/s	Knowledge of	programming languages		Co-Requisite/s				
Course Outcomes & Bloom's Level	Evaluate) CO2- CO2: D CO3- CO3: In CO4- CO4: Ap Organize) (BL	esign a novel and comprehensin nplement the designed solution oply project management princip <b>4-Analyze)</b> ffectively document the project,	ve software solution using app effectively, demonstrating core cles to plan, schedule, track pr	ns in the chosen project area within computer ropriate programming languages, frameworks functionalities and addressing potential limita ogress, manage resources, and mitigate pote ementation details, user manuals, deployment	s, and tools. (E ations. (Develo ntial risks thro	esign) (BL6-Ci p) (BL6-Create ughout the proj	reate) e) ect lifecycle. (P	Plan and
Coures Elements	Skill Developr Entrepreneurs Employability Professsonal Gender X Human Values Environment	ship X ✓ Ethics ✓ s X	SDG (Goals)	SDG1(No poverty) SDG2(Zero hunger) SDG8(Decent work and economic growth) SDG9(Industry Innovation and Infrastructure)				
	-1		Part B	1				

Pedagogy

Hours

Contents

Modules

ſ

	Par	t C		
Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
I	Project Design Document	PBL	BL5-Evaluate	50
I	Project Implementation & Testing	PBL	BL6-Create	50
I	Project Documentation	PBL	BL6-Create	50

Part D(Marks	Distribution)

	Theory								
Total Marks	Minimum Passing Marks	External Evaluation Min. External Evaluation		Internal Evaluation	Min. Internal Evaluation				
			Practical						
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation				
100	24	60	30	40	0				

	T dit E
Books	
Articles	
References Books	
MOOC Courses	
Videos	

							Cours	e Articulatio	on Matrix						
COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	2	-	1	-	-	-	-	-	-	-	2	2	2
CO2	1	-	2	-	2	-	-	-	-	-	-	-	1	2	1
CO3	1	2	-	2	1	-	-	-	-	-	-	-	2	2	1
CO4	1	1	-	2	-	-	-	-	1	-	-	-	2	2	1
CO5	-	-	-	-	1	-	-	-	-	1	-	-	2	1	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



## BTech-ComputerScience

Title of the Course	Major Project - II	Major Project - II							
Course Code	CSD0804[P]	CSD0804[P]							
			Part A						
		•	011		L	т	Р	С	
Year	4th Ser	Semester	8th	Credits	0	0	10	10	
Course Type	Project	Project							
Course Category	Projects and Inter	Projects and Internship							
Pre-Requisite/s	Knowledge of prog	gramming languages	Co-Requisite/s						
		uct in-depth research and	critically analyze existing solutio	ns in the chosen project area within computer s	cience or	information	technology. (E	valuate) (BL5	
Course Outcomes & Bloom's Level	Evaluate) CO2- CO2: Design CO3- CO3: Impler CO4- CO4: Apply Organize) (BL4-A	n a novel and comprehens ment the designed solutior project management princ nalyze)	sive software solution using app n effectively, demonstrating core ciples to plan, schedule, track pr	ns in the chosen project area within computer s opriate programming languages, frameworks, functionalities and addressing potential limitati ogress, manage resources, and mitigate potent mentation details, user manuals, deployment p	and tools. ons. (Dev tial risks tl	. (Design) ( <b>B</b> elop) ( <b>BL6-C</b> hroughout th	L6-Create) reate) e project lifecyo	cle. (Plan and	

Pedagogy

Hours

Contents

Modules

	Par	tC		
Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Project Design Document	PBL	BL5-Evaluate	50
1	Project Implementation & Testing	PBL	BL6-Create	50
I	Project Documentation	PBL	BL6-Create	50

Part D(Marks	Distribution)

	Theory								
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation				
			Practical						
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation				
100	24	60	30	40	0				

Books	
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	-	1	-	-	-	-	-	-	-	2	2	2
CO2	1	-	2	-	2	-	-	-	-	-	-	-	1	2	1
CO3	1	2	-	2	1	-	-	-	-	-	-	-	2	2	1
CO4	1	1	-	2	-	-	-	-	1	-	-	-	2	2	1
CO5	-	-	-	-	1	-	-	-	-	1	-	-	2	1	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



## BTech-ElectricalEngineering

Title of the Course	Essentials of Information	tials of Information Technology									
Course Code	CSL0201	L0201									
Part A											
Year	1st	Semester	2nd	Credits	L	т	Р	С			
Teal	150	ist Sellester		Credits		0	2	4			
Course Type	Embedded theory a	bedded theory and lab									
Course Category	Foundation core										
Pre-Requisite/s		To understand the contents and successfully complete this course, a participant must have a basic understanding of Basics of Computer system, Storage Systems, Operating systems, Networking and Database.									
Course Outcomes & Bloom's Level	CO2- Apply the vari CO3- Explain variou CO4- Design the co	e basics of Computer systems like types, I/O de ous networking concepts, topologies and remov us memory management techniques and Analy ncept of software, operating system for better u e various algorithm, its solution and other comm	ve deadlocks. (Apply).( <b>BL2-Understand</b> ) te the concept of Sub-programs and blocks tilization of external system (Design)( <b>BL4-A</b>	(Analysis)(BL3-Apply) (nalyze)							
Coures Elements	Skill Development ✓       Entrepreneurship ✓       Employability ✓       Professsonal Ethics ✓       Gender ×       Human Values ×       Environment ×			SDG1(No poverty) SDG2(Zero hunger) SDG4(Quality education) SDG8(Decent work and economic growth) SDG9(Industry Innovation and Infrastructure)							

Modules	Contents	Pedagogy	Hours
1	Computer Basics: Basics of Computer Systems(T1,T2), Evolution of Computers, Computer Generations, Classification of Computers(T1,T3), Computer Applications, Interaction between User and Computer(T7). Hardware Components, Basic Computer Organization, Input and Output Devices(T1,T3), Central Processing Unit(T1), System Bus Architecture, Memory or Storage Unit	White Board, PPT	6
2	Operating System: Introduction to Operating System, Function of Operating Systems(T1), Working Knowledge of GUI-Based Operating System (T3,T4), Working with latest version of Windows(T3,T4). Various Operating Systems, Evaluation of Operating System(T3,T4,T7). Virtual Machine, Operating Systems for Mobile, Installation of Operating System(T1,T3,T4), Boot Process.	White Board, PPT	6
3	Computer Networks and World Wide Web: Introduction to Computer Networks (LAN, MAN, WAN, PAN)(T3,T4), Network Topologies, Ethical Issues related to Network Security(T2,T3). Internet and World Wide Web(T7,T8), Internet Evolution(T1), FTP, Electronic Mail, Search Engines(T1), Introduction to HTML, Static and Dynamic Web Pages	White Board, PPT	6
4	Computer Software: Introduction, System Software(T1,T3), Application Software, Firmware(T3), Software Installing and Uninstalling(T3,T4), Software Development Steps, Characteristics of good software(T1,T7), Usability of software, Introduction to Free and Open Source Software(T3,T4), Introduction to Database Management System	White Board, PPT	6
5	Subprograms and Blocks: Problem Solving: Flow Charts(T3,T4), Tracing Flow Chart, Algorithms. Fundamentals of sub-programs(T1,T3,T4), Scope of life time of variables, static and dynamic scope(T7), design issues of subprograms and operations, parameter passing methods(T3,T4), overloaded sub-programs, generic sub-programs(T1,T3), design issues for functions user defined overloaded operators	White Board, PPT	6

	Part C								
Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours					
1	Explain the Installation process of Operating system and its Memory Management.	Experiments	BL2-Understand	10					
2-3	Design of a Web Page which describe your Biodata.	PBL	BL3-Apply	10					
4-5	Describe Software development life cycle (SDLC) with all components.	PBL	BL5-Evaluate	10					

	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	Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal		Min. Internal Evaluation				
100	0	40	20	60	0			

	Part E
Books	P. K. Sinha, Priti Sinha; Computer Fundamentals; BPB Publication. V. Rajaraman; Fundamentals of Computers; Prentice Hall of India Publication. G. G. Wilkinson; Fundamentals of Information Technology; Wiley-Blackwell Publishing. Yashwant P. Kanetkar; Let Us C; BPB Publication.
Articles	
References Books	E. Balagurusamy; Programming in ANSI C; Tata McGraw-Hill Publishing. Ron Mansfield; Working in MS-Office; Tata McGraw Hill Publishing.
MOOC Courses	
Videos	

COs	P01	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	-	-	-	-	-	-	-	-	-	-	1	1	2
CO2	1	2	-	-	-	-	-	-	-	-	-	-	3	3	2
CO3	-	-	1	-	-	-	-	-	-	-	-	-	3	2	2
CO4	-	-	-	2	-	-	-	-	-	-	-	-	2	2	2
CO5	-	-	-	-	-	-	-	-	-	-	-	-	2	2	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



## BTech-Electronics\_and\_Communication

Title of the Course	Essentials of Information	tion Technology						
Course Code	CSL0201[T]							
		Part	Part A					
Year	1st Semester 2nd		2nd	Credits	L	т	Р	С
i cui				oredita		0	2	4
Course Type	Embedded theory ar	Ided theory and lab						
Course Category	Foundation core	Foundation core						
Pre-Requisite/s	To understand the contents and successfully complete this course, a participant must have a basic understanding of Basics of Computer system, Storage Systems, Operating systems, Networking and Database.			Co-Requisite/s				
Course Outcomes & Bloom's Level	CO2- Apply the varie CO3- Explain various CO4- Design the cor	e basics of Computer systems like types, I/O devi ous networking concepts, topologies and remove s memory management techniques and Analyze coept of software, operating system for better utili various algorithm, its solution and other commun	deadlocks. (Apply).( <b>BL2-Understand)</b> the concept of Sub-programs and blocks (Ar zation of external system (Design)( <b>BL4-An</b>	nalysis)(BL3-Apply) Ilyze)				
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professsonal Ethics Gender × Human Values × Environment ×		SDG (Goals)	SDG1(No poverty) SDG2(Zero hunger) SDG4(Quality education) SDG8(Decent work and economic growth)				

## Part B

Modules	Contents	Pedagogy	Hours
1	Computer Basics: Basics of Computer Systems(T1,T2), Evolution of Computers, Computer Generations, Classification of Computers(T1,T3), Computer Applications, Interaction between User and Computer(T7). Hardware Components, Basic Computer Organization, Input and Output Devices(T1,T3), Central Processing Unit(T1), System Bus Architecture, Memory or Storage Unit	White Board, PPT	6
2	Operating System: Introduction to Operating System, Function of Operating Systems(T1), Working Knowledge of GUI-Based Operating System (T3,T4), Working with latest version of Windows(T3,T4). Various Operating Systems, Evaluation of Operating System(T3,T4,T.7), Virtual Machine, Operating Systems for Mobile, Installation of Operating System(T1,T3,T4), Boot Process.	White Board, PPT	6
3	Computer Networks and World Wide Web: Introduction to Computer Networks (LAN, MAN, WAN, PAN)(T3,T4), Network Topologies, Ethical Issues related to Network Security(T2,T3). Internet and World Wide Web(T7,T8), Internet Evolution(T1), FTP, Electronic Mail, Search Engines(T1), Introduction to HTML, Static and Dynamic Web Pages	White Board, PPT	6
4	Computer Software: Introduction, System Software(T1,T3), Application Software, Firmware(T3), Software Installing and Uninstalling(T3,T4), Software Development Steps, Characteristics of good software(T1,T7), Usability of software, Introduction to Free and Open Source Software(T3,T4), Introduction to Database Management System	White Board, PPT	6
5	Subprograms and Blocks: Problem Solving: Flow Charts(T3,T4), Tracing Flow Chart, Algorithms. Fundamentals of sub-programs(T1,T3,T4), Scope of life time of variables, static and dynamic scope(T7), design issues of subprograms and operations, parameter passing methods(T3,T4), overloaded sub-programs, generic sub-programs(T1,T3), design issues for functions user defined overloaded operators	White Board, PPT	6

	Part C							
Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours				
1	Explain the Installation process of Operating system and its Memory Management.	Experiments	BL2-Understand	10				
2-3	Design of a Web Page which describe your Biodata.	PBL	BL3-Apply	10				
4-5	Describe Software development life cycle (SDLC) with all components.	PBL	BL5-Evaluate	10				

Part D(Marks Distribution)							
Theory							
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation Min. Internal Eva			
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	0		

	Part E
Books	P. K. Sinha, Priti Sinha; Computer Fundamentals; BPB Publication. V. Rajaraman; Fundamentals of Computers; Prentice Hall of India Publication. G. G. Wilkinson; Fundamentals of Information Technology; Wiley-Blackwell Publishing. Yashwant P. Kanetkar; Let Us C; BPB Publication.
Articles	
References Books	E. Balagurusamy; Programming in ANSI C; Tata McGraw-Hill Publishing. Ron Mansfield; Working in MS-Office; Tata McGraw Hill Publishing.
MOOC Courses	
Videos	

COs	P01	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	-	-	-	-	-	-	-	-	-	-	1	1	2
CO2	1	2	-	-	-	-	-	-	-	-	-	-	3	3	2
CO3	-	-	1	-	-	-	-	-	-	-	-	-	3	2	2
CO4	-	-	-	2	-	-	-	-	-	-	-	-	2	2	2
CO5	-	-	-	-	-	-	-	-	-	-	-	-	2	2	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



## BTech-ComputerScience

Title of the Course	Software Engineering							-		
Course Code	CSL0303[T]							-		
		Part	A							
Year	2nd	Semester	3rd	Credits	L	Т	Ρ	С		
i cai	210	Geniester	510	oredita		0	0	3		
Course Type	Theory only	ry only								
Course Category	Discipline Core	scipline Core								
Pre-Requisite/s	student must have kno concepts.	Co-Requisite/s								
Course Outcomes & Bloom's Level	<ul> <li>C01- Understand the basics of software engineering like characteristic, crisis of software and process of software engineering systems (Knowledge, Understand)(BL2-Understand)</li> <li>C02- Apply the various SDLC, ER, DFD models, to collect SRS, And understand the software. (Apply).(BL3-Apply)</li> <li>C03- Design the Design Strategies, Architectural Design concept for better development of software (Design).(BL6-Create)</li> <li>C04- Explain various testing techniques and Analyze the concept of testing strategies (Analysis)(BL4-Analyze)</li> <li>C05- Evaluating the need of Software Maintenance and Software Project Management Software, Need for Maintenance, Corrective and Perfective Maintenance, Cost of Maintenance, Software Re- Engineering, Reverse Engineering and other interocess communication tech An Overview of CASE Tools, Constructive Cost Models (COCOMO), Software Risk Analysis and Management. (Investigation).(BL5-Evaluate)</li> </ul>									
Skill Development ✓         Entrepreneurship ✓         Employability ✓         Professsonal Ethics ✓         Gender ×         Human Values ✓         Environment ×			SDG (Goals)	SDG1(No poverty) SDG2(Zero hunger) SDG4(Quality education)						

Part B

Г

Modules	Contents	Pedagogy	Hours	
Unit-1	Introduction: Introduction to Software Engineering, Software Components, Software Characteristics, Software Crisis, Software Engineering Processes, Similarity and Differences from Conventional Engineering Processes, Software Quality Attributes. Software Development Life Cycle (SDLC) Models: Water Fall Model, Prototype Model, Spiral Model, Evolutionary Development Models, Iterative Enhancement Models.	Lecturing	6	
Unit-2	Planning: Software Requirement Specifications (SRS) Requirement Engineering Process: Elicitation, Analysis, Documentation, Review and Management of User Needs, Feasibility Study, Information Modeling, Data Flow Diagrams, Entity Relationship Diagrams, Decision Tables, SRS Document, Software Quality Assurance (SQA): Verification and Validation, SQA Plans, Software Quality Frameworks, ISO 9000 Model.	Case Study	6	
Unit-3	Design: Basic Concept of Software Design, Architectural Design, Low Level Design: Modularization, Design Structure Charts, Pseudo Codes, Flow Charts, Coupling and Cohesion Measures, Design Strategies: Function Oriented Design, Object Oriented Design, Top-Down and Bottom-Up Design. Software Measurement and Metrics: Various Size Oriented Measures: Function Point (FP) Based Measures, Cyclomatic Complexity.	Case Study	6	
Unit-4	Testing: Software Testing, Testing Objectives, Unit Testing, Integration Testing, Acceptance Testing, Regression Testing, Testing for Functionality and Testing for Performance, Top-Down and Bottom-Up Testing Strategies: Test Drivers and Test Stubs, Structural Testing (White Box Testing), Functional Testing (Black Box Testing), Test Data Suit Preparation, Alpha and Beta Testing of Products. Static Testing Strategies: Formal Technical Reviews (Peer Reviews), Walk Through, Code Inspection, Compliance with Design and Coding Standards.	Case Study	6	
Unit-5	Maintenance: Software Maintenance and Software Project Management Software as an Evolutionary Entity, Need for Maintenance, Categories of Maintenance: Preventive, Corrective and Perfective Maintenance, Cost of Maintenance, Software Re-Engineering, Reverse Engineering, Software Configuration Management, An Overview of CASE Tools, Constructive Cost Models (COCOMO), Software Risk Analysis and Management.	Lecturing	6	

	Par	C		
Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
2,3,4	Case study	Case Study	BL5-Evaluate	15

	Part D(Marks Distribution)							
	Theory							
Total Marks	arks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation							
100	40	60	18	40				
			Practical	·				
Total Marks	Minimum Passing Marks	External Evaluation Min. External Evaluation Internal Evaluation Min. Inter		Min. Internal Evaluation				
100	0	40	12	60	18			

Books	Pressman, R. S., & Dr, B. R. M. (2014, January 23). Software Engineering: A Practitioner's Approach. McGraw-Hill Education. http://books.google.ie/books? id=i8NmnAEACAAJ&dq=R,+S,+Pressman&hl=&cd=1&source=gbs_api (Pressman & Dr, 2014)
Articles	
References Books	Pressman, R. S., & Dr, B. R. M. (2014, January 23). Software Engineering: A Practitioner's Approach. McGraw-Hill Education. http://books.google.ie/books? id=i8NmAEACAAJ&dq=R.+S.+Pressman&hl=&cd=1&source=gbs_api (Pressman & Dr, 2014)
MOOC Courses	
Videos	https://onlinecourses.nptel.ac.in/noc20_cs68/preview

COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	1	-	-	-	-	-	-	-	1	-	2
CO2	1	-	-	-	1	2	-	-	-	-	-	-	1	2	3
CO3	2	1	-	-	1	-	-	-	-	-	-	-	3	2	3
CO4	2	2	-	3	1	-	-	-	-	-	-	-	3	2	3
CO5	2	2	-	2	1	-	-	-	-	-	-	-	3	2	3
CO6	1	1	2	3	2	2	-	-	-	2	-	-	3	3	3



## BTech-ComputerScience

Title of the Course	Artificial Intelligence								
Course Code	CSL0501[T]								
		Part	A						
Year	3rd	Semester	5th	Credits		Т 0	P 1	C 4	
Course Type	Embedded theory an	ad theory and lab							
Course Category	Discipline Core	- cipline Core							
Pre-Requisite/s		ontents and successfully complete this course, a atistical Data Analysis and visualization methods,	Co-Requisite/s						
Course Outcomes & Bloom's Level	CO1- Remember(BL CO2- understand(BL CO3- Analyze(BL4-/ CO4- Evaluate(BL5- CO5- Create(BL6-C	.2-Understand) Analyze) Evaluate)							
Skill Development ✓         Entrepreneurship ✓         Employability ✓         Professsonal Ethics ✓         Gender ×         Human Values ×         Environment ×		SDG (Goals)	SDG1(No poverty) SDG2(Zero hunger) SDG8(Decent work and economic growth) SDG11(Sustainable cities and economies)						

## Part B

Modules	Contents	Pedagogy	Hours
Unit-1:	Introduction to AI What is AI, Turing test, cognitive modelling approach, law of thoughts, the relational agent approach, the underlying assumptions about intelligence, techniques required to solve AI problems, level of details required to model human intelligence, successfully building an intelligent problem, history of AI	Lecturing	9
Unit 2 :	AI Systems and Techniques: Reasoning agents, Logic and inference via Logic Programming, Linked data, semantic net and internet search, planning under uncertainty, Adversarial search, game playing, Probabilistic inference, Natural language processing, approaches to machine translation.	Lecturing	9
Unit 3 :	Al Research Trends: Research trends in machine learning, deep learning, reinforcement learning, robotics, computer vision, natural language processing, collaborative systems, algorithmic game theory, internet of things (IoT), neuromorphic computing. Applications of Al by domain: Transportation, home/service robots, healthcare, education, lower source communities, public safety and security, employment and workplace, entertainment, finance, baking and insurance.	Case Study	9
Unit 4	Role of Artificial Intelligence in Society: Societal challenges AI presents, Ethical and Societal implications, policy and law for AI, fostering dialogue, sharing of best practices. Malicious Use of AI: Prevention and Mitigation: Security relevant properties of AI, Security domains and scenarios: digital security, physical security, pollical security, factors affecting the equilibrium of AI and security Explainable AI: Introduction to explainable AI, why explainable AI, interpretability and explain ability, methods of interpretability and explain ability.	Case Study	9
Unit 5	Introduction to Data Analytics: Working with Formula and Functions, Introduction to Charts, Logical functions using Excel, Analyzing Data with Excel.	Lecturing PBL	9

#### Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Unit - I-V	PBL	PBL	BL6-Create	10
Unit -III - IV	Case Study	Case Study	BL4-Analyze	10
Unit II & V	Implement search algorithm of AI Develop an intelligent game using python Design a intelligent lock using python Elementary programs using LISP. Write a program to predict sales trends. Elementary program using prolog Write a program to design a NLP base user interface. Write a program to convert text to voice vice – versa. Apply and create formulas on excel sheet. Analyze the data using excel Visualize data in Excel using various types of charts.	Experiments	BL3-Apply	10

Part D(Marks Distribution)							
Theory							
Total Marks	Total Marks         Minimum Passing Marks         External Evaluation         Min. External Evaluation         Internal Evaluation				Min. Internal Evaluation		
100	40	60	18	40			
			Practical				
Total Marks	al Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation		Min. Internal Evaluation				
100	50	60	30	40			

Part E							
Books	Patterson, D. W. (1990, January 1). Introduction to Artificial Intelligence and Expert Systems.						
Articles							
References Books	Rich, E., & Knight, K. (1991, January 1). Artificial Intelligence. McGraw-Hill Science, Engineering & Mathematics.						
MOOC Courses							
Videos							

COs	P01	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	-	-	-	1	2	-	-	-	2	-	-	1	-	1
CO2	2	2	1	2	2	2	-	-	-	2	-	-	1	-	3
CO3	2	2	2	2	2	-	-	-	-	-	-	-	2	2	3
CO4	-	2	-	3	1	-	-	-	-	1	-	-	2	3	3
CO5	1	1	-	2	-	-	-	-	-	-	-	-	2	2	3
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



## BTech-Electronics\_and\_Communication

Title of the Course	Data Communication												
Course Code	ECE0620[T]	J620[T]											
		Part	A										
Year	3rd	Semester	6th	Credits	L	Т	Ρ	С					
Course Type	Theory only												
Course Category	Discipline Electives												
Pre-Requisite/s	To Understand the contents and successfully complete this course, a participant must have a basic understanding of device-to-device Communication, Basics concepts of communication, digital electronics and computers.												
Course Outcomes & Bloom's Level	CO2- Understand the fl CO3- To apply simple c CO4- To analysis the ne	oncept of signals, OSI & TCP/IP reference moo low control and error control mechanisms and communication network using different topology etwork topology and circuit for communication. sport Layer Protocols (UDP, TCP) and sugges	apply them using standard data link layer pro y (BL3-Apply) (BL4-Analyze)	otocols (BL2-Understand)									
Coures Elements	SDG1(No poverty) SDG2(Zero hunger) SDG4(Quality education) SDG8(Decent work and economic growth)												

Part B

Modules	Contents	Pedagogy	Hours
1	Communication, Networks Physical Structures; Different Topologies, Categories of Networks: LAN, MAN, WAN, Interconnection of Networks, The internet Protocols and Standards, Standards Organizations, Network Models, Layered Tasks, The OSI Model, Different Layers in OSI Model. TCP / IP protocol suite	lecture method/Group Discussion	9
2	Switching Techniques add Physical Layer: Circuit Switching, packet Switching and Message Switching Techniques, gateway, Routers, Physical, Layer Transmission Medium. Data Link Layer: Framing BSC, I {DLC, ARQ; Stop and Wait, Silding Window, Efficiency Error and Correction, Parity Checks- CRC, Checksum (, MAC Sub layer LAN Protocols, ALOHA, Slotted ALOFIA, CSMA, CSMA/ CD, Token Bus, Token Ring.	lecture method/Project based learning	10
3	Need for Network Layer, Logical Addressing- IPv4 Addresses. IPv6 Addresses. Routing- Data Gram and Virtual Circuits, Dijkstra's, Bellman Ford, Distance Vector, Link State and Path Vector	lecture method/Project based learning	10
4	Transport Layer: Connection Oriented Transport Protocol Mechanism, TCP, TSAP, Transport Flow Regulation fragmentation and Reassemble, Session and Transport Interaction, Synchronization Points, Session Protocol Data Unit, Routing Protocol- Unicast, multicast and broadcast, Congestion Control and ATM, Traffic Management- AAL.X.25, Internal Layer	lecture method/Project based learning	11
5	Data Security: Synchronization, Translation, Enoyption, Decryption' Data Compression and Application Layer Protocols like: FTP, Remote Login, Virtual Terminal, and Network Management Protocols.	lecture method/Project based learning	10

	Par	t C		
Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	To study the Addressing Modes of Microcontroller 8051.	Experiments	BL2-Understand	2

	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								
		·	Practical									
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation							

	Part E
Books	Forouzan, A. B., (2017). Data Communications and Networking. 5th Edition, Tata McGraw-Hill
Articles	https://ieeexplore.ieee.org/document/10529194
References Books	Alberto, L. G., & Widjaja, I. (2004). Communication Networks Fundamental Concepts and Key architectures, Tata McGraw-Hill Stallings, W., (2007). Data and Computer Communication, Pearson Education Larry L. Peterson, L. L., & Davie, B. S. (2007). Digital and Switching Waveforms, Elsevier
MOOC Courses	https://www.my-mooc.com/en/mooc/data-communications-and-network-services/ https://nptel.ac.in/courses/106105082
Videos	https://ieeexplore.ieee.org/document/10528863

	Course Articulation Matrix														
COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	2	-	-	-	3	-	-	-	-	-
CO2	-	-	-	-	-	2	-	-	-	3	-	-	3	-	2
CO3	-	1	1	-	-	-	-	-	-	-	-	-	3	-	2
CO4	-	2	1	2	2	-	-	-	-	-	-	-	3	2	3
CO5	-	-	2	-	-	-	-	-	-	-	-	-	1	3	3
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



#### BTech-Electronics\_and\_Communication

Title of the Course	Wireless Ad hoc N	less Ad hoc Networks												
Course Code	ECE0752[T]	2[T]												
			Part A											
Year	445	0 - martin	7th	Credits	L	т	Р	С						
Year	4th	Semester	Credits	3	1	0	4							
Course Type	Theory only		·											
Course Category	Discipline Specific Elective													
Pre-Requisite/s	Basic knowledge	of communication		Co-Requisite/s										
Course Outcomes & Bloom's Level	CO2- To understa CO3- Apply to se CO4- Analyze en CO5- Evaluate th	er the concepts of communication.(BL1-F and the under lying technologies of wireles lect the appropriate protocol for various a ergy management in ad-hoc wireless net e existing network and improve its quality rotocols.(BL5-Evaluate)	ss networks.( <b>BL2-Understand)</b> oplications( <b>BL3-Apply</b> ) vorks.( <b>BL4-Analyze</b> )	wireless protocols for MAC layer and Netwo	ork layer,	and then	go onto fe	ormulate						
Coures Elements	Skill Developmen Entrepreneurship Employability ✓ Professsonal Eth Gender X Human Values X Environment X	x ics √	SDG (Goals)	SDG1(No poverty) SDG2(Zero hunger) SDG4(Quality education)										

#### Part B Modules Contents Pedagogy Hours Wireless Ad Hoc Networks Introduction to various Wireless Networks and Standards (802..11 / 802.15.4), Cellular and Wireless Ad Hoc Networks, Architecture of Wireless Ad Hoc Network, Issues and Challenges in Wireless Ad Hoc Networks, Applications of Wireless Ad Hoc Networks Lecture Method / Video/ Group Discussion / Case study / Simulation 12 1 MAC Protocol for Wireless Ad hoc Networks Introduction to Medium Access Control (MAC) Protocols, Issues in Designing a MAC Protocol for Wireless Ad Hoc Networks, Performance Parameters of Wireless Ad Hoc Networks, Classification of MAC Protocols for Wireless Ad Hoc Networks. 2 10 Lecture Method / Video/ Group Discussion / Case study / Simulation Routing Protocol for Wireless Ad hoc Networks Introduction, Issues in Designing a Routing Protocol for Wireless Ad Hoc Networks, Classification of Routing Protocols, Destination Sequenced Distance Vector (DSDV) Routing Protocol, Dynamic Source Routing (DSR) Protocol, Ad Hoc Distance Vector (AODV) Routing Protocol, Zone Routing Protocol (ZRP), Multicasting Routing in Wireless Ad Hoc Networks. 3 Lecture Method / Video/ Group Discussion / Case study / Simulation 10 Wireless Sensor Networks Introduction to Wireless Sensor Networks, Comparison with Wireless Ad Hoc Networks, Architecture of Wireless Sensor Network, Issues and Challenges of Wireless Sensor Networks, Design Requirements of Wireless Sensor Networks, Performance Parameters of Wireless Sensor Networks, Applications of Wireless Sensor Networks 4 Lecture Method / Video/ Group Discussion / Simulation 10 Hardware Components and Protocols for Wireless Sensor Networks Introduction to Wireless Sensor Nodes, Architecture of a Basic Sensor Node, Hardware Components of Wireless Sensor Networks, Different Sensor Nodes, MAC Protocols and Routing Protocols for Wireless Sensor Networks, Various Network Simulators for Wireless Sensor Networks. 10 5 Lecture Method / Video/ Group Discussion / Case study / Simulation

#### 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								
		·	Practical									
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation							

	Part E
Books	<ol> <li>C Siva Ram Murty and B S Manoj, Wireless Communication-Principles and Practice, Pearson Education</li> <li>Mohamed Illayas, Handbook of Ad Hoc Wireless Network, CRC Press</li> <li>Kazem Sohraby, Daniel Minoli, Taieb Znati, John Wiley &amp; Sons, Wireless Sensor Networks Technology, Protocols, and Applications, John Wiley &amp; Sons.</li> </ol>
Articles	<ol> <li>Sharma, Bharati, Mayank Satya Prakash Sharma, and Ranjeet Singh Tomar. "A survey: Issues and challenges of vehicular ad hoc networks (VANETs)." Proceedings of International Conference on Sustainable Computing in Science, Technology and Management (SUSCOM), Amity University Rajasthan, Jaipur-India. 2019.</li> <li>Sharma, Bharati, Mayank Satya Prakash Sharma, and Ranjeet Singh Tomar. "A survey: Issues and challenges of vehicular ad hoc networks (VANETs)." Proceedings of International Conference on Sustainable Computing in Science, Technology and Management (SUSCOM), Amity University Rajasthan, Jaipur-India. 2019.</li> </ol>
References Books	(1) Mohamed Illayas and Imad Mahgoub, Handbook of Sensor Networks: Compact Wireless and Wired Sensing Systems, CRC Press.
MOOC Courses	https://nptel.ac.in/courses/106105160
Videos	https://www.youtube.com/watch?v=tlqkVh2Amul

COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	1	-	2	-	-	-	-	-	3	-	2	-	-	-
CO2	-	2	-	3	-	-	-	-	-	3	-	2	-	-	-
CO3	-	3	-	3	-	2	-	-	-	1	1	2	-	-	-
CO4	-	2	-	1	2	-	-	-	-	-	1	2	-	-	-
CO5	-	1	-	-	2	-	-	-	-	-	-	1	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



## BTech-ElectricalEngineering

Title of the Course	Analog & Digital Co	ommunication											
Course Code	ECL0427												
<b></b>			Part A										
Year	2nd	Semester	4th	Credits	L	т	Ρ	С					
	2.10			3	1	1	5						
Course Type	Embedded theory a	and lab	·										
Course Category	Disciplinary Minor	Disciplinary Minor											
Pre-Requisite/s				Co-Requisite/s									
Course Outcomes & Bloom's Level	CO2- understand the CO3- have a practic CO4- practical expo	ive knowledge of analog and digital comm he modulation and demodulation technoi ical experience of different communicatic cerience of communication methods and rrent project based works and fond solution	logies and apply whenever essential ( <b>E</b> on technologies and can identify and an evaluate different process.( <b>BL5-Evalua</b>	nalyze(BL3-Apply)									
Coures Elements	Skill Development : Entrepreneurship v Employability v Professsonal Ethic: Gender X Human Values X Environment X	1	SDG (Goals)										

## Part B

Modules	Contents	Pedagogy	Hours
1	Introduction:Overview of Communication system, Communication channels Need for modulation, Baseband and Pass band signals.Noise: Internal & External Noise, Signal to Noise ratio, Noise Figure, Calculation of Noise. Amplitude Modulation: Double side band with Carrier (DSB-C), Double side band without Carrier, Single Side Band Modulation, DSB-SC, SSB Modulators and Demodulators, Vestigial Side Band (VSB).	Talks and presentations	12
2	Angle Modulation: Angle Modulation; FM and PM waveforms, phase deviation, frequency deviation, modulation index, phase and frequency modulators and demodulators, frequency spectrum of angle modulated waves, bandwidth requirement for angle modulated waves, Average power of angle modulated waves, direct and indirect FM transmitters, FM Receivers, Angle Vs Amplitude modulation, FM Vs PM, FM noise suppression.	Talks and presentations	13
3	Pulse Modulation and Waveform Coding Techniques: Pulse Modulation Digital Transmission of Analog Signals: Sampling Theorem and its applications, Pulse Amplitude Modulation (PAM), Pulse Width modulation, Pulse Position Modulation. Their generation and Demodulation, Digital representation of Analog Signals, Pulse Code Modulation (PCM), PCM System, Differential Pulse Code Modulation.	Talks and presentations	11
4	Digital Modulation and Demodulation Techniques: Digital Data transmission, Line coding review, Pulse shaping, Scrambling, Digital receivers, Method of generation and detection of coherent & non- coherent binary ASK, FSK & PSK, Differential phase shift keying, quadrature modulation techniques. (QPSK and MSK), M-ary Digital carrier Modulation.	Talks and presentations	12
5	Information Theory & Coding: Information, entropies(Marginal and Conditional), Model of a communication system, Mathematical representation of source, channel and receiver characteristics, Mutual information, channel capacity, efficiency of noise free channel , Binary symmetric channel(BSC), Binary erasure channel(BEC), Shannon theorem, Shannon –Hartley Theorem, Shannon Fano and Huffman coding methods and their efficiency, Error control coding, Minimum Hamming distance, Linear block code, Cyclic code and Convolution codes.	Talks and presentations	12

## 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	22				
			Practical						
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation				
100	50	60	30	40	20				

Books	
Articles	
References Books	
MOOC Courses	
Videos	

	Course Articulation Matrix														
COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	1	-	1	1	-	-	-	-	1	1	2	2	2
CO2	1	1	1	1	1	-	-	-	-	-	1	1	2	2	3
CO3	1	1	1	1	1	1	-	-	-	-	1	1	2	3	2
CO4	1	1	1	1	1	1	-	-	-	-	1	1	3	2	3
CO5	1	1	1	1	1	1	-	-	-	-	1	-	3	2	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



## BTech-Electronics\_and\_Communication

Title of the Course	Electric Vehi	ectric Vehicle Technology									
Course Code	ECO0701A[1										
	Part A										
Year	4th	Semester	7th	Credits	L	т	Р	С			
Tear	401	Semester	701	Credits	3	0	0	3			
Course Type	Theory only										
Course Category	Open Electiv	ve									
Pre-Requisite/s				Co-Requisite/s	j						
Course Outcomes & Bloom's Level	CO2- CO2: 1 CO3- CO3: 1 CO4- CO4: 1	Identify various types of EV's Describe battery basics and th Identify various types of electri Describe Solar panel design a Identify installation and commi	eir types in EV and HEV(BL ical machines used in EV ins nd integration. (BL4-Analyze	2-Understand) tallation(BL3-Apply) e)							
Coures Elements     Skill Development × Entrepreneurship × Employability ✓     SDG (Goals)     SDG3(Good health and well-being) SDG4(Quality education) SDG3(Decent work and economic growth) SDG3(Decent work and economic growth) SDG3(Decent work and economics) SDG3(Decent work and economics) SDG3(Court education) SDG3(Court education) SDG3(Court education)       Coures Elements     SDG (Goals)     SDG3(Cood health and well-being) SDG4(Quality education) SDG3(Decent work and economic growth) SDG3(Subatinable cities and economics) SDG3(Subatinable cities and economics) SDG3(Court education)											

	Part B									
Modules	Contents	Pedagogy	Hours							
1	UNIT-I The knowledge of Principles of EV and HEV and Basic knowledge about renewable energy sources UNIT-I No. of Lectures: 8 Types of EV: Battery electric vehicles, The IC engine/electric hybrid vehicle, fuelled electric vehicles, Electric vehicles using supply lines, Solar powered vehicles, Electric vehicles which use flywheels or super capacitors, Electric Vehicles for the Future	Lecture Method/Video	8							
Ш	UNIT-II No. of Lectures: 07 EV Batteries : Electric Vehicle Operation, Battery Basics, Introduction to Electric Vehicle Batteries, Fuel Cell Technology, Choice of a Battery, Electric Vehicle Body and Frame, Fluids, Lubricants, and Coolants, Effects of Current Density on Battery Formation, Effects of Excessive Heat on Battery Cycle Life, Battery Storage, Battery Capacity	Lecture Method/Video Clips/Group Discussion	8							
111	UNIT-III No. of Lectures: 08 Special Electrical Machines for EV : Real-Time Model of a Two-Phase PMSM, PM Brushless DC Machine for EV, Switched Reluctance Motor (SRM) uses in EV, Synchronous Reluctance Motor (SyRM) for EV and HEV, Linear Induction Motor (LIM) – Construction, DC Linear Motor (DCLM) for EV, Analyze the control aspects of brushless DC motor	Lecture Method/Video Clips/Group Discussion	9							
IV	UNIT-IV No. of Lectures: 08 Solar Panel Design and Integration : Solar Radiation Energy Measurements, Estimating Energy requirement, Types of Solar PV System, Design methodology for SPV system, Design of Off Grid Solar Power Plant, Case studies of 3KWp Off grid Solar PV Power Plant, Design and Development of Solar Street Light and Solar Lantern, Off Grid Solar power Plant	Lecture Method/Video Clips/Group Discussion	10							
v	UNIT-V No. of Lectures: 07 Solar Panel Installation and Commissioning : Installation and Trouble shooting of Standalone Solar PV System, Maintenance of Solar PV System, Safety in installation of Solar PV System, Maintenance of Solar PV System. Installation, Commissioning, Trouble shooting of 1KWp off Grid Solar Power Plant, Check list for Solar PV Plant Installation and Commissioning	Lecture Method/Video Clips/Group Discussion	10							

## 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					
	Practical								
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation				

Books	Babu, A. (n.d.). Electric & Hybrid Vehicles. KHANNA PUBLISHING HOUSE. http://books.google.ie/books? id=AzsIEAAQBAJ&printsec=frontcover&dq=9789366173713&hl=&d=1&source=gbs_api Tripathi, P. (2022, June 15). Handbook on Electric Vehicles Manufacturing (E- Car, Electric Bicycle, E- Scooter, E-Motorcycle, Electric Rickshaw, E- Bus, Electric Truck with Assembly Process, Machinery Equipments & Layout). NIIR PROJECT CONSULTANCY SERVICES. http://books.google.ie/books? id=gSZ1EAAAQBAJ&pg=PA351&dq=8195676928&hl=&cd=1&source=gbs_api							
Articles								
References Books	1 Mike Blundell and Damian Harty The Multi body systems Approach to Vehicle Dynamics Elsevier, 2004. 2 John Twidell & Toney Weir Renewable Energy Resources E & F N Spon							
MOOC Courses	Electric Vehicles - Part 1 By Prof. Amit Jain   IIT Delhi EV - Vehicle Dynamics and Electric Motor Drives By Prof. Amit Jain, Prof. Avanish Tripathi   IIT Delhi							
Videos	https://www.youtube.com/watch?v=UgtjRob5qMg&list=PLyqSpQzTE6M9spod-UH7Q69wQ3uRm5thr https://www.youtube.com/watch?v=L2HbpEMfryM&list=PLp6ek2hDcoNCROoQbG05xNfiBEY7492Vn							

	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	-	-	-	1	1	2	1	2
CO2	1	1	1	1	1	1	-	-	-	-	1	1	3	2	2
CO3	1	1	1	1	1	-	1	-	-	-	1	-	2	2	3
CO4	1	1	-	1	-	1	1	-	-	-	1	1	2	2	2
CO5	1	1	-	-	-	-	-	-	-	-	1	1	3	2	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



## BTech-Electronics\_and\_Communication

Title of the Course	Intellectual Proper	ellectual Property Rights									
Course Code	ECO0701C[T]	C00701C[T]									
			Part A								
Year	445	0	74	Credits	L	т	Р	С			
fear	4th	Semester	7th	Credits	3	0	0	3			
Course Type	Theory only		1		а						
Course Category	Open Elective										
Pre-Requisite/s				Co-Requisite/s							
Course Outcomes & Bloom's Level	industries(BL1-Re CO2- To dissemin CO3- To apply the CO4- To analyze	emember) nate knowledge on patents, patent regime e concept of IPR(BL3-Apply)	in India and abroad and registration a n, Geographical Indication (GI), Plant V	o play a major role in development and manag aspects <b>(BL2-Understand)</b> Variety and Layout Design Protection and their	-						
Coures Elements	Skill Developmen Entrepreneurship Employability ✓ Professsonal Ethi Gender X Human Values ✓ Environment X	×	SDG (Goals)								

	Part B									
Modules	Contents	Pedagogy	Hours							
1	Introduction and the need for intellectual property right (IPR) - Kinds of Intellectual Property Rights: Patent, Copyright, Trade Mark, Design, Geographical Indication, Plant Varieties and Layout Design – Genetic Resources and Traditional Knowledge – Trade Secret - IPR in India : Genesis and development – IPR in abroad - Major International Instruments concerning Intellectual Property Rights: Paris Convention, 1883, the Berne Convention, 1886, the Universal Copyright Convention, 1952, the WIPO Convention, 1967,the Patent Co-operation Treaty, 1970, the TRIPS Agreement, 1994	Lecture Method/ Case Study/ Video/ Group Discussion	12							
2	Elements of Patentability: Novelty, Non Obviousness (Inventive Steps), Industrial Application - Non - Patentable Subject Matter - Registration Procedure, Rights and Duties of Patentee, Assignment and licence , Restoration of lapsed Patents, Surrender and Revocation of Patents, Infringement, Remedies & Penalties - Patent office and Appellate Board	Lecture Method/ Case Study/ Video/ Group Discussion	12							
3	Nature of Copyright - Subject matter of copyright: original literary, dramatic, musical, artistic works; cinematograph films and sound recordings - Registration Procedure, Term of protection, Ownership of copyright, Assignment and license of copyright - Infringement, Remedies & Penalties – Related Rights - Distinction between related rights and copyrights	Lecture Method/ Case Study/ Video/ Group Discussion	12							
4	Different kinds of marks (brand names, logos, signatures, symbols, weil known marks, certification marks and service marks) - Non-Registrable Trademarks - Registration of Trademarks - Rights of holder and assignment and licensing of marks - Infringement, Remedies & Penalties - Trademarks registry and appellate board	Lecture Method/ Case Study/ Video/ Group Discussion	10							
5	meaning and concept of novel and original - Procedure for registration, effect of registration and term of protection Geographical Indication (GI) Geographical indication: meaning, and difference between GI and trademarks - Procedure for registration, effect of registration and term of protection	Lecture Method/ Case Study/ Video/ Group Discussion	10							

## 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					
	Practical								
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation				
0	0	0	0	0	0				

Books	1) Nithyananda, K V. (2019). Intellectual Property Rights. India, IN: Cengage Learning India Private Limited.
Articles	http://op.niscair.res.in/index.php/JIPR
References Books	1) Law of Intellectual Property, Asian Law House, Dr.S.R. Myneni.
MOOC Courses	https://www.udemy.com/course/certificate-course-ipr/? =&gad_source=1&gclid=Cj0KCQjw6PGxBhCVARIsAlumnWYAVsP2ByJ2PaFsYr6Xs5JKQfqgImfwumwXAL_wj2tvGaXZiybXm1YaAsoWEALw_wcB&couponCode=LETSLEARNNOWPP
Videos	https://archive.nptel.ac.in/courses/110/105/110105139/

## Course Articulation Matrix

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



## BTech-ElectricalEngineering

Title of the Course	Electrical & Electro	onic Materials						
Course Code	EEL0304							
			Part A					
Year	2nd	Semester	3rd	Credits	L	т	Р	С
Tear	2110	Semester	510	Creuits	3	0	0	3
Course Type	Theory only			·				
Course Category	Disciplinary Minor							
Pre-Requisite/s				Co-Requisite/s				
Course Outcomes & Bloom's Level	CO2- to understan CO3- to understan CO4- to understan	nd different conducting materials(BL2-Un d different semiconducting materials(BL d different magnetic materials(BL2-Und d different insulating materials(BL2-Und fferent materials(BL3-Apply)	2-Understand) erstand)					
Coures Elements	Skill Development Entrepreneurship 3 Employability X Professsonal Ethic Gender X Human Values X Environment √	×	SDG (Goals)					

## Part B

Modules	Contents	Pedagogy	Hours
1	Conducting Material: Classification and main properties, High resistivity alloy: Constantan Manganin, Nichrome, properties of copper, Aluminum, steel tungsten, Molybdenum, Platinum, Tantalum, Niobium, Mercury, Nickel, Titanium, Carbon, Lead, thermoccuple, materials, specific resistance, conductance, variation of resistance with temperature, super conductors.	Talks and presentations	10
2	Semi Conductor Materials: General conception, variation of electrical conductivity, Elements having semiconductor properties, general application, hall effect, energy levels, conduction in semiconductors, Intrinsic conducton, impurity conduction, P and N type impurities, electrical charge, Drift, Mobility current flow in semi conductors P-N junction formation by alloying, (forward and reverse) of P-n junction, Reverse separation current.	Talks and presentations	9
3	Magnetic Materials: Details of magnetic materials, relation between B. H. and $\mu$ , soft and hard magnetic materials. Di-magnetic, Para magnetic and Ferromagnetic materials, electrical sheet steel, cast iron. Permanent magnetic materials. Dynamic and static hysteresis loop. Hysteresis loos, eddy current loos; Magnetization, magnetic susceptibility, coercive force, core temperature, rectangular hysteresis loops.	Talks and presentations	8
4	Insulating Materials: General electrical mechanical and chemical properties of insulating material, Electrical characteristics volume and surface resistivity complex permittivity loss, and dielectric loss, equivalent circuits of an imperfect dielectric polarization and polarisability classification of dielectric.	Talks and presentations	9
5	Classification of insulating materials on the basis of temperature rise. General properties of transformer oil, commonly used varnishes, solidifying insulating materials, resins, biturninous waxes, drying oils, Fibrous insulating materials, wood, paper and cardboard, insulating textiles, varnished adhesive tapes, inorganic fibrous material and other insulating materials, such as mica, ceramic, Bakelite, ebonite, glass, PVC, rubber, other plastic molded materials.	Talks and presentations	9

#### 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 22 Practical Minimum Passing Marks Total Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation

	Part E								
Books	Text Books: 1. A.J.Dekker: Electrical Engineering Materials PHI 2. Indulkar and S. Thruvengadem; Electrical Engineering Materials; S. Chand								
Articles									
References Books	References: 1. Kortisky; Electrical Engineering Materials: 2. Electrical Engineering Material s & Devices; John Allison ; TMH 3. Materials for Electrical Engineering: B.M. Tareev. 4. Anderson; Di-Electrics :								
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	1	2	2	2
CO2	1	1	1	1	1	-	-	-	-	-	1	1	2	2	3
CO3	1	1	1	1	1	1	-	-	-	-	1	1	2	3	2
CO4	1	1	1	1	1	1	-	-	-	-	1	1	3	2	3
CO5	1	1	1	1	1	1	-	-	-	-	1	-	3	2	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



## BTech-ElectricalEngineering

Title of the Course	Microprocessors &	k Interfacing						
Course Code	EEL0509							
			Part A					
Voar	3rd	Somostor	5th	Credits	L	Т	Р	С
Tear	310	Semester	501	Credits	3	1	1	5
Course Type	Embedded theory	and lab						
Course Category	Interdisciplinary N	lajor						
Pre-Requisite/s				Co-Requisite/s				
Year     3rd     Semester       Course Type     Embedded theory and lab       Course Category     Interdisciplinary Major		ARCHITECTURE (BL2-Understand) 2-Understand) stand)						
Coures Elements	Entrepreneurship Employability ✓ Professsonal Ethi Gender X Human Values X	√ ics √	SDG (Goals)					

	Part B		
Modules	Contents	Pedagogy	Hours
1	THE 8085 PROCESSOR : Introduction to microprocessors, Overview, History of microprocessor. 8085 microprocessor: Architecture, instruction set, interrupts structure, and Assembly language programming. Timing Diagrams & simple examples, including loops & nested loops	Talks and presentations	12
2	THE 8086 MICROPROCESSOR ARCHITECTURE : Architecture, block diagram of 8086, details of sub-blocks such as EU, BIU; memory segmentation and physical address computations, program relocation, addressing modes, instruction formats, pin diagram and description of various signals	Talks and presentations	13
3	INSTRUCTION SET OF 8086 : Instruction execution timing, assembler instruction format, data transfer instructions, arithmetic instructions, branch instructions, looping instructions, NOP and HLT instructions, flag manipulation instructions, logical instructions, shift and rotate instructions, directives and operators, programming examples.	Talks and presentations	11
4	INTERFACING DEVICE : 8255 Programmable peripheral interface, interfacing keyboard and seven segment display, 8254 (8253) programmable interval timer, 8259A programmable interrupt controller, Direct Memory Access and 8237 DMA controller	Talks and presentations	12
5	INTERFACING AND APPLICATION OF 8085 MICROPROCESSOR : Interfacing issues, Interfacing ADC &DAC, Interfacing memory, Microprocessor-based voltage, current, frequency, power measurement schemes.	Talks and presentations	12

#### 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	22					
	Practical									
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation					
100	50	60	30	40	20					

## Part E

Books	1. Microprocessor Architecture, Programming & Applications with 8085 : Ramesh S Gaonkar; Wiley Eastern Ltd. 2. The Intel Microprocessors 8086- Pentium processor : Brey; PHI
Articles	
References Books	REFERENCE BOOKS: 1. Microprocessors and interfacing : Hall; TMH 2. The 8088 & 8086 Microprocessors-Programming, interfacing, Hardware & Applications :Triebel & Singh; PHI 3. Microcomputer systems: the 8086/8088 Family: architecture, Programming & Design : Yu-Chang Liu & Glenn A Gibson; PHI. 4. Advanced Microprocessors and Interfacing : Badri Ram; TMH
MOOC Courses	
Videos	

#### COs PO1 PO2 PO3 PO4 PO5 P06 PO7 PO8 PO9 PO10 PO11 PO12 PSO1 PSO2 PSO3 CO1 2 2 2 1 1 1 1 1 -1 1 ---CO2 2 1 1 1 1 1 \_ --1 1 2 3 CO3 1 1 1 1 1 1 ---1 1 2 3 2 CO4 1 1 1 1 1 1 ----1 1 3 2 3 CO5 1 1 1 1 1 1 ----1 3 2 2 CO6 -----------



## BTech-ElectricalEngineering

Title of the Course	Power system	Power system operation & Control								
Course Code	EEL0839									
			Part A	A						
Year	4th	Semester	8th	Credits	L	Т	Р	С		
Tear	401	Semester	oui	Credits	2	1	1	4		
Course Type	Embedded th	Embedded theory and lab								
Course Category	Discipline Co	Discipline Core								
Pre-Requisite/s				Co-Requisite/s						
Course Outcomes & Bloom's Level	C01- Understand the concept of Optimal Power System Operation under various operating constraints.(BL1-Remember) C02- To know the importance of frequency control(BL2-Understand) C03- To analyze different methods to control reactive power(BL3-Apply) C04- To understand unit commitment problem and importance of economic load dispatch(BL4-Analyze) C05- To understand real time control of power systems (BL5-Evaluate)									
Coures Elements	Skill Develop Entrepreneur Employability Professsonal Gender X Human Value Environment	ship X √√ Ethics √ as X	SDG (Goals)	SDG4(Quality education) SDG8(Decent work and economic growth) SDG9(Industry Innovation and Infrastructur SDG11(Sustainable cities and economies) SDG12(Responsible consuption and produ	e)					

Part B									
Modules	Contents	Pedagogy	Hours						
Unit-1	PRELIMINARIES ON POWER SYSTEM OPERATION AND CONTROL Power scenario in Indian grid – National and Regional load dispatching centers –requirements of good power system - necessity of voltage and frequency regulation – real power vs frequency and reactive power vs voltage control loops - system load variation, load curves and basic concepts of load dispatching - load forecasting - Basics of speed governing mechanisms and modeling - speed load characteristics - regulation of two generators in parallel.	Talks and presentations	12						
Unit-2	REAL POWER - FREQUENCY CONTROL - Load Frequency Control (LFC) of single area system-static and dynamic analysis of uncontrolled and controlled cases - LFC of two area system - tie line modeling – block diagram representation of two area system - static and dynamic analysis - tie line with frequency bias control – state variability model - integration of economic dispatch control with LFC.	Talks and presentations	13						
Unit-3	REACTIVE POWER – VOLTAGE CONTROL - Generation and absorption of reactive power - basics of reactive power control – Automatic Voltage Regulator (AVR) – brushless AC excitation system – block diagram representation of AVR loop - static and dynamic analysis – stability compensation – voltage drop in transmission line - methods of reactive power injection - tap changing transformer, SVC (TCR + TSC) and STATCOM for voltage control.	Talks and presentations	11						
Unit-4	ECONOMIC OPERATION OF POWER SYSTEM - Statement of economic dispatch problem - input and output characteristics of thermal plant - incremental cost curve - optimal operation of thermal units without and with transmission losses (no derivation of transmission loss coefficients) - base point and participation factors method - statement of unit commitment (UC) problem - constraints on UC problem - solution of UC problem using priority list – special aspects of short term and long term hydrothermal problems.	Talks and presentations	14						
Unit-5	COMPUTER CONTROL OF POWER SYSTEMS - Need of computer control of power systems-concept of energy control centers and functions – PMU - system monitoring, data acquisition and controls - System hardware configurations - SCADA and EMS functions - state estimation problem – measurements and errors - weighted least square estimation - various operating states - state transition diagram.	Talks and presentations	10						

## Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Experiment 1	To study characteristics of solid state over voltage and under voltage relay	Experiments	BL2-Understand	2
Experiment 2	To study characteristics of static type over current relay	Experiments	BL2-Understand	2
Experiment 3	Under voltage relay static type	Experiments	BL3-Apply	2
Experiment 4	To study IDMT Over current relays single phase and to determine the pick up and reset value	Experiments	BL4-Analyze	2
Experiment 5	To study line to line fault	Experiments	BL5-Evaluate	2

	Theory								
Total Marks	Total Marks         Minimum Passing Marks         External Evaluation         Min. External Evaluation         Internal Evaluation         Min. Internal Evaluation								
100	40	60	18	40	22				
			Practical						
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation				
100	50	60	30	40	20				

Books	1. Olle.I.Elgerd, 'Electric Energy Systems theory - An introduction', McGraw Hill Education Pvt. Ltd., New Delhi, 34th reprint, 2010. 2. Allen. J. Wood and Bruce F. Wollen berg, 'Power Generation, Operation and Control', John Wiley & Sons, Inc., 2016. 3. Abhijit Chakrabarti and Sunita Halder, 'Power System Analysis Operation and Control', PHI learning Pvt. Ltd., New Delhi, Third Edition, 2010.
Articles	
References Books	1. Kothari D.P. and Nagrath I.J., 'Power System Engineering', Tata McGraw-Hill Education, Second Edition, 2008. 2. Hadi Saadat, 'Power System Analysis', McGraw Hill Education Pvt. Ltd., New Delhi, 21st reprint, 2010. 3. Kundur P., 'Power System Stability and Control, McGraw Hill Education Pvt. Ltd., New Delhi, 10th reprint, 2010.
MOOC Courses	
Videos	

COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1	1	1	-	-	3	-	-	-	-	3	3	2
CO2	3	2	2	-	-	-	-	-	-	1	-	-	2	3	-
CO3	1	3	1	2	1	-	1	-	1	-	1	-	2	2	3
CO4	2	1	1	-	-	3	-	1	-	-	1	-	2	1	-
CO5	2	3	3	2	1	-	-	-	-	1	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



## BTech-ElectricalEngineering

Title of the Course	Energy Mana	gement & Audit								
Course Code	EEM0716	-EM0716								
Part A										
Year	4th	Semester	7th	Credits	L	т	Ρ	С		
Tear	401	Semester	7.01	oreans	3	1	0	4		
Course Type	Theory only									
Course Category	Discipline Ele	Discipline Electives								
Pre-Requisite/s				Co-Requisite/s						
Course Outcomes & Bloom's Level	C01- Describe the basics of energy management, energy demand management and energy auditing(BL1-Remember) C02- Understand the need and significance of energy audit and management and understand the concept of measuring instruments for energy auditing, defining, and examining the various characteristics of instruments. (BL2-Understand) C03- To understand efficient heat & electricity utilization, saving and recovery in different thermal and electrical system. (BL3-Apply) C04- Analyze energy consumption patterns and trends within an organization or system, evaluating the economic and environmental impacts of different energy management practices. (BL4-Analyze) C05- Assess and compare various renewable energy technologies and their potential integration into existing energy systems, making informed recommendations based on feasibility and sustainability criteria; (BL5-Evaluate)									
Coures Elements	Skill Development ✓     Entrepreneurship ✓       Entrepreneurship ✓     SDG4(Quality education)       Professsonal Ethics ✓     SDG (Goals)       Gender ✓     SDG12(Responsible consuption and production)       Human Values X     Environment X									

|--|

Modules	Contents	Pedagogy	Hours
Unit-1	General energy problem: Energy use patterns and scope for conservation, Energy Scenario: Commercial and Non-commercial energy resources, Primary & secondary energy resources, Load forecasting Energy needs of growing economy, Thermodynamics of Energy Conservation Energy Conservation Act-2001 and its features.	Talks and presentations	12
Unit-2	Energy audit: Auditing and Targeting, Types of energy audit, Energy monitoring, Energy accounting and analysis, Energy conservation policy, Energy Auditing instruments, , Energy management system, Use of Artificial intelligence based techniques in EMS, Functions of energy managers.	Talks and presentations	13
Unit-3	Energy efficient electric drives, Energy efficient motors, Energy Conservation in transportation system especially in electric vehicle, Energy recovery in thermal systems, waste heat recovery techniques, thermal insulation. Thermal energy audit in heating, ventilation and air conditioning qualities, Energy storage for power systems (Mechanical, Thermal, Electrical & Magnetic).	Talks and presentations	11
Unit-4	Power factor improvement in power system Energy conservation by improvement of load factor, Energy conservation in different industries, e.g. Iron and Steel industry, Aluminum industry, Cement industry, Paper and Textile industry, Electrical Energy Conservation in building, heating and lighting and domestic gadgets.	Talks and presentations	10
Unit-5	Demand side management Load management, Energy costs and two-part tariff, Restructuring of electric tariff from energy conservation consideration, Energy storage and Co-Generation, Payback period, Energy economics, Economic analysis depreciation method, time value of money, Evaluation method of projects, replacement analysis, inflation risk analysis.	Talks and presentations	14

## 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	22			
			Practical					
Total Marks	s Minimum Passing Marks External Evaluation		Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation			

	Tante
Books	1. Power Generation, Operation & Control, A.J. Wood and B.F. Wolenberg, John Wiley & Sons Ltd. 2. Patterns of Energy Use in Developing Countries by Desai, Wiley Eastern Ltd.
Articles	
References Books	1. Electrical energy utilization and conservation S C Tripathi ,Tata McGraw Hills 2. Energy Conservation- Paul O Callagan- Pergamon Press
MOOC Courses	
Videos	

## Course Articulation Matrix

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



## BTech-ElectricalEngineering

Title of the Course	Advanced por	wer system protection								
Course Code	EEM0718	<i>N</i> 0718								
	Part A									
Year	4th	Semester	7th	Р	С					
Tear	401	Semester	701	Credits	3	1	0	4		
Course Type	Theory only	eory only								
Course Category	Discipline Ele	scipline Electives								
Pre-Requisite/s				Co-Requisite/s	Co-Requisite/s					
Course Outcomes & Bloom's Level	CO2- Unders CO3- Realize CO4- Analyz	stand the realization of over curr	ent, distance and differential r istics of digital relays for prote of bus bar and transmission lir	ation using static circuits.(BL1-Remember) relays using comparators.(BL2-Understand) sction of transmission lines, transformers(BL3 nes.(BL4-Analyze)	-Apply)					
Coures Elements	Skill Develop Entrepreneur Employability Professsonal Gender X Human Value Environment	rship ✓ / ✓   Ethics ✓ es ×	SDG (Goals)	SDG4(Quality education) SDG7(Affordable and clean energy) SDG9(Industry Innovation and Infrastructure SDG13(Climate action)	)					

	Part B		
Modules	Contents	Pedagogy	Hours
Unit-1	Protective Relays: Relaying review, characteristics and operating equations of relays.CT's and PT's differential relay, over-current relay, reverse power relay, distance relays, applications of relays.	Talks and presentations	12
Unit-2	STATIC RELAYS: Introduction, advantages and disadvantages, classification logic ckts, smoothing circuits, voltage regulator square wave generator, time delay ckts level detectors, summation device, sampling circuit, zero crossing detector, output devices. COMPARATORS: Replica Impedance, mixing transformers, general equation of phase and amplitude comparator, realization of ohm, impedance and off set impedance characteristics, duality principle, static amplitude comparators, coincidence circuit, Hall effect devices, Magneto receptivity, zener diode phase comparator multi input comparators.	Talks and presentations	13
Unit-3	Generator and transformer protection: Protective devices for system. Protective devices for stator, rotor, and prime mover of generator, percentage differential relays protection, three winding transformer protection, earth fault protection, generator Transformer unit protection	Talks and presentations	11
Unit-4	Bus bar and transmission line protection: Distance protective schemes, directional wave detection relay. Phase compensation carrier protection. High impedance differential scheme, supervisory and check relay, Some features of 500 KV relaying protection.	Talks and presentations	10
Unit-5	Modern trends in power system protection: Different types of digital and computer aided relays, Microprocessor based relays, auto-reclosing, frequency relays, under and over frequency relays, di/dt relays. Algorithms for transmission line, transformer & bus bar protection; out-of-step relaying Introduction to adaptive relaying & wide area measurements	Talks and presentations	14

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	22						
			Practical								
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation						

	Part E
Books	1. Power System Protection and Switchgear, B.Ram – Tata Mc-Graw Hill Pub. 2. Switchgear and Protection, M.V.Deshpande - Tata Mc-Graw Hill Pub.
Articles	
References Books	1. Power System Protection & Switchgear, Ravindra Nath, M.Chander, Willy P 2.Computer Relaying for power system, Arun Phadke, James Thorp, Johns W P
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	-	-	-	-	-	-	-	-	-	2	3	-
CO2	3	-	2	-	-	-	-	-	-	-	-	-	2	3	-
CO3	3	-	3	-	-	-	-	-	-	-	-	-	3	2	-
CO4	2	-	2	-	-	-	-	-	-	-	-	-	3	3	-
CO5	2	-	3	-	-	-	-	-	-	-	-	-	3	2	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



## BTech-ElectricalEngineering

Title of the Course	Distributed Gene	Distributed Generation System										
Course Code	EEM0819											
	Part A											
Year	4th	Semester	8th	Credits	L	Т	Р	С				
Tear	401	Semester	oui	Credits	3	1	0	4				
Course Type	Theory only											
Course Category	Discipline Electiv	iscipline Electives										
Pre-Requisite/s				Co-Requisite/s								
Course Outcomes & Bloom's Level	concept worldwi CO2- Comprehe storage devices CO3- Understan infrastructure an CO4- Identificati audit. (BL4-Anal CO5- Comprehe	de (BL1-Rémember) and the acquaintance of intellig like SMES, pumped hydro stor d the concept of real time prici- d cyber security in smart grid. ( on of power quality issues in g yze) nd the acquaintance of micro	ent electronic devices and the rage and compressed air ener ing, automatic meter reading, o <b>BL3-Apply)</b> rid connected renewable ener	wareness about the national and the internation of application in monitoring and protection. Unc gy storage. Use of PMU and WAMS in modern uutage management system. Identification of c gy sources. Acquiring the knowledge of power grid. Understanding of thin solar films, variable	derstanding ac n power system challenges and quality condit	dvantages and m analysis. <b>(BL</b> d opportunities ioners and imp	challenges of 2-Understanc in advanced n ortance of pov	latest smart t) netering ver quality				
Coures Elements	Entrepreneurshi Employability √	mart grid.(BL5-Evaluate) ikili Development × intrepreneurship ✓ imployability ✓ trofesssonal Ethics ✓ sonder × tuman Values ×										

	Part B		
Modules	Contents	Pedagogy	Hours
Unit-1	DISTRIBUTED GENERATION: Energy Sources and their availability -trends in energy consumption, conventional and non-conventional energy sources – review of solar photovoltaic – wind energy systems – fuel cells, energy storage systems: batteries – ultra capacitors – fly wheels – captive power plants. Distributed generation – concept and topologies, renewable energy in distributed generation. IEEE 1547 Standard for interconnecting distributed generation to electric power systems – DG installations – sitting and sizing of DGs – optimal placement – regulatory issues	Talks and presentations	12
Unit-2	ISSUES IN GRID INTEGRATION OF DISTRIBUTED ENERGY RESOURCES: Basic requirements of grid interconnections – operational parameters – voltage, frequency and THD limits – grid interfaces – inverter based DGs and rotary machines based DGs – reliability, stability and power quality issues on grid integration – impact of DGs on protective relaying and islanding issues in existing distribution grid.	Talks and presentations	13
Unit-3	MICROGRIDS: Introduction to microgrids – types – structure and configuration of microgrids – AC and DC micro-grids – power electronic interfaces for microgrids – energy management and protection control strategies of a micro-grid - case studies.	Talks and presentations	11
Unit-4	CONTROL OF MICROGRID: Modes of operation and control of microgrid: grid connected and islanded mode, active and reactive power control, protection issues, anti- islanding schemes: passive, active and communication based techniques	Talks and presentations	10
Unit-5	OPERATION OF MICROGRID- Microgrid communication infrastructure, power quality issues in microgrids, regulatory standards, microgrid economics, and introduction to smart microgrids.	Talks and presentations	14

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	22						
			Practical								
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation						

Books	1. Essentials of Distributed Generation Systems, Gregory W. Massey, Jones & Bartlett Publishers. 2. Integration of Distributed Generation in the Power System Math H. Bollen, John Wiley & Sons
Articles	
References Books	3. Distributed Generation, N. Jenkins, Nicholas Jenkins, IET Press Rich E and Knight K, "Artificial Intelligence", TMH, New Delhi. 4. Microgrids and Active Distribution Networks, S. Chowdhury, P. Crossley, IET Press. 5. Design of Smart Power Grid Renewable Energy Systems, Ali Keyhani, John Wiley & Sons
MOOC Courses	
Videos	

#### Course Articulation Matrix COs PO1 PO2 PO3 PO4 PO5 P06 PO7 PO8 PO9 PO10 PO11 PO12 PSO1 PSO2 PSO3 CO1 3 1 1 1 1 --1 ---2 3 CO2 3 2 2 1 2 1 ---1 2 --CO3 1 2 1 2 2 1 1 ---3 1 CO4 2 2 2 1 1 1 1 2 1 ----CO5 2 1 1 1 3 2 2 --------CO6 -----\_ \_



## BTech-ElectricalEngineering

Title of the Course	EHV AC and [	DC Transmission										
Course Code	EEM0822											
	Part A											
Part A         Credits         L         T		Р	С									
rour	401	bemester	- Cur	oreans	3	1	0	4				
Course Type	Theory only											
Course Category	Discipline Ele	ectives										
Pre-Requisite/s				Co-Requisite/s								
	CO2- Acquire CO3- Unders CO4- Unders power source CO5- Unders	the knowledge about the prop tand about the various conventi tand the concept of HVDC Tran , ground return and ground elec tand the concept of how to cont	erties of bundled conductors ional and advanced compen- smission and about the vario ctrode.( <b>BL4-Analyze</b> )	BL2-Understand) sation devices.(BL3-Apply) bus scheme of converter station, 12 – pulse co			•					
Coures Elements	Skill Developn Entrepreneum Employability Professsonal Gender X Human Value Environment	ship ✓ ✓ Ethics ✓ es ×	SDG (Goals)	SDG4(Quality education) SDG7(Affordable and clean energy) SDG12(Responsible consuption and produc	tion)							

	Part B		
Modules	Contents	Pedagogy	Hours
Unit-1	Constitution of EHV a.c. and d.c. links, Kind of d.c. links, Limitations and Advantages of a.c. and d.c. transmission, Principal application of a.c. and d.c. transmission, Trends in EHV a.c. and d.c.transmission, Power handling capacity. Converter analysis garetz circuit, Firing angle control, Overlapping.	Talks and presentations	12
Unit-2	FACTS devices, basic types of controller, series controller, static synchronous series compensator(SSSC), thyristor-controlled series capacitor(TCSC), thyristor controlled series reactor(TCSR), shunt controller (STATCOM), static VAR compensator(SVC), series-series controller, combined series-shunt controller, unified power flow controller(UPFC), thyristor controlled phase shifting transformer(TCPST).	Talks and presentations	13
Unit-3	Components of EHV d.c. system, converter circuits, rectifier and inverter valves, Reactive power requirements, harmonics generation, Adverse effects, Classification, Remedial measures to suppress, filters, Ground return. Converter faults & protection harmonics misoperation, Commutation failure, Multiterminal D.C. lines.	Talks and presentations	10
Unit-4	Control of EHV d.c. system desired features of control, control characteristics, Constant current control, Constant extinction angle control. Ignition Angle control. Parallel operation of HVAC & DC system. Problems & advantages.	Talks and presentations	11
Unit-5	Travelling waves on transmission systems, Their shape, Attenuation and distortion, effect of junction and termination on propagation of traveling waves. Over voltages in transmission system. Lightning, switching and temporary over voltages: Control of lighting and switching over voltages	Talks and presentations	14

	Part D(Marks Distribution)											
Theory												
Total Marks	Total Marks         Minimum Passing Marks         External Evaluation         Min. External Evaluation         Internal Evaluation         Min. Internal Evaluation											
100	40	60	18	40	22							
			Practical									
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation							

	Part E
Books	S. Rao,- "EHV AC & DC Transmission" Khanna pub. 2. Kimbark,-" HVDC Transmission" john willy & sons pub. 3. Arrillaga,- "HVDC Transmission"2nd Edition ,IEE Iondan pub.
Articles	
References Books	4. Padiyar, -"HVDC Transmission" 1st Edition, New age international pub. 5. T.K. Nagsarkar,M.S. Sukhiza, -"Power System Analysis", Oxford University 6. Narain.G. Hingorani, I. Gyugyi-"Undustanding of FACTS concept and technology", John Wiley & sons pub. 7.P.Kundur- "H.V.D.C. Transmission" McGraw Hill Pub.
MOOC Courses	
Videos	

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



## BTech-ElectricalEngineering

Title of the Course	Smart Grid and	Smart Grid and Energy Management								
Course Code	EEM0824									
			Part A							
¥	445	0	0#	One elite	L	т	Р	С		
Year	4th	Semester	8th	Credits	3	1	0	4		
Course Type	Theory only	Theory only								
Course Category	Discipline Elec	Discipline Electives								
Pre-Requisite/s		Co-Requisite/s								
Course Outcomes & Bloom's Level	CO2- Conduct CO3- Evaluate CO4- Explore a	comprehensive energy audit and implement energy efficient and analyze sustainable energy	s to identify energy-saving op ency measures in residential, rgy solutions and their impact	es in energy management. (BL1-Rememb portunities and strategies. (BL2-Understate commercial, and industrial buildings. (BL3- on energy management practices. (BL4-A ored for different facilities. (BL5-Evaluate)	nd) -Apply) nalyze)					
Coures Elements	Skill Developm Entrepreneurs Employability Professsonal E Gender Human Values Environment X	hip ✓ ✓ Ethics ✓	SDG (Goals)	SDG4(Quality education) SDG7(Affordable and clean energy) SDG8(Decent work and economic grow SDG9(Industry Innovation and Infrastru						

	Part B		
Modules	Contents	Pedagogy	Hours
Unit-1	Introduction to Smart Grid: Evolution of electric grid, Definitions, Need for smart grid, Smart grid drivers, Functions of smart grid, Opportunities and barriers of smart grid, Difference between conventional grid and smart grid, Concept of resilient and self- healing grid. Components and architecture, Inter-operability, Impacts of smart grid on system reliability, Present development and international policies in smart grid, Smart grid standards.	Talks and presentations	12
Unit-2	Information and Communication Technology in Smart Grid: Wired and wireless communication -radio mesh, ZIGBEE, 3G, 4G and 5G. Digital PLC, DSL, Wi-Max, LAN, NAN, HAN, Wi-Fi, Bluetooth, Bluetooth Low Energy (BLE), Li-Fi. Communication Protocols in Smart grid, Introduction to IEC 61850 standard and benefits, IEC Generic Object-Oriented Substation Event - GOOSE, Substation model.	Talks and presentations	13
Unit-3	Smart grid Technologies Part I: Introduction to smart meters, Electricity tariff, Real Time Pricing- Automatic Meter Reading (AMR) - System, Services and Functions, Components of AMR Systems, Advanced Metering Infrastructure (AMI). Plug in Hybrid Electric Vehicles (PHEV), Vehicle to Grid (V2G), Grid to Vehicle (G2V), Smart Sensors, Smart energy efficient end use devices, Home & Building Automation. Intelligent Electronic Devices (IED) and their application for monitoring & protection: Digital Fault Recorder (DFR), Digital Protective Relay (DPR), Circuit Breaker Monitor (CBM), Phasor Measurement Unit (PMU), Standards for PMU. Time synchronization techniques, Wide Area Monitoring System (WAMS), control and protection systems (Architecture, components of WAMS, and applications: Voltage stability assessment, frequency stability assessment, power oscillation assessment, communication needs of WAMS, remedial action scheme).	Talks and presentations	11
Unit-4	Smart grid Technologies Part II: Smart substations, Substation automation, Feeder automation, Fault detection, Isolation, and Service Restoration (FDISR), Geographic Information System (GIS), Outage Management System (OMS). Introduction to Smart distributed energy resources and their grid integration, Smart inverters, Concepts of microgrid, Need and application of microgrid – Energy Management. Role of technology in demand response-Demand side management, Demand side Ancillary Services, Dynamic line rating.	Talks and presentations	10
Unit-5	Cloud computing in smart grid: Private, Public and hybrid cloud. Types of cloud computing services. Software as a Service (SaaS), Platform as a service (PaaS), Infrastructure as a service (laaS), Data as a service (DaaS), Cloud architecture for smart grid. Cyber Security - Cyber security challenges and solutions in smart grid, Cyber security risk assessment, Security index computation. Power Quality Management in Smart Grid. Fundamentals, Power Quality (PQ) & Electromagnetic Compatibility (EMC) in smart grid, Power quality conditioners for smart grid. Case study of smart grid.	Talks and presentations	14

## 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	22				
	Practical								
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation				

Books	1. Stuart Borlase "Smart Grid Infrastructure Technology and Solutions", CRC Press; 2nd edition. 2. James Momoh, "Smart Grid: Fundamentals of Design and Analysis", Wiley, 2012. 3. S. Chowdhury, "Microgrids and Active Distribution Networks." Institution of Engineering and Technology, 2009.
Articles	
References Books	4. Janaka Ekanayake, Kythira Liyanage, Jianzhong Wu, Akihiko Yokohama, Nick Jenkins- "Smart Grids Technology and Applications", Wiley, 2012. 5. Clark W.Gellings, "The Smart Grid: Enabling Energy Efficiency and Demand Response", CRC Press. 6. Jean Claude Sabonnadière, Nouredine Hadjsaïd, "Smart Grids", Wiley Blackwell.
MOOC Courses	
Videos	

COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	3	1	1	-	1	3	-	1	-	-	1	-	1
CO2	3	1	2	2	-	1	1	-	-	1	-	-	1	1	1
CO3	2	1	3	2	1	1	2	1	1	-	-	-	-	1	1
CO4	2	1	2	1	-	1	3	-	1	1	-	-	1	1	1
CO5	1	1	1	2	1	-	1	1	-	-	-	-	1	-	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



## BTech-ElectricalEngineering

Title of the Course	Industrial train	ning-III						
Course Code	EET0704							
			Part A					
Year	4th	Semester	7th	Credits	L	т	Р	С
Tear	401	Semester	701	Credits	0	0	4	4
Course Type	Project							
Course Category	Projects and	Internship						
Pre-Requisite/s				Co-Requisite/s				
Course Outcomes & Bloom's Level	CO2- Interac CO3- Descrit CO4- Develo	be use of advanced tools and te	ollow engineering practices a chniques encountered during rkplace behavior and build int	nd discipline prescribed in industry.(BL4-Analy g industrial training and visit.(BL4-Analyze) erpersonal and team skills.(BL5-Evaluate)	yze)			
Coures Elements	Skill Develop Entrepreneur Employability Professsonal Gender X Human Value Environment	rship X √√ Ethics √ as X	SDG (Goals)	SDG1(No poverty) SDG6(Clean water and sanitation) SDG7(Affordable and clean energy) SDG9(Industry Innovation and Infrastructure SDG11(Sustainable cities and economies)	)			
			Part B					

	- art B		
Modules	Contents	Pedagogy	Hours

	Part D(Marks Distribution)								
	Theory								
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation				
			Practical						
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation				
	0								

	Part E
Books	
Articles	
References Books	
MOOC Courses	
Videos	

	Course Articulation Matrix														
COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



# BTech-CivilEngineering

Title of the Course	Communication Skill	Is & Colloquim						
Course Code	HUL0101[T]							
			Part A					
Year	1st	Semester	1st	Credits	L	т	Р	С
Teal	151	Semester	151	Credits	3	0	1	4
Course Type	Embedded theory a	nd lab						
Course Category	Discipline Core							
Pre-Requisite/s		ned to enable students to enhance ability nglish) required for effective communication		Co-Requisite/s		nunicatio onal inte		
Course Outcomes & Bloom's Level	CO2- Classify and for CO3- Create cohesi CO4- Analyzing: Stu	ive technical paragraphs & text. □ (BL3-Ap udents will be able to analyze information I tudents will be able to Compare the usage	entific and Technical Writing using applie ply) earnt about communication to become	cative grammar construct.□(BL2-Understan		ocess of	commun	ication
Coures Elements	Skill Development J Entrepreneurship X Employability X Professsonal Ethics Gender X Human Values J Environment X	:	SDG (Goals)	SDG1(No poverty) SDG10(Reduced inequalities)				

Part B

Modules	Contents	Pedagogy	Hours
Module 1	Introduction to Communication Skills, Objectives, Significance of Communication, Flow of Communication, Principles Communication, Essential Features, Process of Communication, Verbal (Oral & Written) and Non-verbal Communication, Barriers to Effective Communication, Introduction to Technical Communication, Major Difference between Technical Communication and General Communication.	Classroom Lecture, PPts,	6
Module 2	Introduction to Communication Skills, Objectives, Significance of Communication, Flow of Communication, Principles Communication, Essential Features, Process of Communication, Verbal (Oral & Written) and Non-verbal Communication, Barriers to Effective Communication, Introduction to Technical Communication, Major Difference between Technical Communication and General Communication.	Classroom Lecture, PPts,	6
Module 3	Introduction to Formal Letter Writing, Elements of Letter Writing and Style of Writing, Layout & Structure of Formal Letter Writing, Introduction to the Types of Business Letters- Enquiry, Calling Quotations, Order, Complaint and Adiustment.Introduction to Employment Communication- Job Application, Writing Resume, Differences among Resume, Curriculum Vitae & Bio-data.	Classroom Lecture, PPts, Videoes	6
Module 4	Introduction to Oral Presentations, Objectives, Significance and Approach, Preparation and Delivery of Oral Presentation (topics to be selected by the teachers). Introduction to Interview Skills. How to Develop Interview Skills. Dos and Don't of Interviews, Types of Interviews, Reviewing TV Program/Book/News Paper Articles etc.	Classroom Lecture, PPts, Videos	6
Module 5	Introduction to Report Writing, Major Objectives of Writing Reports, Significance of Business/Technical, Types and Forms of Reports, Styles of Writing Reports- Printed Format, Memo Format, Letter Format, Book/Letter Text Format. Layout and Structure of Reports, Components of Reports, Writing.	Classroom Lecture, PPts, Videos	6

# Part D(Marks Distribution)

Тһеоту										
Total Marks	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					
100	50	40	20	60	30					

Parte							
Books	Books A Text Book of Scientific and Technical Writing by S.D. Sharma; Vikas Publication, Delhi						
Articles www.helpguide.org/articles/relationships-communication/effective-communication.htm							
References Books Rizvi, M.A. Academic Writing: A course in English for Science and Technology, Nabodaya Prakashak, Calcutta							
MOOC Courses	https://nptel.ac.in/courses/109103020						
Videos	https://nptel.ac.in/courses/109103020						

	Course Articulation Matrix														
COs	COs         P01         P02         P03         P04         P05         P06         P07         P08         P09         P010         P011         P012         PS01         PS02         PS03														
CO1	2	-	-	-	2	2	-	-	-	2	-	-	1	-	1
CO2	2	2	1	2	2	2	-	-	-	2	-	-	1	-	3
CO3	2	1	1	-	1	-	-	-	-	2	-	-	3	2	3
CO4	3	2	-	2	1	-	-	-	-	2	-	-	2	3	3
CO5	3	2	-	2	1	-	-	-	-	2	-	-	2	2	3
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



#### BTech-ComputerScience

Title of the Course	Organizational Bel	Organizational Behavior									
Course Code	HUL0701[T]										
Part A											
Year	4th	Semester	7th	Credits	Т	P	С				
Course Type	Theory only			3 0 0 3							
Course Category	Generic Elective	Generic Elective									
Pre-Requisite/s	Students should b	e familiars with behavioral issues and its link	age with Performance in organization.	Co-Requisite/s							
Course Outcomes & Bloom's Level	CO2- CO2: To development motivational theor CO3- CO3: Apply CO4- CO4: Analyz	ies.(BL2-Understand) motivational theories to analyze and propose ze different leadership styles and their impac	r in organizations, including attitudes, job e strategies for improving employee enga t on organizational culture, employee mo	satisfaction, emotions, personality, values, p agement and job satisfaction.( <b>BL3-Apply</b> )	·			ng, and			
Coures Elements	SDG1(No poverty) SDG4(Quality education) SDG5(Gender equality) SDG8(Decent work and economic growth)										

#### Part B Modules Contents Pedagogy Hours Introduction: The emergence of organizational behaviour, Nature, Foundations and Determinants of organizational behaviour, Model of orgnisational behaviour, Challenges and Opportunities for orgnisational behaviour, Modern perspective on orgnisational behaviour. 1 Interactive Lectures, Case Studies, Experiential Learning 9 Individual Behavior and Behavioral Sciences: Individual behaviour, Perception, Perceptual organization and Perceptual process Components, Theoretical process and Principles of learning, Nature, Dimensions, Types, Factors and Measurements of attitude. 2 9 Interactive Lectures, Case Studies, Experiential Learning Group and Interpersonal Process: Dynamics of formal and informal work groups, Theories of group, Comparative study of formal and informal organization and functions of group. Leadership and its theories, Leadership styles, Likert's management systems and Choice of a leadership style. 3 Interactive Lectures, Case Studies, Experiential Learning 9 Motivation and Organisational Culture: Emerging perceptive of motivation, Types of motives, Motivation approaches. Dynamics of conflicts and negotiation. Nature and Common attribute of organisational culture, Models of International culture, Dimensions and Impact of culture on International organizational behaviour. 4 Interactive Lectures, Case Studies, Experiential Learning 9 Organisational Dynamics: Organisational change, Resistance to change, Change agent, Process of organizational development, Intervention techniques. Carrier dynamics, Carrier planning and Carrier management. Main issues of international dimensions and Emergence of international management. 5 interactive lectures, case studies, experiential learning 9

	Fai	10		
Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
unit1-5	Analyzing the impact of leadership styles on team performance in a corporate culture.	PBL	BL5-Evaluate	15

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					
	Practical								
Total Marks	Total Marks Minimum Passing Marks		Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation				

Part E								
Books	Organizational Behaviour by Stephen P.Robbins and Seema Sanghai Organizational Behaviour by Freud Luthans							
Articles								
References Books								
MOOC Courses								
Videos								

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



## BTech-Electronics\_and\_Communication

Title of the Course	Environmenta	Environmental Pollution & Global Issues									
Course Code	MCL0201[T]	MCL0201[T]									
	·		Part	A							
N											
Year	1st	Semester	2nd	Credits	2	1	0	3			
Course Type	Theory only				I						
Course Category	Foundation of	core									
Pre-Requisite/s		Basic knowledge of natural resources, biodiversity, ecological succession, energy flow, environmental issues and problems. Co-Requisite/s A detailed understanding of the complexity of environmental issues and problems are complexity of environmental issues and problems.									
Course Outcomes & Bloom's Level	CO2- CO2. T CO3- CO3. A CO4- CO4.A environment	To acquire analytical skills in a Ability to distinguish between v cquire expertise and skills nee instrumentation and control s	ssessing environmental imp arious methods of various eded for the Environmental ystems and for the projects	itize them towards environmental issue pacts through a multidisciplinary appro- oblution analysis( <b>BL4-Analyze</b> ) Management Systems and techniques development, implementation, and ma and implement the environmental man	ach (BL3-Apply) of monitoring, Envintenance.(BL5-Ev	ronment audit, aluate)	Environmental Ir	npact Analysis,			
Coures Elements	Skill Develop Entrepreneu Employability Professsonal Gender X Human Value Environment	rship X y √ I Ethics √ es √	SDG (Goals)	SDG2(Zero hunger) SDG3(Good health and well-being) SDG5(Gender equality) SDG6(Clean water and sanitation) SDG7(Affordable and clean energy) SDG8(Decent work and economic gi SDG10(Reduced inequalities) SDG11(Sustainable cities and econo SDG12(Kesponsible consuption and SDG13(Climate action) SDG14(Life below water) SDG14(Life on land)	mies)						

Part B

Modules	Contents	Pedagogy	Hours
Unit – 1 (Environment, Ecosystem and Environmental Education)	Environment – Definition and its segments, (Lithosphere, Hydrosphere, Atmosphere and Biosphere), Multidisciplinary nature of Environmental Science, Ecology and Ecosystem: Basic concepts, functions of ecosystem, Energy Flow, Food chain, food web, Ecological Pyramids, Ecological Successions. Environmental Education- Definition, scope, importance, Need for Public Awareness, Environmental Ethics. Environmental Impact Assessment: Screening, Scoping, Base line Analysis, Impact Mitigation, Documentation, Review, Public hearing, Post Project Monitoring.	Lecture with ppt., Diagrams, Flowchart depiction on whiteboard during online/offline lectures, Audio/Video clips, discussion (questions & answers section)	8
Unit – 2 (Natural Resources Management)	Natural Resources – Classification, Water Resources (availability, quality, water budget), Mineral Resources (distribution, availability and future perspectives), and Forest Resources. Energy Resources- Classification and alternatives of conventional energy resources- Solar, working of solar photovoltaic cells, Geothermal, Wind energy, Nuclear Energy, Biomass and Bio-gas	Lecture with ppt., Diagrams, Flowchart depiction on whiteboard during online/offline lectures, Audio/Video clips, Group discussion.	8
Unit – 3 (Water, Soil & Noise Pollution)	Water pollution – sources & effects, characteristics and treatment of waste water, engineered systems for water purification: Aeration, solid separation, settling operations, filtration and disinfection. Soli - formation of soil, elementary and mineral composition, types of soil in India, soil pollution, effects and abatements. Noise Hazards: Continuous and impulse noise, Effect of noise on man, Measurement and evaluation of Noise, noise isolation and absorption techniques, silencers, practical aspects of noise.	Lecture with ppt., Diagrams, Flowchart depiction on whiteboard during online/offline lectures, Audio/Video clips, Group discussion.	8
Unit –4 (Atmospheric chemistry and Air Pollution)	Classification, sources and toxic effects of air pollutants, dispersal of air pollutants, engineered systems for air purification: Atmospheric cleansing process, approaches to contamination control. Air pollutants with emphasis on reactive intermediates in atmosphere like hydroxyl radical, ozone and nitrate radical, types of hydrocarbon in the troposphere, reaction of organic compounds in the atmosphere.(Green house gas effect, Global warming, Climate change).	Lecture with ppt., Diagrams, Flowchart depiction on whiteboard during online/offline lectures,Audio/Video clips, Group discussion.	8
Unit – 5 (Waste Management)	Solid waste: Generation and waste characterization. Collection, storage and transport. Waste disposal, waste processing techniques, reduction, reuse and recycling, resource recovery and utilization. Physical and chemical treatment methods and composting. Hazardous waste management and treatment.	Lecture with ppt., Diagrams, Flowchart depiction on whiteboard during online/offline lectures, Audio/Video clips, Group discussion. Field visits. Industrial Visit (MSW/BMW/STP/ETP)	8

# 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							
	Practical										
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation						

	Fail E
Books	Environmental Science by B. S. Chauhan; Firewall Media, 2008 • Environmental Science by Cuningham and Cuningham; McGraw-Hill Education; 13th edition (16 February 2014) • Environmental Engineering by S. K. Dhameja; S. K. Kataria & Sons, 2009 • Environmental Science by Richard T Wright; Benjamin-Cummings Pub Co.
Articles	
References Books	Environmental Engineering by Howards S Peavy, Donald R Rowe, T. George • Environmental Science & Engineering by Gilbert M. Master • Environmental Chemistry by Stanley
MOOC Courses	
Videos	

	Course Articulation Matrix														
COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



## BTech-MechanicalEngineering

Title of the Course	Environmental Pollution and global is	sues												
Course Code	MCL0201[T]													
		Part /	A											
Year	1st Semester	2nd	Credits	L	т	Р	С							
1641	Tat Genester	210	Credita	0	0	4	4							
Course Type	Theory only	Theory only												
Course Category	Foundation core													
Pre-Requisite/s	Basic knowledge of natural resources succession, energy flow, environment		Co-Requisite/s		A detailed understanding of the complexity of environment and its challenges and solutions to these problems and challenges									
Course Outcomes & Bloom's Level	CO2- CO2. To acquire analytical skill CO3- CO3. Ability to distinguish betw CO4- CO4.Acquire expertise and skill environment instrumentation and cor	is in assessing environmental imp veen various methods of various p lls needed for the Environmental ntrol systems and for the projects	Management Systems and techniques of development, implementation, and mainte	(BL3-Apply) monitoring, Envi nance.(BL5-Ev	ronment audit, E aluate)	nvironmental Ir	npact Analysis,							
Coures Elements	CO5- CO5. Students acquire skills for to communicate, prepare, plan and implement the environmental management project(BL6-Create)         Image: Solid Development × Entrepreneurship × Employability ✓       SDG5 (Gender equality) SDG6 (Clean water and sanitation) SDG7 (Affordable and clean energy) SDG7 (Affordable and clean energy) SDG12 (Responsible consuption and production) SDG13 (Climate action) SDG13 (Climate action)													

## Part B

Modules	Contents	Pedagogy	Hours
1 (Environment, Ecosystem and Environmental Education)	Environment – Definition and its segments, (Lithosphere, Hydrosphere, Atmosphere and Biosphere), Multidisciplinary nature of Environmental Science, Ecology and Ecosystem: Basic concepts, functions of ecosystem, Energy Flow, Food chain, food web, Ecological Pyramids, Ecological Successions. Environmental Education- Definition, scope, importance, Need for Public Awareness, Environmental Ethics. Environmental Impact Assessment: Screening, Scoping, Base line Analysis, Impact Mitigation, Documentation, Review, Public hearing, Post Project Monitoring.	Lecture with ppt., Diagrams, Flowchart depiction on whiteboard during online/offline lectures, Audio/Video clips, discussion (questions & answers section)	8
2 (Natural Resources Management)	Natural Resources – Classification, Water Resources (availability, quality, water budget), Mineral Resources (distribution, availability and future perspectives), and Forest Resources. Energy Resources- Classification and alternatives of conventional energy resources- Solar, working of solar photovoltaic cells, Geothermal, Wind energy, Nuclear Energy, Biomass and Bio-gas	Lecture with ppt., Diagrams, Flowchart depiction on whiteboard during online/offline lectures, Audio/Video clips, Group discussion.	8
3 (Water, Soil & Noise Pollution)	Water pollution – sources & effects, characteristics and treatment of waste water, engineered systems for water purification: Aeration, solid separation, settling operations, filtration and disinfection. Soil - formation of soil, elementary and mineral composition, types of soil in India, soil pollution, effects and abatements. Noise Hazards: Continuous and impulse noise, Effect of noise on man. Measurement and evaluation of Noise, noise isolation and absorption techniques, silencers, practical aspects of noise.	Lecture with ppt., Diagrams, Flowchart depiction on whiteboard during online/offline lectures, Audio/Video clips, Group discussion.	8
4 (Atmospheric chemistry and Air Pollution)	Classification, sources and toxic effects of air pollutants, dispersal of air pollutants, engineered systems for air purification: Atmospheric cleansing process, approaches to contamination control. Altr pollutants with emphasis on reactive intermediates in atmosphere like hydroxyl radical, ozone and nitrate radical, types of hydrocarbon in the troposphere, reaction of organic compounds in the atmosphere.(Green house gas effect, Global warming, Climate change).	Lecture with ppt., Diagrams, Flowchart depiction on whiteboard during online/offline lectures,Audio/Video clips, Group discussion.	8
5 (Waste Management)	Solid waste: Generation and waste characterization. Collection, storage and transport. Waste disposal, waste processing techniques, reduction, reuse and recycling, resource recovery and utilization. Physical and chemical treatment methods and composting. Hazardous waste management and treatment.	Lecture with ppt., Diagrams, Flowchart depiction on whiteboard during online/offline lectures, Audio/Video clips, Group discussion. Field visits. Industrial Visit (MSW/BMW/STP/ETP)	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									
	0													

Books	Environmental Science by B. S. Chauhan; Firewall Media, 2008 • Environmental Science by Cuningham and Cuningham; McGraw-Hill Education; 13th edition (16 February 2014) • Environmental Engineering by S. K. Dhameja; S. K. Kataria & Sons, 2009 • Environmental Science by Richard T Wright; Benjamin-Cummings Pub Co.
Articles	
References Books	Environmental Engineering by Howards S Peavy, Donald R Rowe, T. George • Environmental Science & Engineering by Gilbert M. Master • Environmental Chemistry by Stanley
MOOC Courses	https://onlinecourses.swayam2.ac.in/cec21_ge08/preview
Videos	

	Course Articulation Matrix														
COs	P01	PO2	PO3	PO4	PO5	PO6	P07	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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



## BTech-ElectricalEngineering

Title of the Course	Making of modern I	iking of modern India											
Course Code	MCL0202												
	•		Part A										
Year	1st	Semester	2nd	Credits	L	Т	Ρ	С					
Tear	Tst Semester		210	Credits		0	0	2					
Course Type	Theory only	ory only											
Course Category	Humanities, Social	umanities, Social Sciences and Management											
Pre-Requisite/s	Basic knowledge o	f social sciences and political sciences.		Co-Requisite/s									
Course Outcomes & Bloom's Level	CO2- The students	f this course, students would be intellectually s will have an understanding of making of In udents to develop their personality and think	dia as a nation and salient features of mode	rn India(BL2-Understand)	)								
Coures Elements	Skill Development Entrepreneurship > Employability × Professsonal Ethic Gender × Human Values √	×	SDG (Goals)	SDG4(Quality education) SDG (Goals) SDG5(Gender equality) SDG15(Life on land)									

#### Part B Modules Contents Pedagogy Hours ldea 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)ldea of India and British Rule , h) Role of Indian Intelligentsia. 6 I Lecture Method 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. п Lecture Method 6 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. ш Lecture Method 6 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 . IV 6 Lecture Method 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. v Lecture Method 6

#### Part D(Marks Distribution)

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

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 India 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. 17. Austin Granville: The Indian Constitution, Oxford
MOOC Courses	https://ugcmoocs.inflibnet.ac.in/index.php/courses/view_ug/61
Videos	

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



### BTech-CivilEngineering

Title of the Course	Making of Modern India							
Course Code	MCL0202[T]							
			Part A					
Year	4.4	0	2nd	Que d'éte	L	т	Р	С
Year	1st	Semester	2nd	Credits	Credits         0         0         3           3         0         0         3			
Course Type	Theory only				1			
Course Category	Humanities, Social Science	es and Management						
Pre-Requisite/s				Co-Requisite/s				
Course Outcomes & Bloom's Level	CO2- The students will have CO3- The students will have	e an understanding of making o e an understanding of salient fe	ually well equipped to have a sense of in of India as a nation( <b>BL2-Understand</b> ) eatures of modern India( <b>BL2-Understan</b> hinking horizon for being a good and co		uate)			
Coures Elements	Skill Development X Entrepreneurship X Employability X Professsonal Ethics ✓ Gender ✓ Human Values ✓ Environment X		SDG (Goals)	SDG4(Quality education) SDG5(Gender equality) SDG15(Life on land)				

	Par	t B	
Modules	Contents	Pedagogy	Hours
1	<ol> <li>Idea of India in historical perspective a) Indian culture, b) cultural commonness, c)cultural diversities, d)unity in diversity, e) cultural accomodations ,f) cultural conflicts, g)Idea of India and British Rule , h) Role of Indian Intelligentsia.</li> </ol>	Lectures with Presentation and Case Studies	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	Lectures with Presentation and Case Studies	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	Lectures with Presentation and Case Studies	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 .	Lectures with Presentation and Case Studies	6
5	India after independence a)Making of Indian Constitution ,b) Post Independent Nehru Era , c) India facing Wars , d) Indian econmy- From Planning to LPG ,e) Achievements, f) Challenges in 21st century India.	Lectures with Presentation and Case Studies	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	0				
			Practical						
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation				
	0	0							

	Part E
Books	
Articles	
References Books	
MOOC Courses	
Videos	

	Course Articulation Matrix														
COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	0	1	1	0	1	1	1	2	2	1	1	1	1	1	1
CO2	0	1	2	1	0	1	1	1	1	1	0	1	2	1	1
CO3	0	1	2	1	0	1	1	1	1	1	0	1	2	1	1
CO4	0	0	1	1	1	2	2	2	2	1	1	2	2	2	2
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



### BTech-MechanicalEngineering

Title of the Course	Making of Modern I	ndia									
Course Code	MCL0202[T]										
			Part A								
Year	1st	Semester	2nd	Credits	T	P 0	C 2				
Course Type	Theory only										
Course Category	Humanities, Social	lumanities, Social Sciences and Management									
Pre-Requisite/s	Basic knowledge of	f social sciences and political sciences.		Co-Requisite/s							
Course Outcomes & Bloom's Level	CO2- The students	this course, students would be intellectua will have an understanding of making of I students to develop their personality and t	ndia as a nation and salient features of m	ern Indian history and culture. (BL1-Rememb odern India. (BL2-Understand) cerned Indian citizen(BL3-Apply)	er)						
Coures Elements	Skill Development : Entrepreneurship > Employability × Professsonal Ethics Gender ✓ Human Values ✓ Environment ×	<	SDG (Goals)	SDG1(No poverty) SDG4(Quality education) SDG5(Gender equality) 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 accomdations, f) cultural conflicts, g)idea of India and British Rule, h) Role of Indian Intelligentsia. 2. Emergence and growth of Indian Nationalism a) Anti-colonial basis, b) Economic Nationalism, c) communalism and nationalism, d) revivalism and Indian natellingentsia. 2. Emergence and growth of Indian Intelligentsia. 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 4. Indian National Movement a) Early Revolts and 1857 Revolt, b)Early Nationalists, c) Bang Bhang Movement, a) Goardhi ted Mass Movements, f) Socialist and Left trends, f) Princely States and their integration into nation, b)Parition and Independence. 5. India after independence a)Making of Indian constitution, b) Cost Independence. 5. India after independence a) Making of Indian constitution, b) Post Independence. 5. India after independence a) Making of Indian constitution, b) Cost Independence. 5. India after independence a) Making of Indian constitution, b) Post Independence. 5. India after independence a) Making of Indian constitution, b) Post Independence. 5. India after independence a) Making of Indian constitution, b) Post Independence. 5. India after independence a) Making of Indian constitution, b) Post Independence. 5. India after independence a) Making of Indian constitution, b) Post Independence. 5. India after independence a) Making of Indian constitution, b) Post Independence. 5. India after independence a) Making of Indian constitution, b) Post Independence. 5. India after independence a) Making of Indian constitution, b) Post Independence. 5. India after independence a)

### 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					
	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. 17. Austin Granville: The Indian Constitution, Oxford
MOOC Courses	https://ugcmoocs.inflibnet.ac.in/index.php/courses/view_ug/61
Videos	

Course Articulation Matrix

COs	P01	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	-	1	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	2	-	-	1	-	-	2	-	-	-	-	-	-
CO3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	2	1	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



### BTech-MechanicalEngineering

Title of the Course	Total Quality N	lanagement									
Course Code	MEL0727[T]										
			Part A								
Year			7th	Credits	L	т	Р	С			
Tear	4th	Semester	7 01	Creats	2	1	0	3			
Course Type	Theory only										
Course Category	Discipline Cor	cipline Core									
Pre-Requisite/s	Basic knowledge of Probability & Statistics Co-Requisite/s										
Course Outcomes & Bloom's Level	CO2- To unde CO3- To appl CO4- To anal	Il industrial engineering and operstand the history of TQM( <b>BL2</b> y the theories of TQM in real life yze the change in productivity transfer the different ways and the	-Understand) e industrial problems(BL3-Ap hrough principles of TQM.(BL	ply)							
Coures Elements	Skill Developr Entrepreneurs Employability Professsonal Gender X Human Value Environment	ship ✓ ★ Ethics ✓ s √	SDG (Goals)	SDG8(Decent work and economic growth) SDG12(Responsible consuption and produc	tion)						

	F	Part B	
Modules	Contents	Pedagogy	Hours
Unit-1	Evolution of Quality Historical Perspective, Basic Concepts of Quality, Vision, Mission and Objectives of an Organization, Corporate Structure in an Organization and Role of Quality	Lectures with whiteboard/PPT, Quiz, Group discussion	
Unit-2	Quality Quality Planning, Quality By Design, Quality Costs and Cost of Failure, Waste Control, How Quality Benefits Business, Quality and Competitiveness in Business, Zero Defects and Continuous Improvement	Lectures with whiteboard/PPT, Quiz, Group discussion	
Unit-3	Total Quality Concepts and Total Preventive Maintenance CWQC, Product Liability Difference in Western And Japanese Approach of TOM, Basic Philosophy and Fundamental Modeis of TOM, Total Quality and Ethics, Internal Politics and Total Quality Management, Quality Culture, Education and Training, Implementing Total Quality Management An Integrated System Approach, Total Preventive Maintenance—Self Assessment	Lectures with whiteboard/PPT, Quiz, Group discussion	
Unit-4	Leadership Leadership Role of Leadership and Commitment in Quality Deployment, Team Building, Motivation, and Rewards, Total Employee Empowerment, Quality Functions Measurement, Inspection, Testing, Calibration and Assurance	Lectures with whiteboard/PPT, Quiz, Group discussion	
Unit-5	Design Control and Conformity, Tolerance and Variability PDCA Cycle, Juran Trilogy, Crosby's 10 points and Deming's 14 Points Customers Requirements, Customer Supplier and Chain Links, Establishing Customer Focus Customer, Satisfaction, Measurement and Customer Retention	Lectures with whiteboard/PPT, Quiz, Group discussion	

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				

Books Joel E. Ross Total Quality Management: Text, Cases, and Readings Routledge					
Articles					
References Books	R. Panneerselvam Total Quality Management: Key Concepts and Case Studies Prentice Hall India				
MOOC Courses	https://onlinecourses.nptel.ac.in/noc20_mg34/preview				
Videos					

COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	2	3	-	-	2	1	-	2	2	-	3	-	3
CO2	3	2	2	3	-	2	3	1	3	3	3	-	3	3	3
CO3	3	3	2	3	-	2	3	1	3	3	3	-	3	3	3
CO4	3	3	3	3	2	2	3	1	3	3	3	1	3	3	3
CO5	3	3	3	3	2	2	3	1	3	3	3	1	3	3	3
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

### Course Articulation Matrix



### BCA

Title of the Course	NCC											
Course Code	NCC -0202 (T)											
		Pa	ırt A									
Year	1st	Semester	2nd	Credits	L 2	Т 0	P 2	C 4				
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.											
Course Outcomes & Bloom's Level	CO2- To think critic CO3- Think diverge	ng, reasoning, critical thinking and creative think ally about different life related issues.( <b>BL2-Und</b> antly and will try to break functional fixedness.( <b>B</b> their real-life problems.( <b>BL4-Analyze</b> )	erstand)									
Coures Elements	Skill Development X     SDG3(Gool 1)       Entrepreneurship X     SDG4(Quality SDG4(Quality Professional Ethics ✓       Human Values ✓     SDG3(Gool 1)       Environment X     SDG3(Gool 1)											

	Part B										
Modules	Contents	Pedagogy	Hours								
Unit 1. Personality Development-I	Thinking- Meaning and Concept of thinking, Reasoning, Process of thinking. Critical Thinking- Meaning & concept of critical thinking, Features of critical thinking, Process of critical thinking.	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. Personality Development-II	Creative thinking- Meaning & concept of creative thinking, Features of creative thinking, Process of creative thinking, levels of Creativity, Characteristics of creative person.	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. Leadership Development-I	Leadership capsule. Important Leadership traits, Indicators of leadership and evaluation.	Whiteboard, PPT, Video Case Study, Project Based Activity, Application Based Activity	5								
Unit 4. Leadership Development-II	Motivation- Meaning & concept, Types of motivation. Factors affecting motivation. Ethics and Honor codes.	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. Social Service and Community Development	(i) Protection of Children & Women Safety. (ii) Road/Rail Safety. (iii) New Government Initiatives. (iv) Cyber and mobile Security Awareness.	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 D(Marks Distribution)											
	Theory											
Total Marks	Total Marks         Minimum Passing Marks         External Evaluation         Min. External Evaluation         Internal Evaluation											
0	0	0	0	0	0							
			Practical	•								
Total Marks	Total Marks         Minimum Passing Marks         External Evaluation         Min. External Evaluation         Internal Evaluation         Min. Internal Evaluation											

	Part E								
Books R Gupta ; NCC National Cadet Corps A, B & C Certificate Examination Book; Ramesh Publishing House, 2018.									
Articles	Articles https://indiancc.mygov.in/activity/snehahoro/article-on-ncc-camp-and-training/								
References Books	Cadets training handbook common subjects (2017), D.G NCC Delhi-110030								
MOOC Courses									
Videos	https://www.youtube.com/watch?v=N7nNupMdS6c								

	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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



### BCA

Title of the Course	NCC									
Course Code	ICC 0505(P)									
		Part	A							
Year	3rd	Semester	5th	Credits	L 0	т 0	P 1	C 1		
Course Type	Theory only				I I I					
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.									
Course Outcomes & Bloom's Level	CO2- Improve commu	am building exercise and value team work.() inication skills by public speaking activities. () security mechanism and management of Borde o join armed forces.()	r/Coastal areas. ()							
Coures Elements	Skill Development × Entrepreneurship × Employability × Professsonal Ethics ✓ Gender × Human Values ✓ Environment ×	,	SDG (Goals)	SDG3(Good health and well-being) SDG4(Quality education)						

Part B											
Modules	Contents	Pedagogy	Hours								
Unit 1. Personality Development	(i) Group Discussions –Team work. (ii) Public speaking.	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 Setup and Border/Coastal management in the area	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. Introduction to Infantry Battalion and its Equipment	Organisation of Infantry Battalion & its weapons	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	Study of Battles of Indo-Pak Wars 1965 & 1971.	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. Health & Hygiene	(i) Yoga- Introduction, Definition, Purpose, Benefits. (ii) Asanas-Padamsana, Siddhasana, Gyan Mudra, Surya Namaskar, Shavasana, Vajrasana, Dhanurasana, Chakrasana, Sarvaangasana, Halasana etc. i) Hygiene & Sanitation (Hygiene- Personal & Camp Hygiene). (ii) First Aid in common medical emergencies. (iii) Treatment & Care of Wounds.	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								

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

Part	Е	

Books	R Gupta ; NCC National Cadet Corps A, B & C Certificate Examination Book; Ramesh Publishing House, 2018. Singh, Neeraj; A Hand Book of NCC; Kanti Prakashan Publisher Cadet training hand book specialised subjects (2017)
Articles	https://indiancc.mygov.in/
References Books	Cadets training handbook common subjects (2017), D.G NCC Delhi-110030 DG, NCC Training directive
MOOC Courses	
Videos	https://www.youtube.com/watch?v=eBA5t4iepAA

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



### BCA

Title of the Course	NCC							
Course Code	NCC 0505(T)							
		Part	A					
Year	3rd	Semester	5th	Credits	L	Т	Ρ	С
					1	0	1	2
Course Type	Theory only		·					
Course Category	Generic Elective							
Pre-Requisite/s	Should be acquainted Development, Defens	d with the basics knowledge of General Awarene se system etc.	ss about Leadership Quality, Personality	Co-Requisite/s				
Course Outcomes & Bloom's Level	CO2- Improve comm CO3- Understand the	eam building exercise and value team work.() unication skills by public speaking activities. () security mechanism and management of Borde o join armed forces.()	r/Coastal areas. ()					
Coures Elements	Skill Development X Entrepreneurship X Employability X Professsonal Ethics Gender X Human Values V Environment X	/	SDG (Goals)	SDG3(Good health and well-being) SDG4(Quality education)				

	Part B		
Modules	Contents	Pedagogy	Hours
Unit 1. Personality Development	(i) Group Discussions –Team work. (ii) Public speaking.	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 Setup and Border/Coastal management in the area	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. Introduction to Infantry Battalion and its Equipment	Organisation of Infantry Battalion & its weapons	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	Study of Battles of Indo-Pak Wars 1965 & 1971.	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. Health & Hygiene	(i) Yoga- Introduction, Definition, Purpose, Benefits. (ii) Asanas-Padamsana, Siddhasana, Gyan Mudra, Surya Namaskar, Shavasana, Vajrasana, Dhanurasana, Chakrasana, Sarvaangasana, Halasana etc. i) Hygiene & Sanitation (Hygiene- Personal & Camp Hygiene). (ii) First Aid in common medical emergencies. (iii) Treatment & Care of Wounds.	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

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

Books	R Gupta ; NCC National Cadet Corps A, B & C Certificate Examination Book; Ramesh Publishing House, 2018. Singh, Neeraj; A Hand Book of NCC; Kanti Prakashan Publisher Cadet training hand book specialised subjects (2017)
Articles	https://indiancc.mygov.in/
References Books	Cadets training handbook common subjects (2017), D.G NCC Delhi-110030 DG, NCC Training directive
MOOC Courses	
Videos	https://www.youtube.com/watch?v=eBA5t4iepAA

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



### BCA

Title of the Course	NCC							
Course Code	NCC 606(P)							
	+	Part	A					
Year	3rd	Semester	6th	Credits	L 2	Т 0	P 2	C 4
Course Type	Lab only				-	-		<u> </u>
Course Category	Generic Elective							
Pre-Requisite/s	Should be acquainte Development, Defen	d with the basics knowledge of General Awarene se system etc	ss about Leadership Quality, Personality	Co-Requisite/s				
Course Outcomes & Bloom's Level	CO2- Aiming range a	ent knots and lashing in day-to-day life for differen	t purposes. ()					
Coures Elements	Skill Development X Entrepreneurship X Employability X Professsonal Ethics Gender X Human Values V Environment X		SDG (Goals)	SDG3(Good health and well-being) SDG4(Quality education) SDG6(Clean water and sanitation)				

Part B

Modules	Contents	Pedagogy	Hours
Unit 1. Drill	(i) Ceremonial Drill. (ii) Guard of Honour.		4
Unit 2. Weapon Training	Short Range firing.	Lecture, Tutorials, Group discussion, Collaborative work,self-study, individual and group tasks, team work, field-based assignments, Physical Training, endurance building and skill development practices	5
Unit 3. Map Reading(MR)	Google maps and Applications.	Lecture, Tutorials, Group discussion, Collaborative work,self-study, individual and group tasks, team work, field-based assignments, Physical Training, endurance building and skill development practices	3
Unit 4. Field Craft & Battle Craft(FCBC)	Knots, Lashing and Stretchers.	Lecture, Tutorials, Group discussion, Collaborative work,self-study, individual and group tasks, team work, field-based assignments, Physical Training, endurance building and skill development practices	4
Unit 5. Social Service and Community Development(SSCD)	Cadets will participate in various activities throughout the semester e.g., Blood donation Camp, Swachhata Abhiyan, Constitution Day, Jan Jeevan Hariyali Abhiyan, Beti Bachao Beti Padhao etc as per the requirement and similar announced days- National and State level.	Lecture, Tutorials, Group discussion, Collaborative work,self-study, individual and group tasks, team work, field-based assignments, Physical Training, endurance building and skill development practices	4
Unit 6 Introduction of Infantry Weapons &Equipment(INF)	Characteristics of 5.56MM INSAS Rifle, Ammunition, Fire Power, Stripping, Assembling & Cleaning Practice.	Lecture, Tutorials, Group discussion, Collaborative work,self-study, individual and group tasks, team work, field-based assignments, Physical Training, endurance building and skill development practices	4
Unit 7. Communication (COM)	(i) Basic Radio Telephony (RT) Procedure. (ii) Introduction, Advantages, Disadvantages, Need for standard procedures. 47 (iii) Types of Radio telephony communication. (iv) Radio telephony procedure, Documentation.	Lecture, Tutorials, Group discussion, Collaborative work,self-study, individual and group tasks, team work, field-based assignments, Physical Training, endurance building and skill development practices	6

	Part D(Marks Distribution)										
	Theory										
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation						
			Practical								
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation						
0	0	0	0	0	0						

	Part E
Books	R Gupta ; NCC National Cadet Corps A, B & C Certificate Examination Book; Ramesh Publishing House, 2018. Singh, Neeraj; A Hand Book of NCC; Kanti Prakashan Publisher Cadet training hand book specialised subjects (2017)
Articles	https://indiancc.mygov.in/
References Books	Cadets training handbook common subjects (2017), D.G NCC Delhi-110030 DG, NCC Training directive
MOOC Courses	
Videos	https://www.youtube.com/watch?v=wnzPVZsm_PE

### 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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



### BTech-ComputerScience

Title of the Course	*NCC									
Course Code	NCC-0202[T]									
		Pa	ırt A							
Year	1st Semester 2r		2nd	Credits	L	т	Р	С		
					1	0	1	2		
Course Type	Theory only									
Course Category	Generic Elective									
Pre-Requisite/s		ed with the basics knowledge of General Aware oment, Defense system etc.	Co-Requisite/s							
Course Outcomes & Bloom's Level	CO1- Define thinking, reasoning, critical thinking and creative thinking ( <b>BL1-Remember</b> ) CO2- To think critically about different life related issues, ( <b>BL2-Understand</b> ) CO3- Think divergently and will try to break functional fixedness. ( <b>BL3-Apply</b> ) CO4- Creatively in their real-life problems. ( <b>BL4-Analyze</b> )									
Skill Development ×         Entrepreneurship ×         Employability ×         Professsonal Ethics √         Gender ×         Human Values √         Environment ×		SDG (Goals)	SDG3(Good health and well-being) SDG4(Quality education) SDG5(Gender equality) SDG8(Decent work and economic growth)							

	Part B		
Modules	Contents	Pedagogy	Hours
Unit 1. Personality Development-I	Thinking- Meaning and Concept of thinking, Reasoning, Process of thinking. Critical Thinking- Meaning & concept of critical thinking, Features of critical thinking, Process of critical thinking.	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. Personality Development-II	Creative thinking- Meaning & concept of creative thinking, Features of creative thinking, Process of creative thinking, levels of Creativity, Characteristics of creative person.	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. Leadership Development-I	Leadership capsule. Important Leadership traits, Indicators of leadership and evaluation.	Whiteboard, PPT, Video Case Study, Project Based Activity, Application Based Activity	5
Unit 4. Leadership Development-II	Motivation- Meaning & concept, Types of motivation. Factors affecting motivation. Ethics and Honor codes.	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. Social Service and Community Development	(i) Protection of Children & Women Safety. (ii) Road/Rail Safety. (iii) New Government Initiatives. (iv) Cyber and mobile Security Awareness.	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 D(Marks Distribution)										
Тнеогу										
Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal										
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						

	Part E
Books	R Gupta ; NCC National Cadet Corps A, B & C Certificate Examination Book; Ramesh Publishing House, 2018.
Articles	https://indiancc.mygov.in/activity/snehahoro/article-on-ncc-camp-and-training/
References Books	Cadets training handbook common subjects (2017), D.G NCC Delhi-110030
MOOC Courses	
Videos	https://www.youtube.com/watch?v=N7nNupMdS6c

	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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



### BCA

Title of the Course	NCC							
Course Code	NCC-0303(T)							
		Part	4					
Year	0	0	3rd	Over diffe	L	т	Ρ	С
rear	2nd Semester		ara	Credits		0	2	4
Course Type	Theory only				1			
Course Category	Generic Elective							
Pre-Requisite/s	Should be acquainted with Development, Defense sy	h the basics knowledge of General Awarene ystem etc	ss about Leadership Quality, Personality	Co-Requisite/s				
Course Outcomes & Bloom's Level	CO2- To think critically ab CO3- Think divergently ar CO4- Creatively in their re CO5- Understand the org	soning, critical thinking and creative thinking yout different life related issues.() ad will ty to break functional fixedness.() aal-life problems() anizations related to disaster management a of NCC cadets in disaster management.()	-					
Coures Elements	Skill Development X Entrepreneurship X Employability X Professonal Ethics ✓ Gender X Human Values ✓ Environment X		SDG (Goals)	SDG4(Quality education) SDG6(Clean water and sanitation) SDG13(Climate action) SDG15(Life on land)				

	Part	В	
Modules	Contents	Pedagogy	Hours
Unit 1. Personality Development	(i) Group Discussions - Change your Mindset (ii) Public Speaking.	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. Leadership Development	Case Studies – APJ Abdul Kalam, Deepa Malik, Maharana Pratap, N Narayan Murthy.	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. Disaster management	(i) Disaster Management Capsule. (ii) Organisation. (iii) Types of Disasters. (iv) Essential Services. (v) Assistance. (vi) Civil Defence Organisation.	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. Border & Coastal Areas	History, Geography & Topography of Border/ Coastal Areas.	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. Adventure	Adventure activities.	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 D(Marks Distribution)	
----------------------------	--

I

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

Books	R Gupta ; NCC National Cadet Corps A, B & C Certificate Examination Book; Ramesh Publishing House, 2018.
Articles	
References Books	Singh, Neeraj; A Hand Book of NCC; Kanti Prakashan Publisher
MOOC Courses	
Videos	https://www.youtube.com/watch?v=kvdDHFALpTw

	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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



# BTech-ComputerScience

Title of the Course	*NCC							
Course Code	NCC-0303[T]	NCC-0303[T]						
		Part A	Ą					
Year	2nd	Semester	3rd	Credits	-		P C	
Course Type	Theory only				1	0	1 2	
Course Category	Generic Elective	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	CO2- To think critically a CO3- Think divergently a CO4- Creatively in their r CO5- Understand the or	asoning, critical thinking and creative thinking. bout different life related issues.() and will try to break functional fixedness.() graiLife problems() ganizations related to disaster management ai o f NCC cadets in disaster management.()	-					
Coures Elements	Skill Development X Entrepreneurship X Employability X Professsonal Ethics √ Gender X Human Values √ Environment X		SDG (Goals)	SDG4(Quality education) SDG6(Clean water and sanitation) SDG13(Climate action) SDG15(Life on land)				

	Part B							
Modules	Contents	Pedagogy	Hours					
Unit 1. Personality Development	(i) Group Discussions - Change your Mindset (ii) Public Speaking.	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. Leadership Development	Case Studies – APJ Abdul Kalam, Deepa Malik, Maharana Pratap, N Narayan Murthy.	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. Disaster management	(i) Disaster Management Capsule. (ii) Organisation. (iii) Types of Disasters. (iv) Essential Services. (v) Assistance. (vi) Civil Defence Organisation.	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. Border & Coastal Areas	History, Geography & Topography of Border/ Coastal Areas.	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. Adventure	Adventure activities.	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					

|--|

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				

Books	R Gupta ; NCC National Cadet Corps A, B & C Certificate Examination Book; Ramesh Publishing House, 2018.
Articles	
References Books	Singh, Neeraj; A Hand Book of NCC; Kanti Prakashan Publisher
MOOC Courses	
Videos	https://www.youtube.com/watch?v=kvdDHFALpTw

COs	P01	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



### BCA

Title of the Course	NCC							
Course Code	NCC-0404 (T)							
		Part /	A					
Year	2nd	Semester	4th	Credits	L 2	Т 0	P 2	C 4
Course Type	Theory only					-	-	
Course Category	Generic Elective							
Pre-Requisite/s	Should be acquainted v Development, Defense	vith the basics knowledge of General Awarenes system etc	Co-Requisite/s					
Course Outcomes & Bloom's Level	CO4- Contribute in envi CO5- Keep abreast of c		ies()					
Coures Elements	Skill Development X Entrepreneurship X Employability X Professsonal Ethics ✓ Gender X Human Values ✓ Environment X		SDG (Goals)	SDG3(Good health and well-being) SDG4(Quality education) SDG6(Clean water and sanitation) SDG13(Climate action) SDG15(Life on land)				

	Part B		
Modules	Contents	Pedagogy	Hours
Unit 1. Personality Development	Group Discussions – Social Skills & Time 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 2. Leadership Development	Case Studies – Case Studies – Ratan Tata, Rabindra Nath Tagore, Role of NCC cadets in 1965 war.	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. Disaster management	(i) Initiative Trg, Organising Skills. (ii) Dos and Don'ts. (iii) Natural Disasters. (iv) Man Made Disasters. (v) Fire Services and Fire Fighting.	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.Environmental Awareness	Adventure Environmental Awareness and Conservation, Local and global approaches to conserve nature.	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. General Awareness & Armed Forces	General Awareness, Army, Navy, Air Force and Central Armed Police Forces.	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	D(	Marks	Distributi	on
--	------	----	-------	------------	----

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			
Practical							
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation		
100	50	60	30	40			

Books	R Gupta ; NCC National Cadet Corps A, B & C Certificate Examination Book; Ramesh Publishing House, 2018.
Articles	https://indiancc.mygov.in/
References Books	Singh, Neeraj; A Hand Book of NCC; Kanti Prakashan Publisher Cadet training hand book specialised subjects (2017)
MOOC Courses	
Videos	https://www.youtube.com/watch?v=eBA5t4iepAA

	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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



### BTech-ComputerScience

Title of the Course	*NCC / **MOOC	CC / **MOOC										
Course Code	NCC-0404[T]	C-0404[T]										
		Part /	A									
Year	2nd											
Course Type	Theory only											
Course Category	Generic Elective	neric Elective										
Pre-Requisite/s		nould be acquainted with the basics knowledge of General Awareness about Leadership Quality, Personality co-Requisite/s Co-Requisite/s										
Course Outcomes & Bloom's Level	CO4- Contribute in env CO5- Keep abreast of	litites of social skills.() p qualities. () serve the nation by joining Armed forces. () vironmental awareness and conservation activit current affairs & general awareness.() bute in managing disaster relief tasks()	ies()									
Coures Elements	Skill Development X Entrepreneurship X Employability X Professsonal Ethics J Gender X Human Values J Environment X		SDG (Goals)	SDG3(Good health and well-being) SDG4(Quality education) SDG6(Clean water and sanitation) SDG13(Climate action) SDG15(Life on land)								

	Part B				
Modules	Contents	Pedagogy			
Unit 1. Personality Development	Group Discussions – Social Skills & Time 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 2. Leadership Development	Case Studies – Case Studies – Ratan Tata, Rabindra Nath Tagore, Role of NCC cadets in 1965 war.	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. Disaster management	(i) Initiative Trg, Organising Skills. (ii) Dos and Don'ts. (iii) Natural Disasters. (iv) Man Made Disasters. (v) Fire Services and Fire Fighting.	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.Environmental Awareness	Adventure Environmental Awareness and Conservation, Local and global approaches to conserve nature.	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. General Awareness & Armed Forces	General Awareness, Army, Navy, Air Force and Central Armed Police Forces.	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		

|--|

Theory	

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					

Books	R Gupta ; NCC National Cadet Corps A, B & C Certificate Examination Book; Ramesh Publishing House, 2018.							
Articles	https://indiancc.mygov.in/							
References Books	Singh, Neeraj; A Hand Book of NCC; Kanti Prakashan Publisher Cadet training hand book specialised subjects (2017)							
MOOC Courses								
Videos	https://www.youtube.com/watch?v=eBA5t4iepAA							

	Course Articulation Matrix														
COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



### BTech-ComputerScience

Title of the Course	NCC / **MOOC	C /**MOOC										
Course Code	NCC-0505[T]											
		Part	A									
Year	3rd	Srd Semester 5th Credits		Credits	L 1	Т 0	P 1	C 2				
Course Type	Theory only				J							
Course Category	Generic Elective	aneric Elective										
Pre-Requisite/s	Should be acquainted Development, Defense	with the basics knowledge of General Awarene e system etc.	ss about Leadership Quality, Personality	Co-Requisite/s								
Course Outcomes & Bloom's Level	CO2- Improve commu	am building exercise and value team work.() inication skills by public speaking activities. () security mechanism and management of Borde o join armed forces.()	r/Coastal areas. ()									
Coures Elements	Skill Development × Entrepreneurship × Employability × Professsonal Ethics ✓ Gender × Human Values ✓ Environment ×			SDG3(Good health and well-being) SDG4(Quality education)								

Part B									
Modules	Contents	Pedagogy							
Unit 1. Personality Development	(i) Group Discussions –Team work. (ii) Public speaking.	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 Setup and Border/Coastal management in the area	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. Introduction to Infantry Battalion and its Equipment	Organisation of Infantry Battalion & its weapons	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	Study of Battles of Indo-Pak Wars 1965 & 1971.	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. Health & Hygiene	(i) Yoga- Introduction, Definition, Purpose, Benefits. (ii) Asanas-Padamsana, Siddhasana, Gyan Mudra, Surya Namaskar, Shavasana, Vajrasana, Dhanurasana, Chakrasana, Sarvaangasana, Halasana etc. i) Hygiene & Sanitation (Hygiene- Personal & Camp Hygiene). (ii) First Aid in common medical emergencies. (iii) Treatment & Care of Wounds.	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	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	60		40	0				
		·	Practical						
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation				
100	50	60	30	40					

	Part E							
Books	R Gupta ; NCC National Cadet Corps A, B & C Certificate Examination Book; Ramesh Publishing House, 2018. Singh, Neeraj; A Hand Book of NCC; Kanti Prakashan Publisher Cadet training hand book specialised subjects (2017)							
Articles	https://indiancc.mygov.in/							
References Books	Cadets training handbook common subjects (2017), D.G NCC Delhi-110030 DG, NCC Training directive							
MOOC Courses								
Videos	https://www.youtube.com/watch?v=eBA5t4iepAA							

	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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



### BTech-ComputerScience

Title of the Course	*NCC / **MOOC											
Course Code	NCC-0606[T]											
		Part /	A									
Year	Year 3rd Semester 6th		6th	Credits	L	Т	Ρ	С				
						0	1	2				
Course Type	Theory only											
Course Category	Generic Elective	eric Elective										
Pre-Requisite/s	Should be acquainted Development, Defense	Co-Requisite/s										
Course Outcomes & Bloom's Level	CO2- Write their CV CO3- Imbibe the feel CO4- Communicate		urity challenges on Border/Coastal areas. ()									
Coures Elements	Skill Development X Entrepreneurship X Employability X Professsonal Ethics · Gender X Human Values ✓ Environment X		SDG (Goals)	SDG3(Good health and well-being) SDG4(Quality education) SDG6(Clean water and sanitation)								

	Part E	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 Evaluat		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					

Books	R Gupta ; NCC National Cadet Corps A, B & C Certificate Examination Book; Ramesh Publishing House, 2018. Singh, Neeraj; A Hand Book of NCC; Kanti Prakashan Publisher
Articles	https://indiancc.mygov.in/
References Books	Cadets training handbook common subjects (2017), D.G NCC Delhi-110030 DG, NCC Training directive
MOOC Courses	
Videos	https://www.youtube.com/watch?v=O8plJgIsYUE

	Course Articulation Matrix														
COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



### BCA

Title of the Course	NCC											
Course Code	NCC-404 (P)	CC-404 (P)										
	•	Pa	art A									
Year	2nd	Semester	4th	Credits		т	Ρ	С				
					2	0	2	4				
Course Type	Lab only											
Course Category	Generic Elective	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	CO2- Apply signals in CO3- Provide first aid CO4- Navigate to the	e and dignity in the performance of foot drill. there day to day functioning. () during the emergencies. () given location on ground using compass and practices for the personal sanitation and hys	GPS. ()									
Coures Elements	skill Development × Entrepreneurship × Employability × Professional Ethics ✓ Gender × Human Values ✓ Environment ×		SDG (Goals)	SDG3(Good health and well-being) SDG4(Quality education) SDG11(Sustainable cities and economies) SDG13(Climate action)								

### Part B

Modules	Contents	Pedagogy	Hours
Unit 1. Drill	(i) Arm Drill. (ii) Salami Shastra. (iii) Squad Drill with Arms.		
Unit 2.Weapon Training	(i) Range procedure & Theory of group. (ii) Short Range firing.		
Unit 3. Map Reading	(i) Map to Ground. (ii) Ground to Map.		
Unit 4. Field Craft & Battle Craft	(i) Fire and Move Capsule. (ii) Field signal- with hand, with Weapons, Signal with Whistle. (iii) Field signals as means of giving orders. (iv) Field signals by day, Field signals by night. (v) Section Formation.		
Unit 5. Social Service and Community Development	Cadets will participate in various activities throughout the semester e.g., Blood donation Camp, Swachhata Abhiyan, Constitution Day, Jan Jeevan Hariyali Abhiyan, Beti Bachao Beti Padhao etc as per the requirement and similar announced days- National and State level.		

### Part D(Marks Distribution)

ſ

	Theory									
Total Marks	Minimum Passing Marks	Internal Evaluation	Min. Internal Evaluation							
	Practical									
Total Marks	Total Marks Minimum Passing Marks External Evaluation Min. External Evaluation Internal Evaluation Min. Internal Evaluation									
0	0	0	0	0	0					

-	
Books	R Gupta ; NCC National Cadet Corps A, B & C Certificate Examination Book; Ramesh Publishing House, 2018. Singh, Neeraj; A Hand Book of NCC; Kanti Prakashan Publisher Cadet training hand book specialised subjects (2017)
Articles	https://indiancc.mygov.in/
References Books	Cadets training handbook common subjects (2017), D.G NCC Delhi-110030 DG, NCC Training directive
MOOC Courses	
Videos	https://www.youtube.com/watch?v=eBA5t4iepAA

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



### BCA

Title of the Course	NCC							
Course Code	NCC0101[P]							
		Part	A					
Year	1st	Semester	1st	Credits	L	т	Ρ	С
real	150	Concerci	151	ordato	0	0	1	1
Course Type	Lab only							
Course Category	Generic Elective							
Pre-Requisite/s	Should be acquainte Development, Defer	Co-Requisite/s						
Course Outcomes & Bloom's Level	CO2- Fire a weapon CO3- Undertake poi	Irill and follow the different word of command. (BL effectively with fair degree of marksmanship(BL2 int to point navigation and take part in route march ocial services on various occasions for better com	P-Understand) les by day and night. (BL4-Analyze)					
Coures Elements	Skill Development × Entrepreneurship × Employability × Professsonal Ethics Gender × Human Values ✓ Environment ×		SDG (Goals)	SDG3(Good health and well-being) SDG4(Quality education) SDG17(Partnerships for the goals)				

Part B								
Modules	Contents	Pedagogy	Hours					
Unit 1. Drill	Foot Drill- Drill ki Aam Hidayaten, Word ki Command, Savdhan, Vishram, Aram Se, Murdna, Kadvar Sizing, Teen Line Banana, Khuli Line, Nikat Line, Khade Khade Salute Karna Parade Par, Visarjan, Line Tod, Tej Chal, Tham aur Dhire Chal, Tham.	Audio/Video clips, group discussion, lecture with ppt, quiz	12					
Unit 2. Weapon Training (WT)	Introduction & Characteristics of .22 rifle, Handling of .22 rifle.	Whiteboard, PPT, Video Case Study, Project Based Activity, Application Based Activity	5					
Unit 3. Map Reading (MR)	Definition of Map, Conventional signs, Scale and Grid System, Topographical forms and technical terms, Relief, Contours and gradients, Cardinal points and types of North, Magnetic Variation and Grid Convergence.	Whiteboard, PPT, Video Case Study, Project Based Activity, Application Based Activity	3					
Unit 4. Field Craft & Battle Craft (FC & BC)	Introduction of Field Craft & Battle craft, Judging Distance, Method of Judging Distance.	Whiteboard, PPT, Video Case Study, Project Based Activity, Application Based Activity	3					
Unit 5. Social Service and Community Development (SSCD)	Cadets will participate in various activities throughout the semester e.g., Blood donation Camp, Swachhata Abhiyan, Constitution Day, Jan Jeevan Hariyali Abhiyan, Beti Bachao Beti Padhao etc.	Whiteboard, PPT, Video Case Study, Project Based Activity, Application Based Activity	7					

	Part D(Marks Distribution)									
	Theory									
Total Marks	Total Marks         Minimum Passing Marks         External Evaluation         Min. External Evaluation         Internal Evaluation         Min. Internal Evaluation									
			Practical							
Total Marks	Total Marks         Minimum Passing Marks         External Evaluation         Min. External Evaluation         Internal Evaluation         Min. Internal Evaluation									
100	40	40	12	60						

	Part E									
Books R Gupta ; NCC National Cadet Corps A, B & C Certificate Examination Book; Ramesh Publishing House, 2018.										
Articles										
References Books Singh, Neeraj; A Hand Book of NCC; Kanti Prakashan Publisher										
MOOC Courses										
Videos	https://www.youtube.com/watch?v=iXzGjyk1wOw									

COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Course Articulation Matrix



### BTech-ComputerScience

Title of the Course	NCC							
Course Code	NCC0101[T]							
		Part A	A					
Year	1st	1st Semester 1st Credits					C 2	
Course Type	Theory only							
Course Category	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.							
Course Outcomes & Bloom's Level	Remember) CO2- To Understand CO3- To Acquire kno CO4- To analyze the	about the history of NCC, its organization, and inc the concept of critical & creative thinking and the wiedge of duties and conduct of NCC cadets (BLL concept of team and its functioning, (BL4-Analyz a process of decision making & problem solving, (I	concept of self-awareness and emotional int 3-Apply) e)		nportance	.(BL1	-	
Coures Elements	Skill Development X Entrepreneurship X Employability X Professsonal Ethics - Gender X Human Values ✓ Environment X	4	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

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

	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							

							Cours	e Articulatio	on Matrix						
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



### вса

		Box													
Title of the Course	NCC														
Course Code	NCC0101[T]														
		Part A	Ą												
Year	1st	Semester	1st	Credits	L 2	Т 0	P 1	C 3							
Course Type	Embedded theory and	Embedded theory and field work													
Course Category	Disciplinary Minor														
Pre-Requisite/s	Should be acquainted Development, Defense	d with the basics knowledge of General Awarenes se system etc.	s about Leadership Quality, Personality	Co-Requisite/s											
Course Outcomes & Bloom's Level	Remember) CO2- To Understand CO3- To Acquire know CO4- To analyze the	about the history of NCC, its organization, and inc the concept of critical & creative thinking and the wledge of duties and conduct of NCC cadets (BL: concept of team and its functioning (BL4-Analyz process of decision making & problem solving (I	concept of self-awareness and emotional int 3-Apply) e)		iporta	ince.(	BL1-								
Coures Elements	Skill Development X Entrepreneurship X Employability X Professsonal Ethics Gender X Human Values V Environment X	/	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	D(Marks Distribution)										
	Theory												
Total Marks         Minimum Passing Marks         External Evaluation         Min. External Evaluation         Internal Evaluation         Min. Internal Evaluation													
100	40	60	18	40									
			Practical		-								
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation								
100	50	60	30	40									

	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

							Cours	e Articulatio	on Matrix						
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



### BCA

Title of the Course	NCC														
Course Code	NCC0606 (T)														
		Part	A												
Year	3rd	Semester	6th	Credits	L 2	Т 0	P 2	C 4							
Course Type	Theory only	Theory only													
Course Category	Generic Elective														
Pre-Requisite/s	Should be acquainted Development, Defense	with the basics knowledge of General Awarenes e system etc	ss about Leadership Quality, Personality	Co-Requisite/s											
Course Outcomes & Bloom's Level	CO2- Write their CV et CO3- Imbibe the feelin CO4- Communicate m	vidaul responsibilities & role in meetings the sec ffective and appealing. () g of patriotism. () ore effectively.() iew effectively in their future. ()	urity challenges on Border/Coastal areas. ()												
Coures Elements	Skill Development X Entrepreneurship X Employability X Professsonal Ethics V Gender X Human Values V Environment X		SDG (Goals)	SDG3(Good health and well-being) SDG4(Quality education) SDG6(Clean water and sanitation)											

	Part E		
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 D(Marks Distribution) Theory												
Total Marks         Minimum Passing Marks         External Evaluation         Min. External Evaluation         Internal Evaluation         Min. Internal Evaluation												
100	40	60	18	40								
			Practical									
Total Marks	Minimum Passing Marks	External Evaluation	Min. External Evaluation	Internal Evaluation	Min. Internal Evaluation							
100	50	60	30	40								

Books	R Gupta ; NCC National Cadet Corps A, B & C Certificate Examination Book; Ramesh Publishing House, 2018. Singh, Neeraj; A Hand Book of NCC; Kanti Prakashan Publisher
Articles	https://indiancc.mygov.in/
References Books	Cadets training handbook common subjects (2017), D.G NCC Delhi-110030 DG, NCC Training directive
MOOC Courses	
Videos	https://www.youtube.com/watch?v=O8plJgIsYUE

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